

SARC-41 Chair's Report to CIE

41st Northeast Regional Stock Assessment Workshop (SAW-41)
Stock Assessment Review Committee (SARC) Meeting
Northeast Fisheries Science Center
National Marine Fisheries Service
Woods Hole, Massachusetts
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Chair's Report

Prepared for

University of Miami
Council for Independent Experts
Independent System for Peer Review

By

Cynthia M. Jones, Ph.D.
Center for Quantitative Fisheries Ecology
Old Dominion University
Norfolk, Virginia, U.S.A.
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Executive Summary

The SAW/SARC-41 met in Woods Hole, MA at the Northeast Fisheries Science Center on June 6-10, 2005 to review stock assessments for summer flounder (*Paralichthys dentatus*), bluefish (*Pomatomus saltatrix*), and golden tilefish (*Lopholatilus chamaeleonticeps*). The Center for Independent Experts appointed Cynthia Jones as SARC chair and Patrick Cordue, Olav Godø, and John Wheeler as reviewers. James Weinberg from the NEFSC/NMFS was the SAW-41 chair.

The SARC-41 meeting was conducted under new procedures where the SARC chair and review team were instructed that no effort should be made to provide consensus on the stock assessments by reviewers. In two of the stock assessments, summer flounder and tilefish, members of the committee reached the same conclusion that these assessments provided sound scientific advice for management. For bluefish, the committee was divided. Two reviewers believed that the assessment was adequate and one did not. All reviewers believed that the bluefish assessment could be improved. Each assessment was reviewed in accordance to its Terms of Reference (TOR) and the TOR differed by species.

The summer flounder stock assessment was an update of the 2004 SAW done by the Southern Demersal Working Group (SDWG) with special attention to biological reference points based on recommendations from the Mid Atlantic Fisheries Management Council's (MAFMC) Scientific and Statistical Committee in 2001. The SARC agreed that the working group fulfilled all of its TOR. TOR-4 required that the working group only review, evaluate, and report on previous implementation of recommendations. They reported that several were not met. The SARC agreed that the assessment was adequate to serve as a basis for providing scientific advice to management. Several SARC reviewers were surprised to see an assessment update as part of a SARC review and commented on this in their final reports to CIE. One reviewer suggested care be taken in the interpretation of the retrospective analysis and that documents needed to reflect a more careful interpretation.

Recommendations for summer flounder – The SARC agreed that the following recommendation would improve future stock assessments.

Short term

- Evaluate the use of newer models that use existing data appropriately such as, a forward calculating age-structured or a fully integrated stock assessment model. Particular attention should be given to the use of statistical catch-at-age models
- Develop integrated survey indices by: combining the three NEFSC research trawl survey indices into a single annual abundance index, and combining state-run survey indices into a single annual abundance index.
- Reconsider the interpretation of the retrospective pattern and revise the assessment documents accordingly.
- Test for trends in the time series of CPUE.

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- Update biological data, such as maturity ogives, reproductive capacity of the stock, and growth-dependent factors, such as survey catchability and maturity.

Long term

- Design and implement a program to collect otoliths from the commercial and recreational fisheries. Compare the accuracy and precision of age estimates between scales and otoliths with attention to ageing older fish. Test the assumption that commercial age-length keys are appropriate for attributing age from recreational-fisheries data.
- Design and implement a research program to estimate the mortality rate of discards for each of the primary commercial fishery gears (i.e. trawls and scallop dredges).

The SARC was divided on whether the bluefish stock assessment was adequate to provide sound scientific advice to managers. Although two reviewers thought that the assessment was adequate, they also recognized the clear problems with the quality and use of data. For example, although Olav Godø thought that the assessment could be used for management, he also strongly stated that its conclusion that the stock is not overfished should be used with great caution. John Wheeler was also cautious but thought that the Bluefish Technical Committee (BTC) did meet its TOR and, even though there were shortcomings to the assessment, he did not think that it was clearly shown that the shortcomings invalidated the model conclusions. Although the BTC did address all five TOR, the SARC was concerned both by problems with the data and inadequate handling of the ASAP model. Patrick Cordue was particularly concerned with the dual use of data in constructing the CPUE by age and by the lack of statistical diagnostics. All SARC members felt that the assessment had been brought back to a SARC too soon and that there was not enough time to incorporate the recommendations of SARC-39.

Recommendations for bluefish - Lack of consensus also occurred in the priority of the recommendations. I have ordered recommendations based on a majority opinion of the SARC.

Short term

- Continue to develop statistically appropriate models for this stock, including evaluation of uncertainty and sensitivity. This modeling should also test sensitivity to data quality. The BTC should avoid double use of the data as model input.
- Evaluate the fishery-independent surveys used to tune the model with special emphasis on determining if the state surveys can be combined to yield better temporal and spatial representation of stock abundance. The BTC should encourage the states to coordinate their survey efforts for bluefish to improve the quality of data that can be obtained. We suggest a workshop to address this and other data issues.
- Evaluate the use of otolith and scale ageing of bluefish. We suggest this be a separate workshop to evaluate the best ageing structure and its reliability for stock assessment input. After the evaluation, intensify collection of age data from

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commercial and recreational fisheries, and evaluate the validity of combining age classes across years in an ALK.

Long term

- Improve sampling coast wide by gear and fishery sector to obtain information with special emphasis on mid-size fish. This may require alternative fisheries-independent assessment methodologies (such as lidar, archival tagging, sonar).
- Increase fishery-independent sampling to better represent the population's offshore and southern habitat.
- Determine if discard mortality of 15% for the recreational fishery is accurate.

Upon reviewing the tilefish stock assessment, the SARC was unanimous in its evaluation that SDWG had done an exemplary job. The SDWG fulfilled its TOR and provided an excellent review of data and modeling in two very professional presentations. Sensitivities were tested extensively and the results appeared to be robust. The SARC agreed that this stock assessment provided sound scientific advice to management.

Recommendations for tilefish - SARC members largely agreed as to the importance of the following recommendations.

Short term

- Improve the quality of effort data by determining the value of alternate measures of effort (number of hooks, amount of bait) and test for trends in effort that would result in bias in CPUE.
- Develop a cooperative research program with industry to include:
 - logbook data;
 - comprehensive biological sampling;
 - alternate measures of effort;
 - technical and behavioral change in the fleet.

Long term

- Increase knowledge of general biology including age and stock identity.
- Develop fully integrated stock assessment model to use with current data.

