

# Opinion Paper for the American Fisheries Society Symposium “Making a Difference Working Cooperatively”

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Cooperative research programs and projects have existed in the NOAA Fisheries Service for most of the agency’s history and are considered a usual and normal approach for conducting fisheries research. This agency values cooperative research in supplementing its existing mandated and core research programs, and we have made cooperative research an integral part of the business of collecting data to support stock assessment and management activities.

In cooperative research, fishery scientists partner with commercial and recreational fishermen, the fishing industry, non-governmental organizations, state fisheries management agencies, and universities. Partners in the regional cooperative research programs vary depending on regional research priorities and opportunities, but all programs have some level of involvement of fishermen or the fishing industry or other partnership groups in conducting regional research. It is through these partnerships that the agency gains access to knowledge, tools, techniques, skills, and experiences that are otherwise unavailable to NOAA scientists. This access improves the quality and completeness of our science recommendations, fosters a better understanding of NOAA science and its process, and creates more support for buy-in of subsequent management policies. Moreover, by working together, synergy is obtained not only in joint problem solving, but in the identification of what scientific questions to undertake, their priorities, and what approaches to use through a cooperative research program.

The remainder of this paper identifies a set of guiding principles relevant to the future of cooperative research activities in the U.S. It is my hope that these principles will be given due consideration over the course of the symposium. Additionally, this paper provides a brief background, highlights current cooperative research programs in each of the six NOAA Fisheries Service regions, discusses examples of the impact of cooperative research in each of those regions, and lastly identifies future needs for those regional programs.

## PRINCIPLES OF COOPERATIVE RESEARCH

- Cooperative research projects must be collectively planned and executed so there is buy-in and increased understanding on all sides. By working together in partnership, scientists, stakeholders, and fishery managers can learn from each other and build mutual trust and respect. This principle supports the National Research Council’s (NRC) 2004 report’s recommendation on cooperative research that the NOAA Fisheries Service should have “*expectations, requirements, and procedures, including the development of agreements carefully detailing the responsibilities of all participants, clarified at the beginning of every project.*”

- Cooperative research projects have to fit into an overall program and not be an “alternate” science with which to confront more traditional programs. Cooperative research must be part of an integrated, not separated, approach to providing information for stock assessment and fisheries management.
- Cooperative research projects must undergo the same level of peer review as traditional efforts so there is only “one science.” Information developed in cooperative research programs must not stand apart from that done by agency scientists. There are not multiple competing sciences, but a united science accounts for all data. Cooperative research results must be fully integrated into the established assessment and peer review processes. Since conditions are constantly changing in the marine environment, the period between the collection of information and management action taken should be as short as possible. This collective desire to get information into the management process quickly must not come at the cost of bypassing normal procedures for quality control/quality assurance and peer review—to do so would potentially jeopardize the utility of the information, undermine its credibility in the management process, and run the risk of the data being successfully challenged under the Information Quality Act and other statutes.
- Cooperative research projects must document more than just the final results, but also the way they are designed, developed, and implemented. Moreover, demonstrating the impacts of the final study results on the science and management processes must be captured. This reporting will serve as a major tool in providing feedback for overall program improvement.
- Cooperative research projects must be conservation neutral (e.g., no added F over and above conservation limits). Cooperative research projects vary in their size and scope, and therefore impact fisheries differently. In all cooperative research programs there is a need to accurately measure absolute fishing mortality due to research activities. By documenting the mortality of target and non-target species, particularly stocks with low abundance, in conducting cooperative research a full accounting of removals can be assessed.
- Cooperative research projects should be conducted in a timely manner. One facet affecting the timeliness of projects is the issuance of permits. Cooperative research participants must obtain appropriate research/fishing permit (Scientific Research Permit, Exempted Fishing Permit, or Letter of Acknowledgement) and receive approval by the appropriate NOAA Fisheries Service authority prior to initiation of the project. The need and type of research/fishing permit required to conduct cooperative research varies with the nature and scope of the cooperative research project. Moreover, additional permits may be required to comply with the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). The National Research Council’s (NRC) 2004 report on cooperative research recommended that the NOAA Fisheries Service should “*streamline and*

