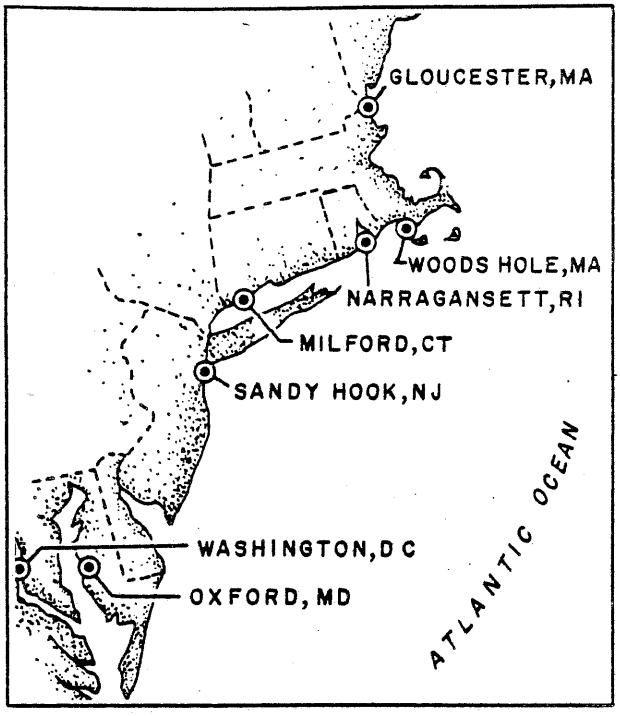
NEFC

Northeast Fisheries Center

NEWS



MONTHLY NARRATIVE REPORT
AUGUST 1978

US DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

CENTER DIRECTORATE

Dr. Carl J. Sindermann participated in three committee meetings to prepare an NMFS position paper on pollution and fisheries-- August 17 in Seattle, August 23 in LaJolla, and September 7 in LaJolla. The draft position paper outlines the role of NMFS in pollution research in response to the recently enacted PL 95-2073. Dr. Sindermann also completed a 400-page draft summary paper titled "Status of North Atlantic Herring Stocks of Concern to the United States." The draft will be reviewed by experts inside and outside the Center before publication.

Proposals to be used in the development of the 1981 Program Emphasis Document were solicited and subjected to preliminary analysis and review by Dr. George J. Ridgway. Dr. Ridgway also reviewed a Sea Grant proposal from the University of Maine for biochemical genetic studies on herring, and reviewed a paper for the Journal of the Fisheries Research Board of Canada.

Art Merrill is studying the early growth of the sea scallop. Most of the data have been tabulated, analysis is well underway, and a draft of a manuscript is nearing completion.

Ron Smolowitz oversaw the completion of the third field experiment of the mesh-size study being conducted for the New England Regional Fishery Management Council. The vessels participating were the Joseph & Lucia II and the Joseph & Lucia III. Data are presently being analyzed. The data report for the second mesh-size experiment conducted aboard the Linda B. and Metacomet was completed and distributed.

Design and purchases for the new clam dredge system are proceeding on schedule under the direction of Ron Smolowitz. All major components have been ordered or contracted for. A memo was also prepared and forwarded to the Office of Fleet Operations detailing NEFC's position on a number of technological problems involving the Delaware II and the Albatross IV, including data logging, trawl mensuration, power supplies, and manpower requirements.

Two major contract efforts have been established to support the development of the regional Fisheries Information System under the direction of Gene Heyerdahl: (1) The GSA Interagency Data Systems Facility in Huntsville, AL, has begun to prepare a standard documentation procedure. The first phase is the identification of all software available to regional users. The initial inventory should be complete by 1 October and will be placed on a centrally available system for user query. Included will be the status of current documentation and a reference for further information. This task will ultimately extend to include the preparation and updating of user manuals within the standardization procedure. (2) The automated GSA Data and Telecommunications Service Office in Boston has placed two subcontracted programmers from Input Output Computer Services, Inc., Cambridge, MA, at the Woods Hole Laboratory. The initial work involves the BLM contract for arraying NEFC survey information in a publishable form. Follow-on programming is being planned for the continuation of this ADP support.

Meetings, Talks, Visitors, Publicity

Dr. George J. Ridgway, was visited during August by Dr. K. Fujino of Kitasato University, Japan. Dr. Fujino is a former employee of NMFS at the Honolulu Laboratory. Dr. Ridgway also participated in the Advisory Board meeting of the Aquavet Program.

Art Merrill recently attended the 44th Annual Meeting of the American Malacological Union, a society of which he is a past president and permanent council member. He has also recently visited several leading museums, including the US National Museum in Washington, DC, and the Museum of Comparative Zoology at Harvard University (29-31 August) in Cambridge, MA, to review mollusk collections and do library research.

Dr. Rafael Robles, Director of the Oceanographic Laboratory of the Spanish Institute of Oceanography in Vigo, Spain, visited the NEFC during 4 August-17 September 1978. His program of work included studies of the: (1) direction of the Center from the organization and research program standpoint; (2) direction of the Resource Assessment Division from the organization and methodology standpoint; and (3) overview of the Division of Environmental Assessment, Marine Ecosystems Division, and Resource Utilization Division.

Manuscripts

Emery, K. O., and A. S. Merrill. Relict oysters on the United States Atlantic continental shelf: a reconsideration of their usefulness in understanding late Quaternary sea-level history: A discussion. Bull. Geol. Soc. Amer. (A)

Merrill, A. S., R. C. Bullock, and D. R. Franz. 1978. Range extension of mollusks from the Middle Atlantic Bight. Nautilus 92(1):34-40. (P)

Merrill, A. S., J. D. Davis, and K. O. Emery. 1978. The latitudinal and bathymetric ranges of living and fossil Mesodesma artatum (Bivalvia) with notes on habits and habitat requirements. Nautilus 92(3): 108-112. (P)

Sindermann, C. J. Pollution-associated diseases and abnormalities of fish and shellfish. Fish. Bull., US. 100 p. (A)

Smolowitz, R. J. 1978. Trap design and ghost fishing: An overview. Mar. Fish. Rev. 40(5-6):2-8. (P)

Smolowitz, R. J. 1978. Trap design and ghost fishing: discussion. Mar. Fish. Rev. 40(5-6):59-67. (P)

Smolowitz, R. J. 1978. Annotated bibliography on lobster trapping and related subjects. Mar. Fish. Rev. 40(5-6):68-77. (P)

Smolowitz, R. J., R. Testaverde, and M. Diliberti. 1978. New England mesh selectivity studies. Experiment two. Inshore groundfish. NMFS, NEFC, Woods Hole Lab. Ref. No. 78-24. 82 p.

RESOURCE ASSESSMENT DIVISION

Resource Surveys Investigation

During August the summer bottom trawl survey was completed. The Delaware II covered the area from Cape Fear, NC, to Cape Cod, MA, during 25 July - 11 August (Tom Azarovitz and Linda Despres as Chief Scientists for

Parts I and II, respectively) and the Albatross IV covered Buzzards Bay, Cape Cod Bay, Gulf of Maine, and Georges Bank (Chuck Byrne, Chief Scientist) during 31 July - 11 August.

A scallop survey aboard Albatross IV was conducted from 15 August to 1 September. Henry Jensen was Chief Scientist and the area from southwestern Georges Bank to Cape Hatteras was covered. Concomitant with the Albatross IV scallop survey, and after an "open house" at the American Fisheries Society's annual meeting at Narragansett, RI, the Delaware II (Linda Despres, Chief Scientist) was used during a scallop dredge experiment (22-27 August) using the new 8-ft scallop dredges. These dredges will replace the 10-ft dredges currently in general use, and the purpose of this experiment was to compare the performance of the 8-ft dredge with that of the 10-ft dredge aboard Albatross IV.

A pelagic fish survey was conducted aboard the USSR R/V Aliot during 2-14 August. John Nicolas was Chief Scientist and the survey was conducted on Georges Bank and in the southwestern portion of the Gulf of Maine.

August activities for the electronics section were split between the surf clam and hydroacoustics projects. Summer engineering students Jeffrey Mills of Worcester Polytech and Robert Flynn of Cape Cod Community College, assisted James Crossen in the design and construction of a hydroacoustic calibration frame used in making transducer source-level measurements at dockside and/or at sea. Facilities were made available at the WHOI dock hydroacoustic calibration range and measurements of the NEFC's "HA" system have been conducted. Results are now being analyzed.

Also developed during this period was a hydroacoustic fixture for in situ calibrations of ships' transducers. The tripod fixture is attached to the hull of the ship by magnets. Preparations have been made to use this system aboard the FRG R/V Anton Dohrn prior to the hydroacoustic assessment cruise in October.

Specifications have been prepared for the surf clam dredge electric submersible pump, cable, and connectors. Plans are to pressure test the underwater Joy connectors to 300 psig.

Age and Growth Investigation

Gary Shepherd prepared approximately 600 fin-ray sections from New Jersey party boat summer flounder samples. He also continued weekly sampling of goosefish from the Cap'n Bill V.

Cathy Reardon worked on aging butterfish samples from Delaware II Cruise No. DE 77-12. She also spent 2 wk helping Ron Smolowitz with his mesh-selectivity experimental data.

Loretta O'Brien completed aging the American plaice samples from Albatross IV Cruise No. AL 72-08 and summarized the age data by area for females and males. She tried sectioning some fin rays for comparison with scales and otoliths, but the results were not very satisfactory. Loretta is now working for John Ropes by aging surf clams and sea scallops.

Louise Dery worked up 1,629 Atlantic herring samples from July and August. She also worked with Fred Nichy on aging silver hake from Albatross IV Cruise No. AL 77-02.

Kris Kantola finished aging pollock samples from Albatross IV Cruise No. AL 77-07, and sent the age sheets to ADP for keypunching.

Vi Gifford completed aging third-quarter commercial redfish samples from 1977 and sent the age sheets to ADP.

Age data for Atlantic cod from Albatross IV Cruises No.'s 75-03, 75-12, 76-02, 77-02, 77-07, and 77-12 have been put on age sheets and will be sent to ADP shortly.

Melinda Grace, Jackie Cook, and Mike Campbell resigned at the end of the month to go back to school. Mike will be continuing his work on scup while completing his final year at Southeastern Massachusetts University.

Sandy Hook Investigation

Bob Hatus, Paul Yuschak, Russel Terranova, and Bill Rogers completed 75 bluefish and 9 summer flounder party-boat trips. They interviewed 2,200 out of 3,200 fishermen who caught 6,300 bluefish and 600 summer flounder. They also continued collecting bluefish ovaries and scale samples and summer flounder scale samples and fin rays. John Clifford and June Sebasta completed coding of the creel survey data collected through July. John also completed the first estimate of the 1978 spring Atlantic mackerel recreational catch. John and Steve Turner worked with the Sandy Hook ADP unit to revise programs for the analysis of creel census data. The latest version now allows for estimation of catch by boat type, fishing method, species caught, home port, and location of fishing sites. Additional modifications to the program will enable the generation of confidence intervals about the estimates.

