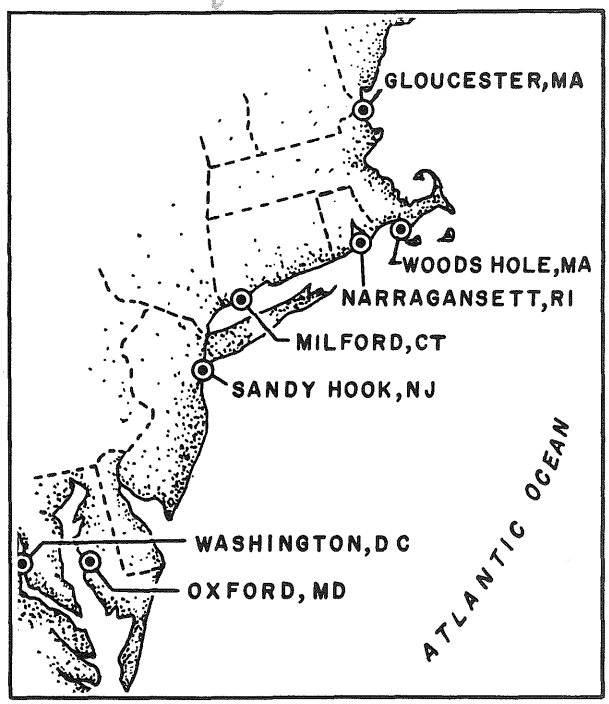
NEFC

Northeast Fisheries Center

NEWS



MAY 1980

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

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NORTHEAST FISHERIES CENTER
WOODS HOLE, MASSACHUSETTS

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NATIONAL SYSTEMATICS LABORATORY DIRECTOR	DANIEL M. COHEN
ATLANTIC ENVIRONMENTAL GROUP DIRECTOR	MERTON C. INGHAM

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

Environmental Management Office

Introductions of Non-Indigenous Species

Center staff members participated in a meeting of the International Council for the Exploration of the Sea (ICES) Working Group on Introductions of Non-Indigenous Species at Nantes, France, during 21-25 April 1980. Dr. Sindermann is Chairman of the Working Group, and Dr. Rosenfield is a member.

Principal activities during the meeting centered on: (1) responses to the growing concerns about Pacific salmon introductions; (2) continuing problems with French introductions of Pacific oysters; (3) expansion and clarification of the ICES Code of Practice concerning introductions; and (4) preparation of a combined report on the status of introduced species in all ICES countries.

Some indication of the effectiveness of a working group can be determined from its report and from its recommendations to parent committees. In addition to its report, the Working Group on Introductions of Non-Indigenous Species should produce this year three useful documents: (1) an expansion and elaboration of the Code of Practice adopted by ICES in 1979; (2) a summary report on the status of introduced species in ICES waters; and (3) a compilation and summarization of all national laws of ICES countries concerning transfers and introductions of exotic species.

Additionally, the Working Group is proposing for 1982 a Special Meeting on Introduced Species, to precede the 1982 Statutory Meeting. This is felt to be important, in view of the broad interest in the subject and the absence of any recent or projected international conference on the topic.

FAO Aquaculture

Dr. Sindermann met with a number of United Nations Food and Agriculture Organization (FAO) staff members, principally those concerned with aquaculture and aquaculture-related problems, on 28 and 29 April at FAO headquarters in Rome. Principal discussions were with Dr. Pillay, Director of FAO's Global Aquaculture Program -- a world-wide program which emphasizes regional aquaculture centers. Discussions emphasized four areas: (1) international transfers of non-indigenous fish and shellfish; (2) the status of the FAO convention for the control of the spread of major communicable fish diseases; (3) the future of the FAO Aquaculture Bulletin and related methods of communication; and (4) the formation of an international aquaculture federation.

The interchange with FAO staff members was very informative. Problems with communication are universal, but I think that in the areas of introduced species and in pathology, the routes of communication are reasonably clear. The FAO aquaculture structure is somewhat complex, however, since Dr. Pillay's Global Aquaculture Program is under the Division of Operations, since it is a field program. The rest of FAO aquaculture is in the Division of Fishery Resources and Envrionment, and is headed by Dr. F. Henderson. Beyond that, special consultations and conventions seem to fall in the Division of Policy and Planning. The fisheries superstructure of FAO at present is:

Assistant Director General for Fisheries (K. C. Lucas)
Assistant to the Assistant Director General for Fisheries (L. I. J. Silva)
Director, Operations Division (N. Kojima)
Director, Fishery Resources and Environment Division (H. Kasahara)
Director, Fisheries Industries Division (A. Labon)
Director, Fisheries Policy and Planning Division (J. E. Carroz)

Pollution Research at the Biologische Anstalt Helgoland

Dr. Sindermann met in Hamburg during 1-3 May with a number of key staff members of the Biologische Anstalt Helgoland, and with staff members of the Bundesforschungsanstalt für Fischerei, Hamburg.

Probably the most important results of discussions related to recent findings in the German Bight concerning pollution effects on fisheries. Through a suite of biological and chemical indicators, a clear relationship is emerging between chemical dumping and prevalence of fish diseases -- particularly epidermal papillomas in flatfish. Results of five consecutive cruises indicate the relationship, and a preliminary report has been published. Full results will be reported at the ICES Statutory Meeting in October 1980. The information has already been used in public meetings with the press and the Ministry of Fisheries, since cessation of dumping is imminent in the German Bight, and is an important public issue at the moment.

A second area of discussion concerned future research on effects of chemical contamination in the German Bight and possible cooperative research with NEFC. The Ministry of Fisheries has given approval to Dr. Rosenthal to use a research platform in the German Bight, as well as its support helicopter, to conduct bioassay work, using eggs and larvae, as well as related chemical work. Additionally, the West German R/V's Anton Dohrn and Heinke will be doing the trawling and water sampling work. The research will extend into June 1980.

Additionally, a proposal for work in 1981 has been encouraged by the Ministry of Fisheries, and again a cooperative proposal with NEFC is solicited. The thesis is that cooperative research, using standard methods, in both the New York Bight and the German Bight, would provide mutually reinforcing data on pollution effects -- a thesis that seems supportable. Dr. Rosenthal will prepare a draft of a proposed joint proposal and send it to us for review and comments. His key indicators are reciprocal bioassays (using mixed function oxidases) and pathological signs (especially epidermal papillomas). We could augment these approaches with other biochemical work and possibly with mutagenesis.

Pathology of Marine Organisms

Dr. Sindermann and Mr. Farley participated in a meeting of the ICES Working Group on Pathology of Marine Organisms in Bergen, Norway, during 6-9 May 1980.

This was the fourth meeting of the Working Group, under the Chairmanship of Dr. Maurin of France. This year, for the first time, the Working Group will have tangible products in the form of two printed documents -- an Index of Marine Diseases (about 200 pages) and a series (of about 28 issues) of diagnostic pamphlets (each of four pages) for the important diseases of commercial species. Manuscripts for both documents will be submitted to ICES at the time of the 1980 Statutory Meeting.

Several interesting new developments in marine diseases were described during the meeting:

(1) The epizootic of the fungus disease caused by Ichthyophonus continues in plaice and haddock in waters north of Scotland.

(2) A mycobacterial (tuberculosis-like) infection of Atlantic mackerel and Atlantic cod livers is building to epizootic levels in parts of the North Sea.

(3) Research by the Federal Republic of Germany at its Cuxhaven facility has demonstrated a relationship between acid-waste dumping and the occurrence of epidermal tumors in dab (Limanda).

(4) A new disease caused by an organism similar to that which causes "Denman Island Disease" on the American Pacific Coast, has been recognized in European oysters (Ostrea edulis) from the French Coast.

(5) The French National Center for the Exploitation of the Oceans has begun a study of pollution-associated skin diseases and related chemistry at a number of stations along their coast. The study is similar to the NEFC's Ocean Pulse Program, but has fewer approaches.

(6) Several follow-up studies in the area of the Amoco Cadiz wreck have disclosed high prevalences of necrosis in oysters -- with indexes up to 20-30 times that of controls. Gonad necrosis suggests that oyster spawning may have been affected.

Interstate Transfers of Marine Animals

A series of regional meetings on problems associated with interstate and interregional transfers of marine species (particularly oysters) has been planned and conducted under the leadership of Dr. Rosenfield of the Oxford Laboratory.

The latest in this series was held in Charleston, SC, on 22 and 23 May 1980. Participants included Dr. Rosenfield, Dr. Sindermann, Mr. Kern, and representatives of the States of North Carolina, South Carolina, and Georgia.

The meeting followed the pattern established in New England and on the Pacific Coast, with a review of national and international roles of NMFS, followed by a discussion of state problems and development of an action plan for the region.

During the meeting a clear statement of purpose was developed, to the point that the meeting was not to create new regulations that suppress aquaculture, and not to insert the federal government into state matters, but it was to standardize procedures to safeguard the environment and native species, and it was to encourage effective communications, at all levels, but particularly at the permit decision level.

Several action items for the participating states were discussed, and assignments made for a future meeting. These included: (1) preparation of a compendium of state statutes and regulations, together with summaries and interpretations by each state; (2) preparation of a descriptive chart, state by state, discussing relevant regulations, the nature of enforcement, deficiencies, principal introduced species, permit authority, etc.; (3) preparation of geographic charts for each of the principal diseases of Atlantic Coast species -- to be used in decisions about proposed transfers from one state to another; (4) preparation of a compendium of

permit forms, with a view toward eventual standardization; and (5) consideration of information systems concerning diseases, predators, etc., that may be relevant to introductions and transfers.

Fisheries Utilization Office

An impediment to the expansion of the US squid fishery is the limited alternatives for processing these species. A machine originally designed for removing the membrane from beef livers has been successfully tested, in an effort initiated by the Gloucester Laboratory and conducted in collaboration with the manufacturer of the machine, to process squid.

Subsequently, the machine's suitability for producing squid "tubes" (intact mantle minus the tail/fin section) was demonstrated before local processors at the Gloucester Laboratory. The machine permits an economic incentive for the production of a squid product that already has a moderate market, and it has the potential for facilitating a significant expansion of the present market.

RESOURCE ASSESSMENT DIVISION

Resource Surveys Investigation

The spring bottom trawl survey was completed early this month by the R/V Delaware II with Henry Jensen as Chief Scientist and Evelyn Howe participating. The R/V Albatross IV conducted an exploratory deep-sea red crab survey from 6 to 9 May with Chuck Byrne as Chief Scientist and Malcolm Silverman and John Nicolas participating. From 10 to 16 May the Albatross IV and Delaware II jointly conducted a fishing gear/vessel experiment using a standard bottom trawl survey #36 Yankee net.

The Albatross IV conducted the first leg of a sea scallop survey from 19 to 30 May with Linda Despres as Chief Scientist and Dennis Hansford participating.

Pat Twohig designed and interfaced electronics necessary to operate simultaneously three remote Russet water samplers used during Soviet R/V Evrika Cruise No. 80-02.

Jim Crossen and Eddie Burke (a summer student) are working on the electro-hydraulic dredge equipment for the summer surf clam and ocean quahog survey.

Tom Azarovitz, Chuck Byrne, and Liz Bevacqua continued work on the US Bureau of Land Management report summarizing historical bottom trawl data. Required graphic outputs were completed this month; work on the final report is now underway.

Fishery Biology Investigation

Finfish

Cathy Rearden completed aging all 1979 New Jersey recreational bluefish samples and also completed a preliminary age-length key. She also assembled all red hake length-frequency data on tape for a research project.

Louise Dery was primarily involved with the 19-20 May State-Federal Summer Flounder Age/Growth Workshop. In addition, silver hake samples of the 1979 fall survey were aged and work on the red hake age-validation study was continued.

Brenda Fields participated in the above Workshop and completed aging 1976 summer flounder bottom trawl survey samples. She also participated in a bottom trawl survey.

Ambrose Jearld participated in the preparations for and in the Summer Flounder Age/Growth Workshop.

Age and Growth

Vi Gifford completed aging first quarter 1971 commercial redfish samples. She worked with Fred Nichy photographing otolith sections for the age-validation paper on redfish. She also worked with Ralph Mayo and Ambrose Jearld on preparing a final draft of the redfish paper.

Kris Andrade completed aging 717 commercial haddock samples and 591 commercial pollock samples from the fourth quarter of 1979.

Judith Penttila completed aging 695 of the March 1980 commercial yellowtail flounder samples. She also was out for surgery and convalescence.

Shellfish

Loretta O'Brien and Maurice Crawford aged sea scallops with Maurice learning the technique in the process. Loretta also left for summer school at Iowa State University.

Maurice Crawford completed slide preparations of 1978 collections of surf clam chondrophores. He began making photographs.

John Ropes was in the hospital for first half of month. Upon return, he prepared a manuscript on "Size and Age at Sexual Maturity of Ocean Quahogs, Arctica islandica Linne, from a Deep Oceanic Site." This involved writing as well as preparation of photographs of shells and tissues for use in the manuscript and in a meeting presentation.

Maureen Griffin worked with Ambrose Jearld on preparation of surf clam age data for presentation at the 72nd Joint Annual Shellfish Institute of North America -National Shellfisheries Association Convention and Meeting. She also participated in the first leg of Albatross IV Cruise No. AL 80-06, a sea scallop survey.

