New England Fishery Management Council
Scallop Survey Advisory Panel

Meeting Summary

Narragansett Town Hall, Narragansett, RI
May 4, 2006

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Participants:
Panel members: Mr. Richard Taylor, Dr. Kevin Stokesbury, Mr. Ron Smolowitz, Dr. William Phoel, Mr. Arthur Ochse, Mr. Glen Nutting, Mr. Victor Nordahl, Mr. Michael Marchetti, Dr. Trevor Kenchington, Dr. Dvora hart, Dr. William DuPaul, Mr. Andrew Applegate
Council and NOAA Fisheries staff: Dr. Russ Brown
Others: Mr. Brad Harris, Mr. Michael Marino, Mr. Jacob Noqueira

Agenda items: This was the Panel's first meeting, which focused on Panel structure and organization, its role and terms of reference, a briefing about surveys that are currently conducted or are under development, the NMFS research vessel transition in relation to doing future scallop surveys, a need for evaluating and developing better survey dredge designs, and a discussion of sensing technology (sonar and video).

Summary of committee actions

In the absence of a new chair, Mr. Applegate facilitated the meeting discussion, opening with a review of how the Panel was organized, the Panel roles and responsibilities, and the management of the Panel. He explained that the Council was organizing the Panel under its FACA exemption to assist NMFS and others to develop better and more coordinated surveys. Although the personnel support issues had been resolved, the Panel was convening without cost because no funding was available. Mr. Applegate explained that the Panel would most likely meet 4 or 5 times each year in 2006 and 2007 to work on short and long term issues, including improving the NMFS survey dredge to give it more consistent performance, to look at and recommend deployment of new survey tools, to examine coordination of cooperative industry surveys, and to recommend ways to better coordinate the flow of survey data into the management process.

Meetings would often be held in conjunction with other meetings, like the Scallop Advisory Panel or the PDT, to minimize travel costs and that meetings would be held in available free meeting space. Thus this meeting was held at Narragansett Town Hall, the day after the Scallop Advisory Panel meeting in Warwick. He added that subgroups may meet at various times and places to work on specific issues to report back to the main Panel. These subgroups may be convened to work on capture technology, sensing capabilities (video and sonar), as well as data flow management issues. Mr. Applegate said that the Panel would report directly to the Council, but that NMFS and others would be taking the advice from the Panel as it develops.

Mr. Applegate explained that today's meeting was mainly to get things organized, to get people on the same page with respect to surveys that are presently being conducted or contemplated, and to get the ball rolling. Dr. Brown added that the Panel would serve to improve transparency in the survey program and ensure that survey resources were deployed optimally.

The Panel briefly discussed the Panel chairmanship and what that person's role would be, but decided to defer selecting a chair and vice-chair until more people were involved and the Panels organization began to develop. The Panel decided to ask Mr. Applegate to facilitate the meeting until the Panel chose a chair. Mr. Applegate made clear that his role was to facilitate administration of the Panel and he was not to serve as chair.

Dr. Kenchington pointed out that this will be an important process since the management of the resource was very dependent on good survey data. He said that the Panel would need strong leadership and clear terms of reference. RT pointed out that there was a disconnect between the PDT/Council and the RSA research program that could be addressed by the Panel. The Panel decided to discuss terms of reference later in the meeting and Dr. Brown explained that the Panel needed to take ownership of the terms of reference.

Dr. Kenchington was asked to give a briefing of the industry panel that met on the surveys last fall. He said that the meeting was partially responsible for kick-starting this process, but that the industry did not intend on taking a lead role in organizing and managing the various scallop surveys. The meeting thought that it would be necessary to convene subpanels to focus on specific issues, like remote sensing technology and direct catch measurement.

Mr. Smolowitz stressed the need to collect additional information during the surveys on finfish catch, habitat/substrate characteristics and changes, and animal health. The Panel agreed that it was important for future surveys to collect a broader array of data about the scallop environment. In terms of estimating scallop abundance and biomass, the Panel classified the issues into broad scale, long term monitoring, area-specific estimates biomass and TACs for access areas, and identification of areas having high abundance of small scallops.

Current and potential resource data collection systems

The panel was given short presentations on the various surveys and survey designs that have been proposed or are being conducted. The provided a good overview of existing survey technology and potential and gave the Panel an opportunity to agree on relative strengths and weaknesses of the various approaches. This will help the panel structure future discussion on how to improve, integrate, and coordinate the various surveys.

