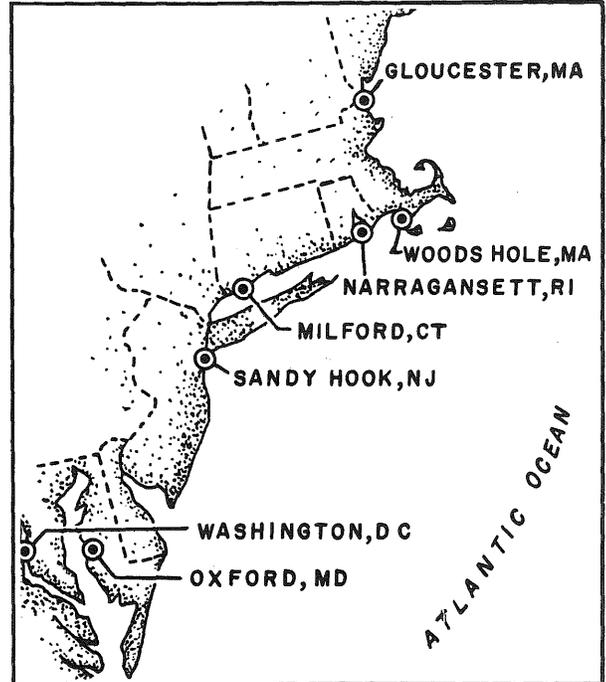


NEFC

Northeast Fisheries Center

NEWS

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JUNE 1980

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



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

CENTER DIRECTORATE

Fisheries Utilization Office

Dr. J. Perry Lane is the Gloucester Laboratory's representative on a Steering Committee of Cape Ann civic leaders who are coordinating a "Year of the Coast" celebration during 2-10 August. In addition to the assistance given by Dr. Lane at the Committee's periodic planning meetings, the Laboratory will hold its open house during the week of the Cape Ann celebration. Considerable local publicity is being generated for the event.

Special Scientific and Technical Projects Office

Significant progress was made during June on the Woods Hole pier contract. The contract was awarded to AGM Marine Contractors, Inc., for \$247 800 and the Notice to Proceed has been given. All permits have been received along with the first delivery of piles. A pre-construction meeting will be held and test piles will be driven within the next few weeks.

The gear comparison tests on the recent sea scallop survey cruise were highly successful, providing good size-selection data between a lined and unlined survey drag. The scallop trawl was tested and seems to work well.

A videotape of the underwater operation of a clam dredge and the subsequent path survey was shown at the combined Shellfish Institute of North America and National Shellfisheries Association (SINA-NSA) meeting in Hyannis, MA. It was well received and has initiated many requests for more information.

The Woods Hole Oceanographic Institution's (WHOI) R/V Bird of Passage was outfitted for a joint NMFS/WHOI shark tagging expedition.

The paper on the electro-hydraulic clam dredge was completed and sent out to Marine Technology Society.

RESOURCE ASSESSMENT DIVISION

Resource Surveys Investigation

The second leg of the 1980 sea scallop survey was conducted on the NOAA R/V Albatross IV from 3 to 12 June with Henry Jensen as Chief Scientist and Andrew Thoms and Elizabeth Bevacqua participating. Mark Lundy, a biologist with the Canadian Fisheries and Marine Service in Halifax, NS, participated on this cruise. Spring bottom trawl survey data have been corrected and are ready to be placed on computer tape.

Steve Selden, a summer student, started his fourth summer with the Investigation.

Pat Twohig developed specifications for a 0.75-inch "U"matic TV system to be purchased by the NOAA Manned Undersea Science and Technology Office and used for NEFC diving operations. Jim Crossen continued preparing for the surf clam - ocean quahog survey cruise this summer. Jim is also preparing to participate in a hydro-acoustic experiment in Norway next month.

Tom Azarovitz, Chuck Byrne, and Linda Despres continued to work on the final report to the US Bureau of Land Management summarizing historic bottom trawl survey catch data.

Fishery Biology Investigation

Ambrose Jearld worked with Vi Gifford and Ralph Mayo to prepare a final draft of the redfish age validation paper to be presented at an upcoming meeting of the Northwest Atlantic Fisheries Organization's (NAFO) Scientific Council.

Finfish

This month Brenda Fields completed age determinations of 1978 commercial summer flounder samples. She also began aging 1979 commercial samples.

Cathy Rearden began back-calculating a subsample of the 1979 New Jersey recreational bluefish scale samples. She also completed red hake FISHMAP plots for a joint research project.

Louise Dery spent the week of 2-6 June training Fran Pierce of the Maine Department of Marine Resources in the aging of red, white, and silver hake, and to a lesser extent American plaice. Red hake of the 1979 fall bottom trawl survey were sectioned, aged, and summarized. Atlantic mackerel of the 1980 spring bottom trawl survey were processed for lengths, weights, and otoliths.

Shellfish

Maurice Crawford continued aging sea scallops, and, with Maureen Griffin, began aging surf clams from NOAA R/V Delaware II Cruise No. DE 78-07. Approximately 500 surf clams and 400 sea scallops were aged.

John Ropes participated in the 72nd Joint Annual Shellfish Institute of North America -- National Shellfisheries Association Convention and Meeting in Hyannis, MA, by presenting a paper, "Size and Age at Sexual Maturity of Ocean Quahogs, Arctica islandica Linné, from a Deep Oceanic Site;" a manuscript on the same subject is being prepared for a meeting of the International Council for the Exploration of the Sea (ICES) during the month. Photographic records of marked ocean quahogs recovered after 1 yr of release were in preparation. A data report on the occurrence of horseshoe crabs was assembled. The data were garnered from several types of survey cruises. These data are to be used in a manuscript about the distribution of the horseshoe crab on the eastern North American continental shelf, done in cooperation with Dr. Carl Shuster of the Federal Energy Regulatory Commission.

Progress on renovating the inside of the cottage used by the Fishery Biology Investigation at the Woods Hole Laboratory has ceased due to a lack of funds. Fixtures and materials for finishing the two bathrooms are on hand, but not installed.

Age and Growth

Kris Andrade completed aging both the haddock and pollock age samples from the spring bottom trawl survey cruises, Delaware II No. DE 80-02 and Albatross IV No. AL 80-03.

Judy Penttila checked the aging work done by the new Atlantic cod age reader for the Massachusetts Division of Marine Fisheries, Doris Jimenez. Cod age samples from the following bottom trawl survey cruises were checked for accuracy: Delaware II No. 78-05; Albatross IV No. AL 78-09; Albatross IV No. AL 79-08; and Delaware II No. DE 79-09. Judy also spent 1 day aging cod samples with Doris in order to help her resolve some of the aging problems she was having. Judy spent 2 days working with Jim Hayes from Northeastern University to help him prepare scale impressions and then age several samples of winter flounder.

Sandy Hook Investigation

Stuart Wilk and Erin Feeney have begun preparation of a manuscript describing the historical and present exploitation of sciaenid species along the US East Coast. This manuscript will be presented at the Sixth Annual Marine Recreational Fisheries Symposium to be held in Houston, TX.

Stuart Wilk, with Brad Brown, made final revisions to a paper, "A Description of Those Fisheries, Which Take Place in the Western North Atlantic Between the U.S.-Canadian Border and North Carolina, Which Presently Have or Potentially Could Have User Group Allocation Conflicts," for inclusion in the Proceedings of the Technical Consultation on Allocation of Fishery Resources, which stem from a meeting held in Vichy, France, during 20-24 April 1980.

On 17 June, Stuart Wilk and Darryl Christensen, along with members of the US Coast Guard stationed at Sandy Hook, followed up reports of a whale sighting, which turned out to be a pilot whale of about 4.5 m and in good condition.

Darryl Christensen and John Clifford continued work on the manuscript of the 1975-77 charter and party boat survey conducted in New Jersey. The 1980 samples of Atlantic mackerel from the recreational fishery were shipped to the Woods Hole Laboratory for age analysis.

Wally Morse completed the first draft of a manuscript describing the reproductive biology of the summer flounder.

Fishery Assessment Investigation

Ralph Mayo, Steve Clark, and Steve Murawski attended the "Supervision and Group Performance" training course in Gloucester, MA, during 23-27 June.

Joe Wade participated as a member of the scientific crew aboard the Albatross IV cruise during 3-12 June.

Paul Wood participated in the Canadian sea scallop survey of eastern Georges Bank aboard the Canadian R/V E.E. Prince from 21 May to 5 June.

Kathi Rodrigues, Ralph Mayo, and Steve Clark completed summaries of the 1978 commercial sampling of haddock and pollock for submission to NAFO.

Mike Fogarty is coordinating the collection of papers on American lobster larvae research in New England to be submitted as a NOAA Technical Report NMFS SSRF. To date, Mike has distributed papers to reviewers in the US and Canada for comments. He also has a paper of his own (with M. A. Hymen and C. A. Griscom as junior authors) undergoing internal review -- "The Seasonal Distribution of Lobster, Homarus americanus larvae in Block Island Sound, 1978."

Emma Henderson and Steve Clark reviewed a manuscript for the American Fisheries Society. Emma also reviewed a draft manuscript for members of the Fishery Assessment Investigation. Emma and the Woods Hole Laboratory Automatic Data Processing (ADP) Unit are developing improved user guides for assessment software. She is also planning an auxiliary orientation/teaching manual for fisheries software for assessment personnel. On 9 June, Emma gave a seminar on a probabilistic model for virtual population analysis. She is presently working on a variance estimate for catch-at-age calculations and is teaching a weekly class on basic assessment models.

Margaret McBride, Annette Noble, and Charles Byrne are presently working on a study involving statistical analysis of fishing power and gear differences between the Albatross IV and the Delaware II.

On 7 June, Harold Foster, Annette Noble, and Margaret McBride participated in the Mass-Pep Parent-Student Symposium as role models for information regarding careers in fishery biology and statistics. Margaret also was a panel member for a career information seminar sponsored by the Woods Hole Laboratory Federal Women's Program Committee on 19 June.

Gordon Waring, Margaret McBride, Harold Foster, and Brad Brown attended Equal Employment Opportunity (EEO) courses, "Focus on Understanding" and "EEO on the Committee," during 10-12 June in Point Judith, RI.

Steve Murawski initiated processing of surf clam length-weight data from Delaware II Cruise No. DE 80-01 with Ruth Gudtar, a volunteer from Roger Williams College. Steve also began assessment updates on surf clam and ocean quahog for Amendment Three of the Surf Clam-Ocean Quahog Fishery Management Plan.

Thurston Burns completed a yield-per-recruit analysis of American lobsters for the Lobster Plan Development Team.

Senior Assessment Scientists

Emory Anderson completed analysis for estimating maximum sustainable yield for pelagic sharks in the western North Atlantic. Emory also began work on preliminary assessment of black sea bass in the Middle Atlantic region.

Steve Clark began definitively reviewing Gulf of Maine northern shrimp assessments.

Fred Serchuk began analysis of sea scallop dredge selectivity data derived from the 1980 Albatross IV sea scallop survey. Alternate tows were accomplished using 8-ft lined and unlined sea scallop dredges. Preliminary data indicate that for sea scallops less than 60 mm in shell height, the lined dredge was two-to-four times as efficient in capturing sea scallops than the unlined dredge. For individuals greater than 60 mm in shell height, the unlined dredge was approximately 30% more efficient than the lined dredge in capturing scallops. Fred also continued length-weight and age & growth analyses of commercial samples of sea scallops from offshore areas in the Gulf of Maine.

Brad Brown attended the Center Promotion Committee meeting this month and also dealt with senior promotion concerns in a meeting on the 4th with Chris Phee of the NMFS Personnel Office in Washington, DC. Other management activities that consumed considerable time were those related to budget details of the Division for the remainder of the fiscal year. On Friday, 6 June, Brad and Mike Sissenwine met with Guy Marchesseault to discuss cooperative work towards evaluating potential effort management in the Northwest Atlantic fisheries.

During June, Brad was also involved with: (1) the Washington Office of the Farmers Home Administration concerning fishery resources in the Northwest Atlantic as a basis for making loans to processing plants; (2) representatives of EG&G and Normandeau Associates concerning production of information material on Georges Bank resources relative to oil drilling evaluation studies; (3) NMFS Offices in Washington, DC, concerning Canadian predictions of future US catches; and (4) Mr. Dery Bennett of the American Littoral Society concerning NEFC participation in a special issue of the Underwater Naturalist.

Vaughn Anthony participated in the Northeast Regional Office/NEFC Task Force on organization of the statistics function. He also initiated actions for the annual status of the stocks report.

University and Research Institute Relations and Activities

Ralph Mayo advised Loretta Sullivan, a University of Rhode Island (URI) graduate student, on the analysis of American plaice commercial catch and length data.

Steve Clark and Fred Serchuk provided assessment data on Atlantic cod, haddock, and yellowtail flounder to Dr. P. F. Lett of Marine Resources Analysts in Halifax, NS.

Steve also met with Dr. Earl Whitener of Louisiana State University in Baton Rouge, LA, on 11 June to review aspects of pandalid shrimp biology and ecology in the western Gulf of Maine.

Mike Fogarty met with Stan Cobb of URI to discuss aspects of lobster population dynamics to be reviewed in a chapter he is writing on "Fishery Biology of Lobsters and Crayfish" to be included in Biology of Crustacea, edited by Dorothy Bliss.

Steve Murawski met with Dr. Michael Ross of the University of Massachusetts at Amherst to discuss mutual work on witch flounder population biology.

On 25 June, Fred Serchuk met with Pat Gerrior, a graduate student at Southeastern Massachusetts University, in Woods Hole to discuss progress on her masters thesis on analysis of commercial deep-sea red crab catch and effort data.

