

FUNDED CINAR PROJECT ABSTRACTS
2009

Commercial Fishing Vessel Electronic Trip Reporting Pilot Study
Steve Eayrs
Gulf of Maine Research Institute

With the move to sector management in the Northeast Multispecies Fishery Management Plan (as reflected in Amendment 16 to the Plan), the need for catch data increases in both quality and timelines. This will result in new requirements for the timeliness of data flowing to NMFS's Northeast Regional Office (NERO) and Northeast Fisheries Science Center (NEFSC). At the same time, groundfish sectors are developing technical capabilities to electronically monitor their vessels' fishing activity and to track progress toward their annual catch entitlements (ACE).

The convergence of these two factors makes this a crucial time to test the feasibility of giving vessels the option to submit their vessel trip reports (VTRs) electronically rather than on paper. In addition to NMFS's Fisheries Logbook Data Recording Software (FLDRS) and web-portal data entry system, there are other commercial products available to vessel captains. As these systems develop, it is critical to ensure they are compatible with NMFS's regulatory reporting requirements. These are specific to the needs under sector development, but also to the general reporting system for vessels. Priority for this project will be those vessels that are anticipated to join a sector. However, any system developed must be applicable to a broad range of fisheries throughout the northeast.

The primary goal of this pilot study is to collaborate with sectors and NMFS to test the feasibility of adopting electronic solutions for sector reporting requirements across a representative range of sector vessels in the northeast groundfish fleet. The pilot study will be designed to test the range of electronic logbook products and the NEFSC's webbased data entry to identify obstacles to their use by captains, and ensure their compatibility with NMFS's data collection systems.

Understanding Determinants of Success of New England Groundfish Sectors
Dan Holland
Gulf of Maine Research Institute

The New England groundfish fishery is undergoing a major transformation with the expansion of the “sector” allocations to 17 new sectors in addition to the two existing sectors. This new approach, which devolves substantial management responsibilities to groups of fishermen, represents a potential transformation in the relationship among fishermen as well as the relationship between fishermen and the management councils. Sector allocations are considered as a way to provide fishermen with greater control and flexibility in their fishing businesses and greater economic efficiency while simultaneously ensuring sustainable management of groundfish stocks through strict limits on catch and improved monitoring.

The success of sectors is likely to depend largely on the attitudes and capabilities of the members that join them and skills and commitment of sector leaders. We hypothesize that their success will depend in part on the strength of the relationships between members including their degree of trust and collaboration. We expect that successful sectors will build norms and networks that enable collective action over time. Because sectors will be able to trade annual catch entitlement with other sectors to balance catches that exceed their initial allocation, we hypothesize that the connections and ability to cooperate with other sectors will also be important determinants of success. The value of these relationships is commonly referred to in social and economic literature as social capital.

There has been no evaluation of the social capital of existing Groundfish sectors or of the proposed sectors or other baseline information that may explain their future success or failure. We propose to design and implement a survey that will collect the baseline information necessary to measure the social capital of existing sectors and of new sectors before they begin operation. We will also survey a sample of permit holders that have not joined sectors. In addition to information relevant to measuring social capital, we will collect baseline information that can be used to measure performance of groundfish sectors in terms of socio-cultural and safety outcomes. This information will complement other data on catches, revenues and costs regularly collected by the NOAA fisheries. We plan to follow this with one or more additional surveys after the sectors have been operating to determine the role social capital played in their success (or lack thereof) and how whether and how the social capital of the sectors has evolved over time. This proposal requests year 1 funding for this research initiative which will collect and analyze baseline data and develop testable hypotheses on determinants of success for groundfish sectors.

Funding Dockside Monitoring for New England Groundfish Sectors in FY 2010
Jonathan Labaree
Gulf of Maine Research Institute

In Amendment 16 to the Northeast Multispecies Fishery Management Plan, the New England Fishery Management Council laid the framework for shifting from effort controls to output controls in the groundfish fishery by greatly broadening the scope of sector management. In addition to paving the way for 17 new groundfish sectors (for a total of 19), the amendment institutes new provisions for their operation.

Among those provisions is a requirement for close monitoring of fishing activity. Managing groundfish stocks with output controls requires accounting accurately for fish that count against a sector's allocation – both landed and discarded fish. To that end, Amendment 16 stipulates that when sectors begin operating in May 2010, 50% of their landings will be monitored at the dock by a certified third-party. By 2012, sectors must also institute at-sea monitoring.

In an effort to smooth the transition to sector management and defray some of the initial costs that the industry will bear, GMRI requests funds to help approved groundfish sectors pay for dockside monitoring during fishing year 2010. An additional component to the grant request is to provide funds to assess the effectiveness and efficiency of dockside monitoring. If funding permits, GMRI seeks to offset costs for sectors developing at-sea monitoring in 2010 as well. GMRI will not provide monitoring services – it will be the sectors' responsibility to establish an acceptable monitoring program and negotiate contracts with third-party vendors. A final component of the request is for direct funding to sectors to cover other start-up costs to ensure sectors are fully operational by May 2010.

