NOAA Fisheries Service
National Cooperative Research Program

FY 2006 Funded Projects

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Program Objective

The NOAA Fisheries Service National Cooperative Research Program is structured on regionally identified cooperative research priorities and relate to internal and external reviews. Internal reviews include *Managing the Nation's Bycatch (*1998), *NOAA Fisheries Data Acquisition Plan* (1998), *Marine Fisheries Stock Assessment Improvement Plan* (2001), and *Strategic Plan for Fisheries Research* (2004). External reviews include the Kammer Report (2000) and three National Research Council Reports: *Improve Fish Stock Assessments*, *Effects of Trawling & Dredging on Sea Floor Habitat,* and *Cooperative Research in the National Marine Fisheries Service*..

NOAA Fisheries Service proposes a continuation of strategic investments in augmenting fishery stock assessment and the general collection of data through cooperative research, including additional charter vessel days-at-sea, development of gear modifications and fishing practices to reduce bycatch, study of the effects of fishing gear on sea floor habitats, and identification of essential fish habitat (EFH). All allocations are routed through the appropriate Regional Fisheries Science Center.

AOP Elements

Objective 2: Recover Protected Species
Objective 3: Rebuild and Maintain Sustainable Fisheries

External Recipients

A broad range of external recipients are identified in this spending plan, including fishery constituencies in every region across the country as well as state, private, and university participants.

Funding History

FY 2001 = $2,993,000.00
FY 2002 = $2,750,000.00
FY 2003 = $1,043,000.00
FY 2004 = $2,626,000.00
FY 2005 = $2,710,306.00
FY 2006 = $2,712,000.00

Office of Science and Technology

Project Title: National Cooperative Research Coordination and Outreach

Overview: The Office of Science and Technology will support a full-time National Cooperative Research Coordinator to work closely with the NOAA Fisheries Service regional cooperative research programs to improve communication and enhance the scientific quality of cooperative research results for use in stock assessment and fisheries management. The national program will be supported by the Cooperative Research Working Group, which will provide input and recommendations in the development of annual budgets for the NCRP, develop strategies for outreach and education, and develop national guidelines to improve consistency.

The National Cooperative Research Coordinator will provide support for the following objectives:

(1) Provide a forum to coordinate regional cooperative research programs.
(2) Develop national guidelines to enhance regional cooperative research programs and improve consistency, where possible.
(3) Assist the NOAA Fisheries Service regional cooperative research programs in addressing issues of regional and/or national concern.
(4) Facilitate the compilation and communication of information on cooperative research activities to fisheries scientists, managers, fishermen, the fishing industry, and the general public.
(5) Enhance the use of cooperative research results in stock assessment and fisheries management decision-making.
(6) Provide national awareness of the successes of cooperative research activities to Congressional and constituent groups.
(7) Conduct national outreach activities to showcase the benefits of cooperative research.

Research Description: The National Cooperative Research Coordinator, in coordination with the Cooperative Research Working Group, will conduct the following activities during FY 2006:

- Provide input into the development of draft charter vessel safety regulations as they apply to cooperative research activities.
- Contribute to the proceedings from the American Fisheries Society (AFS) Symposium on Cooperative Research and Management.
- Begin planning an annual national cooperative research workshop for FY 2007.
- Develop an annual compilation of cooperative research activities to be published in FY 2007.
- Coordinate analysis of the developing draft legislation to reauthorize the Magnuson-Stevens Act.
- Respond to Congressional and constituent inquiries regarding agency cooperative research activities.

- Provide support to the NOAA Fisheries Service regional cooperative research programs on specific issues of relevance.
- Coordinate input on national initiatives to ensure cooperative research issues and concerns are addressed (e.g., exempted fishing permits, electronic reporting, and peer review).

Pacific Islands Region Cooperative Research Program

Project Title: Northwestern Hawaiian Islands Lobster Tagging Program

Overview: The FY 2006 Pacific Islands Region programmatic funding from the National Cooperative Research Program will be used to support the Northwestern Hawaiian Islands (NWHI) lobster tagging program. This ongoing cooperative research project uses chartered commercial fishing vessels as scientific platforms for the tagging and releasing of spiny and slipper lobsters. The scientific objectives of the tagging program are to:

(1) Collect essential life history and distributional data for spiny lobster and slipper lobster.
(2) Continue the lobster tagging experiment to advance the development of population dynamics models.
(3) Document habitat degradation and associated bycatch (vertebrates and invertebrates) stemming from lobster fishing in the NWHI.
(4) Provide marine vertebrate and invertebrate samples for fatty acid analyses to elucidate trophic linkages and dependencies in monk seals.

The use of chartered commercial fishing vessels is pivotal to the success of this program, as the annual research survey aboard the NOAA research vessel *Oscar Sette* lacks sufficient fishing effort to provide adequate tag recoveries for parameter estimation (as well as samples for tagging).

Lobster biological data and population dynamics models from the 1980s form the basis of present assessments of lobster stocks in the NWHI. Lobster populations in the NWHI have undergone significant changes in abundance and distribution since then, and recent hypotheses suggest that fluctuations in monk seal populations in the NWHI may be linked to population fluctuations of lobsters. During a technical review of the NWHI lobster assessment models, it was recommended that collaborative research programs between industry and the NOAA Fisheries Service Pacific Islands Fishery Science Center (PIFSC) be developed to provide independent estimates of population size and updated estimates of population dynamics.