Sandy Hook Investigation

Darryl Christensen collected biological data at the Mid-Atlantic Bluefish Tournament held during 15-17 May at Hampton, VA. He also helped to tag and release bluefish in a cooperative effort with John Mason from the Mid-Atlantic Fishery Management Council (MAFMC) and Bruce Freeman from the NMFS Northeast Regional Office. Darryl began writing the first draft of a manuscript on the 1975-77 charter and party boat survey conducted in New Jersey.

John Clifford completed the collection of Atlantic mackerel from the recreational fishery.

Wally Morse participated in the second leg of the 1980 spring bottom trawl survey to Georges Bank aboard the Albatross IV.

Dave McGillis participated in the 1980 spring bottom trawl survey to the Gulf of Maine aboard the Delaware II.

Fishery Assessment Investigation

Frank Almeida spent much of the month completing the analysis of silver hake stock distribution data and preparing a series of distribution plots (1977-79) of red, white, spotted, and longfin hake to fulfill a request by Mike Fahay of the Sandy Hook Laboratory and Chris Powell of the Narragansett Laboratory. Frank also

assisted Kathy Rearden in preparing a complete set of red hake distribution plots to be included in a manuscript on red hake biology and aging. Much of Frank's time in May was spent analyzing the space problem at the Woods Hole Laboratory and preparing a report with Dave Potter on the problem and potential solutions to be presented to the Laboratory Director.

Thurston Burns reviewed the final completion report by the State of Rhode Island on "Otter Trawl Induced Lobster (Homarus americanus) Damage Investigations in Rhode Island." Thurston, Ralph Mayo, and Harold Foster participated in the final leg of the spring bottom trawl survey and gear/vessel comparison test with the Albatross IV and Delaware II during 30 April - 16 May.

Harold Foster began his new assignment with the Biostatistical Unit and spent most of his time becoming acquainted with his new duties.

Emma Henderson started a population dynamics course for Resource Assessment Division personnel and other interested NEFC staff. She also distributed for internal review a manuscript on the variance of virtual population analysis estimates.

Ralph Mayo completed his analysis of redfish age validation studies, the results of which are reported in a manuscript with Vi Gifford and Ambrose Jearld, Jr., submitted for the Northwest Atlantic Fisheries Organization (NAFO) annual meeting in June.

Margaret McBride prepared a report on Cape Cod and Gulf of Maine yellowtail flounder landings statistics and survey data and participated in the sea scallop survey aboard the Albatross IV during 19-30 May.

Steve Murawski analyzed growth information on summer flounder for a talk at the American Fisheries Society Northeast Division meeting and produced lengh-frequency tables for the same species for use in a summer flounder aging workshop attended by himself and Mike Fogarty, a new member of the Division who is on loan through an intergovernmental personnel assignment from the State of Rhode Island.

Senior Assessment Scientists

The major portion of Brad Brown's time in May was devoted to the development of tasks within the Fishery Assessment Investigation with the appropriate senior assessment scientists as task leaders. As these tasks are essentially the equivalent of investigations in terms of their scope and difficulties, considerable effort was needed to develop working teams that will meet the needs of the next assessment cycle. There will of course be shorter-term tasks during this period requiring the appropriate ad hoc work assignments, and undoubtedly crises may arise that could require a major shift in responsibilities. The new wrinkle in the assignment of responsibilities is that in addition to species assessment, geographic area responsibilities have been assigned as follows: Gulf of Maine - Steve Clark; Georges Bank - Fred Serchuk; and Southern New England & Middle Atlantic - Emory Anderson. Additional activities by Brad dealt mainly with administrative responsibilities involving the proposed transfer of the Statistics Branch from the Northeast Regional Office to the NEFC, the space problem at the Woods Hole Laboratory, and Woods Hole Laboratory Resource Assessment Division budgetary problems. The Division Chief also devoted effort to the preparation of an evaluation of the amended report by the NMFS Stock Assessment Task Force chaired by Lee Alverson. All of the senior assessment scientists participated. The paper prepared by Stu Wilk and Brad Brown presented at the recreational fishery conference in France in April has been accepted for publication in the proceedings as a reduced version to meet space limitations. A reduced version is now being prepared.

Emory Anderson took the lead in preparing an evaluation matrix for the NMFS Stock Assessment Task Force report. Emory also prepared materials on Atlantic mackerel regarding long-term catch and stock-size trends for various management strategies.

Steve Clark worked on a review of the Gulf of Maine northern shrimp fishery with Vaughn Anthony and Ron Essig which will be presented at the National Shellfisheries Association-Shellfish Institute of North America meeting to be held in June in Hyannis, MA. Steve and Red Wright organized a joint seminar between the Fishery Oceanography Investigation, the Resource Assessment Division, and the Atlantic Environmental Group held at the Woods Hole Laboratory on 30 May to review previous research relating environmental impacts to fishery trends and to explore future research possibilities.

Fred Serchuk continued analyses of the Gulf of Maine sea scallop shell height-meat weight relationships and age composition. He also continued the analysis, with Steve Murawski, on ocean quahog age and growth studies from mark-recapture data and shell-reading studies. Fred also reviewed a Sea Grant research proposal on population dynamics studies related to the West Coast crab population.

Mike Sissenwine, between attending meetings, was involved in planning the Center Equal Employment Opportunity (EEO) Training Meeting to be held in Narragansett, RI, on 10-12 June.

University and Research Institute Relations and Activities

On 27 May, Brad Brown, George Ridgway, Dick Hennemuth, Mike Sissenwine, and Vaughn Anthony met with Drs. Gilmartin and Roberts concerning interrelationships with the marine programs at the University of Maine and the NEFC.

On 12 May, Brad visited Dr. Joseph Cameron and other staff of the Biology Department at Jackson State University in Jackson, MS, concerning potential student hirees and other EEO-related involvement.

On 16 May, Emory Anderson gave a talk on assessments to a biology class from the Cambridge School in Weston, MA. Emory met and talked with Jean-Jacques Maguire of the Canadian Fisheries and Marine Service facility in Dartmouth, NS, while he was visiting Woods Hole on 16 May.

Steve Clark met with Mr. Tormod Venvik of the Norwegian Ministry of Fisheries on 27 May to review our most recent sea scallop assessment work.

Stu Wilk met with John Mason (MAFMC), Jack Casey (our Narragansett Laboratory), and Derry Bennet (American Littoral Society) to discuss the possibility of using the latter Society's tagging data.

Steve Murawski forwarded data from survey cruise catches of Atlantic silversides (Menidia menidia) to Dave Conover, a PhD candidate at the University of Massachusetts at Amherst. He also discussed a joint project on the population biology of witch flounder with Dr. M. R. Ross of the same school. Steve also supplied information on NEFC ocean quahog growth rate experiments to Dr. R. Lutz of Rutgers University. He also presented a talk to members of the Aquavet Program (sponsored by Cornell University and the University of Pennsylvania) on "Stock Assessments" on 22 May.

Meetings, Talks, Visitors, and Publicity

Brad Brown, Dick Hennemuth, Mike Sissenwine, Fred Serchuk, and Paul Wood met with New England Fisheries Steering Committee agents on 8 May to develop a plan for increased interaction and provision of material for use in their activities with the

fishing community. On 13 May, Brad, along with Dick Hennemuth, Tom Azarovitz, and Linda Despres, met with the Southeast Fisheries Center's Resource Survey Investigation's staff in Pascagoula, MS, for discussion of joint problems and survey principles. On 20 May, Brad served on a program with Bill Gordon and Joe Slavin of the Washington Office at Newport, RI, at the Rhode Island Seafood Council's exposition involving exporters and importers of fishery products. On 21 May, he served on a panel at the New England meeting of the Marine Technological Society involving Arnie Howe, John Linahan, Brian Veasie, and Jake Dykstra. On 15 May, he was invited, through Jon Gibson, to speak to the Barnstable County 4H Advisory Committee on affirmative action. On 23 May, he met with George Heimerdinger to provide assistance in developing affirmative action activities at the regional level for the National Oceanographic Data Center. On 30 May, Brad conferred with industry representatives on resources available for fishery development.

Emory Anderson and Stu Wilk attended the MAFMC's Scientific & Statistical (S&S) Committee meeting in Philadelphia, PA, on 8 May. Emory also attended a meeting to discuss shark and billfish assessment data and possible changes to the Billfish and Shark Preliminary Fishery Management Plan on 19 May at the Southeast Regional Office in St. Petersburg, FL. On 21 May, he met with John Mason of the MAFMC staff at the Woods Hole Laboratory for further discussions on the Shark Fishery Management Plan. He also attended several meetings of the "Judy Brennan-Hoskins Memorial Award" Committee during May. He and Mike Sissenwine met with Dr. P. Lett of Marine Analysis, Ltd., in Dartmouth, NS, on 22 May to discuss the stock assessment data base for the Northeast Region.

Vaughn Anthony attended the NAFO Larval Herring Workshop held at the Woods Hole Laboratory on 1 and 2 May. He also attended a meeting of the ICES Advisory Committee for Fisheries Management on 16 and 17 May, and, with Bob Edwards and Dick Hennemuth, attended a special meeting on assessment scientists and their dialogue problems with administration and fishermen held at ICES Headquarters on 20 and 21 May. On 28 May, he attended a meeting in Gloucester, MA, to discuss the transfer of the Statistics Branch from the Northeast Regional Office to the NEFC.

Steve Clark, during 12-17 May, attended and served as rapporteur at the ICES European Hake Working Group meeting in Copenhagen, Denmark.

Fred Serchuk, Harold Foster, and Margaret McBride attended a meeting of the Woods Hole Laboratory EEO Committee on 6 May. Fred, Margaret, and Joan Palmer also attended the Boston Federal Executive Board EEO Conference held in Hyannis, MA, during 7-9 May. Fred also attended a meeting of the New England Fishery Management Council (NEFMC) S&S Committee on 21 May at the Woods Hole Oceanographic Institution (WHOI), the NEFMC Sea Scallop Oversight Committee meeting on 27 May in Mystic, CT, and also the NEFMC monthly meeting on 28 and 29 May, also in Mystic, CT. Fred and Mike Sissenwine met with Dr. Marcello Juanico of the University of Sao Paulo, Brazil, and Warren Rathjen of the Northeast Regional Office to discuss the Northwest Atlantic squid resources at the Woods Hole Laboratory on 12 May.

Mike Sissenwine met with Dr. F. Cameron of the University of Rhode Island to discuss NEFC-NEFMC interactions on 14 May. He met with Robert Edwards and Herb Stern on 12 May to review Center EEO Committee activity, and on 28 May, Mike attended a meeting with Dr. L. Anderson (University of Delaware), Dr. J. Wilson (University of Maine), and others in Boston to discuss Phase II of the Northeast Fishery Management Task Force. On 30 May, Mike, along with many other members of the Resource Assessment Division attended a meeting of the Atlantic Environmental Group and oceanographers from the Woods Hole Laboratory to review abiotic effects on fish production.

Thurston Burns attended a NEFMC Lobster Oversight Committee meeting on 20 May at Peabody, MA. Topics discussed included the revised format for the descriptive biology section of the Draft American Lobster Fishery Management Plan, two proposals for marketing studies, and some of the issues on which policy decisions must be made.

Steve Murawski, Mike Fogarty, Wally Morse, and Stu Wilk attended the Summer Flounder Aging Workshop held at the Woods Hole Laboratory on 20 and 21 May. Steve also attended the MAFMC Surf Clam-Ocean Quahog Subpanel meeting in Dover, DE, on 23 May.

Frank Almeida met with Chris Powell of the Narragansett Laboratory to discuss plotting hake data for use in a paper to be presented in Texas in June.

Tom Azarovitz and Linda Despres met with Southeast Fisheries Center personnel at the Pascagoula Laboratory on 13 and 14 May to discuss mutual problems and possible areas of cooperation relative to surveys.

Pat Twohig presented a paper on "The Application of Underwater Color Video Systems to Fishing Gear Research" at the Engineering and Applications of Underwater Photography Symposium at the Marine Biological Laboratory in Woods Hole, MA. Pat also instructed students from Cambridge School (Weston, MA) on the increasing use of electronics to aid in the study of the oceans on 14 May.

Publications

Chang, S., Ropes, J. W., Merrill, A. S. An evaluation of the surf clam population and fishery in the Mid-Atlantic Bight. Rapp. P.-v. Reun. Cons. int. Explor. Mer 175:121; 1979. (P)

Mayo, R. K. Exploitation of redfish, Sebastes marinus (L.) in the Gulf of Maine - Georges Bank region, with particular reference to the 1971 year class. NAFO Res. Bull. No. 15. (In press). (A)

Reports

Mayo, R. K.; Gifford, V. M.; Jearld, A. An age validation study of redfish, Sebastes marinus (L.) from the Gulf of Maine - Georges Bank region. NAFO Res. Doc.; Annual Meeting, June 1980.

McBride, M. M.; Sissenwine, M. P. Data report: yellowtail flounder of the Cape Cod area and northern Gulf of Maine. Woods Hole Lab. Ref. Doc.; 1980.

Murawski, S. A.; Ropes, J. W., Serchuk, F. M. Growth studies of the ocean quahog, Arctica islandica. Woods Hole Lab. Ref. Doc.; 1980.

Ropes, J. W. Biological and fisheries data on surf clam, Spisula solidissima. Sandy Hook Lab. Tech. Ser. Rep. No. 24; 1980. 88 p.