Darryl Christensen is working with the ADP unit to incorporate confidence interval subprograms based on suggestions made by Mike Pennington of the Woods Hole Laboratory.

Eric Goldring continued lab work for analysis of bluefish fecundity.

Erin Feeney participated on a bottom trawl survey aboard the Delaware II.

A total of 25,000 bluefish age observations and 1,500 southern kingfish age observations has been computerized and analysis of these data is underway.

Stuart Wilk has concentrated on preparing a paper entitled "Biology and Ecology of the Weakfish (Cynoscion regalis)" to be presented at the Colloquium on the Biology and Management of Red Drum and Sea Trouts to be held during the joint meeting of the Gulf and Atlantic States Marine Fisheries Commission in Tampa, FL, during 16-20 October. He is also in the final stages of completing a manuscript on the population structure of summer flounder between New York and Florida based on linear discriminant analysis. Stuart's briefing book on biology and fisheries data on weakfish has been sent out for review.

Fishery Analysis Investigation

Investigation personnel participated extensively in research survey cruises during August: Ralph Mayo and Harold Foster participated in the summer bottom trawl survey during 31 July - 11 August, and Paul Wood, Maureen Griffin, and Liz Bevacqua participated in the western Georges Bank - Cape Hatteras sea scallop survey during 14-31 August.

Bill Callahan provided data for the following individual requests: (1) commercial landings of Atlantic cod, haddock, and yellowtail flounder, by tonnage class for the Statistics Branch of the Northeast Regional Office; (2) monthly commercial landings data (on tape) for the University of Rhode Island; (3) vessel activity tape (1965-77) and reports for Gene Heyerdahl of the NEFC; and (4) analysi of vessel data from Coast Guard computer tapes for Division personnel.

Ralph Mayo and Liz Bevacqua completed the determination of redfish von Bertalanffy growth parameters, derived from research survey age-length data for 1975-77.

Steve Murawski provided surf clam and ocean quahog research survey relative abundance data to the Statistics and Scientific Committee of the Mid-Atlantic Fishery Management Council for use in a preliminary study of the impact of offshore gas and oil exploration on Mid-Atlantic marine resources.

Fred Serchuk prepared assessment materials on Atlantic cod and sea scallop for use in poster displays at the 1978 American Fisheries Society Annual Meeting at the University of Rhode Island. Fred and Paul Wood participated with Tom Azarovitz, Art Posgay, and Henry Jensen in planning the August sea scallop survey sampling design. Fred also completed a sea-sampling trip report summarizing the results obtained from his trip aboard the recreational party boat Capt. Red.

Six sea-sampling trips were completed in August under Paul Wood's supervision, with Steve Clark's assistance when Paul was out at sea. Vessels participating in the program during the month included the Sea Flea II, Miss Sandy, Capt. Scrod, Joseph and Lucia II, Joseph and Lucia III, and the Immigrante.

Helen Markestyn and Marj Aelion left the Investigation during August to return to school.

Joan Palmer returned to the Woods Hole Laboratory and the Investigation after completing a year of graduate study at Iowa State University.

Meetings, Talks, Visitors, Publicity

Steve Murawski attended a Management Regulations Review Team meeting at the Gloucester Laboratory on 29 August.

Fred Serchuk attended a groundfish meeting of the Mid-Atlantic Fishery Management Council in Riverhead, NY, on 3 August, and the August monthly meeting of the New England Regional Fishery Management Council in Peabody, MA, on 30 and 31 August. Fred met with representatives from the Government Accounting Office on 11 and 14 August in Woods Hole to discuss resource assessment programs. Fred also met with Robert Schoning on 17 August to provide background information on regional council - resource assessment activities.

Fred Serchuk and Steve Murawski attended the American Fisheries Society Annual Meeting at the University of Rhode Island during 21-25 August. Fred presented the following papers at the meeting: (1) "Rainbow Trout: A Population Simulation Based on Individual Responses to Varying Environmental and Demographic Parameters" (with C. J. Schmitt and B. Floyd); (2) "Assessment and Status of Atlantic Cod Stocks off the Northeast Coast of the United States;" and (3) "Cod, Conservation, and the Regional Councils: Fishery Assessment Science and Resource Management Under Extended Jurisdiction" (with B. Brown and G. Marchesseault - paper delivered by B. Brown).

Fishery Assessment Investigation

During August, Fishery Assessment Investigation personnel participated in a number of sea-sampling trips and research vessel surveys. Emory Anderson participated in a sea-sampling trip on 8 August aboard the Miss Sandy out of Provincetown, MA, and Frank Almeida participated in a sea-sampling trip during 10-13 August aboard the Capt. Scrod out of Gloucester, MA. Hillary Herring, James Baker, and William Overholtz participated in the Delaware II summer bottom trawl survey and scallop gear trials; Hillary Herring and Frank Almeida took part in the USSR R/V Aliot juvenile silver and red hake survey beginning on 29 August.

Emory Anderson completed editing and final preparation of a document summarizing the status of the stocks as determined by personnel of the Resource Assessment Division. Brian Hayden and Emory Anderson completed a manuscript providing biological and assessment information on bluefish. Steve Clark attended the Annual Meeting of the American Fisheries Society at the University of Rhode Island, and gave a talk on the current status of northern shrimp in the Gulf of Maine; he also completed an ICES document on the Northwest Atlantic pollock resource in cooperation with Lynn Cleary (Bedford Institute of Oceanography in Halifax, NS) and Thurston Burns.

William Overholtz continued work on updating the Georges Bank haddock assessment and completed an outline of fishery management objectives and guidelines for use in preparation of a management document for submission to the NERFMC. Frank Almeida and Hillary Herring have also been involved in revising silver and red hake catch-at-age data for use in future assessment analyses, and Barry Armet, Brian Hayden, and James Baker have spent considerable time processing and analyzing commercial and survey data for northern shrimp.

Fishery Systems Investigation

Activities for August were highlighted by the Annual Meeting of the American Fisheries Society in Kingston, RI, during 21-25 August. The meeting was attended by Gordon Waring (who participated in the poster session), Mike Sissenwine (who participated in a striped bass State-Federal scientific committee meeting held in conjunction with the AFS meeting), and others.

Mike and Gordon also attended a New England Regional Fishery Management Council meeting at the University of Rhode Island on 9 and 10 August. Gordon made a sea-sampling trip aboard the Immigrante out of New Bedford during 28 August - 2 September.

Anne Lange continued as the NEFC's scientific representative at US-Canadian boundary negotiations. She attended meetings associated with the negotiations in Washington, DC (2-4 August), Ottawa (10-13 August), and Boston (21 August). Considerable time was required in preparation for these meetings. In her spare time, Anne prepared with Fred Lux a document on flounders other than yellowtail flounder and summer flounder as background for a fishery management plan. She also completed two additional manuscripts indicated below.

Karen Johnson was on a leg of the summer bottom trawl survey through 13 August. During the remainder of the month, she prepared a paper on the length-weight relationship of Loligo and Illex. Karen departed for school on 23 August. Kathy Rodrigues will now be responsible for squid sample workup. Kathy also helped Dick Hennemuth in the preparation of a paper reviewing the status of stock-recruitment models throughout the world.

Margaret McBride prepared a trip report on her sea-sampling trip of last month. Otis Jackson continued working with a group of consultants which is now developing an improved data management package.

Manuscripts

Clark, S. H., L. Cleary, and T. S. Burns. 1978. A review of the Northwest Atlantic pollock resource. ICES C. M. 1978/G:61. 33 p.

Hayden, B. P., and E. D. Anderson. 1978. Information on the current status of bluefish (Pomatomus saltatrix) in the Gulf of Maine - Middle Atlantic area. NMFS, NEFC, Woods Hole Lab. Ref. No. 78-41. 9 p.

Lange, A. M. T. Historical trends and current status of the squid fisheries off the Northwestern USA. Proceedings of the Illex Squid Workshop, Halifax, NS, 25-26 May. (A)

Lange, A. M. T., and M. P. Sissenwine. Biological conditions relevant to the determination of optimum yield of squid (Loligo pealei and Illex illecebrosus) of the NW Atlantic. NOAA Tech. Rep. NMFS SSRF. (S)

Resource Assessment Division. 1978. Summary of stock assessments, August 1978. NMFS, NEFC, Woods Hole Lab. Ref. No. 78-40. 26 p.

Murawski, S. A., and C. F. Cole. 1978. Population dynamics of anadromous rainbow smelt, Osmerus mordax, in a Massachusetts River System. Trans. Amer. Fish. Soc. 107(4):535-542. (P)

Ropes, J. W., A. S. Merrill, S. A. Murawski, S. W. Chang, and C. L. MacKenzie, Jr. Chapter XI. Impact on clams and scallops associated with anoxic bottom water in the Middle Atlantic Bight during the summer of 1976. Part I. Field survey assessments. In R. L. Swanson and C. J. Sindermann, eds. Oxygen depletion and associated mass mortalities in the New York Bight, 1976. NOAA, ERL-MESA Spec. Publ. (A)

Serchuk, F. M., S. A. Murawski, E. M. Henderson, and B. E. Brown. The population dynamics basis for management of offshore surf clam populations in the Middle Atlantic. Proceedings of the Northeast Clam Industries - Management for the Future. (A)

MARINE ECOSYSTEMS DIVISION

Ecosystems Dynamics Investigation

Marv Grosslein, Wendell Hahm, and Ed Cohen met with Mike Sissenwine of the Resource Assessment Division to decide on modifications and improvements of the ecosystem simulation model of Georges Bank (GEORGE). Wendell Hahm is in the process of modifying the programming of GEORGE to take into account both nonlinear relationships in species interactions and geographic detail. Ed Cohen and Red Wright of the Fishery Oceanography Investigation completed their paper, "Changes in the Plankton on Georges Bank in Relation to the Physical and Chemical Environment during 1975-76," for the ICES symposium in the fall. Ed Cohen, with Ken Sherman and Jack Green, worked on a paper comparing the primary and fisheries productivity of the Gulf of Maine, Georges Bank, and Southern New England which will be presented in a special ICES symposium in the fall. Mike Pennington has been at the Second International Ecological Statistics Conference where he delivered a paper and chaired one of the sessions. Marv Grosslein was on leave part of the month; after his return he left for the ecological statistics conference to present a paper (co-authored by B. E. Brown and R. C. Hennemuth) titled "Research, Assessment, and Management of a Marine Ecosystem in the Northwest Atlantic - A Case Study."

