NEFC

Northeast Fisheries Center

NEWS

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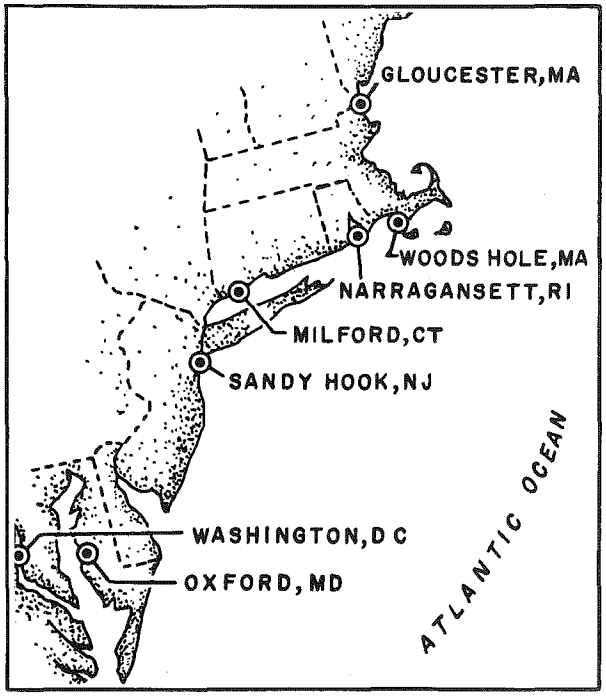

DECEMBER 1979

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

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WOODS HOLE, MASSACHUSETTS

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SUBMISSIONS TO THE "NEFC NEWS" ARE PREPARED BY THE AFOREMENTIONED RESEARCH ADMINISTRATORS, AND COMPILED AND EDITED BY JON A. GIBSON, TECHNICAL WRITER-EDITOR, NEFC.

CENTER DIRECTORATE

Fisheries Utilization Office

On the History of the U.S. Commercial Fisheries is a book being prepared by Dr. Bernard Gordon (a professor of oceanography at Northeastern University (NEU) and an author of The Secret Lives of Fishes and numerous marine articles), Dr. William Fowler (a professor of history at NEU), and Dr. Wayne Anderson (a professor of audiovisual communication at NEU). These professors visited the Gloucester Laboratory for assistance in a special project that they have undertaken to tape-record the memoirs of the few remaining venerables of the US fishing industry. While the project has been underway for some time, the NEU group recognizes the need to accelerate their progress because of the ever diminishing probability that they will get to the more important contributors in time. According to John Kaylor, who has assisted the group, the gentlemen that should be interviewed are in their 80's and 90's, or in too many cases, they have passed on.

The NEU group is covering such topics as: changes in the industry; methods of fishing; ethnic and educational backgrounds; entry into industry; relationships involving captains, boat owners, US Coast Guard, NMFS, and other federal and state agencies; and wage systems.

John Kaylor has provided the NEU group with invaluable leads and, according to Dr. Gordon, has expedited their mission significantly.

Special Scientific and Technical Projects Office

Arthur Posgay finished a Woods Hole Laboratory Reference Document on the age and growth of the sea scallop and a manuscript on the design and construction of the bongo plankton samplers.

Ron Smolowitz held discussions with personnel of Blount Seafood Corporation on possible joint projects concerning ocean quahogs. Similar discussions were held with members of the Seafood Producers Association of New Bedford in regards to sea scallops. The majority of the time this month was spent on attempts to acquire funding for technical projects through cooperative fisheries development proposals and other means.

RESOURCE ASSESSMENT DIVISION

Resource Surveys Investigation

In December the Survey Unit worked on completing the processing of the autumn bottom trawl survey data. Linda Despres returned from her 3-wk assignment at the Oxford Laboratory. While there, Linda worked with several of its staff on samples collected for pathobiology studies. This training will help in the collection of pathology data on future survey cruises.

The NOAA R/V Delaware II returned to Woods Hole on 18 December and investigation activities immediately centered on staging the vessel for the early January surf clam-ocean quahog cruise. By the end of the month, the critical staging tasks had been completed and we expected no problems in beginning the cruise on time. Chuck Byrne supervised the staging activities (he will be chief scientist during most of the cruise) and Jim Crossen wired the controllers, winches, and electrical pump.

Fishery Biology Investigation

Finfish

Cathy Rearden completed aging red hake samples from the 1979 spring bottom trawl survey. She also continued work on the age and growth archiving project and began a statistics course taught by Mike Pennington of the Marine Ecosystems Division.

Louise Dery consulted with Dave Lebby of the Maine Department of Marine Resources on alewife aging problems, and with Mary Ellen Dore of the Connecticut Department of Environmental Protection on shad scale-otolith age comparisons. She completed aging and summarizing silver hake samples from the 1979 summer bottom trawl survey, and began sectioning samples from the fall bottom trawl survey. Louise also coordinated a 2-day Falmouth-Out-Of-School Program and together with Cathy Rearden wrote up the proceedings of the November scup aging workshop.

Age and Growth

Vi Gifford completed aging the 1978 commercially landed redfish samples.

Kris Andrade completed aging almost all of the third quarter 1979 commercially landed haddock samples.

Judy Penttila completed aging fall bottom trawl survey (Delaware II Cruise No. DE 79-10 and NOAA R/V Albatross IV Cruise No. AL 79-12) yellowtail flounder samples. She also checked the second audit listings for yellowtail flounder data coming from bottom trawl surveys ranging from Albatross IV Cruise No. AL 79-02 in the spring to Albatross IV Cruise No. AL 79-12 and Delaware II Cruise No. DE 79-10 in the fall, and okayed them for being put on computer tape.

Shellfish

Loretta O'Brien continued aging shells of sea scallops for age analysis. She worked with Ralph Mayo on fitting growth curves of the von Bertalanffy-type to observed 1977 sea scallop age data. She also assisted in teaching Steve Morrison the complete routine of processing surf clam shells for aging. To date, Steve has had experience in all steps of the aging method except photographing the thin-sectioned chondrophores.

Maureen Griffin worked on processing surf clam shells for age analyses. She worked with Ambrose Jearld on auditing University of Maryland Eastern Shore (UMES) surf clam aging data. Maureen also worked with Joan Palmer and Ambrose Jearld on processing the UMES surf clam data for growth analyses.

John Ropes and Steve Murawski examined all of the marked ocean quahog shells recovered during the April 1979 Delaware II cruise (No. DE 79-08). New shell deposition (growth) was clearly evident. Measurements of shell growth were taken for analysis as well as photographs to show microstructural growth. John, Steve Murawski, Fred Serchuk, and Ambrose Jearld met to discuss and plan the remaining preparatory procedures for ocean quahog aging to be completed in January by the Smith College volunteer students.

Sandy Hook Investigation (November and December)

Darryl Christensen and Wally Morse participated on a bottom trawl survey from

1 November through 10 November. Darryl finished revising a manuscript which was subsequently accepted for publication in the Fishery Bulletin. Darryl and John Clifford completed a first draft of an informal report on age composition of recreationally caught Atlantic mackerel from their spring 1979 survey. John Clifford finished collecting bluefish and summer flounder age samples and sent them to the Woods Hole Laboratory for aging. Wally Morse continued analysis of fecundity logs from the fall bottom trawl surveys.

Fishery Assessment Investigation

Members of this investigation were busy working on assessments of a number of species.

In the silver hake stock identification study, Frank Almeida continued his examination of data from isoelectric focusing procedures. Frank also began examining the possibilities of using the standard bottom trawl survey computer programs to locate concentrations of pre-recruit silver hake to help identify spawning areas for use in the stock identification work.

Dennis Hansford, working with Thurston Burns, completed the auditing of: third quarter 1979 commercially landed yellowtail flounder age records, first and second quarter 1979 commercially landed pollock age records, and all commercial length samples for September and October 1979. Dennis also aided Thurston in summarizing 1978 and 1979 American lobster catch data and produced a magnetic tape containing all 1977-79 commercial shrimp data for Steve Clark.

Anne Lange finished a review of a document on the spawning biology of the long-finned squid, coauthored by herself, Ken Pecci, and Rhett Lewis. Anne has also completed some preliminary yield-per-recruit analyses for squid in response to a proposal for a change in mesh size regulations from 45 to 60 mm, and is preparing a document summarizing these results. She has also prepared numerous responses to questions concerning the US-Canada boundary negotiations.

Ralph Mayo is preparing a redfish assessment manuscript for publication and has worked with Liz Bevacqua completing the final 1978 US catch and effort report for the International Commission for the Northwest Atlantic Fisheries (ICNAF). The procedures for producing this report were completely revised this year, and several problems had to be resolved before the report could be completed. Next year's report, however, should be produced in considerably less time because of the work accomplished in 1979. Ralph also prepared material for the January meeting of the NMFS foreign fisheries observers, and Liz continued her work cataloging the domestic fishing vessel logs received at the Woods Hole Laboratory.

Steve Murawski, with the assistance of Dea Freid, continued his analyses of growth rates and shell length - meat weight relationships of marked - recaptured ocean quahogs. The shell length - meat weight studies indicate no significant differences between marked and unmarked samples. Steve also helped plan the 1980 clam cruise and reviewed a number of manuscripts and Public Law 89-304 (Anadromous and Great Lakes Fisheries Act of 1965) reports. Dea contributed to the analyses of ocean quahog length-frequency studies, and calculated some Atlantic cod von Bertalanffy growth curves for Fred Serchuk.

Joan Palmer assumed the leadership of the newly reestablished Biostatistics Task and, as such, is taking over much of the work formerly performed by Ralph Mayo.

Paul Wood prepared Atlantic cod length-frequency data and sea scallop shell-height-frequency and age composition data for the 1977 ICNAF Sampling Yearbook. Paul also coordinated three sea-sampling trips during December.