MANNED UNDERSEA RESEARCH AND TECHNOLOGY PROGRAM

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

MARINE ECOSYSTEMS DIVISION

Larval Physiology and Biochemistry Investigation

The joint NMFS-US Fish and Wildlife Service (USFWS) striped bass study is proceeding smoothly. To date, fertile eggs from 32 females have been received from five hatcheries. Larvae were reared in six groups of 100 individuals each. Daily mortality was recorded on each replicate through day 26 when 50 fish were frozen for age and growth studies and chemical and biochemical analysis. Growth in most groups was very rapid. Large differences in mortality were observed between groups. Task personnel made two trips to the Texas Instrument Buchanan Hatchery on the Hudson River to pick up larvae and talk with hatchery personnel. Scientists from the USFWS Columbia National Fisheries Laboratory have been in residence at the Narragansett Laboratory since the start of the striped bass study, helping with rearing and sampling of the larvae.

Wild winter flounder larvae from the Plymouth Harbor, MA, area and Atlantic cod and haddock larvae from the Marine Resources Monitoring, Assessment, and Prediction Program's (MARMAP) spring cruise were frozen for RNA-DNA analysis. Preparations were made for the Soviet R/V Evrika Cruise No. 80-02. A shipboard plankton pumping system and sieves were designed and constructed for profiling studies. We participated with the US Environmental Protection Agency (EPA) and the University of Rhode Island (URI) in a preliminary current drift study to determine circulation patterns near intakes and outfalls of the three laboratories. Larry Buckley demonstrated the use of TLC fluorometry for detection and quantification of paralytic shellfish toxins to personnel from URI and the US Public Health Service.

Dr. Jan Beyer (Danish Institute of Fisheries and Marine Research) visited the Narragansett Laboratory to confer with Geoff Laurence regarding the continuation of cooperative modeling studies.

Ecosystem Dynamics Investigation

Marv Grosslein prepared the preliminary report of the NAFO Larval Herring Task Force which met in Woods Hole during April. A full report of the proceedings of the Task Force will be given in September at the meeting of the NAFO Scientific Council. Marv also reviewed the "Preliminary Research Plan for Determining Effects of Oil and Gas Exploration and Production on Georges Bank" prepared by the Biological Task Force on Georges Bank.

Mike Pennington continued working with Greg Lough on analyzing the growth of larval Atlantic herring in the field and relating the results to lab studies.

Wendell Hahm discussed with Drs. Ted and Ann Durbin (URI) the question of sample variability at the level of individual tows. The Georges Bank ecosystem model is being modified by Ira Sohn (New York University), the NEFC's J. Kirkley, M. Grosslein, and W. Hahm, and WHOI's Tom Leschine and Geof Evans for interfacing with an economic sector in preparation for a modeling workshop. Wendell also modified the WHLOTKA program to deal with the problem of strongly damped oscillations in the predator-prey relationship.

Recruitment Processes

Greg Lough, George Bolz, and Mike Pennington completed a manuscript on a growth model for larval Atlantic herring based on daily otolith growth increments.

Greg Lough and George Bolz also continued analysis of growth and mortality of the International Commission for the Northwest Atlantic Fisheries' (ICNAF) larval Atlantic herring time series, attempting to sort out various biases in the data, and worked with Stephan Grimm (Poland) over a 3-wk period on a study of spawning locations, spawning dates, and larval dispersal in relation to environmental factors.

Roz Cohen continued analysis of the larval Atlantic herring condition-factor data and completed a first draft of a report on comparison of copepod biomass length-weight regressions. Work continued by her on the ICNAF zooplankton data base preparing station species abundance listings for 12 surveys. Bea Hess is editing larval herring gut-content data and has completed corrections for the 1976 spawning season. Roz also escorted visitors from Poland around the Plymouth (MA) area, the Plimouth Plantation, and a replica of the Mayflower on 22 May.

Dave Potter and Hal Merry spent considerable time designing and getting together a variety of sampling gear to use on Evrika Cruise No. 80-02 during 16-29 May to study phytoplankton, primary productivity, oceanography, microzooplankton, and ichthyoplankton on Georges Bank. Robert Halpin participated in that survey.

Ira Palmer (a Co-op student) participated on Delaware II Cruise No. DE 80-03, a MARMAP survey from 21 to 30 May.

Roz Cohen attended an EEO meeting at the Woods Hole Laboratory on 6 May and a Federal Women's Program meeting on 8 May.

Fishery Oceanography Investigation

Notable progress in data processing was made in May. Gil Dering has virtually completed programming the Tektronix graphics terminal for reading and quality control of our current-meter records, a step which will save both time and money in the future. Derek Sutton completed processing the STD (salinity-temperature-depth) tapes from the international larval Atlantic herring patch study and, with Steve Ramp, has continued work on the Northeast Channel current-meter records.

Gil and Steve also put together a preliminary analysis of the Nantucket Shoals flux experiment results: six of the nine instruments which were recovered appear to have good records for the entire 7 mo of deployment, two have good records for part of the time, and one had electronic problems buy may yet be salvaged. This is a very good result by any standard and is evidence of the care and skill that went into preparing the instruments and moorings. Both Gil and Steve deserve great credit.

Derek brought the flux hydrography up to date by plotting the sections from the recovery cruise, Albatross IV Cruise No. AL 80-03. Roger Hernandez started a temperature/salinity plot for the expendable bathythermograph (XBT) sections along the flux line and did several sections from ship-of-opportunity runs across the Gulf of Maine. Sam Nickerson plotted temperature and salinity data from the spring bottom trawl survey cruises. Roger and Cindy Chappell reorganized our weather map file.

Sea duty included the last leg of the bottom trawl survey on Delaware II (Roger); a microdistribution cruise on Evrika (Dan Patanjo), and the first leg of the MARMAP cruise on Delaware II (Dana Densmore and Bruce Davis). Cruise preparation included Derek's giving instructions in dissolved oxygen determination to Cindy Chappell and others; Gil's providing a rosette and 12 Niskin bottles for Evrika; Sam and Bruce's outfitting Delaware II for hydrographic work. Derek also prepared a depth-activated water sampler for sea trials.

Ron Schlitz, Steve Ramp, and Art Allen attended the annual meeting of the American Geophysical Union in Toronto, where Art presented a paper on currents in the Labrador Sea based on his master's dissertation. Art paid his own way to the meeting. The same three, with Red Wright, participated in the NAFO Larval Herring Task Force Workshop at the Woods Hole Laboratory at the beginning of the month, and in a discussion about possible interaction with the Resource Assessment Division on 30 May. A closer working relationship was favored and talks will continue. Red participated in meetings of investigation chiefs to adjust space allocation and budget difficulties in the Woods Hole Laboratory. He also completed a course in First Aid given at Woods Hole Oceanographic Institution.

Roger helped Ambrose Jearld with a program for visiting Boston school pupils and Red spoke to a group of students from Cambridge, MA.

Cindy Chappell graduated from Falmouth High School and began full-time work for the summer.

Ichthyoplankton Investigation

The MARMAP I survey conducted in cooperation with Soviet scientists on the Evrika was successfully completed in mid-May. Stations were occupied in Middle Atlantic and Southern New England waters, as well as on Georges Bank and the Gulf of Maine to the eastern limit of the US Fishery Conservation Zone that is uncontested by Canadian claims. Plankton samples were taken in the remaining portion of Georges Bank and the Gulf of Maine by the Albatross IV as part of the spring bottom trawl survey. At the end of the month our third survey of the year was underway on Delaware II. John Sibunka, Field Party Chief, and Alyce Wells represented this Investigation. Based on gross observations of the 6B5 samples, spring ichthyoplankton appears exceptionally low in Middle Atlantic waters where yellowtail flounder and Atlantic mackerel larvae occur. Atlantic cod and/or haddock larvae seem to be in good supply on Georges Bank, especially around Cultivator Shoals.

We received from the Polish Sorting Center in Szczecin larval length sheets and specimens from Albatross IV Cruises No. AL 79-06, 79-11, and 79-13, as well as Soviet R/V Belogorsk Cruises No. 79-01 and 79-03. With the exception of Belogorsk Cruise No. 79-05, all 1979 6B5 samples scheduled for analysis have been sorted. Samples collected in February-March 1980 on the Polish R/V Wieczno and Albatross IV were shipped to Poland in early April on Wieczno's return to Gdynia. These samples have since been forwarded to Szczecin and are now being processed. Arrangements were made for two scientists from Szczecin to spend a 1-mo working visit at the Sandy Hook Laboratory later this summer. They will receive intensive training on egg identification while at the laboratory.

Wally Smith attended the Sixth Annual Advisory Board Meeting of the Polish Sorting and Identification Center. This year's meeting was held at the Narragansett Laboratory from 19 to 21 May.

Chris Powell met with Mike Fahay at the Sandy Hook Laboratory on 29 and 30 May for additional work on a paper they will present at the American Society of Ichthyologists and Herpetologists meeting in June.

Plankton Ecology Investigation

Robert Marak, Jack Green, Geoff Laurence, and Kenneth Sherman met with Moe Ringenback and Bob Taylor (of the National Ocean Survey's Engineering Development Laboratory) at the Narragansett Laboratory on 12 May to discuss the possibilities

of cooperative work on developing a continuous underway microzooplankton sampling system.

The sixth Annual Advisory Board Meeting of the Polish Sorting and Identification Center, held at the Narragansett Laboratory during 19-21 May, had Andrzej Ropelewski (Deputy Director) of the Sea Fisheries Institute, Jerzy Płociak of the Fisheries Central Board, and Leonard Ejsymont (Director) of the Sorting and Identification Center, representing the Polish side. The American side was represented by Kenneth Sherman, Robert Marak, and Wally Smith. Art Kendall of the Northwest and Alaska Fisheries Center (NWAFC) attended to discuss sorting schedules for ichthyoplankton samples which the NWAFC has committed itself to forward to the Polish facility. Reuben Lasker of the Southwest Fisheries Center and Tom Potthoff of the Southeast Fisheries Center (SEFC) also attended the meetings. Negotiations are underway with the SEFC and Polish facility for sorting a limited number of samples this year. Reuben Lasker is also investigating the possibility of using the Pole's expertise as a means of handling samples from the California Current.

On 22 May, Robert Marak presented an illustrated lecture on MARMAP plankton studies to veterinary students in the Aquavet Program of the University of Pennsylvania and of Cornell University, held at the Marine Biological Laboratory in Woods Hole, MA.

On 7 and 8 May, Mert Ingham (of the Atlantic Environmental Group) and Carolyn Griswold attended a meeting of the Georges Bank Biological Task Force's (BTF) Subcommittee on Monitoring at Woods Hole. Comments on the consensus program were reviewed and elements of a new program were drafted.

On 20 and 21 May, Carolyn Griswold attended a meeting of the Georges Bank BTF and, on 30 May, she attended a meeting of the Mid-Atlantic BTF.

Biostatistics

A Decwriter III was installed and is now being used as a printing terminal. For small and medium data sets, use of the Decwriter III will save line printing charges and decrease turnaround time.

Automatic data processing (ADP) equipment changes at the Narragansett Laboratory included: (1) installation of two hard-wired data lines; (2) moving of one data phone and installation of extra phone jacks; (3) rental of one additional CRT (cathode ray tube) terminal; (4) installation of the Decwriter III on the same date line as one of the CRT terminals; and (5) retrievel of the long-lost Texas Instruments computer terminal from that company.

A tape of the Map Analysis Package developed at Yale University has been purchased. The package will be implemented on ADP/First Data, the NOAA teleprocessing vendor.

A trial subscription to DATAPRO Reports on Data Communications was received.

The Fager statistics (indices of dominance) for zooplankton densities by survey area (Georges Bank, etc.) and by survey season have been printed for all 1978 data and two cruises of 1979.

Karen Johnson left us at the end of the school year. She will be working in the Resource Assessment Division at the Woods Hole Laboratory during the summer.

Julien Goulet attended a meeting, held at Hanscomb Air Force Base on 9 May, of the Alternatives Committee for the Northeast Region Remote Sensing Center.

Julien Goulet presented a summary of data processing procedures, and of data reporting products available, to the Polish Sorting and Identification Center Advisory Board on 19 and 20 May.

Julien Goulet met with Gene Heyerdahl and Linda Kelley, the latter with the Government Services Administration, in Woods Hole on 29 May to review performance of the Narragansett Laboratory-Input/Output Computer Services, Inc., Task Group and discuss the structure of the task orders for FY81.

Benthic Dynamics Investigation

Two papers were accepted this month for publication as NOAA Technical Reports-SSRF's: (1) "Distribution of Gammaridean Amphipoda (Crustacea) on Georges Bank," by John Dickinson and Roland Wigley; and (2) "Food of Eight Northwest Atlantic Pleuronectiform Fishes," by Rich Langton and Ray Bowman. Two other final drafts were completed and will be submitted shortly: (1) "The Rate of Gastric Evacuation and Daily Ration for Winter Flounder, Pseudopleuronectes americanus (Walbaum)," by Judy Huebner and Rich Langton; and (2) "Variability of Tubule Types within the Digestive Glands of Mercenaria mercenaria (L.), Ostrea edulis L., and Mytilus edulis L.," by Bill Robinson, Mike Pennington, and Rich Langton.