In response to these recommendations, the PIFSC lobster research team—with wide support from industry and the Western Pacific Regional Fishery Management Council—implemented a collaborative lobster tagging program. A series of lobster tagging and recapture cruises, using both research and chartered commercial fishing vessels, have already occurred at Necker Island and Maro Reef, and additional cruises (research and charter) are required to complete the studies and to recapture animals tagged on previous

cruises. The initial cruises provided some data on habitat degradation and bycatch levels stemming from commercial lobster fishing operations in the NWHI, and preliminary samples for fatty acid analyses. Additional data and samples are required to assess fishery impacts on the environment and on trophic interactions.

Research Description: Two commercial fishing vessels are chartered for 30 sea-days each in September to conduct lobster tagging research at two banks in the NWHI—Necker Island and Maro Reef. One vessel is assigned to each bank. Sampling sites are selected using a stratified random design and site locations are provided to each captain prior to departure. Each vessel sets 15 strings of 20 traps daily, one string per sampling site. Traps are baited with approximately 2 lbs. of mackerel and fished overnight. A standardized protocol is followed for the handling of lobsters and biological data for each lobster is collected—e.g., species, carapace length, sex, reproductive condition, and tag number. Location data (latitude and longitude) of caught and released lobsters is also collected at the string level. All lobster and bycatch are released on the bottom using a tethered release cage device.

Alaska Fisheries Science Center Cooperative Research

Project Title: Bering Sea Fisheries Research Foundation Cooperative Research

Overview: Management of the Alaskan crab fisheries in the eastern Bering Sea is undertaken jointly by the Alaska Board of Fisheries and the North Pacific Fishery Management Council. Implementation of the management is the responsibility of Alaska Department of Fish and Game in consultation with NOAA Fisheries Service. Scientists from the Alaska Fisheries Science Center (AFSC) are responsible for conducting the annual eastern Bering Sea bottom trawl survey and research to estimate various population parameters (e.g. growth, mortality, recruitment, reproductive potential), which are then used to estimate the abundance of juvenile, mature female, and legal male crab stocks and the productivity of the stock for modeling purposes in deriving sustainable annual harvest levels. Representatives from the Alaska crab industry have formed a non-profit Bering Sea Fisheries Research Foundation (BSFRF) to support cooperative research with NOAA Fisheries Service to improve the database for managing Bering Sea crab resources. The goal for 2006 is for the Foundation and the AFSC to establish a third Memorandum of Agreement for summer 2006 and to engage in cooperative joint research projects of mutual interest where costs will be shared equitability.

Research Description: In consultation with AFSC scientists, the BSFRF Board of Directors has identified research projects to address the uncertainty of the crab assessment to improve management models for the tradition crab resource in the eastern Bering Sea. Because many of these crab stocks are near or below B_{msy}, the rate of exploitation is set at a conservative level to encourage further rebuilding. Given the relative uncertainty in the estimates of resource productivity and acceptable levels of harvest, scientists from NOAA and the Board of BSFRF agree that the 2006 summer research project will conduct a crab-specific survey using the Canadian survey scheme evaluated in 2005 and directed at Bristol Bay red king crab. The BSFRF will charter a

fishing vessel in 2006 for 40 to 60 days to conduct the cooperative research effort. They will take the lead in planning the cruise, provide the scientific lead for the survey, and conduct the analysis and reporting of the survey results using funds raised by the Foundation from the industry. AFSC will assist in staffing the cruise; build, certify, and maintain sampling gear; and provide fuel and sampling supplies for the vessel. AFSC will also review the data, analysis, and draft reports of the results, and will take the lead in preparing the updated Memorandum of Agreement.

Project Title: Sablefish Logbook Program

Overview: AFSC scientists, in cooperation with Alaska's longline industry, have been conducting a sablefish logbook program to index sablefish abundance based on commercial fishery data. The time series for this logbook program dates back to 1997, when the longline industry and the North Pacific Fishery Management Council encouraged NOAA Fisheries Service to use logbook data in the sablefish assessment. Both the Alaska Longline Fishermen's Association and the Petersburg Vessel Owners Association endorse voluntary logbook participation by their members, but NOAA Fisheries Service does not have a dockside program to collect logbooks and verify information from fishermen. Therefore, AFSC will contract with the International Pacific Halibut Commission (IPHC)—which has an active dockside program for the halibut fishery—to provide port samplers to collect sablefish logbooks from fishermen. Using their experienced samplers will increase data quality and the visibility of the sablefish logbook program, and using an existing dockside program also will be less expensive than an independent dockside program administered by NOAA Fisheries Service. The collection of logbooks by IPHC began in 2004 and is intended to be a multi-year project.

Research Description: The IPHC will be contracted to collect sablefish logbooks at dockside, edit logbooks based on skipper interviews, and enter the edited data into a database. The IPHC staff, as requested, will enter the edited data to protect confidentiality of fishery records.

Project Title: Fishing Technology and Conservation Engineering to Reduce Trawl Bycatch

Overview: The Conservation Engineering project of the AFSC has experience, equipment, and a number of willing industry partners to pursue cooperative research to improve fishing gear and methods for bycatch reduction and address the effects of fishing gear on seafloor habitats. Funding is needed for fishing vessel costs and small amounts of travel and supplies to pursue these opportunities. Potential partner organizations include from the fishing industry include the North Pacific Fisheries Research Foundation, the Groundfish Forum, Alaska Draggers Association, Lummi Fisheries Systems, Trident Seafoods, Dantrawl, NET Systems, and United Catcher Boats. Other projects may be pursued with individual fishermen or gear designers.