Senior Assessment Scientists

Brad Brown worked with Gene Heyerdahl, Regional Data Base Administrator, on the problems of accessibility of confidential fisheries data to regional fishery management council members and to Resource Assessment Division staff. He and Gene met with Al Peterson, Northeast Regional Director, and the New England Fishery Management Council staff to discuss this issue. Brad also spent considerable time reviewing the yellowtail flounder stock status and completing his work on section chair responsibilities for the multispecies fisheries management meeting held recently at St. Johns, NF.

Mike Sissenwine also reviewed the yellowtail flounder assessment and prepared material to update the current assessment. Mike was also involved in the planning of Phase II of the Northeast Fisheries Management Task Force (NEFMTF).

Emory Anderson spent 5 days on the West Coast at a meeting at the Northwest and Alaska Fisheries Center (NWAFC) in Seattle with members of the NMFS Stock Assessment Task Force. This meeting was attended by a representative from each center and from NMFS headquarters, at the request of Dr. Dayton Alverson, chairman of the task force, to complete the report of the task force. Completion of the report required editing sections already prepared by Dr. Alverson from contributions submitted from the centers, and drafting new sections. The report will attempt to describe NMFS efforts and capabilities in stock assessment endeavors for the benefit of federal administrators, regional fishery management councils, state fisheries agencies, industry groups, and academia. Emory also completed an analysis of pelagic shark catches in the US Fishery Conservation Zone in the Atlantic Ocean and Gulf of Mexico, and he drafted a document describing the results of this analysis.

Fishery Economics Investigation (November and December)

November

During November, the Fishery Economics Investigation devoted full time to preparing testimony on the potential economic impacts of an oil spill in the Eastport, ME, area. The written testimony was completed and submitted for review.

December

The investigation continued work on the siting of an oil refinery and marine terminal at Eastport, ME, by the Pittston Company of New York, primarily in the form of preparing oral testimony for the purpose of cross examination. Other work included a review of two papers on the economic effects of increasing the legal minimum carapace length of American lobsters which can be harvested and a review of a report on the economic benefits and costs of the Fishery Conservation and Management Act of 1976.

Meetings, Talks, Visitors, and Publicity

On 19 December, Don Flescher spoke to a group of students from Falmouth (MA) High School.

Stuart Wilk attended the following meetings on the indicated dates: Mid-Atlantic Fisheries Management Council's (MAFMC) Scientific and Statistical (S&S) Committee meeting in Philadelphia, PA, on 5 November; MAFMC S&S Committee meeting in Philadelphia, PA, on 3 December; NMFS State-Federal Program Striped Bass

Management Project S&S Committee meeting in Philadelphia, PA, on 10 and 11 December; MAFMC Recreational Fisheries Committee meeting in Philadelphia, PA, on 12 December; and a Bluefish Fishery Management Plan Coordination Committee meeting in Washington, DC, on 19, 20, and 21 December.

On 3 December, Emory Anderson, with Stu Wilk and Dick Hennemuth, attended a meeting of the MAFMC's S&S Committee in Philadelphia, PA.

On 3 and 4 December, Mike Sissenwine attended the Striped Bass Population Dynamics Workshop in Washington, DC.

On 4 December, Fred Serchuk attended the Woods Hole Laboratory EEO Committee meeting.

On 5 December, Mike Sissenwine met with personnel from the State of Rhode Island to discuss the 1980 winter yellowtail flounder survey. Thurston Burns, Ron Essig, Ralph Mayo, and Steve Murawski attended the American Fisheries Society Southern New England Chapter meeting in Shrewsbury, MA. Thurston Burns presented a talk titled "Review and Assessment of the USA Offshore Lobster Fishery," coauthored by Thurston, Steve Clark, Vaughn Anthony, and Ron Essig. Also at the meeting, Ralph Mayo was elected secretary-treasurer of the chapter for 1980.

On 5 and 6 December, Gordon Waring met with Stan and Jean Chenoweth of the Maine Department of Marine Resources to discuss Atlantic herring sampling and tagging.

On 6 December, Brad Brown, Dick Hennemuth, Mike Sissenwine, and Jim Kirkley met with Brian Rothschild in Washington, DC, to discuss Phase II of the NEFMTF. Ralph Mayo attended an IYABA meeting at the Milford Laboratory to discuss, among other topics, the planning of the upcoming NEFC spring research meeting. Fred Serchuk presented a seminar on "Fisheries Stock Assessments" to the marine fisheries science class of Salem (MA) State College at the Gloucester Laboratory.

On 10 December, Brad Brown chaired the first meeting of the American Fisheries Society's Marine Fisheries Committee at which a major step was taken toward establishing a marine section of the society.

On 11 December, Fred Serchuk attended a Groundfish Oversight Committee meeting of the New England Fishery Management Council (NEFMC) at Peabody, MA.

On 12 December, Fred Serchuk attended an NEFMC S&S committee meeting at Peabody, MA. Steve Murawski and Ron Smolowitz met with personnel at Blount Seafood in Warren, RI.

During 16-20 December, Emory Anderson met in Seattle with representatives from the other fisheries centers to complete the NMFS Stock Assessment Task Force final report.

On 18 December, Brad Brown and Ambrose Jearld attended a meeting at the Sandy Hook Laboratory to discuss cooperation between the Fishery Biology Investigation and the studies being conducted by Wally Morse of the Sandy Hook Investigation on fecundity. Brad also met with Jack Pearce and Darryl Christensen concerning the Ocean Pulse Program, and established Darryl as the liaison between the Ocean Pulse Program and the Resource Assessment Division.

On 19 December, Fred Serchuk attended the Woods Hole Laboratory EEO Promotion Subcommittee meeting.

On 20 December, Ralph Mayo met with a returning group of NMFS foreign fishery observers to discuss biological sampling aspects of the program. Fred Serchuk and Paul Wood attended a Sea Scallop Oversight Committee meeting of the NEFMC at Peabody, MA.

On 27 December, Mike Sissenwine attended a meeting at Narragansett, RI, to plan phase II of the NEFMTF.

Publications

Christensen, D. J.; Clifford, W. J. The 1978 spring recreational catch of Atlantic mackerel (Scomber scombrus) off the Middle Atlantic region. Fish. Bull., US. (A)

Kirkley, J. E.; Pennington, M. R.; Brown, B. E. A short-term forecasting approach to analyzing the effects of harvesting quotas: an application to the Georges Bank yellowtail flounder fishery. J. Fish. Res. Bd. Can. (S)

Reports

Anderson, E. D. Analysis of various sources of pelagic shark catches in the Northwest and western Central Atlantic Ocean and Gulf of Mexico. Woods Hole Lab. Ref. Doc. No. 79-56;1979.

Clark, S. H.; Burns, T. S.; Essig, R. J. Scotian shelf, Gulf of Maine, and Georges Bank pollock assessment update. Woods Hole Lab. Ref. Doc. No. 79-59;1979.

Clark, S. H., Essig, R. J.; Hansford, D. Gulf of Maine northern shrimp - current status and future outlook. Woods Hole Lab. Ref. Doc. No. 79-51; 1979.

Henderson, E. Biological models for the New England groundfish fishery. Woods Hole Lab. Ref. Doc. No. 79-47;1979.

MANNED UNDERSEA RESEARCH AND TECHNOLOGY PROGRAM

No report received. The December report will be included in the January issue.

MARINE ECOSYSTEMS DIVISION

Ecosystem Dynamics Investigation

Mike Pennington spent considerable time this month preparing and presenting two lectures per week in the statistics course he is giving for Woods Hole Laboratory personnel. About 20 people are enrolled.

Marv Grosslein attended a meeting of the US/USSR Working Group (V) on Bioproductivity and Biochemistry of the World Oceans, in Tallin during 10-14 December. It was agreed to include ecosystem modeling of Georges Bank as a specific item in the Working Group (V) protocol, and a workshop on the status of the US multispecies fish production model and the USSR primary-secondary model (and consideration of the possibilities for linking them) is scheduled for late 1980 or early 1981 in Leningrad. Marv Grosslein also conferred with Dr. Vyalov, Director of AtlantNIRO, on plans for US-USSR joint fisheries research in 1980.

A meeting was held at the Woods Hole Laboratory with Drs. Ted and Ann Durbin of the University of Rhode Island and Marv Grosslein, Wendell Hahm, Rich Langton, and others, to discuss joint development of daily ration estimates for the model GEORGE. The Durbins have been awarded an intergovernmental personnel assignment

appointment for the next 6 mo to assist the division with this aspect of our modeling. Wendell Hahm spent most of the month on further summaries of the size classification of both prey and predator from the 1973-76 fish food habits data base.

Recruitment Processes

Greg Lough served as Chairman of the Larval Herring Patch Study Working Group meeting held at the Bedford Institute of Oceanography in Dartmouth, NS, during 10-12 December. The meeting was held to review the disposition of samples and present status of data, and to explore areas for joint analysis of the data resulting from the fall 1978 Georges Bank larval Atlantic herring patch study. Other participants from NEFC were Red Wright, Ron Schlitz, Rich Langton, Geoff Laurence, and from Bedford were Ron Trites, Dan Ware, Robert O'Boyle, Douglas Sameoto. H. Hill on sabbatical from the laboratory in Lowestoft, United Kingdom, and K. Waiwood from the laboratory in St. Andrews, NB, also attended. A detailed report of the meeting will be forthcoming.

George Bolz continued work on the ICNAF ichthyoplankton data base, completing summary tabulations for the 1971-76 seasons. Upon receipt of the data from more cruises, the report can be put into final form. George Bolz also attended a course in optical microscopy and photomicrography at the Marine Biological Laboratory during 2-7 December. The course, a combination of lecture and laboratory experience, was an intensive survey of the state of the art of microscopy.