Two of our temporary employees finished work in April. Dr. Judy Huebner will be returning to her teaching duties at the University of Winnipeg and Dan Couture is moving south.

Ray Bowman continued to work on the analysis of fish feeding chronology data. He is currently preparing a laboratory report summarizing the data collected on a 1978 Belogorsk cruise.

Roger Theroux spent a good deal of time honoring the requests for benthic data we received last month. Most of his remaining time was spent on the reorganization and intralaboratory moving of the Benthic Dynamics Investigation. He did, however, present a short talk on benthic studies to a group of students visiting the aquarium and also gave a lecture to students in the Aquavet Program from Cornell University and the University of Pennsylvania.

Rich Langton worked on two programs for data analysis this month. One was done in conjunction with Bill Freund (WHOI) to automate diet-overlap calculations. The other was formatting FASTLOOK to generate stomach-contents data listings and print out stomach weights (and standard deviations) within size classes and for individual tows.

Jackie Murray, a student aid, started full-time work for the summer and is working on the 1973-76 food habits data base. She is making final checks on some of the data.

Apex Predators Investigation

Since January we have received information on 14 recaptures including 5 sandbars, 4 blues, 1 mako, 1 dusky, 1 oceanic whitetip, 1 blacktip, and 1 dusky/blacktip. Several were long-distance recaptures. Two of the blue sharks made transatlantic migrations from NE Cape Hatteras and SE Shinnecock, respectively, to the coast of Portugal. The distance traveled was approximately 3000 mi in 557 and 266 days, respectively. Two additional blue sharks tagged off Rhode Island were recaptured in Grenada and St. Lucia in the West Indies. They traveled 1763 and 1883 mi in 964 and 267 days, respectively.

Of the remaining recaptures, four species showed movement between the Atlantic and Gulf of Mexico. A sandbar, mako, and dusky, all tagged off the Middle Atlantic States, were recaptured in the Gulf. For the mako this is the first indication of movement from the Atlantic into the Gulf. An earlier mako recapture showed movement from the Gulf into the Atlantic. An oceanic whitetip traveled from 100 mi west of the Tortugas to Cape Canaveral.

The histological preparation of last year's tissue samples from a large white shark was completed to the paraffin block stage. A short note on white shark reproduction based on some of these samples is in the first stages of preparation. A manuscript, "Observations of Two Large White Sharks in the New York Bight," has been submitted for in-house review.

Preparations have begun for our summer tournament season. A form has been prepared for tournament directors in an attempt to collect catch, effort, and size data. This year about 12 shark tournaments will be held in New Jersey, New York, and Rhode Island. The first major tournament we will sample is the annual Bay Shore Mako Tournament to be held 27-29 June.

Dr. Frank Carey (WHOI) visited on 13 and 14 May to discuss his work on sonic-tagged blue sharks and his future publications.

Ann Erskine, a St. Georges School volunteer, finished her month with us. She updated and upgraded our taxonomic skin-patch collection and printed shark identification photos taken on Wieczno this spring.

Our June newsletter is in preparation and should be ready for mailing during the first week in June. In the newsletter we have summarized our total shark recaptures to date.

We began analyzing the liver-body weight information collected from sharks since July 1978. Preliminary findings for blues and makos suggest liver weights taken over a full season may not be a good index of "condition" with time. It appears the liver weights can vary as much as 7-8 lb for a given body weight at any season of the year, especially in the blue shark. These observations suggest that we could be sampling individuals from a population undergoing continual immigration and emigration.

Dr. Charles Apffel of the Ira T. Nathanson Research Laboratories in Walpole, MA, presented a seminar on cancer research to Narragansett Laboratory personnel. His research involves the anticarcinogenic activities of the microsomal and endoplasmic reticulum membrane systems of liver tissue. He is working on carcinoma-inhibiting extracts from shark livers we provided from the Wieczno cruise. There are indications that shark liver extracts may be capable of inhibiting growth of carcinomas.

A commercial longliner delivered to the Narragansett Laboratory the smallest free-swimming mako shark on record. Wes Pratt calculates the 9.5-lb, 75.5-cm mako was about a month old. Vertebral and other samples were taken to extend existing life history data to the early juvenile stage of this species.

Wes Pratt and John Hoey dissected a 24-ft basking shark that was tangled in a trap net on 15 May. The shark which had beached in Little Compton, RI, was a mature female, from which a complete set of morphometric measurements was taken together with samples of vertebrae, skin, and teeth. The stomach was empty.

Meetings, Talks, Visitors, and Publicity

On 2 May, Ken Sherman attended the NAFO Larval Herring Task Force Workshop at the Woods Hole Laboratory.

On 5 and 6 May, Ken Sherman was at the Scripps Institute of Oceanography attending a meeting of the National Science Foundation panel reviewing the SCAR/SCOR BIOMASS Program.

On 8 May, Ken Sherman was at the Woods Hole Laboratory attending a meeting of the Georges Bank Biological Task Force Subcommittee on Monitoring.

On 15 May, Ken Sherman met with Perry Jeffries at URI to discuss the addition of a post-doctorate student to the development team working on the electronic plankton counting and sizing system.

Andrzej Ropelewski, Jerzy Płociak, Leonard Ejsymont, Art Kendall, Wally Smith, Reuben Lasker, Tom Potthoff, Robert Marak, and Ken Sherman participated in the Sixth Annual Advisory Board Meeting of the Polish Sorting and Identification Center.

On 21 May, Ken Sherman participated in a meeting of the URI Fisheries Curriculum Development Committee. On 28 May, Ken served as a session chairman of a meeting of potential users of the National Oceanic Satellite System. The meeting was convened by the National Environmental Satellite Service at the WHOI Redfield Auditorium.

Publications

Allen, A. A. Observations of topographic Rossby waves in the Labrador Current. Presented at annual meeting of American Geophysical Union, Toronto, 1980 May 22-27. Abstract in Eos 61(17):252; 1980. (P)

Dickinson, J.; Wigley, R. Distribution of gammaridean Amphipoda (Crustacea) on Georges Bank. NOAA Tech. Rep. NMFS SSRF. (A)

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

Lough, R. G., Pennington, M. R.; Bolz, G. R.; Rosenberg, A. S. A growth model for larval sea herring (Clupea harengus L.) in the Georges Bank - Gulf of Maine area based on otolith growth increments. Fish. Bull. (US). (In review). (A)

Robinson, W.; Pennington, M.; Langton, R. Variability of tubule types within the digestive glands of Mercenaria mercenaria (L.), Ostrea edulis L., and Mytilus edulis L. J. Exp. Mar. Biol. Ecol. (S)

Sherman, K. MARMAP, a fisheries ecosystem study in the NW Atlantic: fluctuations in ichthyoplankton-zooplankton components and their potential for impact on the system. Diemer, F. P.; Vernberg, F. J.; Mirkes, D. Z.; eds. Advanced concepts in ocean measurements for marine biology. Univ. of South Carolina Press; 1980:9-37. (P)

Sherman, K.; Deming, J. W.; Grassle, J. F.; Lynch, R. V.; Shulenberger, E.; Taillie, C. Marine populations: processes and interactions. Diemer, F. P.; Vernberg, F. J.; Mirkes, D. Z. eds. Advanced concepts in ocean measurements for marine biology. Univ. of South Carolina Press; 1980: 539-544. (P)

Reports

Griswold, C. A. Draft plan for assessing the impacts of acute spills of oil and other toxic substances on fishery resources. May 1980. Narragansett Lab. Ref. Doc. No. 80-37; 1980.

RESOURCE UTILIZATION DIVISION

Fisheries Engineering Investigation

Al Blott attended the meetings of the ICES Working Group on Engineering Aspects of Fishing Gear, Vessels, and Equipment, and the Working Group on Reaction of Fish to Fishing Operations. He presented a paper titled "Scallop Drag Tests and Development."

The design of the experimental scallop drag has been completed and construction drawings are about ready to go out for bids. The video results from the 1979 scallop work were presented to Gloucester, MA, fishermen and to the NEFMC.

The hydrodynamic study of the Isaacs-Kidd mid-water trawl (IKMT) is continuing with flow profile data being taken this month. A paper on the IKMT study is being prepared.

The aluminum feed roller for the squid ring cutter has been constructed and successfully tested. A production model with an aluminum frame is being built.

A waste-heat recovery system designed for fishing vessels has been tested, and a paper on the results is being written.

Engineering Assistance to Other Programs

The first trip on the M/V Marine Evangeline in cooperation with the Atlantic Environmental Group to collect XBT, salinity, and chlorophyll samples was completed by John Kenney.

Through our contacts with gear researchers in Virginia, we found a manufacturer of crab dredges in Hampton, VA, for reference by the Milford Laboratory.

We are continuing to assist the Woods Hole Laboratory in preparing for the August surf clam-ocean quahog survey cruise, and in Ocean Pulse Program studies.

R/V Rorqual

This month the Rorqual was used for the continuing IKMT studies and as a dive platform for the ongoing Ocean Pulse work on Jeffreys Ledge in the Gulf of Maine. Routine engine room and safety equipment maintenance was performed.

Facilities

Dan Baker is now the Center Coordinator for Occupational Safety and Health Act regulation compliance. This will take a significant portion of his time in the near future. The chemical-waste storage venting system has been completed. Work on construction of the front-door vestibule and replacement of the condemned boiler has begun.

Resource Development and Improvement Investigation

Crab Meat

A storage study to determine the effect of freezing and subsequent refrigerated storage on crab meat quality was completed. Freshly pasteurized lots of roller-extracted meats and commercially picked meats were frozen for 1 mo, then held at 34°F for an additional 5 mo. Some were held frozen for 2 mo and at 34°F for 4 mo, and some were held frozen for 3 mo and then at 34°F for 3 mo. Taste tests were done on all refrigerated samples once a month. The results indicate that

the treatment did not have an adverse effect on product quality. Taste test scores for both types of meat were consistently in the 6.0 to 7.0 range (like slightly to like moderately).

In another experiment, pasteurized roller-extracted blue crab meat formed into simulated lumpmeats by steaming in a mold and by the use of the alginate technique were compared to pasteurized backfin lumpmeat. The results indicate that the steam-formed simulated lumpmeats were comparable to the backfin lumpmeats during the 60 mo of refrigerated storage. The alginate-formed lumpmeats, however, were excessively hard and differed significantly from the commercial backfin meats and to the steamed lumpmeats in flavor and texture after 2 mo of storage.

New Products

A total of 10 collaborators agreed to try the method for crab species identification by thin-layer isoelectric focusing (IEF). This collaborative study is a necessary step towards the method receiving "Official Method" status from the Association of Official Analytical Chemists (AOAC). Most of the collaborative tests kits have been distributed.

Samples of frozen Atlantic cod fillets were withdrawn from the +5°, 0°, -5°, and -20°F rooms after 8 mo of storage. The taste-test results of the steamed product showed that all the samples were fair to good except the sample stored at -20°F which was rated as good to very good. The Hunter L Colorimeter measurements showed very little change in any of the samples. In all the samples, except the one stored at -20°F, the panelists considered the texture close to borderline. Very little change in texture was measured on the Instron Texturometer in the raw samples. However, the cooked-sample measurement showed that they were getting tougher, especially those samples stored at +5° and 0°F.

An experiment was begun to determine the dip time and concentration of potassium sorbate that can be used before the taste panelists detect it in Atlantic cod fillets. Since the weight and shape of the fillets vary so much, the exact concentration of the sorbate in a fillet is difficult to control.

Product Quality, Safety, and Standards Investigation

Product Quality

We welcome on board Betty Tuhkunen who will assume the duties of conducting the organoleptic evaluations and other related work.

Using the appropriate penicillin bottle in the analysis for ammonia by the microdiffusion procedure, a more intense yellow color developed with the Nessler reagent compared to the pale yellow color reported last month using larger bottles. However, with the smaller bottles a precipitate forms and this interferes with the spectrophotometric measurement of the color intensity. The cause for this precipitate is currently being investigated.

We are conducting a study for the US Fish and Wildlife Service to ascertain whether or not a flavor difference is apparent among American shad taken from different areas of the Delaware River. This involves "triangle" sensory tests on both the cooked flesh and roe, and it is expected that the testing will continue for several more weeks.

Experimental packs of canned bluefish have been put up in several different styles, including raw or precooked steaks, or, fillets packed in tomato sauce or

sunflower seed oil. All products were favorably received and this is encouraging, considering the fish had been frozen since last fall. A brine-packed product had a slightly bitter aftertaste, and this was believed to be associated with the high-temperature heating of certain products which may have formed in the 7-8 mo of frozen storage. This work should complete our study on the utilization of bluefish and a paper will be written on the subject.

Work on the textural study of red hake is behind schedule due to the late run of the hake in this area.

Ron Lundstrom confirmed the identity of 40 species using the AOAC-IEF species identification method for the North American Research and Development Command's (NARADCOM) edibility characteristic study.

Ron also participated in Judy Krzynowek's collaborative study of her method for cooked crab meat identification by polyacrylamide gel IEF.

Product Safety

Samples received for polychlorinated biphenyl (PCB) analysis from Montclair State College, Gulf Coast Research Laboratory, the Southwest Fisheries Center's Tiburon Laboratory, and Texas A&M University have been composited and homogenized.