Research Description: In consultation with partners, several of the following projects will be carried out (some are continuations of prior years' cooperative studies and others are new initiatives). The main projects will be:

(1) Development of halibut excluders for the Gulf of Alaska shallow water flatfish and cod fisheries.
(2) Further modifications and improvements to a trawl prototype system for reducing salmon bycatch. This system was developed last year in cooperation with United Catcher Boats and the North Pacific Fisheries Research Foundation, with support from several other fishing companies and organizations.
(3) Development of and evaluation of trawl groundgears that produce less damage to living structure in soft bottom areas.

Other potential projects include: fishing for cod and rockfish with semi-pelagic trawls, detecting areas of vulnerable habitats to avoid when trawling, measuring the width and consequences of "pelagic" trawl bottom contact, determining injury rates for crabs contacting trawl sweeps and bridles, and determining distances of cross-seafloor movements by longlines and pots.

Project Title: Octopus Harvest Species Identification – Bering Sea and Aleutian Islands (BSAI) & Gulf of Alaska (GOA)

Overview: Octopi are taken as incidental catch in both the BSAI and GOA fisheries, particularly in the Pacific cod pot, longline, and trawl fisheries. In the past few years, the market for octopus has increased, and processors in both Kodiak and Dutch Harbor have begun to offer nearly $1 per pound for these animals. Although recent research has been conducted to determine the number of species occurring in Alaska and their life histories, we do not have an accurate estimate of which species are being harvested by federal groundfish fisheries and what impact a more targeted fishery might have on them. AFSC does know that at least seven species are likely to be taken and these species have a wide range of life histories. The primary target, *Enteroctopus dofleini,* is a terminal spawner and lays an average of 50,000 eggs. Females feeds for two months after mating and before spawning and may be targeted by the fishery before spawning. The goals of this cooperative research are to:

(1) Determine which species are being collected during the winter and fall cod pot fishery (the fishery with the highest bycatch rate for octopi).
(2) Obtain the species composition and sex ratio during each season and determine whether it differs from winter to fall.
(3) Determine whether the fishery is targeting mated females.

Research Description: Identifying octopus species requires particular expertise, and is most easily done with fresh specimens. The proposed research would send an AFSC cephalopod expert to Dutch Harbor and Kodiak on two trips, one to be conducted during the winter 2006 cod pot fishery and one during the following fall fishery. Industry partners would take this expert on one winter and one fall cod pot trip (approximately 4 days) from each port. The expert would observe pot fishing operations and determine the

species, sex, maturity, individual weight, and mantle length of all cephalopods collected. The scientist would also spend several days of each trip at the shoreside processor to identify species taken and obtain individual weights and sexes for octopi collected during the cod pot fishery. Harbor Crown Seafoods in Dutch Harbor and Alaska Pacific Seafoods in Kodiak have agreed to provide access to their facilities and octopus deliveries for this research.

Project Title: Evaluate New Gear Technology and Collect Semi-pristine Age Structures for Underutilized Rockfish in the Eastern Gulf of Alaska

Overview: As the result of the Eastern Gulf of Alaska trawl closure in 1998, a number of rockfish species available for harvest have not been effectively targeted by commercial fishing. Over 6,000 tons of Pacific ocean perch, other slope rockfish, and pelagic shelf rockfish go unharvested each year. In February 2004, fishermen and scientists from the Auke Bay Laboratory and Alaska Department of Fish and Game identified three fishing gear types to evaluate under an Experimental Fishing Permit (EFP) for catching these unharvested rockfish. Since this meeting, the Alaska Longline Fishermen's Association (ALFA) has coordinated the evaluation of this gear and found that one of the three gears—shrimp-fly troll gear—was highly effective in targeting silvergrey rockfish with virtually no bycatch. Although no seabirds were caught in the first part of the experiment, seabirds did attempt to feed on the fish during gear retrieval. As a result, seabird predation could affect the quality of the catch if long trains of hooks were used. This information was presented to the Gulf of Alaska Groundfish Plan Team in September 2005. The Plan Team recommended that ALFA continue testing the shrimp-fly troll gear under a new EFP, allowing scientists to collect biological data from the catch, including further monitoring of bycatch. The Team also suggested that the fishermen continue trying to catch Pacific ocean perch, perhaps using smaller lures.

Research Description: The proposed project is an opportunity for fishermen to explore new gear in a controlled manner, while allowing scientists to collect biological information on a virtually unexploited stock. NOAA Fisheries Service will provide fish distribution data describing where we believe aggregations of underutilized rockfish occur. ALFA will coordinate opportunities for an observer to sample catch for sex, length, weight, and otolith and record the species composition. These data are important to establish baseline information for the species, before it is potentially exploited by a new fishery. ALFA will also continue to experimentally fish the gear to determine whether Pacific ocean perch can be targeted, primarily by using smaller shrimp-flies to target schools.

Project Title: Video Technology for Observing Gear Performance and Bycatch Reduction Devices to Improve Selectivity of Fishing Gear

Overview: Alaska Fisheries Science Center (AFSC) gear specialists, working with the north Pacific trawl fleet and their representatives, have developed and tested a number of gear devices to reduce the bycatch of salmon, halibut, and other non-target species. Because fishermen lack access to direct observation on the installation and engineering

performance of these devices, they can only infer critical fish behavior and gear configuration based on catches and other indirect data. This can slow or misdirect attempts to improve gear selectivity. The AFSC proposes to make gear-mounted camera and sonar systems available to fishermen to speed the development and application of methods to reduce bycatch. The Conservation Engineering Division of the AFSC has developed the necessary experience and equipment and applied them in cooperative research to improve fishing gear.