On 23 June, Mike Sissenwine presented a lecture on population dynamics at the Isles of Shoals Marine Laboratory.

Brad Brown, along with Dr. Earl Droessler, Director of NOAA's Office of University Affairs, participated in a workshop on the development of a marine science consortium centered at Hampton Institute. Brad also made a presentation to a group from La Guardia Community College visiting the Woods Hole Laboratory. His talk involved a description of NEFC activities.

Meetings, Talks, Visitors, and Publicity

Henry Jensen, Donald Flescher, Malcolm Silverman, Linda Despres, and Evelyn Howe attended the American Fisheries Society's meeting at the Boston Aquarium on 18 June.

During 9-13 June, Tom Azarovitz attended the NAFO meeting in Halifax, NS.

The 72nd Annual Joint SINA-NSA Convention and Meeting was held in Hyannis, MA, during 8-12 June. Mike Fogarty, John Ropes, Fred Serchuk, Steve Murawski, Steve Clark, and Brad Brown attended these meetings on various days. On 11 June of these meetings, Mike Fogarty attended the Offshore Molluscs Session and Steve Murawski presented a paper titled "Population Biology of the Ocean Quahog, Arctica islandica in the Middle Atlantic Bight," coauthored by J. W. Ropes and F. M. Serchuk. During this same meeting, Steve Clark presented a paper titled "Assessment and Management of the Gulf of Maine Northern Shrimp Resource," coauthored by V. Anthony and R. J. Essig.

On 10 June of these SINA-NSA meetings, Fred Serchuk organized and served as moderator of discussion on a special Offshore Mollusk Panel. Two panel forums were conducted: one on "Ocean Quahog/Surf Clam Fisheries: Research and Development," and the other on "Sea Scallop Fisheries: Research and Development." Invited panelists making presentations included: Dr. Richard Lutz of Rutgers University; Mr. John Bryson of the Mid-Atlantic Fishery Management Council; Mr. John Borden of The Gorton Group; Mr. Joseph Mueller of the NMFS Northeast Regional Office; Dr. Guy Marchesseault of the New England Fishery Management Council; Dr. Glen Jamieson of Fisheries and Oceans, Canada; Mr. David Bolivar of National Sea Products, Canada; and Mr. James Costakes of the New Bedford Seafood Producers Association.

During the SINA-NSA meeting, Brad Brown, Fred Serchuk, Steve Murawski, John Ropes, and representatives from Rutgers University met with key industry representatives to discuss ocean quahog problems.

During 3-6, June Ambrose Jearld attended the NAFO Scientific Council meeting as an American observer and to present a redfish age validation paper during the Age and Growth Session of the meeting. The meeting was held at the Bedford Institute of Oceanography in Dartmouth, NS. On 7 June, he participated in the Second Annual Mass

Pre-Engineering Program for Minority Students Workshop. The Program has been extended to include science, mathematics, and technology. The Workshop was held at the Maddison Park High School in Roxbury, MA. Ambrose made final preparations for and delivered a paper on 11 June dealing with "Variability in Size at Age and Year Class Strength in Surf Clam, Spisula solidissima Dillwyn, Populations Off the Delmarva, Peninsula." He also delivered a paper at the 72nd Annual Joint SINA-NSA Convention and Meeting in Hyannis, MA, during 8-12 June.

Loretta O'Brien is still on training assignment at Kansas State University.

On 13 June, Fred Serchuk met with Dr. Glen Jamieson of Fisheries and Oceans, Canada, to discuss sea scallop research, and on 6 June, with Paul Perra, a research biologist at Battelle-Clapp Laboratories in Duxbury, MA, to discuss current resource assessment activities.

On 18 June, Ralph Mayo and Gordon Waring attended a meeting of the Southern New England Chapter of the American Fisheries Society at the New England Aquarium in Boston, MA. Ralph also attended an IYABA meeting at the Gloucester Laboratory on 30 June.

Paul Wood attended the New England Fishery Management Council (NEFMC) meeting during 24-26 June in Peabody, MA. On 24 June, he attended a meeting of the NEFMC's Sea Scallop Oversight Committee.

On 5 June, Emory Anderson attended the Mid-Atlantic Fishery Management Council's (MAFMC) Scientific and Statistical (S&S) Committee meeting in Philadelphia, PA.

Brad Brown, Fred Serchuk, Steve Clark, Emory Anderson, Vaughn Anthony, Geoffrey Lawrence, Mike Sissenwine, and Dick Hennemuth were present at the US-Canadian assessment meeting held at Bedford Institute of Oceanography in Dartmouth, NS, on 17 and 18 June. This meeting covered discussions emphasizing program review and avenues of future research.

Mike Fogarty and Thurston Burns met with the Lobster Plan Development Team on 18 June at the NEFMC's headquarters in Peabody, MA. Mike also attended the MAFMC's Summer Flounder S&S Committee meeting on 24 and 25 June in Norfolk, VA.

Margaret McBride, Harold Foster, and Fred Serchuk attended the regular monthly meeting of the Woods Hole Laboratory EEO Committee on 3 June.

During 9-12 June, Joan Palmer and Thomas Azarovitz attended the NAFO Scientific Council meetings held in Dartmouth, NS.

Brad Brown met with the representatives of the Barnstable County (MA) Extension Service/4H staff on Cape Cod concerning affirmative action consultation at their request for NEFC assistance.

Vaughn Anthony attended the NAFO Scientific Council meetings during 2-6 June. He is presently attending meetings of the ICES Advisory Committee on Fisheries Management.

On 5 June, Stuart Wilk attended the MAFMC's S&S Committee meeting in Philadelphia, PA. On 18 June, he met with Jack Wise from the NMFS Office of Policy and Planning to discuss the Marine Recreational Fishery Program within the NEFC. On 19 June, he met with the Northeast Regional Office staff in Gloucester, MA, to discuss the application of the "PARTS" computer system to plan fishery management coordination. On 24 and 25 June, he attended a meeting of the State-Federal Program's Summer Flounder S&S Committee in Norfolk, VA.

Wally Morse attended the EEO Training Seminar on 11 and 12 June at Narragansett, RI.

Darryl Christensen was elected Chairperson of the Sandy Hook Laboratory EEO Committee.

Reports

Anderson, E. D. MSY estimate of pelagic sharks in the western North Atlantic. Woods Hole Lab. Ref. Doc. No. 80-18;1980. 12 p.

MANNED UNDERSEA RESEARCH AND TECHNOLOGY PROGRAM

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

MARINE ECOSYSTEMS DIVISION

Larval Fish Dynamics Investigation

Experimental Studies

The joint NMFS-US Fish and Wildlife Service (USFWS) study of the effects of existing contaminant burdens on the viability of striped bass eggs from selected East Coast river systems was continued. Samples of the spawning adults, unfertilized eggs, and fry at hatching, 26, 45, and 60 days were frozen for contaminant residue analysis and biochemical studies by the USFWS's Columbia National Fisheries Laboratory. Samples of the spawning adults, unfertilized eggs, and larvae at hatching, first feeding, 7, 14, 21, and 26 days were taken for analysis of total RNA, DNA, protein, lipid, and carbohydrate at the Narragansett Laboratory.

All larvae samples from day 26 on were photographed for growth determinations. Analysis of RNA, DNA, and protein in all samples taken through day 21 is nearing completion. This study will provide an opportunity to look further at the relations between RNA-DNA ratio and growth rate and the relationship between paternal inheritance and subsequent growth and conditions of offspring. It will also provide an opportunity to evaluate the RNA-DNA ratio technique as a tool for monitoring the effects of pollutants on the early life stages of an important marine fish.

Preliminary results from a study of haddock and winter flounder reared at four temperatures suggest that while temperature at or below the optimal level markedly affects growth rate, the RNA-DNA ratio is not similarly affected.

Selected plankton samples from the intensive discrete sampling design conducted aboard Soviet R/V Evrika Cruise No. 80-02 were examined to determine the best approach to processing and the effort involved prior to complete analysis for larval fish food organisms.

Larry Buckley and Tom Halavik attended 3 days of EEO Training in Narragansett, RI. Larry Buckley participated in 5 days of supervisory training in Gloucester, MA. Geoff Laurence presented an overview of research in the Marine Ecosystems Division at a joint US-Canada workshop on fishery assessments in Halifax, NS.

Population Processes

Greg Lough and Mike Pennington revised a draft of a Gompertz growth model manuscript. Estimates are based on otolith daily growth increments of larval Atlantic herring.

George Bolz and Greg Lough have reviewed for quality control and stored in the computer data from 0.333-mm mesh net samples of larval Atlantic herring taken as part of the International Commission for the Northwest Atlantic Fisheries (ICNAF) time series. They are now producing Georges Bank larval herring abundance and mortality estimates for the 1971-77 seasons.

Dave Potter assisted in the pre-cruise logistical support for the Evrika Atlantic cod-haddock larval microdistribution study. Dave also issued "NEFC Energy Newsletter No. 6," concerning the optimum size of solar collector systems, and a manuscript for Dr. Saul Saila's fishery biology course at URI. Dave is now completing work on a 1-yr study of neustonic ichthyoplankton collected on the ICNAF larval Atlantic herring surveys.

Roz Cohen worked on two papers. The first concerns larval Atlantic herring condition factors. The second concerns larval herring biomass estimates. Roz and Janet Murphy also worked on computerized data summaries of 1976-77 larval herring gut contents and condition factors. Roz Cohen attended Federal Women's Program and EEO meetings and also attended a 2-day career development seminar in Boston sponsored by the US Office of Personnel Management.

Hal Merry spent most of June servicing the PET computer and helping Greg Lough with acquisition of the HIAC particle counter and related computer interfacing.

Ecosystem Dynamics Investigation

Marv Grosslein was on special assignment with the UN Food and Agriculture Organization in Casablanca, Morocco, from 28 May to 13 June. Two other instructors and he taught a training course on hydroacoustics and trawl surveys to 35 fishery biologists from six northwestern African countries plus Spain and France. Marv presented a series of lectures covering the theoretical and practical aspects of designing and interpreting trawl surveys. The instructors and he are preparing written summaries of their lectures which will form the basis for a manual of survey techniques for developing countries.

Upon his return from Casablanca, Marv went to Washington, DC, to help draft a final research and monitoring plan for assessing the effects of oil and gas production on Georges Bank. After approval by the Georges Bank Biological Task Force's sub-committee on Monitoring, the plan will be presented to the Task Force on 14 July.

Mike Pennington started an analysis of the bottom trawl survey data on Atlantic cod with Fred Serchuk. In addition Mike worked with Rich Langton on the analysis of stomach-content variability.

Benthic Dynamics Investigation

The manuscript on silver hake by Ray Bowman and Edgar Bowman was accepted for publication. A final draft on digestion in winter flounder was also submitted for publication.

Roger Theroux continued to work on his bivalve report; he also obtained a quote on production of the final 125 figures. Work continued on the revision of the northern (including Georges Bank) biomass report. Theroux consulted with Cynthia Carlson (WHOI) regarding the availability of benthic data for US-Canada negotiations on the 200-mi limit. He also worked with Tom Leschine, Judy Spiller, and Ann Martin (all WHOI) with regard to our joint research effort to map the benthic data in the region of the oil-tract lease sites. Roger also provided emergency photographic assistance for Robert Edwards, Donald Flescher, Ray Bowman, and Steven Murawski.

Ray Bowman revised and resubmitted the silver hake paper that was accepted for publication. He also completed the rough draft of a laboratory report summarizing the available data on feeding periodicity and catchability of demersal fish from a 1978 cruise of the Soviet R/V Belogorsk. Finally, Ray prepared for the upcoming cruise on the Evrika.

Rich Langton participated in a 3-day EEO training course held in Point Judith, RI, during 10-12 June. He also gave a brief talk to a group of college students from LaGuardia Community College on marine ecosystems research. Ray consulted with Drs. Ted and Ann Durbin (URI) with regard to utilizing the fish food habits data base to predict daily rations. The Durbin's also participated in a "stomach meeting" in which potential ICES documents and appropriate authors were identified. Potentially, four ICES documents relating to food habits research will be prepared and submitted for this year's meetings. Rich began work on generating the data for one of these documents on the question of sample variability and the optimum number of stomach samples to collect.

Jim Towns and Jackie Murray updated the 1973-76 food habits data base and coded log sheets from more recent cruises.

All the people in the Benthic Dynamics Investigation were involved in a move this month. A good deal of time has been spent reorganizing office space, lab space, etc.

Our best wishes go to Betty Murray who retired on 30 June after 36 yr of Federal Service!

Ichthyoplankton Investigation

Because of untimely vessel breakdowns and the consequent need for a last-minute reshuffling of the vessel schedule, our May-June MARMAP (Marine Resources Monitoring, Assessment, and Prediction) I survey, which began on Delaware II, was completed on Evrika on 30 June. The efforts of H. C. Boyar, Scientific Vessel Coordinator; the cooperation of Evrika's crew and scientific party; the assistance of John Antonellis and others in transferring equipment between ships; and finally, the patience and perseverance of John Sibunka and other members of the American field party, made it possible to complete 149, or 85%, of the scheduled stations. Our next survey begins in mid-July and runs through mid-August, again on Evrika. Preparatory efforts for this summer survey are underway. Arrangements have been made through Tom Azarovitz to sample plankton and neuston in the Canadian zone during the July-August time period when Albatross IV will be involved with the summer bottom trawl survey. These samples will complement those taken by Evrika in the American zone.

