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Stewardship of the Northeast's Living Marine Resources: Northeast Implementation Plan for the NMFS Strategic Plan

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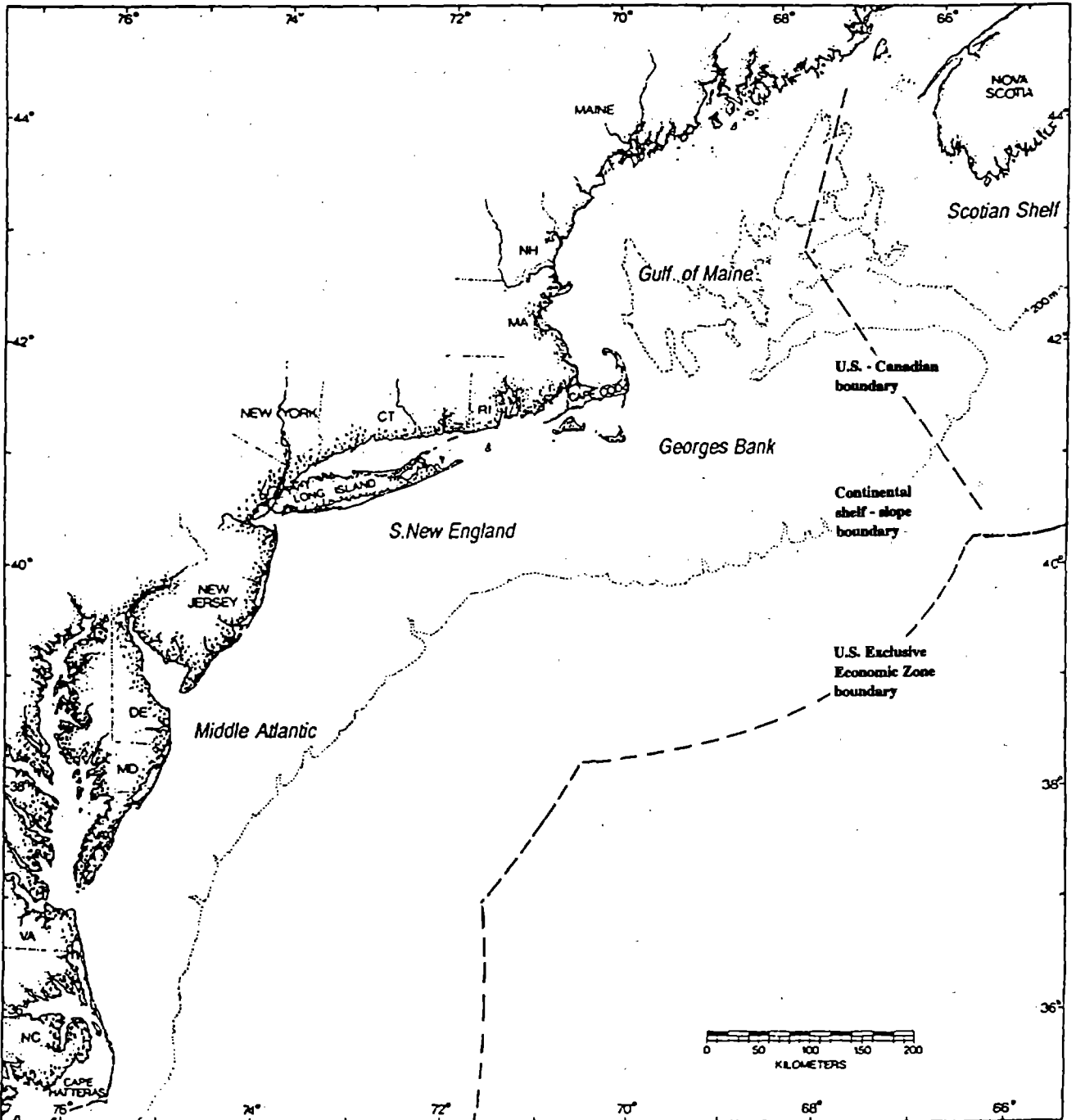


Figure 1. Northeastern U.S. Coastal Zone, Continental Shelf, and Exclusive Economic Zone.

INTRODUCTION

The Northeast Region of the National Marine Fisheries Service (NMFS) is composed of the marine and estuarine waters from Cape Hatteras, North Carolina, to the Canadian border, and from shore to the 200-mile boundary of the U.S. Exclusive Economic Zone (Figure 1). Within this area exist distinct ecological regimes, including the Gulf of Maine, Georges Bank, and Southern New England - Mid Atlantic Shelf. Each ecological regime has distinct aspects of three common pressures: (1) overfishing by an overcapitalized fishing industry; (2) conflicts between fishing on the one hand and whale watching and marine mammal/endangered species protection on the other hand; and (3) long-term trends of habitat degradation and loss which affect the conservation and management of living marine resources. To these pressures are added the continually increasing demand for high quality and safe seafood by the densely populated northeastern United States.

The Northeast Region has prepared this five-year regional implementation plan to address these issues within the context of the eight goals of the "NMFS Strategic Plan for the Conservation and Wise Use of America's Living Marine Resources." The remainder of this "Introduction" section generally describes the organizational units which will carry out the implementation plan. The next section, "Northeast Regional Implementation Plan," lists the goals, objectives, activities, and schedules for fulfilling the plan.

NORTHEAST REGIONAL DIRECTOR

Representing the NOAA Assistant Administrator for Fisheries, the Northeast Regional Director oversees a 30-million-dollar NMFS research and management program for the northeastern United States. With a responsibility for the conservation and management of living marine resources from Cape Hatteras, North Carolina, to the Canadian border, the Regional Director provides policy guidance

and coordination to ensure that authorities are exercised and mandates are adhered to.

The Regional Director oversees two programmatic elements: (1) the Northeast Regional Operations Office, with responsibilities for management; and (2) the Northeast Fisheries Science Center, with responsibilities for research (Figure 2).

NORTHEAST REGIONAL OPERATIONS OFFICE

The NMFS Northeast Regional Operations Office administers the conservation and management of the living marine resources of the northeastern United States as mandated by the Magnuson Fishery Conservation and Management Act (MFCMA), the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), the Clean Water Act (CWA), the Fish and Wildlife Coordination Act (FWCA), and numerous other federal authorities. The Office works closely with federal, state, and private agencies (including the regional fishery management councils and the interstate fisheries commissions), as well as with commercial and recreational fishing interests, consumers, and the general public, to conserve and manage the region's living marine resources.

The Office operates through four management divisions (*i.e.*, Fishery Management Operations, Fishery Analysis, Habitat and Protected Resources, and State, Federal, and Constituent Programs) and two support staffs (*i.e.*, Information Resource Management, and Management and Budget) (Figure 3).

Fishery Management Operations Division

The Fishery Management Operations Division provides scientific, technical, and administrative coordination

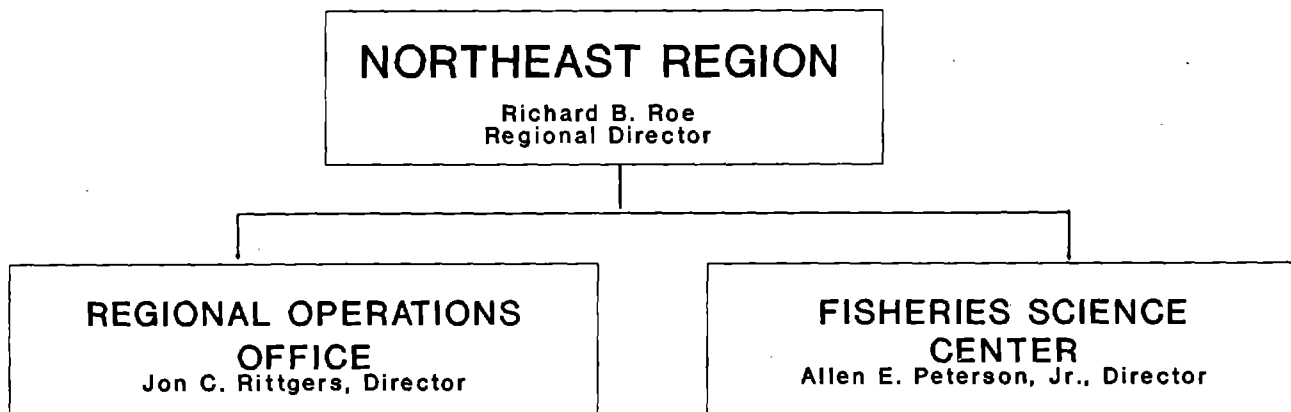


Figure 2. NMFS Northeast Regional Directorate.

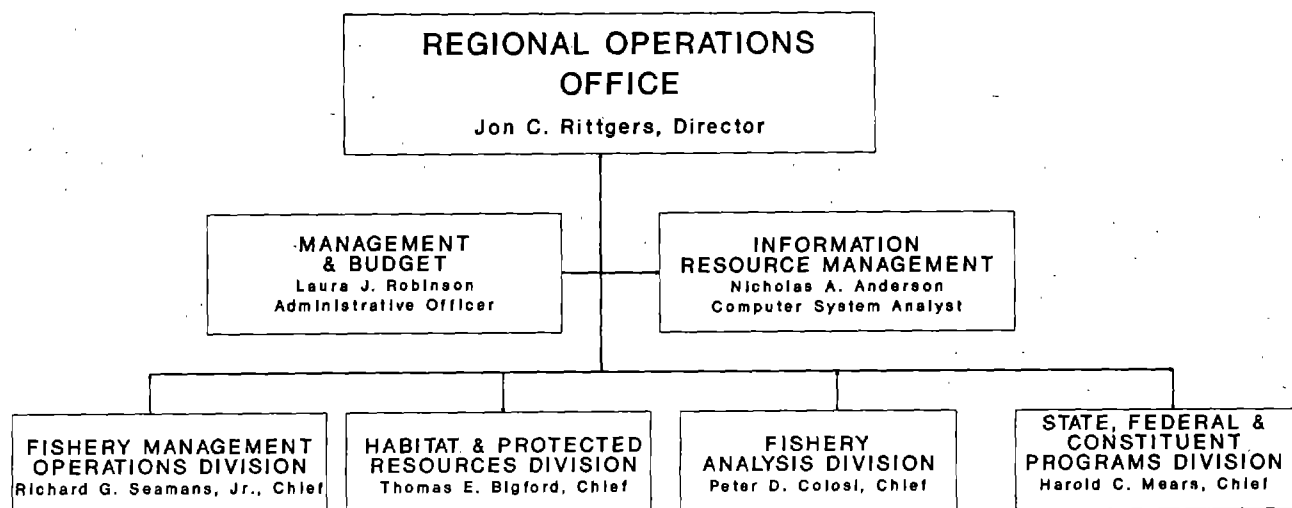


Figure 3. NMFS Northeast Regional Operations Office.

between the Regional Director and the New England and Mid-Atlantic Fishery Management Councils as established under the MFCMA. The Division works closely with council members and staffs, as well as with NMFS and state scientific and technical experts and the NOAA General Counsel, in developing, implementing, and monitoring the performance of fishery management plans (FMP) prepared by the councils, and of interstate fishery management plans (ISFMP) prepared by the state/federal management boards under the auspices of the Atlantic States Marine Fisheries Commission (ASMFC). The Division: (1) administers special programs to open/close or monitor fisheries under management or development; (2) reviews FMPs to ensure consistency with national standards and with regional and national policies and procedures; (3) identifies and reports needs for amendments to FMPs; and (4) facilitates and expedites the approval and implementation of FMPs and amendments.

The Division develops, implements, and monitors regulations for the Atlantic bluefin tuna fishery pursuant to U.S. commitments in the International Commission for the Conservation of Atlantic Tunas (ICCAT), and cooperates and coordinates with other NMFS regions and the NMFS Washington Office on the development and implementation of Secretarial FMPs for other highly migratory species. The Division also maintains the Northeast Regional Federal Fishery Permit System to carry out permitting operations required by various federal fishery regulations.

Fishery Analysis Division

The Fishery Analysis Division: (1) evaluates and reports on issues and trends in fisheries relating to FMPs and regulations; (2) evaluates the effectiveness of agency programs and regulations to meet conservation and management goals and mandates; and (3) tracks and reports on national and international economic trends in the fishing

industry affecting agency programs and policies. Working closely with the Northeast Fisheries Science Center, the Division conducts analyses for the Regional Director in support of policy formulation and of other divisions' programs, and for the councils and NMFS Washington Office staff in support of FMP development. The Division's analyses are based on current fishery data and information, on accepted biological, economic, and engineering techniques, and on computer programs useful for simulating and evaluating FMP effects related to fishing gear, fish harvest, and economic fishery management controls. The Division works closely with the councils, with national and international scientific, economic, and fisheries engineering experts, and with the fishing industry to identify and evaluate alternative management options, measures, and technologies.

The Division also assists in the development of research priorities for grant programs, and evaluates proposals for such grants.