Roz Cohen and Greg Lough completed a Woods Hole Laboratory Reference Document on the laboratory techniques and data processing methods used for larval Atlantic herring gut content-condition factor analysis. Roz Cohen continued work with Bill Hayden on the computer organization of the ICNAF zooplankton data, began an evaluation of selectivity and electivity feeding indices to use in the larval herring feeding analysis, calculated the abundances of the dominant zooplankters from 10 surveys (1974-75 and 1975-76 seasons), and graphed standardized species-stage data by station and mesh size for comparison of net selectivity to be presented as a poster session at the January 1980 meeting of the American Society of Limnology and Oceanography in Los Angeles. Janet Murphy's appointment terminated on 18 December and she returned to school for her bachelor's degree. Bill Hess returned to temporary employment with us on 3 December and is helping process plankton samples and larval gut contents.

Dave Potter began December with the third issue of the NEFC Energy Newsletter and answered questions and requests received from the previous issue. Most of his time was occupied with the manuscript on the ICNAF ichthyoplankton-neuston bongo net comparison. Dave Potter and Hal Merry, an electronics technician, worked on interfacing the MOCNESS (multiple opening-closing net and environmental sensing system) computer situation display with a hardcopy printer and tape-reader to be able to calculate the backlog of volume-filtered data. Dave Potter spent 1 day with Sally Laurence from the USEPA Narragansett, RI, laboratory calibrating their flowmeters. Two "Certificates of Recognition" and $75.00 in cash were awarded to Dave Potter from NOAA for two useful suggestions.

Robert Livingstone continued work on revising the Georges Bank haddock fecundity manuscript. One week was spent in Dartmouth, NS, at the Bedford Institute of Oceanography conferring with R. Halliday. Halliday reviewed the manuscript and they made plans for a joint paper on the fecundity relationships in the Georges Bank and Scotian shelf haddock stock. (All the Scotian shelf egg counts have been completed and cover the same time period as those for

Georges Bank, i.e., 1969-73.) It was agreed that the Georges Bank study should be published first; the manuscript is presently being styled for the ICNAF Research Bulletin.

George Bolz and Dave Potter continued a one-night-a-week course at the Woods Hole Oceanographic Institution on solid-state electronics. Roz Cohen, Dave Potter, and George Bolz are attending a two-morning-a-week class on statistics for experimentation given by Mike Pennington.

Hal Merry repaired a General Oceanics meter block power supply and an expendable bathythermograph (XBT) system for MARMAP (Marine Resources Monitoring, Assessment, and Prediction Program) sampling aboard one of the Soviet vessels. He also spent considerable time on the installation of the surf clam dredge with James Crossen aboard Delaware II.

Benthic Dynamics Investigation

Preparation of a report pertaining to the macrobenthic multispecies invertebrate fauna inhabiting the continental shelf south of Martha's Vineyard and Nantucket was one of the major activities this month. This report consists primarily of delineations and explanations of the density and biomass distributions of all major species and higher taxonomic groups. Sections describing the faunal communities and the feeding types of the principal constituents are currently being assembled and evaluated. A manuscript describing the distributions of bivalve mollusks of the US East Coast in our collections is near completion. This work is being carried out primarily by Roger Theroux. Specimens of a decapod shrimp (Dichelopandalus leptocerus) from our collections were loaned to Dr. Earl Weidner of the Marine Biological Laboratory in Woods Hole, who has discovered microsporidian parasites in this species.

Work on the food habits of fishes centered chiefly on yellowtail flounder, silver hake, and haddock. Rich Langton continued with the analysis of the yellowtail flounder data in preparation for a report on the food habits of this species. A first draft of a report on the feeding chronology and catchability of silver hake by Ray Bowman and Ed Bowman has been completed and will be circulated within the Marine Ecosystems Division for comment. Ray Bowman continued with the analysis and the preparation of a report on the food habits of juvenile haddock. Data processing also required considerable time. Listings of the stomach contents data from the 1973-76 data base are now complete for 17 priority species. The data are separated into 11 different presentations for each species of predator fish to reveal the effect of spatial, temporal, and physiological factors on diet composition. In mid-December, Rich Langton attended a meeting of American and Canadian biologists at Halifax, NS. Purpose of the meeting was to review results stemming from cooperative work on the 1978 Atlantic herring patch study and schedule work assignments.

Ichthyoplankton Investigation

We completed the final MARMAP I survey for the calendar year on 21 December. Because of the combined effects of poor weather and mechanical problems with Albatross IV, less than half of the preselected survey stations were completed. The western half of the Southern New England subarea and the entire Middle Atlantic subarea were not surveyed. Despite some disappointing sampling shortfalls, we completed an active and rewarding year of research, both in the field and laboratory. We were at sea during 11 mo of the year, missing only January;

collected some 3000 plankton samples which occupied 213 vessel days; published several manuscripts in scientific journals; and participated in international working groups and symposia, professional society meetings, etc. Furthermore, we managed to reduce the turnaround time for processing ichthyoplankton samples at the Polish Sorting Center in Szczecin. The Automatic Data Processing (ADP) Unit shows positive signs of reducing the backlog of data entry, and has developed some routine analytical programs to assist in handling the volume of data generated by the extensive and intensive field program.

We received from Szczecin the larval length sheets for four cruises. Two were 6B3 catches from 33 stations occupied during the October 1978 larval Atlantic herring patch study and two were 6B5 catches from 226 stations sampled in February-March and May 1979. The data sheets have been quality controlled and forwarded to ADP for keypunching. Cards will be forwarded to the Narragansett Laboratory within 2 wk.

Plankton Ecology Investigation

Ruth Byron retired after having completed 24 yr of federal service. Ruth was initially employed as a statistical clerk, but it was in the capacity of a biological laboratory technician that her unique skills and expertise were manifest. Through her enthusiasm, diligence, study, and innate ability, Ruth became an acknowledged expert in plankton taxonomy and in this capacity contributed immeasurably to our studies and understanding of plankton systematics and ecology and to the training and supervision of personnel in the exacting techniques and procedures of identification and staging of invertebrate plankton and ichthyoplankton taxa. Ruth coauthored and contributed anonymously to a number of important scientific publications. Her contributions to our understanding of plankton ecology and dynamics were more like those expected of a biologist than of a laboratory technician. Ruth's departure will create a significant void in the Marine Ecosystems Division.

Donna Busch spent the beginning of December on post-cruise cleanup for USSR R/V Belogorsk Cruise No. 79-05, writing the phytoplankton portion of the cruise report, and organizing data generated by Soviet scientists during the 1979 cruises. She will coordinate the issuing of two NEFC data reports from the US-USSR cruises (Belogorsk Cruises No. 79-03 and No. 79-05) with all data that are available in early 1980.

She also made preliminary arrangements with Stefan Grimm of the Polish Sea Fisheries Institute in Gdynia and Jay O'Reilly at the Sandy Hook Laboratory to initiate cooperative phytoplankton studies between NEFC and the Polish institute. After Myra Cohn at the Sandy Hook Laboratory completes her analysis for phytoplankton species composition and abundance from samples collected on MARMAP Survey I, Ocean Pulse, and joint US-USSR or US-Polish cruises, then selected samples from Georges Bank will be sent to Gdynia where Dr. Sophia Ringer will further process them to determine cell volumes. Using these values, seasonal variability in phytoplankton standing stocks on Georges Bank may be estimated.

Donna Busch also prepared for the Narragansett Laboratory Director a summary matrix table of productivity-related measurements and the cruises and dates on which the measurements were made, with an accompanying list of data reports, analyses, etc., resulting from cooperative work with the USSR in 1979.

Biostatistics

The Biostatistics Unit, alias Computer Services Unit, looked into the ramifications of acquiring an imaging printer linked to the National Environmental Satellite Services' Washington Satellite Field Service Station for receiving Global Orbiting Environmental Satellite images. The function to be performed is neither ADP nor teleprocessing, thus acquisition is through normal procurement channels.

Input-Output Computer Services, Inc., has succeeded in stabilizing the performance of the MARMAP Information System (MIS) so that user demands for data products have been increasing rapidly. Consequently, we have increased our use of disk space and processing time to the level of severely impacting the University of Rhode Island's computer performance.

Data were received as follows: (1) zooplankton keypunched cards for Canadian F/V Lady Hammond Cruise No. 78-01; (2) zooplankton logs for Delaware II Cruise No. DE 79-03; and (3) zooplankton volume logs for 10 cruises from 1975 and earlier.

Processing was accomplished as follows: (1) Problems in master files for Federal Republic of Germany R/V Walther Herwig Cruise No. 71-01 and Albatross IV Cruise No. AL 74-13 were corrected, and revised FISHSUM's were produced for Greg Lough. (2) Master files were created and station activity summaries and net-tow calculations were produced for Albatross IV Cruises No. AL 79-03 and No. AL 79-06. (3) Master station records were edited for Delaware II Cruise No. DE 79-05. (4) Master station records and zooplankton sampling logs were edited, master files were created, and station activity summaries and net-tow calculations were produced for Belogorsk Cruise No. 79-01 and USSR R/V Aliot Cruise No. 79-02. (5) A master file was created for German Democratic Republic R/V Eisbar Cruise No. 79-01. (6) Net-tow calculations were produced for NOAA R/V Mt. Mitchell Cruise No. MM 79-02. (7) Maps of station locations on Georges Bank and FISHSUM's for larval Atlantic herring were produced for about 30 cruises for Stefan Grimm of the Polish Sea Fisheries Institute in Gdynia. (8) Data listings and Fager's analysis of 1978-collected ichthyoplankton were produced on a seasonal and areal basis. This processing was accomplished using the Statistical Analysis System's data management capabilities.

Fishery Oceanography Investigation

Except for Dana Densmore and Dan Patanjo who were at sea on Albatross IV Cruise No. AL 79-13, the members of the investigation were busy with reducing and plotting data from earlier cruises.

