



## New England Fishery Management Council

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### **Draft Research Steering Committee Meeting Summary May 19-20, 2008 Dedham, MA**

The Research Steering Committee (RSC), chaired by New England Fishery Management Council (NEFMC) member David Goethel, met on May 19-20, 2008 at the Hilton Hotel in Dedham, MA. Other committee members in attendance were Dana Rice, fishermen Richard Taylor and Curt Rice, Gib Brogan of *Oceana*, as well as Michael Pol and Dr. Mike Armstrong of the MA Division of Marine Fisheries. National Marine Fisheries Service (NMFS) Cooperative Research Program (CRP) staffer Dr. Earl Meredith also participated along with New England Fishery Management Council (NEFMC) staff member Patricia Fiorelli.

Council Monkfish Plan Development Team (PDT) Chair Phil Haring, Habitat PDT Chair Chad Demarest and Habitat PDT members Dr. David Stevenson and Dr. Peter Auster also participated. The RSC thanks these individuals for their time and effort in assisting the committee with its management evaluation over of 16 projects over the course of the two-day meeting.

Audience members included Ryan Silva from NOAA Fisheries Regional Office, Cape Cod MA gear technologist Ron Smolowitz and Rachel Feeney from the Northeast Consortium. Principal Investigators (PIs) attending were Jim Manning from the Woods Hole Oceanographic Institution and Dan Salerno and Dr. Jonathan Grabowski, both from the Gulf of Maine Research Institute.

#### **Overview**

The following agenda items were addressed during the meeting:

- A very brief overview of the status of NCRPP funding for cooperative research
- Management review of sixteen CRP and Northeast Consortium final reports

#### **Update on CRP Activities**

Dr. Meredith briefed the committee on CRP activities providing an accounting of the various projects funded through the program, including the Council's three research set-aside programs. He reported that the program will not likely issue a request for proposals for short-term projects this year. Dr. Meredith provided details concerning funds allocated to various program elements and projects supported through the Cooperative Research Program, including staff dedicated to providing information in a usable format to GARM III. He also discussed issuance of a NOAA-wide Broad Agency Announcement (BAA) that provides a mechanism to fund innovative but unsolicited proposals that address the agency's core mission. It is not related to the traditional BAA/request for proposals that has been published by NMFS to fund short-term projects in the Northeast, but is a competition that is open to all who submit proposals for either small and large-scale projects.

## **Final Project Reviews**

The Research Steering Committee reviewed 16 final reports related to cooperative research. As outlined in the Council's Research Review Policy, the RSC is charged with reviewing final reports that are generated through cooperative and possibly other research activities in the Northeast Region and providing advice on whether results may be acceptable for consideration in the management process.

### **Monday, May 19, 2008**

**1.) *Field trials of 4" rings in the inshore scallop fishery of the GOM***; Dana Morse, ME Sea Grant with fishing partners Stephen Patryn and Robert Holland, both of Jonesboro, ME; funded by the Northeast Consortium for \$92,932. Two independent evaluations were conducted and provided by the Consortium.

#### **Description**

The project, conducted in eastern Maine coastal waters, evaluated the selectivity of 4-inch diameter rings used in a scallop drag, as compared to a drag rigged with the regulation-sized 3-1/2-inch rings. The objective was to examine the utility of larger rings with respect to a recent state regulation that increased the minimum landing size from a 3.75-inch to a 4-inch shell height. The fieldwork used side-by-side tows by two fishing vessels and a paired tow analysis. Experimental and control drags were switched between vessels each day. Data collection included catch volume of scallops and other species, scallop shell heights, location and bottom type. Ten fishing days were completed in eastern Maine, both inside and outside of Cobscook Bay.

#### **Results**

As the authors summarized, data from the study indicated that a switch to 4-inch rings would result in a loss of marketable size scallops. Similarly, there would be a reduction in the number of undersized scallops landed on deck. Given the scallop size ranges encountered during the study, however, it appeared that a greater impact on the scallop harvest would result because of the minimum shell height size. While the change in ring size resulted in a 3 and 12 percent loss of the legal sized scallops brought on board (relative to the minimum shell size), the shell size itself may reduce the legal-sized portion of the catch by as much as 25 percent, according to the PIs conclusions.

#### **RSC Discussion**

Members agreed with the technical reviewers regarding inconsistencies between the two scallop dredges designed for the experiment. Statistical assumptions also may not have been completely thorough, but the committee felt the objectives of the project were nonetheless accomplished. Overall, the committee determined this work is good first step toward assisting the industry in accepting the use of 4-inch rings. Note, this project was conducted in Maine state waters and is of limited utility to the management of scallops in federal waters because of the differences in management requirements, although some information may be useful to the Scallop PDT .

**2.) *Identification of life history parameters for two exploited skate species (thorny and smooth) in the Gulf of Maine: Strategies for fisheries management***; Dr. Paul Tsang UNH; Dr. James Sulikowski, University of NE and fishing partner Joe Jurek; funded by the Northeast Consortium for \$200,000. Three evaluations were provided by the NEC.

