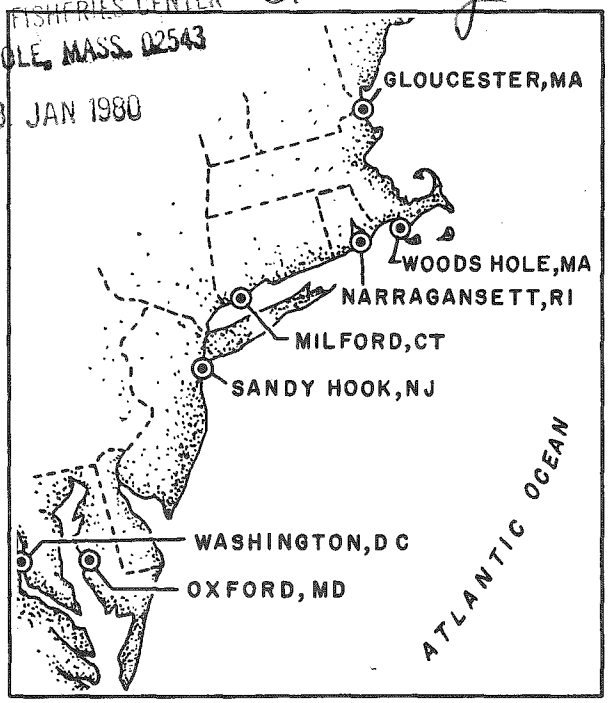
NEFC NEWS

Northeast Fisheries Center



OCTOBER 1979

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

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NORTHEAST FISHERIES CENTER
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

Center Director's Office

International Meetings

The 67th statutory meeting of the International Council for the Exploration of the Sea (ICES) took place at the Palace of Science & Culture in Warsaw, Poland, during 1-10 October 1979. Dr. Robert L. Edwards, one of two US delegates, led the 32 US participants. Twelve others from the NEFC represented the US on various committees: Bradford Brown - Advisory Committee on Fisheries Management; Arlene Longwell - Mariculture; John Pearce - Environmental Quality; Michael Sissenwine - Demersal Fish; Richard Hennemuth - Pelagic Fish; Kenneth Sherman - Biological Oceanography; Stephen Clark - Shellfish & Crustacea; Eugene Heyerdahl and Kathryn Paine - Statistics; Robert Marak - Baltic Fish; Redwood Wright - Hydrography; and Carl Sindermann who took part in several working groups and committee meetings. Committee reports and over 600 papers which were presented in scientific committees are available at the Center Director's Office.

Over 200 scientists from 25 countries participated in the 14th European Marine Biology Symposium which was held in Helgoland, Federal Republic of Germany (FRG), during 23-29 September 1979. The general topic of the symposium was "Protection of Life in the Sea." The symposium served as a platform for marine biologists from different countries and with different professional backgrounds to discuss on a worldwide basis what progress has been made since the 1967 symposium which was concerned with water pollution in the North Sea and adjacent waters, whether essential new methods and concepts changed the picture, whether we are now moving in the right direction, and related questions. Dr. Carl Sindermann and Dr. John Pearce took part in the symposium. Dr. Sindermann was an invited speaker and panel member. He presented a paper titled "Pollution Effects on Fisheries - Potential Management Activities." Dr. Pearce was invited to participate in organizing the informal session concerned with methods for assessing pollution effects where he presented a paper titled "The Effects of Pollution & Need for Long Term Monitoring." He also chaired a session on environmental evolution.

Dr. Carl Sindermann attended the United States-Japan Natural Resources (UJNR) Aquaculture Panel 8th Joint Meeting in Bellingham, WA, during 16-19 October 1979. More information on this meeting will be covered in the "Environmental Management Office" report.

Environmental Management Office

ICES

In the recently held 67th statutory meeting of ICES noted earlier, the US made outstanding contributions to the documents and discussion in environmental management -- principally in the Marine Environmental Quality Committee and the Mariculture Committee. In the series of estuarine papers requested by and effectively summarized by the former committee, Dr. Pearce received much favorable comment. In the latter committee, the series of 17 genetics papers developed by Dr. Longwell was also very impressive.

Dr. Sindermann is chairman of the ICES Working Group on Introductions of Non-Indigenous Species, which reports to four committees -- Marine Environmental Quality, Mariculture, Shellfish, and Anadromous/Catadromous Fishes. The report of that working group excited much discussion in each of the committees. The recommendations (13 of them) were endorsed by the primary committee -- Marine Environmental Quality.

UJNR

Carl Sindermann participated in the earlier noted UJNR meeting as a member of the Executive Committee of the US Panel and chairman of the Editorial Committee.

The meeting typically consists of 1 day of overview scientific papers from both sides, and a second day devoted to business matters (such as new joint proposals, exchange of scientists, editorial policy, etc.). Normally the meeting is followed by a field trip to visit aquaculture facilities.

The meeting reviewed the status of ongoing joint projects. We (NEFC) are involved in several, including a 5-yr study of oyster mortalities in the US and Japan; an expansion of the ICES disease index to include Japanese aquaculture diseases; and additions of Japanese material to the Oxford Laboratory's National Registry of Marine Pathology.

One of the Japanese participants was Dr. Matsusato, who will spend the next 3 mo with us in NEFC, principally at Oxford, since his primary interest is histopathology. He is also interested in pollution-associated diseases, so he will spend some time at Sandy Hook.

Meeting on Microbial Tests for Mutagenicity

Dr. Rosenfield of Oxford organized and convened a workshop meeting on "Microbial Tests for Mutagenicity," held in Washington on 23 October 1979. Representatives of a number of federal agencies and several universities participated. Principal discussant was Dr. James Parry of Swansea University (UK) who has been doing pilot studies on microbial mutagenicity tests using samples provided by NEFC under contract with the Oxford Laboratory. His results are promising, and the general conclusion of the workshop was that this approach to pollution monitoring should be encouraged and expanded.

Fisheries Utilization Office

The 24th Atlantic Fisheries Technological Conference (AFTC) was held during 14-17 October at the Kings Grant Inn in Danvers, MA. The AFTC is an organization which was formed in 1956 for the purpose of providing an informal forum for the exchange of technical information on Atlantic fisheries. The conference is held annually on a rotating basis between eastern Canada and the eastern US. Attendees include fisheries technologists and administrators from federal, state, and provincial governments, academia, and private industry representing the entire Atlantic community. The conference includes invited papers, research papers, and panel sessions. This year's conference was attended by approximately 150 technologists with participants from Australia, New Zealand, Poland, Norway, Denmark, Canada, and the US. Bob Learson was chairman of the conference, Fred King was secretary-treasurer, and Joe Licciardello was chairman of the Program Committee. Technical papers were presented by Ron Lundstrom, Judi Krzynowek, Joe Licciardello, Bob Learson, and Ron Smolowitz.

The National Microconstituents Task Advisory Committee met at the Gloucester Laboratory during 17-19 October with representatives from each of the four fisheries centers and Washington Office personnel.

Louis Ronsivalli traveled to Seattle, WA, during 24-26 October to attend a meeting on fisheries development in policy implementation.

Special Technical Projects Office

This month was mostly spent reviewing the NEFC's role in regards to fishery development and conservation engineering. A presentation on the subject was prepared for future use.

Ronald Smolowitz delivered a talk on the NEFC's ongoing harvesting gear research to the AFTC.

RESOURCE ASSESSMENT DIVISION

Resource Surveys Investigation

During October investigation activity centered around the autumn bottom trawl survey. The second part was completed between 2 and 15 October on the NOAA R/V Delaware II. Henry Jensen was the chief scientist. Stations were occupied from the Virginia Capes to Southern New England. Part III with Linda Despres as chief scientist began on 19 October and is scheduled to be completed on 2 November.

Preparations were also being made for a previously unscheduled bottom trawl cruise on NOAA R/V Albatross IV. The purpose of the cruise is to provide increased coverage in critical areas similar to that accomplished during last spring and fall. Chuck Byrne, Harold Foster, and Jim Crossen continued preparing for the surf clam-ocean quahog survey cruise scheduled for January 1980 and began to prepare for the red crab survey scheduled for April 1980.

Pat Twohig is attending a series of video taping and editing seminars. With this new experience we hope to create a video tape library of important seminars and meetings conducted by the NEFC.

The net monitoring package was installed on Delaware II and is being integrated into routine use to verify net performance during odd legs of the bottom trawl survey.

On 4 and 5 October, Andy Thoms participated in an Equal Employment Opportunity Program (EEO) effort for recruiting of co-op students in Washington, DC; Pennsylvania; Maryland; and Delaware.

Fishery Assessment Investigation

Frank Almeida completed 1977 assessments of silver hake stocks (Georges Bank, Gulf of Maine, and Southern New England-Middle Atlantic Bight), utilized the new FISHMAP computer program to plot hake distribution from autumn and spring survey cruises during 1963-78, and continued work on the silver hake stock identification study. To date, over 3000 silver hake have been measured for discriminant function analyses of morphometric data. In addition, he and Joan Palmer consulted with Rita Schenck of the University of Rhode Island (URI) on analyses of data obtained from isoelectric focusing experiments on silver hake samples. The ultimate goal of the stock identification program is to define further stock composition of the silver hake resource found off the Northeast Coast of the US.

Liz Bevacqua spent much of her time working on the International Commission for the Northwest Atlantic Fisheries (ICNAF), now the Northwest Atlantic Fisheries Organization (NAFO), Statlant 21B report, and exhausted most of her patience reviewing and editing finfish logs.

Pat Carter worked on 1977 and 1978 pollock biostatistics and on 1978 haddock age-length keys.

Ron Essig completed summarization of historical catches and catches per tow of major fish species for analyses of species interactions. Ron also continued assessment activities on pollock and northern shrimp, audited 1970-77 lobster commercial length frequencies, and helped Thurston Burns fill a request for lobster length frequencies by the Massachusetts Division of Marine Fisheries.

Joan Palmer and Tonga Brennan completed statistical analyses of recruitment data for their ICES paper.

Anne Lange continued ongoing assessments of squid populations and responded to questions from the NMFS Office of International Fisheries relative to US-Canadian negotiations on the East Coast. Anne also submitted the standard 30-day catch statistics report to ICNAF.

Rhett Lewis has been analyzing information to determine if summer flounder exhibit different spatial and temporal distributions by size, in response to a request by the Mid-Atlantic Fishery Management Council's Scientific and Statistical Committee Task Force.

Ralph Mayo initiated a project to validate redfish ages based on otolith readings using the 1971 year class as a bench mark. Ralph and Otis Jackson wrote a users' guide to the biostatistical computer programs FMBIOSEX and FMBIOMKT.

Margaret McBride continued work on yellowtail flounder stocks to determine year-class composition of present catches and relative abundance from US and Soviet research vessel cruises. Margaret is also presently enrolled in a marine fisheries course at Cape Cod Community College.

Steve Murawski continued analyses of ocean quahog and surf clam population dynamics, and began a study of the growth rate of ocean quahogs based on mark-recapture material from the clam cruise of the Delaware II during the summer of 1979.

Paul Wood conducted studies of growth rate parameters of Atlantic cod from Georges Bank and the Gulf of Maine, corrected errors in age data, and placed corrected ages on labeled tape. Paul also coordinated a sea sampling trip by Pat Gerrior, a NMFS New Bedford, MA, port agent, aboard the Clearview IV, a red crab vessel out of Fall River, MA.

Investigation personnel spent considerable time at sea during October. Thurston Burns, Tonga Brennan, Frank Almeida, Ron Essig, Fred Serchuk, Margaret McBride, Dennis Hansford, and Jim O'Connell participated in various legs of the autumn bottom trawl survey. Gordon Waring served as chief of the US scientific party aboard the USSR R/V Belogorsk during 10-23 October and Ralph Mayo was chief of the US scientific party on the FRG R/V Anton Dohrn between 27 September and 19 October.