Dana and Dan ran the hydrography watches on the last MARMAP I cruise of the year. The ship was gone from 30 November to 21 December with a 1-day break to take on fuel in Woods Hole. Because of weather and ship problems, fewer than half of the regular MARMAP stations were completed. Toward the end of the second leg, the ship made a hydrographic section along the Nantucket Shoals flux experiment line south of Martha's Vineyard. When she docked on the 21 December, all hands fell to work unloading in preparation for a shipyard overhaul.

Derek Sutton and Steve Ramp were busy with the computer. Steve finished adapting to a Woods Hole Oceanographic Institution format the weather data from the NOAA Monster Buoy on Georges Bank, and Derek was processing STD (salinity-temperature-depth) tapes from the 1978 larval Atlantic herring patch study. He also copied current-meter tapes from the patch study and developed some statistics from the Northeast Channel current-meter arrays.

Several were active in our double-barreled salinometer operation, utilizing our own Guildline Salinometer and one from the Sandy Hook Laboratory. Derek, Cindy Chappell, Jim King (back from college for the holidays), Ron Kirschner, and Sam Nickerson ran the analyses, completing both fall bottom trawl and MARMAP survey cruises. Sam also completed plots of surface and bottom temperatures and surface salinity for the bottom trawl survey cruise.

Ron Kirschner, with help from Jim King, continued drafting hydrographic sections along the Nantucket Shoals flux experiment line.

Ron Schlitz began assembling data and figures for his talk on upwelling along the northern edge of Georges Bank, to be given in early February at the International Decade of Ocean Exploration Program's Coastal Upwelling Symposium in Los Angeles. Jim King helped with the plotting.

Jim King, Ron Schlitz, and Red Wright assisted Stefan Grimm of the Polish Sea Fisheries Institute in Gdynia in gathering materials for his studies relating larval herring distribution to hydrography.

Ron Schlitz, Steve Ramp, and Red Wright went (with Greg Lough, Rich Langton, and Geoff Laurence) to Dartmouth, NS, on 10 December for 2 days of meetings at the Bedford Institute of Oceanography to develop plans for producing data reports and scientific papers on the results of the patch study. Red also participated in a meeting in Provincetown, MA, with John Steele, Woods Hole Oceanographic Institution's (WHOI) Director, and other WHOI scientists on inaugurating a CEPEX (controlled-ecosystem population experiment).

Apex Predators Investigation

Wes Pratt and Jack Casey summarized and plotted the occurrence data for white sharks in the western North Atlantic. This information will be used in a publication on the distribution and abundance of white sharks based on current and historical data. Work is also proceeding on two short publications on the white sharks studied this past summer. To this end, the claspers and a vertebra of a 2075-lb male were x-rayed by the University of Rhode Island infirmary.

Chuck Stillwell and Nancy Kohler continued work on preparation of a paper titled, "Food and Feeding Habits of the Shortfin Mako (Isurus oxyrinchus) in the Northwest Atlantic." Food habit data from blue sharks and other apex predators were coded on keypunching forms when time permitted.

Jack Casey and Wes Pratt met with Dr. Louis Garibaldi and Greg Early at the New England Aquarium to check the progress of their shark tagging experiment and to discuss further projects. To date, a few of the legend capsules from the dart tags used on the aquarium sharks have been lost to predation by turtles and/or trigger fish. A few of the fin tags were shed, but most tags were retained and the fins look to be in a healthy condition.

The 1979 sport tag data have been verified, edited, and merged with the tagging data base file. Preliminary analysis of the 1979 data has been completed and the results will be published in our annual newsletter to sportsmen.

In response to a proposal by Polish scientists to conduct a joint Polish-American research cruise across the Atlantic, Chuck Stillwell prepared a list of pelagic longline equipment with cost estimates required to outfit the Polish R/V Wieczno with 500-hooks-worth of gear.

Larval Physiology and Biochemistry Investigation

A study of the effect of three temperatures on the growth and RNA-DNA ratio of summer flounder larvae continued, and experimental work on serum alkali-labile phosphorus levels in mature summer flounder was completed. Also, daily mortality rates for summer flounder larvae at constant food concentration and temperature during the first 2 wk after hatching were determined in replicated experiments.

Adult scup were successfully induced by temperature and photoperiod manipulation to spawn 6 mo out of phase from their natural cycle. However, the spawnings have not produced enough eggs for experimental purposes.

Cooperative research with the USEPA using their "bugwatcher" videotape system for behavior analysis began. Preliminary work will determine the proper light fields and develop appropriate viewing chambers for larval fish. The ultimate goal is to observe larval fish feeding behavior and activity in a quantitative manner.

Joel Bodammer of the Oxford Laboratory spent several days in our lab investigating the olfactory sensory abilities of summer flounder larvae to detect extracts of their natural copepod food in natural and pollution-perturbed situations.

Geoff Laurence attended meetings in Halifax, NS, concerning status of the data base and preparation of results of the larval Atlantic herring patch studies, and in Woods Hole with WHOI personnel regarding cooperative research with *in situ* environmental chambers.

Meetings, Talks, Visitors, and Publicity

On 3 December, Dr. Winn from the University of Rhode Island met with Ken Sherman at the Narragansett Laboratory to discuss the distribution and abundance of marine mammals off the Northeast Coast.

On 4 December, a Marine Ecosystems Division meeting was held at the Narragansett Laboratory. In attendance were: Ken Sherman, Marv Grosslein, Jack Colton, Red Wright, Geoff Laurence, Robert Marak, and Greg Lough.

On 5 December, Prentice Stout of the University of Rhode Island and Peggy Lamoureux met with Ken Sherman at the Narragansett Laboratory to discuss their space needs.

On 5 December, Wes Pratt, John Hoey, Nancy Kohler, and Chuck Stillwell attended a meeting of the Southern New England Chapter of the American Fisheries Society. Wes presented a lecture titled, "White Sharks in the New York Bight." Nancy Kohler lectured on "Food Habits of the Mako Shark in the Northwest Atlantic." Wes gave his white shark talk to the staff of the Narragansett Laboratory and University of Rhode Island Bay Campus personnel on 7 December.

The administrative personnel from the NMFS Northeast Regional Office met at the Narragansett Laboratory on 5 and 6 December.

Carolyn Griswold attended the first annual meeting of the OCS (outer continental shelf) Advisory Board in Norfolk, VA, during 5-7 December. The board consists of policy, scientific, and regional technical working group committees, all of which function to advise the US Bureau of Land Management on various aspects of offshore oil and natural gas development, including transportation problems, environmental studies, and state participation. The NOAA representatives to the regional technical working groups met in Washington, DC, on 4 December with Jim Rote (NMFS Office of Habitat Protection) and with Bud Ehler (NOAA Office of Coastal Zone

Management) to discuss NOAA's policy and the approach the NOAA representatives should take.

On 6 December, Donna Busch attended an IYABA meeting at the Milford Laboratory.

On 10 December, Leo Murphy initiated his temporary appointment to the Office of the NOAA Administration for reviewing the multispecies groundfish management plan for the NEFMC.

From 10 to 12 December Mr. Ganowiak of the Polish Sea Fisheries Institute at Gdynia, Poland, visited the Narragansett Laboratory to discuss the MARMAP Information System.

Robert Marak attended a meeting on 11 December at the Woods Hole Laboratory to discuss current vessel operating problems and make recommendations for future operation practices.

On 13 December, Ken Sherman traveled to Nova Scotia to deliver the first shipment of papers to ICNAF for final technical editing and printing of the Early Life History of Fish Symposium volume.

On 14 December, Donna Busch attended a seminar by John Sieburth at the University of Rhode Island's Graduate School of Oceanography. He discussed recent productivity methodology for estimating open-ocean dissolved organic carbon and total primary productivity.

On 17 December, Don Phelps of the USEPA's Narragansett research facility met with Ken Sherman regarding cooperative studies in the Superflux Project.

Robert Marak met at the Milford Laboratory on 20 December with Jack Pearce, James Thomas, and Mert Ingham to plan an NEFC-SEFC survey to collect data on petroleum hydrocarbons in fish.

On 20 December, there was a space meeting at the University of Rhode Island's Challenger Room attended by Ken Sherman.

Reva Kuhlman and Jane Allen of the Narragansett Laboratory were both presented awards for their special service provided during the extended absence of the administrative officer. During this period, Reva and Jane provided for a smooth and efficient administrative operation.

Stefan Grimm of the Polish Sea Fisheries Institute in Gdynia visited the Narragansett Laboratory to work with and obtain data products from the MIS data base.

Brian Hayden of the Woods Hole Laboratory visited the Narragansett Laboratory to work with and obtain an output data set from the MIS data base.

Julien Goulet attended a course in "Effective Supervision."

Roz Cohen and George Bolz attended one EEO meeting, and George Bolz attended a subcommittee meeting on promotion within NEFC.

Publications

Beyer, J. E.; Laurence, G. C. A stochastic model of larval fish growth. Ecol. Model. 8:109-132;1980. (P)

Griswold, C. A.; Prezioso, J. In situ observations on the behavior of the long-finned squid, Loligo pealei, during egg laying. Fish. Bull., US. (S)

Stone, R. B.; Pratt, H. L.; Parker, R. O. Jr.; Davis, G. E. A comparison of fish populations on an artificial and natural reef in the Florida Keys. Mar. Fish. Rev. 41(9):1-11;1979. (P)

Reports

Casey, J. G.; Hoey, J. Estimated catches of large sharks by U.S. recreational fishermen in the Atlantic and Gulf of Mexico. Narragansett Lab. Ref. Doc. No. 79-96;1979. 21 p.

Cohen, R. E.; Lough, R. G. Laboratory and data processing methods recommended for larval fish gut content and condition factor analysis studies using larval sea herring (Clupea harengus L.) as a prototype. Woods Hole Lab. Ref. Doc. No. 79-39;1979. 64 p.