Finally, several statistical and modeling concerns were discussed during the meeting that applied to assessments in general and these concerns were addressed directly in Patrick Cordue's report to the CIE. These concerns were for replacement of older models, such as ADAPT, that require complete and accurate input with newer statistical models that integrate seemingly disparate data sets within the model.

Review of Activities

The SAW/SARC-41 met in Woods Hole on June 6-10 2005 to review stock assessments for summer flounder (*Paralichthys dentatus*), bluefish (*Pomatomus saltatrix*), and golden tilefish (*Lopholatilus chamaeleonticeps*).

Meeting Preparation

The SAW-41 chair, Dr. James Weinberg, set up a password-protected website for distributing SAW/SARC-41 stock assessment documents on May 11, 2005. These files were updated, and additional files added prior to the meeting. There was more than adequate time for document review. All SARC reviewers were able to access this website and all reviewed the materials prior to the meeting. We also received printed copies of the major assessment documents by FedEx prior to the meeting.

Before the meeting, the terms of reference were revised and the stock assessment for American lobster was removed from the agenda. The final terms of reference included summer flounder, bluefish, and tilefish (Appendix 1 TOR). Subsequent to this revision, the SAW and SARC chairs reviewed the tasks and assigned each of the SARC reviewers to lead the discussion of one of the individual species. This was done to provide more efficiency during the meeting and all reviewers were aware that this leadership did not excuse them from fully participating in every species discussion.

Meeting Attendance

The 41st Northeast Regional Stock Assessment Workshop (SAW 41) Stock Assessment Review Committee (SARC) meeting was held at the Northeast Fisheries Science Center, National Marine Fisheries Service, Woods Hole, MA during June 6-10, 2005. The SARC chair was Cynthia M. Jones and the SARC reviewers were Patrick Cordue, Olav Godø, and John Wheeler. The SAW chair was James Weinberg.

The meeting began at 1300 on Monday, June 6 with the review of the summer flounder stock assessment. Mark Terceiro presented the assessment and Kathy Sosebee was the rapporteur. Patrick Cordue was SARC discussion leader for this species. The meeting closed for the day at 1700. On Tuesday, June 7 from 830-1200, Jessica Coakley presented the bluefish assessment with Gary Shepherd acting as rapporteur. Olav Godø was SARC discussion leader for this species. From 1315-1700 PM, Paul Nitschke presented the golden tilefish assessment and Laurel Col was the rapporteur. John Wheeler was SARC discussion leader for this species. On Wednesday June 8, we began at 830 with an hour-long closed session and then meet with the SAW presenters in open session until 1200 to obtain additional information on all three species that arose from the formal presentations on the preceding two days. On Wednesday afternoon and on Thursday, June 9, SARC members began writing their reports.

Twenty-five documents, including PowerPoint presentations, and rapporteurs notes were made available to SARC members during the meeting (Appendix 3). Patrick Cordue also made his presentation on retrospective analysis available as a PowerPoint presentation.

The statement of work (Appendix 4) instructed us to produce individual species summaries in reference to their TOR (Appendix 1), and a list of recommendations for each stock assessment. The conclusions and recommendations reflect the reviewer's opinion on how well the assessment met its TOR, the adequacy of each assessment in serving to provide sound scientific advice to management, whether previous recommendation had been followed, and a list of prioritized recommendations. Note that under the new SARC process, the "report shall be a summary of the individual Review Reports, accurately and fairly representing all viewpoints." ...with "no attempt by the Chair to develop a consensus report." Note also that the TOR differed for each assessment.

Please note that in preparing the species reports, I have relied heavily on the SARC reviewer reports and, when they stated ideas and conclusion with utmost clarity, I have paraphrased tightly.

Stock Assessments

Summer Flounder

Summer flounder are demersal fish that exhibit seasonal migratory behavior. They are harvested along the US East coast by commercial (65%) and recreational (35%) fishers. This species was assessed with age-based models in 2002, reviewed by SARC-35 and the assessment was updated in 2003 and 2004.

Meeting the TOR

TOR-1. Update the summer flounder assessment models (i.e. ADAPT VPA and AGEPRO projection) using the same configurations as those used in the 2004 SAW Southern Demersal Working Group (WG) assessment update.

The current assessment model (ADAPT VPA) updates the assessment done in 2004. A property of the ADAPT VPA model is that it does not estimate errors in the catch at age, but relies on the matrix as accurate and precise. The catch-at-age matrix relies on age-length keys (ALK) developed from commercial landings, which are then applied to the recreational harvest. Because there are different capture methods and different depth ranges in both fisheries, several reviewers were concerned that error could be introduced into the catch-at-age matrix by using an ALK from the commercial sector, but would not be accounted for.

The stock assessment relies on three annual NMRFS NEFSC fishery-independent surveys along with state surveys to tune the model. Reviewers were concerned over the use of numerous state surveys as tuning indices because of their limited spatial coverage and the untested expectation that they provide unbiased population indices. However, according to the TOR, a prescribed formulation of the VPA (which included the state surveys) had to be used. The review panel agreed with the WG that they begin using a forward age-

structured program (such as ASAP). The reviewers suggested that the working group should use the most up-to-date model to optimize the use of available data.

A retrospective pattern exists in the output of the VPA, which Mark Terceiro stated was “retrospective bias”. However, in the Assessment Summary document there were several sentences which implied that the current estimators of biomass and fishing mortality were biased, as evidenced by a retrospective analysis. This is the standard interpretation and terminology of retrospective patterns within the assessment community. However as a statistician, Patrick Cordue suggested caution in interpreting the pattern as bias. He emphasized that the VPA results are from one realization only and that auto-correlation between years can exacerbate such putative relationships. The proper way to determine the presence of bias is to perform simulations where different “realizations” can be assessed. Cordue gave a presentation entitled “Retrospective analysis, a note on correct interpretation”. In his talk, he showed that retrospective analysis, as currently practiced, only dealt with a single realization of a time series of random variables. As such, the results cannot reveal anything about the bias or variance of the estimators of current biomass or current fishing mortality. The SARC members encouraged him to develop a paper for publication that reflects these points. This was a very informative presentation.

TOR-2. Estimate biological reference points derived by yield and SSB per recruit analysis and by stock-recruitment modeling, following the procedures adopted by the 2002 Working Group on Re-Evaluation of Biological Reference Points for New England Groundfish.

