

# National Cooperative Research Program FY 2004 Annual Report



U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service



Developed by the  
**Cooperative Research Working Group**

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## Program Highlights



The National Cooperative Research Program (NCRP) spent a total of \$2.627M in FY 2004 to support cooperative research activities in all six regions of NOAA's National Marine Fisheries Service (NMFS). The majority of funds were allocated to the Fisheries Science Centers and Regional Offices to conduct activities in support of regional stock assessment and fisheries management priorities. Detailed annual reports for each program are available on request. Major activities in FY 2004 include:

- *A full-time National Cooperative Research Coordinator was hired and the NMFS Cooperative Research Working Group was appointed.*
- *A Memorandum of Understanding between the Alaska Fisheries Science Center and the Bering Sea Fisheries Research Foundation was signed for snow crab cooperative research.*
- *Electronic reporting was implemented to collect commercial catch-and-effort data on Alaska sablefish, Southeast snapper-grouper fishery, and a variety of species in the Northeast through the study fleet pilot program.*
- *Commercial bycatch studies were conducted for Southeast reef fish; longline fishing in the Gulf of Mexico, Mid-Atlantic, and Georges Bank; and yelloweye rockfish and canary rockfish on the West Coast.*
- *Five resource surveys were conducted or supplemented, including the Bering Sea snow crab survey, the Northeast surfclam and mid-Atlantic transect surveys, a multispecies survey of juvenile nearshore groundfish in California and Oregon, and an adult sardine survey in Southern California.*
- *Long-term cooperative tagging studies continued for yellowtail founder, black sea bass, and sharks in the Northeast; spiny and slipper lobster in the Hawaiian Islands; and North Pacific albacore.*
- *Conservation engineering studies were conducted to evaluate gear performance in the commercial pollock trawl fishery, to reduce salmon bycatch in the pollock fishery, and to test pelagic longline bycatch reduction technology.*
- *Additional life history, essential fish habitat, and seabird interactions studies were conducted.*

## **Allocation of FY 2004 Funds**

In FY 2004 a total of \$2.627 M was provided through Congressional appropriations to support the National Cooperative Research Program (NCRP). Funds were allocated to each of the six NMFS regional cooperative research programs for use in conducting cooperative research activities, and to the Office of Science and Technology for overall programmatic coordination (see Attachment 1, page 11, for details on FY 2004 fund allocations). The Northeast, Southeast, and Northwest used NCRP funds to conduct specific projects, as well as to supplement Congressional appropriations for cooperative research programs in these regions.

Several programs deviated slightly from the approved allocation for FY 2004 NCRP funds due to the late distribution of funds (funds were available for distribution in the third quarter of FY 2004). This funding delay affected several programs in hiring full-time staff and in chartering commercial fishing vessels. In these situations, allocated FY 2004 NCRP funds either were used in FY 2004 to support additional cooperative research activities or these funds are obligated to be spent in FY 2005 for the activities approved in the FY 2004 NCRP spending plan.

## **Program Activities**

### **National Coordination—Office of Science and Technology**

The NMFS Office of Science and Technology used NCRP funds to coordinate the national program and conduct a workshop for NMFS regional cooperative research coordinators (see Attachment 2, page 12, for an overview of all activities by program). The workshop focused on identifying crosscutting issues that the national program could address to improve the implementation of regional cooperative research activities. Funds allocated to support software development for the Fisheries Scientific Computing System (FSCS) are obligated to be spent in FY 2005 to test new hardware functionality and to improve wireless communication for use on board cooperative research and chartered surveys.

### **Northeast Cooperative Research Partners Initiative**

NCRP funds were allocated to the Northeast Fisheries Science Center (NEFSC) and the Northeast Regional Office (NERO) to supplement funding for the Northeast Cooperative Research Partners Program (NE CRPP). The NERO provided funding support for two regional workshops: (1) the Northeast Regional Bycatch Workshop to develop improved measures to reduce or eliminate bycatch, and (2) a workshop to review and evaluate the design and utility of mark-recapture projects. Funds also were used to supplement a CRPP initiative to develop fishing gear and practices and to establish potential special access programs.

NEFSC continued implementation of the Northeast study fleet, expanding the number of vessels reporting data, developing electronic logbooks for data collection, and continuing development of the study fleet data management system. Funds also were provided to support NEFSC staff participation in several ongoing cooperative research activities, including yellowtail flounder and black sea bass cooperative tagging programs, industry-based and other resource surveys, life history studies, and scup-*Loligo* conservation engineering.