Habitat and Protected Resources Division

The Habitat and Protected Resources Division works to minimize adverse effects of human activities on riverine, estuarine, and marine habitat by carrying out NMFS responsibilities under the MFCMA, ESA, CWA, FWCA, and other federal authorities. Among other activities, the Division: (1) works with the councils to prepare habitat sections of FMPs; (2) evaluates regional environmental threats to resources or habitats, and negotiates interagency agreements to conserve marine and estuarine habitats; and (3) coordinates regional input to the Federal Energy Regulatory Commission's licensing process. The Division manages the Northeast Region Estuarine Program in Chesapeake Bay, and coordinates within NMFS, with other NOAA line offices (including the National Ocean Service and the Na-

tional Sea Grant College Program), and with other federal and state agencies, the conservation of habitats in the nine special-emphasis bays in the Northeast identified under the Environmental Protection Agency (EPA)-funded National Estuary Program.

The Division also coordinates protected species management programs in the Northeast as established under the MMPA and ESA. Efforts include: (1) management of the Marine Mammal Exemption Program; (2) assessment and monitoring of marine mammal strandings and mortalities; (3) development of recovery plans for endangered species; and (4) drafting of guidelines and regulations for managing human interactions with protected species.

State, Federal, and Constituent Programs Division

The State, Federal, and Constituent Programs Division administers programs of federal financial assistance to states and other nonfederal interests (including universities, regional fishery management councils, interstate fisheries commissions, and regional fishery development foundations) for carrying out projects consistent with program mandates and/or authorizing legislation (*e.g.*, Interjurisdictional Fisheries Act, Anadromous Fish Conservation Act, Saltonstall-Kennedy Act) relating primarily to the conservation, management, and utilization of fishery resources in the Northeast. The Division also administers the review of programmatic documentation required in executing grant programs.

Working closely with the states, the ASMFC, the Great Lakes Fisheries Commission, and Sea Grant programs, the Division coordinates the interjurisdictional management of coastal and anadromous fishery resources and the respective interests of the commercial and recreational fishing industries. The Division also works closely with other agencies and private interests in addressing aquaculture issues within the management regimes of the aquacultured species, and in establishing regional policies on such issues.

NORTHEAST FISHERIES SCIENCE CENTER

The Northeast Fisheries Science Center is the research arm of NMFS in the Northeast. Directed by the Northeast Science and Research Director, the Center plans, develops, and manages a multidisciplinary program of basic and applied research to: (1) understand better the living marine resources and the habitat quality essential for their existence and continued productivity; and (2) describe and provide to management, industry, and the public, options for utilization and conservation of living marine resources and maintenance of environmental quality consistent with regional and national goals and needs. The Center primarily conducts its

research from Cape Hatteras, North Carolina, to the Canadian border.

To carry out its mission, the Center organization includes a Center Directorate, three support staffs (*i.e.*, Research Planning and Coordination, Program Support, and Data Management Support) and three research divisions (*i.e.*, Conservation and Utilization, Environmental Processes, and National Systematics Laboratory) (Figure 4). Research is carried out at seven laboratories strategically located along the New England and Mid-Atlantic coasts: (1) Gloucester (Massachusetts) Laboratory which emphasizes seafood utilization, safety, and chemistry; (2) Woods Hole (Massachusetts) Laboratory which emphasizes fish stock assessments, fisheries biology, fisheries statistics, and ecosystem models; (3) Narragansett (Rhode Island) Laboratory which emphasizes fisheries ecology and ecosystem dynamics; (4) Milford (Connecticut) Laboratory which emphasizes experimental biology; (5) Sandy Hook (New Jersey) Laboratory which emphasizes fishery habitat research; (6) Oxford (Maryland) Laboratory which emphasizes fish pathology and toxicology; and (7) National Systematics Laboratory (Washington, DC) which emphasizes finfish and shellfish identification and systematics (Figure 5).

Conservation and Utilization Division

The Conservation and Utilization Division studies living marine resource populations, their fisheries and selected other human interactions, their biological and ecological interactions, their management, and their consumption by humans. The Division operates through five branches (*i.e.*, Fisheries Statistics and Economics, Population Biology, Population Dynamics, Resource Utilization, and Ecosystem Dynamics).

The Fisheries Statistics and Economics Branch collects and analyzes commercial and recreational fisheries data. Commercial data come from landings in major ports and from catches at sea. Recreational data largely come from a contractor-operated, telephone survey of marine anglers. These data are provided directly to fishery researchers and managers, and are also used by the Branch to determine the status and trends in commercial and recreational fishing industries, as well as to determine the economic effects of different fishery management regulations.

The Population Biology Branch surveys finfish and shellfish populations to gather distribution, abundance, and biological data. Whole specimens and selected body parts of more than 40 species of finfish, shellfish, and mammals are collected and analyzed to determine such basic biological factors as age, growth, maturity, fecundity, food habits, survival, *etc.*

The Population Dynamics Branch studies the distribution, abundance, and basic biology of commercially and recreationally important stocks of finfish and shellfish to determine recruitment, fishing mortality, yield, *etc.* From these studies, the Branch assesses the status of these stocks

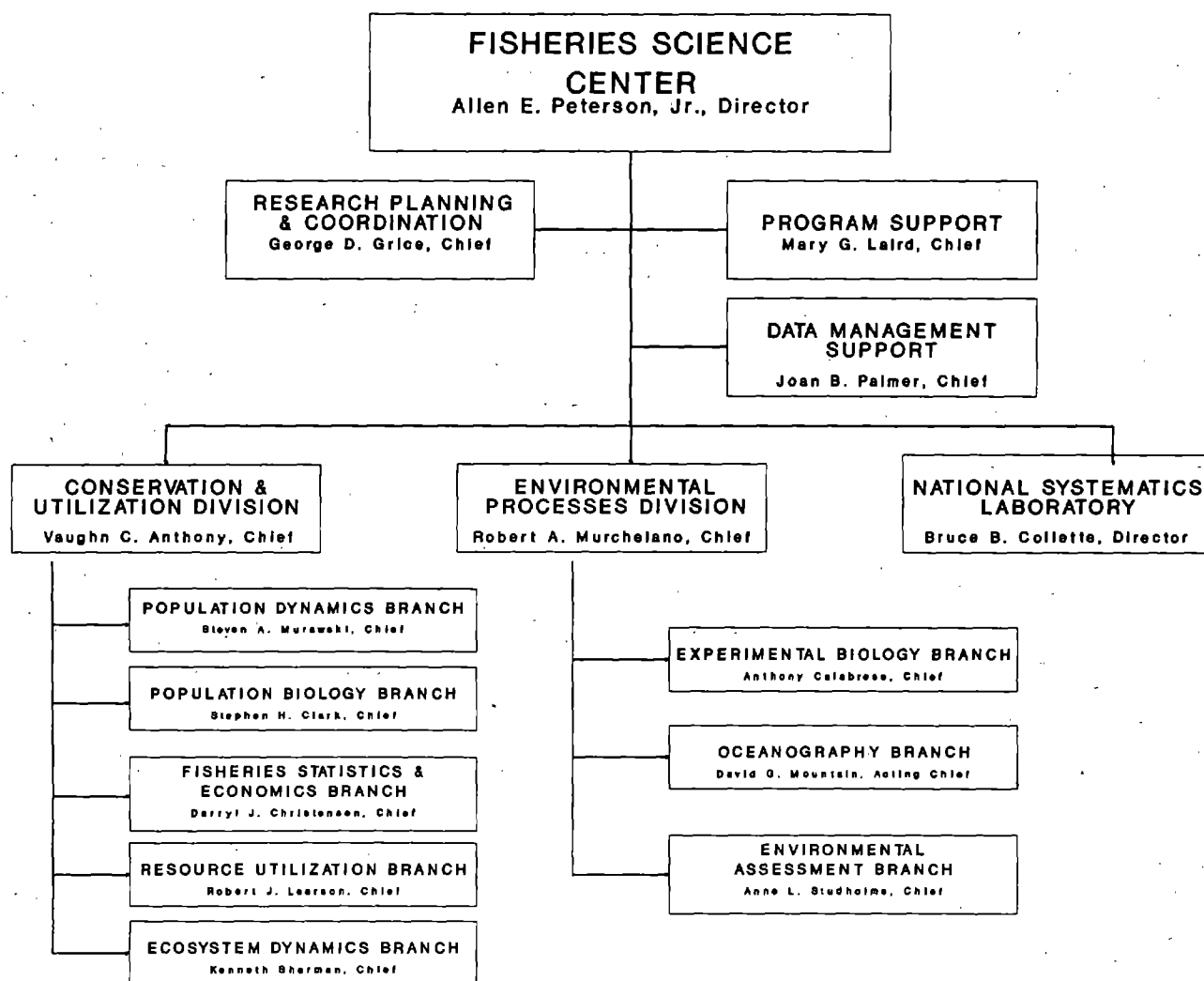


Figure 4. NMFS Northeast Fisheries Science Center.

and advises fishery resource managers for formulation of FMPs and ISFMPs. It also evaluates management practices and provides feedback to managers on the effects of those practices.

The Resource Utilization Branch conducts studies to assure the public of safe and wholesome seafood products. Research focuses on: (1) nutritional content of fresh and processed seafoods; (2) reduction of wasted flesh during seafood processing; (3) improvement in seafood harvesting and processing efficiency; and (4) development of new seafood products from nontraditional seafood species. The Branch also develops methods for species identification in seafood products based on biochemical (*i.e.*, isoelectric focusing) and immunological (*i.e.*, monoclonal antibody) techniques, and develops methods for determining and measuring microcontaminants in seafood.

The Ecosystem Dynamics Branch studies ecosystem components and ecological processes to predict changes in finfish and shellfish stocks and in marine mammal populations in response to changes among other ecosystem components and ecological processes. Ecosystem component

research focuses on zooplankton and larval fishes which are near the bottom of marine food chains, and on sharks and marine mammals which are at the top of those chains. Ecological processes research focuses on recruitment dynamics and food chain dynamics.

Environmental Processes Division

The Environmental Processes Division conducts field and laboratory research based on monitoring and process-oriented studies to characterize the biological, chemical, and physical environment of fishery resources, and to determine how it varies, both naturally and from human activity. The Division operates through three branches (*i.e.*, Oceanography, Experimental Biology, and Environmental Assessment).

The Oceanography Branch conducts short- and long-term studies to assess the role of environmental variability on the survival, abundance, and distribution of larval, juvenile, and adult fishery resources. The objective of these

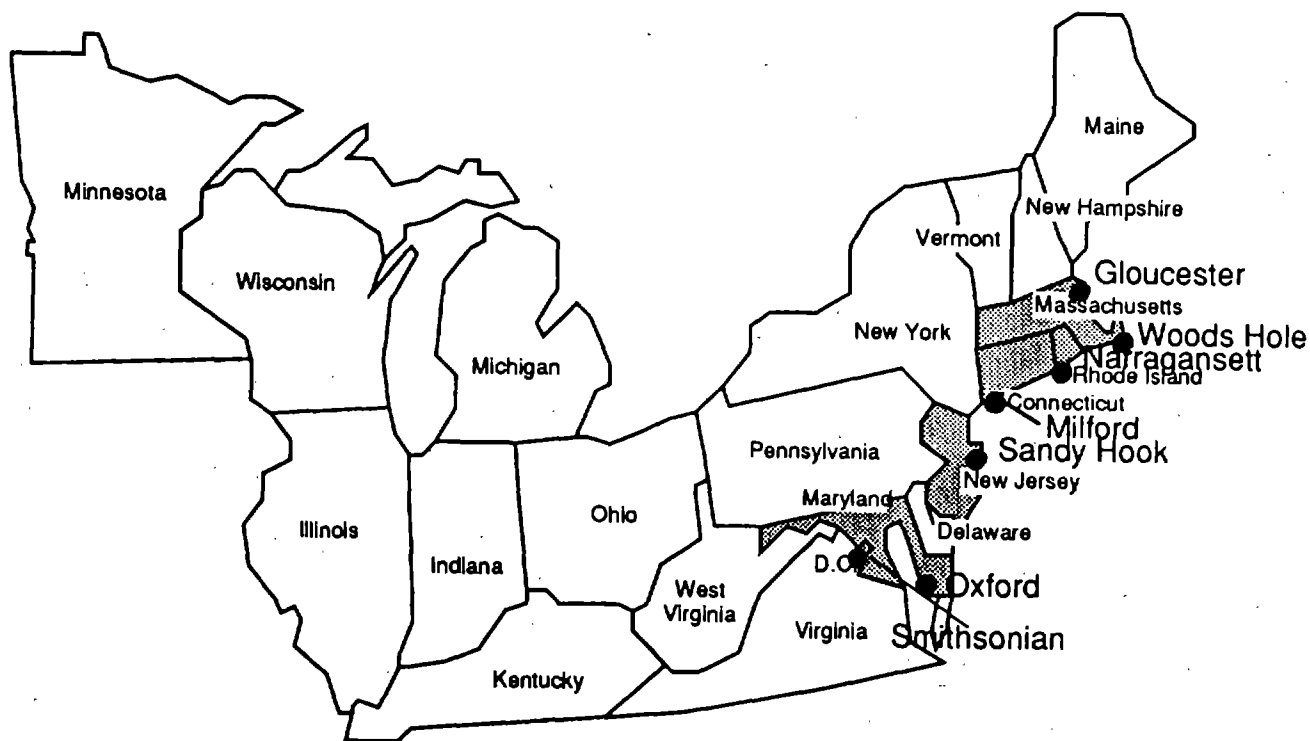


Figure 5. Location of NMFS research and management facilities in the Northeast Region.

studies is to understand better the relationship between environmental variability and fishery resource variability, and ultimately to be able to predict the effects of the former on the latter.