In addition to their other duties, most of the staff is involved in collating data and drafting manuscripts for the fall ICES meeting in Copenhagen. Peter Berrien is working on an estimate of yellowtail flounder spawning biomass, based on distribution and abundance of eggs. Wally Smith, Donald McMillan, Myron Silverman, Patricia Rosenberg, and Alyce Wells are describing seasonal and annual changes in the distribution, abundance, and species composition of eggs and larvae off our Northeast Coast from 1977 through 1979. Mike Fahay is preparing a short description of his guide to identification of fish eggs and larvae from the western North Atlantic.

Oceanic Gamefish Investigation

The capture of a giant white shark highlighted a productive June. The 1950-lb mature male was sampled by Wes Pratt and Chuck Stillwell on 26 June. Reproductive, age, and bioenergetic samples were taken after a body cast was made by a Long Island taxidermist. An impression of the shark is to be donated to the American Museum of Natural History in New York City. This shark, harpooned by Frank Mundus off Montauk, NY, follows by a few weeks the capture of a 633-lb immature male off Moriches Inlet, NY, which was sampled for us by Bob Conklin, one of our cooperators on Long Island.

The Bay Shore Mako Tournament (BSMT), which we have monitored since 1963, represents the most complete set of catch records for sharks on the East Coast. On 28 and 29 June, we sampled both the BSMT and a new shark tournament run by the Jersey Coast Sharkers in Brielle, NJ. During these two tournaments, approximately 300 boats caught 482 sharks of which 342 were brought to the dock and about 100 were tagged and released. The majority of the catch was made up of mako and blue sharks. Unusual specimens included a 405-lb white at Bay Shore and a 381-lb thresher at Brielle. Eight tagged sharks were recaptured at the tournaments (two at Bayshore, six at Brielle). These included six blue sharks and two makos. Three of the six blue sharks were short-term recaptures. Of the remaining blue sharks, two were tagged south of Long Island while the other was tagged by a NMFS observer in a Japanese longliner off Cape Hatteras. These fish were at liberty for up to 11 mo. The two makos that were recaptured were at liberty for almost a complete year. One of these fish was tagged and recaptured at the same shark tournament a year later.

Wes Pratt and Larry Lindgren removed vertebrae from 15 male makos from 32-60 lb to test Wes's estimates of size during the first 3 yr of life (0, I, II). Reproductive samples were taken from the aforementioned 405-lb white and selected other sharks.

On the same day (27 June), a 463-lb male mako was sampled for us by Bob Conklin at Moriches. This is the largest male mako (by over 100 lb) that we have ever sampled. The vertebrae were thus a very valuable addition to our age collection.

A previous tournament on 14 June was sampled by Wes and Alan Lintala at Moriches, NY. Sixty-three sharks, mostly blues, were landed.

Food habits data were collected from sharks landed at the sport fishing tournaments held at Brielle, NJ, and Bay Shore, NY. Between the two tournaments, 65 stomachs (from mako, blue, sandbar, white, common thresher, and tiger sharks) were examined. Almost 50% of them were empty. The mako was the only species usually containing food which consisted almost entirely of large bluefish (8-12 lb).

Maximum stomach water volumes were determined from selected sizes of makos and blue sharks and from all sizes of the other species examined. This measurement will be used to calculate the average theoretical maximum volume of food that can be consumed by a shark at one meal. Once this value is established for each species of shark being studied, an attempt will be made to estimate the maximum biomass consumption levels of the major shark species occurring along the coast from Cape Hatteras to Southern New England.

Liver weights from male blue sharks were also collected at the above tournaments. These weight values will expand our data base for June males and permit more statistically sound comparisons with June females and October males. Preliminary analysis of liver weight data suggests there is no statistical increase in liver weight over a short time period (1-2 mo). A definite increase in weight was seen, however, when March and October (8 mo) data were compared.

Chuck Stillwell presented a seminar to Narragansett Laboratory personnel. The subject was an overview of the Oceanic Gamefish Investigation (formerly the Apex Predators Investigation) food habits study with some interesting findings to date. Nancy Kohler sailed aboard the WHOI boat Bird of Passage for the first leg of a cooperative cruise with Dr. Frank Carey of WHOI. The purpose of the cruise is to study digestion rates in blue sharks with the aid of sonic telemetry instrumentation and to track swordfish to monitor their diel behavioral activities.

Our spring newsletter, "The Shark Tagger," was mailed to 2000 cooperative taggers on 12 June.

On 25 June, Wes Pratt lectured at a clinic on underwater photography at URI.

Plankton Ecology Investigation

Jack Green and Bob Marak journeyed to Solomons, MD, to evaluate the performance of the National Ocean Survey's Engineering Development Laboratory's towed, clean-water pumping system. The sampling capability of the towed pump was compared to that of the 20-cm bongo nets aboard the R/V Laidley in the Patuxent River Estuary. Preliminary inspection of the pump samples indicated that the plankton was in excellent condition, whereas bongo samples from the seine area were badly clogged by gelatinous organisms making it difficult to evaluate the relative effectiveness of the two systems. An attempt was made to compare the Engineering Development Laboratory's pump with the plankton pumping system built at the Narragansett Laboratory and used on Evrika Cruise No. 80-02, but the research vessel was unable to supply adequate electrical power to start the pump. Cooperative work with this group is being pursued further.

Jerry Prezioso, with the help of Tim Clays, sent a shipment of plankton to the Polish Plankton Sorting Center in Szczecin, Poland. The shipment included samples from Evrika Cruise No. 80-01, Albatross IV Cruises No.'s AL 80-02 and AL 80-03, and Delaware II Cruises No.'s DE 80-02 and DE 80-03. Prezioso has been examining the 1977-78 zooplankton sorting records for location and abundance of euphausiid species and has plotted these data by stage of development and species. Jerry has been helping Joe Kane with the microscopic examination of the discrete-depth, 0.333-mm mesh net samples from Evrika Cruise No. 80-03. Joe's results from the first samples sorted show highest densities of larval haddock at 15 m in the early evening hours. Haddock are the most abundant ichthyoplankton in these tows with numbers up to 350 in a 5-min tow. Joe is also currently revising for publication his first draft on dry weight - wet volume relationships of zooplankton.

Jack Green and Donna Busch met with Igor Sigaev on 1 July to discuss the temperature data from Evrika Cruise No. 80-02 for a contribution to the "Coastal Oceanography and Climatology Newsletter."

Bob Marak met with Jack Pearce and Robert Reid to discuss prioritization of samples to be analyzed from the GAS I (Gulf-Atlantic Survey) cruise. Samples were selected that would maximize the use of data to be collected in the New York Bight this summer for petroleum hydrocarbon studies of fish and invertebrates.

Bob Marak and Ken Sherman attended a strategic planning meeting at the Woods Hole Laboratory with group members from that laboratory.

Official word was received from the US Department of Energy that our \$75 000 energy proposal was accepted. Considerable interest has been shown by numerous contractors who will be submitting proposals for design and construction of the active and passive systems.

Donna Busch supplied chlorophyll and productivity data reports to the Woods Hole Laboratory Director, located data for Dr. Yuri Senin aboard Evrika, and prepared phytoplankton sampling equipment for the upcoming MARMAP cruise during July and August. On that latter cruise, phytoplankton will be sampled at four depths on Georges Bank and in the Gulf of Maine and analyzed by Zofia Ringer of Dr. Stefan Grimm's laboratory in Gdynia, Poland. Equipment has been made available to assist Soviet scientists in setting up their own primary productivity unit as part of our cooperative research agreement.

Meetings attended by Donna Busch were Brookhaven Symposium in Biology, Number 31, "Primary Productivity in the Sea," held during 2-5 June at Brookhaven National Laboratory in Upton, NY, and an IYABA meeting at the Gloucester Laboratory on 30 June.

Biostatistics

New master files were created for 1979 MARMAP cruises: Albatross IV Cruise No. AL 79-13 and Belogorsk Cruises No.'s 79-03 and 79-05; and for the 1978 larval Atlantic herring patch study cruises: Albatross IV Cruises No.'s AL 78-13 and AL 78-14 and Polish R/V Wieczno Cruise No. 78-04. Editing is being done on four 1980 cruises. Ichthyoplankton data for Albatross IV Cruises No.'s AL 79-06, AL 79-11, and 79-13 have been merged into master files. Bob Sand is working on the zooplankton data backlog and completed merging data for four 1977 MARMAP cruises and for six pre-1977 ICNAF cruises into the master files.

Contours of abundance of three species of copepods for the 1978 MARMAP surveys were completed by Steve Eldridge and Lorrie Sullivan, and are being reviewed for quality control. Cindy Jones is working on the statistics for the 1979 data, having completed analysis of the 1978 data. She and Tom Plichta have begun summarizing volume data.

Julien Goulet spent 23-37 June in supervisory training in Gloucester, MA. Julien attended a Geographic Information Analysis Workshop in New Haven, CT, on 3 and 4 June. He also attended a MULTICS workshop at the US Geological Survey in Woods Hole on 17 June.

Lorrie Sullivan spent 2 wk working with Ralph Mayo of the Resource Assessment Division pulling together commercial and survey American plaice data and spent a day with Louise Dery, also of the Resource Assessment Division, and Fran Pierce, of the State of Maine, learning aging techniques using otoliths.

Carolyn Griswold reviewed and prepared comments on two plans for monitoring the effects of oil and gas development on Georges Bank: one which was submitted to the Georges Bank Biological Task Force (BTF) by a group sponsored by the URI Center for Ocean Management Studies, and another which was the plan developed by the BTF's Subcommittee on Monitoring. She also reviewed NOAA's "Five-Year Pollution Monitoring Plan," the Northeast Monitoring Program, and the "Habitat Protection Strategic Planning Document." Revisions were also made to the NEFC's draft oil spill plan.

Carolyn Griswold and Mert Ingham attended a conference on the Impact of Pollution on Society held on the URI Bay Campus during 23-25 June.

On 18 June, Lorrie Sullivan, Cindy Jones, Jerry Prezioso, Wes Pratt, Chuck Stillwell, Jack Casey, Nancy Kohler, Al Smigielski, Carolyn Griswold, and Tom Halavik attended a meeting of the Southern New England Chapter of the American Fisheries Society at the New England Aquarium in Boston.

Fishery Oceanography Investigation

Several members of the group were involved with the MARMAP cruise on Delaware II (Cruise No. DE 80-03) until it was terminated early to permit the vessel to take part in the Superflux study. Art Allen, Bruce Davis, Ron Kirschner, and Dan Patanjo all participated in various portions of the cruise. Dan was put ashore in Woods Hole after chemicals used in dissolved oxygen analysis accidentally got in his eye. There were no ill effects.

Salinity determinations from the cruise samples were performed by Sam Nickerson, Cindy Chappell, Jim King, and Roger Hernandez. Sam also read the XBT traces, plotted station positions and surface temperatures for Delaware II Cruise No. DE 80-03, and prepared plots of surface and bottom temperature and surface salinity for the 1980 spring bottom trawl survey.

Dan Patanjo, aided by Jim King, Bruce Davis, and our new Northeastern Co-op student, Bob Buckman, has been drafting vertical transects of temperature, salinity, and oxygen distribution from MARMAP cruises. This work includes a comparison of XBT and reversing-thermometer data where paired observations are available; the conclusion is that XBT's were a valuable supplement in the early years of the program but are now redundant and could be eliminated.

Steve Ramp completed the estimates of biweekly transport of both heat and volume through the Northeast Channel from 1976 to 1978. A preliminary calculation of nutrient transport suggests the Northeast Channel influx can account for one-half the nutrient requirement of Georges Bank.

Gil Dering continued to expand and modify the ARI (Asynchronous Reader Interface) programs which have greatly improved the versatility of our Tektronix terminal especially in dealing with current-meter and deepsea pressure records. Ron Schlitz and Steve Ramp have helped develop algorithms for ARI.

Art Allen has continued editing Canadian current-meter tapes from the 1978 larval Atlantic herring patch study, while Derek Sutton has been processing data from the Northeast Channel.

Ann Dorkins is calculating geostrophic transports from the Nantucket Shoals flux experiment's hydrographic sections for comparison with current-meter data, while Roger Hernandez prepared a surface temperature/salinity diagram from XBT sections along the flux line. Cindy Chappell completed typing volumetrical tables for a report with Kathy Bush.

Derek Sutton completed a prototype pressure-activated water sampler and expects to test it soon. If it works as planned, it will provide near-bottom water samples at bottom trawl survey stations for salinity and possibly other analyses. Derek has also been developing plans for modifying our marker buoys. Tom Laughton has disassembled and cleaned the current-meter cages, vanes, and rotors from the flux experiment.

Our STD (salinity-temperature-depth recorder) has been loaned to Bigelow Laboratory in West Boothbay Harbor, ME, for sampling in the Gulf of Maine and across Georges Bank frontal zones. Gil Dering prepared the instrument and provided instruction for Toby Garfield of Bigelow who will operate it from R/V Eastward.

Art Allen's note about a fireball sighting during the flux mooring recovery cruise in April was published in EOS on 17 June. Ron Schlitz continued work on his paper on upwelling mechanisms around Georges Bank.

Red Wright participated with Fred Serchuk and Jack Brennan in preparing recommendations for easing the parking situation at the Woods Hole Laboratory this summer.

On 23 June, Bill Miller of Orbisphere Corporation demonstrated new oxygen sensors in the Woods Hole Laboratory Conference Room. On 26 June, Red Wright participated in a Marine Ecosystems Division meeting at the Woods Hole Laboratory.

Tom Laughton graduated from Northeastern University and is back at the Woods Hole Laboratory. Bob Buckman, a new Co-op student from Northeastern, joined the group. Roger Hernandez, a Co-op student from Southampton College, transferred to the Woods Hole Laboratory ADP Unit and will work with Kay Paine. Roger also took a brief introductory computer course at WHOI in June.