### **Southeast Cooperative Research Program**

The Southeast Fisheries Science Center (SEFSC) used NCRP funds to supplement funding for the Southeast Cooperative Research Program (SE CRP) competitive federal assistance program. Projects funded through this program include commercial and recreational data collection, life history studies for a variety of species, cooperative tagging for reef fish and coastal pelagic species, bycatch reduction technology studies for pelagic longline fisheries, and evaluation of the effects of closed marine protected areas.

### **Alaska Cooperative Research Program**

The Alaska Fisheries Science Center (AFSC) funded 10 projects with NCRP funds. Projects included logbook reporting for the sablefish fishery, improving survey data accessibility, conducting conservation engineering studies, augmenting the annual crab survey, evaluating localized depletion of cod fisheries, developing seabird mitigation measures, and evaluating the effects of mobile gear on essential fish habitat. AFSC and the Bering Sea Fisheries Research Foundation formed a long-term partnership by signing a formal Memorandum of Understanding to cooperatively improve the science that supports snow crab management.

### **Northwest Cooperative Groundfish Research Program**

The Northwest Fisheries Science Center (NWFSC) updated and improved the West Coast cooperative research website and conducted a workshop to develop research survey designs for trap and hook-and-line cooperative research. NCRP funds were also used to supplement funding for a competitive grants process in collaboration with the Pacific States Marine Fisheries Commission (PSMFC) to fund industry-developed research proposals. Specific research projects funded through this process included developing survey methodology for rockfish sampling, conducting a multispecies survey of juvenile groundfish, quantifying bait selectivity taken as bycatch, and conducting life history studies on groundfish.

### **Southwest Cooperative Research**

The Southwest Fisheries Science Center (SWFSC) conducted a Southern California adult sardine survey and partnered with industry to design a nearshore tag-based survey of cabezon in central California waters. SWFSC also conducted albacore tagging in cooperation with the American Fishermen's Research Foundation (AFRF).

### **Pacific Islands Cooperative Research**

The Pacific Islands Fisheries Science Center (PIFSC) continued the cooperative spiny lobster and slipper lobster tagging program in the Northwestern Hawaiian Islands.

## Results

### **Coordination Activities**

Coordination activities are integral to the success of cooperative research programs. All national and regional cooperative research programs provide some level of overall coordination, whether funded directly through cooperative research funds or as a day-to-day responsibility of existing Center staff (see Attachment 3, page 14, for an overview of specific projects). In May 2004, the NMFS Office of Science and Technology hired a National Cooperative Research Coordinator to provide overall coordination for the national program. A workshop for regional cooperative research coordinators was conducted in August 2004 to develop the national program and identify crosscutting issues for improving the implementation of regional cooperative research activities.

The NERO and NWFSC used NCRP funds to hire full-time staff to coordinate regional cooperative research activities, including outreach to program partners and other stakeholders. These programs also conducted workshops to improve coordination of ongoing regional cooperative research activities, including bycatch data collection and mark-recapture studies.

A Memorandum of Understanding between the Bering Sea Fisheries Research Foundation and the NMFS AFSC was signed in April 2004. This MOU resulted in a long-term cooperative partnership between NMFS, the Alaska crab fishing industry, and other stakeholders to conduct research to improve the science that supports crab management.

### **Commercial Fishery-Dependent Data Collection**

Cooperative research activities focusing on commercial fishery-dependent data collection can provide information to supplement dedicated NMFS data collection programs and provide useful information in support of fisheries stock assessments and management. Commercial fishery-dependent data collection activities were conducted by the Alaska, Southeast, Northeast, and Northwest Fisheries Science



Centers. Catch, effort, and other associated information was collected via logbooks in the Alaska sablefish and groundfish fisheries and the Northeast study fleet. The NEFSC doubled (from 15 to 30) the number of vessels collecting information in the study fleet, and evaluated electronic logbook reporting methods to improve data collection. The NEFSC also continued developing the

data models and processes necessary for the timely availability of study fleet information. The SEFSC funded a project to evaluate electronic logbook reporting in the snapper-grouper fishery, as well as a pilot program to assess methods of collecting bycatch, discard, and biological data in commercial fisheries of the U.S. Caribbean. The NEFSC provided funds to supplement the squid fishery vessel monitoring system (VMS). Funds allocated to the Office of Science and Technology will be used to test the functionality of new hardware and to improve wireless communications on board cooperative research and chartered survey vessels.