RESOURCE UTILIZATION DIVISION

Fisheries Engineering Investigation

The Fisheries Engineering Investigation was called in to help the Woods Hole Laboratory on the installation of the surf clam and ocean quahog sampling system aboard the Delaware II. Unfortunately, the planned installation of the new dredge docking platform could not be accomplished due to time constraints and the poor condition of the Delaware II's hoisting equipment. Instead, the old platform was reinstalled for the upcoming cruise.

Work is continuing on the design of a scallop drag with improved size selectivity and decreased related mortality; testing is continuing on the speed log; and design of a new dredge system upper ramp is still underway.

Material was prepared describing fish harvesting methods and equipment in New England. This was presented to a Salem (MA) State College class.

A large percentage of many people's time was spent writing fishery development proposals.

Facilities Engineering

Work has been limited to repair and maintenance of the freezer and laboratory systems. Much planned work is losing out to "fire-fighting" as we are severely shorthanded.

Resource Development and Improvement Investigation

Seafood Composition

We are experimenting with extraction/cleanup techniques for analysis of the lipid fraction of seafood. Initial work will concentrate on crab meat for inclusion in the blue crab annual report.

Fish block samples were analyzed for proximate composition for the Product Quality, Safety, and Standards Investigation. The project is intended to determine the effect of cooking on the protein content in fish portions.

Blue Crabs

Roller-extracted blue crab meat has been demonstrated to be equal in quality to that of commercially picked controls in overall quality. The results will be reported to the National Blue Crab Industry Association.

New Product Development

Fish sticks prepared from minced fish collected from fish frames, with soy added, were sent to the US Army Research and Development Command (NARADCOM) laboratory in Natick, MA, for large-scale taste testing.

Marine Products Development Irradiator (MPDI) Cobalt Source

We have managed to contact a person in the environmental bureaucracy of the US Department of Energy in reference to disposal of our MPDI cobalt source.

Product Quality, Safety, and Standards Investigation

Product Quality

We are still in the process of collecting chemicals and equipment in preparation for Ames testing. Some of the chemical standards required are carcinogenic and entail extraordinary paperwork for acquisition and shipment.

Time-temperature tolerance studies on frozen red hake fillet blocks are underway. A noticeable texture change has occurred after 2 wk in samples stored at +10°F.

The data generated during the course of the Torrymeter evaluation are being collated and analyzed statistically. We hope to present all of the results in the form of a laboratory report and then to publish selected material in journals.

Twenty fillets were identified to species for NARADCOM's edibility characteristic study by the Association of Official Analytical Chemists' (AOAC) isoelectric focusing method.

We continued to study the texture of frozen minced silver hake (whiting) treated with various additives. Minced whiting treated with Addi-Fro 71 shows continued softening, while untreated control samples have become very tough and rubbery. The addition of sodium tripolyphosphate to minced whiting offers only slight protection against toughening at this point in the storage study. The addition of L-Lysine to minced whiting as a formaldehyde scavenger protected the texture for only a short time, then accelerated the texture changes.

Product Safety

A great deal of time was spent in accurately calibrating various columns of deactivated silica gel (1, 2, and 3% water). Various fractions of p,p'-DDE analogues of DDT and Aroclors 1242, 1016, 1254, and 1260 were analyzed by gas liquid chromatography to determine the percent of eluted material. Several samples of unfortified and fortified mackerel were analyzed by the AOAC procedure and by silica gel cleanup step. It was demonstrated that the incorporation of this additional cleanup step in the overall AOAC procedure of polychlorinated byphenyl (PCB) analysis in fish samples is necessary to separate PCB's from certain chlorinated pesticides. Although we were not successful in removing all of the p,p'-DDE, analogues of DDT were removed. The p,p'-DDE did not interfere in the analysis of PCB's by gas liquid chromatography (GLC). The final extract was clear; whereas by florisil cleanup, it was a deep yellow. This cleanup step also protects the GLC column by removing some of the compounds which might be trapped at the head of the column during injections.

A shipment of 10 samples of striped mullet, spotted seatrout, and Spanish mackerel was received from the Gulf Coast Research Laboratory. Samples were collected from St. Louis Bay, MS; East Bay, FL; Mobile Bay, AL; and Chandeleur Island, LA. The fish were composited, homogenized, and a portion of each sample was packaged and shipped to John G. Reutter Associates for PCB analysis. We plan to analyze each of these samples shortly, and our results will be compared to that of the contractor.

From a shipment of two striped bass from the SWFC's Tiburon Laboratory, an edible portion of each fish was removed as well as the liver and gonads. One fish had two lesions in the ventral portion. The fish have been composited, homogenized, and made into two samples. The two samples, livers, and gonads, are presently being worked up by the AOAC procedure. Since this will be an important species to investigate, we plan to become thoroughly familiar with it before we attempt to analyze collected samples. Dr. Whipple plans to send us a sampling schedule as soon as she finishes working out the details with other investigators.

The Perkin-Elmer 3BHPLC high-performance liquid chromatograph (HPLC) was utilized to analyze a mixture of alkylbenzenes. A solvent programming mode was used to test the chromatograph, the automatic programmer, and the Sigma 10. Analysis was conducted on a C18-bonded silica column. Reversed-phase chromatography was used with methanol and water as solvents. The instrument is operating very well. We have also chromatographed various Aroclors on silica and bonded silica. Elution of Aroclor 1260 versus HPLC is rapid; whereas by GLC, it is very slow. HPLC promises to be a valuable tool in the tentative confirmation of fish extracts.

We feel very confident with the AOAC procedure and plan to analyze collected samples shortly. We also plan to participate in an intercalibration exercise shortly. Quantitation of mixed Aroclors in fish extracts remains a minor problem at the moment.

Product Standardization

The proposed unified shrimp standard was revised in accordance with comments received from the 18 November meeting at the Washington Office. It was forwarded to the Washington Office for publication in the Federal Register as an "Advance Notice of Publication."

Proposed revisions of the frozen precooked fish portions and frozen fried fish sticks standards have been prepared. The purpose of the revision is to include puff batter and large-size breading granules as optional styles of product. These styles are the fastest growing products in the prepared fish product market.

A grading survey of products covered by the Codex proposed draft standard for fish sticks and fish portions is being planned. Requests for participation by the major producers of the product are being prepared along with the score sheets and instructions on using the standard.

Pollock and Atlantic mackerel fillet samples were prepared and sent to a NMFS home economist for determining cooking losses. Similar samples were divided into 4-oz portions and analyzed for protein, water, oil, and ash by the analytical group. The purpose of the project is to determine the effect of cooking on the protein content of fishery products. The information obtained will be used to revise the current percentage of cooked protein yield used by the US Department of Agriculture's school lunch program administrators.

A study is being conducted on converting the present system of determining the color of canned tuna fish to a more modern system employing color measurement equipment. This study has been requested by the US Food and Drug Administration as part of its proposed update of the current standard of identity and fill of container for canned tuna.

Technical Assistance

Resource Utilization Division personnel provided information and technical assistance in the following areas: herring; striped bass; types of NMFS publications; fishing vessel safety; materials for marine education course; sand eels; lobster licenses; new products from minced fish; manufacturers and distributors of meat/bone separators; salting of minced fish; use of meat/bone separators; smoking fish; background information on possible procurement of rockfishes by the military; good manufacturing practices for canned crab meat; code of practice for scallops; information on plate freezers; regulations covering fishing industry; whale bone vertebra; the basis for use of lemon juice on fish; scientific names of fish; names of manufacturers of lobster tanks; yield figures for fillets of six species of fish; names of buyers of dogfish; composition of cod liver oil and herring and menhaden oil; how to process dogfish; characteristics of Pacific ling cod; names of producers of scallops in New Bedford and sea urchins in Maine (for Hong Kong interests); European small brown shrimp scientific name; labeling of fillets; storage of live lobsters; advice on modest sales promotion program for supermarket chain; incidence of marine borers in Long Island waters; advising three Northeastern University professors on a special project they have started in Gloucester fishing circles; and use of US Postal Service Express Mail (24-hr delivery) for shipment of lobsters.

Meetings, Talks, Visitors, and Publicity

Perry Lane attended the monthly meeting of the New England Fisheries Steering Committee.

Vincent Ampola presented a seminar on squid technology to a group of research food technologists at NARADCOM's Natick (MA) laboratories.

Mike Allsup attended a 2-day workshop on "Management and Disposal of Hazardous and Chemical Waste."

John Ryan attended the Conference on Open Dating/Shelf Life of Frozen Fish at Boston's Logan Airport Hilton Inn on 4 December. It was sponsored by the National Fisheries Institute.

A group of graduate students from the University of Rhode Island were given a tour of the Gloucester Laboratory and an explanation of its objectives by John Ryan.

Marc Crampton and Dan Hankard visited the Gloucester Laboratory on 14 December 1979 to discuss with Bob Learson and Fred King a proposed "joint venture" with NMFS on squid harvesting, handling, and exporting research.

DIVISION OF ENVIRONMENTAL ASSESSMENT

No report received. The December report will be included in the January issue.

AQUACULTURE DIVISION

Aquacultural Genetics Investigation

Selective Breeding of the Commercial American Oyster

An annual census of American oysters constituting the mass selection experiment for juvenile growth, the family selection experiment for meat yield, and the larval selection experiment for larval growth is being conducted. These data will be used to evaluate survivorship in the older year classes and setting success of the 1979 year class.

Measurements of the 1978 year-class selection stocks are continuing. Some 9269 oysters have been measured to date. Preparations for the 1980 spawning season are beginning; breeding plans are being formulated. Routine care of the 1976, 1977, 1978, and 1979 year-class oysters continues.