Investigational personnel attended various meetings during the month. Anne Lange attended public hearings for squid and mackerel fishery management plans (FMP's) on 15 October in Point Judith, RI, and also on 16 October in Falmouth, MA. Anne was also present at the Northeast Fisheries Management Task Force meeting during 18-19 October, as were Margaret McBride and Rhett Lewis. Steve Murawski attended a meeting of the Surf Clam-Ocean Quahog Sub-Panel of the Mid-Atlantic Fishery Management Council on 26 October in Dover, DE. Pat Carter visited the University of the District of Columbia on 5 October to speak

with students in the Environmental Science, Computer Science, Mathematics, and Engineering Departments about co-op opportunities available in NMFS, and about careers in marine science. Woods Hole Laboratory EEO Committee meetings were attended by Gordon Waring and Rhett Lewis. Rhett and Margaret participated in the NEFC EEO Committee meeting on 31 October in Milford, CT. Rhett Lewis spent 2-5 October discussing career development in marine sciences (particularly fisheries) in the Philadelphia area as part of the Woods Hole Laboratory's EEO activity.

Senior Assessment Scientists

Brad Brown, Mike Sissenwine, and Steve Clark attended the 67th statutory meeting of ICES from 1 to 6 October 1979 in Warsaw, Poland. Several papers authored by Resource Assessment Division personnel were presented: "Recruitment Distributions and Their Modality," by Dick Hennemuth, Joan Palmer, Brad Brown, G. P. Patil, and C. Taillie; "Review and Assessment of the Offshore Lobster Fishery Off the Northeast Coast of the USA," by Thurston Burns, Steve Clark, Vaughn Anthony, and Ron Essig; "Distribution, Size Composition, and Relative Abundance of Ocean Quahog Populations Off the Middle Atlantic Coast of the United States," by Steve Murawski and Fred Serchuk; "A Unique Method of Ageing Surf Clams," by John Ropes and Loretta O'Brien; "An Assessment of the Gulf of Maine Redfish Stock in 1978," by Ralph Mayo, Liz Bevacqua, Vi Gifford, and Maureen Griffin; and "Analysis of Sea Herring Fisheries of the Northwest Atlantic from Cape Hatteras to Southwest Nova Scotia," by Mike Sissenwine and Gordon Waring.

Ongoing assessment activities continued during October with Fred Serchuk computing growth rates of Georges Bank and Gulf of Maine Atlantic cod stocks using bottom trawl survey data from 1970 to 1978. Fred also analyzed 1979 sea scallop survey results. Emory Anderson worked on updated red hake assessments and on shark data for the Atlantic shark fishery management plan. Steve Clark continued assessment work and related research on the Gulf of Maine northern shrimp stock.

Brad Brown, Mike Sissenwine, and Joan Palmer continued work on a paper concerned with multispecies interactions, for presentation at a symposium in St. Johns, NF, during November. Brad and Margaret McBride completed a paper titled "Status of the Marine Fishery Resources of the Northeast United States," as a supporting document for the Northeast Fisheries Management Task Force meeting.

Senior assessment scientists represented the NEFC at several diverse meetings during the month. Brad Brown attended a meeting of the Fishery Task Force of the Ocean Policy Committee of the National Academy of Science (NAS) on 11 and 12 October in Washington, DC. Steve Clark chaired the State-Federal Northern Shrimp Scientific Committee assessment meeting in Gloucester, MA, from 10 to 12 October, and attended the 38th annual meeting of the Atlantic States Marine Fisheries Commission (ASMFC) in Hyannis, MA, from the 16th to the 18th. Emory Anderson and Frank Almeida participated in a review of the Government Accounting Office (GAO) study of the "underutilized" species development program on 5 October. Brad Brown and Emory attended a meeting of the Northeast Fisheries Management Task Force on 18 October. This meeting was the first-phase wrap-up of task force activities. Fred Serchuk and Paul Wood participated in the New England Fishery Management Council Sea Scallop Oversight Committee meeting on 12 October in Danvers, MA. Fred also attended the ASMFC meetings. Steve Clark represented the NEFC at a public hearing on the squid and mackerel FMP's on 18 October, in Portland, ME.

A training course titled "Supervision and Group Performance" was given during 15-19 October, and was attended by Mike Sissenwine and Fred Serchuk.

Steve Clark and Jon Gibson (Center Directorate) participated in preparation of material for NOAA testimony relative to an application by the Pittston Company of New York to build an oil refinery in Eastport, ME.

Brad Brown conferred with Melvin Thompson and Dr. Kenneth Smickle of NAS's Committee on Minorities and Engineering, relative to mutual areas of interest. On leave, Brad attended the following EEO related meetings: a 1-day conference on making race relations a higher priority for the 1980's, held on 19 October in Boston and sponsored by the US Department of Justice, B'nai Brith, and the Urban League; and a 2-day meeting of chairpersons of state advisory committees with the US Civil Rights Commission and the Commission Directorate. Mike Sissenwine attended the Woods Hole Laboratory EEO committee meeting on 9 October.

Emory Anderson reviewed manuscripts submitted to the Fishery Bulletin and Marine Fisheries Review.

Publications

Lange, A. M. T.; Sissenwine, M. P. Biological considerations relevant to the management of squid (Loligo pealei and Illex illecebrosus) of the Northwest Atlantic. Mar. Fish. Rev. (S)

Murawski, S. A.; Serchuk, F. M. Shell length-meat weight relationships of ocean quahogs from the Middle Atlantic shelf. Proceedings of the National Shellfisheries Association 69:40-46; 1979. (P)

Murawski, S. A.; Waring, G. T. A population assessment of butterfish in the northwestern Atlantic Ocean. Trans. Am. Fish. Soc. 108(5): 427-439;1979. (P)

Serchuk, F. M.; Wood, P. W.; Posgay, J. A.; Brown, B. E. Assessment and status of sea scallop populations off the Northeast Coast of the United States. Proceedings of the National Shellfisheries Association 69:161-191;1979. (P)

Reports

Mayo, R. K.; Jackson, O. L. Users' guide to the biostatistics program FMBIOSEX and FMBIOMKT. Report prepared for internal distribution.

McBride, M. M.; Brown, B. E. The status of the marine fishery resources of the northeastern United States. Woods Hole Lab. Ref. Doc. No. 79-52;1979.

Murawski, S. A. Areal distribution of the offshore surf clam and ocean quahog resources of the Middle Atlantic Bight: 1979. Woods Hole Lab. Ref. Doc. No. 79-44;1979.

MARINE ECOSYSTEMS DIVISION

Ecosystem Dynamics Investigation

Ecosystem Modeling

Marv Grosslein continued editing the monograph on New York Bight fishes.

Mike Pennington started to prepare for a course he is giving on statistics which will begin in the latter part of November. Mike helped George Bolz write a program to apply the Delta-distribution technique to larval fish data. Mike also derived the minimum-variance, unbiased estimator for the standard error with the Delta-distribution and a program is presently being developed to apply it to Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) survey data. It appears to be much more efficient than the estimator currently being used.

Wendell Hahm and Brian Hayden spent 2 wk aboard the Belogorsk (Cruise No. 79-04). The purpose of the cruise was to get a firsthand look at how the food habits group within the Benthic Dynamics Investigation measures fish and collects stomach samples. In addition to this cruise, Wendell Hahm worked on the problem of determining feeding preference functions. Brian Hayden is presently aiding Roz Cohen. The work involves converting raw tapes into files that can be accessed by existing programs.

Recruitment Processes

A laboratory report by Greg Lough and George Bolz, summarizing larval Atlantic herring survey data (for samples collected with 0.505-mm-mesh nets) for 1968-78 that have been used in abundance estimates for the Georges Bank and Gulf of Maine, is in the final editing stages. George Bolz also continued work on the ICNAF ichthyoplankton data for samples collected with 0.333-mm-mesh nets) for 1971-77. Data from all 37 cruises have been reduced to summary form. Larval data are presently being transformed using the Delta-distribution to estimate species abundance and standard error.

Dave Potter has been revising a manuscript on neustonic ichthyoplankton collected on ICNAF larval Atlantic herring surveys during 1974-75. He has been working with Cabell Davis and with Dr. H. Edgerton of the Massachusetts Institute of Technology (MIT) to perfect our silhouette photography techniques using ultrahigh resolution film to be able to identify and count copepod nauplii in culture.

A final draft of the larval Atlantic herring gut content and data processing manual was prepared by Roz Cohen and reviewed by Greg Lough. Janet Murphy and Roz Cohen are revising the copepod identification manual to submit for publication. Work was continued by Roz Cohen on the analysis of the larval Atlantic herring gut content data and the data on zooplankton sampled with 0.333-mm-mesh nets as well as the biases involved in using various samples and mesh sizes.

Vicky Massard began work 22 October as a part-time temporary employee to help with the sorting of zooplankton collected by a multiple opening-closing net and environmental sensing system (MOCNESS) during a recent larval Atlantic herring patch study. Susan Schoen, our World Underwater Scholarship recipient, is in residence at NEFC through December and we have introduced her to plankton by having her help Bill Michaels. Bill Michaels, a University of Massachusetts co-op student, participated on the Albatross IV bottom trawl survey during 2-15 October.

Ron Halpin, a temporary employee, is helping on the Belogorsk MARMAP surveys during 10 October - 7 November. Hal Merry repaired two 6.0-m blocks for MARMAP plankton cruises. Robert Livingstone has been revising the haddock fecundity manuscript. In this regard he has set up the Woods Hole Oceanographic Institution's (WHOI) BMD computer program for probit analysis with Gordon Glass.

Ichthyoplankton Investigation

Doris Finan departed for Szczecin, Poland, on 8 October. She will spend 6 wk working with members of the staff at Morski Instytut Rybacki (MIR) on identification and enumeration of ichthyoplankton collected on MARMAP surveys in the western North Atlantic.

Dan Cohen of the National Systematics Laboratory visited the Sandy Hook Laboratory to meet with Mike Fahay and Chris Powell. They discussed approaches to a taxonomic investigation of larval hakes belonging to the genus Urophycis. Nancy Nazar, a graduate student at Monmouth College, has joined the staff on a 1040-hr appointment. She will assist in the study. In addition to the work on Urophycis, we are cooperating in a taxonomic study of the genus Ammodytes. Marek Baranowski of MIR will be the principal investigator. Wally Smith arranged to acquire adult specimens collected during the fall bottom trawl survey between Cape Hatteras and the Gulf of Maine. Attempts are being made to extend the geographic scope of the study by obtaining specimens from Canadian shelf waters as far north as the Grand Banks.

The outset of the October MARMAP survey was delayed for a day by vessel problems on Albatross IV. Inclement weather shortly after the cruise began further interrupted the itinerary. Sampling ended in the Gulf of Maine after completing 160, or 89%, of the survey stations. Predictably, young stages of Urophycis numerically dominated the ichthyoplankton and neuston from Georges Bank south. Both fish eggs and larvae were scarce in the Gulf of Maine. Our next survey is scheduled to start on 14 November. Sampling will begin in the Gulf of Maine and proceed southward. John Sibunka will be field party chief.

Larval Fish Physiology and Biochemistry Investigation

Summer flounder have been successfully induced to spawn and the embryos are being maintained for experiments after they hatch. Adult scup have not, as yet, responded to off-season thermal and photoperiod induction of spawning.

Studies of alkali-labile phosphorous levels in the serum of summer flounder were continued. Although sex determination may not be possible prior to the spawning season, the technique is useful for monitoring ovarian development prior to spawning. Preparations were made for completing some earlier studies on a nitrogen budget for larval summer flounder.