Meetings, Talks, Visitors, and Publicity

Meetings

On 4 June, Kenneth Sherman attended the Center Promotion Committee meeting at the Woods Hole Laboratory.

On 5 June, Kenneth Sherman traveled to Washington, DC, to the office of the NOAA Associate Administrator, Dr. George Benton, for a briefing on the proposal for a NOAA Scientific Advisory Research Council.

On 6 June, Luther Bivins of URI met with Kenneth Sherman and personnel in the Narragansett Laboratory concerning the image-scanning project.

The Center EEO Committee met at the Narragansett Laboratory Conference Room.

The first NOAA Scientific Advisory Research Council meeting was held on 17 and 18 June at the Woods Hole Laboratory.

Ken Sherman attended a seminar at URI on 24 June, the Marine Ecosystems Division meeting at the Woods Hole Laboratory on the 25th, and a strategic planning meeting with George Ridgway on the 27th at Woods Hole.

Talks

Cindy Obenchain presented a talk on "Seasonal Distribution, Abundance and Correlation of Larval Fish Populations in the New York Bight from July 1974-June 1976," at the American Society of Ichthyologists and Herpetologists' 60th annual meeting in Fort Worth, TX, during 15-20 June.

Michael Fahay and Christopher Powell presented a talk on "An Approach To Identifying Eggs and Larvae of Urophycis-Phycis in the Middle Atlantic Bight and Gulf of Maine," at the same meeting.

Publications

Bowman, R.; Bowman, E. Diurnal variation in the feeding intensity and catchability of silver hake (Merluccius bilinearis). Can. J. Fish. Aqua. Sci. (A)

Huebner, J.; Langton, R. The rate of gastric evacuation and daily ration for winter flounder Pseudopleuronectes americanus (Walbaum). Can. J. Fish. Aqua. Sci. (S)

RESOURCE UTILIZATION DIVISION

Fisheries Engineering Investigation

The design of the experimental scallop drag has been completed and the plans are out for bid. Construction is expected to begin early July.

A test frame was designed and built for use in a mechanical and analog method of net modeling.

The hydrodynamic study of the Isaacs-Kidd mid-water trawl (IKMT) has been continuing this month with a total of 18 tows to obtain flow data. A calibration frame was built for calibration of the flowmeters used in the IKMT study.

Design research has commenced on a juvenile fish sampler.

A redesigned prototype squid ring cutter has been built. The gearing has been changed so that the knife blades turn three times as fast as the aluminum feed roller. This will allow better slicing action. As soon as a drop chute can be built and guards can be attached for safety, the new machine will be ready for testing. There is a temporary delay in this work since Dan Baker was appointed Center Coordinator for Occupational Safety and Health Administration regulations, and a significant amount of time is being spent on inspection trips to the various NEFC laboratories. So far, visits have been made to the laboratories at Oxford, MD, and Sandy Hook, NJ.

Engineering Assistance to Other NEFC Programs

The second trip on the M/V Marine Evangeline to collect XBT, salinity, and chlorophyll samples was completed by Tom Connors.

R/V Rorqual

Several cruises on the NOAA R/V Rorqual for IKMT studies were made. External maintenance work on the boat -- in preparation for the summer work season -- is being done in a continuing program to upgrade the vessel.

Facilities

Installation of the new steam boiler has been progressing. Bob Van Twuyver completed the conversion of one of the refrigeration units to a two-stage compressor which will result in greater low-temperature capabilities.

Training

Al Blott and Bob Van Twuyver attended a course on "Supervision and Group Performance" held in Gloucester.

Dan Baker attended an EEO training session on "EEO and the Committee" held at Galilee, RI.

Resource Development and Improvement Investigation

The collaborative study for crab species identification by isoelectric focusing is progressing. Two of ten collaborators have completed the test. We are working against an 11 July submission deadline for the resulting manuscript.

Kate Wiggin has been experimenting with agarose gel isoelectric focusing for crab species identification. She has also been working on methodology for nutrient analyses of seaweed. The texture of the seaweed is making it difficult to obtain homogeneity.

Texture of Boiled Squid

The objective of this study is to determine the relationship between texture readings on the Instron apparatus and texture evaluations of the taste panelists. Squid mantles were boiled for 1, 2, 4, 8, 16, and 32 min. A total of three taste tests were conducted, each consisting of 12 panelists. These taste panel scores were averaged and compared to the force readings obtained on the Instron for each

cook time. Thus far, a statistically significant correlation has been observed between the Instron readings and panel scores for the 2, 4, 8, 16, and 32-min cook times.

Preservation Technology

An experiment designed to determine whether potassium sorbate is effective in extending the shelf life of refrigerated Atlantic cod was completed. This experiment simulated conditions in a local processing plant that takes in a boat-load of fish on Friday and wishes to hold it over the weekend for cutting on Monday. The quality of their fish, which they have found to hold best in chilled seawater (CSW), was marginal after weekend holding. Accordingly, one lot of 1-day-old dressed cod was held in CSW containing 0.5% of potassium sorbate. Another lot (controls) was stored in CSW without sorbate. The CSW tanks were then placed in a refrigerated (35-40°F) room over a 3-day weekend. After storage, the plant owner pointed out that the sorbate-treated fish were distinctly superior in quality to the control fish as were the fillets that were cut from them.

Half of the fish from both the potassium sorbate and the control lots were filleted at the plant. The fillets were placed in plastic boxes and brought to the Gloucester Laboratory where they were placed on ice. The rest of the dressed fish were iced down in wooden boxes and stored in a refrigerator. Raw and cooked evaluations were done daily on both lots of whole dressed iced fish and the fillets cut from these fish, as well as on the fillets cut from potassium sorbate treated and control fish at the plant. The quality and shelf life of the fish were determined.

In this experiment, storing dressed cod over a weekend in CSW containing 0.5% potassium sorbate had a definite beneficial effect on the shelf life of the whole fish and the fillets cut from them. The following table shows the shelf life in days of the potassium sorbate-treated and control fish as determined by the organoleptic panel:

Type of evaluation	Type of treatment	
	Control	Potassium sorbate
Raw dressed fish held in ice	5	6
Raw fillets cut from same	8 ^(a)	13 ^(a)
Cooked fillets cut from same	8	13
Raw fillets cut after weekend storage and held in lidded plastic boxes with ice	7	13
Cooked fillets from same	7	13

(a) Although panelists scored gill color and odor as poor, fillets cut from these fish were acceptable.

Further experimentation along these lines is planned using older fish held in CSW and treated with potassium sorbate simulating in-plant weekend storage conditions. Also, the use of potassium sorbate-treated ice in which to hold freshly caught fish will be investigated.

New Product Development

The results from the experiment to determine the concentration of potassium sorbate detectable by the taste panelists in Atlantic cod fillets showed that a 30-sec dip in a 5% solution was not detected in either the scrod or market-sized fillets. The weight range was very large; even in the smallest fillet, though, no potassium sorbate was detected by our panel. Using these parameters, an experiment was set up to store at 34°F undipped and potassium sorbate-dipped fillets. The potassium sorbate-dipped fillets are still acceptable after 13 days, while the undipped control was not even acceptable after 5 days of storage. The surface pH of the stored samples is also being measured. This storage study will continue until the taste panel rejects the potassium sorbate-dipped samples.

Training

Judi Krzynowek attended a week-long course in supervision.

Vin Ampola attended an EEO training session at Narragansett, RI.

Product Quality, Safety, and Standards Investigation

Product Quality

The time-temperature-tolerance study with red hake fillet blocks has passed the 26th week. Samples stored at +10°F were borderline in quality after about 14 wk because of a tough fibrous texture. Other samples stored at +5°, -5°, -20°, or -80°F are still acceptable in texture and flavor and the organoleptic scores are commensurate with storage temperature. Shear-force values for samples stored at -80°, -20°, and -5°F were 243, 257, and 288 lb respectively. The value for the hake samples stored at -5°F was significantly greater, statistically speaking, than the values for the other two temperatures. The initial shear-force measurement was 235 lb. The dimethylamine-N content for the -5°F sample (approximately 12 mg/100 g) was also significantly greater than the values for samples held at -20° or -80°F.

Five-pound cartons of red hake fillets were frozen by three different methods as part of a study to determine the effect of freezing rate on textural stability during storage at 0°F. The time for the temperature at the center of the package to pass through the latent-heat-of-fusion phase, that is, going from 34° to 27°F, was about 30 sec for liquid nitrogen immersion, about 2.5 hr for plate freezing (plate temperature = -25°F), and about 7.75 hr for packages shelf-frozen at 0°F. Taste panelists rated the liquid nitrogen and plate-frozen samples comparable in texture, but the shelf-frozen sample was scored slightly lower. The dimethylamine content for the liquid-nitrogen-frozen sample was about half that of the shelf-frozen sample. Shear-force measurements on the liquid-nitrogen-frozen, plate-frozen, and shelf-frozen samples were 161, 206, and 214 respectively. The liquid-nitrogen-frozen sample was significantly softer, statistically speaking, and had less cook loss compared to the other samples.

Raw breaded red hake portions were prepared for the annual Gloucester Laboratory open house scheduled for August.

At the request of the US Fish and Wildlife Service and the New York Department of Environmental Conservation, a series of triangle taste tests were conducted on American shad taken from various locations to determine whether or not flavor differences existed. Males, females, and roe were tested separately. No significant flavor difference was observed among fish taken from different locations along the Delaware River, but Hudson River shad could be differentiated from Connecticut River shad.

In accordance with his duties as Center Coordinator for hazardous chemical waste storage/disposal methods, Mike Allsup visited the Narragansett Laboratory and the Oxford Laboratory for a safety evaluation. Recommendations will be made to the Center Directorate for corrective action. Mike also attended a course on hazardous chemical safety sponsored by the J. T. Baker Chemical Company.

A paper on a cooperative research project between the University of Massachusetts and the Gloucester Laboratory was presented at the annual meeting of the Institute of Food Technologists.

Product Safety

A large shipment of striped bass samples for polychlorinated biphenyl (PCB) analysis has been received from the NMFS Tiburon Laboratory. The samples were collected from the Sacramento River off Clarksburg, CA, the San Joaquin River off Antioch, CA, and the Coos River in Oregon. Samples of each fish consisted of muscle, gonads, and liver.

Our contractor for PCB analysis, John G. Reutter Associates, Inc., is not accepting any more samples. That firm has officially requested the Northeast Regional Office to terminate this contract. Since the firm is not realizing a profit from the \$22.50 per sample, it sees no need to continue this work. We are now doing all of the work-up and analysis of the samples. Fortunately, we are in a position to continue this work without any time loss.

Two kilograms of carp were received from the USFWS's Columbia National Fisheries Laboratory. The sample will be used as a blind reference sample for every set of samples being worked up for PCB's at the Gloucester Laboratory.

A proposal to conduct sampling of selected fish species for analysis of PCB content in the Southern California Bight has been received from the University of Southern California. Four sites and four species of fish for seasonal sampling at each site were detailed. Budget price for this work was quite high. Dr. Caillit of the Moss Landing Research Laboratory is unable to take on any additional work at the present time. The only other apparent source in this region is the State of California. A contract would be needed and collection would be on individual specimens.

Samples continue to be composited, homogenized, worked up, and analyzed routinely by gas liquid chromatography for PCB content.

Two students have recently joined our staff for the summer to assist in PCB analyses.

Product Standardization

An initial draft of a "U.S. Standards for Grades of Fish Steaks" has been typed. We were fortunate to have the Woods Hole Laboratory's Word Processing Unit type it. This draft is being circulated for informal comments.

The commercial item description (CID) for canned salmon has been accepted by the US Department of Agriculture (USDA) as an interim purchase document. We have been given to understand that this document is now being used for an immediate purchase of a large quantity of canned salmon.

A draft copy of a CID for canned tuna was prepared and forwarded to the Food Quality Assurance Division of the USDA.

Institutional meat purchase specifications for: (1) sausage products, (2) edible by-products, and (3) cured, dried, and smoked beef products were reviewed for the USDA's Food Quality Assurance Division.

We are continuing to assist in selection of species for the U.S. Army's North American Research and Development Command's (NARADCOM) nomenclature project. In addition, we obtained authentic samples of several less well known species of fish to use in species identification by thin-layer isoelectric focusing.

Preparations are being made for a visit by the Armed Forces Product Evaluation Committee to the Gloucester Laboratory on 9 July during their meeting at NARADCOM. A buffet of products prepared from non-traditional fishery items will be presented during their visit.

Comments by Regional Chiefs of Inspection on the interpretation of the "Breaded Shrimp Standard" regarding the correct method for determining count of breaded shrimp in reference to the presence of pieces are being resolved. A change will be made in the instructions for breaded shrimp to implement the change.

Comments were furnished to the NMFS Office of Utilization and Development on recommendations for proposed changes to the "U.S. Standards for Grade of Frozen Raw Scallops." We recommended that a grading survey be carried out to determine the effect of the changes on the distribution of "U.S. Grade A's."

Technical Assistance

Information and technical assistance were given in the following areas: fish processing and quality control; softening of fish bones; eels; fillet-portion nomenclature; fishery cooperatives and marketing associations; guaranteed fish quality study; trout farms; fish identification; cockles, periwinkles, and top shell; ling cod; oyster harvesting; parasites; squid processing; the Torrymeter; methods of determining if a fish has been frozen; use of an oxygen meter; labeling requirements; minced fish preparation; US Food and Drug Administration (FDA) acceptance methods for chemicals; fish species of New Zealand; use of a rocking chair dredge for quahogs; development of an FDA-approved artificial color for crab meat; use of potassium sorbate to extend shelf life of fish; review of "Fish Fact" circulars; preparation of fish sticks from minced fish and textured soy protein; smoking herring; fish processing equipment; use of microwave energy to open bivalves and cook fish; and home smoking of fishery products.

