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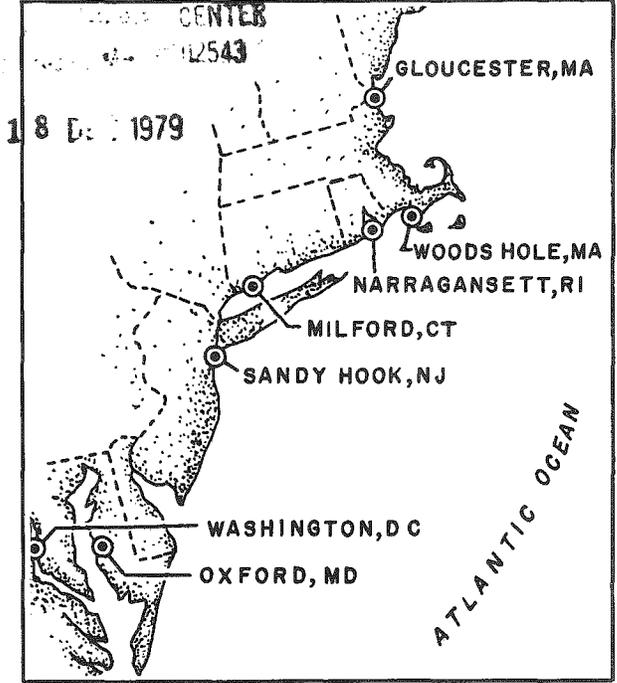
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SEPTEMBER 1979

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



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CENTER DIRECTORATE

Fisheries Utilization Office

Louis Ronsivalli participated in the New England Conference on Food, Nutrition, and Health held in Boston on 19 and 20 September. At this conference, Louis was able to remark on the role and the potential of seafoods on the New England food supply and economy and on the public health. An action plan, endorsed by guest speakers Carol Tucker Foreman, Assistant Secretary of the US Department of Agriculture; Senator George McGovern; Jean Mayer, President of Tufts University; and other national leaders in food and nutrition, contained a contribution by members of the Resource Utilization Division at the Gloucester Laboratory -- Burt Tinker, Judi Krzynowek, and Joe Mendelsohn. Several members of the conference staff were complimentary of the Resource Utilization Division/Gloucester Laboratory contribution and have requested our continuing participation.

Bob Learson, who was on the Program Committee of the Research and Development Associates Meeting on 11 and 12 September, presented a paper titled "New Opportunities in Processed Seafoods." The meeting was held at the US Army North American Research and Development Command (NARADCOM).

Special Technical Projects Office

This month Ronald Smolowitz, the NEFC Technical Projects Coordinator, assumed the additional duties of Port Captain for the R/V Albatross IV and R/V Delaware II.

The draft cruise results for the August clam cruise of the Delaware II were completed. The cruise was highly successful and much was learned about the operation of our clam dredge.

A meeting was held with electrical engineers from the National Ocean Survey's (NOS) Atlantic Marine Center (AMC) in Norfolk, VA, and the local utility to plan and specify a new power distribution system for the Woods Hole Laboratory and its docked vessels. These specifications will become part of the new pier facility contract package.

Efforts were initiated to arrange for possible replacement of the R/V Rorqual with a new fishing vessel seized by the Federal Drug Enforcement Administration.

RESOURCE ASSESSMENT DIVISION

Resource Surveys Investigation

The first part of September was spent by wrapping up the processing of summer research cruise data and preparing for the autumn bottom trawl survey. This year's survey is scheduled in four parts between 12 September and 19 November.

Part I of the autumn bottom trawl survey was conducted from 12 to 28 September. Linda Despres was the chief scientist. The area surveyed was from Cape Fear, NC, to Cape Charles, VA.

During the month, personnel from the investigation were actively involved in preparing charts and equipment for cooperative cruises aboard foreign research vessels. Cruises are anticipated on the Federal Republic of Germany's (FRG) R/V Anton Dohrn, the Union of Soviet Socialist Republic's (USSR) R/V Belogorsk, and the Polish R/V Wieczno.

The investigation processed a sample of trawl logs for the State of Maine's bottom trawl survey. The sample batch is to serve as an example for that state's biologists so they can begin independent processing using this division's bottom trawl survey data format.

Electronics support personnel returned the NEFC's new underwater video camera to the manufacturer for modifications. The cruises this year were successful, but the anticipated modifications should improve considerably the camera's overall performance. The modified system will be used in December to monitor the performance of the multiple opening-closing net and environmental sensing system (MOCNESS) sampler.

Modifications to the NEFC's radio-telephone to accept radio-telegraph traffic are progressing on schedule and some preliminary testing has shown that this mode of operation will shorten broadcasting time and provide greater accuracy in the reception of scientific data transmitted from vessels.

Fishery Biology Investigation

Age and Growth

In an effort to bring yellowtail flounder aging up to date, samples from the following cruises were aged and the data put on sheets, coded, summarized, and sent to the Woods Hole Laboratory's Automatic Data Processing Unit (ADP) by Judy Penttila for keypunching: Albatross IV Cruise No. AL 77-07 and Delaware II Cruise No. DE 77-09 (336 fish aged); Delaware II Cruise No. DE 78-05 and Albatross IV Cruise No. AL 78-09 (315 fish aged). Judy also completed checking Delaware II Cruise No. DE 78-06 Atlantic cod age samples and sent age sheets to ADP for keypunching.

Kris Andrade completed aging pollock samples from Albatross IV Cruise No. AL 79-03 and sent the age sheets to ADP for keypunching. She also completed aging commercially landed haddock samples for the first quarter of 1979.

Vi Gifford worked on commercially landed redfish samples from 1971. She also spent time orienting Ambrose Jearld to redfish aging. In addition, Vi met with Ambrose and Ralph Mayo to discuss an approach to a redfish validation study to be completed by early spring 1980.

Judy Penttila and Ambrose Jearld attended another progress meeting on the automatic age reading system contract at Cambridge-IMANCO in Monsey, NY. Work on developing software to age haddock should be completed under this contract by 1 February 1980.

Shellfish

Most of John Ropes' time this month was devoted to preparation of manuscripts. Principally, most of his effort was spent on a briefing book on surf clams. The literature cited section is quite extensive and is now being checked by Judy Brownlow, Woods Hole Laboratory librarian. John also initiated a manuscript on histological studies of hard clams from Raritan Bay.

Loretta O'Brien completed aging 281 sea scallops commercially landed during August-December 1977. These samples, plus the June and July 1977 commercial samples, made a total of 368 commercial samples aged, summarized, and sent to ADP. Loretta also completed shell measurements and meat weight determinations from Albatross IV Cruise No. AL 79-04 sea scallop samples for a study proposed by Paul Wood. In addition to these activities, Loretta spent time working with Ambrose Jearld on a proposal to study juvenile sea scallop aging problems.

Finfish

Cathy Rearden completed aging and summarizing butterfish samples from the 1977 summer bottom trawl survey and began impressing 1979 recreationally caught bluefish scale samples collected in New Jersey. Cathy met with Ambrose Jearld to discuss work completed and future work on the age data archiving project. Later in the month, Cathy went to sea on the first leg of the autumn bottom trawl survey.

Louise Dery continued sectioning and aging silver hake samples from the 1979 bottom trawl spring survey and prepared alewife and silver hake age-length data for ADP. Periodically, Louise, Ambrose Jearld, and Mike Campbell met to age scup samples and to coordinate activities for the 5 or 6 November NMFS State-Federal Program scup aging workshop to be held at the Woods Hole Laboratory.

Fishery Assessment Investigation

Steve Clark completed a review of the "Draft Final Fishery Management Plan for the Pollock Fishery of the Northwestern Atlantic" prepared by the New England Fishery Management Council (NEFMC).

Emory Anderson coordinated the completion of the division's annual report summarizing the status of stocks in the US Fishery Conservation Zone in the Northwest Atlantic. He and Guy Marchesseault (NEFMC staff) drafted a report on "Definition of Management Units," one of eight appendices to the report of the Northeast Fisheries Management Task Force.

Frank Almeida completed the most recent silver hake assessments, completed work on the recently modified virtual population analysis computer program and loaded it into the assessment computer program library, has been learning the new computer mapping routines, and has also been assisting Dennis Hansford in calculating survey abundance indices for northern shrimp for 1977-78.

Thurston Burns participated in a joint US-USSR silver hake tagging feasibility study during 5-10 September in the Cultivator Shoals region of Georges Bank aboard the Belogorsk. The study proved unsuccessful during the time available in obtaining live, healthy specimens for tagging. The silver hake which were caught suffered extensively from scale loss and/or gas bladder eversion, and the few fish which did survive trawl haulback lived only for a few hours. Additional details of this study are available in the cruise report (Belogorsk Cruise No. 79-02). Thurston also worked with Dennis Hansford on the commercial fishery length-frequency and age-sample data base, and with Steve Clark in summarizing 1979 northern shrimp commercial catch-per-unit-of-effort statistics.

Pat Carter completed a variety of activities relating to the haddock and pollock commercial and survey data base.

Dennis Hansford worked on coding and correcting commercial length-frequency and age samples for various species and years, and some survey data for northern shrimp.

Fishery Systems Investigation

The Fishery Systems Investigation continued assessment activity on Atlantic herring, yellowtail flounder, butterfish, and squids during September. Margaret McBride and Mike Sissenwine also participated in the preparation of background documents relevant to fisheries management in the NMFS Northeast Region. These documents will be appendices to the report of the Northeast Fisheries Management Task Force.

Mike Sissenwine attended the technical meeting held by the Federal Energy Regulatory Commission in Washington, DC, on 12 and 13 September to discuss aspects of the Consolidated Edison Company of New York, Inc.'s, testimony in licensing hearings for the Storm King pumped-storage electrical power plant construction license. Mike spent considerable time during September reviewing technical documents concerning this case.

Meetings, Talks, Visitors, and Publicity

Emory Anderson attended a meeting of the Mid-Atlantic Fishery Management Council's (MAFMC) Scientific and Statistical (S&S) Committee on 10 September in Philadelphia, PA.

Emory Anderson gave a talk on 19 September on NEFC activities in general and assessments in particular to a group of students from the Marine Biological Laboratory enrolled in the Boston University Marine Program (BUMP).

Mike Sissenwine attended an S&S Committee meeting of the NEFMC held in Woods Hole on 19 September. At this meeting the Northeast Fisheries Management Task Force was discussed.

Steve Clark attended a meeting of the NMFS State-Federal Program Northern Shrimp Sub-Board on 21 September in Portsmouth, NH, and presented material on assessments and other aspects of the Final Draft Northern Shrimp Management Plan.

On 21 September, Henry Jensen spoke to a group of students from Cambridge School (Weston, MA).

On 24 September, Emory Anderson attended a meeting in Peabody, MA, of a working group of the Northeast Fisheries Management Task Force to discuss input to a report on defining management units.

Ambrose Jearld and Harold Foster joined other Woods Hole Laboratory staff for the New England Career Counselors and Government Recruiters Conference held on 27 September 1979 at the Hogan Campus Center of the College of the Holy Cross in Worcester, MA.