Considerable time was spent on two proposals to do research as part of the Ocean Pulse Program. They concerned biochemical indexes of larval fish condition and petroleum hydrocarbon assays of larval fish survival and growth. Larry Buckley and Geoff Laurence met with the personnel of the Larval Physiology and Biochemistry Investigation at the Milford Laboratory regarding toxicological research.

Work continued on two manuscripts: (1) "Temperature-Salinity Effects on Yellowtail Flounder Embryo Mortality and Development;" and (2) an ICES Early Life History of Fish Symposium paper on, "Modelling Growth and Survival of Larval Herring."

Fishery Oceanography Investigation

Cruises and preparation for sea occupied most of the staff in October. Gerry Metcalf and Dana Densmore started work on 1 October and went right to sea (along with Derek Sutton) on the first leg of the Albatross IV fall MARMAP cruise. After 2 wk, at the halfway point, Dana and Derek came ashore and Ron Kirschner joined the ship for the second half. Ron Schlitz and Gil Dering sailed in mid-month on Anton Dohrn on a cruise hastily rescheduled from a month later. They will provide the hydrography on an exploratory bottom trawling cruise designed to cover the upper continental slope (from 200 to 1000 m in depth) from Florida to Nova Scotia. They took with them the Neil Brown conductivity-temperature-depth (CTD) apparatus and Tektronix Graphics Terminal for a first real seagoing test of that equipment. Arranging for compatible electric power and repairing a last-minute Tektronix breakdown occupied much of the time before sailing.

Red Wright traveled to Warsaw, Poland, for the statutory meeting of ICES, and a meeting of the Shelf Seas Working Group of the ICES Hydrography Committee. He delivered two papers during the session (titles given below). At the end of the month he was off again to Lisbon to attend a workshop on developing a marine science curriculum in Portugal. Steve Ramp visited Seattle, WA, to give an invited talk on our Northeast Channel current measurement program at the Oceanography Department of the University of Washington (UW). He spent some time with UW oceanographers discussing how best to analyze the Nantucket Shoals flux experiment data and also visited the NWAFC and NOAA's Environmental Research Laboratories' Pacific Marine Environmental Laboratory (PMEL). He returned via New Orleans where he attended the annual meeting of the Marine Technology Society and delivered a paper on current meter comparisons. Tim Cain attended two Equal Employment Opportunity training programs for his new position as EEO counselor. One session was in Washington, DC, and the other in New York City.

In other activities, Sam Nickerson and crew processed salinity samples from Delaware II Cruise No. DE 79-10, Belogorsk Cruise No. 79-03, and finally Albatross IV Cruise No. AL 79-11. All values were tabulated and entered on the log sheets. Sam also read expendable bathythermograph (XBT) plots, plotted station positions, and contoured bottom temperatures for a number of cruises. Derek calculated and plotted spectra for the third and fourth Northeast Channel current meter arrays. Tim Cain prepared a report on the September Ship of Opportunity Program (SOOP) runs across the Gulf of Maine. Ron Kirschner plotted hydrographic data sections (temperature, salinity, and oxygen) for several runs along the Nantucket Shoals flux experiment transect.

Benthic Dynamics Investigation

Benthic invertebrate studies conducted this month were concentrated on Southern New England continental shelf invertebrate fauna -- particularly bivalve mollusks and gammaridean amphipods. The analyses of data on macrobenthic invertebrate fauna on the continental shelf south of Martha's Vineyard and Nantucket were continued with special effort devoted to the preparation of charts showing the distribution of the various faunal components. Of particular interest in this data set is the high abundance of amphipods and the large standing crop (in terms of biomass) of bivalve mollusks. Roger Theroux continued to prepare a report describing the distribution of East Coast bivalve mollusks. It is anticipated that this will be a lengthy report dealing with 225 taxa of bivalves.

John Dickinson has made substantial progress on a study of Georges Bank gammaridean amphipods. The identification of approximately 100 species has been completed and the ecological relationships and distributional patterns have been determined. A report on this subject is in preparation.

Work on the food habits of fishes was centered on the preparation of reports and upgrading the data base. Ray Bowman continued to work on a report on the food habits of juvenile haddock and has also prepared a rough draft of a report describing the feeding chronology and catchability of silver hake. Analyses of the stomach contents of other fish species collected for evaluating feeding chronology were continued and should be completed in November. Routine coding and auditing of analyzed stomach content data continued. The updating of the 1969-72 and 1973-76 data bases was continued. The computer program FODHABTS has been revised to enable us to list the data 11 different ways and we are currently running test files to check the revision. Judy Huebner has joined the staff on a 6-mo temporary appointment and will conduct some laboratory studies on digestion in fish.

Apex Predators Investigation

Ten tagged sharks were reported in October: six blue sharks, three sandbars, and one dusky. Most fish were at liberty for less than 100 days and traveled short distances. Two of these recaptures were noteworthy. The first was a female sandbar shark tagged off Cape Charles, VA. It was returned from Veracruz, Mexico, 761 days later after a journey of 1753 mi. The other was a male blue shark tagged aboard the Polish R/V Wieczno. It traveled 3145 mi in nearly a year (352 days) to be recaptured just inside the Straits of Gibralter. This is the first direct evidence of movement of blue sharks between the Atlantic and Mediterranean.

Over half of the 1979 sport tagging data base has been keypunched, edited, and entered into the computer. A new program is being developed which combines the tag and recapture data bases. This will facilitate further analysis of the shark migration data.

The purchase of a set of Lipshaw staining receptacles expedited Alan Lintala's processing of histological samples collected over the summer. In reviewing microslides from the past two seasons, H. Wes Pratt noted that half-term pregnant blue sharks from offshore waters carried copious amounts of spermatozoa in their shell gland. Full-term pregnant blues collected inshore possessed barely detectable amounts. This may be due to the longevity of stored spermatozoa or possibly that the females have returned inshore to be reinseminated after pupping.

Work continues on the report of the 2075-lb white shark caught this summer. Behavioral notes and photographs of the whites attacking the whale carcass have been supplied by Bob Conklin, a biology teacher from Riverhead (Long Island), NY. Bob has been supplying specimens, photographs, and information to us for 6 yr.

Wes Pratt began analyzing our historical data base for age and growth of the white shark. A preliminary set of length-frequency curves shows promise in establishing the first three age classes of this poorly understood shark.

Chuck Stillwell, Nancy Kohler, and John Hoey conducted a cruise aboard the Wieczno from 5 to 28 October from the Gulf of Maine southward along the edge of the continental shelf to the offings of Cape Hatteras, NC. Twenty-eight sets of pelagic longlines produced a total of 319 sharks (nine species) and 19 teleosts (five species). Of these, 157 were tagged, 165 were brought on deck, and 16 were identified but lost at the rail. Stomachs from sharks and teleosts

examined for food habits information most often contained remains of cephalopods and fish or a combination of both. The primary food item found in blue sharks was the octopus (Alloposus mollis) which comprised 81% of the total diet by volume. Biological materials collected in addition to the food habits samples included: (1) 35 muscle and liver samples from seven species of sharks to be used in selenium studies by the SEFC's Charleston Laboratory; (2) reproductive and vertebral tissues for studies at the Narragansett Laboratory; (3) spiral valves from two pelagic rays for Brian Hayden at the Woods Hole Laboratory; and (4) a porbeagle shark for physiology studies being conducted by Dr. Frank Carey at WHOI. An attempt to examine two warm-core eddies was made, but only eddy 79-I south of Georges Bank was located. This eddy was transected with XBT probes to determine its thermal hydrography and a longline set at the center position produced no fish.

Food habits data collected from sharks and other big game species during the past months continue to be codified in preparation for keypunching.

The NMFS foreign fishery observers continue to tag the bycatch of large sharks and teleosts aboard foreign vessels and in obtaining documentary photographs of obscure species. Unusually large numbers of sharks (up to 55 per tow) were taken by Mexican squid trawlers off Cape Hatteras in October. These were primarily young (3-5 ft) sandbar, dusky, and hammerhead sharks. Observers transferred samples of the various species to Chuck Stillwell who was on board the Wieczno in order to validate identifications. In addition, two trawlers were brought to port to obtain samples of shark catches and observers obtained photographs for species identification aboard other vessels.

Plankton Ecology Investigation

Ruth Byron completed the first quality-control study of zooplankton processing by Polish Sorting Center personnel (on samples from Albatross IV Cruise No. AL 76-01). Processing was found to be excellent in all respects and the few taxon corrections necessary were most likely due to the use of different reference material for identification.

Jack Green spent 1 wk aboard Delaware II comparing mid-water gear and attempting to locate juvenile fish for predator-prey studies.

Donna Busch and Jack Green made preparations for and participated in a joint primary-secondary productivity cruise aboard the Belogorsk. The area from the southern Gulf of Maine to the New York Bight was surveyed twice during the month with routine measurements and observations of: temperature; salinity; oxygen; ^{14}C primary production; chlorophyll-a and nutrient concentration; phytoplankton species composition, distribution, and abundance; and microzooplankton species composition, distribution, and abundance. Special studies included a comparison of "on-deck" with in situ incubation of ^{14}C samples, an investigation of effect of particle size on the food ration of zooplankton, characterization of particle size distribution of whole seawater samples using a Coulter counter, and observations of zooplankton grazing using a gut fluorescence technique.

Observation of unusual species assemblages and hydrographic conditions during the sampling aboard Belogorsk from 10 to 24 September provided the opportunity to observe the behavior of a warm-core eddy south of Martha's Vineyard. A summary of the observation was submitted to Coastal Oceanography and Climatology News, coauthored by Ray Maurer, Donna Busch, and Jack Green.

During the second half of the Belogorsk cruise there was a diatom bloom over much of Georges Bank and Southern New England waters. Observations on feeding of dominant copepod species using the gut fluroescence technique indicated that Centropages typicus and Metridia had full guts during this time while Calanus finmarchicus appeared not to be feeding. Slava Sushin's efforts to study grazing by Pseudocalanus on laboratory-reared phytoplankton cultures were thwarted by problems with the Coulter counter.

Preparations are currently underway for a second cruise with the same objectives on the Belogorsk during 18-29 November.

Much of October was spent on work relating to Belogorsk Cruise No. 79-03 (primary-secondary productivity survey). Gear used to compare in situ with on-deck incubation of ^{14}C samples was returned to Red Wright and Wes Pratt. Jack Green and Chris Powell conducted the work on the second half of the cruise.

Donna Busch made plans with Jay O'Reilly to collect microzooplankton and phytoplankton samples on the October MARMAP cruise aboard Albatross IV. The samples will be later analyzed by Slava Sushin and Igor Krasovsky on Belogorsk and in Kaliningrad during 1980. She also sent phytoplankton species, abundance, and distribution data from 1977 cooperative cruises on the Soviet R/V Yubileiniy (prepared by Soviet colleagues) to Myra Cohn at the Sandy Hook Laboratory for comparison with phytoplankton results from MARMAP survey samples which she is processing.

Donna Busch prepared for the Narragansett Laboratory Director a review of an ICES paper on DCMU [3-(3,4-dichlorophenyl), 1-dimethylurea] poisoning by Roy and Legendre. She also prepared a summary table of phytoplankton and related data with dates of collection during 1977, 1978, 1979, to be used for MARMAP planning purposes. Samples of ^{14}C from work conducted by Igor Krasovsky aboard Belogorsk were sent to the Sandy Hook Laboratory where they will be analyzed on the scintillation counter by primary productivity chlorophyll-a personnel.