Research Description: This continuing project will provide access to video equipment and a channel for communication with researchers to all commercial fishermen working to reduce bycatch. Industry partners will arrange for agents to maintain one or more camera systems in Alaskan ports, provide the system to participating vessels, and train vessel crews in its operation. NOAA Fisheries Service will provide materials for distribution that describe bycatch reduction methods, and the agents will help fishermen understand and apply this information to their gear, and will also document how devices are installed. This activity is important for interpreting bycatch data from the fishery to help industry assess effectiveness between vessels and further improve bycatch reduction. The agent will be familiar with fishing gear construction methods and be trained by NOAA Fisheries Service in the maintenance and deployment of the camera systems.

Project Title: Investigation of the Feasibility of Utilizing Local Fishing Vessels to Assess Pollock Abundance in Nearshore Critical Habitat

Overview: The eastern Aleutian Islands–western Gulf of Alaska (WGOA) is an isolated area with a complex coastline of islands, bays, and coves. Pollock occur very close to shore over much of the area and is difficult to assess using standard fishery research vessels. The coastal waters of the area are also critical habitat for Steller sea lions, and an area of interest for increasing pollock harvests.

This study would explore the feasibility of using small to mid-sized fishing vessels to collect fisheries distribution and abundance data. Specifically, the AFSC is interested in the potential for commercial fishing vessels to collect information on the density and distribution of pollock and other pelagic species in the nearshore waters of the WGOA. Further, agency scientists would like to explore the effect of various systematic survey designs that could be used to assess the temporal and spatial distribution of pollock in nearshore critical habitat. In conjunction with the acoustic data, collection trawl samples will be taken to identify the species composition of the echo sign and to collect biological data.

The local groundfish trawl fleet presents an opportunity to collect information on the distribution and abundance of pollock and other pelagic fish in the nearshore critical habitat area. Commercial fishing vessels are being used increasingly to conduct cooperative acoustic research. Large catcher-processors are being used to collect density and distribution data for analysis of effects of fishing (Barbeaux et al. 2005), and studies of rockfish off Oregon on a 65-foot trawler have shown that acoustic data can be

successfully collected by midsized trawlers (Ressler et al 2005). The vessels used in the WGOA are primarily small trawlers in the 45- to 60-foot range.

The eastern Aleutian Islands Borough, which represents Western GOA coastal fishing communities, will be a cooperating partner in this project and will communicate with the villages. They will also contact vessels equipped with appropriate acoustic and trawl gear and provide them with charter bid packages. Additionally, the eastern Aleutian Islands Borough will arrange orientation and planning meetings as requested by the project scientists.

If this project proves successful, a follow-up study with investigators from the National Marine Mammal Lab will be proposed to focus on fish-mammal-fishery distribution and interactions within the nearshore critical habitat of the WGOA.

Research Description: This study is an initial attempt to determine whether local vessels can collect data of sufficient quality to estimate the extent of pollock availability in nearshore critical habitat. The proposed research project would charter two vessels for two sets of replicate cruises off the Shumagin Islands in the WGOA. Two sets of 5-day observations will be conducted, with the first set in late spring–early summer and the second in late summer.

A survey design will be developed via meetings with fishermen. This should help focus the research by integrating local knowledge with the existing AFSC survey database. The basic design will incorporate sets of tracklines in two areas, and the tracklines will be covered by the two charter vessels. The intent is to examine repeatability of observations within a 5-day period and between periods.

The survey will use charter vessels equipped with Simrad ES60 echo-sounders cabled to data storage drives for collecting the sounder raw data. The surveys will operate during daylight up to 18 hours. Tracklines will be occupied by both vessels to evaluate vessel effects. The two vessels will share trawling and biological sampling operations.

Recorded echo sign and biological data collected on the surveys will be compiled and analyzed to produce spatial analysis of the density and distribution of pollock and other pelagic species in the nearshore critical habitat zone.

Northwest Fisheries Science Center Groundfish Cooperative Research

Project Title: Personnel and Associated Management Costs

Overview: NCRP funds will be allocated to support staff members coordinating the groundfish cooperative research program at the Northwest Fisheries Science Center (NWFSC). Overall objectives of the NWFSC program are:

- To enhance the collection of information on groundfish species and their associated ecosystems by working cooperatively with fishermen on the West

Coast of the United States to collect information.

- To improve the understanding and credibility of fisheries information used for fisheries management on the West Coast.
- To increase the trust and empathy between fishermen and fisheries scientists.

Research Description: Funds will support the associated costs for travel and incidental supplies. The goal will be to provide personnel to support the continuing multifaceted program that in the past has included a port liaison project to compensate fishermen who participate in research planning and data collection. Each of these cooperative efforts has leveraged resources effectively and created important opportunities and benefits for NOAA Fisheries Service research and for the fishing community. Personnel supported by this funding will ensure the broadest participation in cooperative research, monitor the quality of research, provide guidance on research planning and budget, and conduct outreach to constituents about the program.

Project Title: Cooperative NOAA Fisheries Service/Industry Surveys

Overview: Since 1998, the NWFSC has conducted resource surveys in cooperation with commercial fishing vessels. These surveys provide important information about distribution, abundance, and age structure of groundfish populations. The industry and the NWFSC have been working cooperatively to develop several surveys for species that are not well surveyed by existing trawl surveys. Notably, widow rockfish, canary rockfish, and a suite of recreationally important fishes are the focus of these cooperative efforts. The objective of these surveys is to improve tracking of the status of these populations. The funds requested will allow the full development and review of final survey plans for these cooperative surveys and will support implementation of initial tests of the proposed survey designs.