## **Description**

The primary objective of the proposed study was to foster a partnership between commercial fishermen and research scientists in order to quantify the life history parameters essential to the development of a fisheries management plan for the thorny skate, *Amblyraja radiata*, and smooth skate, *Malacoraja senta*, in the Gulf of Maine.

## **Results**

For the thorny skate, the PIs found that this species grows slowly ( $k=0.11$  for males, and  $k=0.13$  for females), is long lived (16+ years for both males and females), reaches sexual maturity at a late age and size (50% maturity occurs at a total length of 860 mm and near 11 years of age for males and a total length of 875mm and around 11 years of age in females) and is reproductively active all year round. While the data for smooth skate is still being analyzed, results suggest that, like the thorny skate, this species reproduces continuously throughout the year.

## **RSC Discussion**

The committee concurred with the technical reviews, including the relatively small items identified in the reviews, and noted that nearly all the information collected has been included in seven peer reviewed papers, two of which are appended to the report. The others are in press. All reviewers noted the same problem, that the planned genetic work was not completed as discussed in the project proposal, basically because of lack of time and funds. Other project objectives were met and the project was considered highly useful and relevant to the management process. The RSC directed the report and attached publications to the Skate Committee and its PDT.

**3.) Comparison of catch and bycatch with beam and otter trawls in the Northeast shrimp fishery;** Capt. Bill Lee, and Allan Michael and Melissa Hall of ADM Associates; funded by the Northeast Consortium for \$24,950. Two technical evaluations were forwarded by the NEC.

## **Description**

The PIs investigated the applicability of using a beam trawl in the Gulf of Maine shrimp fishery to determine catch and bycatch rates relative to a standard otter trawl. The work was conducted as an NEC-funded demonstration project.

## **Results**

Although valued for contributions to conservation engineering (what works, as well as what does not), the PIs concluded that in this application the beam trawl neither enhanced the harvest of Northern shrimp nor decreased groundfish bycatch in the fishery when compared to otter trawls.

## **RSC Discussion**

The Consortium's reviews were mixed. RSC members agreed with NEC comments that analyses were not thorough, adding that a careful description of methods should be a minimum requirement of funded research projects. Nonetheless, useful information was noted concerning variable bycatch rates between vessels. (As a project participant, Chairman David Goethel did not comment except to clarify that bycatch variability was related to area fished.)

Others noted that a body of literature is already available on this issue; consequently the experiment was somewhat redundant. The RSC agreed with the reviewers, that no further resources should be allocated to the use of this gear type in the shrimp fishery, although they agreed to pass the work on to the Groundfish PDT for reference.

**4.) Comparison of catch and bycatch with the addition of escape holes to otter trawl nets in the Northeast shrimp fishery;** Capt. Bill Lee; and Allan Michael and Melissa Hall of ADM Associates; funded by the Northeast Consortium for \$22,800. The NEC provided two technical evaluations.

#### **Description**

This small-scale project investigated the performance of a shrimp net with small escape holes installed just in front of the Nordmore grate net. The purpose of the gear modification was to determine catch and bycatch rates relative to a standard otter trawl. Small escape holes made from cut pieces of 6-inch PVC pipe were sewn into the net in front of the Nordmore grate in a standard net used in the Northern shrimp fishery.

Preliminary tests had provided video of fish escaping through these holes during active trawling, although these were not available at the time of the RSC's management review. A series of tows, with and without the holes in the nets were made from two vessels. Seven other participating boats from Rockport, Massachusetts and Hampton, New Hampshire towed standard gear at the same time and in the same general area. Catch and bycatch were weighed and identified to provide a direct quantitative comparison of the percentage bycatch with and without the escape holes.

#### **Results**

The study did not accomplish the objective of determining the percent of bycatch reduction achieved by the use of the rings as an escape mechanism.

#### **RSC Discussion**

As a demonstration project, this work also received limited funding and perhaps accordingly, PIs provided limited detailed information about methods to the extent that replication of the work would not be possible. The project did not yield useful results to a standard that would support management decision-making concerning bycatch reduction, particularly of small pelagics. The committee further agreed that the project did not point to further research in this area at this time, although as above, they agreed to pass the work on to the Groundfish PDT for reference.

**5.) The inshore Gulf of Maine survey of Atlantic herring sentinel spawning grounds;** Gulf of Maine Research Institute, Dr. John Annala, Daniel Salerno, Shale Rosen, Dr. Matt Cieri and fishing partners Mark Bichrest, Lendell Alexander and Alden Leeman, all of Harpswell, ME; funded by the Northeast Consortium for \$192,919. Three evaluations and a response from the PI were provided by the Consortium.