Recruitment Processes Group

Greg Lough has devoted considerable time this month to planning details of this fall's Georges Bank larval Atlantic herring patch study and to consolidating the report of the discussions from the fifth planning meeting held during 26-28 July 1978 at the Bedford Institute of Oceanography. We also are in the final steps of putting together two major larval herring reports for the New England Regional Fishery Management Council's Atlantic herring assessment review: (1) "Summary of Larval Herring Survey Data, 1968-1978, for the Georges Bank and Gulf of Maine Area Used in Abundance Estimates;" and (2) "Larval Abundance and Distribution, Growth and Mortality of Sea Herring in Relation to Spawning Stock Size and Recruitment for the Georges Bank and Gulf of Maine Area, 1968-1978." These two reports will be major milestones for the Recruitment Processes Group. Sorting and measuring of all fish larvae were completed from eight MOCNESS vertical hauls (72 samples) collected in March 1978 in the Nantucket Shoals area. Individual net volumes of water strained have not been estimated as yet to standardize the data. Most of the MOCNESS samples from this cruise have 100 or less American sand lance larvae, and an insignificant number of Atlantic herring larvae. Sorting is now in progress on the November 1977 MOCNESS samples collected on Anton Dohrn. We have recently finished processing samples of two consecutive winters, 1975 and 1976, for larval herring gut contents and condition factor measurements. The data are to be keypunched and analyzed to examine the possible relationship of larval herring prey selection and condition with distribution and abundance of prey species and with larval population mortality and growth rates during the overwinter period.

Larval Physiology and Biochemistry Investigation

Studies of zooplanktonic prey mortality rates and spatial distributions at different concentrations within experimental larval fish rearing aquaria were completed. These studies were designed to augment and validate assumptions concerning larval fish feeding studies. Results showed that zooplanktonic prey were randomly distributed according to a Poisson distribution and that mortality rates approached 20%/day. Drs. Beyer and Laurence have completed initial development of the Barrier stochastic model describing growth and mortality of winter flounder larvae. They are now analyzing previously collected experimental data on haddock, Atlantic cod, and summer flounder for use in extending the model and developing future studies. Geoff Laurence presented an invited paper on a stochastic model of larval fish growth and mortality in a special session on Stochastic Methods in Fishery Science at the 108th Annual Meeting of the American Fisheries Society in Kingston, RI. A manuscript entitled, "A Stochastic Dynamic Model of Larval Fish Growth," has been submitted to the journal "Ecological Modelling."

Work on the summer flounder serum electrophoresis sex determination study was continued. We are presently looking at the effect of IM injection of carp pituitary extract on vitellogenin levels. Fluorometric methods for the determination of nucleic acids are being evaluated in hopes of standardizing an alternate method to the Schmidt-Thannhauser procedure for very small quantities of nucleic acids. Results of nucleic acid analysis of Atlantic mackerel and bluefish muscle, liver, and brain using the fluorometric ethnidium bromide method are being compared with results obtained by the Schmidt-Thannhauser procedure.

Fishery Oceanography Investigation

Preparations for our 11-16 September current-meter cruise (Albatross IV Cruise No. AL 78-11) have progressed well during the month of August. Gil Dering and Tom Laughton have completed renovation and testing of six vector-averaging current meters (VACM's) and all four AMF releases. Three new VACM's were checked out at Nova University in Florida and have been delivered to the Woods Hole Laboratory. Two more units are being reconditioned at Nova for early September delivery. In addition, arrangements have been made to borrow two ENDECO tethered current meters so that there will be a total of 13 meters in the array.

It was agreed with the Canadians at Bedford that each current-meter mooring should be protected by three large marker buoys, with radar reflectors and flashing lights, set in a triangle around the subsurface mooring. We have succeeded in borrowing four of the necessary nine buoys from WHOI and Steve Ramp has arranged for the others to be obtained as surplus from the US Navy Base in Newport, RI. The towers are being welded locally. While we were at it, we also obtained additional large buoys, several smaller floats, and other lots of hardware and wire.

The Textronix Graphics System has been set up so that it now functions as a regular alphanumeric terminal, but because of a low transmission rate it is still not fully operable as a graphics terminal. That problem is being corrected. In the meantime, we plan to take the system to sea on Albatross IV Cruise No. AL 78-11 to try it out in conjunction with the new Neil Brown CTD unit which has just been delivered.

Data analysis continues with Sam Nickerson completing the bottom temperature charts for the bottom trawl survey cruises during 1972-77, and Red Wright amending the text of the earlier report on surface observations to incorporate the new material. Vertical temperature, salinity, and oxygen sections from Albatross IV Cruise No. AL 78-06 have been drawn by Jim King and Tim Cain; Jim and Ron Kirschner are comparing Northeast Channel wind data derived from weather maps at the Woods Hole Laboratory and by computer in Monterey, CA; it looks as if we can use the computer results with negligible loss in quality and great saving in time. Steve Ramp, with Maxine Jones, has completed programming for STD data to the point that we are now receiving temperature-salinity (T/S) diagrams.

Dan Patanjo has put together a summary of NEFC cruises on which XBT, STD, or bottle stations have been made, together with cruise tracks, for quick reference and for keeping track of the data. Gil Dering and Tom Laughton have designed and built a flowmeter for Dave Potter, with a test box, for the flow tank at Otis. The papers by Ed Cohen and Red Wright and by Steve Ramp and John Vermersch have been photocopied and sent to ICES. Ron Kirschner has completed SOOP run reports for both July and August. Tim Cain has written a report on the EEO conference he attended in Washington in late July. Anne Dorkins, Bill Burns, and Jim King are all leaving at the end of August to return to school or college.

Ichthyoplankton Investigation

The Belogorsk sailed from Woods Hole on 9 August to begin the sixth and final MARMAP I survey of FY 78. Tom Morris is Field Party Chief. He and Bill Brennen represent the Ichthyoplankton Investigation on the 30-day cruise, which began off Cape Hatteras and proceeded northward through the Middle Atlantic Bight. All phases of hydrography, plankton, and primary productivity work are

reportedly going well. Young bluefish dominated neuston catches off Virginia, while larval butterfish, hake (species unspecified), and Gulf Stream flounder occurred most frequently in 60-cm bongo tows.

We were privileged to have four visiting scientists from the Morski Instytut Rybacki in Szczecin, Poland, visit the Sandy Hook Laboratory for a 3-wk period. Elzbieta Mazuchowska, Barbara Kosiorowska, Hanna Fidelus-Ferlas, and Janusz Rozack arrived on 2 August to assist us in joint research and further develop their expertise in identification of fish eggs and larvae from the western North Atlantic. Ann Naplin worked with them on eggs of Atlantic cod, haddock, yellowtail flounder, and Atlantic mackerel. Doris Finan gave them a detailed accounting of our laboratory procedures and assisted them in identifying some of the more exotic larvae that occur in samples taken along the edge of the continental shelf. Pete Berrien and Art Kendall gave short seminars on identifying larvae belonging to the families Sciaenidae and Serranidae.

We are beginning to assemble our contribution to the BLM contract. With all the existing loose ends, several of us will be busy for the next month. Dr. Arthur Kendall, Fishery Biologist, transferred to NMFS in Seattle, WA.

Plankton Ecology Investigation

Plankton Hydrography

Upper 100-m integrated temperatures and stratified and mixed (isothermal) areas have been determined for the Gulf of Maine and Georges Bank on the basis of XBT observations obtained on eight bottom trawl surveys made during the spring and fall of 1972-75. These data are now being analyzed with respect to the distribution of ichthyoplankton and zooplankton taxa.

Plankton Sorting Group

Zooplankton samples collected on 1978 MARMAP cruises are being processed as they become available. We have completed samples taken during February-May on Albatross IV, Argus, and Delaware II from the areas of Southern New England, Georges Bank, and Gulf of Maine.

An exhibit was set up for the American Fisheries Society Open House on 23 August. It included examples of laboratory procedures and equipment used for processing zooplankton samples, from splitting techniques and identification methodology to published data analyses. Many of the conference delegates expressed interest in the aliquoting procedure and equipment, and in the sophistication of the techniques used for species identification. Mutual identification problems and available reference materials were discussed with those engaged in similar research.

Three members of the sorting group have left upon completion of their 1040 appointments: Vivian Botelho, George Donnelly, and Eric Stirrup. Two summer employees, Dennis DiIorio from the University of Rhode Island and Steven Kramer from the University of Massachusetts, will be returning to college this month.

Biostatistics Unit

Progress was made during August to incorporate additional data into the MARMAP Information System (MIS). A significant portion of this data relates to those cruises being studied through a contract with BLM. The final training

session for members of the Biostatistics Unit in the operation and maintenance of the MIS was held on 28 August. Gene Heyerdahl (NEFC), Kay Paine (Woods Hole Laboratory), Herb Stern (NEFC), and Mary Laird (NEFC) met with Ken Sherman, Dave Bearse, Mert Ingham (AEG), and Jack Jossi on 1 August at Narragansett to discuss ADP problems and progress relative to the implementation of the "NMFS NE Regional Fisheries Information System." Members of the Biostatistics Unit assisted Mark Reed, a graduate student in Ocean Engineering at the University of Rhode Island, in his efforts to gather organism data for use in his oil-spill model for Georges Bank. Dave Bearse sat in on a meeting on 29 August at the Graduate School of Oceanography (GSO) of the University of Rhode Island, where it was resolved that the GSO would pursue attempts to upgrade its computer facility with the purchase of an Interdata Model 8/32 Minicomputer.

Image Analysis Project

Approximately 100 fishery scientists from the American Fisheries Society attended a demonstration of the Image Analysis System on 23 August as part of an open house. Most were interested in the system's capability to measure fish eggs and larvae.

Ray Maurer completed a poster summarizing the initial results in automating plankton counting, sizing, and computer-aided identification. This poster will be presented at the annual ICES meeting in Copenhagen, Denmark.

Results of a discriminant function analysis performed by Bill Johnson (University of Rhode Island's Oceanography Department) using morphometric measurements from published figures of zooplankton are extremely encouraging. By this method, 100 species of plankton were placed into their six respective major taxonomic groups (copepods, chaetognaths, euphausids, fish eggs, cladocerans, and pelecypod veligers) with an accuracy of 93%. Joe Kane completed calculations for the comparison of copepod length-frequency distributions, manual versus electronic. For this experiment, 300 specimens of Calanus finmarchicus were measured by a technician using a microscope and then measured electronically using the Image Analyzer. No significant differences were detected between the two methods. A progress report to OOE/NOAA summarizing the summer's activities is in preparation.