Southeast Fisheries Science Center Cooperative Research Program

Project Title: Supplementation of the Southeast Cooperative Research Program

Overview: The objective of the Southeast Cooperative Research Program is to conduct high-priority research projects that have been identified in concert with the regional councils and industry and that will address critical research needs. This program is consistent with the Government Accountability Office (GAO) recommendations to heighten working relations with stakeholders. The spending plan reflects the Region's highest priorities for cooperative research and supports both ongoing and new project proposals selected through the FY 2005 competitive process advertised through publication in the *Federal Register.* A broad range of external recipients are identified in the spending plan, including commercial and recreational fishermen involved in the highly migratory species, Gulf of Mexico, and Southeastern U.S. Atlantic fisheries, and southeastern region state, private, and university researchers.

Congressional funds are appropriated to conduct the Southeast Cooperative Research Program, in addition to funds provided by the national program. The Southeast plan

provides funding for a broad array of external recipients. The plan includes continuing activities from projects begun in previous fiscal years and projects that will be selected based on the competitive solicitation process advertised in the *Federal Register*. Due to funding limitations, the full range of high-priority cooperative research demands within the region could not be fully met in FY 2005 and a process for prioritizing competitive requests for funding is under way. Specific projects that may be supported with NCRP funding by the Southeast Cooperative Research Program in FY 2006 include the following:

Cooperative research on Bycatch Reduction Devices' (BRD) effectiveness in finfish reduction and shrimp retention during commercial shrimping operations in the southeastern U.S. Atlantic

Minimizing bycatch continues to be a very high priority for NOAA Fisheries Service in the Southeast. Outreach and education are critical components of reducing bycatch, and the agency has worked closely with industry to develop new gear and promote clean fishing practices in all fishing sectors. This research continues a cooperative effort between the shrimping industry and the Southeast Fisheries Science Center Galveston Laboratory. The primary objective of this research is collect observer data on bycatch during commercial shrimping for use in further refining catch rate estimates of finfish and shrimp by area and season for this fishery. Vessel compensation is a critical aspect of this activity and these funds will be used for that purpose. This activity is a carry-over of prior years' commitments.

Cooperative Statistics Data Collection

Fishery-dependent statistics are collected by various organizations throughout the southeastern U.S. It is critical that standards and procedures be established and followed for the collection and data management of fishery statistics. The purpose of this cooperative data collection is to ensure that all statistics are collected with similar procedures, and that all statistics are compatible and can be combined into a comprehensive database for stock assessment and other scientific or management analyses. This activity is accomplished through grants to states in the Southeast Region, and is a carry-over of prior years' commitments to this cooperative research activity.

Cooperative Shark Research

The Cooperative Center for Shark Research (CSR), based at the Mote Marine Laboratory, conducts cooperative research with the Southeast Fisheries Science Center through a Memorandum of Understanding in place since 1994. The focus of the cooperative research program involves the following activities: (1) field studies of shark nursery areas and shark fisheries, including tagging studies of shark migration, ageing, and growth; (2) advanced studies of shark behavioral ecology and population biology using acoustic telemetry, satellite remote sensing, and laboratory molecular biology; (3) conservation biology of depleted species of shark and rays, including the sawfish; (4) studies of population dynamics, stock structure, and abundance of shark species; (5) surveys of commercial and recreational shark fisheries; (6) field and laboratory studies of shark habits and feeding mechanisms; and (7) investigations of reproduction and endocrinology of shark in the field and laboratory. Funding will enhance ongoing research on

population dynamics of coastal shark resources in the region, through application of Pop-Up Satellite Archival Tags (PATs) on blacktip sharks and involvement of the charter sector in cooperative tagging of this species to determine elements of blacktip critical habitat and migratory pathways.

Extending a Swordfish Longline Recruitment Index Along the Florida East Coast
This project was a successful proposal in the FY 2003 competitive selection process. However, because of lags in permitting required for this activity, it was not possible to fund the work in FY 2003 or FY 2004. FY 2005 funds have been used for this project, and FY 2006 funding represents a carry-over of prior years' commitments to this cooperative research activity.

Potential Projects Based on FY 2005 Competition for Funds
Selection of the awards from FY 2005 are to be finalized in FY 2006 and will follow procedures outlined in the *Federal Register* notice. Projects are eligible for funding subject to technical review and recommendations received from the review panel.

Northeast Fisheries Science Center Cooperative Research

Project Title: Study Fleet Phase III Implementation, Monitoring and Analysis

Overview: Stock assessments routinely use data that describe the performance of fishing vessels as indices of relative abundance (e.g., catch per unit of fishing effort). Data on fishing effort (e.g., fishing method/tow speed and haul duration, mesh size, area fished), catch and landings characteristics (e.g., species/size/sex age composition), disposition of the catch (e.g., discards vs. landings), and environmental factors affecting catches (e.g., water temperature; depth, habitat type) are critically important in stock assessments. These data are usually collected (1) by observers at sea, (2) through self-reporting by the fishing industry in logbooks, or (3) via dockside interviews. All of these methods have limitations (e.g., observers are expensive, dockside interviews are limited in scope).

A study fleet is a group of cooperating fishing vessels/operations that provide more accurate, more detailed (temporal and spatial), and more comprehensive data than would be obtained without deploying expensive observers. The study fleet concept focuses on electronic reporting mechanisms for haul-based data, as compared to trip- or sub-trip-level records typical of logbooks in the Northeast. Study fleet participants helped design and test the program. Special equipment (laptops linked with GPS units and temperature data loggers) has been tested, and 30 vessels were participating in the evaluation and field testing of electronic data acquisition systems when the contract ended during the third quarter of FY 2005.