Meetings, Talks, Visitors, and Publicity

Meetings

Burt Tinker and Judi Krzynowek attended the annual meeting of the Shellfish Institute of North America-National Shellfisheries Association in Hyannis, MA, during 8-12 June.

Judi Krzynowek hosted the IYABA meeting at the Gloucester Laboratory.

Fred King participated in a meeting of the Center Incentive Awards Committee on 17 and 18 June.

Perry Lane attended the annual meeting of the New England Fisheries Steering Committee, meetings of the Planning Committee for the celebration of Cape Ann Week of the Coast, a meeting of the Northeast Regional Office EEO Committee, and a meeting with members of the Graduate School at the University of Massachusetts-Boston.

Visitors

Ken Hutchinson, Executive Director of the New England Marine Advisory Service (NEMAS), to review the NEMAS proposal for Fiscal Year 1981.

Mike Moser, Maine Department of Marine Resources, and Nate Bowditch, Maine Development Corporation, to discuss the guaranteed fish quality program.

T. M. Wong, University of Science for Bahavin Nassim, and Ibrahim Mohamed, University of Agriculture for Malaysia, to tour the Gloucester Laboratory and discuss ongoing research.

Paul Lamoureux, Quebec's Minister of Agriculture and Fisheries, to learn about the Gloucester Laboratory's work on quality control.

DIVISION OF ENVIRONMENTAL ASSESSMENT

Biological Oceanography of Stressed Ecosystems Investigation

Remote Sensing

The second Chesapeake/Delaware Bay and Plume Study (Superflux) occurred during 17-27 June. Again, it was a joint effort involving the NEFC/Division of Environmental Assessment, NASA/Langley Research Center, Old Dominion University, Virginia Institute of Marine Science (VIMS), University of Delaware, US Naval Academy, Anne Arundel Community College, State of Maryland Department of Natural Resources, Chesapeake Bay Institute, US Coast Guard, University of Miami, and the NOAA/National Ocean Survey/Atlantic Marine Center. Seven overflights were made by NASA. The NEFC supplemented five of the overflights by collecting sea truth, as well as the two additional overflights by processing chlorophyll samples collected as sea truth by others. The overflights were as follows:

- 17 June - Delaware Bay mouth using multispectral scanners and fluorosensors for chlorophyll, phytoplankton color groups, and turbidity, and an L-band radiometer for salinity.
- 18 June - Overflight scrubbed due to weather.
- 19 June - Transects of the Chesapeake and Delaware Bays using multispectral scanners and cameras for chlorophyll and total suspended matter.
- 20 June - Transect from the James River out across the continental shelf to the slope waters using multispectral scanners, fluorosensors, an L-band radiometer, and a camera.
- 23, 25, and 27 June - Mapping of the Chesapeake Bay plume using fluorosensors and an L-band radiometer.

As part of the study, a VIMS Beaver aircraft made pre- and post-mission overflights to provide information on the location and shape of the Chesapeake plume. Based on this information, the Delaware II occupied 24 stations down the length of the plume from Cape Henry to Oregon Inlet, NC, to define the three-dimensional structure of the plume in regard to temperature, salinity, dissolved oxygen, chlorophyll-a, phaeophytin, total plankton respiration, and total suspended matter.

Additional work under contract was also carried out on board the Delaware II to enable us to relate remotely sensed data (total suspended matter) to variables which are associated with total suspended matter, but which are not measurable by remote means. This work included contracts to: (1) Old Dominion University to examine hydrocarbons and nutrients associated with total suspended matter, (2) VIMS to examine heavy metals associated with total suspended matter, and (3) VIMS to examine bacterial concentrations and heterotrophic uptake associated with the Chesapeake plume.

All indications are that this second experiment was a success; the seven flights were successful and the necessary sea truth data were collected. A data review meeting is being planned for 19-20 August at the Tidewater Inn in Easton, MD.

Seabed Metabolism

The statistical analysis of the total seabed oxygen consumption data from Albatross IV Cruise No. AL 79-10 and NOAA R/V Kelez Cruise No. KE 80-04 has been completed and plotted. Chemical oxygen consumption measurements (and the biological oxygen consumption component) have been determined from strip charts of oxygen uptake for the Kelez cruise and are being analyzed for the Albatross IV cruise.

Steve Spina is reducing data obtained on Delaware II Cruise No. DE 77-11 to determine the effects of various concentrations of cadmium on the rate of oxygen consumption by the seabed.

Bill Phoel instructed Dave Radosh and Steve Spina in the surface-supplied diving technique utilizing the DESCO helmet. This equipment and technique will be used in July from the R/V Kyma to investigate, in situ, seabed oxygen consumption and nutrient flux in relatively polluted waters.

Algal Bioassay

Assay of 11 samples from two New York Bight outer continental shelf stations was completed. Nitrogen limited growth in all samples. Metals limited growth in nine samples; addition of the metal-complexing compound EDTA completely relieved this in four samples and partially in three other. In a single sample, which apparently had sufficient metals, EDTA caused growth inhibition. The levels of vitamin B₁₂ in three samples were low enough to slow the growth rate, but not enough to lower the final cell density. Silicate was partially limiting in two samples and phosphorous was partially limiting in one sample. The results continue to demonstrate that algal bioassay can provide valuable and unique information on the fertility of Northeast Monitoring Program (NEMP) strata for phytoplankton growth. Preparations were made for bioassay sampling on the July NEMP cruise. A meeting of the New York Bight Advisory Committee was also attended.

A sample of discolored water from Sandy Hook Bay on 30 June 1980 contained the following dinoflagellates: Heterocapsa triquetra, Peridinium trochoideum, Katodinium rotundatum, and Prorocentrum minimum. The first two organisms are listed in Halstead's "Suspect Toxic Species List" of his Poisonous and Venomous Marine Animals of the World, Volume 1. Dr. John Pearce and Mr. Kenneth Morgan, Superintendent of the Sandy Hook Unit of the Gateway National Park, were notified.

Samples for phytoplankton analysis were collected on Delaware II, Cruise No. DE 80-03, Kelez Cruise No. KE 80-04, and Evrika Cruise No. 80-01.

Data analysis was completed on 68 stations for the Belogorsk Cruise No. 78-03 conducted from 6 October to 1 November 1978. The data are being edited and corre-

lated with Dr. Harold Marshall's data from the same cruise. A NOAA Technical Report on this data is anticipated later this summer. Data from Belogorsk Cruise No. 78-04 from 1 to 29 November 1978, covering 38 stations, have been compiled and submitted to the Sandy Hook Laboratory ADP Unit for processing. Sixty-six samples collected from 3 March to 7 April 1979 on Delaware II Cruise No. DE 79-03 are now being examined by Myra Cohn.

Coastal Ecosystems Investigation

Clyde MacKenzie and Bob Reid dove to collect surf clams off Rockaway, Long Island, for assessment of growth, mortality, and reproduction of that population. We are still surveying potential "contaminated" sites for comparison to Rockaway (a relatively clean area) in experiments in which: (1) clams would be deposited and harvested periodically for determination of heavy-metal uptake, (2) effects of contaminated sediments on clam burrowing would be determined, and (3) trays would be set out to measure spatfall. Dave Radosh worked on an assessment of the benthic macrofauna standing crops of Romer Shoals in lower New York Bay. Romer Shoals is a popular sportfishing ground which is also a potential sand and gravel mining area, and information on benthic standing crops will aid in predicting possible mining impacts. Dave helped to complete the major manuscript on the benthic fauna of New York Bight for the NOAA/Marine Ecosystems Analysis (MESA) Program monograph series, and also worked on setting up a summer-long "Year of the Coast" exhibit at the Monmouth (NJ) Museum. Ann Frame continued to supervise processing of NEMP benthic samples, and revised and submitted a paper on a new polychaete species from Long Island Sound.

We provided information on: (1) typical levels of nutrients, heavy metals, and PCB's in northeastern inshore waters, for the New York District of the US Army Corps of Engineers; (2) densities of coliform bacteria around the New York Bight dumpsites, for Interstate Electronics Corporation; (3) potential impacts of a small dredging project at the Sandy Hook (NJ) US Coast Guard Base, for the US Coast Guard; (4) species to be included in a field guide to New Jersey coastal invertebrates, for the New Jersey Marine Sciences Consortium; (5) concentrations of PCB's in Long Island Sound, for the Bridgeport, CT, Telegram; and (6) a bibliography of northeastern benthic studies, with emphasis on biomass and community structure data, for Ken Sherman.

Benthic Energetics and Ocean Pulse Coordination

Most of this month was occupied with preparing for several Ocean Pulse cruises as part of NEMP that are planned for the remainder of the year, including cruises in July, September, November, and December. We also continued to work on several manuscripts, including one on the benthos of Block Island Sound, and on compiling life history data from the literature on common benthic invertebrates of the Northeast. We also continued examining the caloric content of shark liver samples provided by the Oceanic Gamefish Investigation and of some continental slope invertebrates provided by the Resource Surveys Investigation.

Behavior of Marine Fishes and Invertebrates Investigation

In preparing a manuscript for publication, we are currently examining the last set of data from a series of studies which examined the influence of temperature, especially thermal gradients, on the distribution of juvenile bluefish. In these

studies, a small group of fish were exposed to a vertical temperature gradient, and their position within the gradient was quantified. To date, results from these studies show a significant seasonal change in distribution with respect to temperature. In studies conducted during the summer, the fish generally limited their distribution to 20°C, the acclimation temperature, avoiding colder water, while in fall studies in which the same temperature gradient was established, the fish appeared to expand their distribution uniformly throughout a temperature range from about 14° to 20°C. These differences in response to temperature appear to reflect a seasonal change in the ecological requirements of this species possibly related to its fall migratory movements.

Physiological Effects of Pollutant Stress Investigation

Physioecology

Work with the limpet Crepidula fornicata continued this reporting period. Water temperature in the aquaria is 18°C and the C. fornicata are reproducing rapidly. The diluter with the parental stock was turned off and samples were taken for chemistry and pathology studies. The parents were exposed to silver for 2 yr. The diluters containing the progeny are still running.

The American oyster embryo work continued this month. We had, unfortunately, only one spawning. As was mentioned in the last issue of "NEFC News", the mercury concentrations we used exhibited no toxicity. A new stock of mercury has arrived, but now we have been unable to induce our old oyster stock to spawn. New stocks of oysters are now being conditioned for spawning.

The data analysis from a third 48-hr bioassay to determine the effects of mercury, copper, silver, zinc, arsenic, and nickel on embryos of the blue mussel was completed this month. Failure to spawn these mussels on three different occasions this month indicated that their spawning season is now over. Next month we will attempt to spawn mussels which have been held in refrigerated seawater (10°C) for the last several weeks.

Our study to determine egg viability and the effect of subsequent metal exposure to embryos of American oysters collected from clean water (Greenport, NY) and polluted water (Housatonic and Quinnipiac Rivers in Connecticut) was stalled because the oyster stocks collected in January were unable to spawn. New oysters from each of these three areas were collected this month and will be spawned immediately. We hope to compare the bioassay results of these oyster embryos with those of previous months.

As part of a NOAA/National Ocean Survey contract study with Tom Sawyer at the Oxford Laboratory, we collected 50 rock crabs from the New York Bight. Copper and cadmium analyses on gills and some digestive glands from these animals have been almost completed. PCB analyses will also be performed on these samples soon.

Routine analyses of various organisms exposed to a variety of metals continued this month and the data were forwarded to the groups performing the studies.

Physiological Effects

The June Long Island Sound Ocean Pulse study provided tissue samples from 60 windowpane flounder. Processing of these tissue samples was completed in the lab. We have been experimenting with a number of different fixatives for fish and invertebrate gill tissues. These preparations will be further tested during the July Ocean Pulse cruise on the Albatross IV and then evaluated with scanning electron microscopy.

Studies on bay scallop metabolism at different temperature conditions continued this month. In addition, feeding and oxygen consumption measurements of bay scallops are being made at different current speeds using the Brett flowing-water respirometers.

A cooperative study with cadmium-exposed sea scallops was completed this month (see "Biochemical Effects").

Biochemical Effects

For the first time, Biochemical Effects personnel participated in a Resource Surveys Investigation operation, the second leg of the spring sea scallop survey cruise. That Investigation has been supplying us with scallop adductor muscle samples for several years now, but this is the first cruise on which we have been able to contribute personnel. Some 27 stations were sampled during the leg, with 12-18 animals per station taken for analysis. These samples will keep all hands in the biochemistry lab busy for several months.

This month we also began, with the help of the Behavior of Marine Fishes and Invertebrates Investigation at the Sandy Hook Laboratory, a schedule of monthly sampling of a single population of sea scallops from a relatively unpolluted area off the New Jersey coast. We hope to get from 6 to 12 juveniles each month, as well as the same number of adults, and to establish a good seasonal profile of "normal" adductor muscle metabolism, using indicator enzymes for glycolytic, biosynthetic, and amino acid activities.

Analysis continued on samples from the various experimental exposure series using sea scallops: (1) 10 ppb of Cd for 30 days with gill preparations analyzed for two new enzymes (i.e., glutamate dehydrogenase, isocitrate dehydrogenase); (2) 10 ppb of Ag for 30 days with adductor muscle analyzed for two of our regular enzyme series that we have found to be metal-inducible, plus three new ones (i.e., glutamate dehydrogenase, isocitrate dehydrogenase, and arginine kinase); and (3) 10 ppb of Cd for 45 days and 60 days with adductor muscle analyzed for the full regular enzyme series plus the three new ones.