#### **Description**

The Gulf of Maine Research Institute conducted an acoustic survey to monitor the location, timing and biomass levels of pre-spawning and spawning aggregations of Atlantic herring on Jeffreys Ledge and the associated nearshore area. Seven systematic parallel transect surveys were conducted

between late August and early November 2006. Acoustic data was collected using a FEMTO Electronics Limited DE9320 Digital Echosounder interfaced with a 75 kHz hull mounted transducer. Fish aggregations were sampled with a midwater trawl net to confirm species identification and to collect biological samples.

## **Results**

Herring were seen in all portions of the study area during most of the survey except on the northern portion of Jeffreys Ledge where no fish were encountered. Total biomass levels remained relatively low (8974 – 33,095 mt) from August through the end of October but increased three fold (99,488 mt) in early November. Pre-spawning biomass was highest in late August and early September and then dropped to nothing at the end of October. Spawning herring were first encountered in mid-September. Spawning biomass peaked in mid-October and dropped dramatically through early November. This survey was able to capture the complete spawning event. However, the low biomass levels encountered indicate that the area surveyed was not a key area for Atlantic herring spawning in 2006.

## **RSC Discussion**

The committee agreed with the technical reviews on the general quality of the experiment, which was very good, but also agreed with reviewer comments regarding concerns about the calibration. More detailed information on this issue was provided in the PIs response to the reviewers, which RSC members agreed was very helpful. Survey coverage was considered good, as well as the trawl verification for purposes of ground-truthing.

RSC members also agreed with the critique of the single beam 75kHz transducer vs, a 38kHz system, an outcome of budget constraints, according to the PI's letter. Limits on the areas surveyed speak to the possibility of an overly ambitious project, for example, surveying the Downeast and mid-coast regions would have been helpful, according to committee members. Overall, the committee agreed the project was worthwhile, certainly worthy of future funding and agreed to forward the report to the Herring Committee and its Plan Development Team.

***6. Define monkfish trawl gear and areas that reduce groundfish bycatch and to minimize the impacts of monkfish trawl gear on groundfish habitat;*** the Groundfish Group, Associated Fisheries of Maine and Manomet Center for Conservation Sciences; funded by the NOAA/NMFS's Cooperative Research Program for \$374,409. Several technical comments were provided in the cover letter from NMFS to the PIs, but refer to an earlier version of the final report. No technical review accompanied the version received by the RSC.

## **Description**

The goal of this project was to collect observer-based data for use by the NEFMC and NMFS to determine whether seasonal access to a specific area in the monkfish Northern Fishery Management Area, as defined in the Monkfish Fishery Management Plan, can be allowed using trawl gear designed to minimize the bycatch of groundfish and small monkfish, and to minimize the impact of monkfish trawl gear on groundfish habitat.

## **Results**

The PIs reported that the large mesh trawl tested minimized bycatch of undersized monkfish and non-target species, although overall while discarding less monkfish, it also caught less monkfish than the control gear.

The study did not seek to quantify the degree of, or difference in habitat impacts by the control and experimental nets. Accordingly, the PIs did not make statements regarding whether habitat is

impacted to a greater or lesser extent by either net. They did note, however, that the experimental net is lighter than standard gear and, and that intuitively it may reduce bottom impacts.

### **RSC Discussion**

As background, the project was proposed during a period when the Council was considering separating monkfish days-at-sea and multispecies days-at-sea usage requirements --- a management measure that was considered but not adopted during Monkfish Plan Amendment 2 deliberations.

Therefore, the context under which this project was undertaken has changed, raising questions about its relevance to management in the near future, and whether it is necessary at this time to pursue additional work in this direction. The committee agreed it is too early to predict future changes in management philosophy for monkfish as well as the evolution of sector management in groundfish and the need or use of an "exempted fishery", as exists currently for monkfish gillnet gear.

While the net that was used appears on the surface to have reduced some incidental catch of fish other than monkfish (without a reviewed statistical analysis), it also let pass what seems to be a significant portion of legal-sized monkfish. This raises questions about how industry would respond to a requirement to use the net, especially in a high fuel price environment where the gear could be viewed as inefficient.

There was no technical review which would have evaluated the statistical rigor of the project and perhaps point to appropriate follow-on work. This, along with other management developments (sectors, for example) as well as a lack of sufficient data and information on which to base a management decision concerning either the gear's effectiveness or the potential for an exempted monkfish trawl fishery (based on time/area) prompted the RSC to agree that further work on this concept is not warranted. The final report will be on file at the Council office and accessible to its technical teams.

**7. A fishermen-led fishing gear workshop for non-fishermen;** Dr. Ken Lavalley with fishing partners David Goethel, Joe Jurek and Tom Lyons; funded by NOAA/NMFS Cooperative Research Program for \$27,724. A technical review was not provided although as an outreach and training program, participant evaluations were provided as part of the final report.

### **Description**

Designed for professionals associated with the legal, administrative, regulatory, and management aspects of fisheries in New England but who are unfamiliar with fishing operations, the program was conducted off of the coast of New Hampshire and at the Urban Forestry Center, in Portsmouth, NH. Two commercial trawlers and two commercial gill net vessels owned and operated by industry instructors were used as at-sea demonstration platforms of fishing gear operations. The Urban Forestry Center was used for fishing gear design and operation theory and hands-on net mending and gear demonstrations.