The SEFSC and NWFSC funded studies to characterize commercial bycatch of several species. The SEFSC funded a project to characterize commercial reef fish bycatch to determine if regulations are rebuilding stocks, as well as a project to evaluate the commercial fishery interactions between pelagic fishes and longline fishing gear in the Gulf of Mexico, Mid-Atlantic, and Georges Bank. A project funded by the NWFSC will document and quantify bait selectivity for two overfished species (yelloweye rockfish and canary rockfish) taken as bycatch in the longline fishery.

### **Recreational Fishery-Dependent Data Collection**

Historically, cooperative research activities have focused on collecting information from commercial fisheries. However, some projects have been funded to collect information in partnership with recreational or charter fisheries. In 2004, the SEFSC funded a project to estimate catch-and-release mortality using a logbook reporting system for red drum in the recreational fishery off South Carolina.

### **Resource Surveys**



Cooperative research is well suited for conducting fishery resource surveys. Chartered commercial fishing vessels provide information on stock characteristics to supplement NMFS dedicated survey information and to provide additional tuning indices for stock assessments. The NWFSC and SWFSC used NCRP funds to develop survey methodologies and sampling designs for several fisheries. The NWFSC conducted a workshop to

develop a research survey design for a trap and/or hook-and-line cooperative research project that can be used to compare Catch Per Unit Effort CPUE of cabezon in the four regions of California. The NWFSC also funded a NMFS–industry project to develop survey methodology for providing reliable indices of rockfish densities and biomass to be used in tuning stock assessments for the

Pacific Fishery Management Council. The SWFSC sponsored a NMFS–industry workshop in September 2004 to design a cooperative nearshore tag-based survey of cabezon in central California waters. The AFSC developed a relational database of historical longline survey data that scientists, managers, and fishermen may access via the Internet

Several resource surveys were conducted during FY 2004 to supplement NMFS dedicated survey programs. The AFSC, in partnership with the Bering Sea Fisheries Research Foundation, augmented the annual snow crab survey conducted in the Eastern Bering Sea, with the Foundation providing a third survey vessel to sample an additional 77 stations. The NEFSC provided funds to support vessel charters, staff participation, printing of survey log sheets, and data keypunching activities for Northeast industry-based surveys, including the surfclam and mid-Atlantic transect surveys. The NWFSC funded a project to conduct a multispecies survey of juvenile nearshore groundfish in California and Oregon that identified habitat associations and species distribution of juvenile groundfish. The SWFSC conducted an adult sardine survey in Southern California to estimate spawning biomass for inclusion in annual stock assessments for the Pacific Fishery Management Council.

### **Cooperative Tagging Studies**

Cooperative tagging studies provide valuable information on growth, natural mortality, movement patterns, and general life history parameters to improve stock assessments and fisheries management. Cooperative tagging programs are conducted by the Northeast, Pacific Islands, Southeast, and Southwest Fisheries Science Centers. The NEFSC provided NCRP funds to support cooperative tagging programs for yellowtail flounder, black sea bass, and shark. Funds were provided to support NEFSC staff participation and to purchase additional tags, tag rewards, and field equipment for 40 days of yellowtail flounder tagging and 13 vessel contracts for black sea bass tagging. Supplemental funding was provided for a contract employee to support the cooperative shark tagging program. The PIFSC has conducted spiny lobster and slipper lobster tagging since 2002, with NCRP funds provided in 2004 to support this program. Thirty days of tagging was performed at two tagging sites in 2004, with over 16,000 lobsters tagged. Data were incorporated into the NWHI lobster population model.



The SEFSC provided funds to support a partnership among researchers, commercial, recreational, and for-hire fishermen to conduct a cooperative tagging