Four shipments were made to our contractor for PCB workup and analysis. The contractor is demanding a minimum of 25 samples per week. If we are unable to supply them with this weekly quota, they threaten to terminate the PCB contract. We are not presently receiving enough samples from our collectors to meet this weekly quota.

Contact was made with Dr. Soule of the University of Southern California, Dr. Caillit of the Moss Landing Research Laboratory, and Mr. Herrgeselle of the State of California for the collection of additional species off California for our PCB work. Proposals from our collectors, protocols to collect, prepare, and ship samples, and rationale for the PCB project were sent to Dr. Soule and Dr. Caillit. They will review this material and, if feasible, send a proposal. We hope to implement a contract to collect targeted finfish species in the Los Angeles and San Francisco areas. The State of California is presently collecting striped bass, flounder, Pacific halibut, Dover sole, sand bass, American shad, and sturgeon in the San Francisco Bay/Delta area on a monthly basis. Some arrangements could be made to acquire some of these species. These would be individual whole fish. Cost of shipment and other incidental costs would have to be borne by the present task.

Two kilograms of fish are being shipped from the US Fish and Wildlife Service's Columbia National Fisheries Laboratory. The PCB check sample will be used at the Gloucester Laboratory and will be sent to the contractor with each shipment of samples. A letter will be received by Dr. Pettie on the exact concentration of PCB in this sample.

Product Standardization

Fred King participated in the 14th Session of the Codex Committee for Fish and Fishery Products. It was held during 5-10 May in Bergen, Norway. As a member of the US delegation, he participated in the plenary session's discussion of a proposed draft standard for fish blocks and a proposed draft standard for fish sticks and fish portions, breaded or in batter. He was also the rapporteur of a working group which discussed harmonization of defect definitions and defect tables between the four recommended international standards for fish fillets.

Activity on NARADCOM's nomenclature project was noted by the Wall Street Journal this month. The Boston Globe subsequently published a report of this

activity. It was picked up by the wire services and published in other newspapers. Meanwhile, the NARADCOM scientists are continuing to "eat fish." Current emphasis is on a larger variety of species in a given week, and we are continuing to assist in this selection of species.

A draft copy of a Memorandum of Understanding (MOU) between the US Department of Commerce and the US Department of Agriculture (USDA) has been prepared and forwarded to the Washington Office. By this MOU, the USDA will authorize and support NMFS's fishery specifications work.

A work project proposal for specifications work was prepared and sent to the Washington Office. This proposal reflects our new relationship with the USDA.

The commercial item description for canned salmon was finalized and forwarded to the Food Quality Assurance Division of the USDA.

USDA Institutional Meat Purchase Specifications for Fresh Beef; Cured, Cured-and-Smoked, and Fully Cooked Products; Fresh Lamb and Mutton; and Fresh Veal and Calf were reviewed for the USDA's Food Quality Assurance Division.

Portions made from Atlantic cod belly flaps and stored for 13 mo at 0°F were judged to be of "good" quality by our taste panel.

John Ryan and Joe Carver participated in a meeting of the Armed Forces Product Evaluation Committee at NARADCOM in Natick, MA, on 8 May. An invitation for the group to visit the Gloucester Laboratory at their next meeting on 10 July at Natick was accepted. A buffet of products prepared from underutilized fishery products will be offered for their inspection at that time.

Our publication on "Cod and Its Utilization" has become quite popular. Over 40 requests have been received for reprints.

Interactions with Universities

Universities and colleges with which the Resource Utilization Division had interactions during May were: Massachusetts Institute of Technology, University of Florida, University of Rhode Island, Oregon State University, Massachusetts Maritime Academy, Virginia Institute of Marine Sciences, University of Georgia, Michigan State University, Nova Scotia Technical College, Providence College, and University of Vermont Medical School.

Technical Assistance

Information and technical assistance were given in the following areas: fish plant design and sanitation; diesel fuel prices; aquaculture of northern shrimp; nematodes; weight loss in dressed fish; eels; shellfish bacteriological tests; thawing fish; Gloucester fishing industry; modification of crab processing equipment; prepared squid products for Essex Agricultural and Technical Institute; salting fish; handling and preparation of products from sharks and skates; use of minced fish with a soy binder; bottom trawls; freezer trawlers; fishing methods for underutilized species; drained weight of clams; Dutch fish eviscerating machine; regulations on king crab; sources of allergic fishery products; storage and packaging of fishery products in clear retort pouches; mercury analysis on US Department of Commerce export certificates.

Meetings, Talks, Visitors, and Publicity

Meetings

Louis Ronsivalli and Perry Lane attended the opening and dedication of the Community Canning Center at Essex Agricultural and Technical Institute. Massachusetts Governor Edward King was the principal speaker for the program. The Center was the idea of Representative Nicholas J. Costello of Amesbury and will be available free-of-charge to provide facilities for the home canning of locally grown produce.

Al Blott attended meetings in Iceland of two ICES working groups dealing with fisheries engineering and fish reaction to gear.

Dan Baker attended another meeting at the Narragansett Laboratory concerning the asbestos problem there.

Vernon Nulk and John Kenney attended "Electro 80," a high technology electronics exhibition and convention in Boston.

Al Blott and Vern Nulk attended the NEFMC meeting to present the results of the 1979 scallop gear research.

Joe Licciardello participated in a meeting of the National Research Council's Committee on Food Stability at NARADCOM to discuss the topic of fish as a meat extender.

J. Perry Lane and Joe Mendelsohn attended the seminars sponsored by the Northeast International Seafood Exposition in Newport, RI. The purpose of this meeting was to interest foreign fish buyers in American-caught fish. Underutilized fish stocks were discussed as well as joint ventures with foreign nations. Also presented were the new products that can be prepared from underutilized species and processing wastes, as well as the advantages of using potassium sorbate and modified atmospheres for preserving fresh fish.

Judith Krzynowek attended the American Oil Chemist Society World Congress in New York City.

Perry Lane attended a meeting of the Northeast Shellfish Sanitation Association in Davisville, RI, and reported on current shellfish work by the Resource Utilization Division.

Louis Ronsivalli and Perry Lane attended a meeting of the planning group for the Gloucester(MA) celebration of the Year of the Coast.

Visitors

Coco Belfrige and C. Waxburg from Joint Trawlers Ltd. in Helsinborg, Sweden, along with Paul Earl of NMFS, to discuss ammonia in dogfish.

Adam Sitowski, Director of Quality Control, Dalmor, from Gdynia, Poland, to learn of the Division's research projects.

Ann Chapin of Gloucester Nuva Agriculture Project to obtain blue crabs for culture work.

William Alston and students from Hamilton-Wenham High School to tour the Gloucester Laboratory.

Russell Pettigrove of the Maine Marine Vocational Education Program to visit the Gloucester Laboratory and the Gloucester fishing industry.

DIVISION OF ENVIRONMENTAL ASSESSMENT

Behavior of Marine Fishes and Invertebrates Investigation

Final preparations are underway for a field experiment this summer on the effects of petroleum-contaminated sediment on the feeding behavior of the blue crab on littleneck clams. The study is patterned after one performed last summer on the Dungeness crab that was the result of a collaborative effort between this Investigation and the Battelle Laboratory at Sequim, WA. The success of that pioneering study has prompted us to extend the methodology to the blue crab, an important East Coast species. Again, this study will be a collaborative effort between Battelle Laboratory and us, supported jointly by EPA funding and the Ocean Pulse Program. Essentially, the experiment involves placing a number of caged boxes, which contain both blue crabs and various size classes of littleneck clams, on the bottom of Sandy Hook Bay by biologists using SCUBA. Half the cages will contain petroleum-contaminated sediment with the other half containing uncontaminated sediment to serve as controls. Feeding rate will be monitored daily. The way in which the experiment is designed should enable us to determine the effects of petroleum on both the predator and the prey and the resultant interactions between the two.

Environmental Chemistry Investigation

In May, Annette Pratt and Steve Fromm measured chlorophyll-a concentrations at 55 stations sampled between Cape Hatteras and Long Island during the first leg of the MARMAP survey aboard the Delaware II. Mike Hurd measured ^{14}C-primary productio at 20 stations.

Al Matte trained two new seagoing technicians (Wendy Stephenson and Sandy Riley) in the proper preparation of seawater samples for nutrient analyses. Wendy and Sandy participated in the May MARMAP survey. Al Matte and Ruth Waldhauer completed 900 inorganic nutrient analyses on the Technicon Autoanalyzer and 300 ammonium analyses on seawater from the recent Albatross IV (Cruise No. AL 80-02) MARMAP survey.

Ruth Waldhauer completed calculations of inorganic nutrient concentrations in seawater samples from the Nantucket Shoals flux experiment area collected by the Fishery Oceanography Investigation. Ruth Waldhauer and Al Matte also analyzed about 60 samples of seawater for inorganic nutrients which were provided by Dick Greig (Milford Laboratory) for assessing water quality in the Milford Laboratory aquarium.

Construction of our clean heavy-metal analysis lab at Sandy Hook was completed in early May. A lunchtime "ribbon-cutting ceremony" was held in the new lab on 13 May. Vincent Zdanowicz demonstrated the function of the lab and its equipment to staff attending the ceremony.

Jay O'Reilly and Steve Esser (New Jersey Marine Sciences Consortium) continued monitoring late-spring densities of Ceratium tripos in the New York Bight. Average water-column C. tripos densities in mid-shelf of the New York Bight ranged between 1 and 7 cells/ml, and were higher than densities measured in this same area a month earlier.

Jay O'Reilly and Chris Evans continued reducing data on chlorophyll-a distributions on the shelf between Cape Hatteras and Nova Scotia. Based on recurrent patterns of phytoplankton biomass abundance, netplankton/nannoplankton community composition, and hydrographic/bathymetric considerations, the shelf has been partitioned into 17 distinct areas. Analyses of seasonal trends in phytoplankton biomass in each of these areas of the shelf were initiated for characterizing the differences in phytoplankton population dynamics among these regions.

Coastal Ecosystems Investigation

Benthic Communities

Ann Frame completed a manuscript describing a new polychaete species from Long Island Sound. Ann identified invertebrate specimens found in multiple-core samples collected by Bill Phoel for his seabed oxygen consumption studies. She traveled to the University of New Hampshire to consult with the group which is processing Northeast Monitoring Program (NEMP) benthic samples under contract. Dave Radosh worked on our study of benthic recolonization after the 1976 anoxia off New Jersey, on the NOAA Marine Ecosystems Analysis Program (MESA) atlas, and on an assessment of benthic fauna available for fish forage on Romer Shoals, just north of Sandy Hook. (Romer Shoals is a popular fishing area which is being considered as a source of sand and gravel, and information on invertebrate standing stocks will aid in predicting possible mining impacts.) Dave aided the Atlantic Environmental Group in using radio-direction-finding equipment to track buoys deployed at Deepwater Dumpsite 106.

Clyde MacKenzie began a paper on management of shellfish beds, and analyzed samples and data from his diving studies of surf clam populations. Bob Reid and Frank Steimle completed another draft of the technical development plan for NEMP. Bob worked on planning for an intensive benthic sampling of the New York Bight, to be carried out in July and August, in conjunction with the MESA Program. We will compare incidence of gill clogging in crustaceans, distribution and abundance of benthic micro- and macrofauna, and concentrations of organic and inorganic contaminants in sediments and resource species, to past measurements to determine spatial and temporal trends in contaminant levels and effects in the Bight. Bob also coordinated studies of contractors (Universities of Delaware, New Hampshire, and Maine) who are working on portions of the overall benthic monitoring program.

Benthic Energetics/Ocean Pulse

This month we worked with other members of the Coastal Ecosystems Investigation in finalizing the benthic monograph in the MESA-New York Bight series. Time was also spent producing cruise plans and reports for recent and near-future Ocean Pulse cruises, and in the planning of these cruises. Our calorimetric studies continued; this month, we analyzed organisms from the continental slope which are important in certain resource species' diets, e.g., argentines, galatheid crabs. We also initiated another special cooperative project with the Apex Predators Investigation this month. This project involves examining the caloric content, moisture, and ash weight of livers of various species of shark to examine the utility of this approach in determining a condition index.

Physiological Effects of Pollutant Stress Investigation

Physioecology

A third 48-hr bioassay test to determine the effects of mercury, copper. silver, zinc, arsenic, and nickel on embryos of the blue mussel was performed this month. Preliminary analyses of data collected from the first two tests indicate that mussel embryos are as sensitive to copper, mercury, and silver as embryos of the American oyster and the northern quahog (or hard clam). These tests will continue as long as mussel spawning permits.

In 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), we performed two tests this month. However, because of a high level of abnormal development of embryos in control beakers, we had to discount these tests. Further tests will be performed.

A study of the long-term effect of silver on the slipper limpet, Crepidula fornicata, continued this month. These limpets are reproducing quite prolifically, with an average of seven-to-eight releases of larvae per day from our parental, F_1, and F_2 broodstocks.

Tests to determine the effect of mercury on oyster eggs and sperm treated individually and then combined in several different ways continued this month. Problems encountered earlier in the study with the lack of fertilization of eggs have been solved, but a new problem has appeared. Previous studies of the effect of mercury on oyster embryos indicated that 9 µg/ℓ (ppb) was 100% lethal, whereas in this study 9 µg/ℓ is 0% lethal. A new supply of mercuric chloride has been ordered to determine whether our old stock has lost its toxicity.