Despite the cessation of vessel contracts, more than half of the participating captains continued working with the NEFSC study fleet analyst to collect additional trip data and work through issues concerning satellite communications and data quality. This ongoing voluntary participation is one indication of the industry's interest in finalizing an electronic reporting system that could satisfy permit-related reporting requirements.

In FY 2006, ongoing electronic logbook development will be coordinated with the NERO Fisheries Statistics Office (FSO) and the Cape Cod Commercial Hook Fishermen's Association for the electronic Vessel Trip Report (eVTR) project. Additional development and field testing in 2006 will be supported aboard other fleet components to improve the system and enhance electronic reporting capabilities for Special Access Program (SAP) quota monitoring and other priority management needs. By leveraging the achievements of the initial Study Fleet initiative, managers will be able to consider fleet-focused deployment options for expanded electronic vessel reporting in 2007.

Experienced stock assessment staff are required to work with industry and management partners in planning for study fleet expansion, in continuously interacting with participants during implementation, and in collaboratively managing, analyzing, and distributing the acquired data. Existing senior stock assessment staff supported these activities during the pilot stage, but will not be able to support final system modifications, implementation planning, and ongoing analysis planned for FY 2006 and beyond. This applies particularly to finalizing the processes necessary to ensure timely availability of these records to the NEFSC Stock Assessment Workshop (SAW) process.

Research Description: The Population Dynamics Branch of the NEFSC will be responsible for ensuring that any expansion or revision of the vessel/fleet deployment scheme provides an appropriate statistical sample of haul-based records to complement the trip records submitted under other monitoring programs, and that the resulting data addresses management priorities (e.g., improves SAP monitoring).

Specifically, an agency analyst will monitor monthly data submitted by participating vessels, and then work with technical staff in the NEFSC Population Dynamics Branch and Data Management Systems, along with the NERO FSO and Information Resource Management Office, to ensure that data quality assurance standards are satisfied. In collaboration with stock assessment staff responsible for specific species, the analyst will determine the appropriate number of vessels and their operational characteristics (survey design for gear, fishing area, vessel size, etc.) that need to be added to the study fleet to improve the precision of population estimates or trend analyses, and address concerns about bias in sampling. In collaboration with senior NEFSC management and the manager of cooperative research, the analyst will develop a study fleet sampling evaluation plan to ensure the appropriate allocation of sampling effort commensurate with desired levels of assessment precision. This evaluation will support an expanded implementation plan responsive to assessment priorities developed in the SAW process, as well as management priorities and issues identified by the NERO, Fishery Management Councils, state management agencies, and industry constituencies.

Project Title: Equipment and Operating Costs to Support Cooperative Research Projects

Overview: Cooperative research projects between 2000 and 2005 have provided greater experience with respect to costs for vessel charters, field expenses and labor, deployment

and post deployment support, data processing, and final information dissemination. The Northeast Regional Office's Cooperative Research Partners Program (described below) supports staff time that partially addresses these needs. Additional operational funds from the national program are required to support cooperative research projects of ongoing importance to the NEFSC, NERO, the Councils, and industry constituencies.

Research Description: The projects to be supported by the requested operational funds include:

- Yellowtail flounder and black sea bass tag-recapture data processing.
- Mark-recapture priority experiments identified by the SAW.
- Initiation of requirements analyses for data archiving of Northeast gear experiments.
- Equipment, travel, and overtime to support field work including industry-based surveys (e.g., Gulf of Maine cod and the mid-Atlantic transect survey), and added collaboration with state agencies to support increased adoption of electronic data capture technologies at sea (e.g., portable Fisheries Scientific Computing System (FSCS)).

The requested funds will also cover staff travel to cooperative research meetings of the Councils and constituent groups, data entry costs, expendable field equipment, and (depending on SAW recommendations) a limited amount of funding for tagging supplies and vessel contracts (commercial and/or recreational).

Tag reward funds and ongoing support for recapture data processing. Recaptures for both black sea bass and yellowtail are expected to occur over the next few years, requiring ongoing outreach and data processing. In addition, because the NEFSC has developed infrastructure and experience to support mark-recapture projects, there is scientific interest in additional tagging efforts focused on high-priority management species. The current species of interest include scup, haddock, and dogfish in FY 2006. The mark-recapture study for black sea bass provides the only empirical estimate of exploitation rate for this species in support of the fisheries management plan. This program was initiated in 2002, during a 2- to 3-week period in May and repeated in September. Previous tagging has involved chartering commercial and recreational/charter vessels from Massachusetts to Virginia. In addition to the costs associated with vessel charter, monetary rewards are paid for a subset of tag returns for the purpose of documenting the tag reporting rate.

Industry-based surveys are expanding in the Mid-Atlantic and Northeast. NEFSC support includes the at-sea presence of NEFSC Cooperative Research staff, estimated at at 190 sea days for FY 2006; provision of the standard survey deck logs; initial post-cruise screening of deck logs; and data entry and auditing support. Additional work is planned to upgrade the survey system capabilities to deal with unique characteristics of industry-based surveys, enhanced electronic data streams from gear mensuration, vessel and deck-based electronic systems.