Dr. Brown gave a briefing of the NMFS scallop survey, taking 29-31 sea days to conduct using an 8 full-time. Lined dredge, towed at 3.8 knots for 15 minutes at 350-500 stations per year, ranging from the area off VA beach to the northern edge of Georges Bank in Canadian waters. The stations in Canada are surveyed inconsistently because they are sometimes dropped if there is insufficient time to complete them. The survey typically began in mid July and is usually completed by mid August. He felt that its strength and why the survey needed to continue is because it serves well as a long-term, broad scale dedicated survey, as opposed to periodic and targeted surveys of specific areas often conducted by an industry based survey.

The panel identified the strengths and weaknesses of the NMFS survey as shown in the table below. The sampled stratum total about 15,000 nm2 and 400 annual tows would sample 0.527 nm^2 of scallop beds.

Strengths	Weaknesses
• Long, consistent time series • Broadscale monitoring of core resource areas • Detects recruitment one to two years before the scallops become vulnerable to capture • Accurately measures size frequency and subsamples for meat weight on the same tow • Sampling frequency can (and should be) adjusted by stratum to minimize variance	• Less useful for rapid deployment to answer specific questions • Some fished areas are not surveyed • Difficult to calculate absolute abundance (requires dredge efficiency estimates which vary by area, depth, and substrate) • Not intended to produce biomass estimates for areas smaller than survey strata

Dr. Stokesbury gave a presentation about the history and status of the SMAST scallop survey, which uses video images shot from a tripod to collect information about the scallop resource and habitat. The survey started as a cooperative industry survey of Closed Area II in 1998, supported by the Fisheries Survival Fund. Although the survey methods and tools (cameras, lighting, machinery for deployment, processing, etc.) have improved over time, the basic design of the survey has remained the same. Scallops are observed using camaras mounted on a 0.8 m2 tripod, with four samples taken at each station (totaling 3.2 m2). Stations are arranged in a regular grid, with either a 1.57 or 5.55 km interval. Discernable scallops (larger than about 60 mm) are counted and measured from the video frames taken when the tripod sits on the bottom. The size and number of scallops are observed, as well as the number of identified finfish and macroinvertebrates. Meat weights are sampled on commercial tows from comparable areas and times.

Initially the surveys were conducted in specific areas, but since 2003 the survey has been expanded to survey the majority of scallops occurring in the Mid-Atlantic and Georges Bank regions. In 2005, 1781 stations were sampled. Resource-wide, biomass declined from 394.7 million pounds in 2003, to 337.7 million pounds in 2004 and 334.9 million pounds in 2005.

The panel identified the strengths and weaknesses of the SMAST survey as shown in the table below. The sampled area is about the same as the NMFS survey, but the do not cover exactly the same boundaries and 1800 annual stations with 3.2 m^2 of observed bottom at each station would sample 0.002 nm^2 of scallop beds. At the higher sampling intensity using a 1.57 km grid spacing, the SMAST survey has provided better precision for abundance than is given by the Albatross survey.

Strengths	Weaknesses
• Last three annual surveys are broad scale, covering most of the scallop beds in the Mid-Atlantic and Georges Bank regions • Sampling is non-extractive, has minimal habitat effects, and no bycatch • Sampling efficiency is near 100% for observable size animals • More samples taken per sea day, improving precision of estimates • Sampling platform sits on the bottom, reducing variation of sampled area	• Indirect measurement of scallops on video images introduces a source of error • Loose association of meat weight to measured shell heights in samples • Sampling does not cover all of the NMFS shellfish survey strata boundaries, making comparisons difficult. • Labor and ship time intensive • Low spatial coverage

Mr. Taylor described a prototype video survey conducted with a towed sled which is 'flown' just above the bottom. The prototype was developed and tested using NE Consortium funding, a research effort led by Mr. Taylor, Scott Gallagher and John Harland.

Sampling is done continuously along a transect and can cover 100 miles per day, but data processing is a bottleneck which reduces the amount of potential sampling that can occur. The sled is towed at 5 knots. It has an effective sampling area per frame of 1.5 by 1.0 m and the system captures about 14,000 frames per hour. At this rate, the survey would cover 0.729 nm2 for 30 sea days, an equivalent amount of sampling time on the NMFS survey. The strengths and weaknesses of this type are summarized below:

Strengths	Weaknesses
• System allows for continuous sampling, which provides information about patchiness • Sampling is non-extractive, has minimal habitat effects, and no bycatch • Sampling efficiency is near 100% for observable size animals • Many more samples taken per sea day, improving precision of estimates • Less labor and ship time intensive, but requires considerable computer processing	• Sampling is conducted with variable distance from the sea floor and lighting varies • Area in each frame varies, introducing a source of error • Indirect measurement of scallops on video images introduces a source of error • Loose association of meat weight to measured shell heights in samples • Automated discrimination varies with substrate, e.g. cobble or shell hash vs. sand/gravel

Mr. Nutting described the recently developed ME scallop survey, conducted with a New Bedford style dredge, not unlike the NMFS survey. The survey is conducted along the coastline in depths ranging from 3 to 20 fathoms with a 2.1 m wide dredge using contracted commercial vessels, taking 5 minute tows at 3-4 knots. The dredge is unlined and has 2½" rings. Scallops are counted and measured along with bycatch.

The strengths and weaknesses of this survey are similar to those for the NMFS dredge survey, but it is conducted in inshore fishing areas (a strength), amongst lots of fixed gear (a weakness), on hard bottom. Dredge efficiency is unknown, making it impossible to estimate total abundance and biomass at this time.

Dr. Phoel described cooperative research he had been conducting with Mr. Ochse using side scan sonar technology. He illustrated some of the effects of dredging that were observed using the sonar, which clearly showed smoothing of sand waves in the dredge tracks. These areas were resurveys and it took several months for the sand waves to become re-established. He thought that side scan sonar could not pick out individual scallops when towed using relatively low frequency (less definition) to look for fish at longer ranges. By putting a side scan on an AUV and flying it about 3 meters from the bottom, a high frequency side scan sonar might have sufficient resolution. Although it hasn't been tried to detect scallops, the manufacturer's representatives and users feel it is definitely doable. An AUV could covere transects of 50-60 nm2 per day.

Dr. DuPaul had been conducting surveys in access areas using commercial and survey dredges on industry vessels under the RSA program. Part of this work was to compare and estimate the selectivity of the new dredges having 4" rings, compared with the lined survey dredge. This research was conducted using paired tows on a single vessel, with one dredge being the NMFS survey dredge configured per

specifications. Once adjustments for selectivity and dredge size were taken into account, the two dredges provided similar abundance and biomass estimates, having a CV of less than 10%. Thus surveys with carefully configured commercial dredges could provide robust estimates of exploitable size scallops.

The strengths and weaknesses of using standardized commercial dredges on fishing vessels were similar to the NMFS dredge survey, except that they would provide much less information on small scallops that usually escape between and through the larger rings. Dr. DuPaul pointed out that compensation fishing is sometimes incompatible with surveys using standard tows, and the Panel agreed that the separation of the commercial catch and survey activities was a better model to follow. Dr. Brown noted that expansion of cooperative industry surveys would need a larger pool of standard survey dredges to be available.

Mr. Applegate prepared and distributed a table of scallop research that had been conducted during 2000-2005 using RSA or NE Consortium research funds. It might be worthwhile to examine research conducted with a control dredge that might use standardized dredge and also collect survey data. Quite a few projects used a commercial dredge as a control, which if standardized and catch data were recorded could be added as non-random survey tows. He said the table was work in progress and asked the Panel to review it.

Mr. Applegate pointed out that the fishery itself was collecting and reporting vast amounts of information that could be used in a survey context. The VMS data when combined on a trip by trip basis with the gear and catch data on vessel trip reports gave useful information. Sampling points in the GIS framework were only 0.3 nm2, providing relatively fine scale information. Total area swept at each point could be calculated from the amount of fishing time, assumed vessel speed while fishing, and the reported gear width. If the efficiency of the commercial dredge in the areas fished were estimated, it would be possible to even estimate fishing mortality. More to the point, the commercial catch data could be used to identify locations where a higher proportion of small scallops were being caught, potential candidates for area closure. The VMS data gave more detailed information about the distribution where the smaller scallops were caught, but at a larger size than when the small scallops are observed in the lined survey dredge.

In 1998 and 1999, the smallest count category with landings were 61+ and Mr. Applegate showed the geographical distribution of retained scallops for the ratio of 61+ to 11/20 count scallops. In 2004 and 2005, the smallest landed scallops were 41/50 count and he showed the distribution of these scallops as a fraction of the landings of 11/20 scallops. More information about the catches of small scallops could be done using the same methods applied to scallop discards, but in recent years, only 9% of limited access scallop trips in the VTR data had reported discards of any species.

The Panel thought the major weakness in this analytical approach were that the distributions were for larger scallops than could be detected by surveys using lined dredges, and scallop discards were rarely reported.