Work continues on the development of methods for determining low-level concentrations of metals in seawater. We now are able to determine the presence of copper at levels as low as 2 µg/ℓ, whereas with previous methods we were only able to determine levels within the 5-10 µg/ℓ range.

Our gas chromatrogaph which has been set up for the measurement of PCB's has finally been repaired after a series of problems and breakdowns. A backlog of samples collected for PCB analyses will now be examined.

Physiological Effects

Studies continued this month on the use of the scanning electron microscope for detection of pollutant-induced changes in gill surfaces of fish, mollusks, and crustaceans. Suitable techniques for these three groups have been developed, and we are now exposing animals to high concentrations of various pollutants in an attempt to induce gill damage. These changes will be compared to those reported in the freshwater pollution literature. We hope to use this area of study in future Ocean Pulse monitoring activities.

The addition of temporary summer employees allows an expansion of our work on molluscan physiology. We have initiated some work on basic metabolic function that will be useful in aquacultural studies, as well as providing needed baseline measurements for Ocean Pulse.

With the return of our R/V Shang Wheeler, sampling at three stations in Long Island Sound was resumed in May. Hematocrit and hemoglobin measurements were immediately made on blood of windowpane (flounder) collected at these stations, while plasma samples were frozen for later analysis of ions and osmolality. Magnesium analyses of a backlog of windowpane blood samples from 1979 are approximately half finished.

Hemolymph samples were taken from a group of silver-exposed sea scallops and analyzed for sodium, potassium, calcium, and osmolality.

Analyses of plasma samples taken from fish collected on the October 1979 cruise of the NOAA R/V Kelez are nearing completion.

Biochemical Effects

In April, Biochemical Effects personnel participated in the Second Annual NEFC Research Conference in Woods Hole (presenting two papers) and in the spring Ocean

Pulse cruise (Kelez Cruises No. KE 80-03 and KE 80-04). During the 2 mo just past, bench work has dealt with sea scallops, American lobsters, and rock crabs.

For sea scallops, duplicate experiments were either begun or completed on 10-ppb exposures to Ag and Cd, for 30 and 60 days, in order to add to data thus far compiled; we're looking at two new gill enzymes and three new ones in the adductor muscle. In addition, we are exploring the metal-exposed animals, in conjunction with Physiological Effects personnel, for any possible changes in ATP modulation of gill respiratory rates. Data so far show that Ag depresses gill shunt activity and that Cd does not; Ag elevates MDH in gill and Cd depresses it; and Cd elevates the activity of three energy-related enzymes in the adductor muscle and Ag only one. In Ag-exposed animals, 1 mM ATP repressed gill respiration by more than 50%, as compared to a 33% inhibition in controls, for an additive effect. Data for Cd-exposed animals will be developed next month.

For American lobsters, work was completed on the last of the tissues from Pb-exposed specimens, with or without subsequent low-salinity challenge. The few metal effects observed were seen only at low salinity.

For rock crabs, the analysis of heart tissue from animals exposed for 7 wk to 40 ppb of Ag showed no metal effects, as was also the case for crabs fed Ag-contaminated mussels.

Anaerobic Bacteriology/Metabolism

Activities this month concentrated on the identification of bacterial isolates obtained from samples collected on the Ocean Pulse cruise (Kelez Cruise No. KE 80-04) from 24 March to 10 April 1980. As previously mentioned, subcultures, both direct and enrichments, were made for those bacteria isolated from 33 sediment, 16 water, and 15 sea scallop samples. Some 360 bacterial isolates have been obtained from the various samples tested. Of the total, 125 were screened for gram-negative rods, and of this total, 46/125 (36.8%) were identified to species by our API system. The other 79/125 (63.2%) did not fit within any identifiable group under the present schemata used. This is in line with our previous results. However, those groups of identified bacteria are of interest to the fisheries and had the composition shown in the following table:

Bacterium	Composition
Pseudomonas fluorescens	12/125 - 9.6%
Aeromonas hydrophila	9/125 - 7.2%
Pseudomonas putrefaciens	6/125 - 4.8%
Vibrio alginolyticus	6/125 - 4.8%
Vibrio spp. (Lac & halophilic)	6/125 - 4.8%
Vibrio cholerae (NA)[a]	4/125 - 3.2%
Vibrio parahaemolyticus	2/125 - 1.6%
Chromobacterium	1/125 - 0.8%

[a] Non-agglutinating with classic V. cholerae strains.

Of the 15 cultures produced from scallops on the initial screening, none were toxic to mice. However, after treatment with trypsin, 7/15 (46.6%) became toxic (tryptic digestion can activate some bacterial toxins).

With the return of the Shang Wheeler, sampling of our Long Island Sound Ocean Pulse stations has resumed.

Biological Oceanography of Stressed Environments Investigation

Seabed Metabolism

Bill Phoel and Steve Spina finished reducing the seabed oxygen consumption data obtained from the March-April Ocean Pulse cruise and have begun statistical analyses. Steve has also been identifying the macrofauna obtained in the incubated cores under the guidance of Ann Frame.

Myra Cohn continued processing samples for her study, with Dr. Harold Marshall of Old Dominion University, on phytoplankton community structure. The ADP printout for a cruise on the Belogorsk (Cruise No. 78-03) has been completed and the species list is being correlated with the species identified by Dr. Marshall. A NOAA Technical Report is expected in autumn 1980.

Water samples for phytoplankton enumeration are being collected currently on a Delaware II cruise, and samples from the latest cruises of the Evrika and the Kelez are being processed. Occasional local surveillance for phytoplankton blooms is being performed at this time.

Remote Sensing

A planned meeting for the 16-27 June 1980 experiment for coherent Chesapeake/Delaware Bay and Plume studies was held on 6 May 1980 at the NASA Langley Research Center in Hampton, VA. Thirty-seven individuals participated. The institutions and agencies represented included: Chesapeake Bay Institute, Maryland Department of Natural Resources, US Naval Academy, Anne Arundel Community College, Virginia Institute of Marine Science, Old Dominion University, University of Miami, EPA, NASA Langley Research Center, National Ocean Survey, and NEFC. A review of the preliminary data suggested an overall success for the 11-20 March 1980 experiment. Participants of that experiment are to produce individual data reports for exchange within the group. Based on resources available from the 17 April meeting, NASA proposed flight lines for seven remote sensing overflights of the Chesapeake/Delaware Bay and Plume areas. Vessels from each institution or agency were tentatively located along the proposed flight lines and dates were selected for each flight.

Dr. James Thomas participated in and presented a paper at the Symposium on Oceanography From Space held during 26-30 May at the University of Venice (Italy). It was an international symposium at which 18 different countries were represented for the purpose of reviewing the status and presenting new results on remote sensing and oceanography from space. The papers and discussions are to be published in a proceedings volume to be edited by Dr. James Gower of Canada, Chairman of the Symposium. Of particular interest, corrected radiance topes (CRT's) of the Coastal Zone Color Scanner are now being produced. Approximately 135 CRT's are to be delivered to the National Environmental Satellite Service by 2 June.

Algal Bioassay

Assays were begun on a group of 11 samples. The results of the previous run indicated that at times growth limitation was relieved by additions to the seawater of an EDTA-chelated mix of Cu, Co, Mo, Zn, and Fe. The addition of chelator alone

has been found to enhance phytoplankton growth in seawater. Therefore, the present assay has been modified to test the effect of chelator. Additional design changes to speed up the assays and include testing of specific metals are being considered.

Meetings, Talks, Visitors, and Publicity

On 1 and 2 May, Ms. Margaret Dawson, Mr. David Nelson, Dr. John Mahoney, and Dr. John Pearce attended the Water Conference at Ramapo College in Mahwah, NJ. Dr. Pearce chaired the session on marine pollution monitoring and research and presented a paper on the importance of monitoring contaminants in the environment and the effects on living resources.

On 5 and 6 May, Jack Pearce, Bob Reid, and Frank Steimle attended a meeting with other members of the NEMP management team in Rockville, MD, to finalize the NEMP Strategic Plan and discuss further integration and coordination.

Jack Pearce, Frank Steimle, and Bob Reid hosted a Middle Atlantic workshop at the Sandy Hook Laboratory concerned with ongoing activities in marine pollution monitoring and research. Representatives from the New Jersey Marine Sciences Consortium, Brookhaven National Laboratory, the State of New Jersey, the US Army Corps of Engineers, and other state and federal agencies participated. The meeting was specifically organized to ensure communication between agencies carrying on active programs and the developing Northeast Monitoring Program.

On 12 May, Dr. Pearce met with the Dean of Academic Programs and the Comptroller at Drew University to discuss possible involvement of Drew University students and faculty members in research programs ongoing within the NEFC. A faculty person at Drew University is developing a program concerned with immunogenetic studies as monitoring tools.

On 13 May, Jack Pearce met with the Center Director and WHOI personnel in regard to long-term interactions between NEFC and WHOI.

Frank Steimle presented a talk about artificial reefs in New Jersey on 13 May to the Scientific Advisory Committee of the Ocean City (NJ) Artificial Reef Planning Group in Seaville. There has been a resurgence of interest in artificial reefs in New Jersey in the last year with at least three organizations building or planning reefs; other efforts are beginning in nearby states also.

Mr. James Miller attended the New England Estuarine Research Society on 16 and 17 May in Mystic, CT.

Dr. Fred Thurberg participated in a hearing on 21 May by the US House of Representatives, Committee on Merchant Marine and Fisheries, concerning ocean disposal of contaminated dredge spoils, and attended a joint EPA, NMFS, USFWS, and US Army Corps of Engineers meeting on the same subject on 22 May. Both meetings were held in Washington, DC.

Also on 21 May, Dr. Pearce met with the Director and staff at the University of Galway (Ireland) Shellfish Research Laboratories at Carna. This unusual laboratory, operated by the University of Galway, has been commissioned by the Irish government to take the lead role in developing mariculture programs. Perhaps of greatest significance, the caveat for development of the programs is that any program developed should be able to be transferred to Irish industry with extremely small operational budgets. Consequently, much of the rearing activities for various species of crustaceans and mollusks is carried out in extremely inexpensive facilities that can be made from materials readily available within the typical Irish fishing community.

Bill Phoel participated in the NOAA Diving Officers' Workshop on Mixed Gas and Bell Diving Operations at White Oak, VA.

Publications

Mahoney, J. B.; Steimle, F. W., Jr. Possible association of fishing gear clogging with a diatom bloom in the Middle Atlantic Bight. Bull. N. J. Acad. Sci. 25(1):18-21; 1980. (P)

Pearce, J. B. The mussel - a bivalve for all seasons. Underwat. Natur. (S)

Pearson, W. H.; Miller, S. E.; Blaylock, J. W.; Olla, B. L. Detection of the water-soluble fraction of crude oil by the blue crab, Callinectes sapidus. Mar. Environ. Res. (In press.) (A)

Pearson, W. H.; Miller, S. E.; Olla, B. L. Chemoreception in the food searching and feeding behavior in the red hake, Urophycis chuss. J. Exp. Mar. Biol. Ecol. (In press.) (A)

Phoel, W. C.; Draxler, A. F. J. In situ measurements of nitrogen excretion and oxygen consumption as determination of stress in Asterias vulgaris. Proc. 7th Annu. Aquat. Toxic. Workshop; Montreal, Canada. (A)

Phoel, W. C.; Webb, K. L.; D'Elia, C. F. Inorganic nitrogen regeneration at the mouth of the York River, Virginia, U.S.A. Neilson, B. J.; Cronin, L. E., eds. International Symposium on Nutrient Enrichment in Estuaries. Clifton, NJ: The Humona Press. (A)

AQUACULTURE DIVISION

Aquacultural Genetics Investigation

Mass Selection of Oysters

An examination of response to selection for increased larval growth rate in the American oyster is currently being conducted. We are in the process of determining whether by selecting the fastest-growing and earliest-setting larvae, we can improve upon current oyster production at this stage. The experimental design for this study consists of offspring from full-sib families collected on a daily basis so that late-and early-setting larvae could be differentiated. Results from the larval stage of the F_1 generation have shown no response as yet. The juvenile offspring from these same crosses are now being examined for differential growth rate after metamorphosis. Initially, there seems to be no difference in overall growth rate between the late-setting and early-setting lines; however, it appears that the early-setting larvae of the early-setting line may be growing at a faster rate than the early-setting larvae from the late-setting line. Studies are being continued to determine if a similar response is observed in crosses made during the past few months.

Experimental Hybridization and Inbreeding of Oysters

Additional inbred and outbred control crosses were made from 1977 F_1 full-sib animals in an effort to obtain more F_2 progeny. Five families were represented in the crosses for developing inbred lines which eventually will be test-crossed for any expression of hybrid vigor. Larvae from an inbred cross, made earlier in one of the families, survived to metamorphosis, as did larvae from its outbred control.

Progeny from the geographic hybrid cross between Texas and local Connecticut oysters mentioned in last month's report also successfully completed metamorphosis. M. Duronslet of the SEFC's Galveston Laboratory provided Texas oysters for the hybridization study. Some larvae from some of the crosses were "rose-colored."

A collaborative study was initiated with Judy Krzynowek and Kate Wiggin (Gloucester Laboratory) on isoelectric focusing identification of commercial crab species through differences in protein banding patterns. We are interested in isoelectric focusing as a method of differentiating and characterizing relationships among populations and species of oysters for breeding and crossing potential as indicated by similarities of banding patterns.