### **Results**

Post-workshop evaluations indicated that the overall rating of the workshop was "very good". Ninety-percent (90%) of participants reported an extensive increase in their knowledge of fishing gear components and operations following the workshop. The average increase in knowledge was 4.14 on a five point scale with (1) being no increase and (5) an

extensive increase. All participants reported that they would recommend this workshop to their colleagues.

### **RSC Discussion**

All members of the RSC agreed that this project, as a spin-off of the Marine Education Program, is an extremely worthwhile exercise for any Council, federal and state, congressional, environmental advocacy or other professional that addresses fisheries but has only a superficial understanding of how a fishing vessel operates as well as gear deployment. The committee supported its continuation, pending the availability of funds.

### **Tuesday, May 20, 2008**

**1. *The trophic ecology of Atlantic cod: Insights from tri-monthly, localized scales of sampling;*** Chatham fishing partner Theodore J. Ligenza, and Brian E. Smith, Frank P. Almeida and Jason S. Link of the Northeast Fisheries Science Center; funded by the Northeast Consortium for \$201,785. Two evaluations were provided by the Consortium as well as the PIs response to the reviews. The resulting publication in the *Journal of Fish Biology* is also included in the report package on file at the Council office.

### **Description**

This project received funding in 2001 and 2002 to examine the small-scale variation of Atlantic cod feeding based upon tri-monthly stomach sample collections from a nearshore, localized region off Cape Cod, Massachusetts. Results were obtained by examining stomachs from different size classes and maturity stages of Atlantic cod approximately three times per month for nearly three years off Chatham, MA to determine if patterns exist in diet composition and amount of food consumed by cod. Objectives were: 1) to relate any change in cod diet and amount of food eaten to changes in temperature, spawning, prey abundance, and major weather events, filling the "information gap" between broad-scale and lab studies; and 2) to work cooperatively with the fishing industry to transform previously "anecdotal" information into quantitative data available for fisheries science and management.

### **Results**

As described by the authors, final results suggest that the amount of food eaten by cod is generally stable throughout the year, except when pelagic forage fish migrate through the area. This corresponds to critical periods in the life history of cod. The temporal variation in diet composition remained consistent each year over the 28-months of the project, suggesting important feeding periods for cod which correspond to environmental and biological queues. Diet is comprised primarily of several species of forage fish (e.g., Atlantic herring (*Clupea harengus*), sand lance (*Ammodytes sp.*), and Atlantic mackerel (*Scomber scombrus*)), ophiuroids, *Cancer* crabs, and other small crustaceans. The authors state results confirm the preference cod exhibit for prey such as herring, sand lance, and crabs. From this they infer that cod generally eat local forage fish and benthic macro-invertebrates and then supplement their diet by gorge feeding upon migrating pelagic species.

### **RSC Discussion**

The RSC agreed with the technical evaluations, that the report was excellent, critiquing only the utility of the data format which is used by the NEFSC (it was provided in an Access database --- a spreadsheet format might be more useful). The RSC felt the report contributes to a better

understanding of predator/prey interactions, possibly leading to better management of primary prey species from an ecosystem perspective. The report will be made available to the Council's technical teams, including the Groundfish, Herring and Habitat PDTs.

**2. Pilot project to assess need and initialize a methodology to ground truth existing multibeam and sidescan sonar seafloor charts;** MA Division of Marine Fisheries, Dr. Kathryn Ford; funded by the Northeast Consortium for \$24,988. Two technical evaluations were provided by the NEC.

### **Description**

Because research conducted by the Massachusetts Division of Marine Fisheries in 2005 and 2006 identified cod repeatedly in several specific locations, information corroborated by local commercial fishermen, the author undertook this work to determine if habitat characteristics were correlated to the site fidelity of cod.

Using USGS multibeam datasets from the area and empirical information offered by commercial fishermen, sites with very similar habitats as measured by aspect, depth, and backscatter value but with contrasting cod site fidelity, were identified. At these sites, correlations between cod presence and absence and seafloor characteristics (grain size, organic carbon content, and macrofauna) were analyzed using grab samples and still photos collected in June, 2006 aboard the F/V Venture. The overriding objective was to examine if the seafloor characteristics at sites with cod were different than those at sites without cod.

### **Results**

According to the authors, cod were found at sites with significantly different habitats across the MA Bay Cod Conservation Zone, but no seafloor features measured could be correlated to the presence or absence of cod.

### **RSC Discussion**

Because the use of presence/absence data is not a good indicator of habitat value, according to RSC reviewers and as supported by published literature, the project hypothesis and implementation of this project were considered to be flawed. In general, committee members agreed with the more critical evaluation provided by the NEC --- the hypothesis and design were problematic and the data as presented did not allow for an evaluation of the methodology to groundtruth multibeam imaging.