*standardize all permitting procedures for conducting cooperative research projects so as to ensure uniform treatment and rapid processing of all applications in all regions.”* In response to this recommendation, the agency has been working to improve the issuance of permits as well as the collection and handling of recordkeeping and reporting requirements for permits. Additionally, the agency is seeking mechanisms to improve the public’s understanding of requirements of the National Environmental Protection Act (NEPA), ESA, and the MMPA when submitting cooperative research proposals. While we have not yet streamlined all permit granting processes, significant progress has been made and we will seek further authorities to improve these processes even more.

- Cooperative research projects need to leverage resources as much as possible. Cooperative at-sea research is an intensive use of equipment and human capital, especially when the goal for timely data delivery involves numerous platforms and groups with different capabilities. Productive partnerships and innovative approaches to offset the cost associated with research must be sought.

## **BACKGROUND**

Beginning in 1999, Congress earmarked appropriated funds for the design and implementation of cooperative research. Currently, Congressional funding supports a number of cooperative research programs including the Northeast Consortium, Northeast Cooperative Research Partners Initiative (CRPP), the Southeast Cooperative Research Program (CRP), the West Coast Groundfish Cooperative Research Program, and the National Cooperative Research Program (NCRP). Total Congressional funding since 1999 for national and regional cooperative research activities has approached \$85 million. In recent years, annual appropriations have totaled over \$16 million. With this dedicated funding, NOAA Fisheries Service engages in cooperative research activities in all six of its regions with national coordination provided through the NCRP in the Office of Science and Technology.

## **REGIONAL SUMMARIES OF COOPERATIVE RESEARCH**

A broad range of cooperative projects conducted throughout the United States has improved the science and management of our living marine resources. However, demands for high-quality science and more focused management continue to escalate. As future needs are identified, it is clear that the NOAA Fisheries Service must increase its efforts to leverage cooperative partnerships to maximize agency investments in science and management. Below, I summarize some of the exciting efforts that have led to improved science and management in our various regions.

### **Northeast Region - Current Program**

Both the Northeast Regional Office (NERO) and the Northeast Fisheries Science Center (NEFSC) are involved in extensive cooperative research activities throughout the Mid-Atlantic, Southern New England, Georges Bank, and the Gulf of Maine. These programs

are funded by specific appropriations: NCRP, bycatch reduction funds and special grant programs. The largest program, CRPP, is administered by the NERO and the NEFSC. The CRPP supports three long-term monitoring surveys (inshore ME-NH, Gulf of Maine Cod, and Southern New England yellowtail flounder), an electronic logbook study fleet (currently 30 vessels), and an extensive cod tagging initiative (>100,000 cod tagged by five cooperating organizations). Additionally, annual solicitations Request For Proposals or RFPs support shorter-term projects, including conservation engineering research to reduce incidental bycatch, evaluation of habitat and ecosystem impacts of commercial fishing, and projects to address other priority management concerns. The NOAA Fisheries Service also collaborates with the Northeast Consortium, which issues RFPs for cooperative research on a broad range of topics including gear selectivity, fish habitat, stock assessments, and social sciences. This year's priorities include angler practices to reduce release mortality in the groundfish recreational fisheries, ecosystem-based management, and research to develop and implement strategies for enhancing safety at sea.

In the New England and mid-Atlantic regions, the New England Fishery Management Council and the Mid-Atlantic Fishery Management Council support cooperative research activities through a quota and days-at-sea set-aside program. In particular, two cooperative surveys are conducted, as are a number of bycatch reduction / conservation engineering studies. While most of the work focuses on groundfish stocks and trawl fisheries, significant work is underway with dredge, trap - pot, and hook and line fisheries. Commercial fishermen are most active in Industry Based Surveys (fishery independent), study fleet (fishery dependent), and conservation engineering (bycatch reduction) research and monitoring projects. Both commercial and recreational fishermen are very active in a number of tagging studies.