Juvenile and adult oysters were moved to the outdoor tank raceway system.

Cytology and Cytogenetics of Fish and Their Gametes

For the first time the chromosome apparatus of pre-spawned, ripe, and ripening fish eggs is being displayed in fish. Efforts continue to prepare this meiotic apparatus with a degree of methodologic reliability compatible with study of its condition in relation to pollution and general egg quality. Gonads of Atlantic mackerel, windowpane, and winter flounder from routine cruise collections are being used. Inability or difficulty in measuring germ-line mutation rates has been one of the weak points in estimating population effects of mutagens as most data (even on the most widely studied animal group) are on somatic effects.

Spawning and Rearing of Mollusks Investigation

Observations have been completed on the winter survival of bay scallops in mesh enclosures in Long Island Sound and in a shallow estuary in Groton, CT. Survival under all conditions was poor, averaging only 20%. In lantern nets at the Long Island Sound site, scallops at high stocking densities ($1000/m^2$) did poorer (9% survival) than scallops stocked at $500/m^2$ (21% survival) or $250/m^2$ (25% survival). There were no winter survivors in bottomless cages where scallops had access to the natural substrate. Survival in cages 0.25 m above the bottom was about 14% at densities of 250 and $500/m^2$, and 7.6% at $1000/m^2$. Size had little influence on survival. Small scallops (18 mm) survived at 15.7%, medium scallops (34 mm) at 24.6%, and large scallops (41 mm) at 18.9%. Low survival was also observed in enclosures in the Pequonnock River in Groton, CT, where a natural bay scallop population is present. Survival of our stocks there averaged only 10%. We feel that these losses are not due to an inherent natural winter mortality of scallops but, instead, our limited knowledge of this species' requirements in the winter is at fault. We plan to attack this problem with renewed vigor next season. In the meantime, we will improve our methodologies for obtaining market-size bay scallops in one growing season so that an alternative to overwintering is available.

Our hatchery production of seed scallops for field work this year has progressed well. We designed and installed three flowing seawater tables with longitudinal vertical partitions to replace the multitude of small trays we used in the past for raising scallops for the recent post-set size (<0.5 mm) to raceway-planting size (>5 mm). Initial results with these tables have been positive.

We recently sampled two groups of surf clams that had overwintered in natural sand substrate in protective cages. The clams appear to have survived well and are beginning to grow. We are beginning a major field experiment using this type of gear to determine optimal stocking densities for surf clams.

Rich Hass and Gail Lee were added to our Investigation's roster as temporary summer employees.

PATHOBIOLOGY DIVISION

Comparative Invertebrate Pathology Investigation

Oysters, Crassostrea corteziensis, from Estero de Carnichin, San Blas, Nayarit, Mexico, were examined histologically to determine possible causes(s) of reported mortalities. Degenerative changes were observed in some of the oysters examined and parasitic organisms were noted that could be considered the causative agents of this mortality.

Preliminary results from the examination of surf clams and ocean quahogs collected for the Ocean Pulse Program on resource assessment survey cruises indicate that the clams are in good health and contain no significant parasites. Examination of these animals continues.

The majority of time this month was spent in preparation for and participation in the annual meeting of the ICES Working Group on Marine Pathology. The meeting was held in Bergen, Norway, and was attended by representatives from 10 ICES nations. Status reports from each nation were presented. Diagnostic fisches and a disease index were assembled for publication by ICES, and a series of 13 resolutions were formulated for submission to the ICES statutory meeting. A disease (called microcell disease in France) has been discovered in European oysters, Ostrea edulis, and is causing considerable concern. A similar disease, which is highly virulent, has been seen in American oysters. The causative agent is thought to be a protistan parasite.

A bacterial epizootic destroyed one tank of soft shell clams which was part of a neoplasm transmission experiment. Of three surviving injected clams, one has neoplastic cells in its hemolymph 1.5 mo post injection.

A cooperative project has been planned with Dr. Joe Osterman, Chief of the Department of Rickettsial Diseases for Walter Reed Army Medical Center. Among the things to be investigated, using separation techniques and testing the living cells, are the biochemical and physiological properties of the various classes of blue crab hemocytes. Despite the importance of hemocytes in the general physiology of crustaceans, surprisingly little is known concerning the activities of these cell types, or the capabilities of the different classes of hemocytes. Until crabs are abundant enough to allow collection of considerable quantities of hemolymph, Dr. Osterman is working on a second part of the project: attempts to establish a cell line from crab tissues. If successful techniques can be developed for production and maintenance of crustacean cells in culture, a much-needed tool will be available for use in disease studies.

Limited numbers of blue crabs are now available, allowing Linda Dorigatti to familiarize herself with dissection and maintenance techniques for crabs. She is also collecting, identifying, and processing local amphipods for histological examination. As well as serving as a training experience, the completed specimens will provide base-line data on estuarine amphipods that can be compared with the oceanic amphipods we will be studing during Ocean Pulse activities.

Sharon MacLean and Jackie Swing participated in a 4-day cruise of the Kelez in and around Deepwater Dumpsite (DWD) 106 to collect euphausids from within the dumpsite, from a slopewater control area situated well north of the dumpsite, and from a shelfwater control area west of the dumpsite. Examinations of specimens from these areas are expected to provide valuable information on the natural occurrence of focal gill melanization in euphausids. The data obtained will be compared with data from previous cruises.

Scientists from the Atlantic Environmental Group provided essential on-site information on the approximate position of a warm-core eddy then present at DWD 106. With this information, modifications to the cruise plan were made to ensure that organisms were collected from specifically determined water masses and control areas.

Fish Pathology Investigation

Several winter flounder caught on 4 May near Highlands, NJ, by Richard Fox of Oakland, NJ, appeared to have a deteriorated or "wasted" condition characterized by very soft flesh and bone structure. Three frozen specimens were subsequently received at the Sandy Hook Laboratory. All fish were photographed and one representative specimen was fixed for histology. Two fish were packaged and refrozen for possible chemical analysis. Three bottom trawl tows were made on 19 May in the Highlands vicinity and the 29 winter flounder collected displayed no signs of any deteriorative condition.

Acting in response to reports of ulcerated winter flounder caught by sport fishermen in Huntington Harbor, four bottom trawl tows were made in that harbor on 6 May, capturing 386 flounder. Only one fish was found with an ulcer. It was completely healed and positioned on the "blind" side of the fish at an anterodorsal location. Two fish had evidence of eye damage, two had bent caudal fin rays, and three displayed ambicoloration.

Some of the sand lance collected on the spring bottom trawl surveys have been received at the Oxford Laboratory. If the summer and fall cruises are as successful in collecting these fish, an adequate number of samples will have been obtained for a meaningful analysis of skeletal anomalies.

Collection of marine and anadromous clupeids has continued on a weekly basis. This is the first systematic collection from an enzootic area which has been made before the time of the annual epizootic of IPN virus disease. Analysis of the size and ectoparasite burden of these fish may lead to a better understanding of changes in population structure which are related to the occurrence of mass mortalities. These collections will also be used in plaque-assay studies for the presence of virus in the fish. Experimental studies of the susceptibility of different clupeids and related species to this agent are currently in progress.

Presently, studies are continuing on the morphology and cytology of the digestive tract of normal striped bass larvae that were obtained from the Edenton National Fish Hatchery in 1978. The results of this research will be useful in studies of larval striped bass from other locations such as the Chesapeake Bay and Hudson River. Live samples of larval fish from these two latter locations are being collected at this time and forwarded to the Narragansett Laboratory where they are being raised as part of a cooperative study with the USFWS's Analytical Toxicology Laboratory in Columbia, MO. Hopefully, an eventual comparison of the data from these investigations will be made.

Microbial Ecology and Parasitology Investigation

A collection of 107 rock crabs was made in Cape Cod Bay, MA, in order to obtain new information on gill condition in animals living a considerable distance from the New York sewage disposal site. Jay Lewis made the collection on 12 May in cooperation with the Massachusetts Division of Marine Fisheries in Sandwich, MA. One week earlier John Ziskowski and Mark Galasso collected 228 rock crabs from Sandy Hook Bay, NJ. The two collections provided a rare opportunity to compare gill condition, crab size, etc., in specimens collected at approximately the same time and from two widely

separated geographical areas. Both sites yielded males and females in almost the same numbers, and berried females were common; males and females from Cape Cod averaged 3 cm larger in carapace width than did those from New Jersey. Comparative data are summarized in the table below:

Location	No. males[a]	No. females[b]	Total No.	% clean	% discolored	% black
Sandy Hook	96	132	228	67	30	3
Cape Cod	65	42	107	79	21[c]	0

[a] Range of 3.0-11.0 cm (mean of 7.0 cm) for Sandy Hook carapace widths, versus a range of 7.0-13.5 cm (mean of 10.6 cm) for Cape Cod carapace widths.

[b] Range of 4.0-6.0 cm (mean of 5.2 cm) for Sandy Hook carapace widths, versus a range of 7.0-10.0 cm (mean of 8.1 cm) for Cape Cod carapace widths.

[c] Includes five females and four males with black spots (mottled) in otherwise clean or discolored gills.

Histological studies are in progress to study gill pathology in 100 of the Cape Cod specimens and 15 of the worst-appearing gills from Sandy Hook. The New Jersey collection was timed to coincide with the spring migration of rock crabs from the bay to the ocean. Previous data which showed that in May and June crabs caught in the bay either failed to molt, were late to molt, or were heavily fouled and diseased were confirmed this year. Results from the Cape Cod collection confirm earlier observations that rock crabs with completely blackened gills are rarely, if ever, found in areas that are not in proximity to ocean disposal sites. Black-gill monitoring data collected so far this year are in excellent agreement with card-punched data for the 1973-79 period.

An extensive "monograph" on the distribution of marine amoebae in clean and stressed bottom sediments appeared in the last issue (February 1980) of the Journal of Protozoology. Amoebae of the genus Acanthamoeba which are potentially pathogenic to man and animals were discussed with regard to their distribution in nearshore and offshore waters from the Gulf of Mexico to New York and New Jersey. Conclusions presented in the manuscript, principally the association of the amoebae with sewage bacteria, were tested during a recent cruise in Narragansett Bay, RI. Thirty-one stations beginning 0.5 mi from Providence, RI, and ending 25 mi offshore from James Island were sampled for coliform bacteria, ciliate protozoa, marine amoebae, and Acanthamoeba. Eleven of the stations were located in waters that have been closed to shellfishing because of high fecal coliform counts. Among the stations in close proximity to shore (24), all were positive for Acanthamoeba. In contrast, among seven offshore stations only one was positive and it was at a dredge-spoil dumpsite that no longer is in use. Bacteriological data are being provided by CPT Newt Adams and CDR Jack Gaines (US Food and Drug Administration [FDA]), hydrological data by Dr. Don Lear and Mauria O'Malley (EPA), and ciliate data by Dr. Gaytha Langlois (Bryant College [RI]). Preliminary results from the cruise are in remarkable agreement with statistical predictions that are based on data presented in the February publication. The completed report on the Narragansett study is in preparation as a NOAA cruise report. It was of interest to note that at Station #1, 0.5 mi from

Providence, the black silty sediment acted as a cushion which prevented the Smith-McIntyre grab from closing. After several unsuccessful attempts to obtain a sediment grab, a small portable Ekman grab provided the desired sample. We gratefully acknowledge the officers and crew of Kelez for the success of the cruise.

Diseases of Larval Mollusks Investigation

Seven-day-old American oyster larvae contain five types of cells which can be recognized by their ability to attach to plastic cell-culture plates, and by their characteristic morphology on the plates. Exposure of the cells for 60 min to Formalin-killed pathogenic bacteria provides a relative measure of their participation in the immune process. Several experiments have shown that only one cell type, a small, highly motile, crescent-shaped cell, is significantly involved in engulfment of bacteria. High numbers of bacteria also attach to the surface of this cell (attachment is known to be a prerequisite to engulfment in phagocytic cells). One cell type, a spindle-shaped cell, showed no attachment or engulfment of bacteria; three other cell types exhibited only minimal attachment and little bacterial engulfment.

In continued investigation of the West Coast Vibrio termed "green slime," challenge tests with American oysters and washed versus unwashed Vibrio cells were completed. Data indicated that when growing the isolate on TCBS agar, the "green" form of this isolate was not as pathogenic to larvae as was the "yellow" form. Further research will attempt to show whether or not the change to a less pathogenic form of the Vibrio can be induced routinely by a substance added to the intake water of affected shellfish hatcheries.

Data analysis and artwork on past experiments with this organism have been completed for a paper to be presented at the 10 June meeting of the National Shellfisheries Association in Hyannis, MA.

Electrophoretic analyses of the filtrate of a shellfish-pathogenic Vibrio sp. concentrated 40X yielded only one protein band. American oyster embryonic development, however, was not adversely affected by the elute from gel slices of this band. Development was affected by the presence of elute of gel slices taken above the protein band. After further concentration of the filtrate, eight bands were obtained; two bands appeared in the area previously found to be toxic. Studies are underway to confirm their toxicity. Tests showed that the toxic fraction of the filtrate contained carbohydrate and showed amylase and protease activity. The total filtrate showed lipase activity.