Mike Sissenwine departed Woods Hole on 28 September to attend the 67th Statutory Meeting of the International Council for Exploration of the Sea (ICES) held in Warsaw, Poland.

Publications

Wilk, S. J. Biology and ecology of the weakfish, Cynoscion regalis (Block and Schneider). Biology and management of red drum and seatrouts: proceedings of a colloquium of the Gulf States Marine Fisheries Commission; 1978 October 19-20; Tampa, FL; 1979. (P)

Reports

McBride, M. M.; Brown, B. E. The status of marine fisheries resources off the northeastern U.S. Background document for the Northeast Fisheries Management Task Force; 1979.

Resource Assessment Division. Summary of stock assessments, September 1979. Woods Hole Lab. Ref. Doc. No. 79-41; 1979.

Sissenwine, M. P.; Kirkley, J. Fisheries management techniques: a review. Background document for the Northeast Fisheries Management Task Force; 1979.

MARINE ECOSYSTEMS DIVISION

Ecosystem Dynamics Investigation

Ecosystem Modeling

Wendell Hahm gave a seminar at the University of Rhode Island's (URI) Graduate School of Oceanography. The topics included the design of simulation systems and the numerical techniques being developed to analyze the Georges Bank ecosystem model. Wendell was granted access and free computer time to put WHMOD (a simulator), WHLOTKA (an analytical modeling system), and WHNORTH (an ecosystem model based on the Anderson-Ursin model) on the Graduate School of Oceanography's PRIME computer. A similar agreement (free time and access) was made with the Ecosystem Center of the Marine Biological Laboratory (MBL) in Woods Hole. Programs will be run on the MBL PDP 11/34 computer. The purpose of putting the Ecosystem Dynamics Investigation on other computers is twofold. The first is to show other modelers what NMFS is doing, and at the same time to get new ideas from other groups. The second is to compare the utility and economics of the Woods Hole Oceanographic Institution's (WHOI) Sigma-7 system with the newer and supposedly more versatile PRIME and PDP 11/34 computer. Work with these other computer centers and modeling groups should begin in mid November.

Wendell Hahm continued analysis of the food habits data set with Rich Langton and Mike Pennington. The task of getting the range and variability of most of the pertinent variables is finished. A folder of x-y plots (prey weight versus predator size) is being compiled and transparencies of these graphs are being made to facilitate comparisons. Work is now underway to develop feeding preference curves similar to those hypothesized by Ursin.

Brian Hayden continued writing data processing programs with Rich Langton and Otis Jackson. The problem centers on providing the 1973-76 food habits data base with "direct access reads." Completion of this project is expected in October. In addition to this computer work, Brian is preparing a manuscript with R. H. Campbell of Southeastern Massachusetts University (SMU) on a cestode parasite (Zyxibothrium kamrinae) of the smooth skate.

Mike Pennington and Wally Smith completed a paper for ICES on larval haddock abundance and Mike continued work on a haddock recruitment model for GEORGE and on the haddock fecundity data of Robert Livingstone. Mike also completed another draft of the paper with James Kirkley and Brad Brown on measuring effects of quotas, and he designed an experiment with Roz Cohen for measuring effects of towing speed, mesh size, etc., on performance of bongo nets. Marv Grosslein and Tom Azarovitz (Resource Assessment Division) completed editing the last of the 43 species synopses for the New York Bight monograph on fishes. Ed Cohen completed a draft of the updated energy budget for Georges Bank and then left for the University of Washington where he will take courses in population dynamics and ecosystem modeling.

Recruitment Processes

Greg Lough, Dave Potter, George Bolz, and Roz Cohen attended the Marine Ecosystems Division review meeting at the Narragansett Laboratory on 18 September to review progress and coordinate future work. Current-year task plans were prepared by Greg Lough. George Bolz completed the laboratory phase of the otolith study of Atlantic herring larvae reared in autumn 1978 at the Narragansett Laboratory. Preliminary analysis indicates that the number of rings is correlated with standard length and is in good agreement with data from field-collected larvae. Otolith rings are formed prior to yolk-sac absorption in many of the lab-reared larvae, but do not appear to be as well correlated with age as in wild larvae. Work was resumed on the International Commission for the Northwest Atlantic Fisheries (ICNAF) ichthyoplankton data from the 1971-76 larval Atlantic herring seasons. Five of the six seasons have now been reduced to summary tables, graphs, and plots.

Dave Potter participated on the food habits study cruise aboard Delaware II, (Cruise No. DE 79-09) during 28 September-7 October to help in the testing of various mid-water trawling gear. A manuscript is being prepared with J. Kerny of the Gloucester Laboratory on haul characteristics of the Isaacs-Kidd mid-water trawl. Dave Potter also is organizing equipment and planning details for the MOCNESS and mid-water trawl survey aboard the Albatross IV (Cruise No. AL 79-12) during 1-10 November. A chilled, at-sea sorting box was designed and built by Dave Potter for maintaining fish larvae in good condition prior to preservation. Special handling and preservation are required for those larvae on which biochemical analyses will be made to evaluate their physiological condition.

Roz Cohen and Greg Lough worked on a draft of a manual on laboratory and data processing of larval fish gut-content and condition-factor data. Roz also organized zooplankton data from four ICNAF larval Atlantic herring surveys to evaluate selectivity of various mesh sizes to present as a poster for the winter meeting of the American Society of Limnology and Oceanography (ASLO). Mike Pennington and Barbara North (Woods Hole Laboratory ADP) were consulted regarding analysis and computer programming of these data. Larval Atlantic herring gut-content processing (Janet Murphy and Roz Cohen) will include the 1976 season, as well as the 1974 and 1975 seasons, and should be concluded this fall.

Bill Michaels (University of Massachusetts Co-op student) began a pilot study of the vertical distribution of chaetognaths in MOCNESS samples collected during the fall 1978 Georges Bank larval Atlantic herring patch study. A new maturity stage classification scheme has been developed for Sagitta elegans. Cabell Davis (BUMP student) has completed his Ph.D. proposal. He will be analyzing parts of the ICNAF larval Atlantic herring data base to study the production and dispersal of Pseudocalanus and Paracalanus on Georges Bank.

Hal Merry of the Resource Assessment Division's Electronics Unit repaired two General Oceanics meter blocks used on Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) plankton surveys, worked on design of the MOCNESS printer interface module with BESS contractors, and calibrated the Turner Designs ENDECO in situ fluorometer.

Ichthyoplankton Investigation

Bill Brennan is representing this investigation on a 2-wk cruise on the Belogorsk to investigate linkages between primary production and fish distribution, abundance, and production on Georges Bank. This cooperative US-USSR cruise includes

scientists from the Sandy Hook Laboratory, Narragansett Laboratory, and AtlantNIRO in Kaliningrad, USSR. Sampling techniques are similar to those used on MARMAP surveys, but the area has been considerably scaled down to provide more synoptic coverage than we realize on large-scale surveys. In the meantime, John Sibunka is making necessary preparations for our next MARMAP survey of coastal waters from Cape Hatteras to Nova Scotia. An early autumn survey is scheduled for Albatross IV and will begin on or about 1 October. Pete Berrien, Alyce Wells, and Bill Brennan will participate in collecting ichthyoplankton during the two-part survey. Tom McKenney will assist the hydrographers and Chris Powell will help out those responsible for primary productivity measurements. With several members of the investigation at sea and Doris Finan departing for a 5-wk tour at the Polish Sorting Center in Szczecin, our ranks will be rather depleted for October.

We welcomed back Ann Naplin from maternity leave. She and Pete Berrien immediately began working on assessment analyses for yellowtail flounder, using eggs collected on the MARMAP surveys. Wally Smith, Pete Berrien, John Sibunka, and Mike Pennington, along with Maggie Konieczna, Marek Baranowski, and Ella Meller from the Morski Instytut Rybacki in Szczecin, Poland, completed preliminary analyses of the distribution and abundance of Atlantic cod and haddock larvae in US coastal waters. Their results were prepared as a research document and will be presented at the annual ICES meeting in Warsaw.

Larval Physiology and Biochemistry Investigation

Manipulation of adult fishes to promote spawning is in full progress. Summer flounder are receiving injections of carp pituitary according to previously developed techniques. Scup are being subjected to a compressed (1-mo) temperature-photoperiod simulation of fall-winter-spring to see if natural spawning is stimulated.

Studies of trypsinogen activation and trypsin activity in larval marine fish were continued. Trypsin is a key enzyme involved in the hydrolysis of ingested protein and its activity may determine the efficiency of digestion in first-feeding larvae. Work on correlating the level of alkali-labile phosphorus in summer flounder serum with sex, maturity, and vitellogenesis was initiated.

A great deal of time was spent working on administrative and planning documents. The "Report and Recommendations for Process-Oriented Studies of Larval Fish Studies" was finalized and presented to division personnel at a meeting. The "Current-Year Task Development Plan" was completed, and a first draft of an Ocean Pulse "Technical Working Plan" was initiated.

Benthic Dynamics Investigation

Roland Wigley continued the preparation of summary tabulations of the macrobenthic fauna that occupy the continental shelf south of Martha's Vineyard and Nantucket, for the purpose of determining the relationships between faunal groups and the kind of bottom sediments and water depths they inhabit. Roger Theroux devoted most of his time to the preparation of a report on the distribution of East Coast bivalve mollusks. This report is now in an advanced stage of preparation. He also devoted time to updating computer tapes containing benthic invertebrate data. John Dickinson made good progress on a study of benthic amphipods of the Georges Bank region. The taxonomic status of each species has been ascertained and the ecological relationships of each species are currently being studied.

Food habits research this month dealt mainly with data analyses, report preparation, and a cruise. Augmentation and updating of computer listings of the 1969-72 and 1973-76 food habits data required substantial time. A computer program that will facilitate making changes in the data-base tapes is in preparation. The report on the food habits of juvenile haddock, prepared by Ray Bowman, is being reviewed and edited. Progress was also made on a report dealing with the food habits of juvenile fish representing 10 species of fish, including Atlantic cod, silver hake, haddock, red hake, and others. Rich Langton was chief scientist of a cruise on R/V Delaware II to the Gulf of Maine-Georges Bank area during 1-7 September. The purpose of the cruise was to compare the effectiveness and suitability of three types of mid-water sampling gear for collecting pelagic fishes. Other investigation members who participated in the cruise were Ray Bowman, John Dickinson, and Jim Towns. Samples are being processed and a report on the cruise results is in preparation.

Plankton Ecology Investigation

A paper on "Biological Samples Processed by Pattern Recognition," by H. P. Jeffries, R. Maurer, K. Sherman, and C. Katsinis, was prepared for presentation at the International Estuarine Research Federation Conference to be held at Jekyll Island, GA, in October. The report summarizes the recent advances in developing a semiautomatic system for counting, sizing, and classifying of plankton organisms based on enhanced silhouette images. Results indicate that 93% of the organisms retained by a 0.333-mm meshed bongo net could be classified to the major group level and 90% to the species level using a combination of simple morphometric relationships.

Ray Maurer finished the preparation of the "Image Analysis Progress Report for Fall 1979." This report presents a complete analysis of the present Bausch and Lomb system at the Narragansett Laboratory. A series of experiments comparing manual sample analysis to electronic sample analysis was conducted. Results were statistically compared and indicate that image analysis processing provides information on sample composition and size distribution and is four-to-five times faster than traditional processing.