Biostatistics

The draft protocol for the flow of ichthyoplankton and zooplankton data from time of collection through the completion of Fager-Abundant-Statistics is being revised and should be ready for distribution by mid-November. Cindy Jones conducted a feasibility study on using the Statistical Analysis System (SAS) as a data management tool for ichthyoplankton and hydrographic data. The concept is to extract data from the MARMAP Information System (MIS), merge the data with data from other sources, and format the data for further statistical analysis.

A glitch was discovered in the General Reformatter System (GRS), a module of the MIS which extracts data and outputs unit record formatted data. The glitch allowed the GRS to pick up data that had been encountered several output lines earlier. This glitch was promptly corrected by Input-Output Computer Services, Inc. (IOCS). Cindy Jones set up a course in nonparametric statistics conducted by Dennis Lawing, for Tuesday through Thursday from 5:30 pm to 7:00 pm. This course is open to anyone from NMFS and is designed to improve our skills in statistical analysis of ichthyoplankton and zooplankton data which have nonparametric distributions.

Master bridge logs and ichthyoplankton sampling logs were merged into new master files for the following three cruises: Delaware II Cruise No. DE 77-04, DE 77-06, DE 77-07. The same two data log types were entered and edited for two cruises: NOAA R/V Mt. Mitchell Cruise No. MM 79-02 and (Soviet R/V) Aliot Cruise No. 78-01.

Zooplankton data for Albatross IV Cruise No. AL 78-04 and (Soviet R/V) Argus Cruise No. 78-04 were merged into existing master files. Punched cards were received as follows: ichthyoplankton data logs for Albatross IV Cruise No. AL 78-13, Delaware II Cruise No. DE 79-03, Anton Dohrn Cruise No. 78-03, and Belogorsk Cruise No. 78-04; master bridge logs and ichthyoplankton sampling logs for Aliot Cruise No. 79-02 and Belogorsk Cruise No. 79-01.

Cindy Jones came on board as a full-time temporary employee. Robert Sands and Karen Johnson came on board as 1040-hr term employees.

Meetings, Talks, Visitors, and Publicity

Jack Casey delivered a presentation to an assembly of NMFS foreign fishery observers at their headquarters at Otis AFB on 23 October.

Jack Casey and John Sibunka attended a 1-wk NOAA course, "Supervision and Group Performance," at Falmouth, MA during 15-19 October.

Donna Busch attended a seminar at WHOI on 16 October given by Dr. Richard Eppley from Scripps Institution of Oceanography. During part of the talk, Dr. Eppley commented on problems associated with estimating primary production given the limitations of available methods.

Ken Sherman, Donna Busch, and Bob Marak prepared preliminary plans for possible NMFS participation in the FIBEX Program in Antarctica scheduled for February 1981. During the FIBEX Program, vessels from the US, USSR, UK, Japan, Poland, FRG, France, and possibly Norway and Republic of South Africa will conduct an acoustic survey of krill in the western Atlantic sector of the Southern Ocean; following the survey a "patch"-type study will be conducted by the US and FRG on a large krill swarm to examine predator-prey interaction, and the behavior and physiology of individual krill including naupliar, calyptopis, and adult stages.

Greg Lough and Hal Merry met on 9 October with Dr. F. Trungel, President of Impulsphysics and inventor of the VARIOSENS fluorometer, and with Richard Brown, Jr., Vice-President of Impulsphysics U.S.A., Inc., regarding their fluorometer and its applicability to our MOCNESS.

Greg Lough and Hal Merry demonstrated the MOCNESS unit and operation to Dr. Sharon Smith of Brookhaven National Laboratory (BNL) on 10 October. Dr. John Walsh's groups at the BNL are acquiring a MOCNESS unit for initial use in the Bering Sea on Calanus cristatus.

Greg Lough met on 22 October with Derek Eaton of the Lowestoft Fisheries Laboratory to discuss the larval Atlantic herring patch study.

Greg Lough was interviewed on 24 October by Clay Jones of "The Christian Science Monitor" regarding larval Atlantic herring studies.

Greg Lough met with Professor Peter Cole of the Fisheries Department of the University of Massachusetts to discuss the student co-op program. They also met with Bill Michaels (a University of Massachusetts co-op student) to review his special project in the Recruitment Processes Task, and with Ron Essig regarding publication of his masters thesis on larval alewifes.

George Bolz and Roz Cohen attended two NEFC/EEO meetings at the Woods Hole Laboratory on 9 and 10 October.

Roz Cohen attended an NEFC Federal Women's Program meeting at the Woods Hole Laboratory on 10 October.

Dave Potter and Cabell Davis met with Dr. Harold Edgerton at MIT on 25 October to develop silhouette photography techniques using ultrahigh resolution film to identify copepod nauplii and phytoplankton.

Dave Potter met with the mid-water trawl committee at the Woods Hole Laboratory on 16 October.

Robert Edwards designated Dave Potter to be the "prime mover" to prepare an "NEFC Energy Newsletter." The first issue will be forthcoming this month.

Ken Sherman and Robert Marak attended the ICES meeting in Warsaw, Poland, and represented the US as members of the Biological Oceanography and Baltic Committees, respectively. They then proceeded to the Polish Sorting Center in Szczecin to make preparations for initiating the use of density-gradient methods for separation of fish eggs from other plankters.

Robert Marak and Jack Green attended the second task force meeting on sampling of micronekton at the Woods Hole Laboratory on 17 October. Cruise results were reviewed and plans for future work were developed.

Robert Marak met with Dean Knauss of URI and his group to make plans for the visit of Dr. Eric Droessler, Director of the NOAA Office of University Affairs, on 15 October.

On 22 October, Dr. B. Gordon and 22 of his students from Northeastern University visited the Narragansett Laboratory. Talks on MARMAP ecosystem research at the laboratory were given by Robert Marak and Tom Halavik.

Robert Marak met on 24 October with Henry Donaldson and Ron Hersey of the Environmental and Oceanographic Services Division of Raytheon, Inc., to discuss ongoing research programs at the Narragansett Laboratory and those at Raytheon. One most interesting piece of information came out of this meeting: data are available from telemetry drogues tracked by satellite which had been deployed on Georges Bank to evaluate surface circulation patterns. Jack Colton is following up on this data set.

Alfred Meister (Director of the Atlantic Sea Run Salmon Commission at Bangor, ME) gave two lectures at URI: "Atlantic Salmon Migrations in the North Atlantic," and "National and International Fisheries Management Practices and Their Potential Effects on Mariculture and Sea Ranching Ventures in the Northeast," on 24 October. Bernie Skud escorted Mr. Meister and Dr. P. W. Chang (URI) through the laboratory facilities at Narragansett.

Ken Sherman attended meetings at Washington, DC, regarding remote sensing. He also attended the NEFC Board of Directors Meeting with Bernie Skud at the Gloucester Laboratory on 30 October and 1 November.

Publications

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

Colton, J. B., Jr.; Green, J. R.; Byron, R. R.; Frisella, J. L. Bongo net retention rates as effected by towing speed and mesh size. Can. J. Fish. Aquat. Sci. (A)

Langton, R.; Bowman, R. Food of eight Northwest Atlantic pleuronectiform fishes. NOAA Tech. Rep. NMFS SSRF. (S)

Maurer, R.; Busch, D.; Green, J. Observations on slope/shelf front in the immediate vicinity of a warm eddy. Coast. Oceanog. News 1(5); 1979. (P)

Ramp, S. R.; Brainard, E. C. Slack moorings for continental shelf in-situ tethered current meter. Proceedings of the Marine Technology Society Conference; New Orleans. (A)

Reports

Bowman, R. E. Feeding habits of ten Northwest Atlantic juvenile groundfish. Woods Hole Lab. Ref. Doc. No. 79-43;1979.

Brodeur, R. D. A guide to otoliths of some Northwest Atlantic fishes. Woods Hole Lab. Ref. Doc. No. 79-36;1979.

Cain, T. September 1979 temperature transects of the Gulf of Maine. NEFC SOOP Rep.

Ramp, S. R.; Wright, W. R. Northeast Channel flow: the view after one year's measurements. Inter. Coun. Explor. Sea, Hydrog. Comm. Memo. 1979/C:54;1979.

Wright, W. R.; Lough, R. G. The Georges Bank larval herring patch study of 1978: a preliminary report. Inter. Coun. Explor. Sea, Biol. Oceanog. Comm. Memo. 1979/L:36;1979.

MANNED UNDERSEA RESEARCH AND TECHNOLOGY PROGRAM

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

DIVISION OF ENVIRONMENTAL ASSESSMENT

Behavior of Marine Fishes and Invertebrates Investigation

As part of our continuing studies on the behavior and ecological requirements for post-larval and juvenile red hake, spotted hake, and white hake, activities during the past month have centered on their feeding behavior while planktonic. Providing the fish primarily with a natural copepod diet, supplemented occasionally with live brine shrimp, studies have been examining the effects of prey size, prey concentration, as well as time of day on ingestion rates as related to satiation levels and daily feeding rhythms. Beyond defining the feeding behavior of planktonic hake, results from these studies will provide a baseline from which to examine the role that diet and feeding behavior play in their settlement, an apparently crucial stage in the life history of these species.

Coastal Ecosystems Investigation

Ocean Pulse Program (OP) cruises continued to occupy much of our time. Bob Reid was chief scientist aboard the first leg of a NOAA R/V Kelez cruise (10-18 October) and Frank Steimle led the second leg (23-31 October). The major purpose of this cruise was to conduct physiology/biochemistry studies at the same OP strata which had been occupied by other disciplines on a September Albatross IV cruise--the entire suite of OP studies now requires more shipboard space than a single fisheries research vessel can provide. On the Kelez cruise we also took

benthic samples at several stations which had been missed aboard the Albatross IV cruise, and spent some time in locating stations with suitable depths, topography, and sediment type in an effort to reorient the benthic transects leading out of major estuaries. New stations were established near Portland and Eastport, ME, to monitor impacts of petroleum industry activities. Four hundred scallops were collected from near the Hudson Shelf Valley, and were delivered live to the Milford Laboratory for experimentation.

Clyde MacKenzie collected hard clams from Raritan Bay for Dr. Kenneth Gold of the Osborn Laboratories' Coney Island Aquarium. Dr. Gold suspects that hard and surf clams may develop abnormal kidney inclusions when exposed to pollutants. We will be providing specimens of both species from relatively clean and contaminated areas to determine whether this examination of kidneys can provide another tool for monitoring ocean health. Clyde, Bob Reid, and Dave Radosh also continued dive studies of surf clam populations off Rockaway, NY, and Dave and Bill Phoel underwent training in the use of underwater cutting and welding equipment.

Jack Pearce, Dave Radosh, Jan Ward, and Frank Steimle completed revisions on the NOAA Environmental Research Laboratories' Marine Ecosystems Analysis Program (MESA) monograph on benthic macrofauna of the New York Bight, and submitted it to the MESA office. Frank and Jan also revised their draft atlas on distribution and abundance of key benthic macrofauna species in the bight apex. Keith Vinal, an intern in a cooperative marine program with Southampton College on Long Island, NY, assisted Frank in vertical and horizontal contouring of dissolved oxygen values found on several MARMAP cruises; the contours will serve as baselines for detection of low oxygen problems. Sukwoo Chang began revision of his manual on statistical methods applicable to OP.

Biological Oceanography of Stressed Environments Investigation

To resolve a filtration problem with algal bioassay samples encountered on the September OP cruise, Dr. John Mahoney tested the efficacy of various filters. The use of a membrane plus a fiberglass prefilter apparently permits relatively fast filtration and removes all or nearly all of the microorganisms; presence of the latter could influence assay results. Preparations were begun for sampling on the OP cruise. It was decided, starting with this cruise, to sample at primary productivity stations as well as the 16 previously chosen core stations.