The SARC reviewed the use of both non-parametric and parametric approaches to calculate biological reference points. As both approaches gave similar results, the SARC regarded the nonparametric approach to be preferable because limited time series were available to calculate stock-recruit relationships.

The estimation of biological reference points was done according to the TOR. The SDWG tried a range of methods that produced a set of plausible estimates that showed little variation (there were other estimates that were not plausible – caused by clear failure of the method used). I have not considered the technical merits or deficiencies of the different methods in detail as they were prescribed in the TOR. I suggest that some future consideration be given to risk based definitions of reference points (e.g., Francis 1992).

The summer flounder assessment update and revision of biological reference points were done according to the TOR and are adequate as a basis for providing scientific advice to management.

TOR-3. Consider the recommendations of the MAFMC Science and Statistical Committee (SSC) 2001 peer review of the summer flounder Overfishing Definition in developing the analyses described in TOR 2. The major recommendations were to explore other proxies (besides F_{max}) to F_{MSY} , to continue stock-recruitment model

development as additional stock-recruit estimates become available, and to monitor and utilize new data on the population dynamics of summer flounder (e.g., age, growth, and maturity) as they become available.

The SARC had few comments on this TOR. Patrick Cordue suggested that “some future consideration be given to risk based definitions of reference points (e.g., Francis 1992).”

TOR-4. Review, evaluate and report on the status of the SARC/Working Group research recommendations offered in previous SARC and WG reviewed assessments.

There was little discussion by the SARC for this TOR. The SAW-41 assessment was an update of the previous one in 2004. As John Wheeler noted, “Several recommendations from the SARC 35 review of the 2002 assessment and from the 2003 and 2004 assessment updates have not yet been addressed; where appropriate, these should be retained and addressed in detail prior to the next bench-mark assessment review.”

Data Issues

Fishery data

The summer flounder fishery is one of several along the U.S. East Coast that has substantial recreational landings (35% by weight) in addition to the commercial fishery (65% of landings by weight). Both components are adequately sampled for length, well within the protocol (200 mt per 100 lengths) established by the working group.

The presence of a substantial recreational harvest complicates data collection. Recreational catch and effort are monitored the Marine Recreational Fisheries Statistics Survey (MRFSS), which has a minimum reporting lag of two or more months. Recreational harvest is measured for length but not for age. Subsequently, the ALK developed from the commercial fishery is applied to recreational harvest. This is a potential weakness. Several reviewers were concerned about the validity of this approach if commercial and recreational fishery areas do not overlap, in particular, by depth. SARC reviewers suggest that a sampling program should be developed to obtain age data from the recreational fishery.

SARC reviewers were concerned about discard mortality estimates used in the assessments. The commercial fishery annually discards approximately 700 – 800 mt. An 80% mortality rate is assumed, but is based upon anecdotal information only. The SARC suggest that direct estimates of discard mortality rate be done by gear type. John Wheeler commented that “the mortality rate of discards in the recreational fishery is better estimated.”

The SARC also suggest that the working group evaluate the use of scales and otoliths for ageing summer flounder. Currently, summer flounder are aged with scales. However, the SARC felt that as stock size increases and older fish become more abundant, that scales may underestimate true age. Even though otoliths are “expensive to collect due to

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the value of the fish, both commercially and recreationally, as a head-on product”, an ageing comparison is important.

Data gaps – There are no age data from the recreational fishery; there is a need to test the CPUE time series for temporal trends that may compromise their value; research is needed to clarify discard mortality.

Survey Data

Abundance indices are derived from three seasonal NEFSC research trawl surveys, with the winter survey providing better sampling of the stock. Of the survey abundance indices available, these NEFSC surveys cover the broadest spatial and temporal range. The SARC suggested that it would be valuable to combine these indices into a single annual index. In addition to the NEFSC surveys, there are numerous state-run surveys that are individually more limited in their temporal and spatial coverage. Again, if these can be combined appropriately, it would be valuable.

Data gaps- No integrated survey index is available from the NEFSC or state surveys.

Biological Data

Summer flounder are aged with scales. As the stock rebuilds and older fish become more abundant, scales may underestimate age.

Data gaps- validity of using scales to age older fish.

Summary of Findings

The SARC agreed that the working group fulfilled all of its TOR. TOR-4 required that the working group only review, evaluate, and report on previous implementation of recommendations. They reported that several were not met. The nature of this assessment was to update the previous one. The SARC agreed that the assessment was adequate to serve as a basis for providing scientific advice to management. Several SARC reviewers were surprised to see an assessment update as part of a SARC review and commented on this in their final reports to CIE.

Recommendations

Short term

- Evaluate the use of newer models that use existing data appropriately such as a forward calculating age-structured or a fully integrated stock assessment model. Particular attention should be given to the use of statistical catch-at-age models.

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- Develop integrated survey indices by: combining the three NEFSC research trawl survey indices into a single annual abundance index, and combining state-run survey indices into a single annual abundance index.
- Reconsider the interpretation of the retrospective pattern and revise the assessment documents accordingly.
- Test for trends in the time series of CPUE.
- Update biological data, such as maturity ogives, reproductive capacity of the stock, and growth-dependent factors, such as survey catchability and maturity.

Long term

- Design and implement a program to collect otoliths from the commercial and recreational fisheries. Compare the accuracy and precision of age estimates between scales and otoliths with attention to ageing older fish. Test the assumption that commercial age-length keys are appropriate for attributing age from recreational-fisheries data.
- Design and implement a research program to estimate the mortality rate of discards for each of the primary commercial fishery gears (i.e. trawls and scallop dredges).

Bluefish

Bluefish is a migratory pelagic fish that is harvested along the U.S. East Coast from Maine to Florida largely by recreational anglers (>80%). In 2004, SARC-39 rejected the previous bluefish assessment because of the instability of estimates derived from ASPIC, a catch/effort stock assessment model. The new stock assessment used age-based models and much improvement was made in just a year. Note, however that the SARC felt that this was a very short time to develop new assessments to present before another SARC.

Meeting the TOR

TOR-1. Evaluate adequacy, appropriateness and uncertainty of fishery-dependent and fishery-independent data used in the assessment.

The Bluefish Technical Committee (BTC) provided a detailed review of the fishery-dependent and independent data. The SARC reviewers were very concerned that inadequacies in the data would compromise the assessments. Bluefish are a difficult species to sample. They range along the U.S. East Coast and different size fish use habitat and migrate differently. Thus it is difficult to provide a representative sample of the population. Additionally, exploitation is largely from recreational anglers and this also increases the difficulty in providing biological data.