Northeast Regional Office Cooperative Research

Project Title: Oversight and Outreach Activities to Support the Northeast CRPP

Overview: The mission of Northeast Regional Office's (NERO) Cooperative Research Partners Program (CRPP) is to increase communication and collaboration among agency scientists, managers, commercial and recreational fishermen, and other constituents. The aim is to provide additional data to inform fishery management decisions. The key measure of the success of the program is to enhance confidence and understanding of the scientific basis for management decisions. NCRP funds will be provided to the CRPP to pay for coordination, program leadership, and outreach activities to encourage constituents to become involved in the program and to assess and translate program results for management.

A measure of success will be based on the degree to which the separate activities and goals are achieved during the fiscal year. Program leadership and successful outreach activities will demonstrate in large measure the effectiveness of the program. New projects will evaluate how well specialized gear works to harvest abundant species of fish while avoiding non-target, low-abundant species through the New England Fishery Management Council's SAPs approach to the Northeast Multispecies Fishery Management Plan. The Gulf of Maine cod industry–based survey will likely be continued in FY 2006. Although cod tagging will end in FY 2005, cod recaptures will be reported for several years, and additional funds will be required to process recovery data and develop analytical software for effective data analysis and resulting management recommendations. Three workshops will be held in FY 2006—one on analytical evaluation of tagging data (second quarter CY 2006); one on optimizing survey designs for industry, state, and federal vessels (second quarter CY 2006); and one on the status of the study fleet (first quarter 2006).

The tagging workshop will begin determining whether tagging cod and other groundfish species in the Northeast can provide necessary information for the FY 2008 benchmark assessments and for developing fishery management strategies. The outreach effort will provide support for the senior program manager through increased collaboration with partners. In addition, outreach activities will encourage a broader base of participation and involvement in the program (i.e., recreational fishermen and conservation organizations), communicate program results for management purposes to constituents, improve constituent understanding of the program, and provide outreach materials for various workshops.

The CRPP program provides oversight and contract management for over 40 ongoing research projects and three long-term research programs, and provides leadership in developing strategic plans, outreach, research priorities, and guidance on new research initiatives through coordination with the New England Fishery Management Council's Research Steering Committee.

Southwest Fisheries Science Center Cooperative Research

Project Title: Rockfish Surveys Using Advanced Technologies in the Southern California Bight

Overview: The Southwest Fisheries Science Center (SWFC) is a national leader in advanced survey technologies. The SWFSC has partnered with the sportfishing industry to conduct surveys using advanced technologies under development for rockfish in the Southern California Bight. To improve stock assessments of these species, the SWFSC has combined acoustics and observations from a remotely operated vehicle (ROV). These non-lethal technologies are used to determine the status of commercially and recreationally important fish stocks in habitats that cannot be sampled using traditional methods.

Sportfishing in Southern California near coastal waters is a popular activity for commercial and recreational fishermen. The Sportfishing Association of California is the major industry organization representing nearly 200 Commercial Passenger Fishing Vessels (CPFV) operating out of 23 landings from Morro Bay to San Diego. This fleet carries almost 1 million passengers annually to local and Mexican fishing grounds. The fleet and supporting shoreside facilities represent a monetary investment of nearly $80 million, with a labor force of about 4,000. In 2000, an estimated 876,000 trips were taken aboard southern California–based CPFVs, producing a total catch of 2,941,000 fish, representing 44 percent and 30 percent respective increases from 1999. Estimates of southern California CPFV and private vessel trip expenditures totaled $205 million in 2000: 62 percent CPFV and 38 percent private vessel. The CPFV fleet and private recreational boat fleets target both pelagic and benthic fish during their fishing expeditions. Currently, stock assessments of three species managed under the Pacific Coast Groundfish Fishery Management Plan—yelloweye rockfish, bocaccio, and cowcod—have resulted in reduced fishing opportunities for recreational fishermen. Proper management through assessment of these resources is critical to the sportfishing industry.

This project aims to improve the Fish Stock Sustainability Index (FSSI) score for these three priority fish stocks (yelloweye rockfish, bocaccio, and cowcod). This index tracks the outcome of building and maintaining fish stocks at productive levels and captures the critical components of NOAA's efforts in that outcome.

Research Description: In FY 2006, we propose to work cooperatively with the CPFV fleet to conduct a survey using acoustic and ROV technology of demersal fishes associated with hard bottom, and then to map these habitats. The 30-day survey will be conducted from a CPFV in the Southern California Bight. Three technologies will be used in this survey: multi-beam sonar for bottom mapping and typing; multi-frequency echo-sounder for estimating fish distribution, abundance, and bottom typing; and video and still camera observations from the ROV for species identification and validation of acoustic measurements. Three-dimensional images of rockfish and bathymetry are derived from the multiple-frequency echo-sounder and multi-beam sonar data collected

along parallel transects. These data are validated using optical sensors deployed on the ROV. By exploiting the frequency dependence of sound scatter from the various taxa and seafloor types, these surveys can result in quantitative large-scale assessments of rockfish dispersion and abundance.

The primary goal is to complete a successful 30-day acoustic/ROV survey of demersal fish in the Southern California Bight and map the hard bottom habitat. Biomass estimates for recorded species will be made from density estimates and habitat area maps, which will allow NOAA Fisheries Service and the Pacific Fishery Management Council to monitor the recovery of these overfished stocks. The survey methodology developed using these advanced technologies will be independently peer-reviewed, validating the methodology for assessment and monitoring of fish stocks. This survey methodology will benefit NOAA Fisheries Service both locally and nationally, because surveying fish over hard bottom is problematic throughout the U.S. Exclusive Economic Zone. Specifically, in Southern California our ability to monitor the recovery of fish stocks in the Cowcod Conservation Area will improve.

