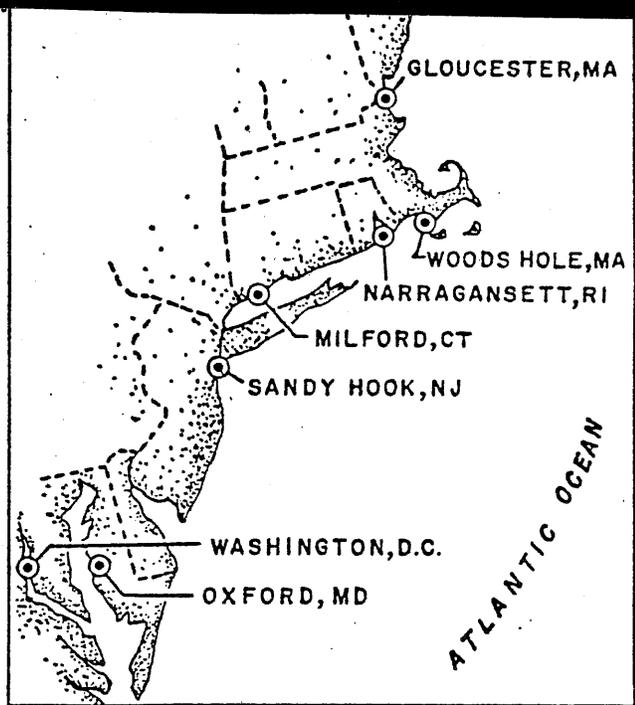


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MONTHLY NARRATIVE REPORT

MARCH 1977

RESOURCE ASSESSMENT DIVISION	1
MARINE ECOSYSTEMS DIVISION	3
RESOURCE UTILIZATION DIVISION	7
ENVIRONMENTAL ASSESSMENT DIVISION	10
AQUACULTURE DIVISION	11
PATHOBIOLOGY DIVISION	13
NATIONAL SYSTEMATICS LABORATORY	15
ATLANTIC ENVIRONMENTAL GROUP	16
MANNED UNDERSEAS RESEARCH AND TECHNOLOGY	18



U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC and ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE.



RESOURCE ASSESSMENT DIVISION

Resource Surveys Investigation

The Middle Atlantic Survey Operations Group (Sandy Hook Laboratory) completed an extensive clam survey with Delaware II on 15 March. John Ropes was chief scientist of this survey which extended from Chesapeake Bay to Nantucket and began on 7 February. The spring bottom trawl survey began on 19 March using Delaware II (Wallace Morse, chief scientist). The area of coverage extends northward from Cape Hatteras with the Sandy Hook portion scheduled to terminate off Long Island in early April.

The Woods Hole Survey Operations Group participated in several cooperative bottom trawl surveys involving foreign research vessels. Henry Jensen and Donald Flescher were aboard the Polish Wieczno from 17 February to 7 March for a comprehensive multi-gear survey as part of the ongoing monitoring of the effects of the Argo Merchant oil spill in the Nantucket Shoals - Georges Bank area. John Nicolas and William Overholtz participated in a juvenile Atlantic herring, groundfish, and ichthyoplankton survey aboard the GDR Gorlitz from 3 March to 7 April in the area extending from the eastern tip of Long Island through Georges Bank and the central portion of the Gulf of Maine. Ralph Mayo and Fred Serchuk were the US participants on the Wieczno for a juvenile herring and groundfish survey during 8-18 March conducted along the inshore portion of the Gulf of Maine from Cape Ann to near Grand Manan Island. Herring catches during the Gorlitz and Wieczno surveys were lower in comparison to results from surveys conducted in previous years.

Recreational Fishery Investigation

During March the remainder of approximately 4,200 specimens, representing 21 species, collected during the December Middle Atlantic groundfish survey were processed for life history studies including distribution, size and age composition, reproduction, and condition.

The New Jersey creel survey of charter- and party-boats continued during March. Preliminary results indicate silver hake, Merluccius bilinearis, red hake, Urophycis chuss, and winter flounder, Pseudopleuronectes americanus, dominated the recreational catch during the month.

Age and Growth Investigation

Redfish samples collected during Albatross cruises 76-02 and 76-09 were aged and the data will be used for updating the data base for assessments. The difficulty of aging this species can be indicated by the fact that some of the fish exceeded 45 years in age.

Fisheries Statistics Investigation

Major output during March was the provisional 1976 annual commercial fishery summaries prepared for the April 1977 Assessments Subcommittee Meeting of ICNAF to be held in Halifax. This included monthly nominal landings for TAC-regulated species and age/length biostatistic summaries for the individual species.

Fisheries Analysis Investigation

Most of the month involved preparation of materials for the 19 and 20 April hearing in Peabody, Massachusetts, on the PFMP for Atlantic herring. Vaughn Anthony will testify on the biological assessment used in the writing of the PFMP.