**MREP as a Catalyst for Cooperation: Improving Science, Management and Trust through
the Marine Resource Education Program for the Benefit of the Northeast Fisheries
Community**

Meredith Mendelson

Gulf of Maine Research Institute

The Gulf of Maine Research Institute (GMRI), in collaboration with fishing industry partner Mary Beth Tooley (O’Hara Corporation and Small Pelagics Group) and John Williamson (Sea Keeper Consulting), seeks funding for two education and outreach initiatives of the Marine Resource Education Program (MREP). While educational in nature, the Marine Resource Education Program model has demonstrated marked success as a mechanism to foster trust and improved communication between the Northeast regional office, Northeast Fisheries Science Center, and fishing industry members. Funding for MREP would enable this successful collaborative program, now in its eighth year, to continue delivery of professional development programs tailored specifically for fishermen and relevant stakeholder groups, with the existing curriculum (MREP 100) offered twice annually, and the development of an advanced (MREP 200) program for alumni of the existing program.

The Marine Resource Education Program provides opportunities for NOAA Fisheries to engage in productive and positive dialogue with marine stakeholders, building relationships based on mutual respect and understanding that deepen over time. MREP provides a mechanism for effective transfer of science and policy information to stakeholders, raising visibility of the Service’s work among key constituents.

The Department of Commerce Office of Inspector General, in its 2009 report to Senator Kennedy, noted that both researchers and industry members said the Marine Resource Education Program formed relationships that “provide a foundation that continually supports the ongoing interactions between NOAA and the industry during the fisheries management process” and that “[a]ccording to those with whom we spoke, these relationships help break down barriers and eliminate preconceptions that each party has of the other...if more industry members participated in such forums, confidence in fisheries science, understanding of management processes, and relationships with NOAA could improve.”

This initiative is also in keeping with the Memorandum of Understanding signed between GMRI and the Northeast Fisheries Science Center (NEFSC) in June 2004 – to develop joint research, education, training, and extension programs to support the critical fishery research and management needs of the Northeast region and U.S. East Coast – and is aimed at achieving the NOAA Mission Goal to “protect, restore and manage the use of coastal and ocean resources through ecosystem-based management” by helping to create a “well-informed public that acts as a steward of coastal and marine ecosystems.” While educational in nature, the program fosters trust and improved communication between the Northeast regional office, Northeast Fisheries Science Center, and fishing industry members.

Student Fellowship: Habitat Use and Dietary Patterns of Diadromous Fishes in the Northwest Atlantic: Making the Connections Between River Restoration and Sustainability of Federally-Managed Fisheries

Thomas J. Miller

**University of Maryland Center for Environmental Sciences
Chesapeake Biological Laboratory**

We seek support for a graduate student to participate in research on the role of diadromous fishes in the north Atlantic coastal fishery ecosystem. The student will receive technical training as part of an MS degree from the University of Maryland in Fisheries. The student will also conduct research on three specific tasks:

Task 1: conduct a literature review with associated statistical analyses to identify the roles that diadromous fishes play in coastal marine ecosystems. The review will focus on the North Atlantic, but will take a global view.

Task 2: Using the Food Habits Data Base (FHDB) developed by the Northeast Fisheries Science Center, we will quantify the trophic demand of diadromous fishes in the Northwest Atlantic Costal Shelf Ecosystem. These analyses will identify the species that individual diadromous fish consume during marine residency, and estimate the biomass and energy represented in the documented consumption patterns.

Task 3: Using the Food Habitat Data Base (FHDB) developed by the Northeast Fisheries Science Center, we will quantify the patterns of consumption of diadromous fishes in the Northwest Atlantic Coastal Shelf Ecosystem by their predators. These analyses will identify the species of individual diadromous fish that are vulnerable to predation during marine residency, and estimate the biomass and energy represented in the documented consumption patterns.

**Acquisition of a pressure housing and array of reaction chambers (pucks) for the
Environmental Sampling Processor (ESP)**
Donald M. Anderson
Woods Hole Oceanographic Institution

The ESP is an electromechanical/fluidic system that collects discrete water samples from the ocean subsurface, concentrates microorganisms (particulates), and automates application of ribosomal RNA (rRNA)-targeted DNA probe arrays that detect harmful algal bloom (HAB) species in near real-time. The ESP also archives samples for nucleic acid analyses, microscopy, and other procedures after the instrument is recovered from deployment. The ESP employs “pucks” for sample collection and processing protocols. Pucks are custom-designed reaction chambers that support a wide variety of filters or chemically adsorptive media depending on protocol requirements. Pucks are stored in a rotating carousel and are manipulated to processing station positions by elevator and shuttle mechanisms. The same mechanisms also move pucks to an imaging station where a CCD camera records results of DNA probe arrays.