Because the NEFSC trawl surveys are not effective in sampling this pelagic species, there is increased reliance on state surveys. However, the state surveys are not coordinated, and have limited spatial and temporal coverage. The surveys use different gears too. Hence, the use of state surveys as population indices is another deficiency in the assessment. These state surveys provide such limited spatial and temporal coverage that their use as population indices cannot be justified. It was clear that coordination of state surveys would yield real value for this species as would developing a method of combining state indices so that the data can be used in stock assessments.

There is particular concern that there is a gap in sampling 3, 4, and 5-year-old fish. This has been an ongoing defect that has not been adequately addressed.

The SARC were also concerned with the difficulty in ageing this species and in the use of ALK. Scales are used for ageing. However, currently scales and otoliths are problematic for ageing older fish. The difficulty in obtaining age data from this predominantly recreationally-exploited species also results in gaps in the annual ALK. The BTC combined ALK across years and locations without testing whether this was an appropriate use of these data. These combined ALK were then used as input to models that assume no error in the catch-at-age matrix.

Overall, the SARC determined that data quality was problematic for this fishery and that there is a strong need to improve the quality of these data or assessments will suffer as this one has.

TOR-2. Evaluate adequacy and appropriateness of models used to assess the species and to estimate population benchmarks.

For SARC-39 the bluefish stock assessment was done with ASPIC, which proved to be inadequate, and was rejected. The BTC has made substantial advance since the prior SARC, which was only a year ago. They have attempted the assessment with a partially age-structured (Collie – Sissenwine) model and subsequently used a catch-at-age (ASAP) model. John Wheeler stated that “the use of the ASAP model, compared to the ASPIC model in SARC 39, is a positive step forward. ASAP is better suited to handle observed selectivity patterns.”

Although the BTC stated during the workshop that it had performed simulations and analysis of errors, these results were undocumented and not available to the SARC. The SARC felt that the subcommittee had insufficient time, and possibly expertise, to provide full documentation of results in the current assessment document. This resulted in one reviewer's comment that “The bluefish assessment was technically deficient and inadequately documented. This was not the fault of the Bluefish Technical Committee. The nature of the bluefish data required that a careful statistical modeling exercise be undertaken. This was outside the expertise of the Bluefish Technical Committee.”

This assessment was the first attempt to use the ASAP model for bluefish and the documentation necessary for statistical evaluation was not available due either to

inexperience or lack of time. Patrick Cordue stated that “They correctly adopted the use of a statistical model (rather than a VPA) but because of inexperience with such models were unable to produce a statistical assessment of sufficient quality on which to base management advice.” Because the data were initially formulated for use with an ADAPT VPA, they constructed a catch-at-age matrix “for a continuous number of years despite inadequate samples of otoliths from 1997 to 2004 (see B-1, Table 8).” The BTC found that use of VPA was inappropriate because it required an exact catch-at-age matrix and because treatment of fishery selectivity was inadequate for bluefish. By using ASAP, they allowed errors in the catch-at-age matrix and more flexibility in the fishery selectivity pattern. However, ASAP also required that they reformulate their data and provide estimates of statistical error.

Several members of the SARC saw the use of CPUE at age as a double use of data because it was derived from the same catch at age also used as model input and therefore not independent. The model assumes independence and this assumption was violated. The result was to give more weight to recreational indices. Patrick Cordue also noted that “it is not clear that any indices had appropriate “weight” in the fitting procedure (assumed CVs and effective sample sizes are not given in the assessment documents). No consideration was given to varying the weight of indices across years within time series (despite variations in sample sizes). Also, the relative weights of time series in the ASAP model were primarily determined using ADAPT; any re-weighting of time series clearly should have been done in ASAP.”

The lack of meaningful diagnostics in the bluefish documentation is also of concern. Patrick Cordue noted that claims of a “good fit” to indices cannot be substantiated without the production of standardized residuals that account for the weight placed on the indices. The tabulation of likelihood values and residual sum of squares is not useful for a single run (B-1 Table 22). Comparison of likelihood values across runs can be useful, but no ASAP sensitivity runs are presented in the assessment documents. Finally, no estimates of uncertainty were presented for the ASAP base model. Bootstrap confidence intervals were calculated for the ADAPT run, but these are obviously not transferable to the ASAP run.

TOR-3. Evaluate and either update or re-estimate biological reference points as appropriate.

The BTC provided updated biological reference points based on ASAP results (Appendix 3. B-1; p 27). However, the SARC did not discuss these because of their concerns with modeling and data quality.

TOR-4. Estimate and evaluate stock status (biomass) and fishery status (fishing mortality rate). Is the stock overfished; is overfishing occurring?

The BTC estimated and evaluated the stock status and found that the stock was not currently overfished based on the assessment. The SARC was unwilling to accept this

assessment result unequivocally. The SARC determined that, at best, this conclusion be treated with great caution due to the problems with input data.

TOR-5. Develop recommendations for improving data collection and for future research.

The BTC presented 16 recommendations to improve data collection and modeling. The SARC agreed with these recommendations and these coincide with those of the SARC.

Data Issues

Fishery Data

Sampling in the commercial fishery is poor to adequate. The dominant gear is gill net (50%), while other commercial gears are pound nets, seines, trawls and hook and line. Gill nets sizes vary by area with the result that small and large fish are adequately sampled but not mid-sized fish. It is not clear whether the lack of mid-sized fish is a result of availability or gear selectivity. The lack of mid-sized fish causes problems when using these data to provide an ALK for transforming length data into a catch-at-age matrix.

The recreational fishery is sampled by MRFSS. There is no direct measure of discard mortality and it is assumed to be 15%. The SARC 39 recommended that this be evaluated but no action has been taken to date.

Data gaps – No evaluation of recreational release mortality; no evaluation of whether gear selectivity is causing an age gap in landings.

Survey Data

Bluefish are surveyed by the NEFSC fall trawl surveys, which cover from Cape Hatteras to Maine. However, this gear under-sampled this pelagic fish, doesn't cover its full distributional range, and catches mostly age-0 and -1 bluefish. Additionally, 11 state surveys are used to estimate abundance (Appendix 3; Document B-1; pages 18-24). However, these surveys differ in survey objective, timing, gear, and spatial extent. SARC-39 recommended that these disparate surveys be integrated to evaluate whether they could provide a reliable estimate of bluefish abundance. This recommendation has not been addressed yet. John Wheeler points out that "The SARC 39 recommended an integrated analysis of the various juvenile bluefish surveys, including a workshop to evaluate data quality, ability as indices, and survey coherence. Sufficient time should have been granted to conduct this workshop and implement the results prior to the review of this assessment."