Meetings, Talks, Visitors, Publicity

Eugene Heyerdahl attended the National Data Management Committee meeting in St. Petersburg, Florida.

Fred Nichy attended a Silver Hake Workshop held in St. Andrews, Canada, for the purpose of resolving the problems in aging this species. Mr. Yuri Grinkov from the USSR and Mr. Joe Hunt from Canada were the other attending members. A report of the results from the meeting will be presented as an ICNAF document.

Manuscripts

Wilk, S. J., W. W. Morse, D. E. Ralph, and T. R. Azarovitz. 1977. Fish and hydrographic data collected in the New York Bight, June 1974-June 1975. NOAA Tech. Rep. NMFS, SSRF (S).

Wilk, S. J., W. W. Morse, and D. E. Ralph. 1977. Length-weight relationships of fishes collected in the New York Bight. Trans. Amer. Fish. Soc. (S).

MARINE ECOSYSTEMS DIVISION

Larval Physiology Investigation

Data analyses have been completed for cod growth and metabolic studies. Oxygen consumption rates in the temperature range 4-10°C mathematically conformed to power functions when individual mean consumption was regressed on body dry weight. Consumption increased with temperature. Specific growth rates in terms of dry weight for the period hatching to metamorphosis were 3.93%/day at 4°C, 6.98%/day at 7°C, and 8.57%/day at 10°C. Winter flounder larvae are currently under culture for planned experiments in May using the controlled environmental chamber. Preliminary studies to adapt standard methods for the determination of RNA, DNA, and total protein in fish eggs and larvae have been completed with Atlantic cod. Experiments designed to follow the changes in RNA, DNA, and protein content of winter flounder eggs and larvae during normal development have been initiated.

Thomas Halavik attended and completed the in-service training course on cold water fish culture presented by Department of Interior staff at the National Fish Hatchery in Spearfish, South Dakota.

Oceanography Investigation

The current-meter cruise scheduled for early March has been postponed because renovation of Albatross IV was behind schedule and NOS was unable to provide a substitute vessel. At this point it appears the trip will be made 7-11 April 1977 on Albatross IV. Meanwhile, preparations for the cruise have continued. The acoustic releases have been tested in water off the WHOI dock, the radios and radio direction finder have been tested, the current meters have been received and inspected, and the other mooring gear has been prepared by WHOI under contract. Members of the oceanography group will ride Albatross IV from Boston to Woods Hole 30-31 March 1977 to check out the STD and ship's gear needed for the current-meter cruise.

Salinity analyses have been completed and a surface salinity chart drawn for a report on water masses on Georges Bank. Sections of salinity and oxygen are being drawn. The STD and digital data logger have been given a post-cruise check and are ready for the current-meter cruise.

Data from 28 months of sections in the Northeast Channel and observations in the Gulf of Maine have been analyzed for a paper to be presented in April at the Gulf of Maine Workshop in Woods Hole. All available NODC data from 40 to 42°N and 68 to 70°W have been obtained for a paper on the Cape Cod front and the Great South Channel, to be presented at the AGU Oceanic Fronts Conference in New Orleans in October. A computer routine has been developed to sort NODC data tapes on the basis of any information contained in the station header form, such as date, depth, and position. The February report on the SBT section from Portland, Maine to Yarmouth, Nova Scotia, has been completed and distributed.

Replicate salinity samples from the November 1976 Anton Dohrn cruise have been analyzed after being stored for 4 months -- the agreement with analyses run in November was excellent, a small but nearly uniform increase of about 0.004%. Another set of replicate samples was taken in the March 1976 cruise of Anton Dohrn and the first set of analyses has been done.

An XBT recorder and launcher were readied and shipped to the Sandy Hook Laboratory for use aboard Advance II in Dr. Thomas's cruise. Efforts are being made to repair in-house a Beckman salinometer for which the company's estimate was excessive (\$1,700). An equipment inventory is being developed to provide proper control of maintenance and use of electronics gear belonging to the investigation. XBT probes were provided for the apex predator tagging and longline cruise on the Polish Wieczno.

Ecosystem Dynamics Investigation

Ed Cohen prepared material for the Georges Bank Energy Budget Workshop, and continued work on chlorophyll analysis with Patricia Carter and David Potter. About one-half of the backlog of samples is now processed (not including the recent material collected on Anton Dohrn) and calculations and plots for nutrients and chlorophyll data have continued. Dr. Marvin Grosslein continued work on the New York Bight Atlas.

Mike Pennington has been learning how to use the computer terminals at Woods Hole, while analyzing trawl survey data on catch versus duration and speed of haul. These data are basic to our study of availability coefficients which affect accuracy of biomass estimates. He has also been assisting Robert Livingstone with analysis of haddock maturity - fecundity data, and several people in the Resource Assessment Division with mathematical problems.