This step in our research task represents a major advance in planktonology. It is the first time a sample of zooplankton has been systematically counted and sized with a semiautomated electronic system. This technique has proved successful in providing counts and size distribution over the most difficult range of zooplankton sizes, from 0.20 to 20.0 mm in length. In production we expect to process one sample in 20 min or less. Included in the report were the results of preliminary studies on shadowgraphs of live experimental fish larvae. Statistical analysis indicates that sizes of live experimental animals can be made from their shadowgraph images using the image analysis system.

Ray Maurer and Renata Lipska (Polish Sorting Center) have completed a draft of a manuscript on "A Comparison of Counts and Measurements - Microscope vs Image Scanner."

On 7 September a meeting attended by Luther Bivins (NOAA Office of Ocean Engineering), Drs. Poularikas and Jeffries (URI), and Ray Maurer was held to review last year's progress and to plan research activities for the coming year.

Biostatistics

A draft protocol for the flow of data from end of cruise through the MARMAP Information System (MIS) to standard reports and products, is being reviewed and revised prior to being sent out for comments. This protocol will provide a standard reference for the way in which data are handled through the MIS. It will also serve to control changes to operating procedures--a problem that has plagued us in the past.

A draft user's guide to assist in training and to serve as a reference for the handling of data from the loading of card images on disk to the generation of standard reports and products is being reviewed and revised while being used. This user's guide covers the portion of the protocol that is directly under the Biostatistics Unit's responsibility.

A priority listing of all backlogged data has been generated. The order is as follows: MARMAP, ICNAF, larval Atlantic herring patch study, and other cruises. Within each cruise-type, priority is assigned in reverse chronological order. The Biostatistics Unit will continue working on this backlog. Should any user wish to raise the priority of a particular cruise, we shall assist while the user performs the prime editing.

The master station records, zooplankton sampling logs, and ichthyoplankton data records were loaded, edited, and merged into master files for Delaware II Cruises No. DE 77-09 and DE 76-10. A tape of all Bureau of Land Management (BLM) data was prepared and will be delivered to the Sandy Hook Laboratory.

Task orders covering MIS system maintenance, selected improvements, and selected evaluations for the period of 1 October 1979-30 September 1980 have been prepared and are being revised. In addition to providing routine (on demand) file maintenance, system data maintenance, program maintenance, and intermediate file maintenance, the Input/Output Computer Services, Inc. (IOCS), task group will provide a data dictionary, a library index, a revised ichthyoplankton extractor, and a zooplankton extractor. IOCS will also provide evaluations of system requirements to meet specific user needs and will recommend system improvements to meet those needs. The specific needs under these task orders are for system management information, revised front end, and data-archiving subsystems.

Fishery Oceanography Investigation

Most of the investigation's time was spent in cruise preparation and participation, and in attending meetings. The majority of the investigation participated on Albatross IV Cruise No. AL 79-09. Steve Ramp was the chief scientist with watch chief support from Red Wright and Ron Schlitz. The main purpose of this cruise was a buoy set and recovery operation. In brief, some of the objectives and accomplishments of the cruise were the recovery of three subsurface current meter moorings; the deployment of new subsurface current meter moorings at prescribed locations; the exchange of current meters moored beneath four subsurface floats with the assistance of divers from the Woods Hole Laboratory; and deployment of a new working surface buoy and current meter at one position. Also, repairs were made on an existing surface marker whose light had failed. Hydrographic sampling and expendable bathythermograph (XBT) casts were made in a series of stations along the moored array. The tracking of drogues deployed near the moored array provided a Lagrangian comparison with the moored instruments. The testing of a new radio-direction-finding (RDF) unit for tracking drogues proved very positive.

On an WHOI R/V Oceanus cruise during 17-21 September, two more current meter moorings were recovered and two redeployed. Two of the redeployed meters were prepared by Gil Dering in less than a week after recovery by Albatross IV. Gil also received two of the recovered meters and began post-cruise operational checks.

Sam Nickerson processed MARMAP survey data including the preparation of salinity and temperature sections for Delaware II Cruises No. DE 79-05 and DE 79-06, surface and bottom temperatures for Albatross IV Cruise No. AL 79-06, positions for Albatross IV Cruise No. AL 79-06 and Delaware II Cruise No. DE 79-07, and temperature profiles for Delaware II Cruise No. DE 79-07 and Albatross IV Cruise No. AL 79-08.

Tim Cain, Sam Nickerson, Ron Kirschner, and Cindy Chappell processed salinity samples collected on Belogorsk Cruise No. 79-01.

Kathryn Bush has completed calculations for the Middle Atlantic Bight heat flux and is in the process of publishing the results. Steve Ramp wrote the cruise report for Albatross IV Cruise No. AL 79-09 and completed a numerical experiment to check out spectral analysis programs. Timothy Cain continued work on publishing the monthly Gulf of Maine temperature transect report.

Apex Predators Investigation

The draining of the large tank at the New England Aquarium (NEA) in Boston, MA, to replace a pane of glass afforded us a unique opportunity to measure all 22 of their large sharks and initiate growth studies of sharks in captivity. Working with curator Lou Garibaldi, biologist Greg Early, and their staff, we tagged 17 sharks (3 sandbars and 14 nurse) with dart and fin tags. Some of the sharks have been maintained at the aquarium for over 4 yr. The tags will help in identifying sharks for future growth studies and will enable us to assess the utility of the dart and fin tags in an aquarium environment. In addition, NEA biologists have agreed to maintain records on food consumed by each shark over the next several months.

NMFS foreign fishery observers out of Falmouth, MA, and Pascagoula, MS, continue to assist in our shark-tagging studies. One of their reports included the capture of three 13-14-ft Greenland sharks (Somniosus microcephalus) taken during 10-13 September 60 mi SW of Hudson Canyon in 250 m of water by a Japanese trawler. Two of these were tagged and photographed by NMFS foreign fishery observer Bob Matus. The center of abundance of the Greenland shark in the western North Atlantic is in the Davis Strait between Greenland and Baffin Island, with occasional strays reported from the Gulf of Maine. The capture of three individuals in the Middle Atlantic Bight extends the southern range of the species and suggests they may be more common in this area than indicated by published reports.

Vertebral samples, primarily from mako and white sharks, were sectioned and examined in conjunction with the study to age isurid sharks. Wes Pratt developed a photographic technique to augment the use of dried vertebrae as an aging tool. Alan Lintala prepared sections of shark reproductive tissues including those from the 2075-lb white shark caught this summer off Long Island.

Chuck Stillwell and Nancy Kohler attended the Rhode Island Tuna Tournament during 1-3 September. They obtained stomach samples from 32 medium-sized (150-250 lb) bluefin tuna. Vladimir Waters of the SEFC also attended the tournament to obtain nasal parasites from bluefin tuna for racial studies. Chuck prepared for the upcoming food studies cruise aboard the Wieczno. The cruise is scheduled for 3 wk in October to study food habits of apex predators in the area from the Gulf of Maine to Cape Hatteras.

Jack Casey and Wes Pratt coauthored an ICES paper with Frank Carey of WHOI on "The White Shark, Carcharodon carcharias, Is Warm Bodied," which reports results of a sonic-tracking experiment this past summer.

Jack Casey and Wes Pratt also prepared a draft of a report on the 2075-lb white shark dissected at Moriches, NY, at the end of June 1979.

Jack Casey has submitted the final illustrations and text for the blue shark section of the serial atlas of the New York Bight.

Meetings, Talks, Visitors, and Publicity

Luther Bivins visited the Narragansett Laboratory and URI on 6 September with representatives of the Miter Corporation.

On 7 September, Ken Sherman attended a meeting with Robert Edwards and others at the Sandy Hook Laboratory to discuss the Ocean Pulse Program for FY80.

On 10 September, we welcomed Peggy Lamoureux back to the Narragansett Laboratory as administrative assistant. During September, the temporary appointments were completed for Adrienne Anderson, telephone operator, and Nancy McCann, accounts maintenance clerk.

On 18 September, there was a meeting of the Marine Ecosystems Division at the Narragansett Laboratory to discuss research priorities for FY80.

Red Wright attended a Marine Ecosystems Division meeting at the Narragansett Laboratory on 18 September.

Frances Swim of the NOAA Environmental Data and Information Service visited the Narragansett Laboratory on 19 September.

On 25 September, Ken Sherman left for Krakow and Szczecin, Poland. Bob Marak joined him in Poland on 29 September to attend the annual ICES statutory meetings at Warsaw (1-10 October). They are also scheduled to visit the Sorting Center at Szczecin before returning to the Narragansett Laboratory in early October.

Jack Casey served as a committee member for George Benz during the latter's master's degree thesis defense at the University of Connecticut on 26 September.

Red Wright is attending the meeting of ICES in Warsaw from 26 September through 9 October.

Jim King returned to Georgia Tech; Dan Patanjo terminates 26 September to return in mid-November; Cindy Chappell has returned to part time since resuming her high school education; and Gerry Metcalf and Dana Densmore have been hired on a part-time basis to participate on MARMAP cruises and instruct new seagoing persons on physical oceanographic procedures.

On 27 September, Bob Marak met with scientists at URI to discuss Dr. Earle Droessler's upcoming visit.

Dr. John Stevens, a British biologist specializing in sharks, stopped in during 27-29 September to visit the Apex Predators Investigation enroute to his new position with the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia.

Steve Ramp prepared two October talks: one on the dynamics of water flow in the Northeast Channel to be presented at the University of Washington, and one on vector-averaging current meter (VACM)-ENDECO comparisons to be given in New Orleans.

Roz Cohen and George Bolz attended several Equal Employment Opportunity (EEO) meetings this month at the Woods Hole Laboratory.

Geoff Laurence participated in a conference with former Controlled-Ecosystem Population Experiments (CEPEX) personnel regarding possible cooperative studies focusing on larval fish using in situ environmental enclosures and attended a meeting of the NEFC's IYABA group at the Sandy Hook Laboratory.

Publications

Kendall, A. W., Jr. Morphological comparisons of North American sea bass larvae (Pisces: Serranidae). NOAA Tech. Rep. NMFS CIRC 428; 1979. 50 p. (P)

Reports

Carey, F. G.; Casey, J.; Pratt, H. W. The activities of free-swimming mako sharks. Inter. Coun. Explor. Sea, Pelag. Comm. Memo. 1979/H:50; 1979.

Langton, R. Food of yellowtail flounder, Limanda ferruginea (Storer). Inter. Coun. Explor. Sea, Demer. Comm. Memo. 1979/G:54; 1979.

Sherman, K.; Jones, C.; Kane, J. Zooplankton of continental shelf nursery and feeding grounds of pelagic and demersal fish in the NW Atlantic. Inter. Coun. Explor. Sea, Biol. Oceanogr. Comm. Memo. 1979/L:27; 1979.

Smith, W. G.; Pennington, M.; Berrien, P.; Sibunka, J.; Konieczna, J.; Baranowski, M.; Meller, E. Annual changes in the distribution and abundance of Atlantic cod and haddock larvae off the northeastern United States between 1973-74 and 1977-78. Inter. Coun. Explor. Sea, Demer. Comm. Memo. 1979/G:47; 1979.