The Experimental Biology Branch conducts field and laboratory studies to evaluate the effects of toxic chemicals primarily on the reproductive success of fishery resources. The objective of these studies is to evaluate the effects of toxic chemical contaminants on individual animals, and, through the application of a life-history model, on the population dynamics of selected species.

The Environmental Assessment Branch conducts field and laboratory studies to define the relationship between habitat quality and fishery resource productivity. The objective of these studies is to establish linkages between anthropogenically compromised habitat status and adverse effects on fishery resources, particularly those effects which compromise ecological adaptability and increase morbidity and mortality.

National Systematics Laboratory

The National Systematics Laboratory lays the foundation for species identification so that fishery managers, port agents, ecologists, and others can determine the identity of species that are harvested or are important components of the ecosystem. Differences between species of fishes, shrimps, lobsters, crabs, squids, and octopi are uncovered through research on morphological and anatomical charac-

ters of specimens in museum collections and in the field. These differences are translated into keys to enable nonspecialists to identify specimens correctly. Correct names are found through study of an extensive literature in many languages. Hierarchical classifications are constructed to serve as a basis for organizing biological information.

NORTHEAST REGIONAL IMPLEMENTATION PLAN¹

GOAL 1: REBUILD OVERFISHED MARINE FISHERIES

1.1 Reduce Fishing Effort on Overfished Stocks

1.1.1.1 Approach

Support FMP and ISFMP amendments that will control effort and harvest in overfished fisheries.

1.1.1.2 Rationale

The populations of the principal groundfishes, sea scallops, American lobsters, and large pelagic fishes are overfished in the Northeast. The principal reason for this overfishing is excess effort by the fishing industry. The

¹ All items in this section listed under the "Major Activities and Schedules" subsections, and followed by an asterisk (*), are unfunded activities.

MFCMA established the New England and Mid-Atlantic Fishery Management Councils to manage these fisheries, with guidance from the Northeast Regional Operations Office and Northeast Fisheries Science Center. In addition, interjurisdictional fisheries are managed by the ASMFC. By supporting FMP and ISFMP development with policy guidance and scientific and management information, amendments will be developed to control effort.

1.1.1.3 Major Activities and Schedules

- Work with the councils and the ASMFC to establish criteria for moratoria, control dates, and effort control measures for recreational and commercial fisheries. (FY 1992-96)
- Review and edit the permit system for establishing participation in fisheries and for supporting effort control measures. (FY 1992)
- Establish an annual administrative fee for the permit system, consistent with the MFCMA, to recover costs for administration of the system. (FY 1992-93)
- Work with the councils to develop and implement management measures which will establish multi-year-class stability in the stock structure. (FY 1992-96)
- Analyze effectiveness of management measures, including trip limits, quotas, bag limits, area and seasonal closures, and gear restrictions, for effectiveness in reducing fishing mortality and in improving enforceability of action. (FY 1992-96)
- Conduct fishery analysis of, and conservation engineering studies for, selectivity of fishing gears in reducing fishing mortality. (FY 1992-96)

1.1.2.1 Approach

Work with the NMFS Office of Conservation and Management and with the NMFS Southeast Region to prepare and implement Secretarial FMPs, where appropriate, which will reduce effort on overfished highly migratory species. Efforts will require international negotiations to complement Secretarial actions for an effective rebuilding strategy.

1.1.2.2 Rationale

Highly migratory species were brought under Secretarial management via 1991 amendments to the MFCMA. As operational management of Atlantic bluefin tuna continues in the Northeast Region, resources will be required for

permitting and assessing the U.S. fishery, as well as for documenting harvest consistent with ICCAT quotas. The Northeast Region will also support management actions for swordfish, billfishes, and sharks as harvested in northeastern U.S. fisheries.

1.1.2.3 Major Activities and Schedules

- Integrate scientific and management information of NMFS Northeast and Southeast Regions in development of Secretarial FMPs for highly migratory species, including swordfish, sharks, tunas, and billfishes. (FY 1992-96)
- Review and assist in the public hearing process for Secretarial FMPs for highly migratory species mandated by MFCMA. (FY 1992-96)*

1.1.3.1 Approach

Develop and improve quantitative stock assessments for overfished resources. Evaluate resource trends, fishing mortality rates, and abundance of major stocks in the region. Integrate recreational harvest with commercial harvest trends.

1.1.3.2 Rationale

Quantitative evaluations of current stock status are critical for development of appropriate management strategies to rebuild depleted stocks. Relative abundance indices from research surveys and commercial statistics are the major sources of information on stock status. Using these data, this approach calls for regular updating of assessments and development of new analytical assessments on important stocks.

1.1.3.3 Major Activities and Schedules

- Maintain monthly collection, processing, and reporting of fishery landing and effort statistics and of biological sampling of the catch through federal and state collection systems. (FY 1992-96)
- Expand coverage of the data collection program and develop new user-friendly computer software for fish dealers who would directly computerize landings and purchase records. (FY 1993-96)*
- Conduct standardized research surveys of finfish and shellfish to provide unbiased indices of abundance of pre- and post-recruits. Collect and process biological samples for age determination and for estimation of biological parameters for major species for input into assessment analyses. (FY 1992-96).

- Expand the scope of research bottom trawl surveys to winter and summer to improve the index data base and to collect additional data on biological parameters. (FY 1993-96)*
- Conduct and update assessments of heavily exploited groundfish and shellfish stocks in New England and Mid-Atlantic regions. (FY 1992-96)
- Participate in assessments of heavily exploited large pelagic and highly migratory stocks, *e.g.*, swordfish, tunas, sharks, Atlantic salmon, striped bass. (FY 1992-96)
- Develop new analytical assessments for several heavily exploited finfish, *e.g.*, American plaice, winter flounder, bluefish, and invertebrate stocks, *e.g.*, sea scallops and American lobster. (FY 1993-96)*
- Participate in stock assessment review fora to improve peer review of assessment analyses and increase cooperation within the agency and with state, university, and council staff scientists. (FY 1992-96)
- Evaluate the accuracy and precision of the marine recreational fisheries statistics survey data for overfished stocks and integrate these data into assessments where possible. (FY 1993-96)*
- Investigate other approaches and sources of recreational fishing data from charter and party boat sectors for improving the data base. (FY 1993-96)*
- Conduct general linear modeling studies to standardize effort in the major overexploited fisheries in the region. (FY 1993-96)*
- Describe harvest-sector activity in the major fisheries by determining vessel and fleet participation, earnings, and behavior of individual vessels over temporal and spatial scales. (FY 1992-96)
- Collect data on detailed vessel costs and performance in order to evaluate individual vessel fishing strategies and the consequent effect of effort restrictions. (FY 1993-96)*
- Appraise the role of underutilized species in supporting programs to reduce effort on overexploited stocks. (FY 1993-96)*

1.1.4.1 Approach

Develop detailed models of fishing effort directed at overexploited stocks. These will include models relating fishing effort to size- or age-specific fishing mortality, and social and economic aspects of vessel and fleet activity.

1.1.4.2 Rationale

Descriptive and predictive models of the relationships between fishing effort and fishing mortality rates are needed to evaluate the efficacy of proposed effort reduction strategies. The effect of effort reduction on the industry as well as the opportunities for fishermen to shift to other fisheries needs to be assessed through detailed economic studies.

1.1.4.3 Major Activities and Schedules

- Maintain and expand collection of effort statistics through the vessel interview program. (FY 1992-96)*

1.2 Implement MFCMA Section 602 Guidelines for Prevention of Overfishing

1.2.1.1 Approach

In concert with councils, prepare overfishing definitions that are scientifically acceptable and appropriate for management use.

1.2.1.2 Rationale

Section 602 guidelines require a definition of overfishing for each managed stock. Definitions must be scientifically based, with biological reference points, and provide a basis upon which trends in recovery of exploited stocks will be evaluated.

1.2.1.3 Major Activities and Schedules

- Through stock assessment workshops (SAW), annually review fisheries to determine if managed (or unmanaged) stocks are overfished. (FY 1992-96)
- Maintain and improve data base on biological data, such as growth, fecundity, and stock identification, for estimation of reference points. (FY 1992-96)
- Evaluate possible reference points in relation to current stock status in the course of stock assessments to determine if a stock is currently overfished. (FY 1992-96)
- Review overfishing definitions for all managed species not presently defined, and for all species planned for management, as developed by the New England and Mid-Atlantic Fishery Management Councils and the ASMFC. (FY 1992-96)

- Produce stock assessment and fishery evaluation (SAFE) reports to evaluate status of fishery, in context of status of stocks and plans for management, to establish a time frame for reducing fishing mortality to below level defined as overfishing. (FY 1992-96)
- Guide the councils to develop "rebuilding plans" with controlled access measures tailored to specific fisheries. (FY 1992-94)
- Guide the councils to develop management measures to address fishery resource needs between recreational and commercial interests. (FY 1992-96)

1.2.2.1 Approach

Support the councils in assessing status of overfished stocks and respective fisheries. Participate in preparing SAFE reports.

1.2.2.2 Rationale

Section 602 guidelines call for annual SAFE reports. These reports should contain the best scientific information on the status of the stocks and will be used to monitor the progress of management. Improved biological and economic analyses are essential for meeting Section 602 guidelines.

1.2.2.3 Major Activities and Schedules

- Prepare the annual *Status of the Fishery Resources off the Northeastern United States*, SAW reports, and economic and socio-economic overview reports as components of the SAFE report. (FY 1992-96)
- Participate in preparation of a national status-of-the-stocks overview document, and in national SAWs, to improve the quality of assessment information. (FY 1992-96)

1.2.3.1 Approach

Provide scientific assessment and management guidance in developing and monitoring of rebuilding strategies through FMPs.

1.2.3.2 Rationale

For overfished resources, rebuilding programs must be developed and implemented under Section 602 guidelines. To evaluate proposed rebuilding programs requires detailed analyses on the biological and economic consequences of proposed management actions. Both fishery management councils in the region, as well as the Regional Director, need technical assistance in order to evaluate and monitor the effectiveness of management measures.

1.2.3.3 Major Activities and Schedules

- Provide analytical support to councils in evaluating current stock status and biological, social, and economic effects of present and proposed measures. (FY 1992-96)
- Provide guidance on recreational/commercial fisheries allocation issues. (FY 1992-96)
- Participate in the New England Council's Technical Monitoring Group, the Mid-Atlantic Council's Scientific and Statistical Committee, and the ASMFC's Scientific and Statistical Committee. (FY 1992-96)

1.2.4.1 Approach

Provide analyses and data collection systems for fisheries now under direct management of the Secretary of Commerce.

1.2.4.2 Rationale

Reauthorization of the MFCMA has given direct management responsibility for fisheries on highly migratory, large pelagic species to the Secretary of Commerce. The available data base for these fisheries needs considerable improvement in order to provide adequate technical advice to the Secretary.

1.2.4.3 Major Activities and Schedules

- Design and develop a data base for large pelagic fisheries including both commercial and recreational sectors. (FY 1993-96)*

- Develop economic and biological models for assessing the value and status of these resources and for evaluating the effects of various management scenarios. (FY 1993-96)*

1.3 Reduce Bycatch of Overfished Stocks

1.3.1.1 Approach

Integrate at-sea sampling data on bycatch and discarding practices into stock assessment and economic analyses.

1.3.1.2 Rationale

Overexploited fish and invertebrate stocks often are subjected to high bycatch rates of small, juvenile fish which are discarded at sea. The effect of this source of mortality on the resource can only be measured by integrating data collected by domestic observers. In addition, vessel behavior is affected by bycatch rates and management measures proposed to alleviate the problem.

1.3.1.3 Major Activities and Schedules

- Provide domestic observer coverage to determine catch, discard, and landings from selected fisheries, and increase this coverage and sampling design based on results of analysis of data to date. (FY 1992-96)*
- Improve the data base and software for accessing the observer data to facilitate their use in biological and economic analyses. (FY 1993-96)*
- Analyze spatial and temporal patterns of bycatch and discarding in the region, and incorporate these data into stock assessments for key species. (FY 1992-96)*
- Conduct studies of individual and fleet spatial and temporal fishing and discarding behavior, and analyze the economics of alternative management scenarios for reducing bycatch. (FY 1993-96)*

1.3.2.1 Approach

Work with the councils to establish and implement area closures when fishery would result in an unacceptable level of bycatch on juveniles and nontarget species.

1.3.2.2 Rationale

Excessive bycatch occurs as fishermen encounter large numbers of juveniles or nontargeted species. In many cases, these areas of excessive bycatch can be predicted from previous survey information. In other cases, urgent action is needed when a high concentration is encountered. In either case, action must be allowed through an approved FMP or taken by Secretarial emergency action.

1.3.2.3 Major Activities and Schedules

- Analyze management measures for protection of juveniles and nontarget species consistent with stock rebuilding plans. (FY 1992-96)
- Define prerecruitment mortality at different levels for effect on stock rebuilding plan. (FY 1992-96)
- Work with the councils to prepare and implement management measures with seasonal closures for areas of high juvenile concentration, spawning schools, or nontargeted finfish. (FY 1992-93)
- Work with the councils to implement Flexible Area Action System closures when fishery would result in unacceptable levels of bycatch of nontarget, overfished species. (FY 1992-96)

1.3.3.1 Approach

Work with the councils to apply conservation-engineering-based gear regulations to reduce bycatch of juvenile and nontarget, overfished species.