Recruitment Processes

A good deal of time this past month has been spent summarizing the Second Planning Meeting of the Joint US-Canadian Larval Herring Patch Experiment held in Woods Hole, 25 and 26 January 1977, and planning for the next meeting in Halifax 5 and 6 April 1977. This included an attempt to switch Anton Dohrn's regularly scheduled November 1977 survey period to October for the proposed patch study. The consensus of both the Canadian and US scientists is to postpone the full-scale patch study until October 1978, when schedules will be less busy and we have time to do some preliminary experiments. We still plan to attend the Halifax meeting to discuss what preliminary work could be done this fall (1977), such as vertical work with MOCNESS.

Again, considerable effort has been made in clarifying proposed computer processing of the ICNAF Larval Herring Data Base in time for the June meeting in Poland. The most recent memo detailing our desired computer products has been sent to Robert Marak today.

Anton Dohrn arrived in Woods Hole 10 March 1977 for her usual spring survey, but because of engine trouble she could not do any trawling, so we elected to conduct an ICNAF larval herring survey. Anton Dohrn was able to survey the Nantucket Shoals - western Georges Bank area during 12-21 March 1977 and, in addition, to collect 43 larvae for our otolith aging study.

Sorting continued during the month on fine mesh (0.053-mm) zooplankton samples (density and size frequency) from special vertical tows from Delaware II cruise No. 74-12. Tables and plots of 0.505-mm zooplankton samples from two February cruises, Albatross IV No. 76-1 and No. 75-2, were prepared by Greg Dube and Greg Lough. Larval Atlantic herring data from the March 1974 Walther Herwig cruise were obtained from Gunnar Joakimsson and put on MARMAP Opscan forms

completing our records for 5 years of February-March FRG cruises. Several meetings were held at WHOI to discuss the progress of MOCNESS fabrication. Several meetings were held with Ed Handy and Sally Heimerdinger for development of a format for larval Atlantic herring gut contents and condition factors. Greg Lough, Rosalind Cohen, and Janet Murphy are presently working on gut contents of larval Atlantic herring from Albatross IV cruise No. 75-2. David Potter is preparing a description of the TUBE apparatus used in the HELGOLAND experiment. We want to spend a few days this June making some preliminary experiments in waters around Woods Hole to show the value of such an apparatus. Work has continued on the manuscript dealing with the reproductive biology of the Georges Bank haddock spawning stock. Completed this month were the sections on age and size at first maturity and the structure of the spawning stock from 1968 to 1975. Information on size and age at first maturity; and fecundity, length, and weight relationships for selected species, was compiled for the energy flow model of the Georges Bank system.

Plankton Ecology Investigation

A comparison of 0.253-mm and 0.333-mm mesh bongo net retention rates at towing speeds of 1.5 and 3.5 knots showed that the size distribution and abundance of larval Atlantic herring were similar for both mesh nets at the two towing speeds. For zooplankton, however, significantly greater numbers of adult Oithona spp. and Pseudo-Paracalanus, unidentified copepodites, and adult and juvenile Hyperia sp. were caught by the 0.253-mm mesh net at both towing speeds. An examination of the gut contents of 7-9 mm and 10-12 mm Atlantic herring larvae caught in these same tows showed that the bulk of the food items consisted of taxa which were not retained by either mesh net (copepod eggs and nauplii, Oithona spp. copepodites, and Pseudo-Paracalanus spp. copepodites). Additional comparisons will be made with the catches of zooplankton in the standard MARMAP 0.165-mm mesh net to determine if the major food items of Atlantic herring larvae are adequately retained.

Ichthyoplankton Investigation

We completed the sorting and enumerating fish larvae and the volumetric determinations of zooplankton collected on the survey of the Middle Atlantic Bight in December 1976. Because of foul weather and diversion of the Delaware II to the area of the Argo Merchant oil spill, we did not meet sampling objectives. Only 49 of the intended 80 plankton stations were occupied. Time did not permit us to survey waters south of Chincoteague Island, Virginia. Sand lance, Ammodytes americanus, larvae accounted for 94.8% of the larval fishes collected on the survey.

We are presently conducting the "Spring Survey" in the Middle Atlantic Bight. This cruise marks the beginning of an intensive field effort which should produce the best series of plankton collections ever taken between Cape Hatteras and Nova Scotia.

Benthic Dynamics Investigation

The major task of compiling, in computer format, the benthic biomass data base for the Gulf of Maine - Georges Bank region was continued throughout the month. Good progress has been made and we expect to have a workable version of this compilation within the next month or two.

Task personnel collaborated with biologists of the Manned Underseas Research and Technology Program in a study of the methodology for conducting quantitative studies of the megabenthic fauna.

Several task members devoted a substantial amount of time assembling data for the forthcoming workshop on the bioenergetics of the Georges Bank ecosystem. Quantitative information on benthic macrofauna and food habits of finfishes were the two principal components included in the data base.