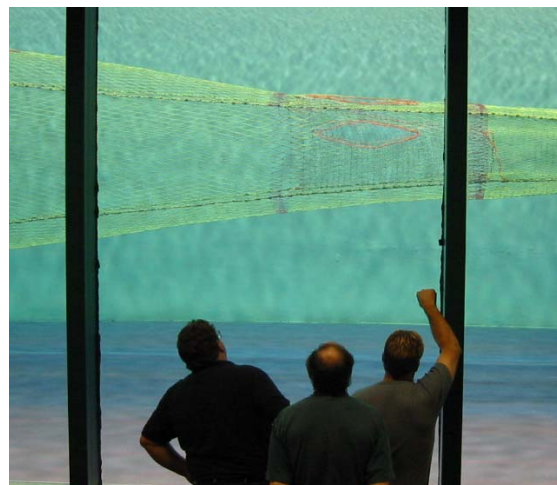
program to elucidate the life history and habitat utilization of selected reef fish and coastal pelagic species in the Florida Keys. The SWFSC provided funds to support a partnership with the American Fishermen's Research Foundation (AFRF) on a five-year research study to determine movement patterns and general life history strategies of North Pacific albacore. This research was initiated in 2001 and is supported in part by funds provided by the AFRF. To date, 227 archival tags have been deployed and 16 have been recovered. The NWFSC provided funds to support a tag-and-release study on nearshore groundfish conducted from commercial passenger fishing vessels. The main purpose of this study is to obtain reliable data on availability and relative abundance, fishery exploitation rates, growth rates, and migration patterns.

### **Life History Studies**

Life history studies can provide information on recruitment processes, reproduction, fecundity and maturity, and age and growth—necessary input parameters for fisheries stock assessments. Life history studies were conducted by the Alaska, Northeast, Northwest, and Southeast Fisheries Science Centers. The AFSC funded a project to improve the accuracy of species identification by graders at seafood processing plants, which included training materials and auditing of rockfish species identification. The AFSC also supported the Fishery Interaction Team research to evaluate localized depletion of winter cod fisheries. The NEFSC provided funds to support a biological technician to process age samples from several cooperative research projects, a stipend to University of Massachusetts–Amherst for Atlantic herring stock identification research, and field supplies and travel to support a haddock maturity study. The SEFSC funded several life history studies, including cooperative longline sampling of the Florida shallow water grouper complex; cooperative hook-and-line sampling of the Gulf reef fish fishery; yellowedge grouper age, growth, and reproduction studies; investigations of gag recruitment processes; and investigations of reproductive aspects, age, and growth of two deepwater snapper species in Puerto Rico.

### **Conservation Engineering**

Conservation engineering research is conducted to make fishing gear more efficient and reduce fishing costs, bycatch mortality, and habitat destruction. This research also improves the data provided by scientific surveys of fish populations. The AFSC provided trawl-mounted video systems to the fishing industry to evaluate the performance of commercial pollock trawls using prototype salmon excluders. This project also developed



a scanning sonar system for this purpose. Based on observations from the video systems, the AFSC developed trawl modifications to reduce salmon bycatch in pollock fisheries through improvements to a prototype system developed in 2003. The NEFSC provided supplemental funds to the scup-*Loligo* conservation engineering study to extend sampling due to weather delays. The NERO provided funds to supplement a CRPP initiative to develop fishing gear and practices to increase options for using limited groundfish days-at-sea under the New England Multispecies Fishery Management Plan. The SEFSC funded a project to evaluate pelagic longline bycatch reduction technology in the Gulf of Mexico and along the eastern seaboard. The project will use observers and test the use of circle hooks and various baits to reduce bycatch of swordfish, tunas, and oceanic sharks in the pelagic longline fishery.

### **Essential Fish Habitat**

The AFSC funded a project to assess the value of Aleutian Islands habitat to juvenile Pacific Ocean perch (POP) by using acoustic techniques to delineate and map juvenile POP habitat, quantifying the relationship between juvenile POP habitat and abundance, and determining whether the condition of juvenile POP varies among habitats.

### **Fisheries Management**

NCRP funds were used to support two projects focused on fisheries management issues. The NERO helped supplement a CRPP initiative to establish potential special access programs to increase options for using limited groundfish days-at-sea under the New England Multispecies Fishery Management Plan. The SEFSC funded a project to compare closed marine areas with similar adjacent habitats to provide insight on the effectiveness of small estuarine reserves for management and enhancement of red drum and snook in the Tampa Bay region.

### **Seabird Interactions**

The AFSC initiated a project to address seabird interactions with trawl netsond cables, known as trawl third wires. Cooperating partners include the At-Sea Processors Association, the Pollock Conservation Cooperative, the Groundfish Forum, and United Catcher Boats. A contract has been issued to the Pollock Conservation Cooperative using NCRP funds to conduct gear trials.