MANNED UNDERSEA RESEARCH AND TECHNOLOGY PROGRAM

No report received. The September report will be included in the October issue.

DIVISION OF ENVIRONMENTAL ASSESSMENT

Behavior of Marine Fishes and Invertebrates Investigation

As part of this investigation's cooperative research project with Battelle, Pacific Northwest Laboratories, with funding from the US Environmental Protection Agency (USEPA), experiments are continuing on the effects of petroleum hydrocarbons on the chemosensory abilities of the Dungeness crab. Field studies, concluded during the summer, were designed to measure the effects of oiled sediment on the ability of the crabs to detect and ingest littleneck clams, a natural food item for this species. Cages measuring 1 m², each containing a single crab, were placed over either a tray containing uncontaminated sediment or one containing sediment mixed with crude oil at concentrations averaging 800-1500 ppm. Each tray also contained a specified number of littleneck clams. Preliminary analysis indicated that crabs in the cages containing oiled sediment ingested significantly more clams than crabs in uncontaminated sediment. This was apparently due to the fact that the clams did not bury as deeply into oiled sediment, and when uncovered by the crabs, did not rebury, i.e., were more available as prey. Oiling appears to disrupt the natural predator-prey interactions between these species. These studies will serve as a model for experiments initiated this year on red hake and blue crabs from the New York Bight.

Biological Oceanography of Stressed Ecosystems Investigation

Sixty-six seawater samples for algal bioassay were collected at 14 stations between Georges Bank and Delaware on the September Ocean Pulse cruise. This was the initial sampling in a yearlong study which has the following goals: (1) assessment of the primary productivity potential of polluted and relatively pristine waters as determined by nutrients, trace elements, vitamins, and the possible presence of phytoplankton growth inhibitors; and (2) accumulation of information on the environmental factors which promote the development of offshore phytoplankton blooms. Plans for a subsequent expanded study were begun.

Isolation of Nannochloris atomus (or Didymocystis sensu), an important species in the New York Bight, was started. This species will eventually be used in the assays. A culture of another candidate for algal bioassay, Thlassiosira pseudonana, was provided by Ravenna Ukeles of the Milford Laboratory and is growing well at the Sandy Hook Laboratory in a synthetic seawater medium.

Following review by several NEFC scientists, editorial changes were made in a manuscript, "Normal Seasonal and Disease Induced Changes in the Blood of the Winter Flounder, Pseudopleuronectes americanus, in Lower New York Bay."

Samples for phytoplankton identification and enumeration were collected on the September Ocean Pulse and Belogorsk cruises for Myra Cohn and Harold Marshall (Old Dominion University). Dr. Marshall and Mrs. Cohn continued to identify and enumerate phytoplankton in samples from earlier Ocean Pulse and MARMAP cruises as part of their long-term effort in monitoring the phytoplankton community from the Gulf of Maine to Cape Hatteras.

Several cases of schistosome dermatitis or "clam-digger's itch" (See 1976 article by M. S. Cohn and D. Blaszcak in Underwater Naturalist, Vol. 9, No. 4.) have recently been reported to the Sandy Hook Laboratory for the Shrewsbury River. The incidence has been and will continue to be monitored by Mrs. Cohn.

Galley proofs have been received for the paper, "Phytoplankton in Lower New York Bay and Adjacent New Jersey Estuarine and Coastal Areas" by Paul Olsen and Myra S. Cohn. The paper is to be published in the fall 1979 issue of the Bulletin of New Jersey Academy of Science. The paper was the result of a joint study conducted from 1975 to 1978 with the New Jersey Department of Environmental Protection (NJDEP), Division of Water Resources. Of the 332 species found, 208 were newly recorded for the area.

Investigations to compare the in situ dome technique with the Pamatmat corer technique for determining seabed metabolism values were conducted from the NOAA R/V Kyma in Sandy Hook and Raritan Bays by Bill Phoel and Steve Hastings, a temporary employee from the Virginia Institute of Marine Science (VIMS). Both Bill and Steve continued the seabed oxygen consumption investigation on the continental shelf from the Gulf of Maine to Chincoteague, VA, using the corer from the Albatross IV during the September Ocean Pulse cruise. Thirty-eight stations were occupied, 236 individual incubations were completed, and 32 sediment samples were frozen for later organic carbon analysis. While anchored in Delaware Bay due to heavy weather we conducted Q₁₀ experiments on seabed oxygen consumption and determined seabed oxygen uptake ratio during an entire tidal cycle.

Large Area Marine Productivity/Pollution Experiment (LAMPEX) truth data for the Coastal Zone Color Scanner (CZCS) on the Nimbus 7 satellite were collected on eight separate days during the September Ocean Pulse cruise aboard the Albatross IV. Sea truth consisted of chlorophyll samples collected by Jim Duggan of the Environmental Chemistry Investigation and total suspended solids samples collected and processed by Craig Robertson of our investigation. Dates, times,

and locations of these samples have been sent to Dr. Warren Hovis, Director of the Satellite Experiment Laboratory, who will obtain the satellite imagery.

Total plankton respiration was measured throughout the entire water column at 36 stations (2000 dissolved oxygen titrations) from the Gulf of Maine - Georges Bank region to the continental shelf off the Delmarva Peninsula during the September Ocean Pulse cruise. The initial effort in this study is to sample as many stations over the continental shelf between Nova Scotia and Cape Hatteras as possible for the purpose of defining strata from which to select representative stations for establishing baselines and for monitoring long-term changes in energy flow patterns and magnitudes in the shelf ecosystem. Such changes have wide ranging implications for the health and management of the system by affecting: (1) nutrient availability for phytoplankton production, and (2) dissolved oxygen concentration and its effects on living marine resources.

The transcript for a talk, "Sewage Sludge Disposal - Current Effects and Problems," presented by Dr. James Thomas at the State of the Sound [Long Island] Conference on 19 May 1979 was revised, approved, and sent to the Oceanic Society to be published in their proceedings of the conference.

Environmental Chemistry Investigation

Several members of the Environmental Chemistry Investigation participated in the September Ocean Pulse survey aboard the Albatross IV. Vincent Zdanowicz collected 120 samples of sediments to be analyzed for heavy metal concentrations and 313 filtered samples of seawater and 118 samples of unfiltered seawater to be analyzed for inorganic and organic nutrients. Using the carbon-14 method, Ralph Bruno measured primary productivity at 23 Ocean Pulse stations. Jim Duggan measured chlorophyll concentrations of netplankton and nannoplankton in the upper 75 m of the water column at 55 stations.

Sue Barker measured chlorophyll-a at 25 stations sampled during the cooperative US/USSR primary productivity/secondary productivity survey of Georges Bank and the New York Bight aboard the Belogorsk.

Chris Evans developed a first draft of a manual which describes standardized methods of measuring chlorophyll which are used by NEFC during Ocean Pulse and MARMAP surveys. Progress also continued on a manuscript which describes distributions of chlorophyll in coastal waters between August 1977 and December 1978.

Ruth Waldhauer and Al Matte completed laboratory analyses for ammonium concentrations in seawater samples collected during the MARMAP survey on the Belogorsk (Cruise No. 79-01), and the Ocean Pulse survey aboard the Albatross IV (Cruise No. AL 79-10), and samples collected during the oceanographic survey of the Nantucket transect area (Albatross IV Cruise No. AL 79-09).

Jay O'Reilly, Chris Evans, Ruth Waldhauer, and Al Matte met several times with Dave Grant of the New Jersey Marine Sciences Consortium to discuss and recommend methods and sampling strategy to be used by the consortium in its monitoring studies (nutrients, chlorophyll, salinity, oxygen, etc.) of Horseshoe Cove, Raritan Bay (NJ). Reciprocal arrangements were made between the Environmental Chemistry Investigation, and the consortium whereby we will provide some analyses and instrumentation in return for shipboard and laboratory assistance on Ocean Pulse surveys.

In September we also prepared for the October Ocean Pulse survey aboard the NOAA R/V Kelez.

Coastal Ecosystems Investigation

Much of our effort was devoted to the Ocean Pulse cruise aboard the Albatross IV from 12 to 28 September. Frank Steimle was Chief Scientist and Dave Radosh handled the benthic macrofauna sampling, assisted by Keith Vinal and Willie Krencik (volunteers who will be working in our sorting lab for 3 mo under an internship program with Southampton College on Long Island). We also prepared for an Ocean Pulse cruise aboard the Kelez in October. Frank completed a revision of his manuscript on the benthic macrofauna of Block Island Sound, and finished work on the fall Ocean Pulse newsletter. The final draft of the NOAA Environmental Research Laboratories' (ERL) Marine Ecosystem Analysis Program (MESA) monograph on benthos of the New York Bight was sent to the MESA office. Dave, Jan Caracciolo, and Frank have put much work into this atlas, along with Jack Pearce. Frank, Jan, and Jack also coauthored a paper summarizing impacts of dumping on the benthos of the bight apex; this was one of several papers presented at the June MESA symposium which brought together scientists, managers, and legislators to focus on the bight's problems.

Bob Reid arranged and led the first meeting of the Ocean Pulse Benthic Ecology Review Committee at the Sandy Hook Laboratory during 10-11 September. The committee presently consists of Drs. Rick Swartz (USEPA, Corvallis, OR), who was absent; Don Boesch (VIMS); Don Maurer (University of Delaware); and John Tietjen (City University of New York). Also attending were Jon Witman (University of New Hampshire) and Jack Pearce, Frank Steimle, and Bill Phoel (all three from the Sandy Hook Laboratory). The committee agreed with most of our objectives, station locations, and sampling and analysis techniques, but made a number of valuable recommendations which will be incorporated into the program. Bob Reid also attended a US Army Corps of Engineers (COE) Disposal Area Monitoring Systems (DAMOS) meeting at which it was proposed that COE and NMFS integrate monitoring studies by conducting Ocean Pulse benthic (and physiology-biochemistry) studies at dumpsites near Portland, ME; Boston, MA; New Haven, CT; and in Rhode Island Sound. Bob and Clyde MacKenzie dove on surf clam beds off Rockaway, Long Island, in our ongoing study of factors limiting abundance and distribution of the clams. Sukwoo Chang distributed draft review copies of his manual on statistical analyses to be used for Ocean Pulse. Ann Frame continued identification work on Ocean Pulse benthic macrofauna samples.

Physiological Effects of Pollutant Stress Investigation

Physioecology

Studies with Crepidula fornicata exposed to silver continued this month. The F₂ generation, 10-ppb exposed animals, have mated, produced egg masses, and released eight broods. Unfortunately, none of the larvae have survived. We are still experiencing difficulties in keeping larvae alive in both the control and experimental populations. We have ruled out water quality, oxygen availability, and temperature variability. The parental stock which has been exposed to silver for a little more than a year, has temporarily ceased to produce eggs. The F₂ individuals have slowed down in their egg-mass production.

In a continuing long-term study which began in early July, juvenile blue mussels (1.6-1.9 cm) are being exposed continuously to copper and silver (1, 5, and 10 ppb) individually in a flow-through system. As of this time, no differences in survival and growth have been observed between experimental animals and controls.