Two manuscripts were refereed for the editor of the Bulletin of Marine Science and one manuscript was refereed for the editor of the Fishery Bulletin. A contribution was submitted to the Shellfish and Benthos Committee of ICES for that committee's annual report. Our first nominee to be hired as a temporary replacement for John Messersmith was rejected (because of ineligibility) by the regional personnel officer. A second nominee was subsequently submitted and, so far, appears to be acceptable.

Apex Predators Investigation

Jack Casey, Chuck Stillwell, Wes Pratt, and Larry Lindgren are aboard the Wieczno on a longline cruise which departed on 20 March 1977. The apex predator portion of the DWD 106 report is complete. Work continues on extraction of information from commercial swordfishing logs. Some information has been punched on IBM data cards and is being verified at present. A draft of a manuscript describing reproduction in the blue shark, Prionace glauca, has been completed by Wes Pratt.

Meetings, Talks, Visitors, Publicity

Division staff participated in press briefings on the Argo Merchant oil spill.

Ken Sherman, Carolyn Rogers, and Jack Pearce met with Drs. Schneider, Phelps, Prager, Perez, and Lefcourt of EPA, Narragansett, and Hal Sanford of MESA to discuss Ocean Pulse Program.

David Potter attended a meeting in Sandy Hook to review requirements for upgrading Delaware II as a research vessel.

Marvin Grosslein and Ed Cohen attended meetings of ICMSE on 9 and 10 March 1977. A report of proceedings will be circulated.

Ken Sherman presented a talk on the MARMAP and Ocean Pulse Programs to a conference sponsored by the National Science Foundation on Long Term Ecological Measurements. The conference was held at the MBL, Woods Hole, Massachusetts, on 16-18 March 1977.

Manuscripts

Lough, G. 1977. Possible relation between dungeness crab (Cancer magister) catch and environmental condition during the larval period. Fish. Bull. (S).

RESOURCE UTILIZATION DIVISION

Projects Supporting the New England Fishery Development Program

NEFDP Task Force Meeting

On 22 March the NEFDP Task Force meeting was hosted by the Laboratory. Approximately 25 people attended. The prototype "Spanish" squid machine was demonstrated to the group along with several options for improvement, including our modified rotary scaler (for skinning). This was followed by a group discussion on future plans and proposed changes to the equipment. Also presented at the meeting were rolled red crab and rock crab lumps that had been reformed with sodium alginate.

A 10-gal volume of marinated squid, prepared by students of the Gloucester High School, was distributed to visitors at the Gloucester Winterfest held at the Gloucester Armory on 5 March 1977. The acceptability of the product was beyond expectations.

Guaranteed Quality Project

While the statistics being generated by this effort indicate that fish of guaranteed quality have sold at a satisfactory rate even when the price of the test fillets was as much as \$.50 higher per pound than competitive fillets from the same species, the retailer has decided to terminate his association with the study. The official explanation for the retailer's action is that the supply was erratic, but there is reason to believe that an irreconcilable situation (which could not be surfaced) had actually developed to terminate the project. Effort is underway to engage another retailer.

Flavor Stability of Frozen Minced Whiting

Storage studies are continuing for 1-lb blocks containing various proportions of minced whiting and quahogs. Samples with 10 or 20% quahog were still acceptable in flavor and texture after 36 weeks at +5°F, whereas controls (100% minced whiting) were considered not acceptable after about 22-24 weeks. The control samples had a higher TBA number and higher DMA content than the samples with quahogs.

Based on the results of 12 weeks of storage, it appears at this time that treatment of minced whiting in either stick form or block form with sodium erythorbate ranging in concentration from 0.075 to 0.3% has prolonged the storage life at +20°F or +5°F. The addition of 500 ppm of EDTA has not provided a synergistic effect. Lemon juice concentrate at a level of 0.5% does not appear to be effective in preventing rancidity. This storage study is continuing.

Projects Supporting the Southern New England Fishery Development Program

Texture Stability of Frozen Minced Whiting

Dr. Soliman Shenouda has made two highly acceptable reports on his progress in efforts to stabilize the texture of frozen minced whiting. The first report was to the New England Fishery Development Task Force on 22 March. One week later he reported to the Southern New England Fishery Development Task Force. Samples

of the frozen products stabilized by Dr. Shenouda were made available to members of the industry, and they agreed that there was evidence of excellent progress and considerable potential.

New Product Development

The production of deboned, minced fish flesh is dependent to some degree on the development of marketable products that can exploit its properties. Such an effort parallels our studies to stabilize this raw material. After several meetings with a local fish processor, he has agreed to prepare minced whiting casseroles with butter sauce for a marketing study. He plans to distribute casseroles through his organization, and we will help him through our contacts. The samples that we initially gave him were very well received, and this product appears to have commercial potential, particularly as a school lunch item and also as an item for the elderly. Samples of our minced whiting casseroles, croquettes, and seafood pie will be sent to another fish processing company for evaluation.

