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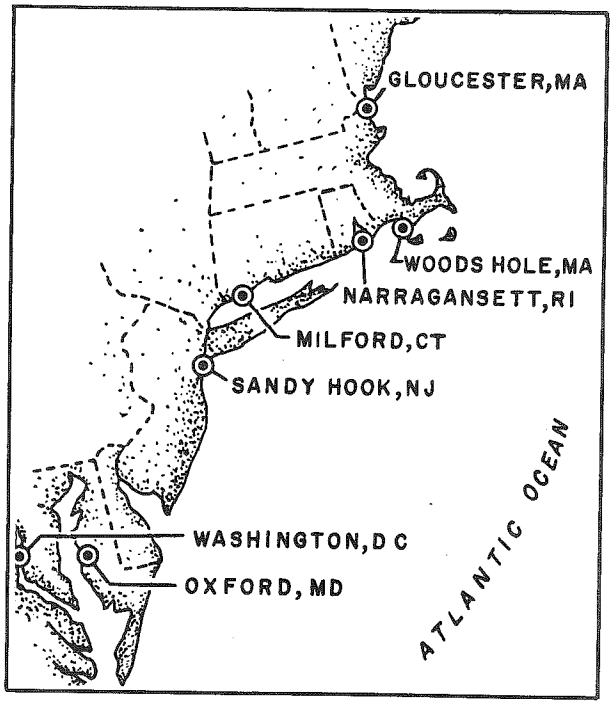
NEWS



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

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CENTER DIRECTORATE

Center Director's Office

The following item, which first appeared in the June 1979 issue of the "ASC (Association of Systematics Collections) Newsletter," could be beneficial to those involved in sample collection at sea: "Two new techniques have helped in curating a small fish reference collection (ca. 12,000 lots) at the Florida Department of Natural Resources Marine Research Laboratory in St. Petersburg. Neither technique is used constantly, but at times one saves space and the other saves handwriting...(The latter technique involves making) jar tags (the labels placed inside each jar of specimens). When many species are taken in a given collecting effort (e.g., a seine haul), the data are the same for all the species even though each will be stored in its own jar. That data can be entered, even typed, on enough tags to cover a standard sheet (e.g. 8½ x 11") and then copied onto sheets of tag stock using a Xerox machine. Xeroxgraphic copiers are the only satisfactory type since they burn ink into the tag stock thereby insuring the ink will not wash out in preservative. With data already on the copied tags, only species names and cataloging numbers must be filled in by hand."

Fisheries Utilization Office

Louis Ronsivalli met with members of the staff of the federal New England Regional Council on Food and Nutrition. The reason for the meeting was to provide information to the Council on the role and potential of seafoods in the diet. It is obvious that we can contribute significantly to the efforts of the Council, and this meeting may be the initial step in a worthy collaboration.

Special Scientific Investigations Office

Arthur Posgay completed a contribution for the 1979 International Council for the Exploration of the Sea (ICES) Annual Meeting demonstrating that sea scallops (Placopecten magellanicus) from eastern Georges Bank exhibit a significantly slower growth rate as the depth of collection increases from 55 to 110 m.

Special Technical Projects Office

The preliminary project report (Woods Hole Laboratory Reference Document No. 79-20) on the sea scallop gear trials was completed and distributed.

Preparations for the August clam gear test cruise were underway full-scale.

Other work conducted during July included: (1) participation in the preparation of the FY82 technology, facilities, and vessels submissions; (2) completion of CAMAC (computer-automated measurement and control) specifications and authorization for the National Ocean Survey's Atlantic Marine Center in Norfolk, VA, to proceed on purchasing the systems; (3) editing of video tape on the June sea scallop cruise; (4) discussion of video taping porpoise escapement from tuna seines with SWFC personnel; (5) reviewing plans for a new pier facility and electrical up-grading at the Woods Hole Laboratory; and (6) reviewing a grant proposal for freshwater mussel bed research.

RESOURCE ASSESSMENT DIVISION

Resource Surveys Investigation

During 9-20 July, an otter trawl mensuration cruise was conducted aboard the R/V Delaware II south of Martha's Vineyard. Both Yankee No. 36 and No. 41 modified trawls were tested in conjunction with both the standard BMV oval doors used on the surveys and borrowed Portuguese doors. Mal Silverman was the Chief Scientist.

On 25 July, the Delaware II departed the Woods Hole Laboratory to conduct the first leg of the summer bottom trawl survey. The first leg will survey the area from Cape Fear, NC, to the Virginia Capes. Tom Azarovitz is Chief Scientist. The cruise is scheduled to end in Woods Hole on 3 August.

On 30 July, the R/V Albatross IV departed the Woods Hole Laboratory on the second leg of the summer bottom trawl survey. Mal Silverman is Chief Scientist. This segment of the survey will operate from the Virginia Capes through Southern New England. The second leg of the survey is scheduled to be terminated on 10 August in Woods Hole.

Fishery Biology Investigation

Age and Growth

Kris Kantola Andrade completed coding and summarizing haddock age data from Albatross IV Cruises No. AL 79-03 and AL 79-04. She also started aging pollock samples from these cruises.

Vi Gifford and Gary Shepherd completed aging the 1970 commercial redfish samples and coded and summarized the data. They then began working on the 1971 commercial redfish samples.

Gary Shepherd and Jim Flescher finished removing age structures from all of the remaining frozen samples of haddock, Atlantic cod, yellowtail flounder, redfish, and summer flounder.

Judy Penttila went to the Sandy Hook Laboratory to bring back a microprojector for aging bluefish at the Woods Hole Laboratory. She also worked with Tom Hotz from the Massachusetts Division of Marine Fisheries comparing Atlantic cod otolith sections with fin ray sections. Results of the comparison show that fin rays are too inconsistent to be used for aging cod. Judy also worked with Mike Campbell on editing his paper on the age and growth of scup. Age sheets for Atlantic cod data from Albatross IV Cruises No. AL 76-09 and AL 78-04 were sent to the Woods Hole Laboratory Automatic Data Processing Unit (ADP) for keypunching. Final checking of ages was begun for Atlantic cod sampled during Albatross IV Cruise No. AL 78-06.

Shellfish

John Ropes assembled various materials to be used in presenting the methodology of thin-sectioning the chondrophores of surf clams (Spisula solidissima) at the 5 August meeting of the American Malacological Union, Inc., at Corpus Christi, TX. Included were projection transparencies showing the diamond saw equipment used, positioning shells to excise pieces of the chondrophore, thin-sections of the chondrophores and whole valves. Measurements of growth bands in the chondrophores and valves in a sample were found to be highly correlated in an analysis provided by Steve Murawski. These results were to be included in the presentation.

Jim Whalen (summer student) spent half-day periods preparing sea scallop samples for age determinations. During the other half-day period, he measured shell dimensions and weights of 134 surf clams from the Delaware II Cruise No. DE 78-07 clam survey and produced thin sections and photographic prints of 56 chondrophores from large specimens (ca. >125 mm). The remaining 77 clams were too small for processing by our equipment. He also participated in the 30 July - 10 August cruise of the Albatross IV.

Loretta O'Brien devoted almost all of her time to aging 1977 commercial sea scallop samples. In addition, she attempted to utilize acetate peels from cross sections of the wing portion of scallop shells. The level of success was not very encouraging. She also participated in the 24 July - 4 August cruise of the Delaware II.

Relative to renovating the cottage in which the shellfish work is conducted, Louise Dery, Judy Penttila, and John Ropes outlined their office and lab requirements with regard to benches, cabinets or shelves, electrical outlets, etc. The maintenance personnel removed all bathroom fixtures from the northeast corner room preparatory to converting it to a darkroom.

Finfish

A number of projects were completed this month in the finfish group. Among these were our portion of the age and growth archiving project, which Cathy Rearden has been working on, and the 1978 New Jersey recreational bluefish fishery aging task. A pilot project concerning silver hake growth patterns was also completed for the silver hake stock separation study. Lisa Diaz began sectioning silver hake otoliths from the 1979 spring bottom trawl survey.

Ambrose Jearld reviewed a paper on age and growth of scup by Mike Campbell and a paper by Gary Shepherd which was a comparative study of age results from reading various hard structures of summer flounder. Ambrose also participated in the Southern New England State-Federal Assessment Workshop. The focus of the workshop was on stock assessment and supporting research activities, data bases, etc., in the Southern New England area. Surfacing during the workshop was a keen interest in scup and problems with aging them, particularly early annuli and outer edge marks. As an attempt to resolve some of the problems that may occur due to differences in individuals performing the age readings, Ambrose recommended that those biologists interested in the problem participate in a Scup Aging Workshop to take place at the Woods Hole Laboratory some time in October. Anticipated participants will include biologists from the States of Massachusetts, Rhode Island, Connecticut, New York, and New Jersey, and biologists from the Woods Hole Laboratory.

Sandy Hook Investigation

Darryl Christensen and John Clifford completed final revisions of a manuscript on 1978 Atlantic mackerel landings. They also worked on revisions of a manuscript on party-boat catches of bluefish. John continued collecting bluefish and summer flounder age samples from the recreational fishery.

Stuart Wilk and Erin Feeney worked on revisions to the bluefish briefing book. Stuart and Wallace Smith completed the final draft of a manuscript on separation of summer flounder stocks using linear discriminant analysis.

Wally Morse completed analysis of the 1977 groundfish maturity data and prepared the first draft of an informal report on the results.

Fishery Analysis Investigation

Ralph Mayo completed final draft updates of alewife and blueback herring synopses for the NOAA Environmental Research Laboratories Marine Ecosystems Analysis Program's (MESA) atlas on fish distribution in the New York Bight. Work was also completed on developing a computer program to summarize historical Northwest Atlantic fisheries catch data for the US, Canada, and all other countries for the 33 stocks under consideration in the American-Canadian fisheries treaty. Ralph also developed data formats for processing commercial red crab data and completed requisite modifications to a Loran-geographic locality conversion program for use with these data.

Liz Bevacqua and Ralph continued summarization of all available commercial catch, effort, length-frequency, and age data for scup, and corresponding inshore and offshore survey data. An initial scup assessment will be prepared in the near future. Liz has completed an audit of the 1978 New England weighout data and is presently correcting the Middle Atlantic data tape in preparation for submission of the 1978 USA STATLANT 21B report.

Garret Flaherty completed an audit of July domestic vessel and processor logbooks received by the NEFC. An inventory of all logbook records received to date has been established and stored on the First Data Computer System.

Paul Wood coordinated three sea-sampling trips during July: (1) F/V Mark Darren, a lobster vessel out of New Bedford, MA, during 5-11 July (Jim O'Connell, sea sampler); (2) F/V Nordic Pride, a sea scallop vessel out of New Bedford, MA, during 21-31 July (Bill Overholtz, sea sampler); and (3) F/V Clearview IV, a red crab vessel out of Fall River, MA, during 24-30 July (Pat Gerrior, sea sampler). Paul initiated analyses of shell height frequency data from the 1979 US sea scallop assessment survey and the 1979 Canadian sea scallop assessment survey.

Marj Aelion and Maureen Griffin completed the restratification of all surf clam and ocean quahog (Arctica islandica) research survey cruise tow data into new shellfish sampling strata. Marj also began shell height-meat weight analyses of sea scallop samples collected from survey cruises. Maurice Crawford is assisting Marj in processing these samples.

Steve Murawski began preparation of an ICES ocean quahog assessment document for the 67th statutory meeting to be held in Warsaw, Poland.

Fred Serchuk and Paul Wood completed analysis of research survey and commercial data of the Southern New England-Middle Atlantic cod populations. Preparation of an assessment report presenting these results is currently underway.

Fishery Assessment Investigation

Steve Clark, Thurston Burns, and Ron Essig completed a review and assessment paper on the offshore American lobster (Homarus americanus) fishery for presentation at the 67th statutory meeting of ICES in October.

Investigation personnel were involved in updating species assessments, including haddock, pollock, silver hake, red hake, Atlantic mackerel, white hake, American lobster, northern shrimp (Pandalus borealis), other finfish, and total finfish and squid.