Apex Predators Investigation

During August over 1,000 sharks were tagged and 50 were recovered. This is the largest number of recoveries in any 1-mo period. A tag was returned from a male blue shark that traveled from Martha's Vineyard to Cabo São Vicente, Portugal (2,839 mi in 381 days). This is the second west-to-east crossing of the Atlantic by a tagged blue shark and strengthens our hypothesis of a mixed Atlantic blue shark population. The blue shark was tagged from the Geronimo, the sailing classroom of St. Georges School of Newport, RI. From 11 to 18 August, Larry Lindgren sailed on the Geronimo for the purpose of tagging sharks and collecting samples. Longest time at liberty for a tagged shark caught this month was 425 days. This female blue shark was tagged south of Montauk, NY, and recaptured off Boothbay, ME. Forty-five other blue sharks were recaptured in August; nine of these were retagged and released by the sports fishermen. Other recaptures included short distance migrations of a nurse shark, a brown shark, and a bonnethead.

Four tournaments were attended this month. Twelve fish at the Freeport Fishing Festival on 5 August were sampled by our colleague, George Benz, of the University of Connecticut. The largest fish was a female mako weighing 585 lb and approaching sexual maturity. Twenty-three fish were sampled by us at the Hudson Anglers Shark Tournament at Freeport, NY, on 12 August, and 75 sharks were examined at the Roger Williams Shark and Billfish Tournament on 12, 13, and 14 August. Twelve fish were examined at the Ocean City, NJ, Marlin and Tuna Tournament by Nancy Kohler on 23 and 24 August. Routine samples at all tournaments included vertebrae of tagged and unusual sharks for age studies, stomach contents and liver weights for trophodynamic studies, and reproductive tissues for investigations into sexual maturity, fecundity, and seasonality of mating and pupping.

Work in the lab on histology continued as Alan Lintala cut and stained tissue samples from the August tournaments. We embedded mako vertebrae to continue our attempts at aging this species. John Hoenig is completing his masters thesis bench work on the aging of several carcharchinids. John Hoey has joined the project after receiving a master's degree from C. W. Post College. He will be a Ph.D. candidate under Dr. Saul Saila at the University of Rhode Island.

Larry Lindgren and Dan Geary have edited and corrected the sport-tagged fish data base for 1962-77. Wes Pratt is in the final stages of rewriting the blue shark reproduction manuscript which should be submitted next month.

Benthic Dynamics Investigation

Study of the New England macrobenthic invertebrate fauna was continued. The quantitative distribution of Pelecypoda was completed. Another aspect of the New England benthos study that required a substantial amount of effort this month was an analysis of the invertebrates inhabiting the continental shelf and upper slope area south of Martha's Vineyard. In addition to the quantitative distribution of this fauna, the mode of feeding by various faunal components is being analyzed and the results will be incorporated in a special report. Updating of five benthic data files was completed.

Food habit studies of demersal fishes taken on bottom trawl surveys were continued throughout the month. Work also progressed on the quantitative aspects of foods consumed by major fish species in the region between New Jersey and Nova Scotia. Arrangements were made with the Massachusetts Division of Marine Fisheries to obtain stomachs from fish, for food habit studies, collected in inshore waters of Massachusetts. Also, special effort this month was devoted to collecting stomachs of pelagic fishes and squids. For this purpose, mid-water and upper-level samples of these two groups were collected by the Soviet research vessel Aliot in several areas extending from Southern New England to the Gulf of Maine.

Roland Wigley is collaborating with other NMFS personnel in assisting the New England Regional Fishery Management Council with the preparation of a red crab management plan. Rich Langton conferred with staff members of the Department of Fisheries and Oceans at the Biological Station in St. Andrews, NB, concerning preparations for the larval patch study to be conducted in the Georges Bank - Gulf of Maine area this fall.

Meetings, Talks, Visitors, Publicity

On 1 August Herb Stern, Gene Heyerdahl, Kay Paine, and Mary Laird visited the Narragansett Laboratory from Woods Hole regarding ADP. Ken Sherman and Robert Edwards attended the New England Regional Fishery Management Council meeting at the University of Rhode Island on 9 August. Dick Haedrick of WHOI visited the Narragansett Laboratory on 22 August. From 23 to 29 August the Narragansett Laboratory and staff were visited by Elzbieta Mazuchowska, Barbara Kosiorowska, Hanna Fidelus-Ferlas, and Janusz Rozack, scientists from the Polish Plankton Sorting and Identification Center in Szczecin, Poland. On 23 August Dave Wallace, along with about 400 members of the American Fisheries Society and several members of the press visited the Narragansett Laboratory during the Bay Campus Open House. Ken Sherman presented a talk at the American Fisheries Society annual meeting on 25 August on the Argo Merchant oil spill and its impact on fisheries. Dr. Bruce Wing of the Auke Bay Laboratory visited the Narragansett Laboratory on 28 August.

An exhibit of MARMAP activities in the NEFC was displayed at the Maine Seafood Festival in Rockland during 3-6 August by Bob Marak. Considerable interest in the exhibit (especially by commercial fishermen) was shown by those who visited the fisheries tent. Discussions with fishermen concerning our role in conducting fisheries ecosystem studies to support multispecies fisheries-management plans were most useful. Hostility directed to NMFS from a good number of local fishermen, although not fully overcome, was reduced significantly through our open dialog.

Bob Marak participated in the Sea Grant site visit at VIMS, Gloucester Point, VA, during 28-30 August. The 32 projects proposed made the evaluation very difficult as the costs were about twice that available. The program is well managed and has good balance. Although many of the projects are concerned primarily with local problems, there are a number that have a bearing on broader ecosystem research problems.

On 9 August, Carolyn Griswold attended a meeting of the BLM Biological Task Force in New York City. The group reviewed blocks which have been leased for oil and gas exploration in the Mid-Atlantic. The group was also authorized by the BLM OCS office to review the draft study plan for the Mid- and North Atlantic lease areas and to make suggestions for additional studies. NEFC personnel had developed several study proposals in May and these were submitted for consideration at the 9 August meeting.

Together with the Graduate School of Oceanography and the EPA Laboratory, the Narragansett Laboratory hosted more than 400 participants from the American Fisheries Society annual meeting held at the University of Rhode Island. Each of the NEFC's major research programs had displays, and representatives greeted visitors and described the various programs. The Delaware II and the Belogorsk were open for tours during the day.

Manuscripts

Publications

Beyer, J., and G. C. Laurence. A stochastic dynamic model of larval fish growth. Ecol. Model. Jour. (S)

Fahay, M. P., and C. Obenchain. 1978. Leptocephali of the ophichthid genera, Ahlia, Myrophis, Ophichthus, Pisodonophis, Callechelys, Letharchus, and Apterichtus on the Atlantic continental shelf of the United States. Bull. Mar. Sci. 28(3):442-486. (P)

Roberts, S. 1978. Biological and fisheries data on northern searobin, Prionotus carolinus (Linnaeus). NMFS, NEFC Tech. Ser. Rep. No. 13. 53 p. (P)

ICES Papers

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Taille, C., and R. Wigley. 1978. Transect sampling methods and their application to the deep sea red crab. ICES Res. Doc. C.M.1978/D:12, Ref. K.

Pennington, M. R., and M. D. Grosslein. 1978. Accuracy of abundance indices based on stratified random trawl surveys. ICES Res. Doc. C.M.1978/D:13.

Beyer, J., and G. C. Laurence. 1978. A stochastic model of larval fish growth. ICES Res. Doc. C.M.1978/L:28.

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Sherman, K. 1978. Ecological implications of biomass changes in the Northwest Atlantic. ICES Res. Doc. C.M.1978/L:24.

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Ramp, S., and J. Vermersch. 1978. Measurements of the deep currents in the Northeast Channel, Gulf of Maine. ICES Res. Doc. C.M.1978/C:40.

ICES Posters

Maurer, R., W. C. Johnson, H. P. Jeffries, and K. Sherman. 1978. Initial results on semi-automatic identification and size frequency analysis of zooplankton samples. C.M.1978/Poster Session No. 3.

Reports

Kirschner, R. A. 1978. July 1978 temperature transects of the Gulf of Maine. NMFS, NEFC SOOP Rep.

Kirschner, R. A. 1978. August 1978 temperature transects of the Gulf of Maine. NMFS, NEFC SOOP Rep.

Brown, B., and R. C. Hennemuth. Research, assessment, and management of a marine ecosystem in the Northwest Atlantic - a case study. Paper presented at Ecological Statistics Conference.

MANNED UNDERSEA RESEARCH AND TECHNOLOGY

During 24 July - 7 August, the MURT team was involved in a surf clam-ocean quahog survey off Rockaway Beach, NY. Eleven stations which had been occupied during August 1977 were reoccupied to measure clam density, size distribution, depth distribution, and other parameters. Samples were taken for contaminant analysis and respiration studies. Representative samples were marked and replanted for long-term growth and survival studies.

During 14-18 August, divers C. Gross, K. Pecci, C. Newell, and K. McCarthy, attended the "JIM" 1-at diving suit demonstration. The demonstration was sponsored by the University of New Hampshire, the MUST Office, and the US Navy. Our divers participated as the "JIM" operators, and as support divers. The demonstration was held at UNH's Marine Laboratory on Appledore Island, ME. Due to late arrival and several mechanical problems, the "JIM" suit was unable to attempt the majority of scheduled scientific tasks.

DIVISION OF ENVIRONMENTAL ASSESSMENT

Behavior of Marine Fishes and Invertebrates Investigation

In earlier studies with adult Atlantic mackerel, Scomber scombrus, in which we subjected fish to temperature changes in a homeothermal environment, activity increases were observed with both increasing and decreasing temperatures. The similarity of the response to either a rise or fall in temperature led us to surmise that this was indicative of avoidance behavior, pointing to the capability of these fish to regulate behaviorally their position within particular thermal regimes. This was much the same response that we had seen with bluefish, Pomatomus saltatrix.

To examine more closely the influence of temperature, especially the role of thermal discontinuities on distribution, we have begun a series of laboratory experiments with juveniles. As in our experiments with juvenile bluefish, which are still in progress, fish are exposed to various vertical temperature gradients.

Distribution of the fish in the gradient is being recorded every 20 sec by means of time-lapse photography and correlated with temperature which is continuously monitored. Studies to date have shown that while the juvenile mackerel, when exposed to a vertical gradient, will periodically approach and appear to test the location of a thermal discontinuity, they tend to remain at or close to the acclimation temperature. In contrast, juvenile bluefish appear to show some attraction to the discontinuity, testing its location more frequently and remaining at colder temperatures for longer periods of time. Studies on both species are continuing.

Biological Oceanography of Stressed Environments Investigation

Christine Evans and Amy Fischer participated in the first leg of the phytoplankton baseline survey/ichthyoplankton cruise aboard the USSR Belogorsk. Amy Fischer, Susan Barker, and William Hogelin are participating in the second leg which will terminate in September. Samples for chlorophyll were collected at 83 stations during the first leg. Instead of freezing and returning the samples to the laboratory, all samples were analyzed in the field. A total of 1,230 samples were analyzed in this manner and completed data sheets ready for keypunching were returned to the laboratory. This mode of operation will enable us to operate next winter and spring on back-to-back cruises without incurring a backlog of chlorophyll samples which would deteriorate with time. In the laboratory we are still trying to eliminate the backlog of chlorophyll samples from earlier cruises. During August, samples from all but 20 stations collected in May on the USSR Argus were completed.