1.3.3.2 Rationale

Conservation engineering has a key role in review and application of gear regulations and restrictions for fisheries managed under the Multispecies FMP, Summer Flounder FMP, and Northern Shrimp ISFMP. Information from these reviews is used by the councils in development of new management measures.

1.3.3.3 Major Activities and Schedules

- Maintain a cooperative conservation engineering approach to fishing gear design and modification that

addresses information needs by the councils, Northeast Regional Operations Office, and Northeast Fisheries Science Center. Cooperative approach may involve both existing inhouse expertise and external contracts, grants, and Cooperative Marine Education and Research Program approaches. (FY 1992-96)

- Conduct gear tests of separator trawls for minimizing bycatch of juveniles and groundfish in northern shrimp fishery. (FY 1991-93)
- Conduct bilateral conservation engineering studies with Canada to develop conservation measures for reducing bycatch of transboundary groundfish stocks. (FY 1993-96)*

GOAL 2: MAINTAIN CURRENTLY PRODUCTIVE FISHERIES

2.1 Reduce Risk of Overfishing

2.1.1.1 Approach

Work with the councils to ensure that scientifically sound definitions of overfishing are in place and that management measures are adequate to meet Section 602 guidelines.

2.1.1.2 Rationale

Section 602 requires that scientifically sound definitions of overfishing be in place and that management measures prevent overfishing of currently productive stocks.

2.1.1.3 Major Activities and Schedules

- Guide the councils in developing amendments to FMPs with effective management measures to maintain currently productive fisheries, *e.g.*, Atlantic mackerel, silver hake, squids. (FY 1992-96)
- Conduct SAWs to review scientific definitions, assess stocks, and identify levels of control required to maintain productive fisheries. (FY 1992-96)

2.1.2.1 Approach

Develop and improve stock assessments for moderately exploited resources, including estimation of biological

reference points and improved data bases on monitoring.

2.1.2.2 Rationale

Quantitative evaluations of current stock status are necessary to monitor the resource with respect to management strategies designed to protect against overfishing. Some of the currently productive resources in the region have not been as extensively studied as the heavily exploited stocks, and consequently, require improved biological and survey information for monitoring.

2.1.2.3 Major Activities and Schedules

- Maintain monthly data collection programs for commercial fisheries landings and effort statistics and for biological sampling of the catch. (FY 1992-96)
- Expand coverage of the commercial data collection programs, and develop software for direct entry of data by dealers. (FY 1993-96)*
- Maintain and expand, where possible, research survey activities with respect to productive fisheries. Develop additional survey methods such as hydroacoustic techniques for pelagic species (*e.g.*, Atlantic herring, Atlantic mackerel) that are not well sampled in the bottom trawl surveys. (FY 1992-96)*
- Conduct and update assessments of moderately exploited species (*e.g.*, Atlantic mackerel, hakes, Atlantic surf clam, ocean quahog) using new methodology where needed. (FY 1992-96)
- Collect or collate appropriate biological data, and improve estimates of biological reference points for these species. (FY 1992-96)*

2.1.3.1 Approach

Conduct detailed analyses of effort directed towards these species and of relationships between effort and exploitation rates and patterns.

2.1.3.2 Rationale

Currently productive fisheries may be vulnerable to rapid increases in effort due to movement of vessels from overexploited depleted fisheries, to technological improvements in vessel efficiency, and to changes in market demand for these products.

2.1.3.3 Major Activities and Schedules

- Carry out studies of individual vessel and fleet spatial and temporal fishing behavior, and analyze fishing strategies to determine factors affecting multispecies effort. (FY 1992-96)*
- Conduct effort standardization modeling, and analyze relationship between effort and fishing mortality rates at age. (FY 1993-96)
- Estimate foreign and domestic demand, resource value, and effects of technological change on these resources. (FY 1993-96)*

2.1.4.1 Approach

Develop and implement an annual permit system, consistent with effort control criteria, to provide accurate records of participation in specific, managed fisheries.

2.1.4.2 Rationale

The Northeast Federal Fisheries Permit System is a simple, no-cost system which lists all vessels permitted to fish in any managed fishery of the Northeast, regardless of their actual effort or landings. This results in an inaccurate assessment of directed effort to any managed fishery, and has required additional criteria to determine active participation in a fishery.

2.1.4.3 Major Activities and Schedules

- Establish an administrative fee for the permit system, consistent with the MFCMA, to recover costs for administration of the system. (FY 1992)
- Develop a process for eliminating vessels from the existing permit file, publishing it in the Federal Register. (FY 1992)
- Annually update federal fishing permit files. (FY 1992-96)

2.1.5.1 Approach

Implement management measures to control both the incidental take of managed, nontarget stocks and the bycatch of juveniles.

2.1.5.2 Rationale

Maintaining currently productive fisheries and reducing the risk of overfishing require reducing the bycatch of both the nontarget stocks and the juveniles of targeted stocks, to allow for recruitment to the fishery.

2.1.5.3 Major Activities and Schedules

- Guide the councils to develop management measures to reduce bycatch of juveniles from currently productive fisheries, e.g., silver hake. (FY 1992-96)
- Implement management measures to limit incidental take of overfished managed species in a directed FMP fishery. (FY 1992-96)

2.2 Reduce Uncertainty in Stock Assessments

2.2.1.1 Approach

Improve the accuracy and precision of stock assessments by incorporating additional sources of data.

2.2.1.2 Rationale

Assessment analyses for several species could benefit by improved biological and research survey indices. In addition, data on recreational catches and catch discarded at sea could reduce uncertainty in estimates of removals, and hence, of mortality rates, from certain stocks.

2.2.1.3 Major Activities and Schedules

- Enhance the scope and accuracy of landings and effort data collection and processing, and expand the biological sampling of the catch. (FY 1993-96)*
- Maintain the time series of survey indices. Conduct additional studies on survey methods to improve both survey precision and calibration of gear and vessel effects. Improve accessibility and reliability of historical data files. (FY 1993-96)*
- Analyze and incorporate information from recreational fishing surveys and from domestic observer data on discarding into assessment analyses. Study statistical sampling design of these programs and improve them if possible. (FY 1992-96)*

2.2.2.1 Approach

Increase number of analytical assessment analyses on stocks in the region, and determine important sources of uncertainty in them.

2.2.2.2 Rationale

Many current assessments only provide relative abundance indices over time. Full analytical assessments include analyses of stock size and exploitation rates and patterns over size or age as well as biological reference points for the stocks. To increase the number of full assessments will require additional personnel as well as the exploration of new methods in certain cases.

2.2.2.3 Major Activities and Schedules

- Evaluate and apply, where appropriate, new assessment methods, increase the number of analytical assessments, and improve their accuracy and precision. (FY 1992-96)*
- Participate in regional, national, and international stock assessment review fora to obtain peer review of assessment analyses and to exchange ideas and information on alternative methods. (FY 1992-96)
- Explore multispecies assessment methods to account for additional sources of uncertainty in the analyses and to provide important information on species interactions (FY 1994-96)*

2.3 Promote Controlled-Access Fisheries and Establish "Property Rights"

2.3.1.1 Approach

Evaluate performance of the Atlantic surfclam and ocean quahog fishery under the individual transferrable quota (ITQ) management system.

2.3.1.2 Rationale

This FMP was the first U.S. fishery regulated under the MFCMA to implement a property rights scheme. Documenting the performance of the fishery before and after

implementation of the ITQ system will be an important example for any future property rights systems.

2.3.1.3 Major Activities and Schedules

- Periodically update stock assessments of these resources, and conduct investigations of the effect of plan measures on stock abundance and biological characteristics. (FY 1993-96)
- Evaluate economic performance of the fleet in this fishery, and collect detailed data on vessel activity, costs, and revenues. Develop bio-economic models of the fishery. (FY 1993-96)
- Evaluate social and economic effects of present and proposed effort control regimes on the fisheries of the Northeast. In conjunction with the councils, collect social and economic data to prepare management measures which meet MFCMA guidelines while addressing concerns within the social and economic structure of these fisheries. (FY 1992-96)

2.3.2.1 Approach

Obtain and analyze detailed information on harvest-sector activities of fisheries in the region, and develop models of vessel and fleet behavior, market demand, costs, and revenues.

2.3.2.2 Rationale

Information on the activity of the fleets will be essential in the development of a property rights system. This information will be needed to develop a system of allocation, to determine resource rents, and to evaluate the likely effect on the industry of proposed schemes.

2.3.2.3 Major Activities and Schedules

- Collect detailed data on harvest-sector activities for each fishery. (FY 1994-96)
- Develop econometric models of foreign and domestic demand, multispecies effort, resource value, and technological change. (FY 1993-96)*
- Evaluate alternative property rights arrangements with respect to the bio-economics of the fishery. (FY 1993-96)*

2.3.3.1 Approach

Evaluate each currently productive fishery for applicability to being managed under an ITQ or other controlled-access scheme.

2.3.3.2 Rationale

Current management regimes, under open access, are ineffective as competition for the resource exceeds conservation. Conversely, controlled-access schemes that establish property rights, including ITQs, offer a partnership opportunity for the industry to benefit from conservation and rebuilding of the stocks.

2.3.3.3 Major Activities and Schedules

- Evaluate SAFE information, trend of historical effort, and future demand for access for managed species, including Atlantic mackerel, silver hake, sea scallop, and American lobster. (FY 1992-93)
- Establish "controlled access" standards/criteria that recognize recreational versus commercial interests and access. (FY 1992-96)
- Collect social and economic data to assess the socio-economic effects of controlled-access programs on existing fisheries, in order to meet Sec 303(b)(6) of the MFCMA. (FY 1992-96)

2.3.4.1 Approach

Establish an administrative fee process for licensing the right to harvest under an ITQ system. The process should include authority to sell harvest rights for a "fair market value" commensurate with the "common property" value of the resource.

2.3.4.2 Rationale

The Northeast Region operates the only ITQ fishery -- for Atlantic surf clams and ocean quahogs. The fishery operates under a federally managed, tag-based accounting system that allows harvest by a small sector of the fishing industry, with no cost recovery for the common resource value allocated under the ITQs. This is inconsistent with the majority of federal resource lease laws. The MFCMA does not provide the additional authority required to establish and recover these fees.

2.3.4.3 Major Activities and Schedules

- Work with NOAA General Counsel and Office of Legislative Affairs to develop legislation consistent with agricultural lease laws. The legislation should be aligned with MFCMA re-authorization. (FY 1993-94)

2.4 Correct Ineffective Elements of Management Processes

2.4.1.1 Approach

Provide evaluation of allocation decisions affecting commercial and recreational fisheries.

2.4.1.2 Rationale

A significant number of the arguments in support of various allocations are specious. Standards are beginning to be recognized on a national scale, but additional advice and education will be required.

2.4.1.3 Major Activities and Schedules

- Continue to provide guidance in recreational/commercial fisheries allocation issues and in recreational fisheries data collection issues. (FY 1992-96)

2.4.2.1 Approach

Participate in councils' and ASMFC's scientific and statistical committees, technical monitoring groups, and plan development teams.

2.4.2.2 Rationale

Many of the proposals for FMP amendments are developed and evaluated by subcommittees of the councils. Ineffective or unworkable proposals can potentially be clarified at this stage, and more effective measures can be highlighted.

2.4.2.3 Major Activities and Schedules

- Participate whenever possible in council committees to evaluate technical measures. (FY 1992-96)

- Provide advice to council committees on the technical effectiveness of proposed measures and current management. (FY 1992-96)
- Participate in plan development teams whenever possible to provide technical expertise in development of FMP amendments. (FY 1992-96)

2.4.3.1 Approach

Through council executive committees and NMFS regional directors' meetings, review effectiveness of council actions in maintaining fisheries below the defined overfished level.

2.4.3.2 Rationale

Effectiveness of council actions is evaluated at council executive committee meetings and discussed among NMFS regional directors. A common point of concern is the initial education of council appointees to fishery management issues and MFCMA responsibilities. These concerns can be handled in numerous ways, including through the annual council chairmen's workshop.

2.4.3.3 Major Activities and Schedules

- Develop an information and education program for council members to increase their understanding of scientific and management analyses. (FY 1992-96)*
- Analyze options for emergency Secretarial management in fisheries either approaching "overfished" or being "overfished." (FY 1992-96)

GOAL 3: ADVANCE FISHERY FORECASTS AND ECOSYSTEM MODELS

3.1 Describe Functional Relationships and Processes that Control Fishery Systems

3.1.1.1 Approach

Through a combination of broadscale ecosystem monitoring (including bottom trawl surveys), process-oriented field studies on a narrower scale, and laboratory studies to investigate cause and biological effect, the potential effect of harvesting, short- and long-term (global climate change) environmental changes, and habitat degradation on living

marine resources can be estimated using fishery forecasting techniques and mathematical modeling.