Data Gaps – The bluefish assessment lacks well integrated, meaningful survey results with which to tune models.

Biological Data

Bluefish are managed as a single stock in the western North Atlantic with recent genetic studies to support this. Tagging data also show extensive coastwide movement and migration. However, there are two discernable juvenile cohorts, one spawned in the spring, the other in summer. It was not clear what triggers spawning or even where spawning occurs. Although many basic questions remain unanswered, tagging studies have demonstrated a broad migratory pattern and genetic studies have shown no differences between areas. Even so, there is no clear explanation for the lack of mid-sized fish and it is unknown whether this has a biological basis.

Bluefish have been aged largely with scales, but also occasionally with otoliths. Both structures are problematic with older fish. Although some ageing comparisons have been done, they are preliminary. As early as 2002, an otolith/scale comparison was recommended in the bluefish FMP review. In the current assessment the subcommittee used a 6+ age group. However, as the stock rebuilds, it will be important to know the dynamics of these older fish.

Data gaps – The use of archival tags would help to obtain a better understanding of the migration patterns and habitat use by bluefish, especially for mid-size fish. It has proven difficult to obtain precise estimates of age for older fish from scales and otoliths. A comparison of scales and otoliths needs to be undertaken, possibly combine with an ageing workshop. As the stock rebuilds, it will be especially important to accurately age older fish.

Summary of Findings

The SARC was divided on whether the bluefish stock assessment was adequate to provide sound scientific advice to managers. Although two reviewers thought that the assessment was adequate, they also recognized the clear problems with the assessment. For example, although Olav Godø thought that the assessment could be used for management, he also strongly stated that its conclusion that the stock is not overfished should be used with great caution. John Wheeler was also cautious but thought that the BTC did meet its TOR and, even though there were shortcomings to the assessment, he did not think that it was clearly shown that the shortcomings invalidated the model conclusions. Although the BTC did address all five TOR, the SARC was concerned both by problems with the data and inadequate handling of ASAP. Patrick Cordue was particularly concerned with the dual use of data in constructing the CPUE by age and by the lack of statistical diagnostics. All SARC members felt that the assessment had been brought back to a SARC too soon and that there was not enough time to incorporate the recommendations of SARC-39.

Recommendations

Lack of consensus also occurred in the priority of the recommendations. I have ordered recommendations based on a majority opinion of the SARC.

Short term

- Continue to develop statistically appropriate models for this stock, including evaluation of uncertainty and sensitivity. This modeling should also test sensitivity to data quality. The BTC should avoid double use of the data as model input.
- Evaluate the fishery-independent surveys used to tune the model with special emphasis on determining if the state surveys can be combined to yield better temporal and spatial representation of stock abundance. The BTC should encourage the states to coordinate their survey efforts for bluefish to improve the quality of data that can be obtained. We suggest a workshop to address this and other data issues.
- Evaluate the use of otolith and scale ageing of bluefish. We suggest this be a separate workshop to evaluate the best ageing structure and its reliability for stock assessment input. After the evaluation, intensify collection of age data from commercial and recreational fisheries, and evaluate the validity of combining age classes across years in an ALK.

Long term

- Improve sampling coast wide by gear and fishery sector to obtain information with special emphasis on mid-size fish. This may require alternative fisheries-independent assessment methodologies (such as lidar, archival tagging, sonar).
- Increase fishery-independent sampling to better represent the population's offshore and southern habitat.
- Determine if discard mortality of 15% for the recreational fishery is accurate.

Tilefish

Golden tilefish have a narrow temperature preference of 9-14 °C and inhabit the upper continental slope along the western Atlantic from Nova Scotia to South America. Tilefish occupy burrows, and are long lived and slow growing. They are harvested in southern New England and the mid-Atlantic Bight primarily by long line. Harvest is dominated by less than a dozen vessels that currently land their catch in Montauk, New York. There is a minimal recreational fishery from rare directed charter trips.

Meeting the TOR

*TOR-1. Characterize the commercial catch including landings and discards.
Characterize recreational landings.*

The SDWG presented information for commercial catch and discard, CPUE, market category and length data. The recreational catch information was exceedingly sparse due to the minimal recreational effort directed at this species. The SARC concurred that this TOR was met adequately.

TOR-2. Estimate fishing mortality and total stock biomass for the current year and characterize the uncertainty of those estimates.

Fishing mortality and stock biomass estimates were developed using three alternate models: ASPIC, AIM, and LRSG. The ASPIC model was used previously in the 1998 assessment and appeared to produce reasonable results. John Wheeler pointed out that ASPIC assumes that CPUE accurately reflects stock abundance. The SARC concurred that this assumption should be investigated in the future. The SDWG rejected the LRSG model because it combined commercial CPUE into a single time series, which did not reflect the nature of the data well. The fleet has changed over time, different hooks have been used, and different sized fish are thought to have been targeted. Therefore, the SARC agreed that the LRSG model wasn't a good model for these data. The SARC concluded that this TOR had been adequately met.

TOR-3. Evaluate and either update or re-estimate biological reference points as appropriate.

Biological reference points were developed using ASPIC. Apparently, there was little change from 1998. The SARC concluded that this was a reasonable approach and there was little discussion of the TOR.

TOR-4. Where appropriate, estimate a constant TAC and/or TAL based on stock status for years following the terminal assessment year.

TAC has been set at 905 mt and this has resulted in stable biomass even though the TAC has been exceeded by 25% lately. The reason for the overage was attributed to a difference in how the industry and NMFS define and interpret landed weights (gutted or round). The SARC members pointed out that one reason for apparent biomass stability was the presence of a strong year-class, probably spawned in 1999. Again, there was no controversy over this TOR and the SARC concluded that it had been met adequately.

TOR-5. If projections are possible,

- a. provide seven year projections of stock status under various TAC strategies and*
- b. evaluate current and projected stock status against existing rebuilding or recovery schedules, as appropriate.*

The SDWG did not produce long-term projections of stock status because of the limitations to the available data and models. The SARC agreed that this was a wise decision.

TOR-6. Review, evaluate and report on the status of the research recommendations offered in the 1999 Science and Statistical committee reviewed assessment.