Project Title: Archival Tagging of North Pacific Albacore

Overview: SWFSC scientists conduct research on the North and South Pacific albacore populations. To date, much of the Center's research has focused on the North Pacific stock, largely because the U.S.-based albacore fisheries, both commercial and recreational, primarily target this population. The North Pacific albacore stock, particularly the juvenile fish (2- to 5-year-olds), typically begin an expansive annual migration in the spring and early summer in waters off Japan, which continues throughout the late summer into inshore waters off the U.S. Pacific coast, and ends late in the year (late fall and winter) in the western Pacific Ocean. It is generally believed that oceanic conditions strongly influence both the timing and geographical extent of the albacore's migration in a given year. Migrating albacore concentrate along thermal discontinuities (oceanic fronts) associated with waters of the Transition Zone in the North Pacific Ocean. The vast majority of albacore are caught in waters with sea-surface temperatures (SSTs) that range from 15 to 19.5 °C (59 to 67 °F). The migrating fish are typically bounded by these thermal gradients as they travel round-trip across the Pacific Ocean. Although the bulk of the migrating stock is typically observed within this SST range, telemetry studies have shown that this species will spend brief periods in much colder water (9.5 °C). Recent research indicates that the albacore adjust their behavior to very different oceanic conditions when passing through at least four distinct physical regimes (geographical strata) of the North Pacific Ocean.

The American Fishermen's Research Foundation (AFRF) has been working with scientists from the SWFSC since 2001 on a 5-year research study to determine movement patterns and general life history strategies of North Pacific albacore to incorporate detailed migration movements of these fish into stock assessment models. The project is supported in part through funding provided by the AFRF, which is a research-based organization spearheaded by the troll fishery and canning industries of the United States. The objectives of the long-term study are to deploy 500 archival tags in albacore over the

period 2001–2005. To date, 308 archival tags have been deployed, and a tagging trip to deploy 75 more is planned for October 2005. Deployments through 2005 will leave us 117 shy of our goal, due to a slow start with limited funding during the first 2 years of the project. Twenty tags, of which six are dummy tags, have been recovered, and the data are beginning to reveal habitat preferences for these fish. With continued funding for this project in FY 2006, and a commitment by AFRF to purchase 20 tags, we can deploy the remaining 117 tags and reach our target sample size.

Archival tag data are integral to providing accurate information on North Pacific albacore migratory behavior and distribution and, ultimately, to developing sound stock assessments regarding this species. Albacore is an actively managed species under the Pacific Fishery Management Council's Highly Migratory Species Fishery Management Plan. It is also a priority species tracked by the Fish Stock Sustainability Index (FSSI). This project aims to improve the FSSI score for North Pacific albacore by improving migration information for stock assessments.

The future of this long-term project rests largely on obtaining operating funds on a year-to-year basis. Given an expected tag return rate of approximately 5 percent, it is essential that tagging efforts continue into 2006 to increase the likelihood of obtaining adequate recoveries to develop scientifically based management recommendations.

Research Description: In FY 2006, 117 tags will be deployed during two tagging trips. Deployments will be made on vessels chartered through the Western Fishboat Owners' Association (the parent organization of the AFRF). Archival tags are used to collect daily locations (through light-level data recorded by the tag), internal temperature of the fish's abdomen, ambient water temperature, and depth.

Project Title: Cooperative Surveys and Biological Sampling of Large Pelagics with the California-based Commercial Passenger Fishing Vessel Fleet

Overview: The CPFV fleet of southern California and supporting shoreside facilities represent a monetary investment totaling near $80 million and a labor force of about 4,000. This fleet routinely fishes for a wide range of pelagic species, including yellowtail, mahi-mahi, large tunas, and sharks. Although a large portion of the business consists of day trips within the Southern California Bight, many of the most desirable and profitable trips are multi-day excursions into Mexican waters in search of large pelagic species. These trips range from day trips to the Coronado Islands to 18-day trips to the Revilla-Gigedos Islands. The increase in Mexico's fishing tourism and commercial fisheries development along the Baja coast has increased the focus on fishery resources off Baja and their joint exploitation by U.S. and Mexican fishermen. The newly reenergized MEXUS-Pacifico joint research framework provides an opportunity to examine the biology and exploitation patterns of pelagic fish stocks that straddle and seasonally migrate between the two countries.

The proposed project would take advantage of the long-range capacity of the sportfishing fleet to survey and conduct biological studies in Mexican waters for those commercially

and recreationally important fish managed under the Pacific Fishery Management Council Fishery Management Plans for highly migratory, coastal pelagic, and groundfish species. During the first year, the SWFSC would work in cooperation with the fleet to design and implement survey methods for monitoring the catch and the economic value of trips into Mexican waters.

This project aims to improve the score for priority shark and tuna stocks tracked by the Fish Stock Sustainability Index (FSSI).

Research Description: Short- and long-range CPFVs will be used as platforms for studying the biology of pelagic fishes, including application of conventional and electronic tags, biological sampling of life history parameters, and plankton surveys for spawning activity and spawning location. These trips are likely to fall under two categories: 1) sending a single U.S. or Mexican scientist on scheduled sportfishing trips to collect basic biological information on the catch, such as species composition, sex, and length frequencies, as well as DNA sampling for stock structure studies on species of interest; and 2) chartering a vessel for a dedicated trip to systematically survey areas for nearshore or pelagic fish and conduct tagging studies on species of interest. SWFSC scientists plan to work together with the CPFV fleet and Mexican scientists through the MEXUS-Pacifico forum to supplement data collection contributing to more effective management, both north and south of the border.