Noting a disconnect between the project title and work undertaken, committee members also acknowledged they could be missing an additional project report that was referenced by a reviewer. They encouraged appropriate modifications to the experiment and suggested the PI could provide the data and provide insights into the hydroacoustic survey, information that could inform future work. The report will be on file at the Council office.

### **3.) Reducing seabed contact of trawling: A semi-pelagic trawl for the GOM shrimp fishery;**

University of NH, Pingguo He and Rachel Hamilton in partnership with commercial fishermen George Littlefield of Kensington, New Hampshire, Bart McNeel of Westbrook, Main, and Richard Syphers of Hampton, New Hampshire; funded by the Northeast Consortium for a total of \$131,004. The report package includes three evaluation reports and a response to the reviews from the PI.

## **Description**

The objective of the project was to investigate the feasibility of seabed-friendly harvesting technologies for the Gulf of Maine. It focused on the modification of traditional bottom trawls used in the region, to make them more environmentally friendly, while at the same time attempting to maintain commercial catch rates.

## **Results**

While the fishing system showed good technological promise, it was found to be dynamic and difficult to control with the type of vessels used in the Gulf of Maine. In his final summary, the principal investigator chose not to recommend the technology for use in the Gulf of Maine shrimp fishery.

## **RSC Discussion**

Despite the project objective -- to reduce habitat impacts by using a pair of pelagic doors operating off the seabed while keeping the ground gear on the seabed --- the RSC felt that many of the attributes of the gear were not evaluated, use of the tank model was not optimized and no analysis of bycatch was provided. Despite these comments, the committee agreed the overall work was fairly well-done and the gear accomplished what it was designed to do from a feasibility perspective. Members also commented that no quantitative approach to evaluating seabed floor contact was included in the report.

The PI determined that application of the technology in the Gulf of Maine did not sufficiently overcome operational hurdles associated with the prosecution of the fishery in the Northeast and did not recommend further work in this direction, illustrating the trade-offs between habitat conservation and fishery considerations. The report package will be on file at the Council office for use by its technical teams.

**4. *eMolt – Environmental Monitors on Lobster Traps***; Northeast Fisheries Science Center, James Manning, project leader; funded by the Northeast Consortium over a six-year period for \$532,075. The final report package included two technical evaluations.

To complement the implementation of a coast-wide ocean observing system, the eMOLT program provides an example of how local fishermen can help, according to the PIs. Beginning in the spring of 2001, sixty- five New England lobstermen have now deployed miniature temperature sensors on their traps at fixed locations and depths.

## **Results**

As described by the PI, nearly 2 million hourly records of bottom temperature (0.2 degrees C accuracy) have been recorded for a total of 245 sites ranging from the Grand Manan Channel to the Hudson Canyon in water depths of 1 to 300 meters. With the help of the lobstermen's associations (Downeast, Maine, Massachusetts, and Atlantic Offshore), data is downloaded every 6 to 12 months,

plotted, archived, and web-served. While efforts are now underway to develop and deploy a set of “real time” probes that will transmit up-to-date readings via satellite, it is expected that the less costly, internally-recording probes will be maintained for years to come.

Records thus far have documented a wide range of variability. The inter-annual signal can be several degrees in some locations and seasons. The spring of 2002, for example was significantly warmer at nearly all sites relative to other years. The seasonal cycles at each location can be drastically different. The fall overturn in Mass Bay, for example, occurs each year but the timing of this event can vary year-to-year from late August through early November. The tidal variation at many sites can be several degree C and, in a few cases, more than 10 degrees C such that the presence (or absence) of thermal fronts can be easily detected.

A few participants have submitted haul counts of lobster (*i.e.*, catch) along with their temperature records. These data provide an opportunity to correlate the two variables in some locations. While very little has been concluded as yet concerning lobster behavior in response to temperature change, some interesting hypotheses have been developed.

### **RSC Discussion**

A number of review participants agreed the collection of oceanographic data is of value to the extent that it may improve the ability of researchers to estimate parameters relevant to fishery management. In that regard, data are important but somewhat removed from immediate management needs. They commented, that given the NEFMC does not have management authority for the lobster fishery, this aspect of the project is not directly relevant to NEFMC management activities, further stating the collection of oceanographic data is of indirect value. The concept of utilizing lobsterman as collectors, to the extent that it can be generalized to all fisherman, is of value. Phase III, which offered no stated objectives, did yield important information that should be utilized in designing future user-reporting mechanisms for cooperative studies.

It was also acknowledged that a tremendous amount of work was expended on all phases of this project. While the direct applicability to NEFMC management activities is low, this was known prior to funding and should not reflect on the project. However, despite the vast amounts of data collected, it is difficult to discern what specifically may be learned. Specific lessons learned from the data collection and management activities could be better summarized. The oceanographic conditions data may be appropriate to validating externally developed oceanographic models, although it is noted that few if any models have attempted to predict conditions at the sea floor at the scales at which these data were collected.