These activities are intended to not only meet agency data needs, but also to strengthen and enhance NOAA Fisheries Service's relationships with the Northeast commercial and recreational fishing sectors.

### **Impacts of Cooperative Research on Science and Management in the Northeast Region**

In the Northeast, data from industry-based surveys will be included and add to information available for stock assessments and the evaluation of management options for a number of stocks including yellowtail flounder and Atlantic cod. In the case of yellowtail flounder, cooperative tagging and gear studies have helped to implement a special access program while improving the industry's understanding of agency science. With improvements in electronic logbooks and integration of Vessel Monitoring Systems (VMS) through study fleets, the level of temporal and spatial detail associated with catch observations will increase and allow finer scale and more focused management.

## **Future Needs for Cooperative Research in the Northeast Region**

Overall, there is a need for program expansion which will broaden and diversify community participation and include a greater diversity of fishery-gear combinations, vessel sizes and sport fishermen. The longer-term goal is to assimilate and archive a rapidly growing research database and to ensure, over time, an effective means to shepherd this information into the assessment and peer review process for eventual use in management. A second goal is to gain public and industry support to help further extend cooperative research in the mid-Atlantic, based upon the success and experiences primarily in New England.

Areas of emphasis for ongoing and future cooperative research activities in this region include:

- Industry Based Surveys, collecting time series data on specific stocks and evaluating time area closures. There is a need for an expansion in the range of habitats being addressed through these surveys.
- Study fleets and electronic reporting also hold promise for specific fleets and fisheries where the greater level of temporal and spatial detail and more timely data availability can improve precision in stock assessments.
- Tagging programs conducted on a 2-3 year frequency could increase the data available for a number of stock assessments produced and provide an opportunity to engage a greater diversity of fishermen (commercial and recreational) in cooperative research and community outreach and education.
- Integrated mark-recapture data management system and tag program clearing house which will allow for long-term support for mark-recapture approaches designed to improve the accuracy and precision of analytical stock assessments.
- Alternate fishing gears will complement trawl-based surveys and expand geographical coverage into habitat areas that trawls can not sample.
- Bycatch reduction and conservation engineering, so that in combination with overall improvements in the temporal and spatial precision in fisheries dependent data, a greater range of management options can be analyzed.

## **Southeast Region - Current Program**

Cooperative research in the Southeast also has a long-standing presence and has been conducted through a host of mechanisms, including state-Federal cooperative statistical programs, cooperative institutes, joint resource surveys, cooperative gamefish tagging studies, and a joint industry-agency observer program. Starting in 2001, the scope of cooperative research has been broadened with the addition of dedicated funding for cooperative research projects to assist in improving confidence that both commercial and

recreational fishermen have in the data and analyses performed in support of fisheries management. The enhanced program seeks to increase and improve the working relationship among researchers from the Southeast Fisheries Science Center, state fishery agencies, universities, and fishermen. As such, the principle goal of this program is to provide a means of involving commercial and recreational fishermen in the collection of fundamental fisheries information to support the development and evaluation of management and regulatory options. Projects are selected in an annual competition giving greatest weight to those projects judged to have the highest likelihood of collecting data that aid in recovering, maintaining, or improving the status of stocks; improving the understanding of factors affecting recruitment success and long-term sustainability of fisheries; and generating increased commercial value and opportunities for fishermen. Program priorities have been developed in consultation among the various regional fishery management councils, with U.S. Atlantic highly migratory species management and advisory bodies, and with regional fishing industry, scientific, and environmental constituents through a constituency workshop on Southeast cooperative research.

The CRP serves a wide range of interests and supports fisheries management decisions of the South Atlantic, Gulf of Mexico, and Caribbean Fishery Management Councils as well as decisions regarding the U.S. Atlantic highly migratory species fisheries. In this regard, the CRP has perhaps the broadest range of interactions of any of the regional programs, particularly, considering the geographical scope of the program. This broad scope is also reflected in the range of research conducted under the CRP, which has included:

- development of gear modifications to reduce protected species interactions in the Atlantic pelagic longline fleet;
- evaluations of the effectiveness of bycatch reduction devices in shrimp trawls;
- shark biology and life history research;
- life history and distribution and movement studies of priority reef fish, snapper-grouper, billfish, tunas and other species in the region;
- on-board scientific observations of various fishing activities;
- feasibility studies for use of electronic logbooks in several fleets;
- evaluation of the efficacy of closed areas for improving stock status of fishery resources;
- cooperative fisheries statistics data collection mechanisms; and
- collection of socioeconomic information to evaluate the impacts of various regional fishery management options.