As part of a contractual study with the NOS Ocean Dumping Office, we participated in a Kelez cruise to Deepwater Dumpsite (DWD) 106 during 17-24 September. Although bad weather hampered collection of plankton samples, we were able to collect 10 samples which most likely will fulfill the requirements of the contract.

An auto-sampler attachment for the graphite furnace accessory for our atomic absorption instrument was purchased recently and is being installed. This should assist us in performing more rapid analyses of metals in tissues of exposed animals.

Physiological Effects

The September sample of blue mussels from Narragansett Bay (RI) was examined and completed this month. This material is now ready for analysis and a 5-month report will be prepared for inclusion with biochemical studies and with studies being conducted at the USEPA Narragansett, RI, facility, in a manuscript to be presented by USEPA staff at the forthcoming "Symposium on Physiology and Pollution of Marine Organisms" to be held in Milford, CT, in November.

Studies on changes in respiration rates of American lobsters over the molt cycle continue and this month should see the completion of this project with 20 complete cycles monitored.

A number of blood samples from Ocean Pulse cruises, USEPA samples, and laboratory-exposed animals were analyzed this month and an apparatus for determining hemoglobin curves was constructed.

Biological Effects

Gill and adductor muscle were taken from blue mussels in the fifth month's sampling from the Narragansett Bay sites used by the USEPA for this collaborative field study. All of September was spent working on biochemical analyses, begun in August, of the frozen-stored (-80°C) tissues from the first through the fourth month's sampling in this series, plus the baseline samples acquired last April. Gill-tissue preparations (which are homogenized immediately after excision and then frozen) from this month are scheduled for testing the first week of October.

Anaerobic Bacteriology/Metabolism

Ocean Pulse activities included screening some 100 isolates of the Vibrio group with the API-20 system (22 biochemical tests). The VP (Vibrio parahaemolyticus) types have been obtained and several of these selected isolates (from different stations) are being further characterized with additional biochemical and physiological tests.

Of the strict anaerobes, Clostridium perfringens is still the dominant type being encountered from the various samples. Other Clostridium spp. do appear on our test systems and these isolates are being further characterized by biochemical and animal tests.

A fifth and confirming experiment on the potential outgrowth of Type E C. botulinum spores in mildly heated oysters was completed this month at the SEFC's Charleston Laboratory, and toxin assays are being performed on the incubated samples after various periods of low-temperature incubation.

Meetings, Talks, Visitors, and Publicity

Dr. A. Calabrese attended the 14th Pacific Science Congress in Khabaroysk, USSR, during 23-30 August, and later visited aquaculture and pollution laboratories in Japan.

Jack Pearce, Bill Phoel, Frank Steimle, and Bob Reid attended an Ocean Pulse Benthic Ecology Review Committee meeting at the Sandy Hook Laboratory during 10-11 September, along with committee members from several East Coast universities.

During 11-12 September, Dr. Pearce participated in the Deep Ocean Mining Conference sponsored by the Marine Minerals Division of the NOAA Office of Policy and Planning and by the US Department of Interior at Bethesda, MD. Dr. Pearce attended the introductory and summarizing plenary sessions and participated in a special workshop which was organized to determine if onshore processing of manganese nodules mined in the deep ocean will have an impact on coastal environments and aesthetics. Dr. Pearce contributed several pages of material to the conference. There is to be a report and proceedings for the entire conference available sometime early in 1980. The results of the conference will be to provide direction to elements within NOAA and the Department of Interior that have responsibility for developing deep ocean mining procedures and the necessary environmental studies to accompany the implementation of deep ocean mining.

Jack Pearce and Clyde MacKenzie attended a public meeting of the New Jersey Shellfish Council in Tuckerton, NJ, on 17 September.

Dr. A. Calabrese attended a MESA editorial board meeting in Arlington, VA, during 17 September.

On 20 September, Dr. James Nagle (Drew University, Madison, NJ), Ms Chris Evans, and Dr. Joanne Stolen met with Dr. Pearce to discuss cooperative studies between students and faculty at Drew University and the Sandy Hook Laboratory, especially within the environmental monitoring program, Ocean Pulse. Dr. Stolen is an authority on immunological responses and is developing a proposal for Ocean Pulse which will outline techniques that might be used at sea and in the laboratory to determine the effects of various forms of pollution on immunological responses and capabilities. Dr. Stolen may possibly become an adjunct professor at Drew University.

During 23-28 September, Dr. Pearce participated in the joint 14th European Marine Biology-Helgoland Symposium, the principal theme being "Protection of Life in the Sea." Dr. Pearce was chairman of one of the sessions on environmental evaluation and also prepared a paper for the informal session on developing monitoring techniques. He also met with the organizing committee for developing the 15th, 16th, and 17th-year symposia to be held during 1980-82.

Miss E. Gould attended the joint 14th European Marine Biology - Helgoland Symposium in Helgoland, FRG, during 23-29 September.

Dr. F. Thurberg attended an NEFC IYABA meeting at the Sandy Hook Laboratory on 25 September.

Tony Calabrese and Bob Reid attended a COE, DAMOS meeting at Avery Point, CT, during 25-26 September.

On Wednesday, 29 August, Dr. Pearce spent the day with the staff of the New York Aquarium discussing the Ocean Pulse Program and some of the activities that might be conducted by personnel at the aquarium. At the present time, Dr. Peter Burn is working with the Ocean Pulse Program and studying levels of parasites in winter flounder collected at several Ocean Pulse sampling strata. Dr. Kenneth Gold of the New York Aquarium has been looking at peculiar inclusions in the kidneys of certain bivalve species. It is possible that these inclusions may be

related to pollution and other stress-induced factors. Arrangements are being made to collect samples of hard clams and surf clams in polluted and unpolluted areas in order to verify this hypothesis.

Publications

Calabrese, A.; Gould, E.; Thurberg, F. P. Heavy-metal effects in marine animals of the New York Bight. Ecological stress and the New York Bight: science and management: proceedings of a MESA symposium; 1979 June; New York, NY. (A)

Calabrese, A.; Nelson, D. A.; Nelson, W. G.; Greig, R. A. Reproduction and development of larvae of the marine gastropod Crepidula fornicata after long-term exposure to silver. Proceedings of the 14th Pacific Science Congress Symposium; 1979 August 13-30; Khabaroysk, USSR. (S)

Gould, E. Low salinity stress in the American lobster, Homarus americanus, after chronic sublethal exposure to cadmium: biochemical effects. Proceedings of the Joint 14th European Marine Biology - Helgoland Symposium; 1979 September 23-29; Helgoland, FRG. (S)

Gould, E.; Nitkowski, M. Changing enzyme activities in maturing gonads of the winter flounder, Pseudopleuronectes americanus. Naylor, E.; Hartnoll, R. G. eds. Cyclic phenomena in marine plants and animals. Oxford and New York: Pergamon Press; 1979:231-238. (P)

Pearce, J. Ocean Pulse -- a coastal environmental assessment and monitoring program. The Coastal Soc. Bull. 3:9-12; 1979. (P)

Pearce, J.; Radosh, D.; Caracciolo, J.; Steimle, F. Benthic fauna. MESA New York Bight Atlas Monograph 14. (S)

Pearson, W. H.; Olla, B. L. Threshold for detection of naphthalene and other behavioral responses by the blue crab, Callinectes sapidus. Estuaries; (1979). In press.

Steimle, F.; Caracciolo, J.; Pearce, J. Impact of dumping on New York Bight apex benthos. Ecological stress and the New York Bight: science and management: proceedings of a MESA symposium; 1979 June; New York, NY. (S)

AQUACULTURE DIVISION

Spawning and Rearing of Mollusks Investigation

In two trials of a juvenile surf clam nutrition experiment, surf clams of an average length of 4.4 mm were grown in a static culture for a 6-wk period at five different algal concentrations. The clams were measured at weekly intervals and the instantaneous growth rate was calculated for each interval. After 6 wk, the group of clams receiving the highest food level of approximately 5×10^5 algal cells per liter grew to 15 mm. This growth is significantly higher than that of clams receiving the lower food concentrations. It is apparent from the growth data that the lesser concentrations did support growth comparable to the

highest treatment, until a certain length was reached. After this point the instantaneous growth rate dropped. This phenomenon occurred in sequence from the lowest food concentration to the highest. From this type of experiment, an optimal feeding schedule can be surmised which conserves algae yet supports maximal growth.

As part of our search for economically feasible methods for the grow-out of hatchery-reared bay scallops, we have placed seven Japanese-style lantern nets containing scallops in Connecticut waters. These plastic-mesh nets are 3 m long, 0.5 m in diameter, and are divided into 10 compartments. We have deployed these nets using SCUBA-equipped divers, moored them to the bottom, and buoyed them vertically with styrofoam floats. In water deeper than 4 m this arrangement is completely underwater and, therefore, does not interfere with boat traffic or lead to interruptive inquiries. Encouraging results have been obtained with a group of four of these nets in Long Island Sound off Milford at depths of 7 m. Bay scallops initially 24 mm in length planted 5 wk ago grew to 39 mm at a density of 500 per square meter, to 36 mm at 1000 per square meter, and to 35 mm at 1500 per square meter. Mortality has been minimal to this point, and the lantern nets have performed well mechanically.

Another possible grow-out procedure for scallops is simply to free-plant the animals in suitable natural environments. Our suspicion has been that such free plants will result in large-scale predation on the planted scallops and additional losses due to movement of the animals. To gain some initial feelings for the complexity of this type of work, we marked and released 2000 hatchery-reared scallops which were 25 mm in length in a suitable estuary in Groton, CT. Results after 1 wk were not nearly as bleak as predicted. Large numbers of marked scallops were easily found and no unusually large concentrations of predators were observed. We will continue to monitor these animals.

E. Rhodes participated in the Washington, DC, workshop for the National Aquaculture Plan.

Aspects of Nutritional Requirements of Mollusks Investigation

The harvest of algae from semicontinuous cultures amounted to 1527 liters of larval foods and 1322 liters of juvenile foods. These cultures were distributed to other investigations as follows: Spawning and Rearing of Mollusks, 815 liters; Aquacultural Genetics, 786 liters; Physiological Effects of Pollutant Stress, 884 liters; and Larval Diseases of Mollusks, 50 liters.

A feeding experiment was conducted with American oyster larvae. The nutritional value of three algal species not previously tested in the larval diet was investigated as compared to the standard diets of Isochrysis galbana and Monochrysis lutheri. The test species were Pseudoisochrysis paradoxaca (axenic), P. paradoxaca (bacterized), and I. galbana (Tahiti isolate). Six-day-old larvae that had been maintained on an I. galbana diet were fed one of the above algal species for 5 days.

Feeding axenic strains of P. paradoxaca resulted in better growth than the control algal foods, M. lutheri and I. galbana. Growth of larvae fed the I. galbana Tahiti strain was similar to that of the controls. Larvae fed the bacterized strain of P. paradoxaca, however, were considerably smaller than other larvae. These experiments were repeated using one-half of the algal concentration used in the above-described experiments. At this reduced level best larval growth was obtained when fed M. lutheri. Less growth occurred with diets of I. galbana, I. galbana (Tahiti), and axenic strains of P. paradoxaca.