During August, Jay O'Reilly and Steve Ward worked with Soviet scientists aboard the USSR Belogorsk to initiate extensive measurements of phytoplankton primary productivity between Cape Hatteras and Nova Scotia. The productivity of several size fractions was measured at two stations on each day of the cruise. Samples have been returned to the Sandy Hook Laboratory to be counted via liquid scintillation to determine values of simulated in situ primary productivity.

Myra Cohn traveled to Norfolk, VA, on 29 August to meet with Dr. Harold G. Marshall, Chairman of the Biology Department at Old Dominion University. As a result of their discussion, coordinated investigation of phytoplankton populatio dynamics at coastal and offshore stations from Cape Hatteras to Nova Scotia is being proposed. Separate segments of the study will be conducted by Dr. Marshal and by Mrs. Cohn. The objective will be to investigate the phytoplankton specie composition, abundance, and distribution in the area as a part of the environmen assessment program, "Ocean Pulse," which is responsive to long-term environmenta problems affecting living marine resources. The investigation is to be conducte in the Ocean Pulse mode: (1) determination of the present status of phytoplankto populations, (2) identification of normal patterns of phytoplankton abundance, distribution, and seasonal succession; (3) documentation of changes from these established norms; and (4) the development of an ability to forecast trends and events such as the onset of toxic phytoplankton blooms with probable environment impact.

Mr. William Phoel collaborated with scientists from the Virginia Institute of Marine Science in an intensive investigation into the cyclic stratification o the York River, VA. In situ oxygen consumption and nutrient exchange experiment were conducted on the sediments at three different depth strata throughout the

monthly stratification cycle. The isolation of bottom water by a strong halocline resulted in conditions similar to those found off the New Jersey coast during the fish kill of 1976 and current studies may provide information leading to a model which can better explain the development of low dissolved oxygen levels in coastal waters.

A manuscript, "Salinity Influence in Phytoflagellate Blooms in Lower New York Bay and Adjacent Waters," by John B. Mahoney and John J. McLaughlin (Fordham University) has been completed and is undergoing internal review.

Coastal Ecosystems Investigation

The past month's work chiefly involved: (1) meeting with Ocean Pulse (OP) participants and sponsors, and further revision of the OP document; (2) reviewing the Center's Oil Spill Response Plan; (3) preparing a final draft of the technical report for the final benthic data set (RECON) remaining from past MESA-sponsored benthic studies; (4) preparing a final draft of a report on the dissolved oxygen levels in the New York Bight during 1977; (5) preparing for the second full-scale OP cruise, to be held aboard Albatross IV during 18 September-12 October 1978; and (6) revising our final report to the Bureau of Land Management concerning the benthos of oil tract areas in the Baltimore Canyon Trough.

Benthic macrofauna sample processing concentrated on the 1976 anoxia area off New Jersey. We now have a fairly extensive data base on severity and areal coverage of initial impacts, and also a good time series of information on the progress of recolonization. A manuscript on these findings is in preparation. We are beginning to process 26 selected samples from the fourth quarterly (spring 1974) MESA cruise to the New York Bight apex, to fill in some critical gaps in our understanding of macrofauna distributions in the apex. Ann Frame spent 2 days at the Woods Hole Laboratory assisting benthic personnel there in species identification.

Drs. Sukwoo Chang and John Pearce continued their analyses of epibenthic data relating seasonal recruitment and survival of key fouling species to substrata type, time of year, and biotic interactions. Station locations being dealt with are off Gloucester, MA; Sea Bright, NJ; and Charleston, SC.

Dr. Pearce completed the final editing of a report developed by NEFC and the Charleston Laboratory, SEFC, concerned with heavy metals in finfish and shellfish.

Physiological Effects of Pollutant Stress Investigation

Physioecology

Oyster larvae respiration experiments were interrupted temporarily this month. The experiments will be started again when new microrespirometers arrive.

Surf clams were spawned nine times this month. Only two of the spawnings produced usable data; fewer than 1% of the eggs were successfully fertilized in the seven other spawning attempts.

A long-term (45-day) copper-exposure experiment with the deposit-feeding clam Macoma balthica continued this month. At the 30-day point, there were extensive mortalities at the 50-ppb exposure levels. Behavioral changes (appearance on the surface) were observed at 25 ppb, whereas those clams that were exposed to 0 and 5 ppb remained wholly submerged in the sand.

A 10-day experiment to determine the effect of silver on the embryos and larvae of the American oyster under various temperature-salinity regimes was completed. The results are being analyzed.

Physiological Effects

A second series of blue mussels was recovered from Narragansett Bay as part of the EPA-NEFC cooperative study. Again, stress was measured by gill-tissue oxygen consumption and serum osmolality, sodium, and potassium measurements.

Work is also continuing on some effects of silver on bivalve metabolism. Copper has now been added as an additional pollutant in these studies.

Considerable effort has been expanded with the Brett respirometers this month with the addition of Mr. Richard Gillerman, a predoctoral student from the University of Massachusetts, Amherst, to the Physiology Group.

Biochemical Effects

The biochemistry lab is undergoing renovation following removal of the spawning tables to more practical areas. While new benches and sink and drawer-cupboard units are being installed with attendant electrical and plumbing operations, the various activities of this subtask are scattered about several labs.

Bench work included enzyme profiles of skeletal muscle from the cadmium-exposed lobsters held in either low-salinity or ambient-salinity seawater; female gonads from the cadmium-flounder recovery experiment; and blue mussel gills from the July and August Mussel Watch sampling (collaborative study with EPA-Narragansett), plus adductor muscles from the July collection. Most of the data generated these past two months is still in the calculation and statistical analysis mill.

Anaerobic Bacteriology/Metabolism

An interim report on the cooperative oyster study with the SEFC's Charleston Laboratory was prepared and submitted. Results show that bacterial growth and toxin production can occur in oysters that are first heated and then inoculated with Clostridium botulinum type E.

Ocean Pulse Activities

Ocean Pulse activities and observations to date were summarized in an ICES document prepared by A. Calabrese, F. P. Thurberg, E. Gould, and J. T. Graikoski. The report was written, revised, printed, and shipped off to Denmark in less than 3 wk. The title is: "Ocean Pulse: Some Physiological, Biochemical, and Bacteriological Activities."

Meetings, Talks, Visitors, Publicity

On Monday, 7 August, Dr. John Pearce and Mr. Frank Steimle attended a NMFS meeting in Washington designed to present the Ocean Pulse program to Washington staff members including Mr. Robert Scott, Dr. Lamar Trott, Dr. Douglas Lipka, EAD and NOAA Ocean Engineering personnel, and other interested groups. The presentation covered the development and implementation of the Ocean Pulse program to date.

Dr. Pearce attended a special planning meeting for an oil response workshop to be held later in August. The planning meeting was held on Tuesday, 8 August, at the University of Maryland, Horne Point facility. Plans were made for the structure and conduct of the NOAA/EPA workshop concerned with responses to oil spills.

Dr. Angela Ivanovici, Australian marine biologist in this country as a Harkness Fellow, visited the Milford Laboratory on 14 August and presented a seminar.

Mr. Frank Steimle represented Dr. Carl Sindermann, Laboratory Director, Sandy Hook Laboratory, at the monthly meeting of the New York Bight Advisory Committee in Edison, NJ, on 14 August.

On Monday, 21 August, Dr. John Pearce and Mr. Frank Steimle participated in a special presentation before NOAA Associate and Assistant Administrators. The hearing provided a forum for presentations on three NOAA programs concerned with long-range environmental assessments and monitoring. Dr. Pearce and Mr. Steimle presented materials concerned with the Ocean Pulse program while Dr. Larry Swanson and Dr. Alex Malahoff discussed the ERL MESA program and the NOS Ocean Dumping program, respectively. Following the presentations, extensive questions were asked and discussions were held.

During 22-24 August, Myra Cohn participated in a seminar for Federal Women's Program Managers conducted by the New York Region of the US Civil Service Commission. The course was presented at the Federal Building in New York City.

Dr. Richard Cooper and Mr. Joe Uzmann visited the Sandy Hook Laboratory on 22 August to discuss the Ocean Pulse program. Dr. Cooper and Mr. Uzmann brought up the matter of contractual studies, and arrangements were made to give small contracts to personnel from the University of New Hampshire and Southeastern Massachusetts University so that they can implement Ocean Pulse studies at special strata located in the Gulf of Maine.

Mr. Tom Wilhelm participated in the special Center displays provided to participants at the American Fisheries Society meeting held at Narragansett on 23 August. Mr. Wilhelm manned the display which covers the various activities of the Division of Environmental Assessment as well as the Ocean Pulse program.

During 28-31 August, Drs. John Pearce, James Thomas, Tony Calabrese, Fred Thurberg, and Mr. Frank Steimle participated in a special EPA/NOAA workshop concerned with responses to spills of oil and other toxic substances. Dr. Pearce chaired three panels concerned with marine biology, offshore environments, and pelagic organisms. Reports were developed for each of the panels during the 3-day meeting. The reports should be available in published form within a month or so.

Dr. Marvin Freadman has officially completed his predoctoral tenure at the Milford Laboratory by submitting a copy of his thesis, "Swimming Energetics of Striped Bass and Bluefish." The major portion of his study was completed using our Brett respirometer facilities.

Manuscripts

Mahoney, J. B., and F. W. Steimle. A mass mortality of marine animals associated with a bloom of Ceratium tripos in the New York Bight. Proceedings of the 2nd International Conference on Toxic Dinoflagellate Blooms. (A)

Olla, B. L., and C. Samet. Effects of elevated temperatures on early embryonic development of the tautog, Tautoga onitis. Trans. Amer. Fish. Soc. (A)

Radosh, D. J., A. B. Frame, T. E. Wilhelm, and R. N. Reid. Benthic survey of the Baltimore Canyon Trough, May 1974. Final Report to Bureau of Land Management. (S)

Reid, R. N., and F. W. Steimle. Offshore oil production and United States fisheries. ICES Pap. C.M.1978/E:49. (A)

Thomas, J. P., J. E. O'Reilly, C. N. Robertson, and W. C. Phoel. Primary productivity and respiration over Georges Bank during March and July 1977. ICES Pap. C.M.1978/L:37. (A)

AQUACULTURE DIVISION

Spawning and Rearing of Mollusks Investigation

The rapid growth of surf clams in the tank farm has slackened considerably from the level at the early part of the summer. The rate of growth in both weight and length has decreased. This drop in growth corresponds with low fluorometric readings, indicating low levels of available phytoplankton in the ambient seawater. Data illustrate that the greatest growth occurred during May through July of this year. The growth recorded within this period confirms the biological feasibility of rearing seed clams which are greater than 10 mm early in May, to a projected market size of 55 mm by the end of July.