### **Impacts of Cooperative Research on Science and Management in the Southeast Region**

Under the enhanced CRP, most high profile research has been on mitigating sea turtle bycatch in the U.S. Atlantic pelagic longline fisheries. Results of technologies developed under this program showed significant decreases in the bycatch of loggerhead and leatherback turtles. This encouraging performance of mitigation measures tested may be a viable solution to meet reduced bycatch requirements for longline operations not only

in the Southeast, but in other regions and oceans as well. Similar cooperative research investigations have been implemented in the Pacific longline fishery off Hawaii. No less significant, however, has been enhanced life history investigations for several reef fish species (*e.g.* red snapper, amberjack, red grouper) with results now being incorporated into stock evaluation analyses in the Gulf of Mexico and the South Atlantic. These studies have, and will continue to provide, a more precise basis for evaluating stock productivity and potentials than previously available. As the CRP is relatively young, relatively few of the initial projects have run to completion.

### **Future Needs for Cooperative Research in the Southeast Region**

Current demand for CRP resources exceeds available funding. For this reason, refinement of research priorities will remain an important component of the overall program. While program evaluation is an ongoing process, the next major re-examination of research priorities will take place in 2006. The future direction of CRP activities in the South Atlantic and Gulf of Mexico will likely continue to revolve around research priorities identified by the Councils and industry with emphasis directed towards the collection of relative abundance patterns, catch, effort, size frequency, bycatch, and socioeconomic information in recreational and commercial fisheries. In the Caribbean, priority will likely be given to enhancing fisheries data collection mechanisms, to assessing optimal designs for Marine Protected Areas (MPAs), investigating the effects on recruitment related to MPAs, addressing protected resources issues, and habitat research including the impacts on coral reefs from fishing activity.

### **Southwest Region - Current Program**

Cooperative research efforts in the Southwest involve commercial and recreational partners and address high priority issues for species managed by the Pacific Fisheries Management Council (PFMC). Current research focuses on groundfish, coastal pelagic species and highly migratory species. The PFMC faces several cases of stocks falling in the “data-poor” category. Monitoring the status recovery of these stocks is often problematic because conventional sampling methods (trawling, hook and line surveys, etc.) are either not effective on hard bottom or further deplete overfished stocks. In cooperation with the Commercial Passenger Fishing Vessel fleet, new technology using acoustics and a remotely operated vehicle (ROV) is being developed to survey demersal fishes associated with hard bottom and to establish baseline biomass data, which will allow the NOAA Fisheries Service and PFMC to monitor the status and in some cases the recovery of over-exploited stocks.

In 2001, a project was initiated with the American Fishermen’s Research Foundation (AFRF) to determine movement patterns and life history strategies of North Pacific albacore (*Thunnus alalunga*). Albacore are targeted by various fisheries of the North Pacific Ocean in any given year, including fleets from the United States, Japan, Taiwan, and Canada. This project is supported in part through funding provided by the AFRF, which serves as a research-based non-profit organization spearheaded by the troll fishery and canning industries of the United States.

## **Impacts of Cooperative Research on Science and Management in the Southwest Region**

Archival tagging of North Pacific albacore has provided information on migratory behavior and distribution. This long-term study involved the deployment of 500 archival tags in albacore over the period 2001-05. To date, 277 archival tags have been deployed and 16 have been recovered. These returns represent the only recoveries of archival tags for this species in the eastern Pacific (Japanese scientists recently recaptured a fish in the western Pacific that was at liberty for nearly a year). Archival tag data are integral to providing information on migratory behavior and distribution and will be critical to developing stock assessments. The project is now tagging at higher rates in order to derive sufficient recoveries to characterize the migration rate of the population as a whole.