In 1999, the SDWG received seven research recommendations from the MAFC S&S committee. These were reviewed. Three of the seven recommendations have been addressed, one is in progress, and two more will be addressed when NMFS conducts a hook selectivity study to be completed in 2006. The final recommendation to estimate r with ASPIC and auxiliary data has not been addressed. The SARC members agreed that this TOR was met adequately and felt that the SARC recommendation would further those of the MAFMC S&S committee.

Data Issues

Fishery Data

Fishery-dependent data consists of landings from longline, trawl, recreational fishing and miscellaneous catches. These landings are sampled for length. Because there is no fishery-independent survey for tilefish, the SDWG used CPUE as their index of abundance. There were three sources for CPUE (Turner data, weigh out, and VTR) that were handled as three separate series. The quality of the landings data should be good because the longline fishery dominates the catches, the fishing grounds are geographically limited, and fewer than a dozen vessels account for most of the landings. Even though sampling has improved, there are still concerns with effort estimates. Olav Godø commented that "Long line is a passive gear and CPUE measures need particular attention due to nonlinearity in most common measures of effort. Simple factors such as gear saturation (Somerton and Kikkawa 1995), territorial or bait defense (Godø *et al.* 1997) are just two examples that may corrupt the index when substantial changes in stock occur". The SDWG used two different measures of effort, days fishing and days absent from port to try to address this question. However, some of the fleet's behavior has changed, such as hook size and targeting specific sizes. This may produce biased estimates of effort. SARC members suggested that other measures such as the number of hooks or amount of bait might give better and unbiased measures of effort. The SARC also noted that because the fishery was limited to a few vessels and these appeared to be cooperative, NMFS could pursue cooperative research with the fleet that would result in better data, particularly for effort indices.

Data gaps – Data for effort and fleet behavior could be improved. Also, documents sent to SARC showed 41% of landings in 2004 were listed as other gear. We were told that this as a coding mistake and was being rectified.

Survey Data

There are no fishery-independent surveys available for tilefish. Therefore, the models are tuned solely by the fishery-dependent CPUE data.

Biological Data

Even though this species has been exploited for a century, very little is known about its biology. There is apparent sexual dimorphism and males may be territorial over their burrows. The suggestion from the SARC to institute a cooperative research program with industry could provide important biological information from this species.

Data gaps – There is a need for improved information on age-length, growth, and fish behavior. The SARC discussed whether stock unity had been determined – there was some question about the relationship between tilefish in the MAB and SAB.

Summary of Findings

The SARC was unanimous in their evaluation that the Southern Demersal Working Group (SDWG) had done an exemplary job with this stock assessment. The SDWG fulfilled its TOR and provided an excellent review of data and modeling in two very professional presentations. The SARC agreed that this stock assessment provided sound scientific advice to management.

Recommendations

SARC members largely agreed as to the importance of the following recommendations.

Short term

- Improve the quality of effort data by determining the value of alternate measures of effort (number of hooks, amount of bait) and test for trends in effort that would result in bias in CPUE.
- Develop a cooperative research program with industry to include:
 - logbook data;
 - comprehensive biological sampling;
 - alternate measures of effort;
 - technical and behavioral change in the fleet.

Long term

- Increase knowledge of general biology including age and stock identity.
- Develop a fully integrated stock assessment model to use with current data.

Other recommendations are listed in Appendix 2.

Appendix 1. Final Terms of Reference

Terms of Reference for the 41st Northeast Stock Assessment Workshop (approved: March 18, 2005)

SAW/SARC 41
June 6-10, 2005
NEFSC, Woods Hole, MA

Bluefish - ASMFC Technical Committee/Assessment Subcommittee

1. Evaluate adequacy, appropriateness and uncertainty of fishery-dependent and fishery-independent data used in the assessment.
2. Evaluate adequacy and appropriateness of models used to assess the species and to estimate population benchmarks.
3. Evaluate and either update or re-estimate biological reference points as appropriate.
4. Estimate and evaluate stock status (biomass) and fishery status (fishing mortality rate).
 - a. Is the stock overfished; is overfishing occurring?
5. Develop recommendations for improving data collection and for future research.

Tilefish - SAW Southern Demersal Working Group

1. Characterize the commercial catch including landings and discards. Characterize recreational landings.
2. Estimate fishing mortality and total stock biomass for the current year and characterize the uncertainty of those estimates.
3. Evaluate and either update or re-estimate biological reference points as appropriate.
4. Where appropriate, estimate a constant TAC and/or TAL based on stock status for years following the terminal assessment year.
5. If projections are possible,
 - c. provide seven year projections of stock status under various TAC strategies and
 - d. evaluate current and projected stock status against existing rebuilding or recovery schedules, as appropriate.

6. Review, evaluate and report on the status of the research recommendations offered in the 1999 Science and Statistical committee reviewed assessment.

(approved: March 18, 2005)

Summer Flounder - SAW Southern Demersal Working Group

1. Update the summer flounder assessment models (i.e. ADAPT VPA and AGEPRO projection) using the same configurations as those used in the 2004 SAW Southern Demersal Working Group (WG) assessment update.
2. Estimate biological reference points derived by yield and SSB per recruit analysis and by stock-recruitment modeling, following the procedures adopted by the 2002 Working Group on Re-Evaluation of Biological Reference Points for New England Groundfish.
3. Consider the recommendations of the MAFMC Science and Statistical Committee (SSC) 2001 peer review of the summer flounder Overfishing Definition in developing the analyses described in TOR 2. The major recommendations were to explore other proxies (besides F_{max}) to F_{MSY} , to continue stock-recruitment model development as additional stock-recruit estimates become available, and to monitor and utilize new data on the population dynamics of summer flounder (e.g., age, growth, and maturity) as they become available.
4. Review, evaluate and report on the status of the SARC/Working Group research recommendations offered in previous SARC and WG reviewed assessments.

Appendix 2. Additional Topics/Issues Raised During the SAW/SARC-41

General Issue of Using Data-appropriate Statistical Assessment Models

A general source of concern was the type of stock assessment model that has been used in assessments for SARC/SAW-41. When data are adequate for age-based models, models are used such as ADAPT that don't handle data irregularities well. One example of this was the problem with bluefish catch-at-age matrices. Patrick Cordue led the discussion on the use of newer statistical models that would better handle irregular and inconsistent data. He stated that "Statistical modeling requires a major shift in philosophy and technique from that applied in VPA assessments. Assessment scientists more familiar with the latter rather than the former need more exposure to statistical modeling ideas and techniques...". This advice is applicable to other assessments than bluefish alone, when more data-appropriate methods are available. Patrick Cordue suggested that staff be trained in these newer methods, including workshops.