Anaerobic Bacteriology/Metabolism

Monthly activities included completing the bacteriological analysis of cultures from samples obtained on Kelez Cruise No. KE 80-04 as part of the Ocean Pulse Program. The results of the cruise were summarized in last month's issue of "NEFC News" and the bimonthly newsletter of the Ocean Pulse Program. Except for some numbers, the results have not changed significantly from those reported earlier.

With the return of our R/V Shang Wheeler, we have resumed sampling of our three Long Island Sound stations. At these stations, top and bottom waters were obtained for bacteriological analysis. Sediments were not obtained since the vessel is not so equipped for sampling at this time. We are also including animals in our survey. American lobsters and American oysters have been obtained for bacterial analysis and media evaluations. Sea scallops and winter flounder hopefully will be added in the near future. The bacterium Clostridium perfringens seems to be universally present, i.e., it was in all samples. Vibrio numbers are increasing, which is reflective of the rise in water temperature. We have again tentatively identified a V. cholerae from Long Island Sound waters.

Time was spent in planning for both Ocean Pulse and MESA cruises this summer.

Meetings, Talks, Visitors, and Publicity

On 2 June, Dr. John Pearce worked with NEFC personnel to develop a strategic plan for the NMFS Habitat Protection Program in the Northeast Region. A draft plan was reviewed and revised to reflect suggestions made by several NEFC reviewers.

Frank Steimle and Bob Reid attended a meeting of the Northeast Monitoring Program management group on 2 and 3 June.

On Wednesday, 4 June, Dr. Pearce met with the NOAA Assistant Administrator for Fisheries to brief him on the current status of the Northeast Monitoring Program.

On 5 June, with NEFC personnel, Dr. Pearce briefed Dr. Benton, the NOAA Associate Administrator, in regard to the activities of the ICES Marine Environmental Quality Committee, especially as they might relate to similar efforts in NOAA.

Bob Reid demonstrated predator-prey interactions to the first-grade class of Shrewsbury Boro School on 6 June.

On 7 June, Dr. John Graikoski attended the State of Long Island Sound Conference, held at Stony Brook, NY. Bob Reid spoke to and served on a panel concerning biological effects of dredge spoil disposal.

Clyde MacKenzie attended the SINA-NSA annual meeting in Hyannis, MA, during 8-12 June.

On 11 and 12 June, Dr. Pearce presented briefings to the NOAA Associate Administrator and the NOAA Assistant Administrator for Fisheries, respectively. The briefings were concerned with the NEMP and monitoring efforts ongoing in the Northeast Region.

During 12-13 June, Dr. Pearce participated in a Massachusetts Institute of Technology Sea Grant Program Workshop on Marine Pollution and Monitoring held at the University of New Hampshire. He was responsible for the preparation of briefings on monitoring and ocean disposal of solid wastes. Proceedings of the workshop will be published and will form the basis for long-term research and monitoring efforts directed by the Ocean Pollution Research Program Act.

Edith Gould attended a meeting of the Center Incentive Awards Committee at the Woods Hole Laboratory during 17-18 June.

Bob Reid met with Dr. Harris White of the National Ocean Survey (NOS) at the Sandy Hook Laboratory on 23 June to discuss integration of NOS and NMFS programs as part of NEMP.

Frank Steimle spent the week of 23 June in Gloucester, MA, attending a NOAA supervisory training course.

Myra Cohn attended a meeting of the New York Bight Committee held in Edison, NJ, on Wednesday, 25 June.

Bob Reid spoke on NMFS research programs in New Jersey coastal waters, to a "Year of the Coast" tour for New Jersey media representatives.

Bill Phoel met with Dr. J. Morgan Wells, NOAA Diving Coordinator, in Rockville, MD, to discuss equipment support for ongoing in situ investigations in contaminated waters. Their paper concerning the effects of sewage sludge on seabed oxygen consumption was also discussed.

Richard Greig visited Texas A&M University and the Gulf Breeze, FL, US Environmental Protection Agency laboratory to obtain information on procedures and analytical chemistry for petroleum hydrocarbon and pesticide bioassay techniques on marine animals.

Publications

- Caracciola, J. V.; Steimle, F. W., Jr. An atlas of the distribution and abundance of dominant invertebrates in the New York Bight Apex with reviews of their life histories. NOAA Tech. Rep. NMFS SSRF. (S)
- Frame, A. Two new species of sand burrowing amphipod crustaceans from Long Island Sound and the New York Bight (Amphipoda: Haustoriidae). *Estuaries* 3(2):75-83; 1980. (P)
- Frame, A. A new species of *Brania* (Polychaeta: Syllidae), from the shallow waters of Long Island Sound. *Proc. Biol. Soc. Wash.* (S)

AQUACULTURE DIVISION

Aquacultural Genetics Investigation

Experimental Hybridization and Inbreeding of Oysters

Geographic hybrids of the American oyster are being used in experiments in which groups of expected different genetic backgrounds are compared for development, growth, and survival under various culture conditions. In embryonic experiments, geographic hybrids (Connecticut X Texas) and non-hybrid controls were compared for development in plastic versus glass containers and in charcoal-filtered versus non-charcoal-filtered seawater. There was a significant difference for the type of filtered seawater, but not for the type of containers. Data to determine whether there are differences between types of crosses are being analyzed.

An algal diet experiment is underway utilizing larvae from the aforementioned groups. To date, larvae of hybrid and Connecticut (local) control crosses have grown and survived better than larvae of Texas (non-local) control crosses. These results are consistent with past experiments in which local controls generally performed best, followed by hybrids, then non-locals. There is an indication that this is true at both larval and juvenile stages. Exceptions seemingly occur on occasions when local culture conditions are not optimum. This is consistent with the concept that locally established organisms are usually better adapted to local natural conditions; but hybrids could have a genetic constitution better suited to a changed or artificial environment. Genetic diversity and flexibility would be important then under these conditions. The success or degree of hybridization could depend on the extent of genetic diversity which may be related to distance or separation over the geographic range. In a past experiment with Maine and local Connecticut hybrids, larvae appeared to be quite vigorous, though gametes from a cross exhibited incompatibility. In another past experiment, mass-spawned groups comprised of local and non-local American oysters manifested good growth and survival with virtually no fertilization problems.

Larvae have been growing and metamorphosing well during this good culture period. When culture conditions are optimum, smaller cultures can be used and the water changed less often for good larval growth and survival as observed in a current experiment. Set (young metamorphosed oysters) of the F₂ generation have been obtained from crosses of three full-sib families initiated in 1977 for developing inbred lines.

Mass Selection of Oysters

Examination of growth response in the American oyster based on age at selection is continuing. Two groups of 4-yr-old oysters and one group of 2-yr-olds were spawned during June.

Susan Halvonik has returned to work with the Mass Selection Section after completing her bachelor of science degree requirements in biology at Northeastern University. She will be working extensively with data processing and data analysis.

Karen Klimovitch, also of Northeastern University, has returned to the Genetics Section for the next 6 mo to continue her cooperative education assignment.

Lou Bacchiocchi of Fairfield University, also recently joined the Genetics Section as a summer employee. He will be responsible for the care and maintenance of our seawater raceway system and the genetic oyster stocks grown there.

Spawning and Rearing of Mollusks Investigation

SCUBA divers have planted 18 cages (1 m x 1 m x 0.2 m) at a depth of 10 m in Long Island Sound. Hatchery-reared surf clams have been introduced into the cages so that their growth can be observed in a natural environment, but free from predation. These cages have no bottom so that the enclosed clams are able to burrow into the natural substrate. Two size classes of clams and three planting densities are being compared. Analogous groups of clams were planted in our pumped raceway system for comparison. Effort is also underway to monitor physical and chemical environmental parameters in the field and in the tank system.

Larval rearing of surf clams during this month has been highly successful. High rates of survival were recorded and the time period from the veliger stage to metamorphosis was 15 days in two culture efforts. This time interval to metamorphosis is about 6 days shorter than in numerous, previous culture attempts. The reasons for these results are not clear.

Two lantern nets were deployed at low stocking densities (i.e., 125/m², 250/m²) of bay scallops to determine uninhibited growth at our field site. In addition, we are trying pearl nets for field rearing scallops between 4 and 17 mm in size. Five densities, from 250/m² to 5000/m², were placed in Long Island Sound near Milford, CT. Observations will be made on growth and mortality, and will be compared to the raceway system.

Production of seed scallops is progressing well. We have moved many juveniles to our raceway system where they will be grown to a size suitable for our field projects.

Rénee Mercaldo (Junior Federal Fellow), Terry McManus and Nancy Beckvar (summer employees), and Nathaniel Sperry (Co-op student from Roger Williams College) have joined our investigation.

Aspects of Nutritional Requirements of Mollusks Investigation

Several studies were conducted in the series of experiments designed to examine optimal nutrient relationships in artificial seawater medium. These experiments are conducted in a non-axenic environment to gather information that will be useful in open basin cultures as utilized in commercial hatcheries.

After considerable effort, the design and construction of an original conception in a flow-through molluscan culture chamber have been completed. An experimental run of several weeks has demonstrated excellent growth of 50 young American oysters (1 inch) in this apparatus.

Harvest of molluscan food from the algal mass culture system yielded 3608.6 liters of larval foods and 2430.0 liters of juvenile foods during the past 2 mo. These cultures were distributed to the various investigations as follows: Aquacultural Genetics, 1886 liters; Spawning and Rearing of Mollusks, 2252 liters; Physiological Effects of Pollutant Stress, 1537 liters; and Control of Molluscan Disease (also referred to as "Diseases of Larval Mollusks"), 89 liters.

Stock culture maintenance has proceeded on schedule. Requests for cultures were received and cultures sent to the following: Brian Muise, Nova Scotia; E. Huskey, Oceanville, NJ; and Haskin's Laboratory, Rutgers University, New Brunswick, NJ.

Meetings, Talks, Visitors, and Publicity

Dr. Arlene Longwell attended a meeting of the Genetics Study Group of the ICES Mariculture Committee in Svanøy, Norway, during 10-13 June. S. Stiles prepared a brief summary on our inbreeding and hybridization work, and E. Losee prepared a report, "Selection for Larval Growth Rate in the Oyster: a Preliminary Report," for presentation at that meeting.

S. Stiles set up an aquarium at the Head Start/Family Resource Festival on the New Haven (CT) Green on 6 June.

S. Stiles presented a poster, "Preliminary Studies on Genetic Variation in Oyster Populations, Species, and Hybrids," at the joint annual meeting of the Canadian Society of Microbiologists and the Genetics Society of Canada during 15-19 June at the University of Guelph in Guelph, ON.

E. Losee attended a week of ADP systems analysis training in Boston, MA, and a week of supervisory training in Gloucester, MA.

PATHOBIOLOGY DIVISION

Comparative Invertebrate Pathology Investigation

Blue mussel samples from Searsport and Damariscotta River, ME, and from a new location at Bethany Beach, DE, were collected as part of the Ocean Pulse Program and processed for histology.

A cooperative study of neoplastic disease in soft shell clams was started with Dr. Ronald Sonstegard of McMaster University in Hamilton, ON. Samples of clams from Maryland will be sent to Canada for reverse transcriptase assays. A sample of clams from Malpeque Bay was processed and is being examined for histopathology.

Oysters, Crassostrea gigas, from Denman Island, BC, were processed and examined grossly and histologically for Denman Island microcell disease. Lesions were detected grossly and microcells have been confirmed histologically. Tissues from these lesions were fixed for electron microscopy and are now being processed.

Samples of sea scallops showing gross abnormalities were collected during the recent sea scallop survey cruise. These scallops will be examined histologically and the resulting data compared with data on scallops collected on previous Ocean Pulse cruises. It is hoped that these samples also will provide additional information concerning a disease problem observed in scallops collected from the inshore waters of Maine.

An experiment to determine the effect of hormonal stress on viral infections in blue crabs is underway. The study will use both light and electron microscopy.

Collection has continued for tissues and sera for the blue crab studies being conducted jointly with Dr. J. Osterman of the US Army's Walter Reed Hospital. During the month, 1021 sections were cut and 1015 slides stained from a variety of marine fish and shellfish by the Division's Histology Unit.

A report for the deepwater dumpsite cruise conducted in Puerto Rico in May 1979 was completed and submitted to the National Ocean Survey's Ocean Dumping and Monitoring Division. This cruise provided additional comparative data for inclusion in the accumulating data base on pathology and diseases of marine planktonic crustaceans. Data obtained from examination of specimens from Puerto Rico and Deepwater Dumpsite (DWD) 106 (southeast of New York City) should prove useful in interpreting the occurrence of some pathologic conditions observed in the DWD 106 specimens. For example, gross examination of over 1500 euphausiids from Puerto Rico supports the hypothesis that, in general, focal gill melanization is not a natural characteristic of euphausiids. Less than 0.2% of the Puerto Rico euphausiids had focal melanization as compared to an average of 42% of the specimens examined from DWD 106 cruises. The dominant euphausiid species in Puerto Rico and in the vicinity of DWD 106 are very closely related and occupy similar depths during their diurnal vertical migrations. It is felt that focal gill melanization is not a depth-related phenomenon, but may be related to certain natural and/or anthropogenic factors in the vicinity of DWD 106.

Representative parasitic infections of marine planktonic crustaceans from Puerto Rico will be submitted to the Registry of Marine Pathology. They include bacterial and juvenile acanthocephalan infections in euphausiids, gregarine infections in the intestines of copepods, and bopyrid isopod infections in the shrimp, Latreutes fucorum.

Christa D'Auria, a handicapped student from Gallaudet College in Washington, DC, was hired for the summer. Plans are to rotate her jobs throughout the Oxford Laboratory to broaden her experiences while here. Presently, she is learning to identify and sort plankton. Jackie Swing, who has progressed rapidly in learning to identify euphausiids to species level, has been of great help in orienting Christa to her work here.