Emory Anderson prepared several reports reviewing finfish and shellfish resources, one for Georges Bank resources and one for Mid-Atlantic resources. These were for the NOAA responses to oil and gas lease sales No. 42 (Georges Bank) and No. 59 (Mid-Atlantic - outer continental shelf). In addition, he drafted a short report addressing the potential impact of the total mortality of a year class of fish caused by a theoretical oil spill.

Frank Almeida completed the 1978 biostatistical computer runs for red hake and silver hake and the 1963-67 runs for red hake (with Emory Anderson). He also continued working with ADP programmers in developing a multiple-option virtual population analysis (VPA) program.

Jeffrey Floyd, Steve Morrison, and Bill Burns continued to work on measuring morphometric characters of silver hake. That project is nearing completion with only the 1979 spring bottom trawl survey samples remaining. Jeff returned to school on 13 July.

Dennis Hansford has been working on northern shrimp data for Steve Clark and also processing commercial sampling data.

Pat Carter continued compiling data for Canadian scientists at the Bedford Institute of Oceanography in Dartmouth, NS, to replace data lost in an April fire. She has also updated white hake commercial catch and research survey statistics.

Pat Carter, Steve Morrison, and Bill Burns participated in a cruise aboard the Delaware II (Cruise No. DE 79-07) beginning on 24 July --part of the summer bottom trawl survey. Frank Almeida and Dennis Hansford were aboard the Albatross IV (Cruise No. AL 79-08 - Part I) beginning 30 July as part of the summer bottom trawl survey.

Bill Overholtz worked on the Atlantic mackerel assessment, on the Groundfish Task Force paper, and also went on a sea-sampling trip during 21-31 July on board a scalloper, Nordic Pride, from New Bedford, MA.

Fishery Systems Investigation

Routine assessment and advisory activity (e.g., regional fishery management councils, National Marine Fisheries Service Central Office, Federal Energy Regulatory Commission, US State Department, and others) continued during July. Mike Sissenwine continued preparation of material supporting the NEFC FY72 budget initiative. Jim O'Connell made a sea-sampling trip on the F/V Mark Darren from 6 to 11 July. The F/V Mark Darren is an offshore lobster vessel.

Mike Sissenwine, Anne Lange, Gordon Waring, and Margaret McBride participated in a workshop on Southern New England stock assessments conducted at the Woods Hole Laboratory on 24 and 25 July. Mike Sissenwine attended a meeting of the Northeast Fisheries Management Task Force in Peabody, MA, on 18 July. The Northeast Fisheries Management Task Force is intended to foster a much broader and less emotional discussion of fisheries management concepts and application to the northeastern region. Mike will be the chairperson of the subcommittee preparing a review of fisheries management techniques.

Gordon Waring attended a joint Groundfish-Herring Oversight Committee meeting in Peabody, MA, on 18 July. The feasibility of closing the spawning grounds for Atlantic herring was discussed at this meeting. Gordon also attended a planning meeting of the Mid-Atlantic Fishery Management Council concerned with butterfish, Atlantic mackerel, and squids. The meeting was held on 23 July in Dover, DE. On 5 and 6 July, Mike Sissenwine participated in the preparation of the report of the joint US-USSR hydroacoustics meeting held at the Massachusetts Institute of Technology (MIT) the previous month. The editorial meeting was held at the Endicott House in Dedham, MA.

Fishery Economics Investigation

During July, the Fishery Economics Investigation was primarily involved in the collection and compilation of socioeconomic data. A data base of daily ex-

vessel prices and landings for Atlantic cod, haddock, and pollock by market category for the Boston Fish Market was developed. A quarterly harvesting allocation model for 10 groundfish species was estimated, and preliminary results are available.

Meetings, Talks, Visitors, and Publicity

During July the joint US-USSR meeting on hydroacoustical methods for the estimation of marine fish populations was held at MIT's C.S. Draper Laboratory in Cambridge, MA, and at the MIT Endicott House in Dedham, MA. The meeting consisted of two distinct activities, each lasting 1 wk. During the first week at the Draper Laboratory, 46 papers were presented by participants from 14 countries. Jim Crossen and Jeff Mills participated and contributed a paper titled "Fisheries Hydroacoustical Calibration Apparatus." Also in attendance at the meetings were Robert Edwards, Brad Brown, Mike Sissenwine, Ambrose Jearld, and Harold Foster.

At the second week's meeting an editorial group chaired by John Suomala considered the discussions of the preceding week and documented the first draft of the first volume, titled "Deliberations, Determinations, and Findings of the Scientific and Technical Specialists." Jim Crossen is a member of the editorial group and will continue working with the editors, J. Suomala and K. Yudanov of the USSR. A complete listing of meeting participants and contributed papers is on file in the library.

On 5 July, Linda Despres conducted a workshop for Woods Hole Laboratory personnel to standardize survey procedures. It was especially intended for new employees.

During 20-22 July, Don Flescher put up and manned a display at the Yarmouth Clam Festival in Yarmouth, ME.

Stuart Wilk and Emory Anderson attended the Mid-Atlantic Fishery Management Council Scientific and Statistical meeting in Philadelphia, PA, on 2 and 30 July. Stuart gave a lecture on the status of estuarine fisheries at the Hudson-Raritan Estuarine Project Technical Development Plan Workshop, sponsored by the Harvard Club, in New York City on 19 July.

Paul Wood attended the New England Fishery Management Council's Sea Scallop Oversight Committee meeting on 20 July in Philadelphia, PA.

Fred Serchuk and Steve Clark met with Canadian assessment scientists on 16 and 17 July in Dartmouth, NS, to review the 1979 Georges Bank and Gulf of Maine Atlantic cod and haddock assessments.

Steve Clark participated in a Source Evaluation Board review of proposals for the study of effects of brine disposal on shrimp and red drum resources in the western Gulf of Mexico held during 9-12 July at the SEFC's Galveston Laboratory. Steve also participated in a meeting dealing with Atlantic cod and haddock assessments on 16 and 17 July with Canadian scientists at the Bedford Institute of Oceanography in Dartmouth, NS.

Division personnel participated in a State-Federal Assessment Workshop held at the Woods Hole Laboratory during 24-25 July. The workshop was attended by representatives from New York, Connecticut, Rhode Island, Massachusetts, the Mid-Atlantic Fishery Management Council, and the Northeast Regional Office.

Emory Anderson met with Jack Pearce and Carolyn Griswold on 5 July to discuss the capability of assessing the impact of oil spills on fish populations; met on 5 July with the Minister of Fisheries from Iceland and his assistant to review current NEFC assessment activities and future areas of research; met with GAO personnel during the week of 9-13 July to review Atlantic mackerel and silver hake

assessments; and met on 16 July with Mr. Akwetey Kuwadah, Director General of the National Office of Fisheries for Togo, and Dr. Yousif Medani, National Director of the Department of Fisheries for Sudan, to discuss NEFC assessment activities.

Jim Kirkley discussed the environmental impacts of the proposed Pittston refinery at Eastport, ME, with members of the Pittston Task Force in Washington, DC, on 24 July.

Jim Kirkley met with Joe Mueller of the Northeast Regional Office and Stan Wang of the New England Fishery Management Council to discuss linear programming optimization problems.

Jim Kirkley met with John Gates of the University of Rhode Island (URI) to discuss the problems of determining fees to be charged foreign fishing vessels for fishing in the US Fishery Conservation Zone.

Jim Kirkley met with Ivar Strand and Ian Hardie of the University of Maryland to discuss an hedonistic approach to resource valuation and supply-response models on 25 July. Jim Coyne and Laura Murphy discussed with Joe Mueller the availability of and need for socioeconomic data.

Publications

Anderson, E. D.; Lux, F. E.; Almeida, F. P. The silver hake stocks and fishery off northeastern United States. Mar. Fish. Rev.; (1979). In press. (A)

Ropes, J. W. Biology and distribution of surf clams (Spisula solidissima) and ocean quahogs (Arctica islandica) off the Northeast Coast of the United States. Management for the future: proceedings of the Northeast Clam Industries Association meeting. MIT Sea Grant Publ. No. SP-112: 47-66; 1979. (P)

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Burns, T. S; Clark, S. H.; Anthony, V.C.; Essig, R. J. Review and assessment of the USA offshore lobster fishery. Inter. Coun. Explor. Sea, Shell. Comm. Memo. 1979/K:25; 1979. 31 p. Available from: Northeast Fisheries Center, Woods Hole, MA.

Mayo, R. K.; Bevacqua, E.; Gifford, V. M.; Griffin, M. E. An assessment of the Gulf of Maine redfish, Sebastes marinus (L.) stock in 1978. Inter. Coun. Explor. Sea, Demer. Fish Comm. Memo. 1979/G:55; 1979. 48 p. Available from: Northeast Fisheries Center, Woods Hole, MA.

Sissenwine, M. P.; Waring, G. T. Analysis of sea herring fisheries of the Northwest Atlantic from Cape Hatteras to southwest Nova Scotia. Woods Hole Lab. Ref. Doc. No. 79-12; 1979. Available from: Northeast Fisheries Center, Woods Hole, MA.

Sissenwine, M. P. An introduction to some methods of stock assessment used by the Northeast Fisheries Center and elsewhere. Woods Hole Lab. Ref. Doc. No. 79-32; 1979. Available from: Northeast Fisheries Center, Woods Hole, MA.

Waring, G. T. Status of the North Atlantic butterfish stock, July 1979. Woods Hole Lab. Ref. Doc. No. 79-33; 1979. Available from: Northeast Fisheries Center, Woods Hole, MA.

MARINE ECOSYSTEMS DIVISION

Ecosystem Dynamics Investigation

During July, Marv Grosslein continued to work on the New York Bight Atlas. He also prepared a report with Steve Ramp and Roland Wigley on the Georges Bank ecosystem. This report will be used by the NOAA Office of Coastal Zone Management personnel in deliberations on the Georges Bank marine sanctuary issue. Marv Grosslein also served as a member of the task force charged with developing FY82 initiatives in research on recruitment processes.

Mike Pennington assisted Ray Bowman with the analysis of fish stomach content data and Robert Livingstone with haddock fecundity data. Mike also consulted with several investigators at the Sandy Hook Laboratory, in particular Wally Smith, on analyzing ichthyoplankton survey data. Mike also continued his research with James Kirkley on measuring the effects of quotas on a fishery. Mike Pennington, Wendell Hahm, and Ed Cohen visited Dr. I. Sohn of the Courant Institute of Mathematics Division of Economic Analysis. In addition to discussing methods of analyzing a model's transfer functions, the group agreed to exchange computer programs and literature to compliment their respective modeling programs.

Earlier in the month, Wendell Hahm and Ed Cohen had the opportunity to explain the Georges Bank modeling program to Dr. Jim Kremer of the University of Southern California's Department of Biology and Dr. K. Johannsson, the Minister of Fisheries of Iceland. Wendell assisted Jim Kremer in putting the Narragansett Bay model (Kremer and Nixon 1978) onto the new PRIME computer at the URI Graduate School of Oceanography. Computer-related work came to a crawl with the summertime overburdening of the Woods Hole Oceanographic Institution's (WHOI) Sigma-7 computer. Brian Hayden, Rich Langton, and Wendell Hahm concentrated on editing the food habits data for errors and the creation of data files. Brian also worked on programming preliminary data summaries of the food habits data.

Ed Cohen, Greg Lough, and Red Wright participated in the second meeting of the task force for process-oriented studies at the Narragansett Laboratory. Ed Cohen and Jack Green attended a meeting with Drs. Mike Dagg, David Judkins, and Julgio Vidal at the Brookhaven National Laboratory on various topics pertaining to the measurement of secondary productivity, larval survival, and the upcoming series of grazing experiments by Slava Sushin aboard the Union of Soviet Socialist Republics (USSR) R/V Belogorsk. Ed Cohen continued to work on the questions of feeding interactions in fish, a comparison of empirical and theoretical estimates of food consumption, and a review of the Soviet model of phytoplankton and zooplankton. The latter project is being carried out using translations of the Russian literature (as well as that published in English) by Debbie Dwyer and Anna Cvikevich (recently hired to do translations).