General Issue of Coordinated State Surveys

Through several of the assessments, the SARC members were concerned that state surveys were valuable indices of many species, but because they are not coordinated, they are difficult to use to tune models. The SARC members were in agreement that if these surveys could be better coordinated and statistical methods used to integrate their results, then immeasurable value would be added to assessments for many species.

Comments on the Revised SAW/SARC Method

Another point of discussion during the SARC meeting was the new process of the SARC. One member, John Wheeler, had been to a previous SAW/SARC and was able to comment on the differences that he saw between the two approaches. Under the previous procedures, more people participated in the review itself and there was revision of model output during the meeting. Under the new procedures, there is no direction to reach consensus, only the SARC members provided evaluation, and there are clearer lines of stock-assessment authorship. In many ways the new procedures are an improvement, but there are also some constraints. Dr. Wheeler suggested a broader panel, with a few other outside reviewers. One obvious result of the new procedure is that with only three SARC reviewers, advice may differ more from one year's assessment to the next because of specific expertise that may be present in some panels and absent in others.

Additional Recommendations

Individual members of the SARC team authored recommendations that were not reflected by others. Although these weren't included in the body of this report because they were unique to the member, they are valuable and are included in this appendix.

Bluefish recommendations

John Wheeler

- Conduct research on influences on recruitment including pathways of larval bluefish.
- Initiate coastal surf zone seine study to provide more complete indices of juvenile abundance.
- Explore a tag based assessment and associated costs compared to age based assessments.
- Determine if a tag based assessment could supplement or replace other assessment techniques.
- Continue to examine alternative models including a forward projection catch-at-age model.

Patrick Cordue

- Formulate stock and migration hypotheses, detailing the basis for each hypothesis.
- Develop a fully integrated stock assessment model that uses the existing data appropriately.

Tilefish recommendations

John Wheeler

- Conduct a hook selectivity study to determine partial recruitment changes with hook size. Determine catch rates by hook size. Update data on growth, maturity, size structure, and sex ratios at length.
- Collect data on spatial distribution and population size structure. This can help answer the question of the existence of a possible dome-shaped partial recruitment pattern where larger fish are less vulnerable to the fishery due to spatial segregation by size.
- Continue to develop the forward projecting catch-length model as additional length data becomes available. Investigate the influence of adding a tuning index of abundance and model estimated partial recruitment (logistic) to the catch – length model.
- Collect appropriate effort metrics (number and size of hooks, length of main line, soak time, time of day, area fished) on a haul basis to estimate commercial CPUE.
- Initiate a study to examine the effects of density dependence on life history parameters between the 1978 – 82 period and the present.
- Increase observer coverage in the tilefish fishery to obtain additional length data.
- Develop a bioeconomic model to calculate maximum economic yield per recruit.

SARC-41 Chair's Report to CIE

- Design and implement a hook selectivity experiment with a spatial – depth component to determine if larger fish occur in deeper waters. The experiment should be designed to provide an annual index of abundance and potentially as a recruitment index.
- Re-examine the lagged recruitment survival growth model to determine if it can incorporate multiple CPUE series. If so, compare and contrast the results with existing surplus production model output.

Olav Godø

- A long-term goal should be to build up our knowledge of the general biology of this species through periods of more intense sampling of catches, as proposed in the Research Recommendation of SAW 41(#4-5).

Appendix 3. Documents Reviewed for SAW/SARC-41, June 6-10, 2005, Northeast Fisheries Science Center, National Marine Fisheries Service, Woods Hole, MA

General Documents

Revisions to the Northeast Regional Stock Assessment Workshop –‘Old’ versus ‘new’

Terms of Reference for the 41st Northeast Stock Assessment Workshop, (approved March 18, 2005), SAW/SARC 41, June 6-10, 2005, NEFSC, Woods Hole, MA

Summer Flounder

A-1 Summer flounder: Stock assessment update and biological reference point estimation by SAW Southern Demersal Working Group, Mark Terceiro, NMFS/NEFSC

A-2 Summer Flounder Appendix A: Data Tables & Figures

A-3 Summer Flounder Appendices B: 1) ADAPT VPA Output, 2) AGEPRO Projection Output

A-4 SSC Committee Overfishing Definition (2001)

A-5 A; Summer Flounder, SAW/SARC-35 Report (2002), NEFSC Reference Document 02-14

A-6 Stock Assessment of Summer Flounder for 2003 by Mark Terceiro, August 2003, NEFSC Reference Document 03-09

A-7 SAW Southern Demersal Working Group 2004 Summer Flounder Assessment Summary, June 21, 2004

A-8 Re-evaluation of biological reference points for New England groundfish by Working Group on Re-Evaluation of biological reference points for New England groundfish, March 2002, NEFSC Reference Document 02-04

SARC/SAW-41 2 Powerpoint presentations by Mark Terceiro, June 6, 2005

SARC/SAW-41 Summer Flounder Rapporteur Report by Kathy Sosebee

SARC-41 Chair's Report to CIE

Bluefish

B-1 B: Working paper for blue stock assessment 41st Northeast Stock Assessment Workshop working document for Stock Assessment Review Committee, June 6-10, 2005

B-2 Corrections to paper B1: Corrections to Paper B1: Bluefish SAW-41 Working Group Stock Assessment Report (May 24, 2005)

B-4 C: Bluefish SARC Report SAW/SARC-23 (1996)

B-5 Report on the 39th Northeast Regional Stock Assessment Workshop (SAW-39) Stock Assessment Review Committee (SARC) Meeting by Andrew I.L. Payne, SARC-39 Chair

SARC/SAW-41 Powerpoint presentation by Jessica Coakley, June 7, 2005

SARC/SAW-41 Bluefish Rapporteur Report by Gary Shepherd

Tilefish

C-1 Assessment of golden tilefish, *Lopholatilus chamaeleonticeps*, in Middle Atlantic-Southern New England Region, SAW 41 SARC Working Paper C1, a report of the Southern Demersal Working Group, NMFS/NEFSC

C-2 Golden Tilefish Summary Report, SARC 41

C-3 Assessment of tilefish in the Middle Atlantic-Southern New England Region by Paul Nitschke, Gary Shepherd, and Mark Terceiro (1998) for S&S Committee Review

C-4 G. Tilefish (Background SAW/SARC 16)

SARC/SAW-41 Powerpoint presentation by Paul Nitschke, June 7, 2005

SARC/SAW-41 Powerpoint presentation by John Brodziak, June 7, 2005

SARC/SAW-41 Tilefish Rapporteur Report by Laurel Col

Appendix 4. Statement of Work

Statement of Work Consulting Agreement between the University of Miami and Dr. Cynthia Jones

May 5th, 2005

General

The Northeast Regional Stock Assessment Review Committee meeting (SARC) is a formal, multiple-day meeting of stock assessment experts who serve as a peer-review panel for several tabled stock assessments. The SARC is the cornerstone of the Northeast Stock Assessment Workshop (SAW) process, which includes peer assessment development (SAW Working Groups or ASMFC technical committees), assessment peer review, public presentations, and document publication.