An assay of seawater, collected off Long Island, NY, with the diatom Thalassiosira pseudonana, revealed that in this instance silica was the limiting nutrient. Nitrogen, phosphorus, iron, and vitamin B_{12} stimulated increased growth when added in combination with silica, but were not singly beneficial. This is an interesting result because nitrogen is the nutrient commonly thought to limit phytoplankton production in local coastal waters.

During October, samples were collected for phytoplankton community structure on an Albatross IV MARMAP cruise, a Belogorsk cruise, and an OP cruise. All samples were returned to Myra Cohn at the Sandy Hook Laboratory. Some of these she sent on to Dr. Harold Marshall (Old Dominion University). The rest she is examining at the Sandy Hook Laboratory.

The annual Sandy Hook Laboratory Open House was held on 19 October and preparation for that involved producing 8x10-inch colored Xerox prints of 2x2-inch photomicrograph transparencies of organisms. These were on display in the laboratory along with an exhibit of live phytoplankton which could be viewed through a microscope. The exhibit was popular, particularly with Cub Scout groups who attended.

Standardization of methods to be used in monitoring phytoplankton populations as part of the sea truth for OP and the Large Area Marine Productivity Experiment (LAMPEX) is moving forward in conjunction with Dr. Harold Marshall.

By using historical data from previous cruises and by communicating with other OP investigators, criteria for locating seabed oxygen consumption stations were established. These locations are to be melded into an overall plan in order that the data obtained can be integrated with the larger data set of OP.

Bill Phoel completed the second draft of "In Situ Metabolism Determinations of Stress in Asterias vulgaris and Porania insignus at the Pigeon Hill, Jeffreys Ledge, Gulf of Maine Ocean Pulse Stations, October-November 1978."

Dr. James Thomas participated in a NOAA Data Buoy Office Ten Year Requirements Conference in New Orleans. At the conference, data buoy technology was presented. Program descriptions and needs for using data buoys were also presented. Dr. Thomas described OP and LAMPEX and presented some of the ways that data buoys could assist these programs. Transcripts of the conference are to be made available.

Dr. Thomas and Craig Robertson visited Dr. Frank Bohlen (University of Connecticut) to discuss LAMPEX and methods of measuring total suspended solids.

Environmental Chemistry Investigation

Several members of this investigation participated in the October MARMAP survey aboard the Albatross IV. Sue Barker and Jim Duggan measured netplankton and nannoplankton chlorophyll-a concentrations in the upper 75 m of the water column at 155 stations. Jay O'Reilly and Ralph Bruno measured netplankton/nannoplankton production at 40 stations.

Chlorophyll-a measurements made on the August Belogorsk cruise were calculated and a contour map depicting chlorophyll concentration between Cape Hatteras and the Gulf of Maine was constructed. Chlorophyll concentrations as chlorophyll-a in the center of Georges Bank in August 1979 were approximately 0.5 mg/m^3, whereas in August 1978 concentrations in the center of Georges Bank were 4-6 mg/m^3.

Ruth Walhauer completed lab analyses for ammonium samples collected during the October MARMAP survey. Al Matte performed additional tests on the efficiency of our ultraviolet oxidation system for organic nitrogen and phosphorus in seawater. Urea and a US Environmental Protection Agency (USEPA) organic nitrogen standard were used to determine oxidation efficiency. Some additional modifications of the automated chemistry are necessary before we routinely run organic nitrogen and phosphorus analyses on seawater samples.

Vincent Zdanowicz collected tissues from invertebrates and fish for heavy metal analyses during the October OP survey aboard the Kelez.

Physiological Effects of Pollutant Stress Investigation

Physioecology

Studies with the slipper limpet (Crepidula fornicata) exposed to silver were continued this month. The original parent stock has now been continuously exposed to silver for 16 mo. This stock of animals will be exposed to silver as long as possible.

Juvenile blue mussels have been exposed to copper and silver for 100 days. No significant differences in growth were observed between mussels at the highest concentrations and the controls. The exposed animals did, however, have elevated oxygen consumption rates.

Silver analyses were completed on sand worms (Nereis virens) exposed to various concentrations of silver by a graduate student from the University of Bridgeport. The worms showed a nearly 100-fold increase in silver when exposed to 1.0 ppm of this metal for 24 hr.

Physiological Effects

Statistical analyses were completed for a joint manuscript with the USEPA facility in Narragansett, RI, on physiological condition of blue mussels held along a pollution gradient in Narragansett Bay, RI. A first draft of that paper was completed and is to be presented at a symposium on "Pollution and Physiology of Marine Organisms" to be held at the Milford Laboratory in November.

Biochemical Effects

Analysis of gill-tissue preparations from 5 September finalized biochemical examination of tissues from blue mussels specimens that were sampled at monthly intervals from clean and polluted Narragansett Bay stations in the collaborative study with USEPA.

Anaerobic Bacteriology/Metabolism

As part of OP activities, some 182 isolates from the Albatross IV Cruise No. AL 79-07 have been characterized biochemically. To date, 35% of the isolates belong to the Vibrio group, 12% to the Aeromonas group, and 4% to the Pseudomonas group. The other 49% need further tests for grouping. At least nine (of 13) isolates from the Vibrio group appear to be Vibrio parahaemolyticus, most of which were toxic to mice. No judgment can be made on any clostridial isolates (other than the perfringens type) at this time without further study.

Toxin assays on heat-inoculated American oysters which have been incubated for up to 4 wk at refrigerator temperatures have been completed. The results confirm previous experiments which showed that mildly heated oysters do not readily support toxin production by Clostridium botulinum Type E spores (cooperative experiment with the SEFC's Charleston Laboratory).

Ocean Pulse Activities

Various staff members of this investigation participated in the OP cruise on the Kelez during 10-19 October and 22 October-1 November.

Meetings, Talks, Visitors, and Publicity

Mr. Richard Greig and Dr. Frederick Thurberg attended a MESA meeting on broad-scan hydrocarbon analyses.

Dr. John Graikoski attended an Interagency Botulism Research Coordinating Committee meeting in Natick, MA.

Mr. David Nelson attended the 4th Annual American Society for Testing Materials (ASTM) Symposium on Aquatic Toxicology in Chicago. He also visited the USEPA laboratory in Duluth, MN.

Dr. Frederick Thurberg served on the College of William and Mary Sea Grant site-review team during 1-4 October and attended a Supervision and Group Performance Course in Woods Hole during 15-19 October.

During 9-11 October Frank Steimle attended an Interstate Seafood Seminar, hosted by the Maryland Department of Health, in Ocean City, MD. At this meeting he presented a talk titled "Anoxia in the New York Bight and Its Implications for Fisheries Resources."

On 16 October, Frank Steimle attended a New York Bight Ad Hoc Advisory Committee meeting at the USEPA laboratory in Edison, NJ.

During the annual Sandy Hook Laboratory Open House on 19 October, Frank Steimle presented a 30-min slide talk on the NEFC's OP environmental monitoring program.

Carol Samet attended the first North American International Association of Fish Ethologists meeting, titled "Ethology and the Behavioral Ecology of Fishes", during 19-21 October at Illinois State University in Normal, IL.

Bill Phoel attended the Symposium on Multidisciplinary Approaches to Oceanographic and Estuarine Research sponsored by the University of Maryland College of Marine Studies.

Jack Pearce participated in the annual meeting of the American Littoral Society and presented a paper on the current status of estuarine habitats in the Middle Atlantic and New England States. The American Littoral Society meeting centered on the "Year of the Coast" and involved numerous representatives of research and management organizations concerned with coastal zone problems.

Dr. Pearce participated in the 14th European Marine Biology Symposium where he chaired a section concerned with research and monitoring activities related to protection of life in the sea. He also served as a member of a special panel which was concerned with problems of monitoring and research in the coastal environment.

During 1-6 October, Dr. Pearce participated in the annual ICES statutory meeting where he served as an appointed chairman for a special working group on mapping of living resources in relation to coastal and shelf environmental activities, especially the development of mineral resources. Dr. Pearce also served as chairman of an ad hoc working group concerned with the development of an international oil spill response plan. Previous oil spill response plans submitted to ICES will be edited and developed for the definitive international plan. This document is scheduled for completion in March 1980 and it will be reviewed by the ICES Advisory Committee on Marine Pollution.

Drs. Robert Edwards, John Pearce, Kenneth Sherman, and James Thomas attended a SEFC meeting on remote sensing and the use of the coastal zone color scanner. At the meeting a joint program was proposed for: (1) comparing boreal, temperate, and subtropical ecosystems; and (2) extending OP and LAMPEX into the Gulf of Mexico.

During 29-30 October, Dr. Pearce served as chairman of a working group that was convened to coalesce three separate NOAA monitoring programs into the single Northeast Marine Pollution Monitoring and Research Program (NMPMRP). This program incorporates Ocean Pulse and elements of the MESA New York Bight Project and the Ocean Dumping Program into a unified monitoring and research activity. A follow-up meeting was scheduled for early December and a final program development plan drafting meeting was planned for the week of 10 December. A prospectus for the overall NMPMRP was developed and will be finalized in the November meeting.

During 31 October - 2 November, Dr. Pearce participated in the NEFC Board of Directors meeting. During this period he met in the evenings with personnel from the Bigelow Laboratory of Ocean Science (BLOS) which will be involved in the OP monitoring program. It is proposed that the BLOS would assume responsibility for much of the OP benthic and planktonic work to be done in the northern Gulf of Maine.

Publications

Mahoney, J.; Steimle, F. Possible association of fishing gear clogging with a diatom bloom in the Middle Atlantic Bight. Bull. N.J. Acad. Sci. (A)

Pearce, J. B. Estuaries. Underwater Naturalist 13(1):29-35; 1979. (P)

Pearce, J.; Steimle, F. Ongoing environmental assessment, monitoring and research under the Ocean Pulse Program. Proceedings of a symposium; 1979 March; Temple University, Philadelphia, PA. (A)

Reports

Thomas, J. P.; Robertson, C. N.; Evans, C. A.; and Duggan, J. W. Large area marine productivity-pollution experiment II: sea truth data report, September 12-28, 1979. Sandy Hook Lab. Rep. No. SHL 79-36;1979.

AQUACULTURE DIVISION

Aquacultural Genetics Investigation

Selective Breeding of the Commercial American Oyster

Measurement of the 1978 year class, the first generation of selected offspring, is continuing. Three crosses, two high-line crosses and one control cross, have been completely measured. Data are now being collected on a second control cross. Selection of brood stock from the high-line crosses occurs immediately after measurement of each cross is complete. A random assortment of American oysters from the control line will be selected for spawning at time of breeding.

In addition to collection of growth data and selection of next year's brood stock, preparation for winter storage of the genetic American oyster stocks is beginning. Special containers for this year's cultchless spat are being constructed. Older oysters are being individually labeled and combined in holding trays to facilitate winter handling.

Aquaculture Genetics as a Study Topic in the ICES Mariculture Committee

As a member of the ICES Mariculture Committee, A. Longwell presented a paper at the statutory meeting in October in Warsaw, Poland, describing the current status of aquacultural genetics in the US and Canada. She invited 17 US experience papers on aquacultural genetics and related topics (such as genetics in fish management and genetics of wild populations). Two of these experience papers came from the Aquaculture Division/Milford Laboratory. The Mariculture Committee elected to set up a special study group in genetics, which will advise the Mariculture Committee.