Other Projects

Blue Crab

An attempt was made to produce alginate-reformed crabmeat while eliminating the long soaking period in the calcium and water baths. Rolled, fully cooked blue crabmeat was mixed with sodium alginate and EDTA. The mixture was combined with a suspension of calcium sulfate and spooned into molds. The mixture gelled only slightly, but there was little water loss.

Standards and Specifications

John Ryan and Dr. Fred King attended a 1-day meeting of the Interagency Task Force on Procurement of Food Items. Members included representatives from the Department of Agriculture, Food and Drug Administration, Department of Defense, and Department of Commerce. They are attempting to develop a unified system of buying food for federal agencies with emphasis on using all available grading standards. John and Fred also attended the all-day Inspectors' Seminar held 18 March 1977 in our library. We outlined the program of work for FY77 and FY78. An explanation of the instructions for grading fillets was given along with other pertinent documents.

The Association of Official Analytical Chemists has appointed Dr. King as an Associate Referee for "Drip Fluid in Fish Fillets and Fish Fillet Blocks, Quantitation of."

Nitrosamine Investigation

Most of this period was spent in the isolation and analysis of volatile N-nitrosamines in hot smoked salmon treated with various concentrations of nitrite and chloride and stored for 0, 7, 14, and 21 days at 33°F.

Engineering

We continued this month to lend technical assistance to the Galatea under contract with the Gloucester OEDC to perform an exploratory survey of quahogs in the immediate area. Their new hydraulic system was debugged and now is operational.

Mike Corbett traveled to Cape May, New Jersey, and Woods Hole to meet with members of the surf clam industry and NMFS personnel for gathering information on the development of a standardized calibrated hydraulic dredging system for sampling aboard the Delaware II.

ENVIRONMENTAL ASSESSMENT DIVISION

Biological Oceanography Investigation

During the period 16 March-2 April, personnel from the investigation conducted an extensive cruise to determine primary productivity and related parameters at stations in the New York Bight apex and Georges Bank. Measurements were taken in the Bight apex to determine the contributions of the Raritan Bay and Hudson River estuary to productivity at selected stations in the Bight. No evidence for low dissolved oxygen or unusual Ceratium blooms was noted. Measurements on Georges Bank indicated that productivity was relatively high over the Bank indicating spring bloom. Gradients in productivity and related parameters were found to exist over the Bank and surrounding slope waters.

Environmental Chemistry Investigation

A workshop was held at Sandy Hook Laboratory on 10 March in regard to data compilation of heavy metals in finfish and shellfish. Scientists are interested in developing information concerned with the effects of high body burdens of heavy metals on physiology and metabolism of selected fishes.

Meetings, Talks, Visitors, Publicity

Two workshops were held in March concerned with the Ocean Pulse program. Scientists met at the Sandy Hook Laboratory to discuss the specific studies that should be conducted at Ocean Pulse stations. The studies will include activities in physiology, pathobiology, mutagenesis, and environmental chemistry. The results of these workshops were included in a proposal to NOAA/NOS for Ocean Pulse studies to be conducted at the Deepwater Dumpsite 106.

Scientists attached to the Environmental Assessment Division met with Mr. Paul Hamer, New Jersey Department of Environmental Protection (NJDEP), to discuss cooperative studies to be conducted in the area which was characterized by oxygen depletion and fish kills during the summer of 1976. The NJDEP will be occupying transects interspersed with longer transects to be monitored by personnel of the Environmental Assessment Division during the spring, summer, and fall of 1977.

Personnel of the Environmental Assessment Division, including Dr. John Pearce, Mr. Robert Reid, and Mr. Frank Steimle, participated in a Center meeting concerned with marine food chains held at the Narragansett Laboratory, 28 and 29 March.

AQUACULTURE DIVISION

Spawning and Rearing of Mollusks Investigation

Laboratory-reared surf clams, Spisula solidissima, less than 1-yr old, have been successfully spawned, producing viable larvae. This egg-to-egg cycle is the shortest recorded during our research with the surf clam. These animals spawned at an average shell length of 49.2 mm. They had been held at 15°C throughout the winter months. These surf clams had not grown appreciably since November, but had resumed growth at the beginning of February. This pause in growth reflects the seasonal abundance of natural phytoplankton in the seawater, which was the clams' sole source of food.

We are encouraged by the rapid growth of Spisula on natural food in unfiltered seawater held at elevated temperatures during the winter months. In addition to the initiation of gametogenesis, many individuals of this laboratory-reared population have reached a length of 52-56 mm. This is the size range that we envision for a marketable, cherrystone-size Spisula. We have, therefore, demonstrated that egg to market in 1 yr is feasible for cultured Spisula.