## **Future Needs for Cooperative Research in the Southwest Region**

Of the 80 species managed under the groundfish fishery management plan (FMP), fewer than 20 have sufficient data to allow determination of the stock status relative to stock size and harvest rate. Addressing this assessment gap and increasing our knowledge of habitat use by groundfish populations are central goals of the region's stock assessment program. Cooperative research is an integral component of this effort. Other priorities include the establishment of a nearshore species survey, research on coastal pelagic species (e.g., market squid), and projects addressing gear interaction with protected species. Further development of acoustic/ROV survey methodology is another key focus because of the increasing use of MPAs as a management tool and because some habitats cannot be sampled well with traditional methods. Locally, this research will enable monitoring of the recovery of fish stocks in the Cowcod Conservation Area in Southern California. Nationally, the use of acoustic remote-sensing tools in combination with ROVs can overcome problems faced by traditional survey methods over hard bottom.

## **Northwest Region - Current Program**

The Northwest Fisheries Science Center has conducted multiple surveys using chartered vessels to monitor groundfish populations. With the establishment of the West Coast Groundfish Cooperative Research Program in 2001, industry participation has been greatly expanded. The program's primary partners are Oregon Sea Grant and the Pacific States Marine Fisheries Commission. This multi-faceted program is designed to provide opportunities through annual solicitations (RFPs) to the fishing community to work with scientists in all facets of research. Innovative approaches to cooperative research in the Northwest include the recently initiated Port Liaison program, where industry leaders take part in matching individual fishermen with researchers (academic, state or Federal) to advise and assist in groundfish research along the West Coast. This assistance can range from review of proposals to the collection of samples.



## **Impacts of Cooperative Research on Science and Management in the Northwest Region**

Cooperative groundfish bottom trawl surveys on the continental slope have provided invaluable fishery-independent information for several West Coast species including dover sole, thornyheads, and sablefish. As the primary source of data for stock assessment models, this information has been critical in developing scientific advice for setting catch limits for these species. Additionally, industry is now partnering with Federal scientists to develop new surveys for overfished widow and canary rockfish. The industry is involved in all phases of these new surveys from planning, through design and execution.

### **Future Needs for Cooperative Research in the Northwest Region**

For the Northwest, future cooperative research needs will continue to focus on the expansion of groundfish surveys both in number and geographic scope. Cooperative research efforts aimed at developing new technologies to assess life histories for overfished species, improved bycatch reduction methods, finer assessment of fishing impacts on habitat, and more robust recreational data collection methods are other major needs.

### **Alaska Region - Current Program**

The Alaska Fisheries Science Center (AFSC) has a long history of cooperation with various groups in the Alaska fishing industry to carry out a broad range of studies. These studies have focused on improving quantitative assessments of crab and groundfish stocks, reducing bycatch in trawl fisheries, reducing the incidental take of marine birds, improving the assessment data base for sablefish and rockfish, and evaluating the effects of mobile fishing gear on bottom habitat. Industry involvement has been at various levels depending on the project. In some cases, industry participants have been involved in identifying the problem and objectives of the study. For those projects that require vessel time, industry involvement has been limited in some cases to the operation of the fishing vessel chartered to conduct the research. Recently, AFSC scientists have been able to establish two formal partnerships with non-profit research foundations set up by industry groups. These partnerships involve the industry participants at all levels of the process from planning, execution, analysis and reporting.

### **Impacts of Cooperative Research on Science and Management in the Alaska Region**

The ongoing effort with Alaska's trawl fisheries and the North Pacific Fishery Management Council to address the halibut bycatch in the various groundfish fisheries is an example of the impact of cooperative research on fisheries conservation in the Alaska region. Since 2002, this cooperative research partnership has also focused on factors affecting bycatch of chinook and chum salmon in the walleye pollock mid-water trawl fishery. By understanding the avoidance behavior of salmon using underwater video and

acoustic cameras, this partnership set out to design and test the effectiveness of various salmon excluder devices to reduce salmon bycatch without significantly lowering catch rates of pollock. Current excluder device designs have achieved a 40% reduction in chinook salmon bycatch, while only lowering the pollock catch rate by 2%. The goal of this ongoing research is to achieve a 60–80% reduction of salmon bycatch, while keeping pollock losses to less than 5%.