Work continued on the International Commission for the Northwest Atlantic Fisheries (ICNAF) autumn-winter 1971-77 surveys of ichthyoplankton abundance and distribution by George Bolz. George and Greg Lough prepared an article for Coastal Oceanography and Climatological News about the anomalous winter of 1977 when ichthyoplankton abundance declined dramatically on Georges Bank compared to the previous 2 yr. They speculated that unusually strong and persistent northwesterly winds that occurred that winter may have been responsible in part for the low

numbers of all larval fishes observed by transporting them off Georges Bank into slope waters.

Greg Lough prepared materials for the third meeting of the Microdistribution Studies Task Force held at the Narragansett Laboratory on 25 July. Materials included: (1) a review of literature on the early life history of haddock; (2) a set of specific testable hypotheses linking survival of larvae and their prey organisms to the timing and extent of thermocline formation around Georges Bank in the spring; (3) a review of current technology; and (4) a set of recommendations for investigating these hypotheses beginning with preliminary studies in the spring of 1980.

Dave Potter was busy with a variety of tasks this month which included editing the neustonic ichthyoplankton manuscript by Dave Potter and Greg Lough, redesigning and rebuilding a flowmeter tank at Otis Air Force Base to accommodate the TSK flowmeters used on the multiple opening-closing net and environmental sensing system (MOCNESS), and repairing a battery-operated digital counter for TSK meter calibrations. He also prepared equipment for MOCNESS data tape editing, and assisted the electronics group within the Resource Assessment Division and LCDR Ron Smolowitz, the NEFC's technical projects coordinator, with film computer programming for their sea scallop dredge, TV-monitoring system.

Roz Cohen received a second tape from the Narragansett Laboratory Biostatistical Unit on haul factor information. This is needed for analysis of 14 ICNAF larval Atlantic herring surveys to evaluate larval herring prey selection and condition factors. In this regard, she also provided more training for Janet Murphy on WHOI's SPSS procedures for computer operations to process the larval herring food habits data. Roz Cohen also prepared a bibliography on secondary productivity and an evaluation of the methods used and applicable to the estimation of Centropages spp. production from the ICNAF time series. She also prepared an outline of proposed analyses from the ICNAF time series for her work in the coming months. This month Janet Murphy completed the laboratory processing of all larval herring guts for the 1974 and 1975 seasons and participated in a Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) cruise (Albatross IV Cruise No. AL 79-03) during 30 June - 15 July. Brian Hess and Wayne Michaels continued sorting and measuring ichthyoplankton from MOCNESS hauls made last fall on the larval Atlantic herring patch study. Wayne Michaels is also helping George Bolz enter ichthyoplankton data into the WHOI computer and helping Dave Potter with gear and logistical details.

Robert Livingstone has been revising his haddock fecundity manuscript following the review and comments by Marv Grosslein. He met several times with Kay Paine and once with Gene Heyerdahl about preparing the haddock data tape for probit analysis. On 5 July, he presented an hour workshop to a group assembled by Linda Despres on collection and identification of maturity stages for selected groundfish.

Plankton Ecology Investigation

Neuston samples from the USSR R/V Argus Cruise No. 77-01 were sorted for ichthyoplankton information. Ammodytes sp. were not present in the samples. Jacquelyn Frisella participated in the Albatross IV Cruise No. AL 79-06 (MARMAP) and Albatross IV Cruise No. AL 79-07 (Ocean Pulse) during 1-14 July and 17-27 July, respectively. Roger Taylor and Chris Brooks received training at the Sandy Hook Laboratory in processing water samples for chlorophyll-a content at sea.

Ruth Byron prepared an outline of meristic information on four Urophycis spp. from published and "in house" data. We are continuing to have difficulties distinguishing the various species of larval hakes (especially U. chuss, U. tenuis, U. regius, and Phycis chesteri) collected on MARMAP ichthyoplankton surveys. We

have completed a summary of published and unpublished meristic data (second dorsal fin ray, anal fin ray, abdominal vertebrae, and gill raker counts) in an effort to resolve this problem. This summary has helped to some extent, but because of the appreciable overlap in vertebral and fin ray counts and the variability in gill raker counts with stage of development we have in no way eliminated the issue.

From 30 June to 14 July, Donna Busch participated in Albatross IV Cruise No. AL 79-06 (Part II), a MARMAP survey, to measure ^{14}C primary production. During the cruise, measurements were made at 28 stations from Cape Hatteras to the Gulf of Maine. After returning from the cruise, preparations continued for primary productivity, autoradiography, and phytoplankton communities work to be conducted on the Belogorsk during August, September, and November 1979.

Renata Lipska, zooplankton specialist from the Polish Sorting Center in Szczecin, arrived to begin a 1-mo tour of duty at the Narragansett Laboratory. She is participating in an experiment assessing the speed and accuracy of the Image Analysis System compared to traditional microscope counts and measurements. Bill Johnson of URI has begun to explore different methods of photography to record and enhance images of plankton for subsequent analysis. His investigations have included different formats, 35-mm, 4x5-inch, polaroid, and a variety of films, developers, and lighting systems. Perry Jeffries is preparing an article which describes the automated zooplankton processing activities at URI. This article will appear in the next Maritimes (URI-Sea Grant) publication.

Joe Kane has completed a draft of his report on wet volume-dry weight relationship for MARMAP cruises in 1977 and 1978. Jack Green participated in a meeting with the mid-water trawling task force and the recruitment research task force. He's also been involved in the planning and preparation, along with Donna Busch, Marv Grossleinn, and Ed Cohen, for the upcoming phytoplankton-zooplankton productivity cruises with scientists aboard the Belogorsk.

For July, Jerry Prezioso and Tom Plichta generated computer plots showing the distribution and abundance of euphausids from the Gulf of Maine to Cape Hatteras for 1977 and 1978, based on sorting records from the plankton lab. The 1979 MARMAP plankton samples and the remainder of Greg Lough's 1978 patch study samples were readied for shipment to Poland.

Biostatistics

We now have a functional program module to extract information on ichthyoplankton larvae, using the General Reformatting System to calculate standardized abundance, using a program written by Cindy Jones and Marie Carter. It is also now possible to store and retrieve zooplankton data in a file suitable for input to a Fager's Analysis Program or a Statistical Analysis System from disk data sets rather than from card input. Ichthyoplankton data for Delaware II Cruise No. DE 71-04 were input to a master file and abundance data were delivered to Greg Lough. Station data for Belogorsk Cruise No. 78-04 were input into a master file and quality checked. Ichthyoplankton data for Belogorsk Cruise No. 73-01 were quality controlled and abundance data were produced for Greg Lough. The master file for Delaware II Cruise No. DE 77-09 was completely quality checked. The entire group turned to quality control, computer crunching, statistical analysis, and plotting of 1979 zooplankton abundance for a paper to be presented at the ICES meeting.

Liaison with Ocean Pulse

On 5 July, Carolyn Griswold met at the Woods Hole Laboratory with Jack Pearce of the Division of Environmental Assessment and several members of the Resource Assessment Division to discuss how assessment techniques can be used in analyzing the effects of an oil spill on fishery resources. Carolyn Griswold and Ken Sherman prepared comments for NOAA on the final environmental impact statement prepared by the Bureau of Land Management (BLM) for the proposed OCS Sale No. 42 (Georges Bank). Several other NEFC and Northeast Regional Office personnel contributed to the document.

Apex Predators Investigation

July began with the capture of one of the most interesting sharks that we have ever examined. A 2075-lb male white shark was harpooned while feeding on a dead fin whale and subsequently measured and dissected by Pratt and Casey. It was mature and contained 50 lb of whale blubber and muscle in its stomach. Two days later a sonic tag was implanted in another male white shark by Dr. Frank Carey of WHOI. Dr. Carey was joined by Jack Casey and Wes Pratt who helped in tracking the white shark in a west-southwest direction along the Long Island continental shelf for 3.5 days.

On Friday, 6 July, Wes Pratt and Jack Casey joined filmmaker Stan Waterman back at the whale for first hand observations using a shark cage of another white shark around the whale. We dart-tagged this animal. A TV crew ("American Sportsman") filmed most of these events which will be the subject of an ABC-TV special in September.

Wes Pratt attended the first annual shark tournament of the Jersey Coast Sharkers at Brielle, NJ, on 7 and 8 July with a crew of three. Seventy makos were caught including a 483-lb New Jersey state record. Fourteen blue sharks, two tigers, five browns, one bluefin tuna, and one white marlin brought the total catch to 93. An unprecedented seven tagged sharks were recaptured at this tournament.

On 21 and 22 July, the annual Montauk Open Shark Tournament was held at Montauk, NY. This year the tournament was filmed by ABC-TV for the "American Sportsman" show. Jack Casey was interviewed by Curt Gowdy and instructed Bobby Kennedy on shark anatomy for this program.

A total of 55 fish was caught. The catch was comprised of: 17 makos; 18 blue sharks; 4 sandbars, 1 of which was pregnant with 8 young; 8 tigers; 2 white marlins; 1 common thresher; 1 hammerhead; 2 swordfish; and 1 bluefin tuna. A 45-lb white shark, probably a young-of-the-year one, was also caught and sampled.

During the Montauk shark tournament, Chuck Stillwell and Nancy Kohler examined 37 fish (35 sharks, 2 billfish) for food habits studies. Food items found in the makos and one blue shark included remains of bluefish, bluefin tuna, unidentified fish flesh, and squid remnants. Two tiger sharks contained mammal flesh, possibly from a whale carcass floating off the Long Island Coast. A third tiger shark stomach contained the entire caudal fin of a basking shark and the scute plates and jaw of a sea turtle tentatively identified as a green or loggerhead. The single common thresher examined contained the remains of five halfbeaks (Hemiramphus sp.) that averaged 15 cm in length. Twenty sharks (57%) had everted their stomachs during capture. The swordfish stomach had remains of squid, butterfish, and American sand lance.

Benthic Dynamics Investigation

Three subjects dealing with the benthic invertebrate fauna were studied this month. Roland Wigley continued with the preparation of summary tabulations of the fauna occupying the continental shelf south of Martha's Vineyard and Nantucket for the purpose of determining the relationships between principal faunal groups and the type of bottom sediments they inhabit. Measures of both density and biomass were used to assess these relationships. John Dickinson made good progress on a study of gammaridean amphipods of Georges Bank. A total of 91 species of gammarideans were identified from approximately 300 samples representing all parts of Georges Bank. The ecological position of each common species--important fish foods--are currently being examined. Roger Theroux and Roland Wigley completed the inventory listing of bivalve mollusks in the NEFC Specimen Reference Collection. This report is now being edited and assembled in manuscript form.

Food habits research work was concentrated mainly on flatfishes and haddock. A manuscript describing flatfish food habits, titled "Food of Eight Northwest Atlantic Pleuronectiform Fishes," was completed by Rich Langton and Ray Bowman. This completes a major task and is a companion to the gadiform food habits report. Ray Bowman continued work on the juvenile haddock data and is currently writing a report on this subject. In addition to these major activities, some effort was devoted to updating and checking the food habits data base. Also, work on the feeding chronology of selected species was continued; the stomach analyses of silver hake for the purpose of determining diurnal feeding patterns, have been completed. Rick Brodeur made good progress on a report describing fish otoliths, which will be useful for identifying fish remains in fish stomachs.

Ichthyoplankton Investigation

Despite recurring vessel problems, we managed to survey the Middle Atlantic, Southern New England, and most of the Georges Bank area during our early summer cruise on Albatross IV. Tom Morris and Tom McKenney are now preparing for the next cruise in the series, which will be a cooperative effort with the USSR in August. The Belogorsk is expected to arrive at the Woods Hole Laboratory early next month and the survey will begin shortly thereafter.