3.1.1.2 Rationale

The management of depleted groundfish stocks in the Northeast requires an understanding of the probable recovery patterns under changing ecological conditions and reduced fishing mortality to optimize management strategies. The changing ecological factors include possible effects from habitat degradation (*e.g.*, contaminants, habitat loss, noxious algal blooms, hypoxia accompanying eutrophication), changes in the abundance of top predators (*e.g.*, skates, dogfishes) resulting from excessive harvesting, and long-term climate change from global warming.

It would include multispecies interaction models to extend the International Council for the Exploration of the Sea's (ICES) approach to bio-economic forecasting and technical fisheries interaction models.

3.1.1.3 Major Activities and Schedules

- Investigate the behavior of multispecies ecosystem models to examine biofeedback from fishing, trophic cascade effects, marine mammal/fishery interactions, and potential global climate change effects on Northeast fisheries from a retrospective study. (FY 1992-96)*
- Evaluate the rates of growth and maturity of selected northeastern living marine resources and their changes over time in response to stock abundance and environmental variability. (FY 1992-96)
- Supply feedback to fishery system models caused by profit-driven effort changes, including augmenting SAFE reports (FY 1992-96) and bio-economic modeling. (FY 1993-96)*
- Conduct new winter/summer bottom trawl survey to provide data on fisheries biology. (FY 1993-96)*
- Determine the effect of the extraordinary temporal, spatial, and numerical expansion of Atlantic mackerel biomass on other components of the Northeast Continental Shelf Ecosystem (*e.g.*, larval gadoid mortality/adult recovery) and on resources, and recommend mitigation options. (FY 1992-96)
- Determine the role of dominant fish predators, including apex predators, small sharks, skates, and gadids, in controlling recruitment. (FY 1992-96)
- Determine the effect of elasmobranch population expansion on early life stages of depleted groundfish

stocks, and recommend mitigation options. (FY 1992-94)

- Determine the effects of biomass flips of pelagic zooplanktivorous fish on the standing stocks and turnover rates of the zooplankton community in relation to grazing effects and ecosystem productivity. (FY 1992-93)
- Investigate stratification variability on Georges Bank and its effect on larval fish survival in cooperation with the GLOBEC program of the National Science Foundation. (FY 1992-95)*
- Develop a model of the recruitment process of Atlantic cod and haddock on Georges Bank in cooperation with the GLOBEC program of the National Science Foundation. (FY 1992-96)*
- Conduct laboratory studies on the suitability of "noxious" algal blooms as a food source for selected shellfish (FY 1992-96) and on the role of algal lipid biochemistry as an index of mollusk nutrition. (FY 1992-96)
- Develop natural history information on the identity, distribution, and prevalence of disease-causing agents in selected mollusks and crustaceans that are resource species, examine their mechanisms of transmission, and develop rapid screening techniques. (FY 1992-96)
- Conduct laboratory studies of the biomagnification potential of heavy metals in phytoplankton to bivalve mollusks (FY 1992-96) and conduct *in situ*, cage-culture experiments on the uptake and elimination of heavy metals by phytoplankton. (FY 1994-96)*

3.2 Develop Higher-Order Forecasting Models for Resource Populations, Fishery Systems, and Ecosystems

3.2.1.1 Approach

From models of large marine ecosystems (LME), from investigations relating oceanographic variability to resource variability, and from models of mixed-species, multifleet interactions, derive predictions to support the fishery management process.

3.2.2.2 Rationale

The LME models will examine the trophic linkages supporting resource species and the potential carrying capacity of the Northeast Continental Shelf Ecosystem. This can be compared to the multispecies yields to examine

different scenarios for restoring depleted fish stocks. Environmentally-driven variations in the distribution and/or abundance of resource species provide one approach to project current ecosystem behavior into the future to predict the response to global climate change. Many of the overfished resource species on the Northeast Continental Shelf are caught as nontarget species in mixed fisheries directed at other resources, and the multispecies nature of our groundfish assemblage necessitates the development of multispecies interaction models to develop adequate biological reference points to evaluate the effect of harvesting.

3.2.2.3 Major Activities and Schedules

- The LME research program involves ecosystem monitoring of the Northeast Continental Shelf utilizing shipboard surveys, remotely-sensed data, and the Ships-of-Opportunity-Program platforms (FY 1992-96), publication of proceedings from the "Stress Mitigation and Sustainability Workshop" (FY 1992), development of ecosystem models to evaluate predator/prey interactions or contaminant effects on winter flounder (FY 1992-94), and development of proposed projects for the Coastal Ocean Program and the Climate and Global Change initiative. (FY 1992-96)*
- Utilize ecosystem monitoring program results to compare environmental variability to changes in the abundance and/or distribution of selected resource species (FY 1992-93),* and develop process-oriented research to investigate the role of density-independent environmental factors on the recruitment and survival of selected resource species. (FY 1992-96)*
- Model the effects of mixed-species fishery interactions in the Northeast Continental Shelf Ecosystem, incorporating bycatch information. Include dynamic models of effort reallocation (FY 1992-95), spatially and temporally disaggregated dynamic fleet models (FY 1993-96), mixed-species fishery analysis for Mid-Atlantic groundfish (FY 1992-95), and analysis of Gulf of Maine groundfish using equilibrium biological and economic conditions. (FY 1993)
- Develop a predator/prey data base to support multispecies virtual population analysis models, and examine the response to various management alternatives. (FY 1992-96)*
- Develop indices of larval fish physiological conditions using advanced molecular biological methods. (FY 1992-96)
- Develop image analysis systems and undulating oceanographic recorder for ecosystem monitoring and sample analysis. (FY 1992-94)

- Conduct surveys of eggs, larvae, and post-yolk-sac larvae to describe spatial/temporal spawning patterns, egg/larval production curves, and fishery-independent estimates of spawning biomass. (FY 1992-96)
- Develop, test, and evaluate a system for indexing annual levels of ecosystem perturbations, including global warming, affecting production of fisheries stocks. (FY 1992-93)

3.3 Maximize Participation in NOAA-wide Programs

3.3.1.1 Approach

Participate in the following NOAA-wide initiatives: Coastal Ocean Program, Climate and Global Change, Data Base Management, and Marine Technology Modernization.

3.3.1.2 Rationale

Involvement in NOAA-wide initiatives will allow Center investigators to utilize expertise/technology of other NOAA line offices or academia, while at the same time leveraging the funding received by these extramural organizations. The extramural organizations will benefit from access to the long-term Center data bases on environmental variables, biological resource trends, fisheries landings, and economics data. They will also have access to the expertise of Center scientists and our support network.

3.3.1.3 Major Activities and Schedules

- Potential Coastal Ocean Program proposals during FY 1992-96 include:

Growth and Regulation of Noxious and Toxic Phytoplankton Species

Comparative Systems Approach to Functional Habitat Evaluation

Nucleic Acid Hybridization Probe Technology

Marine Biodiversity

The Sea Surface as a Nursery and Habitat

Georges Bank: Biological and Physical Controls of a Severely Perturbed Ecosystem

Mid-Atlantic Bight Mackerel Study

Population Control of Benthic Bivalves

Population Control of Crustaceans

Satellite-derived Measurements of Oceanographic Variability in U.S. Coastal Waters

Biological Effects Research on Contaminants

Cod Recruitment on Georges Bank: Role of Predation

Development of Biological Indicators of Exposure and Physiological Responses to Contaminants

Haddock Life History Model

- Potential Global Climate Change proposals during FY 1992-93) include:

Turbulence Model and Planktonic Patch Structure

Stratification Study on Georges Bank and Its Effect on Larval Fish Survival

Ecosystem Monitoring of the Northeast Continental Shelf

Paleoecology of the Gulf of Maine

*Copepod *Calanus finmarchicus* as an Indicator of Climate Change in the North Atlantic*

Response of Living Marine Resources in Mid-Atlantic Salt Marshes to Sea Level Rise

Climate Change and North Atlantic Fisheries: Forecasting from Historical Analogy

Effects of Temperature and Water Column Structure in the Gulf of Maine on the Production Rates of Zooplankton and Larval Fishes

GOAL 4: INTEGRATE CONSERVATION OF PROTECTED SPECIES AND FISHERIES MANAGEMENT

4.1 Identify and Resolve Conflicts between MMPA, ESA, and Fisheries

4.1.1.1 Approach

Determine the significant ecological relationships between fishery resources and marine mammals, the seasonal

habitat requirements of marine mammals, and the economic costs and benefits of marine mammal protection to the harvest sector and to the regional economy.

4.1.1.2 Rational

Marine mammals and sea birds are important sources of mortality for important fish stocks. As marine mammal stocks increase, so does competition for food resources with predacious fish stocks which may be of particular interest to managers. Studies are conducted to develop information on the abundance and distribution of several marine mammal populations and on marine mammal bycatch in regional fisheries, to model optimal exploitation patterns and optimum sustainable population size for marine mammals, to contribute to the recovery of endangered species, and to determine the cost to regional fisheries due to mammal interactions.

4.1.1.3 Major Activities and Schedules

- Analyze marine mammal and fishery resource distribution data to determine predation patterns and spatial occurrence. (FY 1992-96)
- Conduct research with the Alaska Fisheries Science Center on ecosystem-level processes involving marine mammals, and jointly design and convene an ecosystem workshop. (FY 1992)
- Develop a multispecies pelagic ecosystem model including trophic dynamics of pelagic fish, birds, and marine mammals of the Northeast Continental Shelf Ecosystem. (FY 1992-96)*
- Validate trophic dynamics of marine mammals through coordinated at-sea research on spatial overlaps. (FY 1994-96)*
- Develop management models incorporating optimum sustainable population (OSP) levels for marine mammals and harvest rates for fishes. (FY 1994-96)*
- Provide descriptive and statistical analyses of harvest-sector activity for each fishery: level of participation, landings, revenues, and effort. (FY 1992-96)
- Carry out studies of individual vessel and fleet spatial and temporal fishing behavior, reaggregating data bases on an individual vessel basis. (FY 1992-96)
- Participate in shortnose sturgeon, humpback whale, and northern right whale recovery team activities. (FY 1992-96)

- Develop models to permit the maximization of fishery net benefits given levels of marine mammal harassment and takes. (FY 1993-96)*

4.1.2.1 Approach

Work with councils and fishing industry to apply assessments and incidental take data to develop means to monitor and reduce levels of incidental take to meet MMPA mandates.

4.1.2.2 Rationale

NMFS and the councils will be required to balance fishery management with marine mammal conservation, as per the MMPA. Controversial decisions may have to be made on various fisheries, given their level of incidental take.

4.1.2.3 Major Activities and Schedules

- Incorporate observer and Marine Mammal Exemption Program data for identifying magnitude of fisheries/marine mammal conflicts. (FY 1992-96)
- Review FMPs, in light of assessments, for gear restrictions and for seasonal and area closures to reduce level of incidental take. (FY 1992-96)
- Conduct conservation engineering studies to develop gear options for reducing incidental take. (FY 1992-93)
- Work with the NOAA Office of Legislative Affairs for extension of observer program beyond 1993 to collect incidental take information for success of management measures. (FY 1992-93)
- Conduct U.S./Canada bilateral management meetings to develop and implement conservation measures for reducing incidental take or maintaining optimum population levels. (FY 1992-93)

4.1.3.1 Approach

Conduct ESA Section 7 consultations on FMP and ISFMP amendments.

4.1.3.2 Rationale

Endangered species are occasionally taken in commercial fisheries. Recently, Kemp's ridley turtles were taken in

the winter fishery off North Carolina for summer flounder. This incident resulted in the closure of the coastal trawl fishery and in evaluation of the needs for turtle excluder devices.

4.1.3.3 Major Activities and Schedules

- Work with councils, states, and ASMFC to develop management measures for FMPs and ISFMPs (e.g., summer flounder) to minimize incidental take of coastal sea turtles. (FY 1992-93)
- Work with councils and ASMFC to complete Section 7 consultations on FMP and ISFMP fisheries occurring in habitats of endangered species, including riverine habitats of shortnose sturgeon and estuarine habitats of Kemp's ridley sea turtles. (FY 1992-96)

4.2 Determine Status of Protected Species

4.2.1.1 Approach

Determine the current size and status of all marine mammal populations in the Northwest Atlantic and the status of endangered/threatened species in terms of the MMPA and ESA.

4.2.1.2 Rationale

Basic information on marine mammal populations must be obtained to address various management and conservation needs and to determine changes in future populations.

4.2.1.3 Major Activities and Schedules

- Develop improved methods of estimating population size from line-transect sighting surveys and from sight-resight studies. (FY 1992-96)*
- Determine OSP for the Gulf of Maine - Bay of Fundy harbor porpoise population and for pelagic delphinid species taken incidentally in Mid-Atlantic Bight fisheries. (FY 1992-96)*
- Determine the status of endangered North Atlantic humpback and right whales to implement recovery plans. (FY 1992-96)*

- Determine the status of shortnose sturgeon and endangered marine turtles to implement recovery plans. (FY 1992-96)

4.2.2.1 Approach

Provide scientific and management support to list or delist, as appropriate, species or populations, as per the ESA.

4.2.2.2 Rationale

In conjunction with recovery plans and updated assessments, requests will be brought forward to NMFS to either list or delist species. Regional scientific and management expertise will be required to provide technical guidance on actions to list or delist.