Despite these somewhat critical comments, RSC members were enthusiastic about the work, agreed that it should continue over the long-term, and felt that such efforts, extended to other species and/or locations could be very useful in the future and also dovetails very well with other oceanographic monitoring efforts.

Exploring the possibilities of broadening the work and/or linking the data collected to other data sets were issues the committee members were very supportive of, agreeing this would expand the utility of the information to management. The committee also agreed that the project was extremely successful at demonstrating the utility of using fishermen as data collectors.

The appropriate end users are NOAA and other oceanographic scientists. While not explored in the reports or in either anonymous review, the lack of a formal sampling design would perhaps lend these data to validation of small scale oceanographic condition modeling. Caveats noted in the reports are, for the most part, sufficient for proper use of the collected data.

**5.) *An assessment of bottom habitat community recovery in the Western Gulf of Maine Closed Area***; University of Maine Darling Marine Center, Emily Knight and Les Watling, fisherman Cameron McLellan and Joseph T. Kelley; the Northeast Consortium funded the project for \$168,896. Three technical evaluations were provided with the final report.

### **Description**

The PIs state in their abstract that the Western Gulf of Maine Closure Area (WGOMC) encompasses two regions that, as of 2004, had been closed to groundfish trawling for 6 and 4 years, respectively. In this project, changes in benthic community composition following the cessation of trawling were investigated by comparing community states from sites in the 4 and 6 year regions of the WGOMC to sites in an actively trawled fishing ground known as the Kettle. The epifaunal and infaunal components of benthic communities were surveyed via remotely operated vehicle (ROV) and sediment grab sampling in sites of comparable depth and substrate each August from 2002 through 2004. Multivariate statistics were then used to analyze differences in benthic community composition within and between sites. Finally, family life history information for resident taxa was used to determine possible mechanisms driving observed differences between benthic community composition.

### **Results**

Multivariate analysis showed significant differences in benthic community composition between the Kettle and the WGOMC, which were attributed to the cessation of chronic trawling disturbance. However, these differences could not be conclusively attributable to one specific cause because of the lack of pre-closure samples and the distance (~30 nm) between the areas. In general, more disturbance tolerant, opportunistic families dominated benthic communities in the Kettle, while more disturbance intolerant, sessile families dominated communities in the WGOMC. It appears that the infaunal and epifaunal components of benthic communities most likely recover at vastly different rates in open and closed areas.

### **RSC Discussion**

As discussed by the committee, two hypotheses were posed by the PIs: a.) There is no difference in the abundance and diversity of attached infauna between substrates of similar type inside and outside the Closure Area; and b.) there is no difference in the abundance and diversity of attached epifauna between substrates of similar type inside and outside the Closure Area.

The project did accomplish its stated objectives *for the sites selected*. They were not designed to facilitate the conduct of an experiment to evaluate the effects of the closure on seafloor habitat, nor were they initially designed to conserve seafloor habitat.

Reviewers discussed the greater question for management purposes: “to what degree does the site selection decision influence the results?” This question is critical, and is not examined in the report. It is possible, and perhaps likely, that the observed results are to some degree

influenced by differences inherent in the sites themselves, and that any effect of fishing is secondary to this.

The project relates directly to the need to assess the effects of fishing on essential fish habitat and provides useful information about the state of communities in the original WGOM Closure under different management regimes over time. The recommendations and caveats in the report, however, do not fully discuss shortcomings in the project design and therefore do not provide adequate information on appropriate use of the information.

Specifically, the project compares areas that are separated by over 30 nm. Information provided in the report is insufficient to conclude that any observed differences are due to anthropogenic-induced change. The report is guarded on this point, but, as noted in one of the technical reviews, the caveats need to go farther. Additionally, the area noted as “unfished” is in fact open to shrimp trawls, which are known to contact the bottom. There is no investigation into the potential that these areas were contacted by this gear. This issue could be a serious factor that influences the conclusions, or it could be a non-issue — either way, failing to account for it lessens the impact of the conclusions. Participants in the review agreed the research itself was very good, but the inability to verify homogeneity (or quantify prior-existing heterogeneity) and the potential for contamination by trawl gears renders the results less than clear.

The appropriate end user is the Habitat PDT. Fisherman, scientists and others with similar interests are other likely end-users. The committee agreed, however, that the recommendations and caveats do not fully discuss shortcomings in the project design and therefore do not provide adequate information on appropriate use of the information. The report will be on file at the Council office, but it is not recommended for use by the Habitat Committee or its PDT without using caution when interpreting project results.

**6.) *Habitat-dependent catch composition and food web dynamics with respect to long-term and rolling closures on Stellwagen Bank***; Dr. Les Kaufman of Boston University with Mass Fishermen’s Partnership, David Bergeron, Executive Director. The project was funded by the National Marine Fisheries Service cooperative Research Program for \$250,000. Review comments were provided in a cover letter from the National Marine Fisheries Service.

### **Description**

The project proposed six hypotheses to be tested: that fishes inside versus outside the Western Gulf of Maine Closure were: 1.) more numerous; 2.) higher in biomass; 3) more diverse; 4) skewed toward larger size classes; 5) longer in food chain length, and that 6) any given species or size class was higher in the food web than in comparable habitat outside of the closure.