Surf clams that naturally ripened in late spring are being held at 10°C to delay spawning. The viability of gametes from these animals remained high until recently. Examination of this brood stock revealed that although the clams still had full gonads, the other body tissues were flaccid. Supplemental algae were provided to the remaining brood stock and the viability and percent development of the gametes have improved. The condition of the visceral tissues has also improved. Apparently, no reabsorption had occurred although the clams had been subjected to nutritional stress.

In an attempt to optimize the growth and handling of young bay scallops in our raceway system, an experiment was performed in which groups of 20,000 5-mm scallops were grown either suspended in a net or on the bottom on the runways. The suspended scallops were slightly easier to clean and grow fractionally faster than those on the bottom but these small advantages would be outweighed by the cost of the suspension net. The suspension net system may offer some economic advantages at times when siltation is heavy, and might provide us with a means to introduce even smaller scallops to the raceway system.

Two thousand 55-mm surf clams were provided to the Gloucester Laboratory for food storage studies.

The Wampanoag Tribal Council at Gay Head, MA, was provided with 5,000 seed scallops about 35 mm in average length.

Aquacultural Genetics Investigation

Mass Selection

A series of experiments to study the relationship between the size of spawning adult American oysters and the growth rate in their larval offspring has been made. Assortative mating schemes were employed whereby the largest oysters of the hatchery-reared 1976 year classes were mated among themselves. Similar assortative matings were made among the smallest of the 1976 year-class oysters. Within each group larval growth rate was measured. Although random differences did occur, no consistant significant differences in larval growth rate were found between the two groups. Previously, we reported that the fastest growing larvae continue to be the fastest growing adult oysters. The evidence reported above indicates that the reciprocal relationship does not hold true. The fastest growing adults do not necessarily have faster growing larval offspring.

Experimental Inbreeding and Outbreeding in the American Oyster

Six inbred crosses and one outcross were made this month from 1977 year-class (F) fullsibs of the American oyster. The average size of 20 spawners from a single spawning was relatively small at 14 cm^2 (l x w) compared to 35 cm^2 for 2-yr old fullsib spawners used in crosses made in the spring. The number of eggs averaged only 350,000 for five females. Average percent development to the straight-hinge larval stage was good at 74%. One female produced too few eggs for culturing, so after being fertilized, these eggs were preserved for cytogenetic examination only. The spawners were from groups which had been kept in the Min-O-Cool for 2 mo to retard gametogenesis, then were conditioned for about 2 wk prior to spawning.

Aspects of Nutritional Requirements of Mollusks Investigation

The capacity of straight-hinge oyster larvae to utilize nonviable particulate food as a source of nutrition was investigated in two experiments. Results are preliminary and only in the nature of exploring methodology. The material selected for the experiment was lyophilized Isochrysis galbana. Axenic cultures were concentrated by centrifugation, resuspended in sterile medium, and dried overnight. The dried material was pulverized in a mortar and screened through Nitex mesh to achieve some degree of particle uniformity. Observation of larvae 1-hr after feeding showed that the particles and living food cells were consumed by the larvae. A small amount of aeration was introduced into each beaker as a method of keeping particles in suspension. It is possible that this aeration had an inimical effect on the larvae since even the larvae receiving live food did not grow especially well. Larvae receiving the dried food were 0.008 mm smaller in size than larvae receiving living food. However, it is interesting to observe that larvae receiving dried food were 0.005 mm larger than controls receiving only dried salt as a control food. The implication is that dried algae are of some nutritional value, but not as much as living algae. Additional experiments are planned to gain more data and more significant results.

Studies on the growth response of unicellular algae to cadmiun in the growth medium were conducted to observe the effects on the growth rate. Maximum population in 0.1 mg% Cd was the same at all three initial densities ($0.3x10^6$,

$1.1x10^6$, $3.1x10^6$). In 1.0 mg% Cd, a small population increase occurred only in the most dense inoculum for the first 3 days, but these cells eventually died. With lower initial densities this initial spurt of cell division did not occur, and populations were not viable in 1.0 mg% Cd or 10.0 mg% Cd. Growth curves for Isochrysis galbana were very similar. Phaeodactylum tricornutum growth curves were studied at higher concentrations, 10 mg% Cd and 50 mg% Cd. At all three concentrations of the inoculum ($0.4x10^6$, $2.3x10^6$, $4.7x10^6$), growth rates in 10 mg% Cd were slower and maximum populations were less in 10 mg% Cd for controls. There was some growth in 20 mg% Cd in the two highest initial densities, but eventually all cells in these concentrations became moribund.

Meetings, Talks, Visitors, Publicity

Dr. Longwell attended the International Genetic Congress in Moscow, USSR, during 21 August - 1 September 1978, and presented a paper. This will be covered in next month's report.

Manuscripts

Dr. R. Ukeles prepared a manuscript entitled "American Experience in the Mass Culture of Micro-Algae for Feeding Larvae of the American Oyster, Crassostrea virginica." This paper will be presented at the International Conference on Production and Use of Microalgal Biomass to be held in Acre, Israel, during 18-21 September 1978.

PATHOBIOLOGY DIVISION

Comparative Pathobiology Investigation

Diagnostic services were provided to the States of California, Connecticut, Maine, and to Puerto Rico. Thioglycollate cultures of mangrove oysters (Crassostrea rhizophorae) from Puerto Rico demonstrated the presence of Labyrinthomyxa marina. This is the first known report of this disease in Puerto Rico, and the mangrove oyster also may be another host.

Histologic sections prepared from Macoma balthica collected in March, May, and June from the Tred Avon River, MD, were examined microscopically. Three hundred-fourteen animals were examined. Neoplastic lesions were present only in clams from Fox Hole, whereas infections from Labyrinthomyxa marina, Chlamydia sp., and bacteria were present in clams from all areas sampled (Fox Hole, Double Mills, Jenkins Creek).

The completed first draft of the manuscript on the normal histology of the blue crab is in laboratory review. The manuscript is entitled, "Histology of the Blue Crab, Callinectes sapidus (Decapoda: Portunidae), A Model for the Decapoda." The body of the manuscript is 330 pages long and the accompanying appendix (including figures) adds approximately 200 additional pages. Review of the manuscript will be a considerable task; however, the manuscript constitutes a major contribution to marine science.

From 26 July to 8 August, Dr. Johnson was a guest researcher in the lab of Dr. James Stewart, Halifax Laboratory, Fisheries and Marine Service, Department of the Environment, Halifax, NS. American lobsters were experimentally infected

with two kinds of bacteria, a gram-positive pathogen, Aerococcus viridans var. homari (the cause of a fatal lobster disease) and a gram-negative nonpathogen, Pseudomonas perolens. Lobsters were dissected after 2-14 days following infection and examined for gross pathology. Tissues were fixed for examination with light and electron microscopy. Personnel from Dr. Stewart's laboratory conducted examinations of hemolymph to determine the number of bacteria present. With both kinds of bacteria, hemocyte aggregations were prominent at certain stages of the infection, melanization of the aggregates occurred in some of the Aerococcus-infected lobsters. Interpretation of the gross pathology observed, however, must await examination of histologic sections.

Blood chemistry determinations are in progress on Atlantic menhaden with whirling disease. To date, sera from 18 fish have been analyzed for total protein, albumin, and blood urea nitrogen (BUN). Total protein varies from 0.9 to 2.2 g/dl, albumin from 0.33 to 1.1 g/dl, and BUN from 1.8 to 4.1 mg/dl. Until all blood sera have been examined, it cannot be determined whether there are any significant differences between values from diseased and normal menhaden.

Histochemical studies are being conducted on lesions from striped bass with granulomatous oophoritis to try and determine the etiology of the disease. Special stains are being used to look for microorganisms which may be associated with the ova of these fish. The fish appear to exhibit an inflammatory response to their own ova. If the results of these histochemical studies are negative for bacteria, the lesions will be examined with electron microscopy.

During the month, the histology laboratory sectioned 1,758 blocks and stained 744 slides from a large variety of marine fishes, crustaceans, and mollusks.

Disease and Environmental Stress Investigation

Nine cruises were conducted in the New York Bight to collect winter flounder (2, 4, 9, 10, 16-18, 23, and 24 August). One thousand-twenty winter flounder were examined for the presence of fin rot disease, 19 (1.8%) of the fish had fin rot. Of the 1,020 winter flounder examined, 61 were young-of-the-year fish; none had epidermal papillomas. Four cruises were conducted at the sewage sludge site in the New York Bight apex (4, 9, 18, and 24 August) and 257 winter flounder were examined, 10/257 (3.8%) had fin rot. Six cruises were conducted in Sandy Hook/Raritan Bay (2, 4, 10, 16, 17, and 23 August) and 763 winter flounder were examined, 9/763 (1.1%) had fin rot.

Gross examination of planktonic crustacea for Ocean Pulse studies, collected on the February 1978 Deepwater Dumpsite (DWD) 106 cruise, has been completed and histological examination of these samples is in progress. Seventy-eight isopods (Idotea metallica), 120 euphausids, 250 amphipods (Parathemisto) and 300 copepods were examined for abnormalities and parasites. Euphausids, which commonly were infested with ciliates in June 1977 (95%), showed little evidence of infestation in February (17%). Both control (5/34, 15%) and dumpsite (15/86, 17%) specimens were infested. Black gill tissue was observed in 4% of the February euphausids as opposed to 50-60% occurrence in the June euphausids. The variation in prevalence of these two conditions between the June 1977 and February 1978 collections possibly may help to determine the value of these conditions as environmental indicators. The amphipod Parathemisto, although not captured in June 1977, was taken commonly on the February 1978 cruise. Twenty-eight of 250 (11%) Parathemisto showed evidence of internal opalescence in the pleon segmental plates or in the thoracic appendages. A rickettsia-like organism has been reported

from freshwater amphipods and iridescence was one of the diagnostic features of infection. Histological examination of these tissues should reveal the organism's identity. In general, the condition of the isopod Idotea metallica appeared worse in February 1978 than in June 1977. Many of the specimens had necrotic foci and encrusted matter in the cuticle, and pus-like deposits in the segmental plates. Five Idotea had large pus-like masses in the telson dorsal to the pleopods. One specimen showed extension of this into the most posterior pleopods (which function as gills). Smears have been made of this material and soon will be stained.