Experimental Inbreeding and Hybridization in Oysters

The inventory of oyster stocks being utilized in inbreeding and hybridization studies is nearly completed. Full-sib families, geographic hybrids, controls, and backcrosses comprise the groups of oysters now being counted and measured. Only a few F_2 inbred progeny survived, so an effort will be made this upcoming spawning season to obtain more of the second generation offspring. In addition, more hybrid crosses will be made. American oysters from Massachusetts waters are being conditioned for spawning to hybridize with our local Connecticut oysters.

Cytology and Cytogenetics of Field-Sampled Atlantic Mackerel Eggs

Analyses of a third year class of Atlantic mackerel eggs from sample sites in the New York Bight and just out of it are now in the final stage. Presently, the most complete data are those on the Stage-I cleavage eggs. This stage of egg was available at 13 sample sites, 10 of which will also have analytical data on key contaminant levels (hydrocarbon and heavy metal). Half of these 10 stations with early cleavage eggs include, among the plankton and water samples for heavy metal and toxic hydrocarbon analyses, water sampled from the sea surface or microlayer. (There are also other stations with different stage mackerel eggs and chemistry samples.) As in the case of the 1974 and 1977 mackerel egg samples, these 1978 eggs show markedly different viabilities (from 3 to >50%) and quality from site to site. Diagnosis of the egg state is made by picking the egg out of appropriately fixed plankton samples, ascertaining its species identification, dissecting the embryo off the egg membranes, and examining the prepared embryo for the state of its cells and chromosomes as well as the normalcy and presence of mitotic chromosome divisions. Once the analyses of the several embryonic development stages are completed, the 1977 and 1978 data are to be combined and statistical associations between egg health, natural environmental variables, and site contaminant levels are to be examined. The 1977 data alone indicated an adverse impact of contamination on the egg development at some bight stations. However, the number of stations with adequate chemistry data was small. Approximately 1000 early cleavage mackerel eggs from the 1978 collection have been assayed microscopically.

Spawning and Rearing of Mollusks Investigation

As part of our investigation of the field grow-out of hatchery-reared bivalves, we are exploring the use of underwater cages. Four, vinyl-coated, wire-mesh cages have been deployed by SCUBA divers at a depth of about 25 ft in the sand substrate of Long Island Sound. The cages have a volume of about 0.5 m^3. There is no bottom to the cage and there is a hinged door on the top. The cages were partially buried and stakes were driven in at the corners to insure stability. Once in place, predators were removed from the cage and the experimental animals were put inside. Both bay scallops and surf clams have been planted in cages. Examination of the cages, about a week after planting, revealed that some scallops had attached to the walls of the cages and the surf clams had buried themselves in the sand substrate. The cage method of grow-out should exclude all predators and permit normal growth. Previous experience has indicated that biofouling has not been severe on grow-out devices although some cleaning procedure may be necessary in the future. One primary advantage of this grow-out method is that it poses no hazard to navigation and there is an abundance of underwater acreage available.

We have established an experimental overwintering site for bay scallops in Long Island Sound near Milford, CT. We are comparing survival of the scallops and durability of the gear in three different systems. These are vertically deployed lantern nets, off-bottom cages, and on-bottom cages. We will monitor the progress of this experiment with SCUBA and will continue the study into the spring.

About 6000 of our large hatchery-reared seed scallops were planted in Norwalk, CT, this month. This area historically produced bay scallops, but none exist there now.

An attempt is being made this winter to maintain about 50 000 young surf clams in flowing seawater. The clams are being maintained at high densities in stacked trays to determine if this adversely affects their survival. It is speculated that the low ambient water temperatures and the dormant state of the clams should allow maintenance of the animals in a minimum of tank space. If the clams overwinter with low mortality, they will be used for growth studies.

Several thousand juvenile surf clams were provided to the Aquacultural Research Corporation of Dennis, MA, for experimental growth studies to be conducted in South Carolina.

PATHOBIOLOGY DIVISION

Comparative Invertebrate Pathology Investigation

Histologic samples of oysters, mussels, and hard clams collected from Raritan Bay and Great Bay, NJ, were examined microscopically for the presence of disease.

Staining random samples both for copper and for acid and neutral mucous production was also carried out on 10 animals from each sample. *Mytilus* specimens from Great Bay had a 58% prevalence of a newly discovered bacterial disease of the plicate organ and a 4% prevalence of a turbellarian in the gut. Six percent had *Steinhausia* infecting ova and 18% were infected with redia or metacercarial stage trematodes.

Mytilus samples from Raritan Bay showed 20% infected with *Steinhausia*, 28% with ciliates in the gill, and 34% with trematode infections. No difference in prevalence or intensity of pathologic lesions was noted.

Examination of oyster samples demonstrated relatively large differences in prevalence and intensity of both parasites and pathologic lesions. Animals from the Raritan Bay area had higher levels of inflammation, exudation, and adenoplasia in the gill, and Nematopsis and Bucephalus were absent.

Great Bay oysters were mostly ripe for spawning while Raritan animals were mostly in the inactive stage of gametogenesis. Ceroid and systemic inflammation were more prevalent in the Great Bay oysters.

Copper staining showed high levels in Raritan oysters in August and low levels in October. Low levels were seen in all samples of Great Bay oysters and in all clams and mussels that were specially stained. The combined PAS-alcian blue method showed adenoplasia well in gill and digestive gland ducts; highest levels were in Raritan oysters in October.

In virus transmission studies, four crabs were inoculated last September with frozen material, stored for 3 yr, that contained the reolike virus and associated rhabdolike virus. Three of the inoculated crabs died at 3, 15-19, and 30 days post inoculation. The remaining crab was still healthy when dissected 35 days post inoculation. Tissues of these crabs (excepting the one dying on day 15-19) have been examined with the light microscope. There were histological changes suggestive of viral infection, but identification of the causative agent must await ultrastructural examination.

The copy-edited Histology of the Blue Crab manuscript was received, reviewed, and returned to the publisher. Publication of the book is planned for midsummer of 1980.

The histology lab prepared over 1200 sections and slides of various fish and shellfish tissues for examination by resident pathologists.

Fish Pathology Investigation

Ms. Linda Despres, a member of the Resource Surveys Investigation of the Resource Assessment Division at the Woods Hole Laboratory, was at the Oxford Laboratory from 25 November to 18 December. Ms. Despres received intensive instruction on the recognition of diseases of marine fishes. She also was instructed in the fundamentals of histopathology, and acquired firsthand experience in the preparation of fish tissues for examination by light and electron microscopy. Ms. Despres will provide a valuable link between the Pathobiology and Resource Assessment Divisions. She can provide knowledgeable counsel on fish diseases to members of the Resource Surveys Investigation, and can substantially augment the accuracy of the diagnoses made on bottom trawl survey cruises. Together with Mr. John Ziskowski, she will develop a log to be used to record disease prevalence on survey cruises. Hopefully, this log will be a complement and adjunct to the resource assessment log.

Considerable progress is being made in the x-ray examinations of American sand lance for Ocean Pulse. Mr. Glenn Evans, a junior from Colgate University, will be at the Oxford Laboratory for 3 wk and will be of invaluable assistance in taking, developing, and examining x-rays of sand lance. Preliminary results will be tabulated when this series of examinations is completed.

Several inquiries were received regarding large-scale mortalities of Atlantic menhaden in offshore waters of North Carolina. The mortalities occurred during the second and third weeks of December, and estimated losses (North Carolina Department of Natural Resources) were 5-6 million fish. Calls were received from state agencies and the news media. Moribund menhaden were collected by Department of Natural Resources staff and forwarded to the Oxford Laboratory. Isolation of virus from these menhaden will be attempted by Dr. Frank Hetrick at the University of Maryland.

Behavioral testing equipment for studies on olfaction in larval fish is being redesigned and rebuilt on the basis of the results of experiments conducted at the Narragansett Laboratory in November. Although the maze, as constructed, was not too difficult a test for winter flounder, the positioning of the central passageway must be changeable in height within the water column to accommodate the buoyancy and swimming ability of different fish species.

Microbial Ecology Investigation

Preliminary findings on the use of starch-gel electrophoresis for analyzing enzyme patterns in species of Acanthamoeba, in combination with immunoelectrophoresis and indirect immunofluorescence for examining antigen-antibody complexes, have shown that the recently discovered pathogenic species, Acanthamoeba hatchetti Sawyer, Visvesvara & Harke 1977, is a distinct protozoan.

Cooperative studies with investigators at the American Type Culture Collection and at the US Public Health Service's Communicable Disease Center were presented at the annual meeting of the American Society of Zoologists and the American Microscopical Society in Tampa, FL, during 26-30 December 1979, and stimulated considerable interest in the application of biochemical and immunological techniques to the interpretation of species identifications based only on gross morphological features at the light-microscope level. In contrast to A. hatchetti, two new strains of pathogenic amoebae which are similar to A. culbertsoni (Singh & Das 1972) isolated from the Philadelphia-Camden and New York Bight sewage-disposal sites do not have isoenzyme patterns which are peculiar to A. culbertsoni, and may prove to be new species when antigenic analyses are completed. A third species, A. lenticulata, recently discovered in France and also pathogenic to mice, is biochemically similar to one of our strains from the ocean dumping sites. Work now in progress is designed to test our hypothesis that cyst-forming protozoans will serve as indicators of the persistence of sewage-wastes in seabottom sediments for long periods of time after coliform bacteria become nonviable and sediments become negative when tested by standard bacteriological methods. Further studies are being directed to determine whether or not heavy metals and other contaminants are capable of inducing mutagenic effects in protozoans with concomitant modifications of the characteristics that are used for specific identifications based only upon morphological features.