All of the latter yielded similar-sized larvae. The bacterized strain of P. paradoxaca at the lower concentration also resulted in the least amount of larval growth.

Requests for axenic algal cultures were received and mailed to the following: André LaBonté of the Florida Hatchery, Dr. J. Mahoney of the Sandy Hook Laboratory, K. Simon of Normandeau Associates, and the Shinnecock Tribal Project.

Aquacultural Genetics Investigation

Selective Breeding of Commercial American Oysters

In the mass selection experiment for juvenile growth rate, collection of data from the 1978 year-class oysters within each of the three selection lines (fast-growth line, slow-growth line, and random control line) is beginning. The data will be used to analyze selection progress achieved thus far and to establish selection criteria for next year's brood stock. Each cross within each line will be measured, analyzed, and selected separately to minimize age and environmental biases within each line. During September, approximately 1700 oysters from the oldest 1978 fast-growth line cross were measured.

Shearon Dudley prepared a text and presentation on "Relationship Between Larval Setting Order and Spat Growth Rates in the Oyster (Crassostrea virginica)" to be given at the International Estuarine Research Conference during 7-12 October 1979.

Experimental Hybridization and Inbreeding of Commercial American Oysters

Another geographic hybrid cross was made between our local oyster and oysters from Virginia. Hybrid larvae grew well and survived through metamorphosis. In contrast, local control larvae did not perform as well as usual, perhaps because of the lateness of the season when usual breeding has ceased. Hybrids, while generally not performing as well as well-adapted parental populations in their environment, could exceed the parents under certain atypical environmental conditions.

Consistent with past results on a larger scale, larvae from an outcross control culture survived and grew better than larvae from two full-sib inbred cultures.

PATHOBIOLOGY DIVISION

Comparative Invertebrate Pathology Investigation

Histopathological examinations of tissues of shellfish collected from seven areas in Massachusetts were completed and reports sent to proper authorities. This survey revealed Minchinia nelsoni continues to be present only in the Wellfleet area. Two American oysters with neoplasms were found in these collections. Extracts of samples exposed to "Ames-type" assays showed that approximately 50% of the samples were mutagen-positive. A recent sample from Fall River had a 2% prevalence of Chlamydia-like lesions and minimal pathologic conditions.

Histopathological examinations on four service samples of Maine shellfish were completed and reports prepared. Two samples of seed American oysters suffering mortality had bacterial colonies associated with dead animals.

However, a "control population" exhibited no significant lesions or parasites. Mussels from Walpole had 4% infections with Nematopsis ostrearum; 20% trematode infestations; 82% evidence of hemocyte aggregates; 28% abscesses in tissues; and 60% digestive gland metaplasia.

Efforts to develop tests for the in-situ presence of heavy metals in oyster tissues are in progress. It appears that an "old" staining method in conjunction with a new fixative shows promise of being useful in demonstrating the presence of copper and other heavy metal contaminants in histologic sections.

Attempts are being made to recover the reolike virus of the blue crab by inoculating normal crabs with old material that had been stored at -20°C for 2 and 3 yr. (Due to freezer failure, all material that had been stored at -70°C was lost.) If successful in recovering the virus, live material will be submitted to interested individuals at the University of Maryland so that they may compare it with the Atlantic menhaden virus thought associated with that species' mass mortalities.

A report was completed on the microscopic examination of planktonic crustaceans collected on the DWD 106 cruise in November 1978. This report was submitted to the NOS Ocean Dumping Office in Rockville, MD. Results of the examination showed that bacterial infections in euphausiids and isopods were considerably higher in this sample than in previous cruise samples. Eight (15.7%) of 51 euphausiids and four (11.8%) of 34 isopods examined histologically were infected with gram-positive cocci. The site of infection in the euphausiids was the gonads, whereas connective and muscular tissues were affected in the isopods.

There is a possibility of interaction of infectious disease in marine organisms and pollution as suggested by some researchers in recent years. However, the bacterial diseases observed in this DWD 106 study could not be correlated with the disposal of wastes during the cruise. The presence and prevalence of disease and pathologic conditions in planktonic crustaceans will continue to be noted and catalogued in the National Registry of Marine Pathology. In the future, this information is to be used as a baseline reference and may prove useful to indicate changes in the ecosystem after years of waste disposal.

The Histology Section prepared approximately 700 stained sections of various crustacean, finfish, and shellfish tissues for examination by resident pathologists. As a service to Dr. M. Carriker of the University of Delaware's College of Marine Studies, approximately 150 slides of many bivalve molluscan tissues were prepared for courses in comparative morphology and reproductive physiology. The section also spent considerable time on preparation of a "Histological Procedures Manual" and developing a coding index.

Microbial Ecology Investigation

Historical data on the identification and distribution of marine protozoa in the surface waters and bottom sediments of the coastal zone and open ocean were analyzed to determine which species of marine amoebae might deserve attention in Ocean Pulse-related studies. Two genera, Paramoeba and Acanthamoeba, have been selected for future studies since they appear to have a universal distribution throughout a wide geographical range. Free-living Paramoeba species have been reported from the Atlantic Ocean, the Baltic Sea, and the Gulf of Mexico. Previous MESA-related studies have shown that Paramoeba is present in the bottom sediments of sewage, dredge spoil, and acid waste sediments of the New York Bight, and from sediments of oiled seabottom in the Gulf of Mexico. Various species of Paramoeba

feed on bacteria or diatoms. Since it is anticipated that short- or long-term alterations which affect epibacteria and phytoplankton also will affect the population structure of marine protozoa which depend upon them for food, then future analyses of Paramoeba food habits, and presence or absence of its prey at Ocean Pulse study sites, should provide valuable data on acyclic changes in the health of the ocean environment.

A new study was initiated with collaborators at the American Type Culture Collection to identify some of the marine bacteria that are associated with environmental samples collected for culture studies on marine amoebae. Preliminary work has shown that gram-negative epibacteria belonging to the genus Oceanospirillum may be recovered from agar-plate cultures of Paramoeba pemaquidensis. The bacteria are helical-shaped, have rigid walls, and differ from the spirochetes by having tufts of bipolar flagella. The bacteria-amoeba food web association is to be studied further to determine whether environmental circumstances which affect Oceanospirillum introduce a chain reaction which also affects protozoa that use them for food. Other cooperative studies with the American Type Culture Collection have shown that pathogenic Acanthamoeba culbertsoni organisms, isolated from bottom sediments and representing two different geographical strains, differ from the type species in their isoenzyme composition. The starch gel electrophoresis patterns for the three strains differed from each other even though all were morphologically the same, grew at 40°C, and killed laboratory-infected mice. The three strains have been sent to collaborators at the US Public Health Service's Center for Disease Control in Atlanta, GA, where they will be studied to determine whether their antigenic composition is the same or different. The isoenzyme studies suggest that environmental influences may alter physiological and nutritional characteristics of single-celled animals without causing changes in the features that are used to aid in their identification. Thus, in agreement with the Ocean Pulse concept, marine amoebae may be among the first animals to respond at the cellular level when major alterations occur in the chemical or biological makeup of the sea.

Fish Pathology Investigation

A total of 469 American sand lance collected from several stations in the Northwest and Middle Atlantic as part of Ocean Pulse monitoring efforts have been x-rayed. This constitutes about one-half of the samples collected to date. At present the incidence of vertebral anomalies found at various stations ranges from 0% to 8%. The mean value of all stations is 3.4%. When all films have been prepared and examined, the results will be analyzed for correlations between incidence of anomalies and known water quality.

More than 300 thick and 200 thin blood smears were prepared from fish captured in a recent cruise of the Anton Dohrn in the North Sea. Atlantic cod were sampled preferentially. These smears will be examined primarily for evidence of PEN (VEN) (a disease of viral etiology which destroys erythrocytes) and for hemoflagellates, which some investigators feel may be useful biological tags for different stocks of Atlantic cod. This work is being done in cooperation with R. A. Khan of Memorial University.

Experiments to determine the susceptibility of various clupeid fishes to a strain of IPN virus isolated from Atlantic menhaden are underway. Juvenile American shad are currently being tested. Studies of the effect of temperature on the course of the disease in menhaden are also in progress. Preliminary results of virus neutralization tests using sera from diseased and healthy menhaden

show some promise as a tool for surveying the prevalence of this disease in widespread populations. This work is being pursued in cooperation with the Department of Microbiology of the University of Maryland. Although some workers have suggested that there is a relationship between the mortalities induced by this virus and ocean pollution, we have not been able to establish that as of yet.

Larval Diseases of Mollusks Investigation

During this reporting period, a 48-hr bacterial growth and pathogenicity study was completed using two concentrations of a green Vibrio isolated from a shellfish hatchery in California. Hourly samples of developing American oyster embryos and culture water were plated and microscopically examined. The results indicated that bacterial growth was logarithmic during the first 10 hr, whereupon it levels off and then drops off near the 36th hour. Oyster larval mortality steadily increased after the 10th hour with over 99% mortality at 48 hr.

Larval American oyster cultures challenged with two bacterial strains isolated from a hatchery on Long Island, NY, are being reared in 2-liter beakers in an attempt to duplicate the disease process as it occurred at the hatchery. The culture is now 2-wk old and thus far extensive mortalities have not been noted.

Progress has been made in isolating cells responsible for disease defense in larval American oysters. An initially promising technique of attaching immunologically active cells to collagen-coated surfaces, then releasing them with collagenase, was discarded when it was found that the collagenase enzyme reduced the ability of some of the cells to reattach to plastic Petri dishes. However, initial experiments using a different approach have been promising. It now appears possible to isolate a unique subpopulation of cells that can attach to collagen but not to plastic surfaces.

Contrary to some published reports, experimentation has shown that American oyster hemocytes can engulf particles at 4°C. Oyster cells in a balanced salt solution containing amino acids and carbohydrates could take up latex particles at 4°C. No uptake was seen in cells suspended in seawater.

Fixed samples of American oyster larvae experimentally infected with the ISE, Inc., shellfish hatchery Vibrio were sent to Mr. Ralph Elston at Cornell University for Sea Grant cooperative histopathological examination.

Meetings, Talks, Visitors, and Publicity

Cynthia Love of Lincoln University started work as a Work-Study Co-op in the Pathobiology Division on 27 August.

Dr. Rosenfield participated in the Aquaculture Workshop which was held at the 4-H Center in Washington, DC, during 5-7 September.

On 7 September, Dr. Rosenfield and Dr. Murchelano attended an Ocean Pulse planning meeting at the Sandy Hook Laboratory.

Dr. Sawyer traveled to Atlanta, GA, during 17-19 September to attend a conference with the chief of the Parasitology Branch of the US Public Health Service's Communicable Disease Center, concerning diagnosis and identification of protozoa from Ocean Pulse stations in the New York Bight.

Dr. Rosenfield, Mr. Kern, and Dr. Blogoslawski attended an ad hoc Marine Shellfish Transports Committee meeting at Boothbay Harbor, ME, during 18-21 September.

On 24 September, Dr. Rosenfield participated in the Maryland Sea Grant meeting.