Rock crabs were collected near Ambrose Light in the MESA New York Bight apex and examined for evidence of black gill disease. Several specimens with obvious black coloration between the articulations of the appendages were frozen and forwarded to the Atlantic Oceanographic and Meteorological Laboratory (AOML) in Miami, FL, where the gills were sonicated to obtain black sediment from between the lamellae. The sonicate was used in subsequent analysis for the sterol coprostanol. Coprostanol has been shown to be an excellent indicator for sewage in ocean sediments. The study is very preliminary at this time, but further work is planned to determine whether coprostanol is present in sediments which occlude crustacean gills. Sewage sediments are suspected to be responsible in part for the condition known as "black gill" disease. If coprostanol is present, it could be useful as a qualitative indicator of the impact of sewage dumping on crustacean health.

Aquaculture: Control of Larval Disease Investigation

Characterization of bacteria isolated from seawater following ultraviolet light(UV) treatment with a 3 gal/min Aquafine UV unit and a comparable Refco W unit has been completed. Data indicate that the Refco unit was not effective in killing three of the four pathogens tested and the Aquafine unit could not kill two of the four test bacteria.

An attempt to purify the pigment of a pathogenic red pseudomonad has been successful. Not enough of the substance was obtained, however, to determine if it solely is responsible for its toxic effect on oyster larvae. Most larval experiments have been postponed until after a second water table has been installed in the laboratory.

Continued studies of UV spectra of ozonized seawater indicate the presence of an unknown 0.217 mm peak. A bromo-compound is suspected and additional work is planned to identify this unknown.

The quarantine system has been disassembled for the addition of a larger bottom drain. Fiberglass work is complete and after a few days curing time, experiments can resume.

Work on a technique for isolating and harvesting of larval oyster phagocytic cells is continuing. The use of a small tissue-culture dish embossed with about 500 squares measuring 2 mm to a side has improved the reliability of counts made on attachment and release of phagocytes. It is possible to obtain pure suspensions of viable cells by selectively attaching cells to collagen films, washing away other cells, and then exposing the attached cells to a collagenase solution with constant agitation. Thus far, the percent cell recovery has been low, but attempts are being made to improve this by varying exposure time, temperature, and concentration of collagenase.

Meetings, Talks, Visitors, Publicity

Dr. Rosenfield traveled to Cornell University in Ithaca, NY, during 10-11 August to meet with Dr. Gillespie and Dr. Timoney to discuss DWD 106 mutagenesis work. Dr. Rosenfield participated in the Society for Invertebrate Pathology Workshop in Athens, GA, during 20-25 August. He also attended the Aquavet Board of Directors Meeting at Woods Hole, MA, on 28 and 29 August.

Dr. Murchelano and Mr. Newman attended the annual meeting of the Wildlife Disease Association at Fort Collins, CO, during 1-4 August. Dr. Murchelano and Dr. Rosenfield attended a meeting for chairpersons of the Mid-Atlantic Oil Spill Workshop at the Center for Environmental and Estuarine Studies, University of Maryland, Cambridge, MD, on 8 August. Dr. Murchelano was chairperson of the Histopathology Panel of the Mid-Atlantic Oil Spill Workshop at Philadelphia, PA, during 28-30 August.

Mr. Farley attended the EPA Workshop on PAH in the marine environment and presented preliminary data on mutagenic testing of tissues from marine organisms and a review of neoplasm epizootics in mollusks. The workshop was held at Gulf Breeze, FL, during 14-18 August.

Dr. Bodammer attended the American Fisheries Society annual meeting during 21-24 August at Kingston, RI, and participated in the NEFC project demonstration at the Narragansett Laboratory.

Dr. Robohm was a panelist for the National Sea Grant Program site-visit team which reviewed the 1978 proposal of the Virginia Institute of Marine Science during 28-30 August at Yorktown, VA.

Visitors to the Oxford Laboratory included Father Adrian Fuerst, Oxford, MD, on 2 August; American Littoral Society on 6 August; Mr. Chris Ostrom and Mr. Edgar Hollis, Maryland Coastal Zone Unit, Annapolis, MD, on 9 August; Mr. Willie D. Morgan, Mr. Charles Lam, Mr. James Summerour, and Ms. Clarabelle Brown, National Health Institute, Bethesda, MD, on 24 August; and Mr. and Mrs. Irvin Sober, Baltimore, MD, and Ms. Mima Gabarz, Brussels, Belgium, on 31 August.

Manuscripts

Newman, M. W. 1978. Pathology associated with Cryptobia infection in a summer flounder. J. Wildl. Dis. 14:299-304. (P)

RESOURCE UTILIZATION DIVISION

Resources Development and Improvement Investigations

Fisheries Engineering

Development of the NEFC's shellfish assessment system is moving along on schedule. The design of the new 60-inch blade-width dredge has been finalized and detailed construction drawings have been completed. A contract has been let for construction and materials are on order.

Also completed is the design for a new electric cable winch to supply power to the submersible dredge-mounted pump. Drawings have been completed and bids are being solicited for the component.

Since the decision not to use an acoustic link for dredge instrumentation parts, we are also investigating the possibility of using a commercially available

odometer in addition to continuing the redesign of the in-house system. Redesign of the stern-ramp handling system to accommodate the new larger dredge is now getting underway.

The commercial fishing vessel Peggy Bell II, cooperating on the development of the experimental beam trawl, has temporarily re-rigged for scalloping and has not been available.

The Rorqual renovation is continuing as time can be made available. Efforts this month centered on continued painting and engine teardown.

Two trips were made this month aboard commercial vessels. One was aboard a Maine gill-netter as part of the Woods Hole Laboratory program to gather length-frequency data. The other was a trip on a Gloucester purse seiner to observe Atlantic menhaden seining operations.

Assistance continues to be lent to the Woods Hole Laboratory on their mesh selection studies.

Storage and work space is in short supply, therefore work has begun on a small addition to house fishing gear. It is necessary to put all the cod ends used in the mesh selectivity study under cover to stabilize size as repeated re-wetting and exposure to ultraviolet light changes dimensions significantly.

Processing Engineering

Work on the Gloucester Laboratory's experimental freezer system has continued. The No. 4 freezer was rebuilt, and the defrost mechanisms were refurbished.

The fish house chiller had operational problems and required control recalibration. Additional chillers were rebuilt and a new evaporator was specified for the shellfish program.

Storage Study of Blue Mussels

Studies were conducted to determine the correct amount of sulfuric acid to add to the samples analyzed by the micro Kjeldahl technique.

Reformed Crab Meat

Earlier problems experienced in the production of reformed crab lumps have been solved. Storage studies on the crab meat pasteurized in flexible pouches are scheduled to begin before 1 September.

Guaranteed Quality Program

All test shipments of Virginia seafoods that have been subjected to air-shipping stress have been graded US Grade A for freshness. The workmanship of fillets, however, leaves much to be desired. Because of faulty placement of the temperature-sensing probes, the temperatures of two shipments are questionable. In view of this, we have recommended that these shipments be repeated. The cooperating air-cargo people have exceeded their budget, but hope to be able to get extra funding to complete the tests.

Empire Fish Company reports that two additional supermarket chains in upstate New York will sell Empire's US Grade A fillets.

New Product Development

The Channel Fish Company has completed about one-third or more of the contracted pack using the modified LaPine whiting line. A lack of high quality, small whiting (silver hake) is the delaying factor. Originally, the contract called for completion of the pack by 1 July. The whiting did not strike in full force until July, and we requested and obtained an extension until 1 October. A minced whiting salad was made for the American Fisheries Society annual meeting in Narragansett, RI. As in all previous demonstration giveaways, the reception was high.

A second meeting with members of a Japanese firm was held to discuss the possibility of using minced whiting to make surimi. The firm is in the process of setting up a plant in Louisiana to process croakers into surimi.

Blue Crab

A taste test of canned pasteurized steam-formed and alginate-formed blue crab lumps was held after 1 mo of storage at 33-35°F. Although they were of acceptable quality, the steamed lumps differed significantly from the commercial control (back fin lump) and the alginate lumps in appearance and texture.

Squid

Six gallons of marinated squid strips and 75 lb of frozen breaded squid strips were prepared for distribution at the American Fisheries Society at the annual meeting in Narragansett, RI, during 20-25 August.

Prices observed for American slacked-out squid in an Italian retail outlet were: 3-4 inch *Loligo opalescens*-$1.62/lb; 5-7 inch *Loligo pealei* (or *opalescens*)-$2.70/lb; and large (8-12 inch mantle length measurement) red squid of indeterminate species imported from the Far East-$2.16/lb.

Fish House

The older seawater chiller has been revitalized and now seems to be operating satisfactorily. We are currently seeking bids to rebuild the new chiller which rusted out due to the use of an improper grade of stainless steel. The only bid received at this point has been $1,000.

Product Quality, Safety, and Standards Development Investigations

Product Quality

A microbiological study (total plate count, coliforms, fecal coliforms, *E. coli*) of the Arenco filleting process on whiting was completed. The results indicated there was no bacterial buildup on the fillets or frozen blocks associated with the filleting machine and the daily production time. There are no established bacterial standards for frozen fish blocks; however, the International Commission on Microbiological Specifications for Foods has some proposed standards for total plate count and fecal coliforms of frozen fish blocks, and the blocks produced during the pilot plant run met the proposed standards.

A study was initiated to determine the acceptability of cownose ray (an underutilized species from Chesapeake Bay area) as a human food. When prepared

for organoleptic evaluation by: (1) broiling with butter; (2) batter/breading with either a commercial breading or seasoned crumbs and then deep frying; or (3) barbecuing or stewing, the average texture and flavor scores were in the range of good to very good. When prepared as a chowder, acceptability was low. The cooked product bears a closer resemblance in appearance and flavor to meat than fish, and recipes based on meat cookery would probably be more appropriate for cownose ray. A frozen storage study has been initiated to determine the shelf life of uncooked ray at 0°F.

Sand lance (sand eels) stored intact on ice were still acceptable in texture and flavor after 15 days; however, because of the high incidence of burst bellies, the fish would probably not have been amenable to a machine gutting operation after 10 - 12 days. Fish which had been held in chilled seawater (as a transport method) for 48 hr prior to storage on ice remained in rigor longer than fish held exclusively on ice; however, shelf life was not enhanced as a result of holding in chilled seawater. Although flavor score correlated highly ($r = 0.93$) with average Torrymeter reading of the fish, there usually was a large variation in meter readings within a sample of about 30 fish.

The annual progress report to the Association of Official Analytic Chemists (AOAC) on fish species identification by isoelectric focusing has been submitted and will be presented in October at the AOAC annual meeting in Washington, DC.

The old compressor which Mike Allsup and Bob Van Twuyver rebuilt to cool our reflux condensers has worked well. Recovery of added dinitrophenyl-lisine is holding steady at about 93%.

Preliminary work has started on working out a method for SDS electrophoresis of whiting myofibrillar proteins. This should enable us to observe changes in specific myofibrillar proteins. In the past, only changes in total myofibrillar proteins have been observed.