### **Results**

The project took a rigorous look at observed differences in several metrics important to area-based management and the effects of area closures on commercially important species. At the time the final report was submitted, hypotheses (2), (5) and (6) had been investigated. As such, the project did not accomplish all of its stated objectives.

## **RSC Discussion**

The reviewers discussed the fact that not all deliverables were completed and that portions of the discussion and results were ambiguous. In the end, the reviewers felt that the work was of high quality and scientific integrity. Given the rigorous nature of the investigation and the quantity of data collected, the shortfall does not seriously compromise the utility of the research. However, as the NOAA reviewers pointed out, the use of stable isotope technique appears to be founded on the hypothesis that there is fidelity to either in- or out-side areas, and that differences observed are due to that fidelity. No replicate samples are taken, rendering this hypothesis untestable. The observation that particular species were found with higher abundances inside, and others outside, cannot be resolved temporally. Therefore, it is impossible to extend the results beyond the snapshot that the researchers have captured.

The committee agreed the project took a rigorous look at observed differences in several metrics important to area-based management and the effects of area closures on commercially important species. While the PIs method is relatively sound, replicate data collection would substantially improve the utility of these data. The information presented is relevant to area-based management, particularly in the groundfish fishery in New England. It is also likely to be of interest to fishery managers and scientists worldwide with an interest in the potential affects of area-based management. Despite the caveats noted above, most conclusions are adequately guarded and the project was positively received. The final report will be on files at the Council office for use by its technical teams.

*An industry-based characterization of EFH in the Western GOM;* ADM Associates, Allan D. Michael; and CR Environmental, Charlotte Cogswell, John Ryther and Christopher Wright. The project was funded by the National Marine Fisheries Service Cooperative Research Program for \$193,700. Extensive review comments were provided in a cover letter from the National Marine Fisheries Service.

## **Description**

Fishermen representing a variety of commercial fishing activities were interviewed to provide a basis for the selection of two study sites for an assessment of essential fish habitat. The fishermen made recommendations of possible study areas based on their historical knowledge of where the most productive areas were located. This and additional GIS information led to the selection of one site on the Gulf of Maine Closure Area, Pigeon Hills, and another, Long Bank, just off the southwestern corner of the Stellwagen Bank National Marine Sanctuary. In both cases, the study areas consisted of east/west rectangular transects which crossed the boundary of the respective controlled areas.

The sites, both approximately 10 km<sup>2</sup> were surveyed using a 125 kHz Geoacoustic GeoSwath bathymetry system, and an Edgetech 272 TD towfish sidescan sonar. Survey work was conducted onboard commercial fishing vessels. Habitat conditions were evaluated using a towed video sled, a drift camera and a mini-ROV. Benthic grab samples were collected at seven stations at the southern site and at two stations in a reference area. Grab samples were used to characterize the benthic infaunal communities and sediment texture. Baited underwater video systems were placed at a variety of locations for periods of up to 24 hours while other survey work was in progress. Profiles of the water column were taken at various stations throughout both study areas in different seasons.

## **Results**

GeoSwath and side scan sonar revealed complex topography at both sites. The results of 17 video tows at each site were classified according to a habitat classification system proposed by Auster et al (1998). All eight major bottom habitats as described by Auster were found at both sites. A total of 23 invertebrates, 7 fish species and 2 types of red algae were identified in the video sled tapes. More than 200 species of invertebrates were identified in the soft bottom benthic grab samples from the Stellwagen/Long Bank region, while water column profiles highlighted the complexity of the hydrology at both sites.

## **RSC Discussion**

Habitat characteristics of the two study sites were identified, but not habitat-species links for species and life stages that utilize the sites. The committee agreed that without this information the EFH “piece” is missing, as stated by one of the RSC reviewers. However, the report was extremely detailed, the PIs did a very good job providing information that could be used by the Habitat PDT to revise EFH designations and in a current assessment of habitat types at risk from fishing, especially if managed species that utilize these two sites are identified.

Other RSC reviewers noted that the areas have already been mapped with the same technology and the video is available from USGS. The usefulness of the information is limited by the lack of any species-specific fish information, and accordingly no information on the possible ecological significance of the information for managed species was made available. GIS work may be possible if actual data are provided.

The data collected is available through NMFS and the MA Division of Marine Fisheries and may be used by the Council’s Habitat PDT. The final report and cover letter are on file at the Council office for use by this group.

***Identification of juvenile groundfish habitat within nearshore waters of the Gulf of Maine;*** Gulf of Maine Research Institute, Dr. Jonathan Grabowski; Melissa Smith and Philip Yund of the University of New England, and fishing partners Proctor Wells, Marshall Alexander. This project was funded by NMFS’s Cooperative Research Program for \$257, 607. Several brief technical comments were provided by the funder in the cover letter to the report.