A lengthy manuscript titled "Marine Amebae from Clean and Stressed Bottom Sediments of the Atlantic Ocean and Gulf of Mexico" will appear in the February issue of the Journal of Protozoology. The report was presented at a symposium titled "The Ecology of Free-Living Protozoa" held at Stillwater, OK, in August 1979, and lists those species found under the following conditions: (1) tolerant of pollutants introduced in sewage wastes, dredge spoils, and acid wastes; (2) tolerant of aromatic hydrocarbons in the water column at levels three times greater than reported for ambient values; (3) tolerant of PCB's and heavy metals at concentrations greater than ambient; (4) present in nearshore and offshore waters and sediments independently of pollutant additions; and (5) present at depths which range from 2 to 100 m. Two new genera and species of amoebae are described in the report. The 8 yr of "casual" observations presented at the symposium provide a comprehensive account of microfauna which are present in/on sediments of MESA (NOAA's Marine Ecosystems Analysis Program) stations which otherwise have been reported to be improverished by ocean-dumping practices and no longer support benthic macrofaunal communities. An "historical" collection of histologic slides of tissues of the lady crab, Ovalipes ocellatus (Herbst), is under study to

determine which pathological conditions and fouling organisms, previously documented from the rock crab, Cancer irroratus Say, may be useful as indicators of physiological stress. O. ocellatus is abundant in Sandy Hook Bay during the summer months when C. irroratus is scarce. Life history data, factors which affect the spatial and temporal distribution of the two decapods, and comparative histological findings all suggest that O. ocellatus will be ideally suited for studies on the effects of nearshore pollutants on crustacean health. Published accounts of various pollutants in Raritan, Lower, and Sandy Hook Bays indicate that metals, bacteria, etc., are present in concentrations and numbers that are much higher than in the ocean. Thus, continued efforts to document the status of crustacean health in the New York Bight should provide comparative data, at the species level, which may be analyzed by statistical methods.

Larval Diseases of Mollusks Investigation

Eleven biochemical tests of a bacterium suspected to be the cause of shellfish hatchery disease in Maine revealed striking similarities with a known pathogen isolated from a shellfish hatchery in California. Apparently, these companies exchange a European oyster, Ostrea edulis, brood stock, and the "green slime" Vibrio isolated in California may originate from Maine. Continued biochemical tests are planned to prove or disprove this hypothesis.

A series of studies examining the effects of salinity and temperature on the growth of the California "green slime" Vibrio were completed. Isolates were grown in seawater broth at salinities of 0, 10, 20, 30, 40, 50, and 80 °/oo in temperature baths of 2, 8, 10, 15, 20, 25, and 30°C. Samples plated at 0, 8, 24, and 30 hr showed that no growth occurred at 0 °/oo salinity at any temperature; maximum growth occurred at 20-50 °/oo salinity between 25° and 30°C. These data will be correlated with a computer-generated regression analysis of data taken during a 48-hr growth study of the "green slime" Vibrio.

Ultraviolet (UV) radiation of seawater seeded with one of the Flowers Hatchery larval pathogens indicates that either this isolate is extremely resistant to UV radiation or the UV sterilizer unit is not functioning properly. Results from the study show that bacterial growth, after exposure to UV radiation, is inhibited only temporarily, even when a new lamp is used. A well-characterized red pseudomonad is now being used to measure the efficiency of the sterilizer unit.

Work continued on development of an accurate assay system for measuring particle uptake by oyster phagocytes. Oyster hemolymph cells were exposed in vitro to aggregated ferritin particles of various size ranges. These had been produced by several physical and chemical means. Examination of cells after varying time periods indicated that ferritin aggregates of three size ranges (produced by a glutaraldehyde method) may be adequate for uptake studies. Continued work will include refinement of techniques for measuring intracellular as well as extracellular (cell-attached) ferritin. This work is expected to provide accurate measurements of phagocytic rates which are important in understanding disease susceptibility.

Meetings, Talks, Visitors, and Publicity

Dr. Rosenfield attended a meeting of the Fish Health Panel of the Joint Subcommittee on Aquaculture at the Washington Office on 4 December; Dr. Rosenfield and Mr. Kern attended the full Joint Aquaculture Subcommittee meeting at the Washington Office on 14 December; on 10 December, Drs. Rosenfield, Harshbarger

(Smithsonian Institution), and Johnson, as members of the Permanent Program Committee, met and framed out the forthcoming program of the Society for Invertebrate Pathology to be held in Seattle, WA, during 28 July-1 August; and Dr. Rosenfield attended a Maryland Department of Natural Resources Tidewater Administration staff meeting on 19 December where he briefly reviewed NMFS research programs and outlined the Superflux (remote sensing) Project for the Chesapeake-Delaware Bay region.

Dr. Blogoslawski attended the 4th World Congress of the International Ozone Association in Houston, TX, during 26-30 November. He was elected Secretary of the International Board of Directors. While in Texas, Dr. Blogoslawski visited Dr. Jorge Leong at the SEFC's Galveston Laboratory and Dr. Sammy Ray at the Texas A&M University Marine Station.

Dr. Robohm and Ms. Brown attended a spectrophotometer seminar at Rockefeller University on 28 November.

Dr. Murchelano escorted Dr. Matsusato on a tour of the National Fish Health Laboratory at Leetown, WV, on 28 and 29 November; Dr. Murchelano also attended a Ship Committee meeting at the Woods Hole Laboratory on 11 and 12 December.

Dr. Bodammer conducted larval fish experiments at the Narragansett Laboratory and picked up bacteria at the Milford Laboratory during 30 November-3 December.

Mr. O'Connell attended a meeting of NEFC administrative officers at the Narragansett Laboratory during 4-7 December.

Ms. MacLean attended an IYABA Prediction Group meeting at the Milford Laboratory on 6 and 7 December.

Dr. Sawyer attended the annual meeting of the American Microscopical Society in Tampa, FL, during 27-30 December and presented a talk on "Preliminary Observations on the Possible Use of Starch-Gel Electrophoresis as an Effective Method for Separation of Acanthamoeba Species."

Ms. Frances Swim, a librarian with the NOAA Environmental Data and Information Service's Information Services Unit, met with Ms. Hines, the Oxford Laboratory Librarian, on 20 December to discuss future library programs and computer retrieval capabilities.

Ms. Linda Despres of the Resource Assessment Division at the Woods Hole Laboratory spent the month with the staff of the Fish Pathology Investigation receiving instruction on the recognition of fish diseases and histopathologic methods.

Dr. T. Matsusato completed his 3-mo tour of duty with the Fish Pathology Investigation as an exchange scientist (fish pathology); this exchange program is sponsored by the United States-Japan Natural Resources Panel on Aquaculture. Dr. Matsusato is the fourth Japanese investigator to spend an extended period of study with the Pathobiology Division staff during the past 5 yr.

Publications

Blogoslawski, W. J.; Stewart, M. E.; Hurst, J. W., Jr.; Kern, F. G. III. Ozone detoxification of paralytic shellfish poison in the softshell clam (Mya arenaria). Toxicology 17:650-654;1979. (P)

Daggett, P. M.; Nerad, T. A.; Sawyer, T. K.; Lewis, E. J. Preliminary observations on the possible use of starch-gel electrophoresis as an effective method for separation of Acanthamoeba species. Trans. Am. Microsc. Soc. (S)

Lewis, E. J.; Sawyer, T. K. Acanthamoeba tubiashi n. sp., a new species of fresh-water Amoebida (Acanthamoebidae). Trans. Am. Microsc. Soc. 98:543-549;1979. (P)

Murchelano, R. A. Environmental quality as a factor in the diseases of fish and shellfish. Maritimes. (S)

Sawyer, T. K. Marine amebae from clean and stressed bottom sediments of the Atlantic Ocean and Gulf of Mexico. J. Protozool. (A)

Visvesvara, G. A.; Sawyer, T. K. Antigenic analysis of pathogenic, euryhaline, and eurythermal Acanthamoeba hatchetti (Amoebida: Acanthamoebidae). (Abstract). Trans. Am. Microsc. Soc. (S)

NATIONAL SYSTEMATICS LABORATORY

Shrimps Investigation

Work continued on a taxonomic review of the species of rock shrimps (genus Sicyonia) living in the American Pacific. Also prepared were United Nations Food and Agriculture Organization species identification sheets for shrimps of the eastern Central Atlantic (Fishing Area 31).

Other Crustaceans Investigation

Preparation continued of a guide to temperate-water decapod crustaceans of the US East Coast.

Pelagic Fishes Investigation

Research continued on the systematics of the Spanish mackerel genus Scomberomorus. Work also continued on the description of two new species of halfbeaks from New Guinea.

Benthic Fishes Investigation

Observations were made on fish populations during Alvin dives on hot vents in the Galapagos Rift. Abundance was relatively high. About 15 species of fishes were seen, only one of which, an undescribed species of the bythitid genus Diplacanthopoma, was found directly in warm water. Attempts to capture fishes were unsuccessful.

Visitors

Mr. and Mrs. T. P. Harrison of the Viet My Corporation, visited the laboratory for identification of Vietnamese fishes.

Publications

Cohen, D. M. Notes on the morid fish genera Lotella and Physiculus in Japanese waters. Jap. J. Ichthy. 26(3). (P)

Collette, B. B. Family Hemiramphidae. For: Checklist of the freshwater fishes of Africa. United Nations Educational, Scientific, and Cultural Organization. Rome, Italy. (A)

Pérez, Farfante, I.; Grey, D. L. A new species of Solenocera (Crustacea: Decapoda: Solenoceridae) from northern Australia. Proc. Biol. Soc. Washington. (A)

ATLANTIC ENVIRONMENTAL GROUP

Ocean Monitoring and Climatology Investigation

The cooperative Ship of Opportunity Program (SOOP) obtained four XBT and one CPR (continuous plankton record) transects in December: one XBT and one CPR transect in the Gulf of Maine, one XBT transect across the shelf and slope off New York, and two XBT transects in the Gulf of Mexico.