Cytological and Cytogenetic Analyses of Effects of Contaminants on Fish Eggs

Aromatic compounds have the capability of altering surface properties of cell membranes. In a simple and preliminary experiment, the aromatic hydrocarbon benzo[a]pyrene appeared to cause an obscuring and incipient deterioration of the pores in the chorion (outer egg envelope) of a single species of fish eggs collected in plankton from Long Island Sound. The embryos of such eggs showed arrested chromsome divisions but still viable cells. Neither benzene nor anthracene, different although related classes of aromatic hydrocarbons, appeared to have any effect at all under the conditions of this initial experiment. Observations were made on sizable numbers of eggs in a rapid-scanning electron microscope. Benzo[a]pyrene is well known for its mutagenic and carcinogenic potential. As suitable types of fish eggs become available, this work will be repeated in more complex experiments with lower concentrations of the hydrocarbons. This experimental work is being done to assist in interpretation of field data on the chorion state of Atlantic mackerel which, like the cell and mitotic states of the embryos proper, varies widely from sample site to sample site. See prior reports.

Cytological analyses of the 1978 collection of Atlantic mackerel eggs from the New York Bight are nearly complete. These data and 1978 measures of station contaminant levels and oceanographic measures will be combined with 1977 biological, chemical, and oceanographic data for another examination of statistical associations between egg health and contaminant levels.

Inquiries made from time to time by chemical industries and from commercial fisheries interests regarding field studies on the cytological and cytogenetic states of commercial fish embryos have been answered.

Supportive of the studies on Atlantic mackerel eggs in the New York Bight, and indicative that chemical contamination at some sites there is impacting fish embryos at the chromosome level, are fairly recent reports of other researchers on genetic impacts of river pollution on natural populations of royal ferns (Osmunda regalis). Populations of these plants growing in a Massachusetts river heavily polluted with industrial water had a far higher frequency of chromosome mutations in developing germ cells than populations from nearby nonpolluted areas. Further, European workers recently reported that mudminnows (Umbra pygmaea) held in water from the Rhine River had higher incidences of chromosome mutations in gill cells than fish held in untreated groundwater.

While attending the ICES statutory meeting in October in Warsaw, Poland, A. Longwell was able to attend some of the meetings of the Marine Environmental Quality Committee.

Aspects of Nutritional Requirements of Mollusks Investigation

This month's harvest from the mass culture apparatus yielded 1260 liters of larval and 1019 liters of juvenile foods. Milford Laboratory investigations received food cultures as follows: Spawning and Rearing of Mollusks, 650 liters; Aquacultural Genetics, 708 liters; Physiological Effects of Pollutant Stress, 797 liters; and Larval Disease of Mollusks, 49 liters.

Despite the termination of a key laboratory assistant position, we were able to maintain the subculturing of the stock culture collection. However, no new experimental work was initiated although manuscript preparations were pursued.

A prototype apparatus for the study of nutrition in post-set oysters was designed by R. Ukeles and constructed by K. Provost, the maintenance foreman. Oyster spat (0.25 inches) received from the Flower Hatchery are being held in the apparatus for preliminary observations.

Dr. R. Ukeles was requested to review three Sea Grant proposals and two full-length manuscripts.

Spawning and Rearing of Mollusks Investigation

Seasonal growth and survival of data of 20-mm surf clams planted in the pumped raceway system this past May are similar to the experimental data of previous years. This season's tank farm data confirm that growth is correlated to phytoplankton abundance, stocking density, flow rate, and linear position in the tank. Data also indicate that survival of clams in the tanks relates to stocking density.

The profile of phytoplankton level has differed this year from previous years in that a bloom has not as yet been recorded this fall. Consequently, the period of fall growth in clams has not occurred. The absence of a fall phytoplankton bloom might interfere with gametogenic activity affecting either a fall spawning or ripening of clams in the following season. Observation of surf clams held within the lab will be made to explore further this phenomenon.

We have made another set of observations on hatchery-reared juvenile bay scallops that were tagged and free-planted in the Pequonnock River estuary in Groton, CT. While the 1-wk observations were somewhat encouraging, the 3-wk observations are disappointing. In one planted area a few live scallops were found; in another, none were found. Predation primarily and movement secondarily seem responsible for the loss. Our next free-planting experiments will consider more critically the survival of various size classes of bay scallops and will attempt to quantify some of the patterns of movement.

The bay scallop grow-out experiments utilizing mesh enclosures are continuing. Both the Japanese-style lantern sets and wire mesh cages physically survived the effects of storms David and Frederic. Fouling of this gear has occurred at a tolerable level and the scallops have survived and grown well.

Meetings, Talks, Visitors, and Publicity

S. Stiles attended the "Supervision and Group Performance" course held in Falmouth, MA.

J. Hughes attended the Fifth Biennial International Estuarine Research Conference at Jekyll Island, GA.

A. Longwell attended the ICES statutory meeting in Warsaw, Poland.

R. Goldberg attended the fall meeting of the Atlantic Fisheries Biologists in Newagen, ME.

E. Rhodes attended the Fifth Biennial International Estuarine Research Conference at Jekyll Island, GA.

A presentation of the Milford Laboratory's activities was given to the New Haven Hiking Club.

Discussions of the Spawning and Rearing of Mollusks Investigation's specific activities were held with Harold Becker of New London, CT, and Jerome Jenkin of Jenkin Pacific Shellfish Company in Berkeley, CA.

Publications

Hughes, J. The genetics of selected marine organisms as a measure of environmental quality. Abstract. Paper presented at Fifth Biennial International Estuarine Research Conference. Jekyll Island, GA.

Reports

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PATHOBIOLOGY DIVISION

Comparative Invertebrate Pathology Investigation

August samples of American oysters and blue mussels from Raritan and Great Bays, NJ, were processed and examined for histopathology. Clear pathologic differences in inflammatory responses and in parasite prevalences were evident. Feulgen-positive inclusions were seen in the gills of blue mussels from Great Bay. These may be virus or Chlamydia-type lesions which previously have been observed. October samples from these New Jersey locations were obtained and are now being processed. Samples of blue mussels collected through the USEPA "Mussel Watch" program were also examined using a recently developed systematic pathology system that permits identification and quantification of pathologic responses in host animals. Six samples of blue mussels from the West Coast and four from the East Coast provided excellent material for evaluating and understanding comparatively the types of lesions and geographic parasitology associated with undegraded and degraded environments.

Typing and proofreading of the final version of the manuscript Histology of the Blue Crab were completed and the manuscript was sent off to the publishers.

The Histological Services Unit received over 250 specimens for processing and prepared over 300 sections of various mollusks, crustaceans, and fish tissues for histopathologic examination.

Fish Pathology Investigation

In a previous report ("NEFC News," January 1979), the results of an experiment on the exposure of yolk-sac-stage winter flounder larvae to 500 ppb of No. 2 fuel oil (water soluble fraction) and subsequent evaluation of the surface epithelium by electron microscopy were presented. The results of that report were inconclusive owing to the unusual appearance of the cells and their topographical relationships which could have been the result of exposure to the contaminant or because of developmental changes (including cell death) in the skin. Continued examination of the fine structure in larval fish tissues has indicated ("NEFC News,"

April and July 1979) that the olfactory organ in several species (winter flounder and striped bass) may be a suitable tissue for future studies of the effects of contaminants on larval fish. Therefore, supplementary material from the contaminant experiment described above was examined by light and electron microscopy to see whether the olfactory organ was affected. In this instance, the larvae were exposed for 48 hr; however, infrared spectroscopic analysis of the contaminant solution indicated that the total hydrocarbon content had diminished from 500 ppb to 250 ppb over the first 24-hr period. No modifications in the structure of the receptor and/or supporting cells were observed in the sensory organs from the oil-exposed larvae when compared to the controls. It is assumed that the rapid and initial loss of the low molecular weight components from the oil/water mixture, because of their volatile nature, may be the reason that no effect was observed. As has been demonstrated by other investigators, the polycyclic aromatic hydrocarbons, which are the most difficult to keep in solution, are also the most toxic components in most oil/water mixtures. Attempts to keep these molecular species at their initial concentrations often require vigorous addition and mixing techniques that are not tolerable by larval fish during the "critical stage" of their development.

Microbial Ecology Investigation

Rock crabs were collected near Ambrose Light for heavy metal analyses and histological studies on fouled gills. Eighty-nine crabs have been collected to date and a final report will be prepared to summarize data that have been obtained each quarter during 1979. Metal analyses made by Richard Greig at the Milford Laboratory will provide new information for comparison with similar levels in sediments, seawater, and zooplankton in the New York Bight apex. Bottom sediments were collected from the Philadelphia-Camden dumpsite during a cruise on the Kelez in September. Samples from the sewage site, sewage-site fringe areas, and non-sewage areas to the southwest of the dumpsite were cultured for the presence or absence of Acanthamoeba in areas previously found to be positive or negative for coliform bacteria. Amoebae were recovered from 100% (3/3) of the sewage stations, but from 0% (0/7) of the stations outside the dumpsite. Comparative data from the Philadelphia-Camden and New York Bight sewage disposal sites have shown that Acanthamoeba is a useful indicator for following the spread of sewage and sewage-associated bacteria in ocean bottom sediments.

Larval Diseases of Mollusks Investigation

In cell culture studies, three distinct surface adhesive cell types have now been identified in 2-day-old mechanically disrupted American oyster larvae; five types have been identified in 6- to 10-day-old larvae. It is believed that these cells represent transitional stages from primordial to more fully developed immune defense cells. This contention was developed from a series of experiments in which larvae were exposed to bacterial pathogens. The larvae exhibited a reduction in numbers of cells considered to be the most primitive and an increase in one or more of the other cell types after infection. Phagocytes in many adult animals have been shown to become activated as a result of challenge by pathogens. The current work suggests that an activating mechanism exists in larval oysters.

The ozone (O_3) quarantine system returned to service and was checked for efficiency by plating effluent water samples. After O_3-UV (ultraviolet light) treatment, no bacteria were noted on OZR plates.

Two Long Island Sound sampling cruises were completed. Thirteen potential pathogens isolated from Long Island Sound American oyster beds were used in larval challenges to try to establish dose response curves. Approximately 320 organisms collected and isolated from Long Island Sound sampling cruises from March through October 1979 were each run through a series of five biochemical tests as part of an ongoing project to characterize all of these organisms.

Larval culture challenges with the two Flower Hatchery bacterial isolates and the Vibrio sp. toxins have been terminated due to poor larval development in control cultures. Challenges should be continued sometime in January.

Meetings, Talks, Visitors, and Publicity

Dr. Rosenfield and Mr. O'Connell attended a luncheon and awards ceremony at Bolling AFB in Washington, DC, on 4 October. The program was held in honor of the 10 outstanding handicapped federal employees in the nation. One of the 10 recipients was Mrs. Emily Ortt, receptionist at the Oxford Laboratory. Mrs. Ortt was also accompanied by her husband, her children, and their families. Several officials of the US Department of Commerce, NOAA, and NMFS were also in attendance.

Dr. Rosenfield attended the Maryland Sea Grant site visit at College Park, MD, during 16-18 October to evaluate progress made in University of Maryland's Sea Grant Program for the year. He then traveled to Portland, OR, during 18-20 October to meet with state (provincial) and federal personnel from Washington, Oregon, California, Hawaii, Alaska, and British Columbia to discuss the effects of introduction of exotic marine species on local biota and determine what controls the states (provinces) might consider necessary.

Dr. Rosenfield and Mr. Farley attended a mutagenesis meeting in Washington, DC, on 23 October at the Page Building. Drs. James Parry and William Barnes of Swansea University in Swansea, Wales, addressed a group of 20 people who represented the US Departments of Agriculture and the Interior, the US Food and Drug Administration (USFDA), NMFS, and several universities regarding their work on testing for mutagens in marine animals.

Dr. Rosenfield attended a UJNR Panel meeting on toxic microorganisms at the USFDA building in Washington, DC, on 29 October; and attended the NEFC Board of Directors meeting in Gloucester, MA, during 30 October-2 November.