4.2.2.3 Major Activities and Schedules

- Review population estimates and recovery trends for the Atlantic population of sperm whales. (FY 1992-93)
- Review population estimates and trends for the Atlantic harbor porpoise for potential listing. (FY 1992-96)

4.3 Monitor Marine Mammal "Take" by Fisheries and Assess Significance

4.3.1.1 Approach

Through observers, monitor marine mammal "take" by fisheries and assess its significance for establishing levels of "allowable biological removal."

4.3.1.2 Rationale

Estimates of takes are essential for marine mammal population assessments and for determining the effect on those species and stocks. Knowledge of species interactions contributes to the development of a complete understanding of the bycatch problem. At-sea observers are the key element in collecting this data.

4.3.1.3 Major Activities and Schedules

- Monitor 10 percent of the Gulf of Maine groundfish/ Atlantic mackerel gillnet fishery, and 20-35 percent of the swordfish drift gillnet fishery. (FY 1992-93)

- Monitor 100 percent of the foreign directed and joint venture Atlantic mackerel and squid fisheries for marine mammal interactions. (FY 1992-96)
- Record all marine mammal and/or endangered species - fishery interactions observed during domestic fishery coverage for categories II and III vessels. (FY 1992-96)
- Verify the MMPA category for the Northeast's longline fisheries. (FY 1992-93)*
- Analyze fishery effort data collected over past decades and bycatch data collected since the 1980s, and monitor the levels of take in other fisheries using sea-sampling data. (FY 1992-96)

4.4 Implement Endangered Species Recovery Plans

4.4.1.1 Approach

Implement recovery plans for listed species.

4.4.1.2 Rationale

The ESA requires recovery plans to be implemented for endangered species, as appropriate.

4.4.1.3 Major Activities and Schedules

- Implement a recovery plan for the northern right whale and the humpback whale. (FY 1991-92)
- Implement a recovery plan for Kemp's ridley and other Atlantic sea turtles. (FY 1992-94)

4.4.2.1 Approach

Work with the councils to develop fishery management regimes which work within the recovery plan requirements.

4.4.2.2 Rationale

Implementation of endangered species recovery plans will require specific actions to be taken in the event of a fishery conflict. The councils provide the avenue for communicating and discussing the implementation of these plans.

4.4.2.3 Major Activities and Schedules

- Work with the councils to develop FMP amendments that recognize requirements of endangered species recovery plans. (FY 1992-96)

4.5 Reduce Fishery and Passive Viewing Effects on Protected Species

4.5.1.1 Approach

Focus research on the effects of whale watching activities on right and humpback whale populations in the North-west Atlantic.

4.5.1.2 Rationale

Whale watching is a popular recreational activity and an important component of human interactions research.

4.5.1.3 Major Activities and Schedules

- Use airship and fixed gear to observe and evaluate interactions of humpback and right whales in northeastern U.S. shelf waters. (FY 1992-94)*

4.5.2.1 Approach

Work with the NMFS Office of Protected Resources to develop marine mammal protection regulations for the whale watch industry.

4.5.2.2 Rationale

The rapid growth of the whale watch industry has raised significant concerns over the interactions between whale watch parties and the natural behavior of whales. Evaluation of regulatory needs, under the MMPA, is being done by the NMFS Office of Protected Resources. These regulations will require regional guidance and evaluation.

4.5.2.3 Major Activities and Schedules

- Conduct a seasonal information and education program for the whale watch industry on harassment guidelines. (FY 1992-93)

- Review and evaluate complaints of harassment in the Northeast by whale watch and private vessels. (FY 1992-96)*

GOAL 5: IMPROVE SEAFOOD SAFETY

5.1 Develop Methods to Assess Seafood Safety

5.1.1.1 Approach

Examine and carry out research on analytical methods to improve the detection of seafood contaminants and biotoxins, and the assessment of potential consumer risk. Conduct research on sources and distribution of potential hazards and their bioaccumulation in edible tissues.

5.1.1.2 Rationale

Current analytical methods to determine the distribution and sources of potential health hazards in seafoods are expensive and time consuming. Development of rapid and inexpensive analytical methods is necessary for field and market testing of seafoods to assess potential health hazards. Much needed data on sources and distribution will be obtained more easily for risk analysis. The ability to test at sea or dockside for the presence of pathogens, biotoxins, and other potential hazards will significantly enhance seafood inspection activities, improve quality, and reduce consumer risk.

5.1.1.3 Major Activities and Schedules

- Continue monoclonal antibody research for the identification of finfish and shellfish species, marine biotoxins, and shellfish diseases in seafood and seafood products. (FY 1992-96)
- Expand monoclonal antibody research for the detection and assay of paralytic shellfish poison, other pathogenic organisms, and other contaminants related to seafood safety. (FY 1993-96)*
- Develop rapid, reliable analytical methods to assay toxins, organic contaminants, and additives in seafoods. (FY 1992-96)
- Develop analytical methods to quantify quality losses in seafoods. (FY 1992-96)

5.2 Inform and Educate Industry and Consumers on Seafood Safety

5.2.1.1 Approach

To improve the general knowledge of the American public in seafood quality and safety, we must improve the transfer of technology and information to industry, Sea Grant, fishery development foundations, consumers, and recreational fishermen on handling and processing methods and potential health risks.

5.2.1.2 Rationale

A seafood inspection program cannot protect every consumer from every potential risk. Recreational fishermen should be well informed of potentially hazardous species, harvesting areas, *etc.* Fishermen, as well as consumers, need to be informed of the potential risks of mishandling seafood products. Processors must be educated to apply new technology properly to avoid process-induced hazards. Technology transfer programs and other education efforts are needed on a continuing basis to: (1) demonstrate new processing and handling procedures; (2) educate fishermen, processors, and consumers on risk avoidance (*e.g.*, don't eat Atlantic mackerel livers); and (3) educate buyers and consumers of real risk as opposed to perceived risk from seafood consumption.

5.2.1.3 Major Activities and Schedules

- Transfer research results and technological developments to industry, Sea Grant, fishery development foundations, seafood regulators, and consumers. (FY 1992-96)
- Develop technical information on the effects of handling, processing, and storage on seafood safety, nutritional value, and quality losses in seafoods. (FY 1992-96)

5.2.2.1 Approach

Develop mechanisms to monitor and evaluate health risks of fisheries.

5.2.2.2 Rationale

Presently, the shellfish fishery is closed on Georges Bank due to toxic levels of paralytic shellfish poison. NMFS lacks the authority to regulate this or other fisheries for human health reasons. Establishing this authority can be

either through cooperative work with the Food and Drug Administration (FDA) and state public health and environmental protection agencies, or through legislative fix.

5.2.2.3 Major Activities and Schedules

- Develop a regional NMFS/FDA and states protocol for monitoring fisheries for human health reasons. (FY 1991-92)
- In conjunction with the NOAA General Counsel and Office of Legislative Affairs, develop legislation to be able to close fisheries for human health reasons. Legislation may require amendment of MFCMA. (FY 1992-93)
- Work with the councils to provide for the closure of unsafe shellfisheries due to biotoxin levels. (FY 1992-93)
- Investigate toxic algal blooms in federal waters and the fate of biotoxins in the marine food web to determine effects on fishery resources and public health. (FY 1992-96)*
- Continue research on organic contaminants associated with the 106-Mile Dumpsite. (FY 1992-93)

GOAL 6: IMPROVE FISHERY HABITAT PROTECTION

6.1 Use Legal Authority to Protect and Restore Resources

6.1.1.1 Approach

Implement the Northeast Environmental Policy through an integrated, cooperative approach with the councils and other federal and state fishery and environmental agencies.

6.1.1.2 Rationale

The Northeast Environmental Policy focuses on NMFS working more cooperatively on regional habitat conservation in support of fishery management.

6.1.1.3 Major Activities and Schedules

- Convene environmental assessment workshops to develop positions and strategies on major fishery habitat issues of the Northeast. (FY 1992)

- Coordinate the "best available" scientific information into habitat sections of FMPs to meet both MFCMA and National Environmental Policy Act (NEPA) requirements. (FY 1992-96)
- Review habitat sections of FMP amendments for consistency with MFCMA mandates to conserve habitats for managed species, prior to recommending the amendments for approval. (FY 1992-96)
- Work with the ASMFC and Mid-Atlantic Council to strengthen habitat sections of ISFMPs and FMPs for anadromous finfish, including river herring, striped bass, and American shad, to conserve fishery habitats in the Mid-Atlantic area. (FY 1992-96)
- Through interagency coordination, stress the importance of coastal, estuarine, and riverine habitats for the conservation of endangered species, including shortnose sturgeon and Kemp's ridley sea turtles. (FY 1992-96)

6.1.2.1 Approach

As NMFS' trustee to Northeast Superfund sites, and as NMFS's representative for the Oil Pollution Act, represent NOAA in restoration activities of affected sites.

6.1.2.2 Rationale

The upcoming settlements of the New Bedford Superfund case will require development and implementation of restoration activity for the site. Similarly, settlements under the Oil Pollution Act, including those associated with the World Prodigy and Exxon Bayways spills, will require comparable restoration activities. Since the NMFS Northeast Region has the majority of marine Superfund and oil spill sites, a long-term program is being planned. Effective coordination among scientists and managers will prove key in the design of restoration plans and in the evaluation of the effectiveness of restoration projects. Regional activities will require close coordination with the NOAA Restoration Center.

6.1.2.3 Major Activities and Schedules

- As NOAA trustee, work with the NOAA General Counsel and other federal and state trustees to oversee development and implementation of restoration plans for Superfund and Oil Pollution Act sites. (FY 1992-96)*
- Coordinate with the NOAA Restoration Center to outline regional restoration activities within national guidelines. (FY 1992-96)*

- Establish a regionwide restoration program to design and evaluate restoration of fishery resources and habitats at the New Bedford Harbor site and at other sites identified through Superfund and Oil Pollution Act settlements. (FY 1992-96)*

6.1.3.1 Approach

Develop regional interagency fish and wildlife contingency plans as directed in the Oil Pollution Act of 1990.

6.1.3.2 Rationale

The Oil Pollution Act of 1990 directs NOAA and the U.S. Fish and Wildlife Service to develop regional fish and wildlife contingency plans. These plans provide for the assessment of, response to, and restoration of, damaged fish and wildlife resources, and for the evaluation of the effectiveness of restoration efforts. NMFS will be required to participate in developing these plans at the regional level.

6.1.3.3 Major Activities and Schedules

- Work with the EPA, U.S. Fish and Wildlife Service, NOAA line offices, and state marine resource agencies to develop regional fish and wildlife contingency plans. (FY 1992-93)*

6.2 Quantify Effects of Habitat Modifications and Contaminants on Resource Populations

6.2.1.1 Approach

Establish a cooperative strategy with the councils and with state and federal management and regulatory agencies to quantify resource loss due to habitat modifications.

6.2.1.2 Rationale

Regulatory actions and development pressures have resulted in a long-term degrading of the resource habitats and in overall resource loss for the Northeast. To address this trend, a cooperative strategy among environmental regulators and marine resource managers will need to be strengthened.

6.2.1.3 Major Activities and Schedules

- Develop a cooperative strategy, through workshops, to quantify resource loss from habitat loss and environmental degradation. (FY 1992-94)
- Review participation in regional, cooperative state/federal programs for researching habitat degradation linkages in quantifying habitat and resource loss. (FY 1992-93)
- Work with Sea Grant and the states to direct a proportion of NMFS-managed grants programs to identifying linkages between habitat loss and environmental degradation and resource loss. Guide programs towards quantitative assessment. (FY 1992-96)

6.2.2.1 Approach

Conduct scientific studies on the functional values of habitats in support of living marine resource management and fishery habitat conservation.

6.2.2.2 Rationale

Habitat degradation from physical habitat loss or from chemical factors (*i.e.*, contaminants, nutrients, biotoxins, hypoxia) interact in a complex, and as yet not well understood manner, to influence the functional value of habitat for resource species. Better knowledge of the functional value of selected estuarine habitats to prerecruits, juveniles, and adults of resource species will enable the agency to evaluate the comparative nursery value of different habitats. How that nursery support value is modified by habitat loss, toxic chemical contamination, nutrient overenrichment, hypoxia, and noxious algal blooms remains an area of concern.

6.2.2.3 Major Activities and Schedules

- Compare distribution, abundance, growth, and survival of estuarine-dependent marine resource species in selected habitats in the Mid-Atlantic/Southern New England region to develop a data base to evaluate the functional value of habitat. (FY 1992-96)*
- Determine the effects of low levels of oxygen on the behavior, growth, feeding, and survival of selected estuarine-dependent species in the laboratory (1992-94)*, followed by a field study in Long Island Sound. (FY 1993-95)*

- Monitor the concentrations of PCBs, PAHs, and pesticides in selected fish entering estuarine nursery areas in the spring until they depart for offshore in the fall, and compare with contaminant levels in environmental media. Conduct depuration experiments in the laboratory to compute Langmuir adsorption isotherms. (FY 1992-94)*
- Measure hepatic cytochrome p-450 activity in fish from contaminated and relatively clean estuaries as a biomarker of exposure to organic contaminants. (FY 1993-94)

6.2.3.1 Approach

Conduct research on fishery habitat degradation through chemical contamination, including biological-effects studies linking chemical contaminants in estuarine-dependent juvenile and adult fish to growth, reproduction, survivorship, and mortality. Support research in environmental transport and fate, ecosystem monitoring of contaminant levels, and development of biomarkers for organism exposure to contaminants.