The NOAA Environmental Data and Information Service has released the 1978 SOOP report titled "NODC and Gulf Coastal Waters from NMFS/MARAD Ship of Opportunity Program for 1978." The report uses monthly maps and tables to convey the timing and location of 1235 XBT's dropped during the year, and provides full instructions for obtaining data or contoured transects from the National Oceanographic Data Center.

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

AEG/December 21, 1979

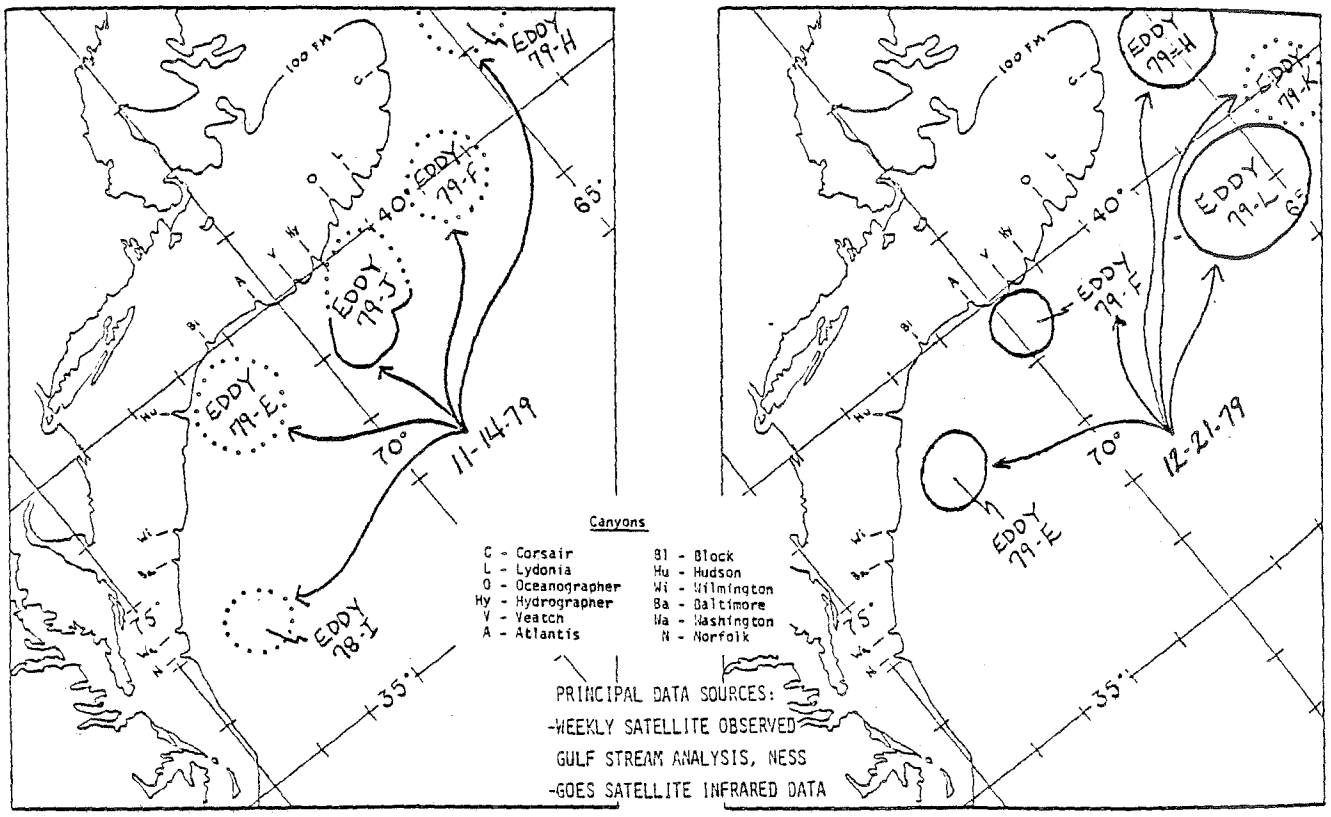
GULF STREAM EDDY LOCATIONS

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

Eddy 78-I was resorbed by the Gulf Stream during the last week of November, southeast of Norfolk Canyon. Eddy 79-E, which reappeared briefly in the satellite imagery, travelled about 60 nm (110 km) to a location centered at about 38.6°N, 72.2°W southeast of Hudson Canyon. Eddy 79-J moved west about 40 nm (75 km) in mid-November and then east about 60 nm (110 km) late in the month as it was resorbed by a Gulf Stream meander south of Oceanographer Canyon. Eddy 79-F moved west about 155 nm (290 km) to a position centered at about 39.5°N, 69.8°W, southwest of Veatch Canyon. Eddy 79-H travelled southwest about 25 nm (45 km) to location centered at 41.3°N, 65.0°W, east of Corsair Canyon. Eddy 79-L formed in mid-December, centered at about 39.2°N, 65.5°W, far to seaward off southeastern Georges Bank. Eddy 79-K separated from the Gulf Stream in mid-November centered at about 40.0°N, 65.2°W. It travelled about 40 nm (75 km) until the first week of December when it reversed toward the east to about 100 nm (185 km) to a mid-month position centered at about 39.8°N, 63.8°W, far to the southeast of Georges Bank. Our interpretation of the mid-December location of eddy 79-K is uncertain. An alternative possibility is that it merged with eddy 79-L near the end of the first week of December.

During the next 30 days, Eddy 79-C may move southwest to a position off Baltimore Canyon; Eddy 79-F west to the vicinity of Hudson Canyon; 79-H southwest to the vicinity of Lydonia Canyon; and 79-L west to about the longitude of Oceanographer Canyon. Eddy 79-K, if it still exists, may move west to the longitude of Corsair 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).



Mert Ingham has agreed to serve as acting Deputy Program Manager for the Ocean Pulse Program for a year beginning in January 1980. He will devote only part (less than 75%) of his time to the program and will continue to serve as Director of AEG during the year.

Ocean Dumping Studies Investigation

Line-of-bearing data from the March, May, and November radio-direction-finding buoy experiments at the 106-mi dumpsite have undergone quality control. Software made available to us by the manufacturer (TECO) will provide a reliable method of transforming five bearings from receiving stations into actual buoy positions. All necessary wind data needed for comparison with the buoy drifts have been requested from the National Data Buoy Office and Pacific Environmental Group at Monterey, CA.

Machine-produced plots of the cruise track of the Kelez and the waste barge Edgemoore (19-26 September 1979) have been received from the National Ocean Survey's Atlantic Marine Center at Norfolk, VA. These plots have been made available to Drs. Kester and Brown at the University of Rhode Island.

Mr. Steven Wright at the University of North Carolina has been contacted regarding design and construction of amphipod traps for the June 1980 radioactive waste dumpsite cruise. At the same time, about half-a-dozen drogued marker buoys are under construction for future waste dumping experiments at sea.

Space has been allocated for the storage of 1000 lb of Rhodamine WT dye which will be used during future waste dumping experiments.

Meetings, Talks, Visitors, and Publicity

Bob Benway traveled to Brownsville, TX, and then to New Orleans, LA, during 1-4 December to outfit the US Coast Guard cutters Durable and Acushnet for the SOOP program.

On 4 December, Mert Ingham went to the Sandy Hook Laboratory for a conference with the Environmental Assessment Division staff.

Mert Ingham attended a reception in honor of Dr. Lewis Alexander held by the Provost for Marine Affairs at the University Club of the University of Rhode Island on 5 December. Dr. Alexander is the recipient of the 1979 Sea Grant Association Award for his contribution in the field of marine affairs.

Reed Armstrong attended a meeting of the IYABA group held at the Milford Laboratory on 6 and 7 December.

During 10-12 December, Mert Ingham attended a meeting of the joint (NOAA Offices of) Fisheries, Oceanic & Atmospheric Services, and Research & Development Working Group on the Northeast Pilot Pollution Monitoring Program to assist in the development of a plan to unify the marine pollution monitoring activities of these three NOAA main-line components.

Publications

Bisagni, J. J.; Kester, D. R. Physical variability at an East Coast United States offshore dumpsite. Proceedings of the 1st International Ocean Dumping Symposium; 1978 October. (A)

Celone, P. J.; Chamberlin, J. L. Anticyclonic (warm core) eddies off the northeastern United States during 1978. Annal. Biol. 35. (A)

Cook, S. K.; Hughes, M. M. Water column thermal structure across the shelf and slope southeast of Sandy Hook, NJ, USA in 1978. Annal. Biol. 35. (A)

Crist, R. W.; Chamberlin, J. L. Bottom temperatures on the continental shelf and slope south of New England during 1978. Annal. Biol. 35. (A)

Hilland, J. E.; Armstrong, R. S. Variation in the shelf water front position in 1978 from Georges Bank to Cape Romain. Annal. Biol. 35. (A)

Ingham, M. C.; McLain, D. R. Sea surface temperatures in the northwestern Atlantic in 1978. Annal. Biol. 35. (A)

Langone, H. K.; Hilland, J. E. Unusual spring conditions at the 106 mile dumpsite. Gulfstream. (S)

Leming, T. D.; Jossi, J. W. Observation of temperature and currents in the coastal waters near Cape Canaveral, Florida during 1970 and 1971. NOAA Tech. Rep. NMFS SSRF. (S)

Reports

Bisagni, J. J. July 1977 physical oceanographic studies at Deepwater Dumpsite 106;1978. In: Deepwater Dumpsite 106 assessment report. NOS;(1980).

Jossi, J. W.; Marak, R. R. MARMAP survey manual;1978. 43 p. Contribution to NOAA fisheries technology shipboard manual;(1980).

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;(1980).

Murray, T. E. A summary of waste inputs to Deepwater Dumpsite 106 during 1976 and 1977;1978. In: Deepwater Dumpsite 106 assessment report. NOS;(1980).

NEFC PUBLICATIONS AND REPORTS

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

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