On 27 September, Dr. Rosenfield traveled to Crisfield, MD, to discuss improvements made at the University of Maryland's Seafood Processing Laboratory and to learn of some new discoveries in seafood processing.

Visitors to the Oxford Laboratory were Vincent Mudrak and Thomas Wiggins of the Pennsylvania Fish Commission, who delivered some fingerling American shad to Mr. Newman to be used for experimental purposes.

Publications

Blogoslawski, W. J.; Alleman, D. W. Ozone-UV water treatment system for shellfish quarantine. *J. Ozone Technol.* (S)

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Howard, D. H.; Crosby, M. P. Parasitological findings in Crassostrea rhizophorae from Puerto Rico. *J. Invertebr. Pathol.* (S)

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MacLean, S. A. Report of November 1978 DWD 106 cruise - planktonic Crustacea. (Prepared for NOS Ocean Dumping and Monitoring Division, Rockville, MD.) Oxford Lab. Informal Rep. No. GL-1-9/21/79; 1979.

Sawyer, T. K.; Lewis, E. J.; Lear, D.; O'Malley, M. Black-gill disease in the rock crab, Cancer irroratus, associated with sewage dumping in coastal waters of Maryland, Delaware, and New Jersey. (Prepared for Maryland Energy and Coastal Zone Administration, Annapolis, MD.) Oxford Lab. Informal Rep. No. GL-3-9/26/79; 1979.

Sawyer, T. K.; Lewis, E. J.; Lear, D.; O'Malley, M.; Adams, W. N.; Gaines, J. Distribution of Acanthamoeba (Protozoa: Acanthamoebidae) in marine and freshwater sediments. (Prepared for Maryland Energy and Coastal Zone Administration, Annapolis, MD, and NOS Ocean Dumping and Monitoring Division, Rockville, MD.) Oxford Lab. Informal Rep. No. GL-2-7/20/79; 1979.

RESOURCE UTILIZATION DIVISION

Fisheries Engineering Investigation

The new docking ramp for the stern-chute clam dredge handling system is under construction locally under the supervision of Vern Nulk. It is expected to be ready for use on the winter survey.

John Kenney participated in a juvenile fish cruise aboard the Delaware II where he observed and measured gear performance. He and Al Blott have completed preliminary calculations on data gathered.

Al Blott delivered a lecture on twine and netting to a Gloucester, MA, fisheries class.

Mike Corbett and Al Blott have been researching and writing an article on New England fishing vessels and gear, with research assistance from Dan Baker, John Kenney, and Vern Nulk.

Jack Moakley, Vern Nulk, and John Kenny prepared the R/V Rorqual for inspection by the NOS Office of Fleet Operations. On 19 September, CDR John Stacklehaus conducted that inspection. We have yet to receive the official results of the inspection.

Also, Jack Moakley is investigating the feasibility of procuring US Customs-seized fishing vessels and/or electronics in order to update and enhance our shipboard capabilities both for the Gloucester Laboratory/Resource Utilization Division and for the NEFC.

Facilities Engineering

Bob Van Twuyver has been supervising the installation of new insulation in freezer #7 at the Gloucester Laboratory. Connections and plumbing to the new freezer compressor are in progress. Bob also had thermostatic controls installed in the office areas and one lab to better control inside temperature, particularly when the building is subjected to uneven solar heat loading. It is expected the new controls will both improve comfort with a more even temperature range throughout the building and save energy.

Dan Baker oversaw the placing on the roof of a new air conditioner to help control the environment in two labs at the Gloucester Laboratory.

Everett Burke repaired the roof on the Gloucester Laboratory main building.

Tom Connors continues working on the energy survey at our Gloucester facilities. All data on the energy consumption from the various sources have been tabulated.

Resource Development and Improvement Investigation

New Product Development

A storage study was begun on fresh frozen Atlantic cod packaged in waxed cartons overwrapped with Saran. The "U.S. Grade A" storage life at +5°F, 0°F, and -5°F will be determined by an inspector and correlated with taste test, colorimeter, Instron texture meter, and pH measurements.

The reproducibility of the Instron texture meter is being determined with foods of known size.

On 11 September, a demonstration of smoked salmon processed in a retort pouch was held in our library. After a short discussion on the advantages of the retort pouch, the salmon was taste tested by the 12 attendees. One of the attendees brought along some samples of fish processed in retort pouches. Both the smoked salmon and a fish in sauce were taste tested. Both products were judged as very good and it was agreed that packaging foods in a retort pouch is the processing technique of the future.

Joe Mendelsohn reviewed a proposal on tenderizing ocean quahogs and began a paper on products made from minced fish.

Species Identification

Work continued on the speciation of sea turtles with the arrival of Dr. Sylvia Braddon of the SEFC's Charleston Laboratory. She brought with her known and unknown species. Various pH ranges were tried on all samples by isoelectric focusing. We are now completing the work and results will be sent to her.

Seafood Composition and Nutrition

The gas chromatograph has arrived and initial runs are being done with standards. Work continues with thin-layer chromatography for lipid cleanup.

Storage of Blue Mussels

Frozen storage samples and September 1979 mussels were analyzed.

Surf Clams

Work continues on the manuscript for the Shellfish Institute of North America (SINA) meeting proceedings.

Marine Products Development Irradiator

Our efforts to unload our cobalt-60 source has run into a temporary snag. We applied at the Savannah River facility of the US Department of Energy to ship and store our source there since that facility originally activated our 96 cobalt-60 strips. Savannah is reluctant to store our source unless we can dig up an agreement that states that Savannah promised to do so 15 yr ago (1964). We can find no such contractual agreement. Now it means that we will have to trace down people who were in the former US Energy Resource and Development Administration and still former US Atomic Energy Commission to see if any such agreement exists. If not, it means knocking on what, we are now beginning to suspect, are reluctant doors to accept our small but still potent waif.

Product Quality, Safety, and Standards Investigation

Product Quality

The Hewlett-Packard (H-P) gas chromatograph was down for most of the month. Several problems were corrected by H-P service engineers. We have begun the analysis of over 250 backlogged volatile amine samples.

Slides were prepared for the presentation of the isoelectric focusing collaborative study results next month at the Association of Official Analytical Chemists (AOAC) meeting.

A simple, more rapid method is being tried for the isolation of whole fish myofibrils for "SDA" electrophoresis.

Methodology is being developed for the gas chromatographic analysis of trimethylamine oxide after reduction to trimethylamine by titanous chloride.

Bluefish fillets which were stored for 50 wk at 0°F still rated high in organoleptic quality. On a scale of 1 to 9, vacuum-packaged samples scored 7.5 in flavor, and air-packaged samples (polyethylene) scored 6.8.

Raw breaded sand lance were unacceptable in flavor after 60 wk storage at 0°F due to the development of oxidative rancidity. Vacuum packaging in an oxygen-impermeable film helped to delay the onset of rancidity, but the results were not that dramatic. Texture remained remarkably stable during the entire frozen storage period.

At the request of the Maine Sardine Council, an experiment was conducted to determine whether the Torrymeter could be used to evaluate the quality of Maine sardines which are usually brined on board ship prior to landing. The data will be analyzed statistically to determine whether the absorbed salt affected the meter readings.

Product Safety

Calibration of polychlorinated biphenyl (PCB) Aroclors 1242, 1248, 1254, 1260, and p,p'-DDE was accomplished. Major peaks from each Aroclor were plotted. These plots checked both the linear range of the instrument and the accuracy of the dilutions. A correlation coefficient >0.95 was realized for all Aroclors.

An injection of 3×10^{-10} g of a mixed PCB standard yielded a clean spectrum with a signal-to-noise ratio of less than 5:1 for the dominant peaks. An injection of 3×10^{-11} g yielded a response which was quantifiable with a precision of at least $\pm 100\%$ relative standard deviation.

Drift, resolution, and column performances were also evaluated.

Work has begun on the AOAC general method for chlorinated and phosphated pesticides. We are presently working with bluefin tuna. This tuna had a fat content of 15.9%. We have gone through all the steps except the Florisil cleanup. This work is proceeding normally without any major problems. We now have a feel for logistics within the lab for PCB workup. We plan to do blank, control, and fortified samples in October. We will also pre-extract glass wool, sodium sulfate, and boiling chips as part of the normal routine for the workup of samples.

As soon as we are confident with the accuracy and precision of a control sample, we will request to be part of the interlaboratory quality control of the quality assurance section of the chemistry branch of the USEPA laboratory in Research Triangle Park, NC.

A contract is being awarded to John G. Reuter Associates in Camden, NJ, for PCB analysis of fish tissues. I have also included a quality assurance section in this contract and will be receiving the raw data and calculations on a monthly basis.

We will be receiving fish samples shortly. The edible tissues will be composited in the lab before shipment to the contractor. The freezer is nearing completion and should be available for storing samples the first week of October.

Product Standardization

On 13 and 14 September, John Ryan, Fred King, and Joseph Carver attended a meeting with Jim Brooker of the Washington Office and Phil McKay, Chief Inspector at the Northeast Inspection Office, to discuss our participation in specifications development and the schedule for standardization projects for FY80 and FY81.

On 18 September 1979, John Ryan participated in a meeting with US Food and Drug Administration (USFDA) representatives in Washington, DC, to discuss the status of and ongoing actions relative to the various "Recommended Codex Standards on Fish and Fishery Products." At the meeting, the list of recommended Codex standards was reviewed, and the action to be taken during FY80 was agreed to by both the USFDA and NMFS.

On 19 September, John Ryan and Joseph Carver participated in a meeting with US Department of Agriculture (USDA) representatives in Washington, DC, to discuss procurement of canned tuna and fried portions for US Department of Commerce (USDOC)-donated foods to be distributed to school lunch programs and disadvantaged people. Two specifications prepared at the Gloucester Laboratory were presented at the meeting. Mr. Marvin Eskin, Chief of the USDA's Food Distribution Division, was very pleased that specifications were ready at such short notice.

Fred King participated in a briefing on NARADCOM's comparative edibility study for Martha Blaxall, Director of the NMFS Office of Utilization and Development, and Tom Billy, Chief of the NMFS Seafood Quality and Inspection Division. A wide variety of fresh fish samples were supplied each week for the comparative edibility study of NARADCOM.

The proposed unified shrimp standard is being revised in accordance with comments received from Tom Billy's division. Comments include: (1) change drained weight method to include separate methods for cooked and raw shrimp; (2) use of USFDA definitions of decomposed shrimp in the standard; and (3) make slight changes in defect tables.

Proposed standards of identity for Atlantic cod and haddock fillets, flatfish fillets, and redfish fillets based upon Codex (international standards) are being reviewed.

A new handbook covering the development of federal food specifications was reviewed and comments submitted to the Washington Office. A letter was prepared for Mr. Leitzell's signature enclosing the comments and requesting that NMFS be made responsible for the preparation of federal specifications.