We are privileged to have three visiting scientists from the Morski Instytut Rybacki in Szczecin, Poland, with us at the Sandy Hook Laboratory. Mss. Elzbieta Meller, Maigorzata Koniczna, and Mr. Marak Baranowski arrived on 26 July. They will be working with biologists and technicians of this Investigation until mid-August. Ms. Renata Lipska, the fourth member of the party, was with us for a week then went on to the Narragansett Laboratory where she will work with Ray Maurer on invertebrate zooplankton. At the Sandy Hook Laboratory cooperative research will be concerned with taxonomic studies of fish eggs and larvae from the western North Atlantic. Ann Naplin returned for a day from maternity leave to brief our Polish colleagues on techniques for differentiating between eggs of invertebrates and those of fishes. She also provided descriptions and specimens of fish eggs currently under study for assessment purposes. Doris Finan has provided them with an in-depth accounting of our laboratory procedures and worked with them in identifying some of the tropical and subtropical oceanic larvae that drift onto the continental shelf from the east and those of south temperate and tropical waters that are transported into the MARMAP survey area via the Gulf Stream. Work was begun on evaluation of a simplified method for separating fish eggs from zooplankton samples using a dilute "Ludox" solution.

Ray Maurer and Renata Lipska completed a comparison between automated and hand-sorted plankton processing methods using microscopes and the Bausch-Lomb Image Measuring System at the Narragansett Laboratory.

Fishery Oceanography Investigation

Several members of our Investigation spent considerable amounts of time at sea, while others devoted their time to meetings and preparing for upcoming cruises. During 2-16 July, Red Wright was aboard the Sailing Education Association's (SEA) M/V Westward. He joined the ship in Shelburne, NS, where he also delivered expendable bathythermograph (XBT) probes to the R/V Conrad for work along the Nantucket Shoals flux experiment line. On the Westward they relocated one of five drogues set out on eastern Georges Bank by Ron Schlitz on the previous leg of the cruise. They were also able to set and recover three additional drogues and to plot the positions of the drogues at randomly selected intervals as they moved with the flow. They were able to determine the direction of the residual flow which was moving generally southeast and had not begun to turn west to complete the "gyre." Unfortunately, navigational equipment problems and lack of cruise time prevented the continuation of the experiment. Ron Kirschner, Timothy Cain, and Jim King participated in MARMAP activities on Albatross IV Cruise No. AL 79-06.

Steve Ramp has been studying the method of "empirical orthogonal modes" and evaluating its usefulness and applicability for the Northeast Channel data set. In cruise preparation Gil Dering discovered five bad circuit boards in the first six vector-averaging current meters (VACM). He repaired all boards and brought them up to specifications. Other malfunctions discovered and repaired were an Ocean Applied Research, Inc., transmitter, a defective compass, and a VACM test box.

Sam Nickerson, Ann Dorkins, Timothy Cain, Jim King, and Ron Kirschner continued to run salinities on the Guildline Salinometer. Sam Nickerson continued data analysis, which consisted of plotting and contouring salinity, oxygen, and temperature values obtained during MARMAP surveys in 1979. Ron Kirschner plotted temperature sections of transects taken near the array of Nantucket Shoals current meters.

Kathy Bush continued statistical analysis of heat flux in the Middle Atlantic Bight. Jim King corrected thermometers and recorded data on hydrologs. Dan Patanjo began compiling data to enable him to write a report on the physical and chemical observations made on MARMAP cruises during 1977-79. Timothy Cain has compiled data for a 2-mo report of the Gulf of Maine ship-of-opportunity (SOOP) run.

Red Wright attended several meetings. He first met with other investigation chiefs to discuss the potential shortage of automatic data processing (ADP) funds for the balance of FY79. He was then visited by Dr. Margaret Robinson of Savannah State College to assist her in establishing a marine biology curriculum there. Also, he attended a task force meeting at the Narragansett Laboratory to discuss new approaches to studying recruitment processes. Ron Schlitz consulted with the Sea Data Corporation about interface for VACM and TEKTRONIX. Timothy Cain met with Steve Cook at the Atlantic Environmental Group to resolve problems occurring in the M/V Caribou Reefer's XBT recording system. He later met with the captain of the ship and suggested corrective measures for more efficient XBT operations.

Larval Physiology and Biochemistry Investigation

Analyses of experimental data on activity levels of winter flounder metabolic rates continued, as did work on a manuscript dealing with yellowtail flounder

embryo mortality. Adult winter flounder are being collected for out-of-season spawning through temperature, photoperiod, and hormonal control. Experiments of the activation of the digestive enzyme, trypsin, in fed and starved fish larvae continued. Geoff Laurence held two meetings of the Task Force on Process-Oriented Studies of Larval Fish Survival in preparation for completing the final report.

Meetings, Talks, Visitors, and Publicity

Roger Theroux assisted in the training program for Midshipman Susan McMahon, US Merchant Marine Academy, at the Woods Hole Laboratory on 9 July.

Rich Langton and Ray Bowman attended a meeting of NEFC personnel at the Woods Hole Laboratory pertaining to the sampling of pelagic fish.

Jim Towns participated in the summer bottom trawl survey to the southern Mid-Atlantic Coast aboard the Delaware II during 23 July - 3 August.

Jack Green, Ray Maurer, and Robert Marak participated in the first Marine Heritage Festival held in Newport, RI, during 13-15 July with exhibits from the NEFC's Gloucester and Narragansett Laboratories, and the Atlantic Environmental Group. There were about 3,000 visitors to the exhibition tent.

A task force has been brought together to develop a program for mid-water sampling. The first meeting was held at the Woods Hole Laboratory on 23 July with George Kelly, Fred Lux, Al Blott, Rich Langton, Jack Green, Ray Bowman, and Robert Marak in attendance.

Robert Marak attended an in-house precruise meeting on 26 July on US-USSR joint studies on plankton productivity.

On 10 July, Ken Sherman and Bob Edwards discussed Ocean Pulse with NOAA Deputy Administrator James P. Walsh, and then met with Jim Rote regarding the position paper dealing with the effects of gas and oil exploration on Georges Bank.

On 12 July, Dr. M. Robinson, for preparing a marine science curriculum, visited NMFS, US Environmental Protection Agency, and URI facilities at Narragansett.

On 16 July, Martin Belsky, Deputy General Counsel, visited the Narragansett Laboratory after speaking at URI regarding a Georges Bank sanctuary.

Jerry Prezioso, Jack Green, and Robert Marak participated in a meeting of the Task Force on Mid-Water Sampling at the Woods Hole Laboratory on 23 July.

Special Achievement Awards were presented to Alice DeNofa, Reva Kuhlman, and Mary Braisted for their contributions to the ICES Early Life History of Fish Symposium. Larry Buckley was given a Special Achievement Award for his pioneer work in the use of RNA and DNA as an indicator of larval fish condition.

On 23 July, Alice DeNofa and Reva Kuhlman participated on a 1-day cruise of the Delaware II.

On 25 July, Geoff Laurence chaired a meeting of the Marine Ecosystem Division Task Force on Process-Oriented Studies of Larval Fish Survival to develop a plan for the next patch study dealing with growth and survival of haddock larvae.

On 25 July, a seminar on Antarctic krill was given to the Narragansett Laboratory staff by Mike Allsup of the Gloucester Laboratory.

Greg Lough, Ed Cohen, and Red Wright attended the Third Microdistribution Studies Task Force Meeting at the Narragansett Laboratory on 25 July.

Roz Cohen attended an NEFC EEO meeting at the Woods Hole Laboratory on 10 July and an FWP meeting on 13 July. She introduced an FWP-sponsored film on 11 July.

Larry Buckley attended an EEO conference at the Milford Laboratory.

Ed Cohen and Jack Green attended a meeting at Brookhaven National Laboratory on secondary productivity on 11 July.

Ed Cohen, Mike Pennington, and Wendell Hahm attended a meeting on analysis of transfer functions in mathematical models at the Courant Institute of Mathematics of New York University during 21-27 July.

Wally Smith attended a task force meeting at the Narragansett Laboratory to draft an FY82 initiative for the process-oriented ichthyoplankton research.

Mike and Cindy Fahay and Chris Powell presented posters at the annual meeting of the American Society of Ichthyologists and Herpetologists in Orono, ME.

Midshipman Susan McMahon from the US Merchant Marine Academy at Kings Point, NY, visited the Narragansett and Woods Hole Laboratories during 28 June - 12 July. MDN McMahon chose the NEFC to fulfill the requirements of the Academy's Internship Program. The objectives of this program are to improve the supervisory capacity and management potential of the candidate through an understanding of management techniques and procedures for the accomplishment of the mission and goals of the NEFC. Personnel from the Narragansett and Woods Hole Laboratories spent considerable time with Ms. McMahon discussing the NEFC's scientific and administrative activities. A report on her internship will be forthcoming.

Mike Allsup presented a talk on "The Fourth Polish Krill Expedition Aboard the R/V Prof. Siedlecki," at the Narragansett Laboratory on 25 July as part of that lab's in-house lecture series.

Publications

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MANNED UNDERSEA RESEARCH AND TECHNOLOGY PROGRAM

No report received. The May, June, and July reports will be included in the August issue.

DIVISION OF ENVIRONMENTAL ASSESSMENT

Behavior of Marine Fishes and Invertebrates Investigation

Results of experiments conducted at the Sandy Hook Laboratory have shown that the blue crab (Callinectes sapidus) is capable of detecting the water-soluble fraction (WSF) of crude oil at levels of 10^{-6} mg/l. This sensitivity is very close to the animal's sensitivity to the pure petroleum hydrocarbon compound, naphthalene, as determined in earlier studies. The results of these studies conducted in conjunction with Battelle, Pacific Northwest Laboratories, with joint funding from the US Department of Energy, show that this species meets the first prerequisite for behavioral mitigation of petroleum induced stress, i.e., detection. These results as well as those from avoidance studies currently underway will be integrated with findings from similar studies on the red hake and Dungeness crab (Cancer magister).

Biological Oceanography of Stressed Environments Investigation

Preliminary statistical analyses during July of seabed oxygen consumption rates indicate significant increases during and after the anoxic event of 1976 in the New York Bight. Data from cruises in July 1976, March 1977, July 1977, and July 1978 indicate significant increases from oxygen consumption rates obtained in February and August 1975. The rates since 1976 have steadily declined; however, not to pre-1976 values. The huge mass of organic carbon deposited on the bottom in 1976 is the most likely cause of these elevated rates of consumption. The September 1979 Ocean Pulse cruise may indicate if this trend is continuing or if the predicted anoxic event of 1979 will add more carbon to that already in the sediment. Linda Pastorius, a Youth Conservation Corps worker, assisted significantly with the analyses.

Myra Cohn and Harold Marshall (Old Dominion University) have received samples from Albatross IV Cruise No. AL 79-06. The samples were collected from 17 to 21 June and from 1 to 13 July. Also received were samples from Albatross IV Cruise No. AL 79-07, an Ocean Pulse cruise from 17 to 27 July. Samples for phytoplankton species identification and enumeration were collected at five depths at 18 stations. Preliminary scans by Myra Cohn and Harold Marshall revealed no unusual organisms or counts. Long chain diatoms indicative of nonstressed conditions were present. Particularly abundant were Asterionella japonica (A. glacialis), Nitzschia seriata, and several species of Rhizosolenia. Dinoflagellates noted were Exuviella, Prorocentrum, Gyrodinium, and Dinophysis. Off Barneget Inlet many Nitzschia seriata were observed, along with Peridinium trochoideum, Dinophysis acuminata, Centrodinium sp., Gyrodinium sp., and Oxytoxum sp. Ceratium lineatum, C. tripos, and C. fusus were not seen in significant numbers anywhere.

Preparations continued for the collection of algal-bioassay water samples on the September Ocean Pulse cruise.

Coastal Ecosystems Investigation

We participated in the fourth full-scale Ocean Pulse (OP) cruise from 17 to 27 July aboard the Albatross IV, on which Greg Parker collected samples of benthic macrofauna, meiofauna, microflora, and sediments. We are now beginning to sort the macrofauna samples from approximately 10 of the highest priority OP strata, having already processed triplicate samples from the same stations taken on the first three cruises. We are thus keeping fairly well abreast of the OP sampling effort, with most of the sample processing being done by volunteers and personnel hired under the Comprehensive Employment and Training Act (CETA) and by the Youth Conservation Corps on Sandy Hook, NJ.