The Center for Independent Experts (CIE) shall provide a panel chair and three panelists for the 41st Stock Assessment Review Committee panel. The panel will convene at the Woods Hole Laboratory of the Northeast Fisheries Science Center in Woods Hole, Massachusetts, the week of 6 June 2005 (June 6-10) to review assessments for bluefish (*Pomatomus saltatrix*), tilefish (*Lopholatilus chamaeleonticeps*) and summer flounder (*Paralichthys dentatus*).

Specific Activities and Responsibilities

The CIE's deliverables shall be provided according to the schedule of milestones in the table below. The final reports from the CIE will provide key information for a presentation to be made by NOAA Fisheries at meetings of the New England and Mid-Atlantic Fishery Management Councils in August and September 2006. The chair's duties shall occupy a maximum of 19 days (i.e., several days prior to the meeting for document review; the SARC meeting in Woods Hole; and several days following the meeting to review the individual panelist's Review Reports and produce the Summary Report). This report shall be a summary of the individual Review Reports, accurately and fairly representing all viewpoints. There shall be no attempt by the Chair to develop a consensus report.

Each panelist's duties shall occupy a maximum of 14 workdays (i.e., a few days prior to the meeting for document review; the SARC meeting; and a few days following the meeting to prepare a Review Report). The SARC Review Reports will be provided to the SARC Chair, who will produce the Summary Report based on the individual Review Reports.

Roles and responsibilities:

- (1) (Chair and Panelists) Prior to the meeting: review the reports produced by the Working Groups.

- (2) (Chair) During the meeting: act as chairperson, where duties include control of the meeting, coordination of presentations and discussion, control of document flow and facilitation of discussion.
- (3) (Chair) After the meeting: provide a Summary Report, which summarizes the findings of the individual panelist’s Review Reports (see previous paragraph). The Summary Report shall be organized like the Review Reports, with an executive summary, a review of activities and, for each stock assessment reviewed, a summary of findings and recommendations that collectively emerged from the meeting. Advice on additional questions that are directly related to the assessments and are raised during the meeting should be included in the report text. These additional topics/issues should be listed along with the original Terms of Reference in a separate appendix attached to the report. The Chair shall not attempt to reach or describe consensus on an assessment, but shall fairly summarize the individual Review Reports and draw attention to the collective conclusions and recommendations.

The milestones and schedule for the Chair are summarized in the table below. The Chair shall begin the summarization using the draft individual Review Reports provided by the Panelists on June 24, 2005. When these individual reports are finalized, following the CIE internal review and approval by the NMFS Contracting Officer’s Technical Representative (COTR), the CIE shall provide copies of the final versions to the Chair on July 7 for completion of the Summary Report. No later than July 15, 2005, the Chair shall submit the Summary Report¹ to the CIE. This shall be addressed to the “University of Miami Independent System for Peer review,” and sent to Dr. David Sampson, via e-mail to david.sampson@oregonstate.edu, and to Manoj Shivilani, via e-mail to mshivilani@rsmas.miami.edu. The CIE shall provide the final Summary Report to the NMFS COTR for final approval on July 20, 2005.

| Milestone | Date |
|--|-----------------|
| Workshop at Northeast Fisheries Science Center (NEFSC) | June 6-10, 2005 |
| Individual panelists provide their draft reports to CIE for review and to Chair for initiating development of the Summary Report | June 24 |
| CIE provides reviewed individual panelist reports to NMFS COTR for approval | June 29 |
| COTR notifies CIE of approval of individual panelist reports | July 5 |
| CIE provides final individual panelist reports to COTR (with signed cover letter) and to Chair to complete Summary Report | July 7 |
| COTR provides final individual panelist reports to NEFSC contact | July 11 |
| Chair provides CIE with draft Summary Report for review | July 15 |
| CIE provides reviewed Summary Report to COTR for approval | July 20 |
| COTR notifies CIE of approval of Summary Report | July 21 |
| CIE provides final Summary Report with signed cover letter to COTR | July 22 |

| | |
|---|---------------|
| COTR provides final Summary Report to NEFSC contact | July 22, 2005 |
|---|---------------|

No consensus opinion among the CIE reviewers is sought, and all SARC reports will be the product of the individual CIE reviewer or chairperson.

The SAW Chairman and SAW Coordinator will assist the SARC Chair prior to, during, and after the meeting in ensuring that documents are distributed in a timely fashion.

NEFSC staff and the SAW Chairman will be responsible for the production of the final SARC report, which will include the Chair's Summary Report and the individual panelist's Review Reports. Staff and the SAW Chairman will also be responsible for production and publication of the collective Working Group papers, which will serve as a SAW Assessment Report.

NEFSC Contact person and SAW41 Chairman:

Dr. James R. Weinberg, NEFSC, Woods Hole, MA. 508-495-2352,

James.Weinberg@noaa.gov

ANNEX 1: Contents of Chair Summary Report

1. The summary report shall summarize the findings of the individual panelist's Review Reports. The Chair shall not attempt to reach or describe consensus on an assessment, but shall fairly summarize the individual Review Reports and draw attention to the collective conclusions and recommendations.
2. The summary report shall be prefaced with an executive summary of findings and/or recommendations.
3. The main body of the report shall consist of a review of activities and, for each assessment reviewed, a summary of findings and recommendations that collectively emerged from the meeting.
4. The report shall also include as a separate appendix the Terms of Reference used for SAW 41, including any changes to the Terms of Reference or specific topics/issues directly related to the assessments and requiring Panelist advice.