Growth of juvenile bay scallops in the tank farm during the summer of 1976 has been assessed. Growth was excellent in the tank farm above 15°C, but markedly less at 12°C and stopped at 10°C. Scallops as small as 5-mm long were successfully transplanted to the tank farm. Growth rate was inversely proportional to biomass at a flow rate of 50 l/min and initial biomasses between 5.0 and 40.0 liters. Current velocities between 14 and 54 cm/sec produced no difference in growth rate.

Juvenile scallops grown for 3 mo this winter on natural food in heated, unfiltered seawater at temperatures from ambient to 20°C above ambient have shown excellent growth at the higher temperatures. No significant growth has occurred during this period at ambient and 5°C above ambient. At 10°C above ambient growth has averaged 18%, at 15°C above ambient the animals have achieved a 32% increase in length, and at 20°C above ambient a 61% growth increment has occurred.

Nutritional Requirements of Mollusks Investigation

Recent investigations into the problems of developing a minimally enriched seawater medium for algal growth were conducted in the area of vitamin requirements. Seven species of algae were studied in these experiments, five or six of which are known to have an absolute vitamin B₁₂ and thiamine requirement. Previous experiments demonstrated that these species could tolerate a reduction in the normal phosphate concentration and perhaps in the nitrogen concentration as well. Current experiments utilized a reduced phosphate concentration in the basal medium and had as variables both the nitrogen and vitamin concentrations. Strains were subcultured twice before estimating growth to avoid carry-over. In most cases, results in the high and low nitrogen concentrations were similar. The reduced vitamin concentration has a surprisingly stimulating effect on Dicrateria sp. It seems to have no significant effect on Tetraselmis maculata, Monochrysis lutheri, and Pseudoisochrysis paradoxa (nom. prov.), while causing a small amount of inhibition in the growth of Phaeodactylum tricornutum, Isochrysis galbana, and Cyclotella cryptica. Unfortunately, the experiments could

not be completed because of malfunction of a critical instrument. Additional work is, therefore, required. In addition, conclusive results of vitamin studies cannot be formulated until the response of many generations in culture can be studied.

Control of Molluscan Disease Investigation

Experiments to challenge Long Island Oyster Farms (LIOF) isolates against oyster larvae continued. One organism, a Vibrio sp., is strongly pathogenic. Another LIOF isolate, a Pseudomonas sp., will be further examined by additional biochemical tests in efforts to determine species. A moribund larval oyster culture, obtained from the Aquacultural Genetics Investigation, was plated out and two bacterial colonies were isolated and used to challenge fertilized oyster eggs. Data from the preliminary experiment suggest that the predominate colony isolated from the moribund larval culture causes abnormal development, while the other isolate causes mortality. Further experiments are planned and characterization studies are beginning.

UV experiments using the pathogenic red pseudomonad have been completed. Data showed that the UV sterilizer employed could effectively kill this micro-organism when it is present at a concentration of 10^5 cells/ml of 10 μ -filtered seawater. Other known bacterial pathogens also will be tested so that the effectiveness of this sterilizer in controlling diseases can be ascertained. Experiments using extracted pigment from the pathogenic red pseudomonad suggest that the pigment is detrimental to developing oyster larvae. The extraction procedure will be carried out on a nonpigmented mutant of the red pseudomonad to determine whether the results were due to the pigment or to the extraction procedure.

Meetings, Talks, Visitors, Publicity

Edwin Rhodes and Ronald Goldberg visited the facility of Aquacultural Research at Dennis, Massachusetts, and conferred with Eugene Petrovitz and Richard Loring about mutual interests in molluscan aquaculture.

Four members of the Shinnecock Tribal Oyster Project, Southampton, New York, are with our investigators on a 3-wk training program in hatchery techniques.

S. G. Younkin, Campbell Soup Company, conferred with the investigational staff about the aquaculture potential of the surf clam. Campbell Soup Company is looking into additional sources of supply of the surf clam to augment the dwindling supply off the Middle Atlantic Coast.

PATHOBIOLOGY DIVISION

Comparative Pathobiology Investigation

Fifty-seven mollusks were examined from the area of the Argo Merchant oil spill sites. Sea scallops comprised the largest sample with 25 animals from the oil spill area and 15 from an oil-free area. No specific pathology that could be related to oil was noted in scallops or any other mollusks examined. It is possible that the samples were taken too soon after the oil spill occurred; since morphologic changes are time dependent additional samples should be obtained from the oil spill area at a later date.

Progress continues to be made on the preparation of a manuscript detailing the normal histology of the blue crab. Much time was spent reviewing and correlating hypotheses and observations reported in the literature that deal with connective tissues. An extensive section on connective tissue and one on epidermis have been completed. A section describing the histology of the gills is in preparation. Several special stains have been completed which are necessary for interpretation of the function and composition of various tissues.