Frank Steimle and Jan Caracciolo continued to work on the New York Bight Apex benthic atlas, and on correcting another set of benthic data from the MESA program. Frank finished a draft of a benthic census of Block Island Sound, and began studies on caloric values of demersal fish forage species, and on stomach contents of artificial reef fishes.

Dave Radosh and Clyde MacKenzie conducted further dive studies of surf clam populations, and worked on several papers. Clyde also reviewed a paper on population dynamics of the seastar Asterias rubens for Dr. Cornelia Nauen of the University of Kiel (Federal Republic of Germany-FRG). Sukwoo Chang assisted Oxford Laboratory and New Jersey Department of Environmental Protection staff with statistical analyses. Bob Reid completed his master's thesis on long-term changes in the benthic macrofauna of Long Island Sound, and worked on a paper reviewing contaminant concentrations and impacts in the Sound for ICES.

Environmental Chemistry Investigation

Several members of the Environmental Chemistry Investigation participated in the July Ocean Pulse survey aboard the Albatross IV. Jay O'Reilly and Jackie Frisella (Marine Ecosystems Division) made measurements of chlorophyll in netplankton and nannoplankton, and Andrew Draxler filtered samples of seawater for inorganic and organic nutrients and dissolved organic carbon measurements. Ammonium concentrations were measured spectrophotometrically aboard the Albatross IV. Ralph Bruno measured primary production. Vincent Zdanowicz prepared samples of sediment and fish and invertebrate tissues for heavy metal determinations. Jim Duggan and Sandie Riley (Drew University volunteers) made measurements of chlorophyll-a during Part II of

the June-July MARMAP survey aboard the Albatross IV. Approximately 1140 determinations of chlorophyll in netplankton and nannoplankton were made during the MARMAP survey. Average chlorophyll concentrations in the upper 75 m of the water column exceeded 2 mg/m^3 in the New York Bight off New Jersey, in the center of Georges Bank, and in coastal water off Virginia.

Twenty-one samples (mussel, rock crab, surf clam, lobster) were collected and sent to the NWAFC's Seattle Laboratory for hydrocarbon analyses. This set of samples completed the work obligated under our MESA contract.

During July we began analyses for inorganic nutrients in seawater samples collected during the June-July MARMAP survey (Albatross IV Cruise No. AL 79-06).

Two "field kits" were assembled containing reagents and equipment required for the measurement of sulfide in seawater. The chemistry kits were prepared in anticipation of anoxia-sulfide conditions which can develop during the summer in the New York Bight.

On 3 July, Jay O'Reilly met with Dr. A. Chisholm (Jersey City State College) and two New Jersey Marine Sciences Consortium students to instruct the students in the ^{14}C method of measuring primary productivity. The equipment and methods used on our Ocean Pulse and MARMAP surveys were demonstrated.

Physiological Effects of Pollutant Stress Investigation

Physioecology

The study of effects of long-term exposure to silver on the slipper limpet (Crepidula fornicata) continues. Ten males and ten females from the parent population were sampled for silver uptake. We now have data on tissue concentrations of silver in slipper limpets at 0, 6, and 12 mo of exposure. Both adults and F_1 progeny continue to produce egg masses and release larvae. A problem has arisen in recent months in keeping the larvae alive. Larvae, even those released by control animals, remain alive for 4-6 days, then die. Having carefully examined each stage of our procedure, we feel that the problem is with water quality. The first pairings of an F_2 generation occurred this month in the animals exposed to 10 ppb silver, the highest exposure concentration.

Physiological and Biochemical Effects

The third month of sampling of blue mussels (Mytilus edulis) from two sites in Narragansett Bay took place during July. This study is being carried out in close collaboration with scientific personnel located at the USEPA research facility in Narragansett, RI, who set out the animals (all from the same original population) last April at sites subject to various degrees of pollution. We use animals taken from the most polluted site and from the cleanest site.

The experimental exposure of blue mussels to 20 µmoles NH_3/1 was completed. Both physiological (i.e., gills, blood) and biochemical (i.e., gills, adductor muscle) examinations have been finished, and the data are being calculated and analyzed.

Two series of experiments involving American lobsters were begun this month in which the animals will be exposed to 50 ppb lead (as nitrate) for 30 days in our chronic-holding facility, then will be held for 2 days at either ambient (27°/oo) or low (17°/oo) salinity. This series, analogous to previous work with cadmium-exposed lobsters, is designed to discover whether long-term sublethal exposure to a heavy metal alters in any way the animals' ability to adapt to low-salinity stress.

Ocean Pulse

Two cruises, comprised of three 1-day sailings each, have been completed this month in the Long Island Sound "mini-Pulse" study. This continuing exercise, encompassing stations from near New York Harbor to points between New Haven and New London, CT, off the northern Long Island Coast, serves as a tool to develop and evaluate methods (for the Physiological and Biochemical Tasks within this Investigation, the Environmental Chemistry Investigation of this Division, and the Microbial Ecology Investigation of the Pathobiology Division) for use in Ocean Pulse cruises.

The fourth major OP cruise, Albatross IV Cruise No. AL 79-07, was also completed this month; Investigation personnel working aboard the Albatross IV were A. Calabrese (Chief Scientist), F. P. Thurberg, J. T. Graikoski, J. R. MacInnes, and S. Penkoff. Preliminary results from this cruise will be reported in next month's narrative report.

Meetings, Talks, Visitors, and Publicity

In June, A. Calabrese and E. Gould participated in the MESA-New York Bight Workshop-Symposium on the Ecological Effects of Environmental Stress. A paper was presented on "Heavy-Metal Effects in Marine Animals of the New York Bight," by A. Calabrese, E. Gould, and F. P. Thurberg. Dr. Calabrese is serving as one of the editors for the publication of the symposium proceedings.

A paper was also prepared this month for contribution to this year's statutory meeting of the ICES Standing Committee on Marine Environmental Quality: "Ocean Pulse: Some Physiological, Biochemical, and Bacteriological Activities - Year 2 (1978-1979)," by A. Calabrese, F. P. Thurberg, E. Gould, and J. T. Graikoski.

Bob Reid traveled to New Haven, CT, on 12 July to discuss criteria for selecting dumpsites in the Long Island Sound region, and to Stony Brook, NY, on 13 July to examine New York State Department of Environmental Conservation data on PCB's in sediments and biota of the Sound.

Ann Frame and Bob Reid each described Sandy Hook Laboratory programs to a group of approximately 20 high school cultural exchange students from France on 23 and 24 July.

On 24 July, Dr. Vic Klemas and Bill Philpot of the University of Delaware visited the Sandy Hook Laboratory to discuss remote sensing issues with Drs. John Pearce and James Thomas.

On 25 July, Wally Smith and Dr. Thomas attended a workshop at the Narragansett Laboratory to discuss the development of research plans to study phytoplankton and zooplankton distribution and abundance within a phytoplankton patch as they relate to larval hake survival.

Dr. James Thomas attended a national workshop at Crystal Mountain, WA, during 30 July-3 August, concerned with carrying capacity of US coastal waters. Crude limits of carrying, or as was preferred at the workshop, assimilation capacity for waste loading, were defined for the New York Bight, Puget Sound, Southern California Bight, DWD 106, estuaries in general, and coastal waters of the US in general. Proceedings of the workshop are to be available in draft form by November and final form by February 1980. It was deemed critical that scientists monitor and assess our coastal waters to define better their assimilating capacities in relationship to their impact on man at various stages of degradation.

Frank Steimle participated in a meeting of the New York Bight Advisory Committee in Edison, NJ, on 31 July.

On Thursday, 5 July, Dr. John Pearce met at the Narragansett Laboratory with Carolyn Griswold of the Marine Ecosystems Division and other personnel from the Division of Environmental Assessment and Resource Assessment Division, to consider further how resource assessment and other fisheries data can be used in oil spill responses. Results of this meeting are to be used in the development of an oil spill response document for ICES, as well as in planning for Ocean Pulse environmental monitoring.

On 9 and 10 July, Dr. Pearce participated in meetings concerned with ocean dumping and remote sensing. In the latter meeting he met with members of NEFC as well as NOAA National Environmental Satellite Service personnel interested in monitoring using remotely sensed data.

On 11 July, Mr. Vincent Zegowitz of the NOAA Environmental Data and Information Service (EDIS) visited Sandy Hook Laboratory, especially to discuss the collection and use of ocean measurements and their incorporation into a marine inventory of environmental data being prepared by NOAA/EDIS.

On Monday and Tuesday, 16 and 17 July, Dr. Pearce participated in the NEFC Board of Directors meeting held at the Woods Hole Laboratory.

On 18 and 19 July, Dr. Pearce participated in a workshop concerned with the 301(h) program as well as the Hudson-Raritan Estuary Project (HREP) being developed by the MESA-New York Bight Project. The 301(h) workshop was designed specifically to brief research and management personnel in regard to the USEPA permit waiver program which is being implemented to allow certain coastal communities to discharge domestic sewage at less than the secondary level of treatment. The HREP workshop was concerned with further developing plans for research and monitoring activities to be conducted in the Lower Hudson and Raritan Bay estuaries. Some of the activities of this program are closely related to the field program which has evolved as part of the Ocean Pulse Program.

On Thursday, 26 July, Dr. Pearce participated in the graduate examinations conducted for Mr. Robert Reid's Master of Science degree at Boston University.

On 31 July, Dr. Pearce met with Mr. Carl Hard and other personnel from the New England Division of the Army Corps of Engineers. This was the second in a series of meetings designed to integrate monitoring activities being conducted by the Corps of Engineers with the ongoing Ocean Pulse monitoring program.

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AQUACULTURE DIVISION

Nutritional Requirements of Mollusks Investigation

Recent experiments with American oyster (Crassostrea virginica) larvae were designed to test the food value of algal species not previously studied. Two different feeding regimes were examined: one in which the larvae were fed at 24 hr after egg fertilization and, subsequently, daily for 9 days. In another regime, larvae were starved for the first 72 hr and then put on a daily feeding regime. Of 12 experimental trials using three different species of algae, only two cases were observed of larvae smaller in size in populations that were starved for the first 3 days. In general, growth of the larvae did not seem to be affected with an initial delay in delivering cultured food to the larvae. Algal species were fed to larvae as washed and unwashed cells. Growth of larvae fed Dicrateria and Chlorophyte #820 was compared with larvae fed Isochrysis galbana. There was little difference between growth of larvae fed washed and unwashed I. galbana. However, both of the new food species, as washed cells, yielded better growth than I. galbana; Chlorophyte #820 showed an increase in size of 8% over larvae fed I. galbana; and Dicrateria, an increase of 45%.

Stock cultures in the culture collection were maintained by subculturing on schedule. A request for two species of algae, Chlorella autotrophica and Nannochloris atomus, came from Allyn Powell of the SEFC's Beaufort Laboratory. These cultures were air-shipped to him. The few remaining bacterized cultures in the collection were treated with a new bacteriocidal agent, i.e., one that has never before been used for this purpose. Because of the generally high lethality of this agent, it was necessary to dilute it to 10^{-6} and 10^{-9} before even 1 ml could be added to an algal culture. One species, however, Synecochoccus sp., could tolerate the agent in a dilution of 10^{-3}. In fact, this concentration was sufficient to make the algae bacteria-free. Another species was also successfully purified (in a dilution of 10^{-6}), Pseudoisochrysis sp. (VA-12).

Spawning and Rearing of Mollusks Investigation

Experimentation has begun which is designed to evaluate the growth of hatchery-reared surf clams in the natural environment of Long Island Sound. An area of hard sandy bottom, about 25-ft deep, has been staked to define an experimental plot. Within the plot, nine subplots are arranged in a 3x3 array. Three size classes of clams will be planted in these subplots in a "Latin Square" pattern. The growth rates and survival of the clams will be monitored regularly. Another focus of observation will be the relationship between the size of planted clams and the rate of predation. It is speculated that predation by crabs and bottom fish may be a major obstacle in farming clams in this manner. Several experiments are planned which will utilize plastic netting as a barrier to predators.