Ms. Brown presented a session on career development planning for women at the Milford Laboratory on 27 September.

Ms. MacLean conferred with scientists attending the ICES meeting in Warsaw, Poland, during 30 September-5 October concerning ichthyoplankton and zooplankton disease studies; she initiated these studies at Szczecin, Poland, during 5-20 October.

Dr. Sawyer visited Gettysburg, PA, on 3 October to discuss a manuscript in preparation on black-gill disease in specimens from the New York Bight apex and to examine sectional material to be used as photomicrographs.

Dr. Robohm, Ms. Brown, and Mr. Rose attended a 1-day workshop on liquid chromotography and infrared spectrophotometry sponsored by Beckmann Instruments in New Haven, CT, on 11 October.

Mr. Kern departed for Bahia, Brazil, on 15 October as a consultant to the Institut de Biologia-Ure, where he will lend technical expertise on oyster disease problems now affecting Brazilian shellfish.

Dr. Sawyer and Mr. Lewis collected crabs for heavy metal studies at Sandy Hook, NJ, on 16 and 17 October.

Dr. Robohm was a panelist for the National Sea Grant Program site visit at the University of Maryland during 16-18 October.

Dr. Blogoslawski was appointed to the editorial board of the Pergamon Press journal Ozone: Science and Engineering.

Visitors to the Oxford Laboratory during October included Dr. Charles Graham of Loyola College in Baltimore, MD, who brought his class of 20 marine biology students for a short seminar and a tour of the facility. Other visitors were Mr. and Mrs. Paul Gavel of the Civil Aeronautics Board in Clinton, MD; Mr. Jerry Valliant of the Citizens Program for Chesapeake Bay in Oxford, MD; and Mr. L. B. Stone of the Delmarva Advisory Council in Salisbury, MD.

Publications

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

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RESOURCE UTILIZATION DIVISION

Fisheries Engineering Investigation

Sampling and Harvesting Gear Development

Construction of the clam dredge docking ramp for the Delaware II was completed, and it was shipped to the Woods Hole Laboratory for final assembly aboard the vessel. Vern Nulk has been supervising this work.

Al Blott attended a task force meeting on micronekton sampling and also investigated the use of a Herman-Engle mid-water trawl for an upcoming cruise. He is also continuing the design of new juvenile sampling gear.

Hydrodynamic studies of an Isaacs-Kidd mid-water trawl are being planned aboard the NOAA R/V Rorqual. John Kenney is the engineer in charge.

Jack Moakley spent time this month following up on possibilities for a Rorqual replacement, preparing an engineering display for the annual Gloucester Laboratory Open House, and responding to items cited in the Rorqual inspection report.

Al Blott gave a lecture at the Peabody Museum in Salem, MA, on twine, webbing, and gear. Mike Corbett and Al Blott are preparing a lecture on harvesting gear to be presented at Salem (MA) State College.

Dan Baker is studying the application of chilled seawater (CSW) to new fishing vessel designs.

Facilities Engineering

John Kenney is performing a literature search on waste chemical disposal methods.

Energy consumption figures for the Gloucester Laboratory were tabulated by Tom Connors and submitted to the NOAA energy coordinator. They show an approximate 20% reduction in electricity and natural gas consumption from the base period. This is due, in great part, to conservation measures taken at the lab.

The entirely new freezer, #7, intended for -40°F use, is almost ready for operation. This freezer system was designed by Bob Van Twyver and is being constructed under his direction.

Resource Development and Improvement Investigation

New Product Development

Joe Mendelsohn reviewed a Sea Grant proposal from URI on storage stability of red hake.

We received on loan an RMF sealing machine that will evacuate and gas flush then seal packages. The unit was set up and several preliminary runs made. It appears to work properly and as soon as the correct bags arrive, a storage study will be started.

Several of the minced products made from silver hake (whiting) were put on display for the annual Gloucester Laboratory Open House.

Blue Crabs

A storage study was begun on roller-extracted pasteurized blue crab meat held in frozen storage from 1 to 6 mo; then thawed and held in refrigerated storage for up to 6 mo more. The purpose of this study is to determine the quality of pasteurized roller-extracted meats.

In another storage study, after 4 mo of refrigerated storage, roller-extracted pasteurized blue crab meat was of similar quality to the commercially picked pasteurized control, except in texture. The roller-extracted meats had developed quite a bit of drip and the meats were mushy.

Seafood Composition and Nutrition

The gas chromatograph is not yet fully operational. The auto-ignite for the flame-ionization detector is giving us problems.

Sport Fish

John Kaylor started on a new chapter covering pollutants that affect sport fishes. One of the more interesting items unearthed was that nearly 100 lakes in the Adirondack mountains in the 1930's had a pH of 6.5 and how have dropped to 4.8 in the 1970's. Increased acidity is due to burning of fossil fuels with increase of sulfur dioxide and oxides of nitrogen which are wafted from industrial centers and precipitated in the form of acid rain, snow, or hail in far-distant areas.

Product Quality, Safety, and Standards Investigation

Product Quality

Following a 9-wk accelerated storage study at 20°F, several observations were made regarding the relative efficiency of various treatments for retarding oxidative rancidity in minced whiting fish sticks. Vacuum-packed sticks prepared from mince treated with sodium erythrobate were the least rancid; however, similarly treated sticks that were packaged in polyethylene without vacuum were not much inferior. Thus, the additional benefit of vacuum packaging of antioxidant-treated sticks is questionable. Protection against rancidity was also achieved when the erythrobate was added to the batter instead of to the mince. A mixture of alginate-citrate-MSG, which was reported by South African researchers to be effective, was no better than the control. Inconsistent results were obtained with vacuum-packaged samples; overall, this treatment provided only slight protection. Storage temperature was the most effective treatment with -20°F or 0°F affording more protection than any of the other process treatments at 20°F. The addition of erythrobate to the minced fish or to the batter caused a yellow-brown discoloration of the fish during storage at 20°F.

Vacuum-packed samples of raw cownose ray steaks were rated "good" in flavor and texture after 60 wk of storage at 0°F. At the start of the study, the product had been scored "very good" in these attributes; thus, not much of a quality change has occurred in over 1 yr of frozen storage.

We are continuing in our conduct of sensory testing on canned mackerel held at an accelerated storage temperature (100°F) for Dr. Sudip Jhaveri of URI. Prior to tasting, samples are assayed for the presence of putrefactive anaerobes.

Forty-one fish fillets were identified by isoelectric focusing for the edibility characteristic study by the US Army North American Research and Development Command (NARADCOM) at Natick, MA.

Sarcoplasmic protein extracts from 12 whole goosefish (monkfish) were examined by isoelectric focusing (IEF) in an attempt to clear up the mystery of the two protein patterns we obtained during the Association of Official Analytical Chemists (AOAC) collaborative study conducted last spring. The results seem to add to the confusion. Instead of the two patterns we have been getting, we find that there are five or six patterns. It now appears to be a polymorphic enzyme. We will continue to sample additional monkfish individuals to determine the relative frequency of the various alleles.

Ron Lundstrom presented the results of the IEF collaborative study at the 93rd Annual Meeting of the AOAC. Based on the results, the AOAC has approved the IEF method for fish species identification for the following seven species: ocean perch, pollock, Atlantic cod, Atlantic wolffish, cusk, haddock, and silver hake.

The method was not given blanket approval for all species because of the problem with the monkfish patterns. The AOAC Analytical Methods Subcommittee has requested we complete the following work before they will consider adopting the IEF method for use with all species: (1) continue sampling monkfish to determine just how many patterns can be expected; (2) determine if the AOAC official cellulose acetate and disc electrophoresis methods also show more than one pattern for monkfish; and (3) conduct an additional collaborative study of the IEF method with another eight-to-ten species including monkfish. We will attempt to complete this work in time for the AOAC meeting next year.

We have begun work on developing a method for the determination of trimethylamine oxide (TMAO) in fish by gas chromatography (GC). It is based on the reduction of TMAO to trimethylamine by titanous chloride and extraction of the free amine into n-amyl alcohol. Analysis of standard solutions of TMAO have yielded a standard curve linear up to at least 200 ug/ml. Recovery experiments are underway. The gas chromatograph now allows us to determine in two simple assays -- monomethylamine, dimethylamine, trimethylamine, and trimethylamine oxide. The assay is done on a semi-microscale and doesn't generate the large volumes of toxic wastes that are formed using the conventional spectrophotometric assays for these compounds.

Product Safety

A considerable amount of time was allocated in purifying sodium sulfate, sodium chloride, glass wool, and boiling chips. They are being used in the AOAC cleanup procedure and have caused interfering peaks. The purity of these reagents and materials is of extreme importance when analyzing samples for residues in the low ppm or ppb range. The electron-capture detector senses any electron-capture materials in the injected sample, whether they be pesticides or other impurities. These extraneous contaminants gave rise to GC peaks that precisely match the retention characteristics of certain polychlorinated biphenyls (PCB's). It was, therefore, necessary to Soxhlet extract these reagents and materials for several hours or cycles with methanol followed by petroleum ether.

A 6-ft x 4-mm (inside diameter) glass column of GP-1.5% SP-2250 and 1.95% SP-2401 on 100/120 mesh supelcoport was conditioned for 48 hr at 245°C. The column was then evaluated by chromatographing a complex chlorinated pesticide mixture to evaluate efficiency, resolution, compound stability and response characteristics. Column efficiency for p,p'-DDT was 3900 plates. A standing current versus output-frequency characteristic curve was also made for the electron-capture detector using this column. Evaluation of Aroclors 1248, 1254, and 1260 for reproducibility and accuracy was also accomplished.

The Perkin-Elmer series 3-B high performance liquid chromatograph has arrived. The chromatograph will be interfaced to the Sigma 10 data system. The chromatograph consists of the following modules: an automatic injector, a microcomputer pump module, an oven, a variable-wave-length UV detector, and a methods processor. The unit is scheduled to be installed on 30 October. The chromatograph will be used for some phases of the PCB work as well as analysis. It will also complement the GC work.

Ten samples of fish (100 fish) will be arriving from Dr. Koepp. The right fillet will be composited at the Gloucester Laboratory. A portion will be homogenized for eventual PCB analysis by John G. Reuter Association and ourselves.

Our lab is being reorganized to accommodate space for the new instrument, glassware, reagents, solvents, and supplies. Nitrosamine glassware is being packaged and stored in the Jones & Hunt Building to make room for PCB glassware. A large batch of glassware has arrived (separatory funnels, glass columns, reservoirs, and Huderna-Danish apparatus). The glassware is in the process of being cleaned.

A batch of PCB reprints arrived from MIT. Each reprint is being read carefully. A great deal of outside time is being spent on reading the Perkin-Elmer manuals for the MPLC instrument. Also, new books related to our work have arrived.

Product Standardization

Comments on an advance copy of a proposed rule -- to establish Standards of Identity and Quality for Fish Fillets -- were compiled into a single set of comments for transmittal to the USFDA.

A revision of a proposed unified standard for all shrimp products except breaded, based upon comments received from the Washington Office, was prepared. It will be forwarded to the Washington Office for publication as an advance copy of a proposed rule.

A project proposal to develop a sound and practical method for assuring the amount of protein contained in a cooked serving of fish was reviewed and changes suggested to the Washington Office.

A display, part of the annual Gloucester Laboratory Open House was prepared, and demonstrations given to interested visitors on 16 and 17 October. The display, illustrating the preparation of fish sticks and portions from a 16.5-lb fish block attracted a lot of interest and favorable comments.

Shrimp samples to be used for a seminar on "Evaluation of Flavor and Odor of Different Forms of Shrimp" were received and placed under proper refrigeration.