Approximately 150 larval fish (Ammodytes) were obtained from Wally Smith at the Sandy Hook Laboratory for histologic examination. The fish were obtained from the area of the Argo Merchant oil spill. Some fish have been sectioned and others have been prepared as whole mounts. They will be examined for gross and microscopic abnormalities.

Disease and Environmental Stress Investigation

Data on fin rot prevalence in Raritan Bay in 1975 and 1976 have been tabulated by season and by size of fish. Upon completion of tabulation of data on fin rot prevalence in offshore areas, all data will be analyzed statistically.

SEM evaluation of cod eggs exposed to oil for 10 hr at concentrations of 0, 100, and 500 ppb revealed no clear difference in the integrity of the chorion for the exposed specimens. Presently, TEM preparations of larvae and eggs from the same experiment are being studied, with special attention being given to the structure of larval skin and its intercellular junctions. In addition, future experiments on fish larvae have been initiated through the cooperation of Dr. Geoffrey Laurence and Mr. Alphonse Smigielski of the Narragansett Laboratory. These experiments on normal larvae of the winter flounder and scup will be concerned with the cellular events accompanying the development of the digestive, respiratory, and neurosensory systems during those periods which are believed critical to survival.

Benthic crustaceans collected from the area of the Argo Merchant oil spill were processed for histologic examination and examined for histopathology. Tissues were examined from hermit crabs (18), rock crabs (4), sea urchins (9), starfish (7), and lobsters (4). Several crabs and lobsters had swollen hemocytes and melanized nodules. Several hermit crabs had sessile ciliate protozoa on their gills. The starfish and sea urchins did not have any notable microscopic abnormalities. It is likely that the benthic invertebrates examined were obtained prior to the time that lesions attributable to the oil would be recognizable.

The taxonomy of the Vibrio species isolated from ulcerative lesions in flatfish was discussed with Dr. Rudolph Hugh of the George Washington University School of Medicine. Dr. Hugh is chairman of the Subcommittee on the Taxonomy

of Vibrios, International Committee on Systematic Bacteriology. Based upon the biochemical characteristics, he believes the organism is sufficiently dissimilar to currently known vibrios to merit designation as a new species. However, he encouraged determination of the guanine-cytosine (G-C) content of the DNA of the organisms as one of the minimal characteristics for designation within the genus Vibrio. Accordingly we have used a cell press to release DNA, a phase-fractionation method to purify the DNA and a spectrophotometric method to determine G-C content. The initial determination shows a G-C content of 44.5% which falls in the center of the 40-50% range of the Vibrio species. However, the procedure should be repeated because of contaminating protein content of the control DNA. This may shift the true ratio by several percentage points.

Meetings, Talks, Visitors, Publicity

Mr. Farley and Mr. Kern attended a workshop sponsored by the Center for Environmental and Estuarine Studies (University of Maryland) which explored the causes of recent mortalities of oysters in the Chester River (a tributary of Chesapeake Bay). Although discussions presented a variety of biologic, chemical, and physical data relevant to the site of the mortalities, presently the cause or causes of the mortalities are unknown. Another workshop on the Chester River oyster mortalities will be held after all data have been thoroughly reviewed.

Manuscripts

- Bodammer, J. E. Cytological observations on the blood and hemopoietic tissue in the crab, Callinectes sapidus. I. The fine structure of hemocytes from intermolt animals. Cell and Tissue Research. (S).
- Murchelano, R. A., and J. Ziskowski. 1976. Fin rot disease studies in the New York Bight. In M. G. Gross, ed., Middle Atlantic Continental Shelf and the New York Bight. American Society of Limnology and Oceanography Special Symposia, Vol. 2, pp. 329-336. (P).
- Rosenfield, A. 1976. Infectious diseases in commercial shellfish on the middle Atlantic coast. In M. G. Gross, ed., Middle Atlantic Continental Shelf and the New York Bight. American Society of Limnology and Oceanography Special Symposia, Vol. 2, pp. 414-423. (P).

NATIONAL SYSTEMATICS LABORATORY

Work continued on a taxonomic review of the blue hake genus Antimora, an abundant fish of the continental slopes in temperate water around the world. Work also continued on a synopsis of the 80 genera of ophidioid fishes. A draft was completed of a manuscript entitled, "The Evolution and Systematics of the Mackerels and Tunas," to be included in a symposium volume, Physiological Ecology of Tunas, published by the Academic Press.

A proof was read on a manuscript revising the American royal red shrimps and dividing the genus Hymenopenaeus into several genera. Work also continued on a worldwide revision of the genus Penaeopsis. Progress was made on the descriptions of a new genus of spider crab from the Gulf of Mexico and a new genus of mud crab from the Carolinas. The Guide to the Temperate Water Decapod Crustaceans of the U.S. East Coast is still being developed.