Product Quality and Safety

The Perkin-Elmer 910 gas chromatograph is operating satisfactorily. This month has been devoted exclusively to age work. All of the whitefish extracts from last year's study were chromatographed. This additional work was imposed by FDA as a necessary condition before these extracts could be submitted for further analysis by GC-TEA. This was necessary to see if the composition of the extracts had changed within a year. Fortunately, only five of the extracts were found to be changed. If this work had to be repeated, a period of 3-4 mo would have been necessary to accomplish this work. To reanalyze these extracts, it was necessary to install last year's glass columns and set operating conditio as before. We were able to reproduce the same retention times as before. If the column had been deteriorated or broken, or the microprocessor system did not match the Spectra-System IV setup, then all this work would have to have been repeated. These extracts, along with some cold-smoked salmon and spiked whitefish (5, 2.5, and 1 ppb level), were submitted to Dr. Fine's group at Thermo-Electron for further analysis by GC-TEA.

There is still another backlog of extracts (cold-smoked salmon) to be chromatographed. This work should be completed in about 3 wk.

The Sigma-I gas chromatograph has been installed. The new GC will be used for high resolution work utilizing glass capillary columns.

Product Standardization

The proposed US standards for minced fish blocks were published in the Federal Register of 31 July 1978, as a proposed rule making.

A revision of the US standards for frozen fried scallops to include breaded scallops was published in the Federal Register of 26 July 1978 as a proposed rule making. Revised instructions for grading breaded and fried scallops have been prepared and sent to regional inspection chiefs for review and comments.

A revised draft of the proposed unified shrimp standard has been prepared and transmitted to regional inspection chiefs for review and comments. Score sheets and instructions for testing the proposed standard have also been distributed.

Several technical notes explaining the statistical basis of attributes standards have been prepared and will be distributed for review and comments.

Fred King participated in a series of discussions with NARADCOM scientists to develop protocols for Natick's proposed contract on edibility characteristics of fish.

We continued planning for the 25-27 September Codex Working Group meeting on breading/battered fish fingers (sticks) and portions.

Technical Assistance, Visitors, Meetings, Training

Technical Assistance

Laboratory personnel provided information and assistance on the following: ground ocean perch frames for outside study for food for immature lobsters; description of anglerfish; statistics of inshore versus offshore lobster landings; information on grenadiers; packaging material for international shipments of live lobsters; Greenland cod parasites; immature herring contrasted to pilchards; edible part of conchs; live holding and transport of lobsters; availability of plastic lobster traps; name for albacore; description and seasonality of butterfish; availability of eels and sand lance; packaging of smoked eels for export to Europe; dehydrating scallops for Chinese trade; shipping whole herring; preparing salt fish; imports of frozen shrimp; sources of eels; field visits and interviews for students; fish processing equipment; sodium content of fish and shellfish; ocean quahogs; anadromous fish; squid-splitting machines; economics of developing a squid fishery in Boston; weight-length relationship of squid; possibilities of Chinese (Taiwan)-American collaboration on exporting squid; refrigeration requirements; brine freezing with corn syrup; chilled seawater systems; primary fish sorting; salt content of fish fillets; adopting the Codex recommended standard for lobsters to military purchases; the Torrymeter (an instrument to measure freshness of fish); development of a grade standard or an inspection guideline for blue mussels; freezing raw crayfish; use of polyphosphate for treating fish and scallops; cooking methods for rays; packaging of frozen breaded oysters; nomenclature of hakes in US; and definition of tempura batter.

Visitors

Mr. J. S. Campbell visited us to discuss New Zealand's current and future plans to develop its new 200-mi economic zone. He is a fishery consultant to R. C. MacDonald, Ltd., and was accompanied on this trip by Mr. R. L. Harrison, its director.

Mr. Chikashi Ito, a field representative for Tokyo Maruichi Shoji Co., Ltd., of Tokyo, Japan, visited us to discuss the potential for making surimi blocks from whiting for export to Japan. He was accompanied by Mr. Cornelius Iida, National Marine Fisheries Service, Washington, DC.

Meetings

Dr. Fred King participated in a sanitation workshop on 14 and 15 August in Cherry Hill, NJ. It was sponsored jointly by FDA and the Food Sanitation Institute.

Ron Lundstrom attended the American Fisheries Society Open House at Narragansett, RI, to present a poster comparing conventional electrophoretic species identification methods with methods based on isoelectric focusing and isotachophoresis.

Dr. Perry Lane and John Kaylor attended an MIT-sponsored meeting on "Red Tide."

Dr. Lane attended a meeting of the American Fisheries Society. He and Mike Allsup participated in an NEFC Open House and presented attendees with samples of underutilized species (red crab, minced whiting, and squid).

Manuscripts

Krzynowek, J., and K. Wiggin. Species identification in cooked crabmeat by isoelectric focusing. J. Assoc. Off. Analyt. Chem. (S)

NATIONAL SYSTEMATICS LABORATORY

Shrimps

Studies continued on the systematics of the genera Sicyonia and Penaeopsis.

Other Crustaceans

Papers were edited for a symposium to be held in October on "Composition and Evolution of Crustaceans in Cold and Temperate Waters of the World Ocean."

Benthic Fishes

Data were reviewed on western Pacific gadiform fishes in preparation for a study trip to Japan. Data were also reviewed on eastern Pacific benthic deepsea fishes in preparation for a meeting to plan submersible dives in the Galapagos deepsea thermal vent area.

Pelagic Fishes

Research continued on the anatomy of Spanish mackerels. Preliminary work was also conducted on the classification of snake mackerels (Gempylidae) and cutlass fish (Trichiuridae).

Manuscripts

Herbst, G. H., A. B. Williams, and B. B. Boothe. Reassessment of northern geographic limits for decapod crustacean species in the Carolinean Province, U.S.A.; some major range extensions itemized. Proc. Biol. Soc. Wash. (A)

ATLANTIC ENVIRONMENTAL GROUP

Ocean Monitoring and Climatology Task Group

During August the cooperative Ship of Opportunity Program obtained seven XBT transects, two in the Gulf of Maine, one across the Southern New England shelf along the 71°W meridian, two across the shelf and slope off New York, one off Norfolk (VA), and one in the Gulf of Mexico.

Continuous plankton and temperature records at 10 m were obtained along one of the Gulf of Maine routes, and a continuous plankton record (CPR) was collected northeastward from Norfolk, VA. Plans have also been finalized with Seahorse, Inc., and their contractors, Texaco and Exxon, to use supply ships traveling between Quonset Point, RI, and the area of Baltimore Canyon to obtain monthly CPR records. The first sampling is planned for September.

A one-page report updating the location and configuration of warm-core Gulf Stream eddies adjacent to the continental shelf in the Middle Atlantic Bight was submitted for publication in the September Atlantic Notice to Fishermen, and also was released to a mailing list of interested individuals at the same time. This report points out that the three warm-core eddies observed off the Northeast Coast of the United States in mid-July were still in the vicinity in mid-August. Two of the eddies do not appear to be close enough to the continental shelf to affect offshore trap fishing in the immediate future. The other eddy, however, although still east of the fishing grounds, is so far to the north that there is a possibility of its coming close to the continental slope of southeastern Georges Bank during coming weeks. All three eddies are expected to move generally westward to southwestward.

Some AEG scientific hardware got quite an opportunity to tour the nation recently. The equipment amounts to two radio-direction-finding (RDF) stations used for tracking drifting, transponding buoys. The RDF units had been at the NMFS Galveston Laboratory where they had been used in a cooperative effort to determine currents off Texas. After return of the units to Narragansett, Texas A&M University requested to borrow them. So, they were shipped back to Texas and then transported to Alaska for use in the NOAA-sponsored OCSEAP studies during August. In September the RDF stations will be used by the Woods Hole Laboratory, and, subsequently, will be on loan to NOS for use in Deepwater Dumpsite 106 studies.

Ocean Dumping Task Group

Research regarding water-mass differentiation in the slope-water region has been initiated using end-member water types and discriminant analysis techniques.

Equipment, including a backup STD (model 9040) "fish," will be loaned to Dr. Donald Atwood at AOML for the upcoming November cruise to DWD 106.

A paper entitled "Physical Variability at an East Coast United States Offshore Dumpsite" has been submitted to Dr. Dana R. Kester at the University of Rhode Island. This paper represents our contribution to the Ocean Dumping Symposium to be held at the University of Rhode Island in mid-October.

Meetings, Talks, Visitors, Publicity

On 16 August Steve Cook traveled to the US Maritime Academy at Kings Point, Long Island, NY, to confer with personnel, and to New York City to talk with the Academy representative.

A display of posters and equipment was assembled by the Atlantic Environmental Group and was included in the NEFC's exhibition on 23 August for the American Fisheries Society annual meeting. The display was manned by Reed Armstrong, Woody Chamberlin, Jack Jossi, Grayson Wood, Bob Benway, and Dan Smith.

On 29 August Bob Benway went to Norfolk, VA, to train Coast Guard personnel on use of the CPR.

Steve Cook again visited the US Maritime Academy at Kings Point, Long Island, on 30 August to confer with personnel.

Manuscripts

Bisagni, J. J. July 1977 physical oceanographic studies at Deepwater Dumpsite 106. Deepwater Dumpsite 106 Assessment Report. (S)

Cook, S. K., and C. Gardner. 1978. An example of rapid change in the summertime water column over the continental shelf southeast of Sandy Hook, N.J. Gulfstream 4(5). (P)

Cook, S. K. Expendable bathythermograph observations from the NMFS/MARAD Ship of Opportunity Program for 1975. NOAA Tech. Rep. NMFS SSRF. (A)

Cook, S. K. Water column thermal structure across the shelf and slope southeast of Sandy Hook, N. J. in 1977. Annales Biologiques. (S)

Crist, R. W., and J. L. Chamberlin. Bottom temperatures on the continental shelf and slope south of New England during 1977. Annales Biologiques. (S)

Gunn, J. T. Variation in the shelf water front position in 1977 from Georges Bank to Cape Romain. Annales Biologiques. (S)

Jossi, J. W., and R. R. Marak. MARMAP survey manual. Contribution to NOAA fisheries technology shipboard manual. 43 p. (S)

Mizenko, D., and J. L. Chamberlin. Gulf Stream anticyclonic eddies (warm-core rings) off the northeastern United States during 1977. Annales Biologiques. (S)

Mizenko, D., and J. L. Chamberlin. Gulf Stream anticyclonic eddies and shelf water at Deepwater Dumpsite 106 during 1977. Deepwater Dumpsite 106 Assessent Report. (S)

Murray, T. E. A summary of waste inputs to Deepwater Dumpsite 106 during 1976 and 1977. Deepwater Dumpsite 106 Assessment Report. (S)