6.2.3.2 Rationale

With the heavy burden of chemical contaminants in many of the Northeast's estuaries, research is ongoing to link chemical contaminants to effects on organisms. Translating biological effects to estimates of population response of living marine resources to chemical habitat degradation is the next step in assessing environmental effects in conserving and rebuilding depleted stocks. Mathematical modeling approaches provide a tool to extend organismal responses to habitat degradation to population responses. Comparative studies of living marine resources that occupy similar habitats, but exist at different locales along environmental stress gradients, provide a tool to study organismal (physiological acclimation and genetic adaptation) or population (demographic changes) responses to the stresses.

6.2.3.3 Major Activities and Schedules

- Develop an understanding of the transport of contaminants by physical forces and biogeochemical cycles at the 12-Mile (sewage sludge) Dumpsite. (FY 1992-96)
- Establish an ecosystem monitoring program on the Northeast Continental Shelf for organic and inorganic contaminants in selected fish species. (FY 1992-93)*

- Determine trends in both modern and preindustrial organic and inorganic contaminants by measuring contaminant profiles in deep sediment cores from estuarine and coastal depositional areas in the northeastern United States. (FY 1994-96)*
- Monitor the effect of the cessation of sewage sludge dumping at the 106-Mile (deepwater) Dumpsite by measuring contaminant levels in epibenthic biota and distribution/severity of chitinoclasia in American lobsters (FY 1992)*
- Conduct field and laboratory studies of the effect of contaminants on the viability of the early life stages (eggs and larvae) of winter flounder collected in Long Island Sound (FY 1992-94), and develop a population model to quantify potential contaminant effects. (FY 1993-96)
- Examine mammalian immune function system assays for applicability to finfish/shellfish as biomarkers of chemical damage (FY 1992-94), and relate biomarker intensity to microbial disease susceptibility (FY 1993-95). Extend immune dysfunction biomarkers to environmental samples. (FY 1994-96)

6.3 Determine if Artificial or Restored Habitat Fulfills Resource Needs

6.3.1.1 Approach

Study, synthesize, and develop an appropriate regional restoration and assessment program, in conjunction with the NOAA Restoration Center, to determine effective methods for restoring functional value to degraded fishery habitats.

6.3.1.2 Rationale

Restoration activities, either as established through Superfund cases or agreed upon through the NEPA process, will require evaluation of the effectiveness in restoring functional values to fishery habitats.

6.3.1.3 Major Activities and Schedules

- In conjunction with the NOAA Restoration Center, develop a regional program to assess restoration needs and evaluate effectiveness of restoration projects in fulfilling habitat needs for living marine resources. (FY 1992-96)*

- Identify restoration projects for the Northeast that are appropriate to meeting regional fishery management needs and consistent with the NMFS/U.S. Army Corps of Engineers memorandum of agreement. (FY 1992-94)*

6.3.2.1 Approach

Assess the trophic enhancement opportunities to living marine resources provided by a temperate estuarine artificial reef compared to that of natural benthic habitat in the reef area to estimate the reef's ecological function and value as a habitat-loss mitigation option.

6.3.2.2 Rationale

Artificial reefs are being proposed to mitigate habitat loss or modifications in several estuaries in the Northeast, although there is limited information on how well they will serve for this purpose. This study will provide some of the trophodynamics and forage availability information required.

6.3.2.3 Major Activities and Schedules

- In cooperation with the EPA, U.S. Army Corps of Engineers, and the state and University of Delaware, obtain and interpret food habits of fishery-important species associated with the Delaware Bay artificial reef. (FY 1991-95)
- Again in cooperation, obtain and interpret the quantity and availability of epibenthic prey species supported by the reef habitat. Compare with the adjacent nonreef benthic habitat. (FY 1991-95)

6.4 Restore Depleted Stocks Adversely Affected by Habitat Modifications

6.4.1.1 Approach

Cooperatively work to restore historical runs of Atlantic salmon, striped bass, river herring, and American shad.

6.4.1.2 Rationale

Runs of many of the Northeast's major anadromous species are well below historical levels. Cooperative work

has been ongoing in assessing and restoring these runs, through interagency commissions and working groups. Further work is needed as these species become managed under ISFMPs.

6.4.1.3 Major Activities and Schedules

- Participate in interagency working groups and technical committees to guide restoration of New England Atlantic salmon rivers. (FY 1992-96)
- Conduct cooperative research with the state of Maine on habitat effects on Atlantic salmon. (FY 1992-95)
- Work with the states and the ASMFC in developing and evaluating management measures for anadromous species, including striped bass, river herring, and American shad. (FY 1992-96)
- In conjunction with the states, assess the status of stocks of anadromous species considered for management by ISFMPs. (FY 1992-96)

6.4.2.1 Approach

Administer the emergency striped bass research program and conduct research on fishery and habitat effects on stock status. The Northeast Regional Office supports a state/federal program on river herring and American shad.

6.4.2.2 Rationale

Emergency striped bass legislation dictates that coordinated fishery and habitat research will be conducted.

6.4.2.3 Major Activities and Schedules

- Produce the annual report to Congress. (FY 1992-96)
- Organize and chair the annual striped bass research workshop. (FY 1992-96)
- Conduct research on stock separation and the predictive power of survey programs. (FY 1992-96)
- Evaluate various research projects funded by the study and provide comment on various management proposals. (FY 1992-96)

GOAL 7: IMPROVE EFFECTIVENESS OF INTERNATIONAL FISHERIES RELATIONSHIPS

7.1 Use International Agreements to Conserve Resources and Habitats

7.1.1.1 Approach

Formalize U.S./Canadian bilateral management discussions for transboundary stocks of Georges Bank, Gulf of Maine, and Atlantic offshore waters.

7.1.1.2 Rationale

The fisheries of the Gulf of Maine, Georges Bank, and Atlantic offshore waters are jointly harvested by both the United States and Canada. While management measures are applied to the resources by both countries, these measures differ in their approach and overall goals. Close coordination between the two countries will facilitate an effective bilateral management approach in rebuilding these transboundary stocks.

7.1.1.3 Major Activities and Schedules

- Conduct semi-annual U.S./Canadian regional fisheries management meetings. (FY 1992-96)
- Analyze bilateral management regimes for overfished Georges Bank stocks, *e.g.*, haddock. (FY 1992-94)
- Analyze bilateral management regimes for overfished Gulf of Maine stocks, *i.e.*, Acadian redfish and flounders. (FY 1992-94)

7.1.2.1 Approach

Improve accessibility and reliability of research vessel survey data bases and age data files, and conduct cooperative short-term and long-term population biology studies.

7.1.2.2 Rationale

U.S. and Canadian scientists have cooperated closely on transboundary stock research for many years. This has

provided options for collection and access of data, sharing of expertise, and other benefits which have greatly enhanced research capability and output of the organizations involved.

7.1.2.3 Major Activities and Schedules

- Collect, transmit, and archive survey data. (FY 1992-96)
- Conduct aging exchange studies to ensure quality control and consistency in age interpretation. (FY 1992-96)
- Conduct joint population biology studies. (FY 1992-96)
- Participate in scientific meetings and workshops. (FY 1992 - 1996)

7.1.3.1 Approach

Participate in North Atlantic Salmon Conservation Organization (NASCO) meetings, working toward a goal of managing foreign interception of Atlantic salmon of U.S. origin.

7.1.3.2 Rationale

The United States, as a member of NASCO, participates in management discussion and scientific evaluation of fishing pressures on Atlantic salmon from U.S. waters. As the fishery is closed to U.S. fishermen within the Exclusive Economic Zone through an FMP, managing foreign interception remains a concern.

7.1.3.3 Major Activities and Schedules

- Provide technical and management expertise to NASCO as part of treaty arrangements. (FY 1992-96)

7.1.4.1 Approach

Conduct research on the status of Atlantic salmon and the fishery and habitat constraints to improving depleted stocks.

7.1.4.2 Rationale

Atlantic salmon stocks have been depleted for over a century due to habitat alterations and overfishing in the distant-water fisheries. U.S. agreements to assess these stocks in NASCO and ICES require that this research be conducted.

7.1.4.3 Major Activities and Schedules

- Coordinate the salmon tag recovery program. (FY 1992-96)
- Conduct research on Atlantic salmon stock identification. (FY 1992-96)
- Coordinate contract research on Atlantic salmon production in U.S. rivers, and associated studies of the sources of mortality of various stocks. (FY 1992-96)

7.1.5.1 Approach

Participate in international commissions relating to the exploitation of, and management for, shared fishery resources.

7.1.5.2 Rationale

Multinational cooperation is necessary for the rational management of transboundary resources.

7.1.5.3 Major Activities and Schedules

- Conduct joint assessments of large pelagic fishes under the auspices of ICCAT. (FY 1992-96)
- Participate in the assessment processes of the Canadian Atlantic Fisheries Stock Assessment Committee and the North Atlantic Fisheries Organization. (FY 1992-96)
- Participate in the International Whaling Commission's Scientific Committee assessment activities with respect to large and small cetaceans. (FY 1992-96)
- Participate in ICES's Marine Mammal Committee activities. (FY 1992-96)

7.2 Establish and Improve International Agreements to Promote Research and Communication

7.2.1.1 Approach

Participate in activities of international fishery management and consultative organizations as dictated by U.S. statutes.

7.2.1.2 Rationale

U.S. participation is mandated in numerous international organizations relating to the research, assessment, and management of Northwest Atlantic fish stocks.

7.2.1.3 Major Activities and Schedules

- Participate in United States - Canada joint discussions on stock assessment for transboundary stocks in Canadian Atlantic Fisheries Stock Assessment Committee and other bilateral fora. (FY 1992-96)
- Participate in NASCO activities regarding Atlantic salmon from U.S. home waters. (FY 1992-96)
- Participate in ICCAT assessment activities for bluefin tuna, swordfish, and other species. (FY 1992-96)
- Chair the ICES Advisory Committee on Fishery Management, ICES Multispecies Assessment Working Group, and ICES Atlantic Salmon Working Group, and participate in other ICES activities as appropriate. (FY 1992-96)
- Participate in a joint NOAA-France (IFREMER) study to develop mixed-species assessment methods. (FY 1992-96)

7.2.2.1 Approach

Participate in research programs on long-term productivity of living marine resources and its variability.

7.2.2.2 Rationale

Studies of ecosystem dynamics can provide a basis of

forecasting the productivity of living marine resources, and can provide a sound basis for management of both the resources and their habitat. Many of the studies involve large-scale programs and transboundary systems which are the focus of major international research efforts.

7.2.2.3 Major Activities and Schedules

- Continue cooperation with the state of Maine and with Canada on monitoring the status of Atlantic herring recovery in the Northwest Atlantic. (FY 1992-96)
- Participate in the ICES Study Group on Cod Stock Fluctuations: Cod and Climate Change. (FY 1992-96)
- Participate in the ICES Biological Oceanography Committee relative to the analysis of unusual phytoplankton blooms and to the measurement of primary productivity in the ocean. (FY 1992-96)
- Continue joint activities for research and monitoring of large marine ecosystems with the Intergovernmental Oceanographic Commission, International Union for the Conservation of Nature and Natural Resources, United Nations Food and Agriculture Organization, United Nations Environment Program, Scientific Committee on Oceanographic Research, ICES, and International Council for the Exploration of the Mediterranean, working through the NOAA Office of International Activities. (FY 1992-96)
- Continue cooperative data exchange and analysis with several nations on the ecology of large sharks. (FY 1992-96)

7.3 Influence Trade Negotiations for More Competitive U.S. Seafood Products

7.3.1.1 Approach

Evaluate regionwide trade opportunities for U.S. fishery products by providing real analyses of markets.

7.3.1.2 Rationale

U.S. fishery products need to compete in the international market, as international demand for seafood focuses

on resource blocks not harvested, *e.g.*, Atlantic mackerel and Atlantic herring, and on new products, including roe of sea scallops and sea urchins. Additionally, aquaculture is growing in New England, providing an additional source of U.S. product for placement in, and competition with, the international market.

7.3.1.3 Major Activities and Schedules

- Collect and supply data on ex-vessel and wholesale market levels of product demand, on various inventories, and on imports for demand analysis. Establish a nationwide market news data base to facilitate modeling of world fisheries trade. (FY 1992-96)
- Renew econometric assessment of foreign markets for U.S.-caught Atlantic mackerel and Atlantic herring. Estimate derived demand by foreign fleets for the U.S.-offered total allowable level of foreign fishing. Evaluate the role of these species in foreign assistance programs. (FY 1993-96)*
- Monitor regionwide market activities for changes in import/export patterns. Evaluate the effects that such changes will have upon rebuilding strategies for managed species. (FY 1992-96)
- Continue efforts to develop options for marketing U.S.-caught Atlantic mackerel through the Food for Peace Program. (FY 1992-96)

GOAL 8: IMPROVE OPPORTUNITIES FOR U.S. AQUACULTURE

8.1 Determine Effects of Aquaculture on Habitat and Wild Populations; Reduce Adverse Effects

8.1.1.1 Approach

Establish a cooperative interagency state/federal approach to protect habitats, fisheries, and marine mammals from placement of salmon-pen aquaculture operations.