We have started to investigate the shell deformity phenomenon in bay scallops (Argopecten irradians) that we have noticed in our animals occasionally, and that has been reported by other workers. Our hypothesis is that the shell deformities are caused by damaged mantle tissue or damaged shell edges produced when bay scallops collide or become entangled with each other during swimming excursions. We have observed increased swimming activity under conditions of stress, such as low food levels or low oxygen, both of these conditions aggravated by crowding. Experimentally, we butted and entangled pairs of juvenile scallops and kept appropriate controls. Within a week a substantial number of those animals that were experimentally entangled have begun to exhibit abnormal shell deposition. All other groups are normal.

A large mortality of young juvenile scallops less than 1 mm in length occurred in late July. The mortality was associated with a pink-staining Pseudomonad sp. that we often see in our system. This is the first time we have suspected the Pseudomonad sp. as the causative agent in a juvenile scallop mortality and we will be working with our pathobiology investigators on this problem.

We successfully deployed a 2-m lantern net containing 2000 bay scallops which were 20 mm in length and were located in 7 m of water in Long Island Sound off Milford, CT. We plan to observe the field characteristics of this system for a few weeks and, if they are satisfactory, we will put up to 10 more in operation in August.

Aquacultural Genetics Investigation

Experimental Hybridization of Oysters

This month we were fortunate to obtain contemporary crosses of interspecies hybrids, intraspecies hybrids, and controls utilizing the local American oyster at least as one parent. Comparisons were made among the three groups of fertilized eggs and of larvae for development, growth, and survival under normal culture conditions and under conditions of temperature and bacterial stress. Cytogenetic data were collected also. The general pattern from past separate studies was repeated, with the best performance under usual laboratory practices by local controls, intermediate performance by intraspecies hybrids employing Virginia specimens as the other parental population, and then the interspecies hybrids with the Japanese oyster (Crassostrea gigas) as the other parent. Generally, the groups ranked the same when cultured under temperature stress. Percentages for development of eggs to the straight-hinge larval stage were: 49% for the interspecies hybrids, 57.6% for the intraspecies hybrids, and 39% for the local controls.

A Vibrio pathogen obtained from a local hatchery killed most larvae in the three groups, but there were more live normal larvae in both hybrids than in the control exposed to the bacteria. In another experiment, when older, setting-size larvae of local oysters were included, all of these larvae were dead in 2 days after being exposed to bacteria, while younger larvae of hybrids and nonhybrids alike were still alive.

Cytogenetic results indicated some delayed and ineffective fertilization in the interspecies cross and a good number of cleavages in the other crosses 1 hr past fertilization.

A C. corteziensis female which had spawned previously, spawned again, but still only a few eggs. These eggs were fertilized with pooled C. virginica sperm, then cultured. By 60 min, some eggs were up to 3 - 4 cells. Early development appeared to proceed on schedule as normal for C. virginica embryos. However, development then seemed to slow down as only rotating embryos were seen by 24 hr, a time when many C. virginica larvae have progressed to the straight-hinge stage at 27°C. Some of the embryos were abnormal.

Measurements taken on 50 eggs of C. corteziensis averaged 47.12 μ. Average sizes of 50 C. virginica and 50 C. gigas eggs were 48.9 μ and 51.7 μ, respectively.

Mass Selection of the American Oyster

Young spat collected during the past 5 mo from meat selection and larval selection brood stock have been moved to the seawater raceway system. Here, they are being carefully tended to insure that they put on maximum growth during this critical period. Water entering the tanks is being treated with ultraviolet light to prevent wild oyster larvae from setting on the genetic stocks of young oysters. Older oysters from previous year classes are also continuing to be grown out in the seawater raceway system or on trays suspended in Milford (CT) Harbor.

Meetings, Talks, Visitors, and Publicity

E. Rhodes hosted a marine biology class from Fairfield University on 25 July. Visitors included Messrs. Cavallaro and Cruickshank of Terra Master, Inc., in Browns Mills, NJ; William Cuthbert of Guilford, CT; and Jon Lindberg of the Campbell Soup Company.

PATHOBIOLOGY DIVISION

Comparative Shellfish Pathology Investigation

Histopathologic examination of clams and oysters collected from five sites in the James River was completed. Collections were made in October, January, April, and August. American oysters were collected from two downriver sites (Wreck Shoals and Horsehead Point) and two upriver sites (Deepwater Shoals and Point of Shoals). Common rangia clams (Rangia accuminata) were collected from James Island. Gross and microscopic pathological, parasitological, and two physiological parameters were compared with Kepone levels and mutagenicity of substances extracted from the tissues. No differences were noted in gametogenesis, digestive gland activity, acute or chronic inflammation, perivascular cuffing, or sclerosis of blood vessels in oysters from up or downriver locations. Oysters upriver appeared to have higher condition factors than those collected at the two lower sites. Parasites were more prevalent at the lower sites (namely, Minchinia nelsoni, Bucephalus cuculus, and Pinnotheres ostrearum). Kepone levels were higher in oysters from Point of Shoals (0.56 ppm). Other values were: Horsehead Point, 0.39 ppm; Deepwater Shoals, 0.36 ppm; and Wreck Shoals, 0.26 ppm. James Island clams were 0.38 ppm. Mutagenic activity was found in oysters from all four locations, but all clam samples were negative. No lesions were seen in the clams. Any differences noted were most probably due to salinity differences rather than differences in contamination levels.

Spring samples of oysters from five locations in Delaware Bay were examined for Minchinia nelsoni (MSX). Prevalence of the disease has remained low (0-10%) for the second year in a row. All of the infections observed were considered to be light in nature.

Experimental studies have begun in cooperation with researchers at WHOI as a supplement to the Deepwater Dumpsite (DWD) 106 field studies. Mixed cultures of copepods (Temora, Centropages, and Pseudocalanus) were exposed to waste products from DuPont's Grasselli or Edgemoor plants. Field studies at DWD 106 indicate that these wastes are diluted by a factor of 10^4 and 10^5, respectively, and remain at these concentrations for several days. Therefore, laboratory exposures of each waste were made for 96 hr at concentrations of 1000 ppm (10^{-4}) and 100 ppm (10^{-5}).

Exposures of combined wastes were not made. Total mortalities were recorded and are listed in the Table 1. One set of exposed and control cultures was fixed for light microscopy and a duplicate set for electron microscopy. Little effect is expected to be apparent at the light level; however, effects at the subcellular level may have occurred and should be evident with the aid of the electron microscope. These laboratory studies are needed to correlate the dumping of wastes at DWD 106 with the pathologic conditions observed in field-collected specimens.

Table 1. Percent mortalities of mixed copepod cultures exposed for 96 hr to DuPont waste products[a]

Waste product	Concentration (ppm) 1000	100
Grasselli	45	20
Edgemoor	50	30

[a] Cultures receiving no waste products (controls) showed 10% mortality after 96 hr.

Epizootic in Florida Sponges

An epizootic of unknown cause is occurring in commercial sponges of lower Biscayne Bay. Dr. Lanny R. Udey of the University of Miami submitted both normal and diseased tissues from grass and yellow sponges (Spongia) for histological examination. Macroscopically visible lesions consisted of bleached, eroded areas on the surface. The bleached areas extended into the mesenchyme of the sponges. Preliminary examination of lesions in tissue sections stained with H&E and by the Feulgen technique showed what appear to be masses of slightly Feulgen-positive cocco-bacilli. The masses of putative bacteria also occurred in deeper parts of the supposedly normal tissues. They were associated with what appear to be necrotic choanocytes (flagellated cells that line parts of the internal cavity or spongocoel of the sponge).

Histology of the Blue Crab

A contract has been signed with Praeger Scientific for publication of this manuscript. Praeger estimates that the total number of printed pages will be approximately 300. Comments from one reviewer have been received and necessary changes made in the manuscript. The second reviewer has promised to return the manuscript with her comments within 1 or 2 wk.

Histological Services

The Histology Unit cut and otherwise processed approximately 1500 sections of several types of fish and shellfish tissues for light microscope examination by the Division's staff pathologists.

Fish Pathology Investigation

Recent efforts on cytological studies of fish larvae have included a fine structural evaluation of the olfactory epithelium in striped bass and winter flounder. In both instances, the larvae were at an age (several days post-hatching) where predatory feeding had begun and all the fish were in good condition at the time they were sacrificed. Electron micrographs of the olfactory tissues indicated that the sensory, supporting, and basal cells were well differentiated and, based solely on morphological criteria, appeared to be functional. Two types of receptor cells (ciliated and microvillous) were found in the striped bass olfactory tissue, while only ciliated cells were observed for the winter flounder. This circumstance (i.e., the presence of more than one type of receptor cell) is commonly observed for these sensory tissues in adult fish and appears to be species dependent. Further plans for the study of this sensory system in larval fish will include both contaminant and behavioral experiments in order to better ascertain the role of olfaction in larval fish physiology (feeding) during the "critical time period." A short paper discussing the results of this work was prepared and submitted for inclusion in the proceedings of a soon-to-be-held (fall 1979) ICES meeting.

Microbial Ecology Investigation

Microscopical studies on fouling organisms present on gills of the rock crab (Cancer irroratus) were made on a sample of 12 animals collected near the munitions pier in Sandy Hook Bay (NJ) in June. The small number of crabs to be examined in the study was predetermined in order to test our hypothesis that adult crabs present in the Bay during summer months often are "stragglers" which fail to migrate seaward during the spring months. Previous studies showed that adult rock crabs usually were absent or caught only in small numbers during trawls made in late June, July, and August. Crabs that were caught during the summer months usually had shell erosion, blackened articulations, and bryozoan growth on the external carapace. Microscopically, they had discolored or blackened gills, heavy fouling with bacteria and diatoms, and dense populations of peritrich or suctorian ciliate protozoans. Summer-caught rock crabs are believed to be among the most stressed crustaceans that are recoverable from Sandy Hook and Lower Bay, New Jersey. Observations on the 12 crabs collected in June included: 1 with clean gills, 8 with discolored gills, and 3 with black gills; 6 had dense bacterial fouling; and 1 had heavy diatom infestations. On one sectioned and stained gill there were over 300 peritrichs and 3 suctorians. Gross and microscopic observations on the 12 crabs confirmed the hypothesis, based on previous studies, that the residual summertime population of rock crabs is ideal for continued studies on the effects of environmental contamination and microbial fouling.

Larval Diseases of Mollusks Investigation

Challenges of fertilized oyster eggs with two Vibrio strains isolated from a Long Island hatchery are continuing. Strain #1 appears to be more virulent than strain #2. When the two bacteria are present together in a larval culture, the former retards the growth rate of the latter. The addition of as little as 10^1 cells of the two strains per milliliter of embryonic culture water will cause oyster larval mortality.

An unidentified bacterium, isolated from International Shellfish Enterprises (ISE) in Moss Landing, CA, has been found to be pathogenic to American oyster larvae. The bacterium is being characterized along with 19 other ISE isolates and 150 isolates collected from three sampling cruises. The latter are being screened for pathogenicity to oyster larvae.

Data collection along the following three lines of work continued during the month: (1) assessment of the effects of microbial pathogens on induction of motile (early hemocyte) cells of oyster larvae, (2) the use of collagen monolayers to isolate motile (early hemocyte) cells of oyster larvae, and (3) propagation of oyster larval cells in tissue culture. In the latter cooperative work with Dr. K. Kanungo of Western Connecticut State College, microbial contamination of cell cultures has continued to cause problems. By altering incubation temperatures, varying the use of antibiotics, and changing egg fertilization regimes, survival and differentiation of larval cells have been extended to 10 days.

Meetings, Talks, Visitors, and Publicity

Dr. Rosenfield, Mr. F. Kern, and Dr. R. Lippson attended a FY82 Planning Committee meeting on "Estuarine Pulse" convened on 6 July at Sandy Hook, NJ, by Dr. Sindermann. Dr. Rosenfield attended the NEFC Board of Directors Meeting on 16 and 17 July at the Woods Hole Laboratory to develop FY82 programs. He attended the Maryland Sea Grant meeting in Annapolis, MD, on 18 July.