WHOI will acquire a pressure housing for a core Environmental Sample Processor. The housing will be compatible with the EPA/ AED ESP and will be co-deployed in support of HAB monitoring and research in the NERACOOS. WHOI will also acquire 120 reaction pucks that are needed to operate the ESP for extended deployments, and that are also compatible with the EPA/AED ESP. WHOI will retain ownership of the housing and its associated components, as well as the pucks. The parts to be acquired by WHOI are necessary to allow the ESP to be operable in submerged marine deployments and to integrate it within the NERACOOS testing, mooring, and data stream infrastructure.

HabCam Data processing for Leg 3 of the 2009 Scallop Survey

Scott M. Gallagher and Amber York

Woods Hole Oceanographic Institution

Richard Taylor Arnie's Fisheries, Inc.

This proposal is to support image processing, scallop and ground fish identification and enumeration, and comparison of HabCam data with that obtained by standard dredge tows during Leg 3 of the 2009 NMFS scallop survey. The HabCam imaging system was installed on the R/V Hugh R. Sharp for Leg 3 of the survey to conduct joint tows for the purpose of addressing dredge efficiency, logistical difficulties related to operation of an optical survey tool under full survey conditions, and to evaluate the abilities for HabCam to survey groundfish, particularly yellow tail flounder. HabCam surveyed 23 standard stations in parallel with the Sharp and collected a total of 485,451 images with a footprint of about 1 m² each. By area, 85,572 images were collected in Closed Area I, 216,809 images in Closed Area II, 183,070 on the Canadian side of the Northeast Peak of Georges Bank, and 302,381 images between stations. The objectives of this proposal are to: 1) Process all images from HS_20090623 for color correction, light field correction, and conversion to jpeg. 2) Manually count and size images along each track for scallops, all fish, and substrate characterization. 3) Plot ship tracks, images and data products in Google Earth for ease of visualization. 4) Establish a training set of images manually processed for use with an automated target classifier and compare results with manual classification. 5) Compare results from HabCam with those of the dredge survey to obtain a dredge efficiency for both scallops and yellow tail flounder, where possible.

Health Implications of Entanglements of Large Whales
Michael Moore
Woods Hole Oceanographic Institution

The goal of this project will be to evaluate photographic, necropsy and other data obtained from North Atlantic large whales observed entangled in fishing gear over the past two decades to determine the potential short- and long-term health effects of these entanglements. Entanglement in fishing gear is a source of injury and mortality to large whales, but the magnitude of lethal and sub-lethal events is not well-understood. The Provincetown Center for Coastal Studies (PCCS) will use mark-recapture statistical modeling and other approaches to estimate entanglement survival and fecundity impacts on Gulf of Maine humpback whales. It will also collaborate with New England Aquarium (NEAq) to produce comparable estimates for North Atlantic right whales. Entanglement survival and fecundity will be estimated relative to unexposed animals from the same population and will evaluate factors such as animal age class, sex and entanglement severity. In addition the Woods Hole Oceanographic Institution will undertake an analysis of necropsy reports of large whales that have been examined and shown to have died from entanglement in the past two decades. The product of the study will be three papers published in the peer reviewed literature, reflecting analyses of the right whale, and humpback whale mark-recapture and fecundity studies, and the necropsy analyses. The first two papers are described in the sub contract proposals from PCCS and NEAq respectively. The third paper is outlined below.

**Image Analyses Tools for Quantitative Mensuration and Classification of High
Resolution Optical Imagery**
Hanumant Singh
Woods Hole Oceanographic Institution

As part of the ongoing collaboration between the Woods Hole Oceanographic Institution and the PIFSC and the NWFSC we have developed an AUV for conducting high resolution optical imaging surveys. This platform is now routinely collecting thousands of images per dive. This proposal is a first attempt to standardize and develop the tools required to deal with such datasets within the constraints and requirements of the end users. This effort is aimed at building up a set of common tools to aid the end users in their analysis. We will aim to provide a web-based system that runs on the Linux and Windows operating platforms that provides a mechanism for users to examine, annotate, and make measurements of a series of images. To the extent possible, we will seek to automate some of these processes (such as the classification of habitat in particular imagery) but with the overall philosophy that the end user can either accept, correct, or override the results of the automated processes.

Development of Automated Tools for Underwater Photographic Analysis
Hanumant Singh
Woods Hole Oceanographic Institution

As part of the ongoing collaboration between the Woods Hole Oceanographic Institution and the PIFSC and the NWFSC we have developed an AUV for conducting high resolution optical imaging surveys. This platform is now routinely collecting thousands of images per dive. This proposal is a first attempt to standardize and develop the tools required to deal with such datasets within the constraints and requirements of the end users. The emphasis for this particular project will be on basic research in the area of automated analysis and classification. Within the context of the standard tools already in development, this project will focus on the use of principal component analysis and the Fisher linear discriminant for automatically extracting and classifying organisms of interest within the AUV imagery. In addition it will investigate the use of Varma-Zisserman method for background habitat classification.