Fish Pathology Investigation

Thomas Daniels has completed his collation of the disease prevalence data collected during the bottom trawl survey cruises conducted this past spring. In all, 34 species (11 463 individuals) of fish were examined for the presence of integumental lesions, pigmentation, skeletal anomalies, and metazoan parasites. To date, all lesions have been identified on the basis of gross characteristics only; histologic sections of representative lesions yet must be examined for verification of gross findings. Sample size was quite large, especially for yellowtail flounder, silver hake, red hake, American plaice, Atlantic herring, haddock, white hake, winter flounder, butterfish, and Atlantic cod. The frequency of occurrence of gross lesions was very low. Fin rot continues to be the most numerically abundant lesion and was most evident on cod (3.5%) and winter flounder (3.0%). Ulcers were rarely noted and never were numerically significant. Lymphocystis was observed only in American plaice (0.37%), a species in which the disease is well established. Pseudobranch adenomas were found only in cod (3.7%) and appear to be more prevalent in fish from nearshore stations. Trematode metacercariae and parasitic copepods are numerically abundant in several fish species and also appear to be most prevalent in fishes from nearshore stations. For the trematodes, this is probably due to the presence in these areas of appropriate intermediate hosts. The survey has not generated any unexpected findings, but will provide useful baseline data for fishes from Georges Bank.

Radiographic study of sand lances collected during spring bottom trawl survey cruises has begun. X-rays should be completed by mid-July.

A preliminary analysis of epizootiological data on the IPN virus disease of Atlantic menhaden was completed. The analysis indicated that 0-age fish which utilize Chesapeake Bay as a nursery area are primarily affected by the epizootics.

Studies of nematode parasites of American eels are currently in progress in an attempt to respond to concerns expressed by North European countries regarding possible introduction of new diseases with eels exported from the Chesapeake Bay.

Ultrastructural studies on the chondrocytes in the developing hyaline cartilage in the head of larval fish were initiated this month. Topological deformities in fish have been reported for many years; however, recent observations have indicated that some of these abnormalities may be the result of environmental contamination. In keeping with Ocean Pulse-oriented studies on the development of larval fishes, the present study on the cartilage-forming cells is related to our interest in the morphological systems that play a role in feeding behavior. The chondrocytes we are examining are located along the dorsal aspect of the mouth in a position that may eventually become the palate. The cells are rounded and grouped tightly together in striped bass and winter flounder larvae that have just begun to feed. They are embedded in a light-staining hyaline matrix and do not show isogenous orientation at this time. The cytoplasm of the cells stains lightly with toluidine blue dye and the rounded or oval nuclei of the cells are large and centrally located. Fine structural observation of this chondrocyte cytoplasm indicates intense secretory activity, presumably chondromucoprotein which is being released into the developing matrix. Although the fish larvae presently under examination are regarded as normal, the results of this study will be compared with comparable data collected from larvae that have been exposed to heavy metals (i.e., Cu^{++}) or on larval fish from contaminated environments.

Microbial Ecology and Parasitology Investigation

Twenty-five rock crabs were collected near the New York Bight sewage disposal site as part of the ongoing "black gill" monitoring study. Gills were taken from all of the specimens for histological study and for heavy-metal analyses by Richard Greig at the Milford Laboratory. Two of the specimens had black gills and extensive blackened areas on the carapace. Three other specimens had black discoloration of the carapace or appendages, and one had all of the gills missing on one side of the body. The relatively small collection of 25 animals provided data which were consistent with previous observations on the frequency with which blackened crabs may be caught in the Bight apex. The June collection also completes the sampling of 100 crabs for metal analyses by Mr. Greig. Analyses are completed for the first 75 animals and a final report on the health of the animals will be prepared in August or September.

Histological studies on 100 rock crabs collected from Cape Cod are almost finished. Several observations are worthy of note: (1) although all specimens were intermolt adults, none of them had black gills; (2) up to 91 suctorian ciliates, *Ephelota* sp., were counted on one gill section while not more than 16 per section have been recorded from animals from New York-New Jersey waters; and (3) up to 43 copepods were recorded from one gill section while not more than 9 have been recorded from animals from New York-New Jersey waters.

Comparative data on gill fouling and blackening in rock crabs continue to show that the "black gill" condition is of common occurrence in or near sewage-sludge dumpsites, and that new efforts to study gill-fouling communities should provide useful qualitative and quantitative data for designing environmental and monitoring models.

John Ziskowski of the Sandy Hook Laboratory collected 50 rock crabs during a recent fish trawling survey and held them overnight for a special study the next day. The gills were examined for a cooperative study with John Clamp, Associate Curator of the North Carolina State Museum of Natural History in Raleigh, NC. The study was planned in order to make the first series of photomicrographs of living peritrich ciliate colonies attached to gill surfaces. The peritrichs studied in histological preparations or on silver-stained whole mounts showed some similarities to Zoothamnium and to Orbopercularia, but did not agree entirely with descriptions of known species. A series of photomicrographs of the living colonies, combined with observations on silver-stained specimens, have allowed Mr. Clamp to conclude his studies and initiate a valuable publication. The ciliates belong to a genus described in Germany in 1935. A literature search now in progress indicates that the ciliates have not received any attention since their original discovery on gills of the green crab and are previously unknown from North America. Comparative studies made this month have shown that Zoothamnium sp. and the newly rediscovered peritrichs may be present on gills of the same crab specimen, thus explaining the confusion that existed prior to the excellent cooperation of Mr. Clamp.

Diseases of Larval Mollusks Investigation

Comparative biocharacterization of the American Type Culture Collection Vibrio anguillarum Strain No. 19264 and the Vibrio sp. (CA 10) which was isolated from a shellfish hatchery in Moss Landing, CA, revealed differences in three biochemical tests and in morphology on marine agar. These findings support earlier studies in which the CA 10 isolate was found to closely resemble the suggested archetype for V. anguillarum.

Another sampling cruise of American oyster beds in Long Island Sound was completed. Work continued on biocharacterization of isolates taken during these monthly cruises, as well as on challenges of oyster larvae with the isolates. Another apparent pathogen was found; this brings the total to eight pathogenic strains uncovered from among the 500 isolates obtained to date from the cruises.

The toxic fraction of the concentrated filtrate from a broth culture of a shellfish-pathogenic Vibrio sp. has been isolated. The experiment demonstrating the toxicity of the fraction will be repeated and then the toxic fraction will be characterized.

A preliminary experiment suggests that if charcoal filtration is used together with ultraviolet radiation to make seawater more suitable for rearing oyster larvae, it should be used daily starting the 1st day of development. Bacteria were noted swarming around 12-day-old larvae from a culture which did not get charcoal-filtered seawater until the 2nd day of development. The bacterial population also increased dramatically in a 12-day-old culture which did not get charcoal-filtered seawater until the 3rd day of development.

Additional examination of two units of work highlighted the importance of repeating experiments and studying several parameters before making generalized interpretations of data. Previously, it was reported that *in vitro* loss of oyster hemocytes due to attachment to container walls could be prevented by using paraffin-coated containers. Repeating these experiments with cells from different oysters indicates that there is no advantage in using paraffinized containers. It is suspected that seasonal changes and differences in nutritional status of the animals may influence the degree of cellular adhesiveness. In other work, exposure of larval oysters to a third pathogenic Vibrio sp. resulted in a dose-dependent reduction in cells capable of attaching to cell-culture plates; whereas in earlier work, using two other Vibrio sp., these cells increased in number. Experiments to characterize the differences are continuing.

Meetings, Talks, Visitors, and Publicity

Dr. Rosenfield attended: a meeting with the People's Republic of China aquaculture delegation in Washington, DC, on 3 June; the Center Promotion Review Board meeting at the Woods Hole Laboratory on 4 June; the Executive Board meeting, as well as the annual meeting, of the National Shellfisheries Association in Hyannis, MA, during 2-13 June; and the Joint Subcommittee on Aquaculture/Fish Health Committee meeting at Leetown, WV, on 19 and 20 June.

Drs. Brown and Blogoslowski from the Milford Laboratory attended the annual meeting of the National Shellfisheries Association in Hyannis, MA, during 9-12 June. Dr. Brown presented a paper on "A Study of Two Shellfish-Pathogenic Vibrio Strains Isolated from a Long Island Hatchery During a Recent Outbreak of Disease," and Dr. Blogoslowski presented a paper on "Isolation, Characterization, and Control of a Vibrio sp. Pathogenic to Crassostrea virginica and Ostrea edulis Larvae."

Mr. Rose of the Milford Laboratory attended an EEO seminar titled "EEO and the Committee" at Narragansett, RI, on 11 and 12 June.

Dr. Blogoslowski attended the Board of Directors meeting of the International Ozone Institute in Atlanta, GA, on 15 and 16 June.

Dr. Sawyer attended the annual meeting of the Society of Protozoologists in Washington, DC, during 15-19 June.

Mr. Kern attended the Center Incentive Awards Committee meeting at the Woods Hole Laboratory during 16-18 June; and the Joint Subcommittee on Aquaculture/Fish Health Committee meeting at Leetown, WV, on 19 and 20 June.

Dr. Murchelano, Dr. Johnson, Mr. Newman, Mr. Farley, and Mr. Daniels attended the 5th Annual Fish Health Workshop at Leetown, WV, during the week of 16 June. Dr. Johnson presented a paper on "The Fixed Phagocytes (Macrophages) of Decapod Crustaceans," and Mr. Newman presented a paper on "IPN Virus Disease of Clupeid Fishes."

Mr. O'Connell attended a meeting of NEFC Administrative Officers at the Gloucester Laboratory during 18-21 June.

Dr. Johnson accompanied Dr. Rosenfield, Dr. John Briggs (Ohio State University), and Dr. Earl Droessler (NOAA Office of University Affairs) on an inspection tour of the NEFC's Franklin City, VA, facility on 23 June.

Dr. Robohm of the Milford Laboratory attended a course in invertebrate cell and organ culture at the W. Alton Jones Cell Science Center in Lake Placid, NY, during 23-27 June.

Mr. Galasso and Mr. Lewis collected rock crabs for MESA heavy metals study at Sandy Hook, NJ, on 25 and 26 June.

Ms. MacLean participated in an IYABA meeting at the Gloucester Laboratory on 29 and 30 June.

Mr. Philip McDermott of Northeastern University completed his 3-mo work/study program at the Milford Laboratory on 20 June; Miss Lynn Gilson, also of Northeastern University, began a 6-mo work/study program on 23 June.

Miss Christa D'Auria entered on duty on 16 June at the Oxford Laboratory for the summer.

Ms. MacLean was recently chosen "Young Career Woman" by the Maryland Federation of Business and Professional Women (BPW). Representing the Easton club of the BPW, she won the statewide competition in Ocean City in which 28 women competed. Contestants were evaluated on the basis of their resumes, group and individual interviews, and content and delivery of a speech before the convention body of 300. Congratulations Sharon!

Visitors to the Oxford Laboratory during June included Dr. Dave Maneval of the University of Maryland's Department of Microbiology in College Park, MD; Dr. Robert Fenske of Gallaudet College in Washington, DC; Dr. Roger Newell of Horn Point Laboratories in Cambridge, MD; and Dr. William J. Pegg and his ecology class from Frostburg (MD) State College.

Publications

- Blogoslawski, W. J.; Stewart, M. E.; Hurst, J. W., Jr.; Kern, F. G., III. Ozone detoxification of paralytic shellfish poison in the softshell clam (Mya arenaria). *Toxicol.* 17:650-654; 1979. (P)
- Daggett, P-M.; Nerad, T. A.; Sawyer, T. K.; Lewis, E. J. Preliminary observations on the possible use of starch-gel electrophoresis as an effective method for separation of Acanthamoeba species. (Abstract.) *Trans. Amer. Microscop. Soc.* 99:230; 1980. (P)
- Robohm, R. A. In vitro phagocytosis by molluscan hemocytes: a survey and critique of methods. *Comp. Pathobiol. Ser.* (S)
- Visvesvara, G. S.; Sawyer, T. K. Antigenic analysis of pathogenic, euryhaline, and eurythermal Acanthamoeba hatchetti (Amoebida: Acanthamoebidae). (Abstract.) *Trans. Amer. Microscop. Soc.* 99:238-239; 1980. (P)

Reports

- MacLean, S. A. Report of May 1979 Puerto Rico dumpsite cruise - planktonic crustacea. Prepared for National Ocean Survey, Ocean Dumping and Monitoring Division, Rockville, MD. 1980 June. 18 p.
- Sawyer, T. K.; Lewis, E. J.; Galasso, M.; Bodammer, S.; Ziskowski, J; Lear, D.; O'Malley, M.; Smith, S. Black gill conditions in the rock crab, Cancer irroratus, as indicators of ocean dumping in Atlantic coastal waters of the United States. (Abstract.) *Int. Counc. Explor. Sea.*
- Sawyer, T. K.; Rosenfield, A.; Perkins, F. O.; Zwerner, D. E.; Dias, T. K.; Lichtenfels, J. R.; Madden, P. A.; Jackson, G. J.; Bier, J. W.; Payne, W. L.; Gerding, T. A.; Miller, G. C. A multidisciplinary approach to the identification of larval parasitic nematodes in the calico scallop, Argopecten gibbus (Linn.), and the surf clam, Spisula solidissima (Dillwyn). (Abstract.) *Int. Counc. Explor. Sea.*

NATIONAL SYSTEMATICS LABORATORY

Panaeoid Shrimp Investigation

Work continued on a revision of the genus Sicyonia in the eastern Pacific. Description of a new species of Solenocera from the Philippines was commenced.