Meetings, Talks, Visitors, Publicity

Dr. Daniel M. Cohen presented a lecture on "Deep Sea Biology and Submersible Dives" at the College of Charleston, South Carolina.

ATLANTIC ENVIRONMENTAL GROUP

Ocean Dumping Task Group

A new monitoring transect has been established in the Middle Atlantic Bight to collect temperature, salinity, and zooplankton data. The transect, from Scotland Light in New York Harbor to Deepwater Dumpsite 106, is occupied biweekly for temperature and salinity, and monthly for zooplankton. The ships of opportunity used for the transect are tugs of the Spentonbush-Red Star Company which tows barges of chemical wastes to the dumpsite from New York Harbor. The data are collected by expendable bathythermographs (XBT), surface water samplers, and a Hardy continuous plankton recorder (CPR) deployed by one of this group's staff, Steven Congdon, assisted by a Coast Guard observer assigned to the tug. The transect, which is about 110 nautical miles (nm) long, involves 10 XBT drops, about 2 hr or 12 nm apart. The temperature and salinity data are processed and graphically portrayed within a few days after the tug returns to port. The zooplankton samples collected by the CPR will be analyzed by the MARMAP Field Group, including a count of all zooplankton and Ceratium phytoplankton on alternate 10-mi increments of the record.

Ocean Monitoring and Climatology Task Group

Dr. Chamberlin made a presentation to the New England Fishery Management Council on 10 March concerning monitoring activities at AEG and the documentation of the severity of the winter of 1976-77 off New England and the Middle Atlantic States. Copies of the recently released Marine Environmental Notice concerning the anomalous winter conditions and their potential impact on fisheries were handed out to the Council and observers in attendance. This Notice points out that colder-than-average air temperatures were recorded every month from October to January at each of 12 coastal stations from Portland, Maine, to Brownsville, Texas, and that the record cold anomalies of the past 40 years were equalled or exceeded in one or more months at each of the stations except Key West, Florida.

A review of computed mean monthly Ekman (wind-driven) transport data for the southern Georges Bank area for 1976 has revealed that there were two periods of highly anomalous transports which may have led to significant losses of zooplankton from the bank ecosystem. During the first period, February-March, the transports were to the southeast instead of the usual direction, to the southwest. The eastward component during this period was nearly unique, only appearing one other time in February in the 31 years of record. Coincident with the unusual southeast transport, there was an abnormal amount of Gulf Stream and eddy activity close to Georges Bank, which also drew water off the banks. The second period, November-December, was one of anomalously strong (3-4 times normal) southwestward transports resulting from the persistent, strong northwest winds characteristic of the early months of the recent, severe winter.

Manuscripts

Chamberlin, J. L. 1977. Monitoring effects of Gulf Stream meanders and warm core eddies on the continental shelf and slope. ICNAF Selected Papers No. 2. (P).

Gunn, J. T., and M. C. Ingham. 1977. A note on: "velocity and transport of the Antilles Current northeast of the Bahama Islands". Fish. Bull. 75(1): 222-225. (P).

Nelson, W. R., M. C. Ingham, and W. E. Schaaf. 1977. Larval transport and year-class strength of Atlantic menhaden. Fish. Bull. 75(1): 23-41. (P).

Armstrong, R. S. 1977. Climatic conditions related to the occurrence of anoxia in the waters off New Jersey during the summer of 1976. In: Compiled Reports of Workshops on the New Jersey Fish Kill. (A).

Cook, S. K., and K. A. Hausknecht. 1977. Expendable bathythermograph observations from the NMFS/MARAD ship of opportunity program for 1974. NOAA Tech. Rep. SSRF. (A).

Ingham, M. C., S. K. Cook, and K. A. Hausknecht. 1977. Oxycline characteristics and skipjack tuna distribution in the southeastern tropical Atlantic. Fish. Bull. 75(4). (A).

MANNED UNDERSEAS RESEARCH AND TECHNOLOGY PROGRAM

Much of the month was devoted to planning and programming field activities for summer and autumn. Cruise plans were developed for shallow water (<1000 ft) submersible research in benthic ecology in June at Wilmington and Baltimore Canyons with follow-up submersible and SCUBA work in isolated reefs off Beaufort; these canyon and shelf operations will be followed in August by a series of deep (>1000 ft) dives with DSRV Alvin at Atlantis Canyon in August, a continuation of our long-term studies on the ecology and geology of submarine canyons.

Meetings, Talks, Visitors, Publicity

Dr. Richard A. Cooper attended meetings of NOAA Diving Safety Board at Panama City where he also attended first formal meeting of the newly organized National Diving Institute and was elected to the Board of Directors.

Manuscripts

Uzmann, J. R., R. A. Cooper, and K. J. Pecci. 1977. Migration and dispersion of tagged American lobsters, Homarus americanus, on the southern New England continental shelf. NOAA Tech. Rept. NMFS SSRF-705, 92 pp. (P).