## **Description**

As stated in the abstract, given the historical value of groundfish fisheries in New England and the current depleted status of several of these fish species, identification of habitats rich in food and refuge for juvenile cod and other groundfish is necessary within nearshore waters of the Gulf of Maine. The PIs used a small-mesh 70-m wide otter trawl to assess the effects of season (spring through fall), bottom depth (25-75 m), closure status (in vs. out of the Western Gulf of Maine Closure), and landscape setting (along the edges of rock ledge & boulder habitats and on mud isolated from hard bottom) on the distribution and abundance of juvenile groundfish and predator communities. Additionally, the PIs assessed how these factors influenced the diet composition, size, condition factor, and survival (i.e., the stomach contents of predatory fish captured in each tow were sampled) of the following target species: Atlantic cod (*Gadhus morhua*), haddock (*Melanogrammus aeglefinusi*, and goosefish (*Lophius americanus*). The tested hypothesis tested was that abundance, size and condition for the target species were affected by season, closure status and habitat type.

## **Results**

In the central portion of the Gulf of Maine, the abundance of juvenile and adult cod was very low. Habitat had little effect on the ecology of either of the other two target species in this region. Meanwhile, abundances of juveniles for all three species in and around the Western Gulf of Maine Closure Area (WGMCA) were low, and goosefish were more abundant outside of the closure. This counterintuitive finding, which is similar to findings from studies elsewhere in the Gulf of Maine, suggests that the northern portion of the WGMCA may not be important nursery grounds for these valuable species. However, both adult cod and haddock abundances were greater along the edges of structured habitat than on mud bottom only inside the closure, which could signal the recovery of important habitat types inside the WGMCA. Goosefish condition was greater along the edges of structured habitat regardless of closure status, indicating they are relatively immobile and forage more effectively in this habitat, according to the abstract.

## **RSC Discussion**

A well done project, the work extends current knowledge of habitat used by older juvenile cod in deeper water of the Gulf of Maine beyond the nearshore young-of-the-year nursery zone and adds to what is known about the effects of closed areas on juvenile groundfish abundance and condition as well as the prey species of juvenile cod, haddock and monkfish. The committee agreed the experimental design of the project and the statistical testing of the hypothesis provide very convincing support for the conclusions cited in the final report.

Because the Habitat PDT is currently in the process of revising the EFH descriptions for all NEFMC species, proposing designations for Habitat Areas of Particular Concern and identifying habitat types that are most at risk from fishing impacts, the information generated would be very useful to that group. As with the other reports, the project material provided will be on file at the Council office and available to its PDTs.

*Identifying the habitat of early-juvenile cod in nearshore GOM Waters*; Gulf of Maine Research Institute, Dr. Jonathan Grabowski and Julien Gaudette, Proctor Wells, F/V Tenacious and Vincent Balzano, F/V North Star; funded by the National Marine Fisheries Service for \$180,000. NMFS provided technical comments in the cover letter communicating the final report.

## **Description**

The report offered a number of useful insights, especially on the role that seasonal variability plays in determining the composition of species assemblages and the effectiveness of year-round area closures. The PIs used a variety of sampling methods in an attempt to identify whether age-specific habitat associations exist during the life-history phases of cod after parsing out the potentially confounding effects of bottom depth and water temperature. By coupling over a decade of trawl survey data with video assays and hook-and-line sampling, investigators extended their findings to more complex bottom where small-mesh trawl nets were incapable of being towed because of the risk of entanglement

## **Results**

The PIs findings indicated that gravel and more complex hard bottom are important habitat for juvenile cod. Failure to include consideration of cod use of more complex habitats that are incapable of being sampled by trawl surveys could result in largely skewed and unrepresentative estimates of

the abundance of juvenile cod populations, they concluded. Further investigation is necessary to determine the degree to which the availability of these habitats influence juvenile cod growth and survival rates during this early life-history phase and subsequently limit the productivity of cod fisheries. They added that nearshore habitats could serve as a critical bottleneck that is currently limiting the recovery of cod populations in the Gulf of Maine.

### **RSC Discussion**

The committee viewed this work as a helpful follow on effort to the previous report. They agreed the quality was excellent, were satisfied with all aspects of the report as written and did not offer comments other than to say that, as with the previous report it would be very useful to the Habitat PDT.

### **Other Business**

The RSC agreed to take a more critical look at the evaluation criteria for final projects subjected to a management review. This conclusion was based on the helpful suggestions of the reviewers invited to assist in discussing the habitat final reports.

Further, to facilitate use of the final research reports, the committee agreed they should be made electronically available to Council Plan Development Team Chairs on their respective ftp sites.

Committee members also noted that it is helpful in reviewing reports to also have the associated proposals to better react to the information ultimately provided.

A final point made relative to project funders was the notion of making PIs aware of the public review of their work, as called for in the Council process, in advance of preparing their final reports. As was discussed at the meeting, document preparation may be very different when fulfilling administrative responsibilities and documentation of activities and results versus a public vetting of the same report.