Dr. R. Murchelano and Mr. M. Newman departed on 23 July for Hamburg, FRG, in order to participate in a 3-wk research vessel cruise in the Baltic Sea aboard the FRG R/V Anton Dohrn. This is the first in a series of international cruises involving North American and European scientists which is specifically designed to study the health status of fishery stocks in selected ocean ecosystems.

Mr. M. Newman attended the 1979 Midwest Fish Disease Workshop during 7-16 July in Madison, WI.

Ms. Sharon MacLean traveled to the Narragansett Laboratory to pick up and deliver specimens and then met with Dr. Judy Capuzzo at WHOI in Woods Hole, MA, to discuss some cooperative studies during 3-9 July.

Ms. Ann Charles participated in an Ocean Pulse cruise during 13-29 July aboard the Albatross IV which sailed from and returned to Woods Hole, MA.

On 18 and 19 July, Mr. M. Galasso met with Mr. J. LaBaron at the Sandy Hook Laboratory to work on additions to "black gill" disease data records and print-out in order to finalize the project.

Mrs. E. Ortt and Mrs. M. McNelis attended the NEFC EEO Committee meeting at the Milford Laboratory during 18-20 July.

Mr. S. Tettelbach and Ms. E. North of the Larval Diseases of Mollusks Investigation visited Bluepoints Company in Long Island, NY, and took water samples for quantitative bacterial analysis.

Dr. W. Blogoslawski returned to Moss Landing, CA, to continue the investigation of the ISE hatchery disease problem in situ.

Ms. Lisa Petti began her 1040-hr work/study appointment at the Milford Laboratory while Ms. E. North completed her 1040-hr cooperative duty tour, but is remaining as a volunteer student intern.

Mrs. Helen Lang, librarian at the Oxford Laboratory, retired on 12 July. Friends and staff honored her with a luncheon at the Robert Morris Inn.

Visitors to the Oxford Laboratory during July included Congresswoman Barbara Mikulski and members of her staff--Ms. Ann Lewis, administrative assistant; Ms. Gloria Morgan, legislative counsel; and Mr. Mark Shuster, intern. Accompanying them was Mr. David Goehler of NOAA and Mr. Jack Bowie, a "Star Democrat" reporter. Other

visitors were Ms. Dorothy Syzmanski of Baltimore, MD; Mr. Jerry McCormick-Rae, Mr. David Campbell, and Mr. Miles Primrose of the Pathobiology Department at Johns Hopkins University; Estuarine Research Foundation Executive Committee including Mr. M. Castagna and Mr. J. Williams; and Mr. T. B. Weaver, Jr., of the Del-Mar-Va Council of the Boy Scouts of America in Wilmington, DE, who brought his Boy Scout troop to tour the Oxford Laboratory.

Dr. P. W. Chang, Mr. T. Miller, and Ms. Vickie Blazer of the Department of Aquaculture Science and Pathology of URI visited Dr. R. Robohm and Ms. C. Brown at the Milford Laboratory to confer on cultural and serological methods of identifying fish pathogens.

Publications

Bodammer, J. E. Preliminary observations on the cytopathological effects of copper sulfate on the chemoreceptors of Callinectes sapidus. Vernberg, W. B.; Thurberg, F. P.; Calabrese, A.; Vernberg, F. J., eds. Marine pollution: functional responses. Academic Press; 1979:223-237. (P)

Brown, C.; Russo, D. J. Ultraviolet light disinfection of shellfish hatchery sea water. I. Elimination of five pathogenic bacteria. Aquaculture 17:17-23; 1979. (P)

RESOURCE UTILIZATION DIVISION

Fisheries Engineering Investigation

Design work this month centered around the surf clam and ocean quahog sampling system in preparation for the August gear trial and the winter assessment cruise. A new docking ramp for the stern-chute handling system was designed by Vern Nulk to replace the old ramp. The new ramp can be adjusted to accommodate both the old 48-inch blade dredge and the new 60-inch blade dredge. Our compression load cell is being redesigned by Dan Baker and will be modified to serve as a tension load cell in order to monitor the haulback line loads in the dredge cable during gear trials. A level-wind mechanism is also under design by John Callan and Al Blott for the electrical cable winch to allow easier handling and spooling on the drum.

Al Blott attended a task force meeting at the Woods Hole Laboratory on sampling micronekton and "0"-age fish. An upcoming gear comparison cruise on the Delaware II was discussed, and, as a result, Al surveyed an available herring trawl to check its condition and to determine its utility as a juvenile fish sampler. In addition, necessary parameters were agreed upon so he could begin the preliminary design of specific juvenile fish sampling.

The NOAA R/V Rorqual was busy for most of this month taking part in an Ocean Pulse Program benthos monitoring study. Ken Pecci of the Woods Hole Laboratory was chief scientist and Al Blott, Vern Nulk, and John Kenney of the Gloucester Laboratory participated.

Mike Corbett worked on the FY82 budget submission, preparing the remote-sensing and gear research initiatives.

Bob Van Twuyver continued to work on refurbishing of the Gloucester Laboratory's special low-temperature freezer system, completing the assembly of the No. 7 freezer.

Energy Conservation

Mike Corbett prepared an energy reduction plan for the NEFC that had been requested by the Washington Office.

As a pilot program in the initiation of one phase of the plan, an energy inventory was conducted at the Gloucester Laboratory. This entails compiling facts and figures for the previous several years on the use of all energy sources -- electricity, gas, oil, etc. Subsequently, this will lead to energy conservation retrofits throughout the facility to enable further cutbacks in our energy use.

A number of steps have already been taken at the Gloucester Laboratory to reduce energy consumption. In the past month, Bob Van Twuyver installed a new, more efficient cooling tower as a heat exchanger for the freezer and air conditioning systems, and installed a capacity reducer system on the main air conditioner to conserve energy.

Resource Development and Improvement Investigation

New Product Development

John Antonellis and Joe Mendelsohn went to the US Army North American Research and Development Command (NARADCOM) Laboratory in Natick, MA, to compare techniques with Ron Segers and Ernie Johnson on the preparation of fish samples for the Instron Texturometer. They will be using some of our suggestions, and we have adopted their metal guide and electric knife technique to prepare both raw and cooked fish samples. After several trial runs on the multibladed and single-bladed Kramer-Shear press, the single-bladed unit seemed to give the more consistent results. Compression measurements were also made on the fish fillets, but due to the varying thicknesses of the different fillets and their convex surfaces, the results would not correlate with any one parameter.

Fish flesh was collected from haddock and Atlantic cod frames (with head) using our Bibun meat/bone separator for a company that plans to use the material to feed American lobsters.

Species Identification

Finished was work on differentiating species of brine shrimp and verifying that the fish involved in the ciguatera poisoning probably was not dolphin (fish, not mammal). Work has begun to get the method ready for a collaborative study on species identification.

Nutrition

Fat samples are being separated by traditional thin-layer chromatography on silica gel and further separated by their degree of unsaturation by silver nitrate-impregnated silica gel.

Krill

John Kaylor has completed a paper on krill (*Meganyctiphanes norvegicus*) and it has been sent to the Center Directorate for review and recommendation for the type of publication best suited for its length.

Blue Crab

Taste tests are being conducted on refrigerated, pasteurized, roller-extracted blue crab meat as part of a storage study. After 1 mo of storage, there are no significant differences between the roller-extracted meats and the commercially picked control. Lumpmeats were made from homogenized, roller-extracted blue crab meat mixed in different proportions with handpicked flake meats. The mixtures were placed in ice cube trays, steamed for 5 min and then cooled at 0°F for 5 min. Taste testing of the formed lumpmeats indicated that a mixture of two and three parts of homogenized meat to one part of flake meat produced the most acceptable lumpmeats.

Squid

Work is continuing on testing the textural quality of raw and cooked short-finned squid (*Illex illecebrosus*). Tests are being conducted on the Instron Texturometer concurrently with panel evaluations of texture (of the cooked samples only).

Recreational Fish Preservation

Work is in progress on fish smoking and salting techniques for use by sports fishermen.

Product Quality, Safety, and Standards Investigation

Product Quality

The flavor and texture of bluefish fillets packaged in polyethylene still remain at a high level of acceptability after 41 wk of storage at 0°F. The results of organoleptic tests were substantiated by chemical tests for peroxide value, thiobarbituric acid number, and percent-extractable protein nitrogen.

Vacuum-packed samples of raw breaded sand lance were still acceptable in flavor after 50 wk of storage at 0°F. Air-packed samples were unacceptable due to the development of oxidative rancidity. These fish had been held 2 days on ice prior to breading and freezing. Fish which had been kept in chilled sea water prior to freezing were unacceptable because of flavor changes after 50 wk regardless of packaging method. No textural problems occurred during frozen storage.

Cownose ray (raw steaks) continues to display excellent frozen storage characteristics. Flavor and texture were highly acceptable after 40 wk at 0°F, and chemical tests for ammonia content, peroxide value, and pH showed no significant change.

A Hewlett-Packard (HP) automatic sampling system was received and installed on our HP model 5840 gas chromatograph (GC). The automatic sampler operates under control of the GC's microprocessor to automatically inject up to 99 samples. The GC now has a capability to analyze our volatile amine samples completely automatically, including periodic recalibration.

Eye-lens and muscle tissues were collected from several hundred silver hake samples obtained in Gloucester, MA. This will complement the samples collected from Pt. Judith, RI, in our analysis of silver hake populations by isoelectric focusing.

Silver hake from the population analysis samples were scaled, headed, gutted, and minced to produce 200 lb of minced fish blocks. These blocks will be used to evaluate a new succulometer cell and new single-blade shear cell purchased for use on the Instron Universal Testing Machine.

Product Safety

We have obtained peak profiles of the following polychlorinated biphenyl isomers (Aroclors) from the Perkin-Elmer Sigma-1 gas chromatograph: 1016, 1221, 1232, 1242, 1248, 1254, 1260, and 1262.

Retention times have been obtained for the following chlorinated hydrocarbons: lindane; α and β-BHC; heptachlor; aldrin; heptachlor epoxide; p,p'-DDE; dieldrin; endrin; p,p'-DDD; p,p'DDE; and o,p'-DDT.

Stock solutions and working solutions of various Aroclors were made based upon the reference standards of the USEPA.

We are in the process of establishing a contract with Dr. McIlwain of Gulf Coast Research Laboratories to collect samples. He will also measure, determine sex and age, pool, and composite samples according to a protocol of the Resource Utilization Division.

A contract has gone out to Montclair State College to collect samples of selected finfish species in the New York Bight and Delaware Bay regions.

Product Standardization

Instructions for grading fresh and frozen fillets of all commercial species of finfish and for breaded and precooked scallops were prepared and sent to the Washington Office for approval and publication. Copies were distributed to regional supervisory inspectors for use until the approved documents become available. After these standards become effective on 25 July 1979, their availability will assist the USDOC inspectors and plant quality control personnel in proper application of the standards. Score sheets were also made available for publications.

Several meetings were held with interested parties on proposals for detection of bones in fishery products using x-ray techniques and a fluorescent light lens. A trial at a Gloucester, MA, fish plant of the fluorescent light lens is being scheduled at an early date.

John Ryan and Joseph Carver attended the 10-11 July meeting of the Armed Forces Product Evaluation Committee held at NARADCOM. Battered fish sticks and scallops were displayed to the Committee as potential "new" food items. An invitation was extended to the Committee to tour the Gloucester Laboratory during their next meeting. A buffet of products featuring underutilized species will be presented during the tour. Because of the high cost of meat products the military is very interested in substitute items. Fishery products with their high nutritional worth would seem to offer a good value as a replacement for meat products.

A general revision of a proposed Codex Draft Standard for Quick Frozen Fish-Fingers (Fish Sticks) and Fish Portions, Breaded or in Batter, was prepared in cooperation with the Washington Office.