Crustacea Investigation

Work continued on a manual of the temperate-water marine decapods of the eastern US. The manuscript is at present being composed on a text editor.

Pelagic Fishes Investigation

Morphometric and meristic data from more than 1000 specimens of Scomberomorus (Spanish mackerels) were transferred from a computer at the George Washington University to the NEFC system. Work was done on a new species of halfbeak from New Guinea and an analysis of the fish community living among New Guinea mangroves.

Benthic Fishes Investigation

Gadiform fishes were studied in the J. L. B. Smith Institute of Ichthyology in Grahamstown and the South African Museum in Cape Town.

Meetings and Talks

Bruce Collette attended the annual meeting of the American Society of Ichthyologists and Herpetologists in Ft. Worth, TX. As President-Elect of the Society he attended meetings of the Executive Committee and Board of Governors. He also presented a paper titled "The Mangrove Swamp Fishes of New Guinea."

Visitors

Among visitors to the National Systematics Laboratory in June were John Clamp of the North Carolina State Museum for advice on decapod parasites, Ana Dettel of the University of Costa Rica for advice on decapods from the Gulf of Nicoya, and Professor Hugh DeWitt of the University of Maine for discussions concerning his research on Antarctic fishes.

University Affairs

Dr. Austin Williams served as Chairman of a Ph.D. committee at the University of North Carolina.

Publications

Cohen, D. M. Names of the hakes. Mar. Fish. Rev. 42(1):2-3. (P)

Collette, B. B. Families Coryphaenidae, Pomatomidae, and Rachycentridae. For FAO Species Identification Sheets, East Central Atlantic. (A)

ATLANTIC ENVIRONMENTAL GROUP

Ocean Monitoring and Climatology Task

The cooperative Ship of Opportunity Program obtained six XBT transects and three continuous plankton recorder (CPR) transects in June: two XBT and one CPR transects in the Gulf of Maine; one XBT transect off Southern New England; one XBT transect and one CPR transect across the shelf and slope off New York; one XBT and CPR transect out of Norfolk, VA; and one XBT transect across the Gulf of Mexico.

The number of recipients of the weekly "AEG Modified Oceanographic Analysis" has increased 75% (from 16 to 29) during the last month. Distribution of this analysis was started in June 1979. Offshore commercial and recreational fishermen are mostly

responsible for the recent increased demand. Prior to this month, 67% of the recipients were scientists, and only 33% were fishermen. Now fishermen make up half of those receiving the charts. The increased interest by fishermen has largely resulted from publication of a simplified warm-core eddy locator chart by the Mid-Atlantic Fishery Management Council. Fishermen interested in receiving more detailed analyses have been referred to AEG by members of the Council. AEG has not publicized the availability of the modified charts, because it lacks the resources to meet a potentially large demand. Furthermore, the charts have been only a by-product of our research, produced in a rough format. Continuation of the recent rapid increase in demand for the charts will soon necessitate increased support for the activity and justify special efforts to increase the usefulness of the charts. It may be significant to fishery managers that at least eight of the recipients are swordfish fishermen.

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

GULF STREAM EDDY LOCATIONS

AEG/June 19, 1980

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

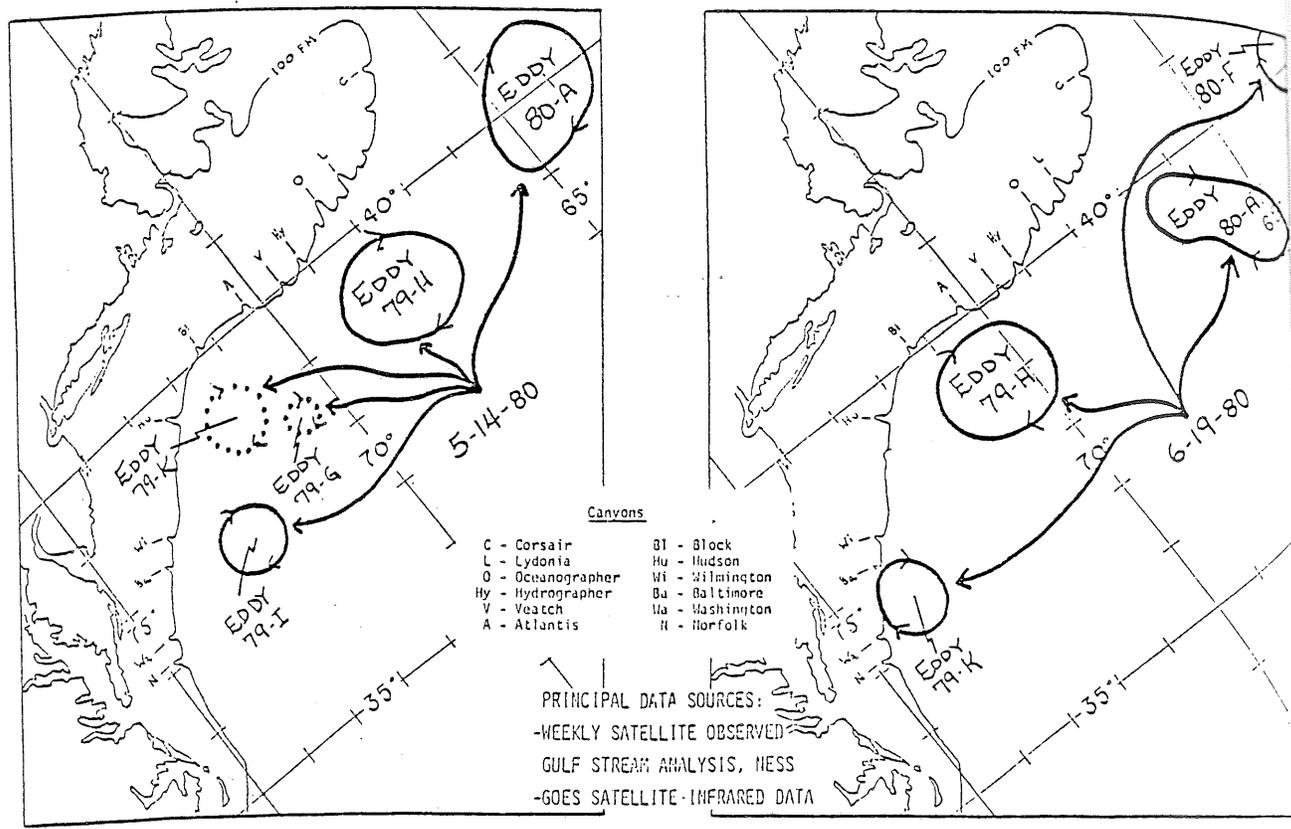
Eddy 79-I was completely resorbed by the Gulf Stream at 36.8°N, 73.4°W during the second week in June. Eddy 79-G reappeared briefly in satellite imagery and was then destroyed during the first week of June at 37.9°N, 71.1°W. Eddy 79-K moved southwest about 141 nm (260 km) to a position centered at 37.5°N, 73.8°W, south of Baltimore Canyon. Eddy 79-H advanced to a center position of 39.1°N, 70.5°W, a distance of about 117 nm (217 km) to the west, and is now south of Atlantis Canyon. Eddy 80-A traveled 85 nm (158 km) to the southwest and is now centered at 39.0°N, 65.7°W, far offshore of the 100 fm line and south of Corsair Canyon. Eddy 80-F was formed at 40.2°N, 62.8°W during the second week of June and has moved west 5 nm (9 km) to a center position located at 40.2°N, 62.9°W.

During the next thirty days, Eddy 79-K may move south, past Norfolk Canyon, and be resorbed by the Gulf Stream; Eddy 79-H may travel west then south to a position northeast of Wilmington Canyon; Eddy 80-A may move west to a position centered south of Oceanographer Canyon; and Eddy 80-F may travel west to a location far offshore of the 100 fm line, southeast of Corsair Canyon.

Fishermen are advised that Eddy 79-H is unusually large and probably contains strong clockwise currents which may cause losses of fixed-gear in the area of Hudson Canyon during the next thirty days.

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,

Rhode Island 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).



Data Analysis Product (DAP) 16, "Time Series Portrayals of Air and Sea-Surface Temperatures in the South Atlantic Bight," was distributed to laboratory directors and various investigators in the Southeast and Northeast Fisheries Centers late in June. The data portrayed are monthly averages and anomalies of air temperature from five coastal weather stations (Daytona Beach, Jacksonville, Savannah, Charleston, and Wilmington) and water temperature from three tide stations (Jacksonville, Savannah, and Charleston). The period generally covered is 1939-78. Anyone interested in obtaining a copy of DAP 16 should contact the Atlantic Environmental Group.

Ocean Dumping Studies Task

Jim Bisagni met with William Hahn, marine technician from the URI Graduate School of Oceanography, to discuss the feasibility of setting up a cooperative equipment plan whereby URI personnel would maintain, repair, store, and calibrate all oceanographic equipment presently in use by the Ocean Dumping Studies Task. In exchange, the Graduate School of Oceanography will have access to the equipment if needed for its R/V Endeavor cruises.

John Hartley has begun fabrication of drogued buoys outfitted with radar transponders (on loan from NOAA's Atlantic Oceanographic and Meteorological Laboratory), flashing beacon, and radar reflectors. The buoys will be employed for tracking a waste plume during the August 1980 cruise aboard the Kelez to DWD 106. Twenty, 5-gal canisters of Rhodamine dye were delivered to the American Cyanamid facility in Linden, NJ, on 30 June. The dye is to be mixed with barge waste being dumped at DWD 106 during the July 1980 cruise.

Kathy Langone has perfected Fortran programs dealing with position plotting of radio-direction-finding buoy data, as well as preparation of log sheets which will be compatible with the MARMAP Information System.

Meetings, Talks, Visitors, and Publicity

Mert Ingham traveled to the Sandy Hook Laboratory on 1 June and spent 2 days at a working meeting of the Northeast Monitoring Program.

On 3 June, Steve Cook met with the US Coast Guard on Governors Island, NY, and visited the Academy Training Representative of the Kings Point Maritime Academy in New York City.

Mert Ingham attended a Center Promotion Review Committee meeting which was held at the Woods Hole Laboratory on 4 June.

Lianne Armstrong, Reed Armstrong, Jack Jossi, and Gertrude Kavanagh attended an EEO training course at the Dutch Inn in Galilee, RI, on 10 June. Also, a supervisor's training course in EEO was held at the Dutch Inn on 11 June and was attended by Mert Ingham.

The US Environmental Protection Agency held a "Mussel Watch" review meeting in Washington, DC, on 12 and 13 June, which was attended by Mert Ingham.

Steve Cook traveled to a Center Awards Committee meeting at the Woods Hole Laboratory on 17 and 18 June.

Mert Ingham visited the Milford Laboratory on 19 June to confer with scientists on Ocean Pulse activities.

From 19 to 25 June, Talbot Murray visited the Environmental Data and Information Service's Climatic Impact Assessment Division in Columbia, MO, conferring with their scientists on joint fishery climatology studies.

On 20 June, Steve Cook and Grayson Wood traveled to Fairfield, CT, to visit Summagraphic, Inc.

The URI Center for Ocean Management Studies held a conference, "The Impact of Marine Pollution on Society," from 23 to 25 June at the Narragansett Bay Campus, which was attended by Mert Ingham.

Jim Bisagni delivered oceanographic equipment to Norfolk, VA, during 25-27 June and began staging the cruise to DWD 106 which takes place in July.

A Strategic Planning Conference was held at Woods Hole Laboratory on 27 June and was attended by Mert Ingham.

Publications

Aiken, J.; Wood, G. B.; Jossi, J. W. The Undulating Oceanographic Recorder Mark 2: a new ship-of-opportunity ocean monitoring instrument. OCEANS '80; Seattle, WA; 1980 September. (A)

Armstrong, R. S. Transport and dispersion of potential contaminants at the Buccaneer Oil Field. EXPOCHEM '80; 1980 October. (A)

- Bisagni, J. J.; Kester, D. R. Physical variability at an East Coast United States offshore dumpsite. Proc. First Int. Ocean Dump. Symp.; 1978 October. (A)
- Celone, P. J.; Chamberlin, J. L. Anticyclonic (warm core) eddies off the northeastern United States during 1978. Ann. Biol. 35. (A)
- Cook, S. K.; Hughes, M. M. Water column thermal structure across the shelf and slope southeast of Sandy Hook, NJ, USA in 1978. Ann. Biol. 35. (A)
- Crist, R. W.; Chamberlin, J. L. Bottom temperatures on the continental shelf and slope south of New England during 1978. Ann. Biol. 35. (A)
- Crist, R. W.; Chamberlin, J. L. Bottom temperatures on the continental shelf and slope south of New England during 1979. Ann. Biol. 36. (S)
- Fitzgerald, J.; Chamberlin, J. L. Anticyclonic warm core Gulf Stream eddies off the northeastern United States during 1979. Ann. Biol. 36. (S)
- Hilland, J. E.; Armstrong, R. S. Variation in the shelf water front position in 1978 from Georges Bank to Cape Romain. Ann. Biol. 35. (A)
- Hilland, J. E. Variation in the shelf water front position in 1979 from Georges Bank to Cape Romain. Ann. Biol. 36. (S)
- Hughes, M. M.; Cook, S. K. Water column thermal structure across the shelf and slope southeast of Sandy Hook, New Jersey in 1979. Ann. Biol. 36. (S)
- Ingham, M. C.; McLain, D. R. Sea surface temperatures in the northwestern Atlantic in 1978. Ann. Biol. 35. (A)
- McLain, D. R.; Ingham, M. C. Sea surface temperatures in the northwestern Atlantic in 1979. Ann. Biol. 36. (S)