Based on our discussions with the US Department of Agriculture (USDA), a commercial item description (CID) for canned tuna was prepared. This document is to become a part of a USDA bid invitation for canned tuna. It is expected that the first bid for 400 000 lb of canned tuna will be awarded before the end of this calendar year.

Technical Assistance

Resource Utilization Division personnel provided information and technical assistance in the following areas: seafood items for military purchases; state of New England fisheries; grading squid; storage characteristics of iced and frozen squid; where to obtain food additives; squid skinning machines; spawning Atlantic herring off the Maine Coast; use of a retort pouch; chilled seawater; lobstering; beam trawling; harvesting red crabs; cutting and hanging nets; drag of nets and netting; vessel rigging; trawl door studies; filtering systems for lobster-holding tanks; film on vessel safety; sea urchins; fish species identification; eel traps; microwave and vacuum/steam thawing; preparation of various types of fish sausage; yearly production of smoked and salted fish products; preparation of salted and dried fish; review of a proposal for a solar-powered smoking and drying operation; live storage of lobster in refrigerated recirculated brine; desirability or not of increasing fishing pressure on tilefish; diseases of lobsters; area of catch and method of preparation of langostinos; swordfish; licenses for lobster fishing; approved common name for labeling purposes of

dogfish; authentic identification of winter flounder and feasibility of obtaining squalene from dogfish.

Meetings, Talks, Visitors, and Publicity

A paper titled "Technological Studies on the Utilization of Cultured Yearling Surf Clams" was presented by Judith Krzynowek at the AFTC meeting in Danvers, MA.

Burt Tinker participated in a Blue Crab Colloquium during 18-19 October 1979 in Biloxi, MS. The meeting was sponsored by the Gulf States Marine Fisheries Commission.

Joe Licciardello presented a paper on "Extending the Shelf Life of Frozen Argentine Hake" at the AFTC, and was program cochairman for the conference. Ron Lundstrom also presented a paper at that meeting on the results of the isoelectric focusing collaborative study.

Perry Lane attended meetings of the New England Marine Advisory Service Board of Directors, the New England Fisheries Steering Committee, and the Sea Grant Association.

On 16 and 17 October the Gloucester Laboratory held an open house. About 200 visitors had an opportunity to tour the lab, view displays, and discuss research projects with laboratory personnel. They also had an opportunity to sample products made from underutilized species.

NATIONAL SYSTEMATICS LABORATORY

Shrimps Investigation

Carried forth was research on a revision on the rock shrimp genus Sicyonia in the American Pacific. Work progressed on a Spanish translation of and additions to FAO Species Identification Sheets for Fishery Purposes, Penaeoid Shrimps, Western Central Atlantic.

Other Crustaceans Investigation

Preparation continued of a manual of temperate-water decapod crustaceans of the eastern US.

Pelagic Fishes Investigation

Prepared were drafts of species identification sheets for FAO of Scombridae, Belonidae, and Hemiramphidae from the East Central Atlantic and western Indian Oceans. Drafted was a report of the Indo-Pacific bluefin tuna, Thunnus thynnus orientalis, in the Gulf of Papua. Continued was research on the systematics and biology of the Spanish mackerels.

Benthic Fishes Investigation

Help was given to the Smithsonian Oceanographic Sorting Center to process a collection of bottom fishes taken by D. Cohen during the eastern Bering Sea groundfish survey; specimens will be sent to cooperating specialists for detailed study. Preparations were undertaken for submersible dives on the Galapagos Rift thermal vent area. D. Cohen visited the Sandy Hook Laboratory to discuss Urophycis.

Meetings, Talks, Visitors, and Publicity

D. Cohen was visited by Tadashi Inada of the Japan Marine Fishery Resource Research Center, who is preparing a worldwide taxonomic revision of the hake genus Merluccius. Another visitor was Dr. Ken Able of Rutgers University, studying liparid fishes. B. Collette was visited by Dr. John Magnuson of the University of Wisconsin to discuss scombrid locomotion.

Austin Williams attended the Jekyll Island, GA, meeting of the Estuarine Research Foundation.

Isabel Canet assisted in the US Department of Health and Human Services project -- Career Profiles for Hispanic Females.

Publications

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. (A)

Russo, J. L. Field guide to fishes commonly taken in longline operations in the western Atlantic Ocean. NOAA Tech. Rep. NMFS CIRC. (S)

ATLANTIC ENVIRONMENTAL GROUP

Ocean Monitoring and Climatology Investigation

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

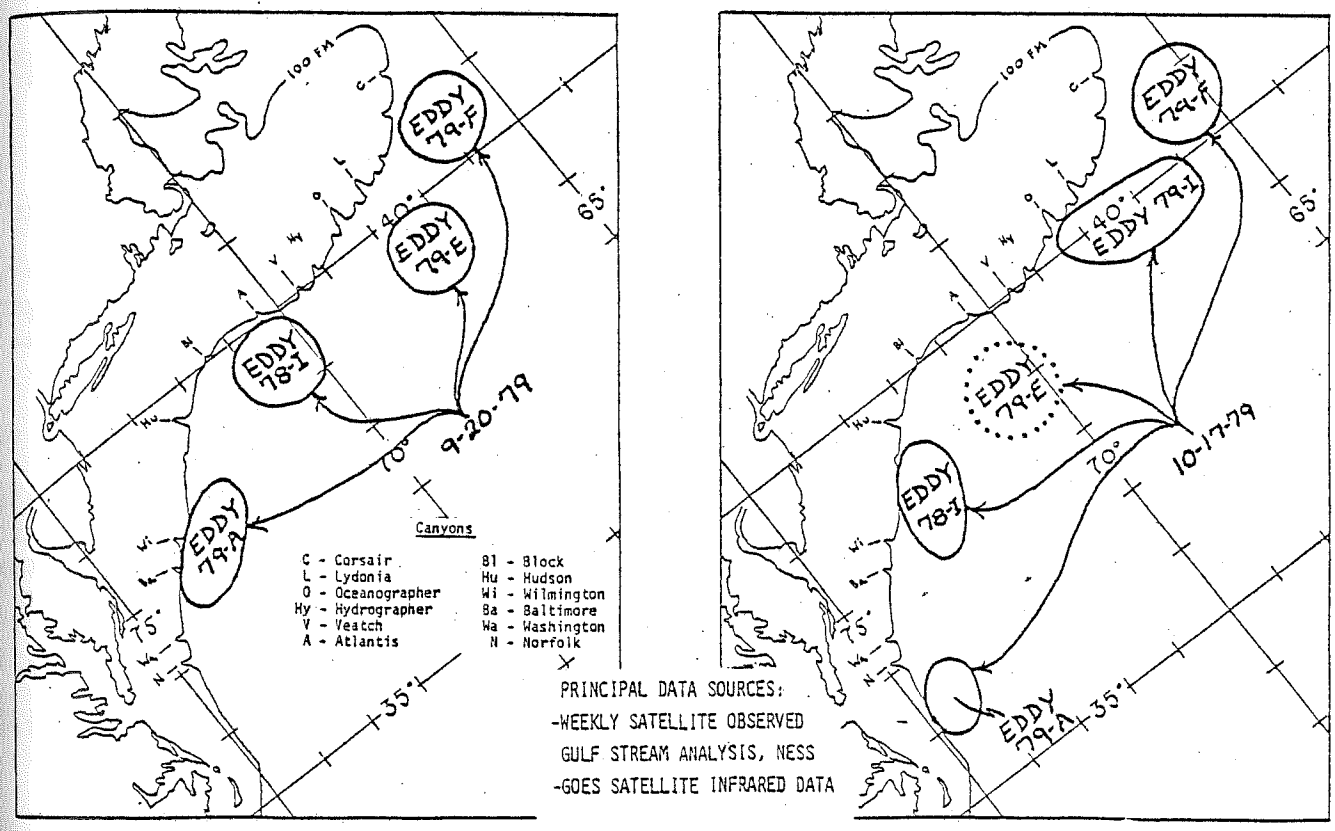
GULF STREAM EDDY LOCATIONS AEG/Oct. 19, 1979

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-October.

Eddy 78-A moved SSW about 125 nm (230 km) to a position centered at about 36.3°N, 74.4°W, south of Norfolk Canyon where it is being dissipated by the Gulf Stream. Eddy 78-I travelled about 115 nm (215 km) WSW to a position centered at about 38.5°N, 72.6°W, to the east of Wilmington Canyon. Eddy 79-E has not been clear in satellite imagery, but apparently moved west and then southwest a net distance of about 150 nm (280 km) to a location centered at about 39°N, 70.5°W, south of Atlantis Canyon. Eddy 79-F was apparently carried about 120 nm (220 km) to the NNE during the third week in September by a Gulf Stream meander off to the SE of the eddy. Since late September the eddy has moved south by west about 70 nm (130 km) to a location centered at about 40.7°N, 65.4°W, to the southeast of Corsair Canyon. Eddy 79-I has just been clearly seen in satellite imagery, and apparently is large and detached from the Gulf Stream in the beginning of October, centered at about 39.7°N, 70.2°W, south by east of Lydonia Canyon. It caused strong currents in the vicinity of Oceanographer Canyon during the record week of October and was partly located by XBT from the fishing vessel, Clear View IV, on October 14.

During the next 30 days 79-A will be dissipated, 78-I may move past Norfolk Canyon, 79-E to the south of Hudson Canyon, 79-F to the vicinity of Lydonia Canyon, and 79-I to Veatch or Atlantis 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).



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

Annual reports of the status of the environment for 1976 and 1977, respectively, were published recently as NOAA Technical Report NMFS Circular 427 and as an article in the May-June 1979 issue of Marine Fisheries Review (MFR). A limited number of extra copies of Circular 427 and reprints of the Atlantic and Gulf section of the MFR article are available from AEG.

Ocean Dumping Investigation

Ms. H. K. Langone has begun work on the physical oceanographic data from the June 1978 cruise aboard the Kelez. Corrected STD (salinity-temperature-depth) plots were produced over the past few months from this cruise and will now be analyzed. Ms. Langone and Mr. Jeffrey Hilland (AEG) have prepared for Gulfstream a short note regarding the unusual conditions which prevailed at Deepwater Dumpsite (DWD) 106 during the spring of 1978.

Meetings, Talks, Visitors, and Publicity

Mert Ingham traveled to Gloucester Point, VA, on 2 October to confer with researchers at the Virginia Institute of Marine Science for 2 days.

On 12 October, Jim Bisagni went to Rockville, MD, to attend the monthly staff meeting of the National Ocean Survey ocean dumping group.

Dr. Earl Droessler, Director of the NOAA Office of University Affairs, visited Mert Ingham on 16 October.

Mert Ingham and Jim Bisagni traveled to the Sandy Hook Laboratory on 17 October to confer with the Ocean Pulse Program staff. Jim returned to Narragansett, RI, and Mert went on to Columbia, MO, for meetings with the NOAA Environmental Data and Information Service's Climatic Impact Assessment Division on fishery climatology projects. He returned on 20 October.

The annual Middle Atlantic Bight Physical Oceanography Workshop, held at the State University of New York in Stony Brook, NY, from 23 to 25 October, was attended this year by three AEG members: J. Lockwood Chamberlin, Jack W. Jossi, and Steve Cook. Jack Jossi presented a paper titled, "The Undulating Oceanographic Recorder," by himself and Grayson B. Wood. Steve Cook also attended an academy training representative meeting at the Merchant Marine Academy in Kings Point, NY, while in the area.

On 29 October, Jack Jossi traveled to Charleston, SC, to participate in a MARMAP program review and returned on 30 October.

Mert Ingham attended the NEFC Board of Directors meeting held in Gloucester, MA, from 30 October to 2 November.

Publications

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NEFC PUBLICATIONS AND REPORTS

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