8.1.1.2 Rationale

Placement of aquaculture salmon pens requires approval by various state and federal regulatory agencies, as

well as review by numerous resource management agencies. A cooperative approach to streamline this procedure will ensure that all concerns are raised at an early stage and that potential habitat effects are addressed.

8.1.1.3 Major Activities and Schedules

- Implement a joint state/federal application and permit process for siting and monitoring of aquaculture facilities. (FY 1992-96)
- In conjunction with Sea Grant institutions, conduct conservation engineering studies for minimizing conflicts between marine mammals, *e.g.*, seals, and maintenance of salmon pens. (FY 1992-93)*
- Support grant-based research programs to establish environmental standards for placement of aquaculture pens. (FY 1992-94)*

8.1.2.1 Approach

Establish bilateral U.S./Canadian standards for importation of Atlantic salmon spawn from Europe into the Gulf of Maine aquaculture industry.

8.1.2.2 Rationale

Importation of non-native salmon spawn poses a risk to the depleted stocks of Atlantic salmon from U.S. rivers. As Canada and the United States share a common oceanic basin and common river drainages, a bilateral agreement is appropriate.

8.1.2.3 Major Activities and Schedules

- In conjunction with the NMFS Office of Research and Environment, U.S. Fish and Wildlife Service, and through participation in NASCO, develop and implement national and international regulations for importation of Atlantic salmon spawn into northeastern U.S. and southeastern Canadian aquaculture industry. (FY 1992-93)

8.1.3.1 Approach

Work with the NMFS Office of Research and Environment to maintain current standards for regional importation of disease and predators with mussels and other shellfish planned for culturing.

8.1.3.2 Rationale

Shellfish disease and predators are major concerns to the northeastern shellfish aquaculture industry. Regulations and programs exist at the state and federal level to evaluate the effects on resident populations from introduced exotic species, predators, and disease.

8.1.3.3 Major Activities and Schedules

- In coordination with Sea Grant and the Chesapeake Basin states, conduct an international workshop on the ecological effect of Pacific oyster (*Crassostrea gigas*) introductions. (FY 1992)

8.2 Permit Cultured Products in Marketplace without Jeopardizing Wild Stocks

8.2.1.1 Approach

None

8.2.1.2 Rationale

None

8.2.1.3 Major Activities and Schedules

- None

8.3 Determine Aquaculture Potential in Recovery of Protected Species and Depleted Fisheries

8.3.1.1 Approach

None

8.3.1.2 Rationale

None

8.3.1.3 Major Activities and Schedules

- None

8.4 Re-evaluate NMFS Role in U.S. Aquaculture

8.4.1.1 Approach

None

8.4.1.2 Rationale

None

8.4.1.3 Major Activities and Schedules

- None

APPENDIX

PLAN FOR ADMINISTRATION AND MANAGEMENT

Goal A: Human Resources

A.1.1 Approach

Develop programs and activities in the Northeast Region to improve professional, technical, and support staff proficiency, and recruit high-quality personnel.

A.1.2 Rationale

The development of a high-caliber, representative, professional work force is essential to providing the best available scientific information and management advice, as well as ensuring a fair and equitable work place.

A.1.3 Major Activities and Schedules

- Establish promotion policies and procedures from a broad regional perspective to ensure they are equitable among programs and facilities. (FY 1992-96)
- Develop strategies to foster known promotion potential of personnel, especially in the scientific and technical fields. (FY 1992-96)
- Evaluate and monitor the region's work force profile of minorities, women, and handicapped persons. (FY 1992-96)
- Review the work environment in consonance with the region's and headquarter's affirmative action plans. (FY 1992-96)
- Recommend appropriate avenues for recruitment of minorities, women, and handicapped persons, including expanding upon the list for distributing job vacancy

announcements, particularly to historically minority institutions and organizations. (FY 1992-96)

- Foster upward mobility, bridge positions, stay-in-school positions, junior fellowships, and other special employment authorities in specific occupational or organizational elements. (FY 1992-96)
- Encourage supervisors to review and update their staff's individual development plans periodically to determine and monitor their long-term career objectives and development. (FY 1992-96)
- Encourage long-term training of employees consistent with the mission of NMFS. (FY 1992-96)
- Determine the effectiveness of training programs and benefits accruing to the region and to the career needs of the individuals. (FY 1992-96)
- Periodically review the internal policies, procedures, and philosophies of personnel management. (FY 1992-96)
- Encourage technicians and junior scientists to author scientific and management manuscripts and to publish in peer-reviewed journals. (FY 1992-96)
- Explore cooperative education options for the Northeast Region to fill positions that are difficult to recruit for and/or with high turnover. (FY 1992-96)
- Use the cooperative education program to attract minorities, women, and handicapped persons with interests in marine sciences. (FY 1992-96)
- Provide opportunities for the use of student interns for conducting work/study on fishery and marine science and policy issues. (FY 1992-96)

- Maintain and expand the cooperative agreement programs with regional colleges/universities, particularly the joint Cooperative Marine Education and Research Program, to provide educational opportunities for promising students in marine sciences. (FY 1992-96)
- Encourage technicians and scientists to become involved more actively in outreach programs, such as the Woods Hole Scientific and Technological Education Partnership (WHSTEP). (FY 1992-96)
- Expand the WHSTEP concept to other private and public school systems throughout the region. (FY 1992-96)
- Review activities related to annual and special awards, and their effectiveness, and ensure equity in awards across grade levels, programs, facilities, and occupations, and members of minority groups, women, and handicapped persons. (FY 1992-96)
- Promote the Employee Assistance Program to employees or spouses/children confronting personal problems. (FY 1992-96)
- Promote and encourage special rotational assignments for regional employees. (FY 1992-96)
- Conduct exit interviews of employees leaving the system as a means to better the work environment. (FY 1992-96)

GOAL B: FACILITIES

B.1.1 Approach

Provide facilities and a full range of facility support services to the region that will help staff in their effort to meet the goals of NMFS.

B.1.2 Rationale

Program activities require an appropriate environment for optimum productivity.

B.1.3 Major Activities and Schedules

- Evaluate conditions at each regional NOAA/NMFS-owned and leased location. (FY 1992-96)
- Assure that regional facilities provide a safe and healthful work setting for staff and visitors. (FY 1992-96)

- Assure that regional facilities are operated in a manner that has no adverse effect upon the environment. (FY 1992-96)

B.2.1 Approach

Maintain a research and public information aquarium at the Woods Hole facility.

B.2.2 Rationale

Provides a unique facility for controlled-environment studies and educational services to NMFS constituents.

B.2.3 Major Activities and Schedules

- Maintain physical plant. (FY 1992-96)
- Maintain exhibits. (FY 1992-96)
- Upgrade plant and displays. (FY 1992-96)*

B.3.1 Approach

Provide small-vessel support to science programs and coordinate large-NOAA-vessel support.

B.3.2 Rationale

Adequate collection platforms are required for science programs.

B.3.3 Major Activities and Schedules

- Acquire, operate, and maintain an adequate number of inshore vessels (*i.e.*, less than 65 feet) within the Center. (FY 1992-96)
- Coordinate charter and NOAA-operated research vessel activities for the Center. (FY 1992-96)
- Coordinate with science programs and other government agencies the foreign research vessel operations in joint activities with the Center. (FY 1992-96)

GOAL C: BUDGET

C.1.1 Approach

Improve the tracking of the regional financial manage-

ment center budget process, and the meshing of planning-function elements, by defining and implementing an automated interconnective system.

C.1.2 Rationale

Linking budget elements over time and among managerial levels with current-year operating plans will provide a more cohesive structure for decision making.

C.1.3 Major Activities and Schedules

- Design a system which enables financial management center management with current-year operating plan project accountability. Test the system. (FY 1992-94)*
- Implementation of system. (FY 1995-96)
- Provide required input to headquarters on budget needs from the budget-formulation phase to the execution phase. (FY 1992-96)
- Provide current-year budget management within the Center. (FY 1992-96)

GOAL D: PLANNING AND EVALUATION

D.1.1 Approach

Using guidance from NMFS, develop a strategy for solving regional issues; prepare program initiative and operating documents; and evaluate research results through a planned process.

D.1.2 Rationale

A regionwide commitment to a stronger process of planning and evaluation is necessary to develop successful budget enhancements in support of NMFS and NOAA strategic plans.

D.1.3 Major Activities and Schedules

- Conceptualize an interlinking system with decision points which captures planning and evaluation elements over a strategic period and interacts with the budget process. (FY 1992)
- Design and test system elements. (FY 1993-94)*
- Implement system. (FY 1995-96)

- Until a new planning and evaluation process is implemented, continue providing traditional planning documents to NMFS. (FY 1992-96)
- Until a new planning and evaluation process is implemented, continue current evaluation process which requires each program area be peer evaluated at least every five years. (FY 1992-96)

GOAL E: INFORMATION

E.1.1 Approach

Provide sufficient library support, both in materials and in reference and retrieval skills, for the staff to design, accomplish, and report research.

E.1.2 Rationale

The proliferation of scientific literature has mandated that the scientific staff have access to an up-to-date library system.

E.1.3 Major Activities and Schedules

- Work toward NOAA-recommended library staff levels at all facilities (except the National Systematics Laboratory). (FY 1992-96)*
- Preserve NMFS investment in library materials and equipment. (FY 1992-96)*
- Assure sufficient access to library materials locally for the most critical areas of investigation. (FY 1992-96)*
- Continue library collection development to reflect research conducted at the Center, with an emphasis on special collections retention and augmentation. (FY 1992-96)
- Pursue appropriate training for library staff. (FY 1992-96)

E.2.1 Approach

Provide the technical services necessary to assure quality publications.

E.2.2 Rationale

Providing scientific, technical, and resource management information in a published form is essential to meeting

the information demands placed upon NMFS. Users in the scientific community, in the fishery management arena, and throughout both NOAA and other agencies look upon research results and management actions for guidance and evaluation.

E.2.3 Major Activities and Schedules

- Implement and manage an automated manuscript tracking system. (FY 1992-96)
- Provide technical writing services as requested. (FY 1992-96)
- Provide finished mechanicals, printing services, and NMFS-generated publications. (FY 1992-96)*
- Provide scientific, technical, and public constituents of the region with data, information, reports, and publications relating to Center research. (FY 1992-96)
- Provide graphic services to the staff for presentation and publication. (FY 1992-96)

GOAL F: COMPUTERS

F.1.1 Approach

Computers of all sizes are found in ever increasing ways in the process of carrying out the various functions and responsibilities of the agency. The basic approach to providing overall computer support in the Northeast consists of maintaining an interconnected mix of these variously sized computer systems while utilizing the Northeast Regional Fisheries Data Center Computer System as the hub for information resource management throughout the region.

This data center provides the capacity for standardized archival, maintenance, and universal access to the region's many data resources. It is linked using the FTS2000 wide-area network both to other NMFS regional computer data centers and to individual desktop terminals, personal computers, and scientific workstations within the region.

F.1.2 Rationale

The above approach is appropriate because it has been shown to be economically sound; it places in the hands of the

scientist and administrator the computing power and software required to carry out agency functions; and it follows the trends of industry technology.

F.1.3 Major Activities and Schedules

- Maintain operations and maintenance of the Northeast Regional Computer Data Center. (FY 1992-96)
- Provide computer applications software and data conversion support for the transfer from the VAX computer systems to the IT-95 computer systems. (FY 1992-93)
- Install IT-95 computer system replacement for the present VAX Computer Data Center. (FY 1993)
- Complete the data dictionary/directory inventory for all master data sets archived and maintained in the Northeast Region. (FY 1992)
- Complete analyses of requirements for regional relational data bases required to meet the goals and objectives of the NMFS long-range strategic plan. (FY 1992-96)
- Design and implement a regional relational data base which can be accessed on the IT-95 computer system. (FY 1993)
- Install a local-area network at each of the major facilities throughout the Northeast Region. (FY 1992-93)*
- Install geographical information system workstation capability at each of the major facilities throughout the Northeast Region. (FY 1992-93)*
- Install analytical modeling workstation capability at each of the major facilities throughout the Northeast Region. (FY 1992-93)*
- Upgrade all PC-XT microcomputers still in use throughout the region to 32-bit technology. (FY 1993)*
- Establish regional bulletin board systems to support management administration needs for ready-reference information. (FY 1994)*
- Inventory IT-2000 computer support requirements for the Northeast. (FY 1996)

LIST OF ACRONYMS USED IN THIS DOCUMENT

All acronyms used in this series are defined upon first mention in each document. However, it is not unusual for the second and succeeding mention of such acronyms to be widely separated from the first mention. To avoid any confusion, the definition of each acronym in this document is listed below.

ASMFC	Atlantic States Marine Fisheries Commission
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDA	U.S. Food and Drug Administration
FMP	fishery management plan
FWCA	Fish and Wildlife Coordination Act
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
ISFMP	interstate fishery management plan
ITQ	individual transferrable quota
LME	large marine ecosystem
MFCMA	Magnuson Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
NASCO	North Atlantic Salmon Conservation Organization
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OSP	optimum sustainable population
SAFE	stock assessment and fishery evaluation
SAW	stock assessment workshop
WHSTEP	Woods Hole Scientific and Technological Education Partnership