## **Reports Available**

- Yellowtail and black sea bass tagging project reports. Available online at [www.nefsc.noaa.gov](http://www.nefsc.noaa.gov).
- Reports on industry-based surveys for monkfish, surfclam, mid-Atlantic transects, and other field work. Available online at [www.nefsc.noaa.gov](http://www.nefsc.noaa.gov).
- Southeast Cooperative Research Program 2004 Annual Report.
- A one-page laminated rockfish species identification key to assist graders with species identification.
- Electronic logbook requirements—Report by Ocean Logic to the AFSC.
- Cruise results—Chartered vessel F/V *Sea Wolf* (Cruise 2004-01), July 6–26, 2004.
- Bering Sea Fisheries Research Foundation, Summary of Activities. March 2005.
- Administrative Report LJ-04-08—Spawning Biomass of Pacific Sardine (*Sardinops sagax*) off California in 2004 and 1995.
- Minutes of the SWFSC workshop to design a cooperative nearshore survey of cabezon in central California waters.
- Summary of the 2004 U.S. Albacore Tagging Program, Report to the 19<sup>th</sup> North Pacific Albacore Workshop.
- Manuscript under review: O'Malley, J.M. and G. DiNardo. 2005. Preliminary estimates of Hawaiian spiny lobster (*Panulirus marginatus*) growth and movements at Necker Island in 2002–2003 and a comparison of growth and movement estimates at French Frigate Shoals and Kure Atoll 1979–1983.

**Attachment 1.** Summary of FY 2004 National Cooperative Research Program funding allocation.

<b>Office/Center</b>	<b>Allocation Method</b>	<b>Activity</b>	<b>Allocation Amount</b>
<b>HQ/ST4</b>	Temporary	Coordination	\$76,500
	Temporary	FSCS	\$40,000
	Temporary	Coordinator workshop	\$20,000
<b>Subtotal</b>			<b>\$136,500</b>
<b>NERO</b>	Permanent	Coordination and workshops	\$140,000
	<b>Subtotal</b>		
<b>NEFSC</b>	Permanent	Study fleet	\$105,000
	Temporary	Tagging and surveys	\$111,145
	<b>Subtotal</b>		
<b>SEFSC</b>	Temporary	Supplement CRP grants	\$356,070
	<b>Subtotal</b>		
<b>SWFSC</b>	Temporary	Southern California sardine survey	\$85,000
	Temporary	Albacore archival tagging	\$433,520
	Temporary	Cabazon survey design	\$60,000
	<b>Subtotal</b>		
<b>NWFSC</b>	Permanent	Coordination	\$142,000
	Temporary	Outreach and survey design	\$68,665
	Temporary	Cooperative Industry Grants Program with PSMFC	\$145,554
	<b>Subtotal</b>		
<b>AFSC</b>	Temporary	Longline database	\$30,000
	Temporary	Rockfish identification	\$25,000
	Temporary	Sablefish logbook	\$50,000
	Temporary	Gear selectivity	\$29,000
	Temporary	Conservation engineering	\$69,000
	Temporary	Crab survey	\$100,000
	Temporary	Pacific cod study	\$15,450
	Temporary	Seabird injuries	\$62,000
	Temporary	Essential fish habitat	\$108,000
	Temporary	Electronic reporting	\$26,000
	<b>Subtotal</b>		
<b>PIFSC</b>	Temporary	Lobster tagging	\$328,982
	<b>Subtotal</b>		
<b>TOTAL</b>			<b>\$2,626,886</b>

**Attachment 2.** Overview of specific projects conducted by the six regional cooperative research programs and NMFS headquarters in support of the National Cooperative Research Program.

Office/Center	Project
Office of Science and Technology	National coordination
	National workshop of NMFS regional coordinators
	FSCS hardware testing
Northeast Regional Office	Contractual assistance to Program Manager
	NMFS Northeast Regional Bycatch Workshop
	Mark-recapture workshop
	Develop fishing gear and practices
	Establish potential special access programs
Northeast Fisheries Science Center	Expansion of number of vessels in study fleet
	Development and testing of electronic reporting equipment
	Data management activities
	Yellowtail flounder tagging
	Black sea bass tagging
	Processing of age samples
	Atlantic herring stock identification
	Cooperative shark tagging
	Squid VMS study
	Surfclam survey
	Industry-based surveys
	Haddock maturity study
	Scup- <i>Loligo</i> conservation engineering study
Southeast Fisheries Science Center/Southeast Regional Office	Commercial reef fish bycatch
	Electronic logbook evaluation
	Life history research—grouper complex, reef fish, gag, snapper
	Commercial fishery interactions
	Recreational catch and release mortality—red drum
	Pelagic longline bycatch reduction technology
	Cooperative tagging for reef fish and coastal pelagic species
	Effects of closed Marine Protected Areas
	Evaluation of data collection methods
Alaska Fisheries Science Center	Data accessibility—Longline survey
	Rockfish species identification
	Sablefish logbook reporting
	Camera deployments on commercial vessels
	Development of scanning sonar system
	Trawl modifications to reduce salmon bycatch in pollock fisheries