Meetings, Talks, Visitors, and Publicity

Dr. Rosenfield and Mr. Kern attended a meeting of the Southeast States Ad Hoc Committee on Shellfish Transports at Charleston, SC, during 14-16 May.

Mr. Daniels participated in a cruise aboard the Delaware II during the 15 April-16 May.

Dr. Sawyer participated in a cruise aboard the Kelez in Narragansett Bay from 28 April to 2 May with FDA and EPA to collect sediments for amoebae studies. Dr. Sawyer also collected crustaceans for black-gill and heavy-metal analysis on 20 and 21 May at Sandy Hook.

Mr. Galasso participated in the cruise aboard the Kelez in Narragansett Bay from 28 April to 2 May to collect sediments for bacteriological and protozoan analyses. Mr. Galasso also collected rock crabs for disease monitoring at Sandy Hook on 5 and 6 May.

LCDR Berman also participated in the cruise aboard the Kelez in Narragansett Bay from 28 April to 2 May to collect sediments for bacteriological and protozoan analyses.

Dr. Murchelano attended the International Association for Aquatic Animal Medicine meeting at Vancouver, BC, during 4-7 May, and presented a paper on "A National Registry of Marine Pathology." He also was a member on the Fish Pathology Panel.

Mr. Farley attended the meeting of the ICES Working Group on Pathology and Diseases of Marine Organisms at Bergen, Norway, during 4-11 May.

Ms. Ortt received training in the use of the "Optacon" at Arkansas Enterprises for the Blind in Little Rock from 4 to 22 May.

Ms. MacLean and Ms. Swing participated in a deepwater dumpsite cruise aboard the Kelez from 5 to 10 May.

Mr. Newman obtained IPN virus materials and consulted with Dr. Philip McAllister on use of tissue culture facilities at Leetown, WV, on 7 May.

Dr. Robohm attended the annual meeting of the American Society for Microbiology in Miami Beach, FL, during 11-15 May, and presented a paper on "Early Phagocyte Activation in a Larval Mollusk Exposed to Pathogenic Vibrio sp."

Ms. Hines visited the National Fish Health Laboratory at Leetown, WV, on 15 and 16 May to learn about USFWS library computer systems.

Dr. Murchelano attended the ninth annual US-Japan Natural Resources Aquaculture Panel in Kyoto, Japan, during 24 May-3 June.

Dr. Blogoslawski attended the successful defense of Carolyn Brown's doctoral thesis at the University of Connecticut on 9 May. Congratulations, Dr. Brown!

Ms. Joyce Bowling, a NOAA Junior Fellow, has joined the Diseases of Larval Mollusks Investigation at the Milford Laboratory for the summer.

Ms. Maria Martin, a student at the University of Maryland Eastern Shore, entered on duty 27 May as a Library Aid under the Cooperative Education Program.

Visitors to the Oxford Laboratory during May included Mr. William E. Peterson of the Maryland Air Quality Program in Salisbury, MD; Mr. Tim Cole of Horn Point Laboratories in Cambridge, MD; and County Health Department representatives from Cambridge, Chestertown, Denton, Easton, Elkton, Centreville, Salisbury, and Snow Hill, MD, who met at the Laboratory on 7 May.

Publications

Bodammer, J. E.; Sawyer, T. K. Initial observations of periphytic bacteria and protozoa found on the gills of Cancer irroratus: a light and electron microscopic study. J. Protozool. (S)

Johnson, P. T.; Farley, C. A. A new enveloped helical virus from the blue crab, Callinectes sapidus. J. Invertebr. Pathol. 35:90-92; 1980. (P)

MacLean, S. A. A study of Haematractidium scombri in Atlantic mackerel, Scomber scombrus. Can. J. Fish. Aquat. Sci. 37:812-816; 1980. (P)

Sawyer, T. K. Marine amoebae from clean and stressed bottom sediments of the Atlantic Ocean and Gulf of Mexico. J. Protozool. 27:13-32; 1980. (P)

NATIONAL SYSTEMATICS LABORATORY

Penaeoid Shrimp Investigation

The description of a new species of rock shrimp of the genus Sicyonia from the eastern Pacific was prepared. Shrimps collected by the original R/V Albatross around the Philippine Islands and by the R/V Anton Bruun in the Indian Ocean were identified for the Instituto de Investigaciones Marinas in Santa Marta, Colombia.

Crustacea Investigation

Preparation continued on a manual on temperate-water decapods of the eastern US.

Benthic Fishes Investigation

Dr. Cohen visited museums in New Zealand and Australia to study specimens of gadoid fishes in order to prepare a catalogue of gadoid fishes for FAO.

Pelagic Fishes Investigation

Sections on Belonidae, Hemiramphidae, and Scombridae were completed for the UN Educational Scientific and Cultural Organization publication, "Check-List of the Fishes of the East Tropical Atlantic." Work was done on manuscripts describing a new species of halfbeak from New Guinea, the rediscovery of an estuarine halfbeak from India, and an analysis of the mangrove swamp fishes of New Guinea. We arranged an exchange of halfbeaks (Hemiramphidae) with N. V. Parin (Institute of Oceanology, Moscow).

Meetings, Talks, Visitors, and Publicity

N. V. Parin (as noted about, with the Institute of Oceanology, Moscow) visited to examine Hemiramphidae, Gempylidae, and Exocoetidae. Austin Williams participated in the Governing Board of the Estuarine Research Federation meeting in Mystic, CT, to plan the 1981 biennial conference. Daniel Cohen presented a seminar on the fauna of the Galapagos Rift thermal springs at the Australian Museum in Sydney.

Publications

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

Collette, B. B.; Smith, B. Bluefin tuna, Thunnus thynnus orientalis, from the Gulf of Papua. Jap. J. Ichthyol. (S)

Parin, N. V.; Collette, B. B.; Shcherbachev, Y. N. Preliminary review of the marine halfbeaks of the tropical Indo-West Pacific. Trudy Inst. Okean. 97:7-173; 1980. (In Russian). (P)

Williams, A. B.; Williams, D. M. Carolinian records of American lobster, Homarus americanus, and tropical swimming crab, Callinectes bocourti: postulated means of dispersal. Fish. Bull. (US). (A)

ATLANTIC ENVIRONMENTAL GROUP

Ocean Monitoring and Climatology Task

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 June issue of Atlantic Notice to Fishermen:

AEG/May 16, 1980

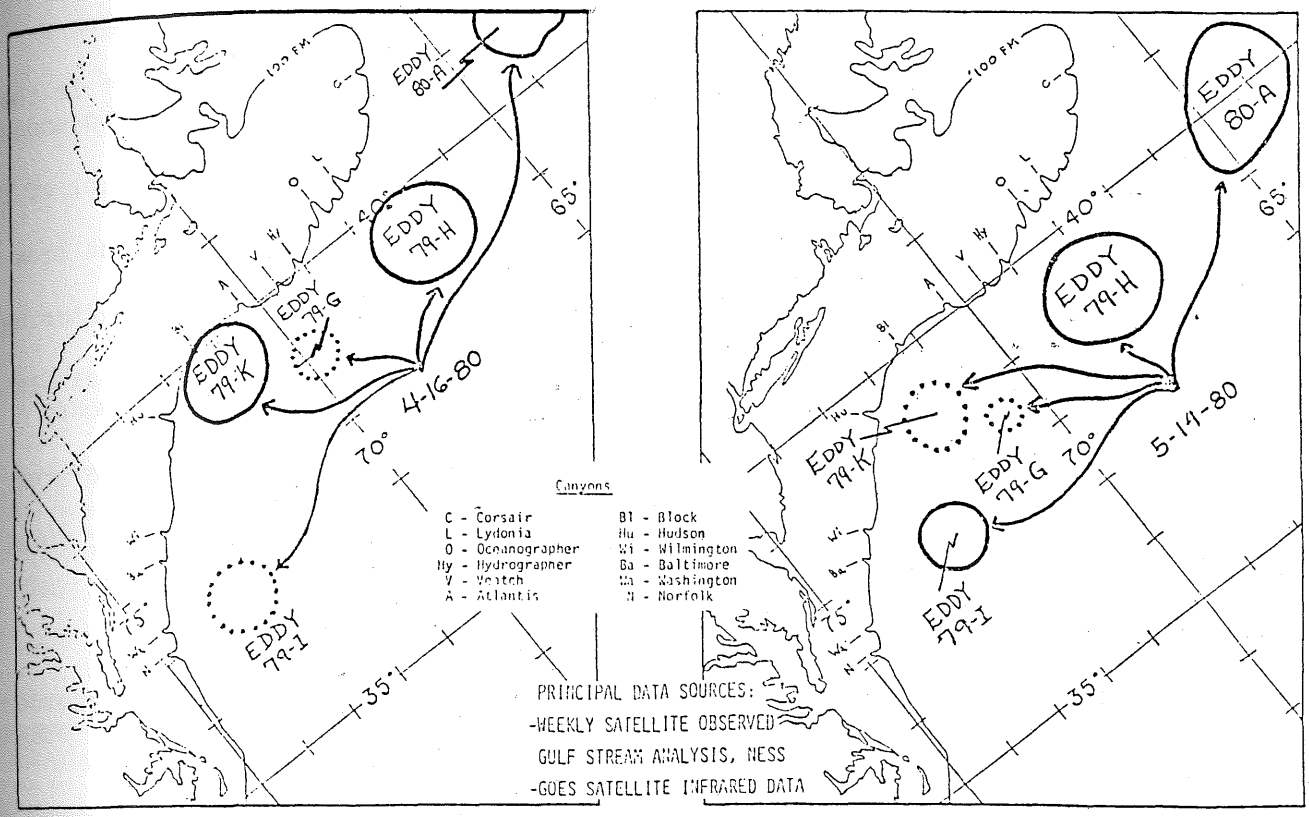
GULF STREAM EDDY LOCATIONS

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

Eddy 79-I, reported in last month's report as resorbed by the Gulf Stream south of Baltimore Canyon during the second week of April, it now appears, did not move so far south as thought and survived. From a position centered off Norfolk Canyon, centered at about 37.2°N, 73.3°W, in mid-April it moved about 45 nm (83 km) northeast, by mid-May, to a position centered at 37.7°N, 72.5°W, where an influx of Gulf Stream water has made it visible again in satellite imagery. Eddy 79-K traveled south about 35 nm (65 km) to a center position of 39.1°N, 71.5°W, southeast of Hudson Canyon. Eddy 79-G, which has not been visible in satellite imagery since the fourth week of April, is estimated to have moved about 45 nm (85 km) to a position centered at about 38.5°N, 70.6°W, far offshore of Atlantis Canyon. Eddy 79-H advanced about 56 nm (104 km) to the southwest and is now centered at 39°N, 68.1°W, south of Oceanographer Canyon. Eddy 80-A moved southwest for about 75 nm (138 km) to 69.9°N, 64.3°W, southeast of Corsair Canyon.

In the next thirty days, Eddy 79-I will probably move southwest and be resorbed by the Gulf Stream; 79-K may move southwest to near Wilmington Canyon; 79-G west to a position south of Hudson Canyon; 79-H west to south of Veatch Canyon; and 80-A west to a location south of Corsair Canyon.

Fishermen are requested to report unusual conditions or catches occurring in the vicinity of these eddies to the Director, Atlantic Environmental Group, National Marine Fisheries Service, RR 7, South Ferry Road, Narragansett, 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).



The cooperative Ship of Opportunity Program obtained seven XBT transects and three CPR (continuous plankton recorder) transects in May: two XBT and one CPR transects in the Gulf of Maine; one XBT transect off Southern New England; two XBT transects 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.

Ocean Dumping Studies Task

A research and monitoring cruise was conducted in the vicinity of Deepwater Dumpsite 106 during 6-10 May on the Kelez. The objectives of the cruise were: (1) to collect water samples (for organic chemical analysis) directly into precombusted glass bottles using a special sampler over a station grid surrounding DWD 106; (2) to collect zooplankton (in conjunction with the sampling of organic chemicals) using standard bongo and neuston gear; and (3) to deploy six drogued radio-direction-finding (RDF) buoys within a fresh waste plume in the northeast quadrant of the dumpsite, and three more buoys on the shelf northwest of the site.

Meetings, Talks, Visitors, and Publicity

Woody Chamberlin visited the Woods Hole Laboratory on 1 May to address a general staff meeting on the uses of satellite remote sensing in AEG.

Jim Bisagni and John Hartley left Narragansett on 3 May to take part in the Kelez cruise to DWD 106 during which they conducted an RDF buoy circulation experiment. They returned on 10 May.

On 5 and 6 May, Mert Ingham went to Rockville, MD, to attend a meeting of the Northeast Monitoring Program Task Force.

Reed Armstrong and Steve Cook participated in the RDF buoy experiment from Montauk, Long Island, from 7 May through 9 May.

Mert Ingham attended the Georges Bank Task Force Subcommittee on Monitoring meetings held at the Woods Hole Laboratory during 7-8 May.

A meeting of the Alternative Design Committee for the Northeast Remote Sensing Center, held at Hanscom Air Force Base in Lexington, MA, was attended by Woody Chamberlin on 9 May.

On 20 May, Woody Chamberlin attended a meeting at the Woods Hole Laboratory of the Requirements Committee for the Northeast Remote Sensing Center.

Woody Chamberlin attended the NOAA Conference on the National Oceanic Satellite System at the Woods Hole Oceanographic Institution on 28 May.

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)

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. (A)