Technical Assistance

Resource Utilization Division personnel provided information and technical assistance in the following areas: aquaculture of scup; paralytic shellfish poisoning; eels, preparation of shark; refrigerated and chilled seawater; design of an

energy recovery system for using waste engine heat on a fishing vessel; packaging requirements for oysters; the use of solar energy for smoking fish; a machine to skin and eviscerate dogfish; ocean pollution; Federal-State Certification Program; inspected fishery products; names of people and organizations of recognized ability in quality control aspects of food manufacture; freezing of whole lobsters and lobster meat; lumpfish; oysters; dogfish; clams from Argentina; Greenland turbot; assist in making minced fish to form the basis of a diet for maricultured lobsters; squid fishery; new canned fish products; ocean quahogs; salting fish; handling, processing, and marketing fish; protein requirements for school lunch program procurement; sodium content of fishery products; and water intake of scallops.

Meetings, Talks, Visitors, and Publicity

John Ryan participated in a 2-day EEO Committee meeting held at the Milford Laboratory on 26 and 27 July. Proposed by-laws were prepared and will be distributed for review and comments to all NEFC Laboratory EEO Committees.

Jack Moakley spent 3 wk at URI's Fisheries Course developed for NOAA Corp officers newly assigned to NMFS.

Fred King participated in a workshop on nomenclature systems for seafoods in Washington, DC. Participants included representatives from industry, industry trade associations, and regulatory agencies as well as NMFS. The purpose of the meeting was to coordinate future contract work by NARADCOM and Brand Group, Inc., with activities by NMFS.

Visitors to the Gloucester Laboratory during July included members of the staff of the Federal New England Regional Council on Food and Nutrition, and Dr. Margaret Robinson of Savannah (Georgia) State College.

Mike Corbett and Kurt Wilhelm put on an exhibit at the Yarmouth (ME) Clam Festival.

NATIONAL SYSTEMATICS LABORATORY

Pelagic Fishes Investigation

Work continued on a taxonomic revision of Spanish mackerels. Bruce Collette returned from an Alpha Helix cruise around New Guinea during which important material was collected. Work continued as well on a field guide to tropical Atlantic longline fishes.

Shrimps Investigation

Work continues on a revision of American rock shrimps of the genus Sicyonia.

Crabs Investigation

Work continued on the description of a new species, genus, and family of crabs from the East Pacific thermal vent area.

Other

Final preparations were made for a US-USSR workshop on the systématics of coldwater fishes to take place during August in conjunction with the Orono, ME, meetings of the American Society of Ichthyologists and Herpetologists.

Visitors

Dr. Osamu Okamura departed after a visit of approximately 4 mo during which he studied Smithsonian Institution collections of Macrouridae.

Publications

Cohen, D. M. Notes on the morid fish genera Lotella and Physiculus in Japanese waters. Jap. J. Ichthy. (A)

Collette, B. B.; Russo, J. L. A new species of Spanish mackerel from Australia and New Guinea. Austral. J. Mar. Freshw. Res. (A)

Collette, B. B.; Russo, J. L. A revision of the scaly toadfishes, genus Batrachoides, with description of two new species from the eastern Pacific. Bull. Mar. Sci. (S)

Pérez Farfante, I. Penaeopsis jerryi, new species from the Indian Ocean (Crustacea: Penaeoidea). Proc. Biol. Soc. Wash. 92(1):208-215; 1979. (P)

Pérez Farfante, I. Catalog of marine and estuarine commercial shrimps of Latin American Pacific Coasts, with notes on their distribution, habitat, and economic value. United Nations Food and Agriculture Organization. (A)

Pérez Farfante, I.; Ivanov, B. G. Range extension of Penaeopsis serrata (Crustacea: Penaeoidea) to off New Jersey and Rio Grande do Sul. Proc. Biol. Soc. Wash. 92(1):204-207; 1979. (P)

ATLANTIC ENVIRONMENTAL GROUP

Ocean Monitoring and Climatology Investigation

The cooperative Ship of Opportunity Program obtained five XBT transects in July, one in the Gulf of Maine, one across the Southern New England shelf along the 71°W meridian, two across the shelf and slope off New York City, and one in the Gulf of Mexico. In addition, continuous plankton and temperature recorders were towed by ships of opportunity in the shelf and slope waters off New York City.

Negotiations were initiated with a British vendor for acquisition of the first production model of the undulating oceanographic recorder (UOR). Meanwhile, efforts to develop a system for processing and displaying UOR data (temperature, salinity, depth, and chlorophyll) continue.

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

GULF STREAM EDDY LOCATIONS

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

The continued existence of eddy 79-A, south of New England, remains questionable. Its mid-June position, apparently placed too far to the SW in last month's report, has been corrected below. An XBT message from a Naval Aircraft transmitted on 21 June, if valid data, was in the eddy at 39.6°N, 71.3°W (15.1°C at 185 m). Recent reports of current conditions from fishermen working in the vicinity of this eddy indicate that its rotational circulation was weakened. Clear satellite imagery from the first half of July gives no evidence of its position.

Eddy 79-B moved west about 40 nm (75 km) from its mid-June location beginning about the third week in June. It was in the vicinity of Veatch Canyon by mid-July, with its center at about 39.4°N, 69.5°W.

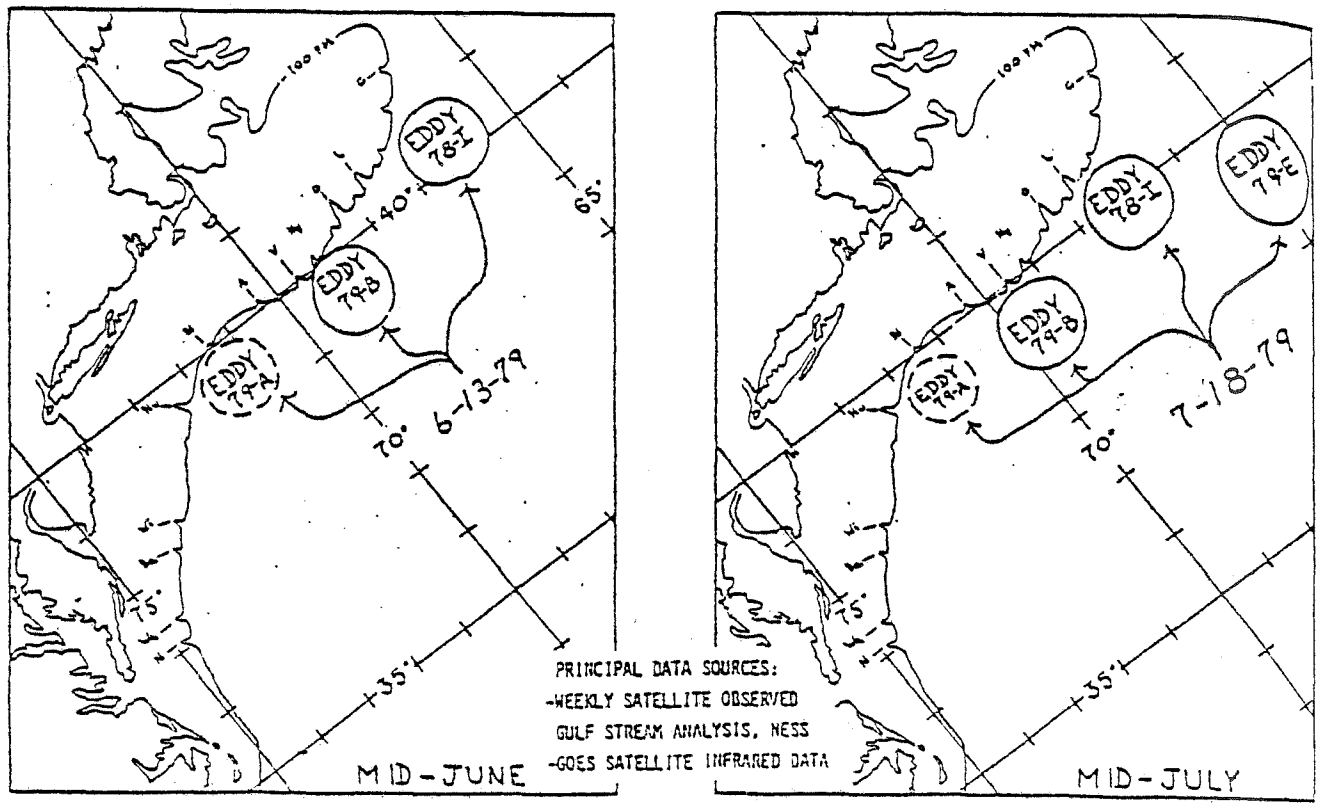
Eddy 78-I moved about 45 nm (85 km) WSW from mid-June to mid-July when it was centered at about 39.8°N, 67.0°W, off Lydonia Canyon.

Eddy 79-E detached from the Stream during the first week of July and then moved west about 20 nm (37 km) by mid-July, when it was centered at about 39.2°N, 64.9°W far to the SSE of Corsair Canyon.

During the next thirty days, eddy 79-A, if it still exists, may move SW past Hudson Canyon; 79-B, west to Block Canyon; and 78-I, west to the vicinity off Hydrographer Canyon. 79-E, if it does not get absorbed by the Gulf Stream, will probably remain far to the SE of Lydonia 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).

(continued)



In response to requests by the NOAA Hazardous Materials Response Team, Reed Armstrong and Steve Cook provided information, advice, and supplies to the investigators studying the movement of oil from the blowout of the IXTOC-1 oil well in the Gulf of Mexico.

A draft report, "Marine Environmental Conditions Off the Atlantic and Gulf Coasts of the United States, January 1978 - March 1979," was completed and multiple copies were mailed to the Center Directors of the NEFC and SEFC for distribution and review. This is the fifth in a series of annual reports of environmental conditions, and it will eventually be published along with a similar report for the Pacific Coast and Alaska.

Ocean Dumping Investigation

Final preparations were underway to conduct the last of this first-year series of radio-direction-finding (RDF) drifter experiments at DWD 106. John Hartley will be at sea on the URI R/V Endeavor (Cruise No. EN-041) to deploy the buoys on or about 20 August 1979. Three listening stations will be set up (Cape Henlopen, DE; Sandy Hook, NJ; and Point Judith, RI). The Point Judith station will be maintained by our group here in Narragansett. Radio contact between our facilities and the Endeavor will be maintained by the URI Graduate School of Oceanography. The first draft progress report from this past year's RDF drifter experiments was submitted to the NOS Marine Environmental Assessment Program Office on 13 July.

Meetings, Talks, Visitors, and Publicity

Reed Armstrong participated in a meeting of principal investigators to plan activities during the fourth and final year of the Buccaneer Oil Field Study, a USEPA-sponsored investigation of conditions around a producing oil field off Galveston, TX. The meeting was held in the SEFC's Galveston Laboratory during 8-10 July.

Woody Chamberlin visited the Washington Office on 10 July to attend a meeting with the NOAA Deputy Administrator, and a meeting with the Director of the National Environmental Satellite Service.

On 13 July, Jim Bisagni went to Rockville, MD, to attend a meeting of the NOS Ocean Dumping and Monitoring Division.

Reed Armstrong attended an NEFC Board of Directors meeting as a representative of AEG on 16 and 17 July.

On 28 July, Jim Bisagni traveled to Brooklyn, NY, to confer with scientific personnel aboard the NOAA R/V G. B. Kelez. He also modified existing equipment which will be used during the September 1979 cruise to DWD 106.

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Bisagni, J. J. July 1977 physical oceanographic studies at Deepwater Dumpsite 106; 1978. In: Deepwater Dumpsite 106 assessment report. NOS; (1979). In preparation. Available from: Northeast Fisheries Center, Woods Hole, MA.

Jossi, J. W.; Marak, R. R. MARMAP survey manual; 1978. 43 p. Contribution to NOAA fisheries technology shipboard manual; (1979). In preparation. Available from: Northeast Fisheries Center, Woods Hole, MA.

Mizenko, D.; Chamberlin, J. L. Gulf Stream anticyclonic eddies and shelf water at Deepwater Dumpsite 106 during 1977; 1978. In: Deepwater Dumpsite 106 assessment report. NOS; (1979). In preparation. Available from: Northeast Fisheries Center, Woods Hole, MA.

Murray. T. E. A summary of waste inputs to Deepwater Dumpsite 106 during 1976 and 1977; 1978. In: Deepwater Dumpsite 106 assessment report. NOS; (1979). In preparation. Available from: Northeast Fisheries Center, Woods Hole, MA.