	Augmentation of the Eastern Bering Sea crab survey
	Localized depletion of winter cod fisheries
	Develop seabird mitigation measures for trawl vessels
	Essential fish habitat and mobile gear effects
	Electronic logbooks—groundfish fisheries
<b>Northwest Fisheries Science Center</b>	Program coordination
	Maintenance of West Coast cooperative research website
	Workshop to develop research survey design for trap and/or hook and line cooperative research
	Planning for a cooperative research workshop
	Survey methodology for rockfish sampling
	Multispecies survey of juvenile groundfish
	Quantify bait selectivity taken as bycatch
Nearshore groundfish tagging study	
<b>Southwest Fisheries Science Center</b>	Southern California adult sardine survey
	Design of nearshore survey of cabezon in central California
	Albacore tagging with AFRF
<b>Pacific Islands Fisheries Science Center</b>	Northwestern Hawaiian Islands lobster tagging program

**Attachment 3.** Overview of specific projects conducted by the six regional cooperative research programs and NMFS headquarters in support of the National Cooperative Research Program. Projects are organized by specific research topic.

<b>Research Topic</b>	<b>Office/Center</b>	<b>Project</b>
<b>Coordination</b>	NERO	Contractual assistance to Program Manager
		NMFS Northeast Regional Bycatch Workshop
		Mark-recapture workshop
	NWFSC	Program coordination
		Maintenance of West Coast cooperative research website
		Planning for a cooperative research workshop
	S&T	National coordination
National workshop of NMFS regional coordinators		
<b>Fishery-Dependent Data: Commercial</b>	AFSC	Sablefish logbook reporting
		Electronic logbooks—groundfish fisheries
	SEFSC	Electronic logbook evaluation
		Commercial reef fish bycatch
		Evaluation of data collection methods
		Commercial fishery interactions
	NEFSC	Development and testing of electronic reporting equipment
		Expansion of number of vessels in study fleet
		Squid VMS study
		Data management activities
	NWFSC	Quantify bait selectivity taken as bycatch
<b>Fishery-Dependent Data: Recreational</b>	SEFSC	Recreational catch and release mortality—red drum
<b>Resource Surveys</b>	AFSC	Data accessibility—Longline survey
		Augmentation of the Eastern Bering Sea crab survey
	NEFSC	Surfclam survey
		Industry-based surveys
	NWFSC	Multispecies survey of juvenile groundfish
		Workshop to develop research survey design for trap and/or hook-and-line cooperative research
		Survey methodology for rockfish sampling
	SWFSC	Design of nearshore survey of cabezon in central CA
		Southern California adult sardine survey
<b>Cooperative Tagging Studies</b>	NEFSC	Yellowtail flounder tagging
		Black sea bass tagging
		Cooperative shark tagging
	PIFSC	Northwestern Hawaiian Islands lobster tagging program

	SEFSC	Cooperative tagging for reef fish and coastal pelagic species
	SWFSC	Albacore tagging with AFRF
	NWFSC	Nearshore groundfish tagging
<b>Life History</b>	AFSC	Rockfish species identification
		Localized depletion of winter cod fisheries
	NEFSC	Processing of age samples
		Atlantic herring stock identification
		Haddock maturity study
	NWFSC	Life history studies on groundfish
SEFSC	Life history research—grouper complex, reef fish, longline fisheries, gag, snapper	
<b>Conservation Engineering</b>	AFSC	Camera deployments on commercial vessels
		Development of scanning sonar system
		Trawl modifications to reduce salmon bycatch in pollock fisheries
	NEFSC	Scup- <i>Loligo</i> conservation engineering study
	NERO	Develop fishing gear and practices
SEFSC	Pelagic longline bycatch reduction technology	
<b>Essential Fish Habitat</b>	AFSC	Essential fish habitat and mobile gear effects
<b>Fisheries Management</b>	NERO	Establish potential special access programs
	SEFSC	Effects of closed Marine Protected Areas
<b>Seabird Interactions</b>	AFSC	Develop seabird mitigation measures for trawl vessels



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