Development and deployment of the salmon excluder device along with a voluntary rolling “hotspot” (VRHS) closure system is expected to result in a significant reduction in the chinook salmon bycatch. Such a technological fix may obviate the need for existing savings area closures. This change in management would decrease the operational costs currently imposed under the existing regulatory regime on the pollock fleet and processors, while still meeting the Council’s intent to minimize the impacts to salmon in the Eastern Bering Sea.

### **Future Needs for Cooperative Research in the Alaska Region**

In Alaska, the NOAA Fisheries Service’s goal is to establish multi-year projects with fishing groups representing most of the major gear/fishery components of the Gulf of Alaska and Bering Sea crab and groundfish fisheries. These projects will be implemented through the formation of additional non-profit foundations via NOAA Cooperative Agreements or Joint Project Agreements. In this way, industry and agency scientists can further pool their resources to conduct research projects as part of a long-range research plan. Plan development would be a cooperative process. A range of projects including conducting species-specific resource surveys, collecting biological data to improve population parameter estimates for stock assessment modeling, collecting fishery data through electronic logbooks and observer programs, improving bycatch reduction technology and methods, evaluating the effects of fishing on essential fish habitat, and quantifying essential fish habitat would be some likely candidates under the plan.

### **Pacific Islands Region - Current Program**

Programmatic funding from the NCRP for this region is currently used to support the Northwestern Hawaiian Islands (NWHI) lobster tagging project. This is an ongoing cooperative research project that uses chartered commercial fishing vessels as scientific platforms for the tagging and release 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) provide requisite data to advance spatially explicit population dynamics model development; (3) document habitat degradation and associated bycatch (vertebrates and invertebrates) stemming from lobster fishing in the NWHI; and (4) supply marine vertebrate and invertebrate samples to elucidate trophic linkages and ecological dependencies. 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 life history and abundance estimation (as well as samples for tagging).

### **Impacts of Cooperative Research on Science and Management in the Pacific Islands Region**

The lobster tagging program has provided data to re-estimate life history parameters including natural mortality, growth, and movement. Previous estimates were dated. The program's analysis of growth parameters indicated a significant decrease over time at certain locations. These differences in time and space are necessary elements of an effective management program, especially when spatial management is required. Acquisition of tagging data has also allowed advancement of population model development resulting in more robust stock assessments. An integrated assessment model has been developed that specifically allows for the incorporation of tagging data, and this has resulted in less uncertainty when assessing stock status.

The cooperative lobster tagging project has used a bottom release device to safely return tagged lobsters to their benthic habitat and avoid incidental predation. Initially, fishermen indicated that they would be opposed to the use of this device in commercial operations for fear of a slow-down in normal operations and a concern that the benefits of its use were unsubstantiated. However, through first-hand experience (observed via video), fishermen now openly endorse the use of this device and may incorporate this device into their operations—should the fishery re-open.

### **Future Needs for Cooperative Research in the Pacific Islands Region**

In the Pacific Islands, the future direction for cooperative research will be to establish a cooperative deep-slope resource survey to cover the entire Hawaiian archipelago. This survey will collect abundance and biological data—primarily on crustaceans and bottomfish, as well as ecological and habitat data throughout the archipelago. Data deficiencies exist for many insular species listed in the FMPs, resulting in stock status determinations with large uncertainties. A further expansion of this survey to include the Samoan and Mariana archipelagos, as well other Pacific remote island areas under the jurisdiction of Western Pacific Fishery Management Council is another long-term priority.

In summary, the NOAA Fisheries Service remains dedicated to ensuring that cooperative research is an integral part of a well-rounded marine science program. As we move into the era of ecosystem-based fisheries management, partnering with industry, academia, and non-profit organizations will become more important in securing the necessary support for the successful stewardship of living marine resources.