Research vessel transition

Dr. Brown informed the Panel about NMFS plans for the new R/V Bigelow and a bit about its capabilities, as well as longer term plans for a possible second new research vessel to come from the SE region. NMFS is to take delivery of the R/V Bigelow on June 23rd, with the first survey work to occur in October. It was unclear when the R/V Albatross would be retired, but it is clear that a significant period of overlap would be needed for vessel and gear calibrations. At the present time, the R/V Albatross operations are funded only through 2007. No decision has been made to actually use the R/V Bigelow for

the scallop survey, but the daily operational cost will be higher. He said that NMFS had plans to transfer a new survey vessel from the SE region later, which might also be considered for scallop survey work.

The R/V Bigelow is larger, more capable, and will carry a larger vessel and scientific crew. The Panel concluded that it will be important to make greater use of the vessel's capabilities, including multibeam sonar and video based methods, if the vessel is to be used for conducting scallop surveys. Dr. Hart did not expect that there would be much vessel effect on the survey results, because scallops unlikely to respond to the vessel presence and sounds. She noted that although the R/V Bigelow is larger it will be capable of maintaining the proper speed because the vessel is more maneuverable. More importantly, however, the Panel agreed that the calibration experiments would provide an opportunity to make gear modifications to give the survey gear more consistent performance. If the scallop survey relied more heavily on cooperative industry surveys for long term monitoring, the Panel pointed out that RSA financial resources is dependent on resource biomass and could become insufficient in times of lower biomass.

Survey dredge design

Given that the R/V Albatross operations are funded only through 2007, gear modifications need to be completed by the end of 2006 so that the calibrations are conducted in 2007, Dr. Hart said. She said that the objective is to identify changes that would make the gear more easily maintained with more consistent performance. Mr. Smolowitz thought that if the direct calibrations cannot be done due to timing, it should be possible to overlap standard gear on commercial vessels with the survey gear on the R/V Albatross and R/V Bigelow. He added that the survey gear design should be linked to the objective, for example if it would be designed to improve sampling of small scallops, epibenthos, and finfish (e.g. yellowtail flounder).

The Panel agreed that consideration of modifying the survey dredge gear was an important objective to work on during 2006. The Panel agreed to form a small focus group, led by Victor Nordahl to evaluate and recommend modifications to the NMFS dredge design and configuration. This group would report back to the Panel. Mr. Nordahl will work with Mr. Applegate to organize and administer the meetings of the subgroup.

Sensing technology

Dr. Hart suggested that an integrated survey approach using a combination of direct sampling (dredge), optical sensing (video), and acoustic (multibeam sonar) technologies could yield significant benefits and make the survey more precise. She said that a systematic sampling approach within strata and model-based estimation could reduce the number of dredge tows while improving the abundance and biomass estimates. She cited some other benefits of the multibeam sonar data in Canada, which identified areas of scallop aggregation and purportedly greatly reduced fishing time for the fishery to catch its quota. The Panel agreed that working on these new technologies was important as a longer term objective.

Terms of reference

The Panel briefly outlined a list of appropriate objectives for future work. Dr. Brown indicated that draft terms of reference had been developed as part of a Panel charter and suggested that Mr. Applegate distribute the draft to the Panel for discussion at a future meeting. Briefly, these issues included:

- Gear design and modification
- Survey development
- Integration of targeted industry-based surveys into the management and assessment process
- Timing and availability of data (management and access)
- Data integration

The Panel briefly discussed the management alternatives in Amendment 11, intended to tighten up the implementation of specifications based on recent survey information. Dr. Brown pointed out that tentative time on the R/V Bigelow had been scheduled to conduct the scallop survey in May and June, instead of July and August. This would give scientists and the Council a little more time to work with and analyze the data, but if the development and review process takes about a year, it would still require advancing the fishing year to accommodate the availability and analysis of the survey information. Advancing the fishing year two months to May 1 would still require the targeted industry surveys to be completed by mid-summer to be used in setting area TACs. The Panel indicated that this would be acceptable, since sampling in August and September is at risk for being interrupted by a tropical storm.

The Panel discussed holding a follow up meeting before the R/V Albatross survey occurs, so that others who were not at this meeting can catch up and the Panel keeps making progress. The Panel suggested holding the next meeting in association with a Scallop PDT meeting to minimize travel costs. Some said that a long series of meetings (there was a two-day scallop advisors meeting before the Panel meeting) was difficult for business owners.