Technical Assistance

Division personnel provided information and technical assistance in the following areas: trout farming; fish plant design; fish composition and storage; aquaculture; fish smoking; packaging fresh fish in a nitrogen atmosphere; distinguishing species of frozen salmon when gutted and headed; reasons for sudden mass mortality of live lobsters; authenticate freshwater drum; authenticate three species of serranids and one dolphin; furnish information on size of butterfish and give leads as to the possibility of mechanized filleting; give leads as to the safest way to ship live lobsters to Hong Kong entailing flight time of 2 days; information on anglerfish, wolffish, and ocean perch; information on the storage of live lobsters in refrigerated seawater; the milkfish of the Indian Ocean; possible effects of water hardness on adherence of batter coatings to fish portions; use of automatic data processing techniques for standards development; and fill-of-container information in terms of drained weight for canned clams.

Meetings, Talks, Visitors, and Publicity

Perry Lane attended a meeting of the New England Fisheries Steering Committee in Boston, MA, and of the Shellfish Transport in Boothbay Harbor, ME.

Fred King participated in the annual meeting of the Research and Development Associates for Military Food and Packaging Systems, Inc., on 11 and 12 September at NARADCOM.

Joe Licciardello presented a paper on irradiation of seafood at the American Chemical Society annual meeting, and also attended a symposium at the Massachusetts Institute of Technology.

NATIONAL SYSTEMATICS LABORATORY

Shrimps Investigation

A manuscript was revised describing a new species of Solenocera from northern Australia. Work continued on a taxonomic review of rock shrimps (genus Sicyonia) from the American Pacific.

Other Crustaceans Investigation

Work continued on the description of a new family, genus, and species of crabs from deepwater thermal vents along the Galapagos Rift. Preparation continued of a guide to decapods of the temperate western Atlantic. A preliminary draft was completed of a note on Carolinian records of species of Homarus and Callinectes.

Pelagic Fishes Investigation

Continued was preparation of a field guide to western Atlantic longline fishes. Summarized were meristic and morphometric data for Scomberomorus cavalla, commerson, and sinensis. Compared were lengths and heights of four preural centra in scombroid fishes and their relatives.

Benthic Fishes Investigation

Plans were completed and gear was assembled for NOAA and National Science Foundation-deepsea submersible dives to take place on Galapagos Ridge thermal vents during November and December.

Meetings, Talks, Visitors, and Publicity

D. Cohen participated in an National Science Foundation panel evaluating "International Decade of Ocean Exploration" projects.

Dr. Childress of the University of California at Santa Barbara visited for research discussions and identification of crustaceans. Dr. Matilde Mèndez of the Instituto del Mar del Peru also visited.

ATLANTIC ENVIRONMENTAL GROUP

Ocean Monitoring and Climatology Investigation

The cooperative Ship of Opportunity Program obtained seven XBT and four continuous plankton recorder (CPR) transects in September: one XBT and one CPR transect in the Gulf of Maine, one XBT transect across the Southern New England Shelf along the 71°W meridian, two XBT and one CPR transect across the shelf and slope off New York, one XBT and one CPR transect across the shelf and slope off Norfolk (VA), and two XBT and one CPR transect in the Gulf of Mexico.

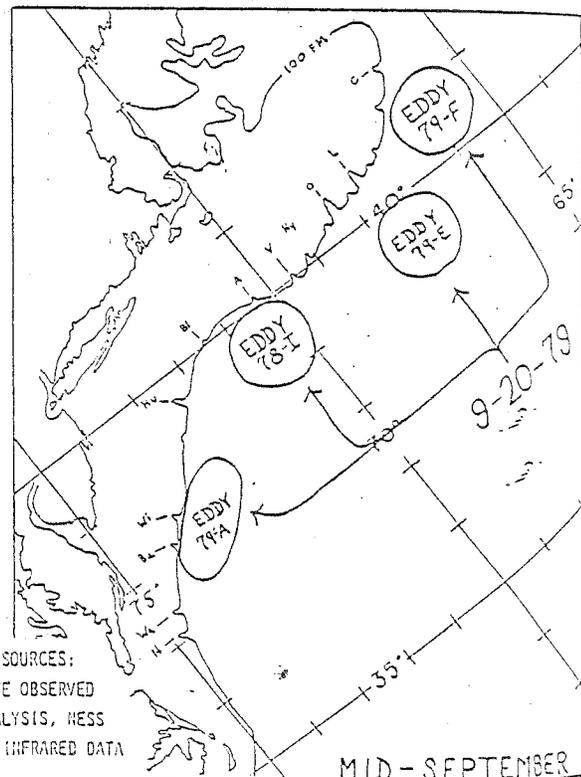
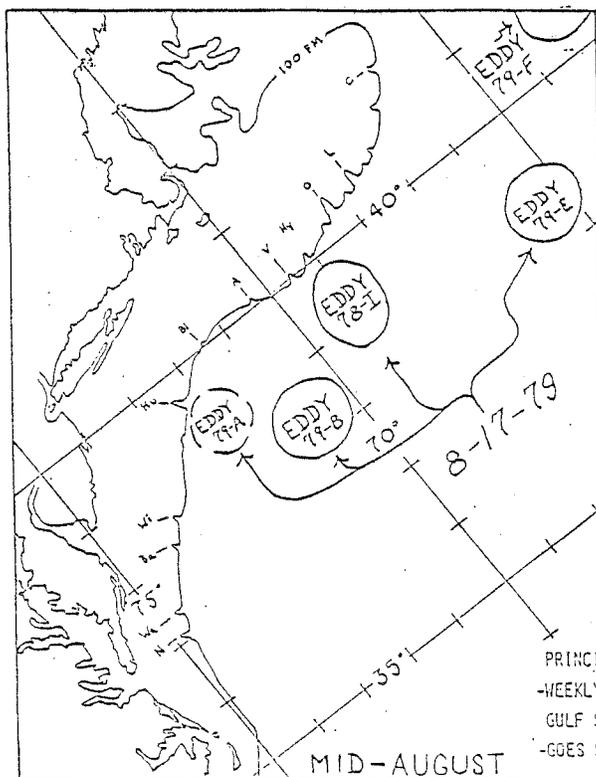
The following announcement of eddy conditions in the Georges Bank-Middle Atlantic Bight area was sent to the commander of the Atlantic area for the US Coast Guard for publication in the October issue of Atlantic Notice to Fishermen:

The Atlantic Environmental Group of the National Marine Fisheries Service reports that there were four warm core Gulf Stream eddies present off the northeast coast of the United States during mid-September.

An XBT transect from the University of Rhode Island's research vessel Endeavor revealed eddy 79-A south of Hudson Canyon during the third week in August; its existence had not been apparent in satellite imagery for over six weeks. By mid-September it was centered at about 38.1°N 73.2°W, near Wilmington Canyon, having moved about 80 nm (148 km) since mid-August. Eddy 79-B probably merged with 79-A during the second week in August. Eddy 78-I moved west about 75 nm (138 km) from mid-August to mid-September, to a position centered at about 39.4°N 67.4°W, south of Lydonia Canyon. Eddy 79-F apparently separated into two eddies during mid-August. The western one, designated as 79-F, moved westward about 135 nm (250 km) from the mid-August position to a mid-September position centered at about 40.7°N 65.9°W, south of Corsair Canyon. The eastern one, designated 79-G, centered at about 42.5°N 62.5°W was enveloped by a Gulf Stream meander during the first week of September.

During the next 30 days, eddy 79-A may move southwest to the vicinity of Norfolk Canyon, 78-I move southwest past Hudson Canyon, 79-E west of Veatch Canyon, and 79-F west-southwest to near Oceanographer Canyon.

Fishermen are requested to report unusual conditions or catches occurring in the vicinity of these eddies to the Director, Atlantic Environmental Group, National Marine Fisheries Service, RR 7, South Ferry Road, Narragansett, RI 02882, by mail. Updates on eddy positions and general information on Gulf Stream eddies may be obtained by calling the Atlantic Environmental Group (401-789-9326).



PRINCIPAL DATA SOURCES:
 -WEEKLY SATELLITE OBSERVED
 GULF STREAM ANALYSIS, NESS
 -GOES SATELLITE INFRARED DATA

Ocean Dumping Investigation

Jim Bisagni of this investigation served as chief scientist on the Kelez with scientists and engineers from NOAA, URI, WHOI, and University of North Carolina on a research cruise to the 106-mi industrial waste dumpsite during 17-24 September. The objective of the cruise was to carry out a dispersion experiment involving one million gallons of duPont acid-iron waste. Continuous on-line chemical analysis of seawater for traces of the iron waste involved the use of a pumping system newly developed by NOAA engineers at the NOS Engineering Development Laboratory. The waste plume was initially detected and was followed for approximately 12-14 hr, while both waste concentration and particulate data from different depths were being collected. Neuston tows both outside and within the waste plume were also conducted and will be analyzed later.

Free vehicle deployments of traps designed to capture deepsea amphipods were also carried out at the now inactive radioactive waste disposal site located 30 nautical miles south of the 106-mi site. The traps were recovered as scheduled by the timed-release mechanisms, but failed to produce samples of deepsea amphipods. The traps, however, did produce two eel-like fish which will be analyzed for low-level radioactive contamination.

Meetings, Talks, Visitors, and Publicity

On 10 and 11 September, Steve Cook went to New York to meet the Mormac Argo and Tamaroa and then had a meeting with the Merchant Marine Academy training representative in New York City.

Jim Bisagni was chief scientist aboard the Kelez on a cruise with scientists and engineers from NOAA, URI, WHOI, and University of North Carolina which visited DWD 106 during 17-24 September.

Also aboard the Kelez cruise was Gretchen White who conducted the Winkler dissolved oxygen determinations and the XBT operations.

Mert Ingham traveled to the NOS Ocean Dumping and Monitoring Division headquarters in Rockville, MD, to attend a staff meeting on 20 September.

On 25 September, Reed Armstrong attended an IYABA meeting at the Sandy Hook Laboratory.

Dan Smith traveled to Gloucester Point, VA, for a meeting with personnel at VIMS on 24 September and then to Morehead City, NC, to confer with US Coast Guard personnel for training purposes on 25 September.

On 25 September, Woody Chamberlin visited the NASA Goddard Space Flight Center in Greenbelt, MD, to discuss a cooperative study of CZCS application to monitoring ocean circulation. He also traveled to the Sandy Hook Laboratory on 27 September to confer with NMFS personnel.

Publications

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- Celone, P. J.; Chamberlin, J. L. Anticyclonic (warm core) eddies off the northeastern United States during 1978. *Annal. Biol.* 35. (A)
- Chamberlin, J. L.; Armstrong, R. S. Data on cold weather conditions along the Atlantic and Gulf Coasts during the fall and winter of 1976-77. Ocean variability in the U.S. Fishery Conservation Zone, 1976. NOAA Tech. Rep. NMFS CIRC-427:167-174; 1979. (P)
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Mizenko, D.; Chamberlin, J. L. Anticyclonic Gulf Stream eddies off the northeastern United States during 1976. Ocean variability in the U.S. Fishery Conservation Zone, 1976. NOAA Tech. Rep. NMFS CIRC-427: 259-280; 1979. (P)

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NEFC PUBLICATIONS AND REPORTS

Recent papers by NEFC authors are noted in the final section of each laboratory, divisional; or programmatic write-up. Papers targeted for scientific journals are listed as "Publications;" all others are listed as "Reports." Publications are labeled as submitted, accepted, or published with an appropriate "S," "A," or "P" at the end of each entry. Reports are included only upon completion.

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