



SEAFOOD INDUSTRY COUNCIL

Report on the SARC 47: Summer Flounder Benchmark Stock Assessment

Prepared for:
The Center for Independent Experts

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BACKGROUND

This report is an independent review of the 2008 benchmark stock assessment of summer flounder, prepared under contract to the Center for Independent Experts. The Statement of Work under which the report has been prepared can be found at Annex 1. The content requirements of this report can be found at Annex 3. The report of the 47th SARC (Stock Assessment Review Committee) has been separately provided, in line with the requirements set out in Annex 4.

Prior to the review meeting (SARC 47) the SARC was provided with web access to the draft stock assessment report, supporting materials, working papers. I participated in SARC 47 at the Northeast Fisheries Science Center, Woods Hole, Massachusetts from 15th to 20th June 2008.

The review process and description of people involved is well covered in the separately provided SARC report. The review closely followed the agreed agenda (Annex 5). I am confident that the review was well informed and supported, that those present were able to provide comments and opinions, and that the process formed a good basis for an impartial and independent response from reviewers as well as an objective and fair SARC report.

The SARC considered all terms of reference (see Annex 2) and whether these had been adequately covered by the SDWG (Southern Demersal Working Group). The SARC considered these in light of the charge provided in the statement of work – whether the work of the SDWG provide a credible basis for determining management advice.

TERMS OF REFERENCE

1. *Characterize the commercial and recreational catch, effort and CPUE, including descriptions of landings, discards and discard mortality.*

The term of reference was successfully completed and provides a credible basis for undertaking a stock assessment to inform management decisions. In addition to comments made in the SARC report, I have three items to note.

First, in previous assessments, the recreational discard mortality rate was assumed to be 25% whilst for the 2008 assessment the assumed rate is 10%. Discussion took place during the SARC and the new rate assumption was accepted. However, as became apparent as the review progressed, stock status relative to defined biological reference points is critically poised and is potentially dependent on a range of factors (but most importantly the assumed natural mortality rate, M). The recreational catch is 40% of the total used in the assessment and the recreational live discard rate is high (up to 87% in 2007); the effect of changing the assumed discard mortality rate is the same as varying M. To

build credibility in the assessment, perceived stock status and consequent management advice it would be useful to explore more fully the “M equivalence” of different recreational discard rate assumptions and to provide robust defence of the assumption made.

Second, it is apparent that the actual recreational catch is not well known. Using the allocated catch in the assessment is reasonable but it would be sensible to conduct sensitivity tests of the benchmark assessment to variations in recreational catch (including trends if considered plausible). This should not be done to increase uncertainty in benchmark results but rather to test the sensitivity of management advice with a view to guiding research and catch monitoring decisions to ensure robust advice.

Third, more “characterisation” of the summer flounder fisheries would be valuable to guide analyses and help interpretation of results. By characterisation I mean a fuller exploration of the available fishery dependent data to describe the spatial and temporal patterns of fishing and how they have varied through time in response to management, and how they relate also to fishery independent information (biological from surveys, but also economic). Simple graphical and mapped outputs would provide a useful snapshot of the fishery.

2. *Review methods for using fishery-independent surveys as abundance indices in assessment models.*

- a. *Evaluate whether to combine several of the surveys into a composite survey index. If appropriate, implement this approach.*
- b. *Develop and implement an appropriate statistical method to account for the probability of observing zeros in NEFSC survey tows.*

a) The term of reference was attended to and completed. The SARC noted its agreement with the SDWG that determining how to combine separate surveys is a large research question. I agree with these comments and note that the SDWG approached the term of reference in the most obvious way, using a GLM to combine indices. However, given the lack of spatial overlap between inshore (state) surveys and between those surveys and the offshore NMFS surveys, plus the lack of temporal overlap between the three offshore surveys, combining indices using a GLM approach could not succeed. Linking spatially and temporally disparate data can only be accomplished given additional assumptions about process. If process models are to be explored to link survey information, this would probably best be explored within an integrated stock assessment model.

Having multiple surveys, and 51 indices, is a both a luxury and a pain in the stock assessment context. It is inevitable given so many surveys and indices that many will conflict internally or with other data sets. Finding a suitable weighting procedure is one approach to dealing with data conflict, as is developing a suitable

process model to integrate information from different sources - in this instance, however, it may also be profitable to review all surveys individually to consider design, conduct, internal consistency, etc. It may be that individual surveys could be excluded from analyses based on *a priori* considerations or that a more integrated approach to surveys could in time yield more useful results.

b) The term of reference was fully considered and completed. The distinction between zero tows and indices was made by the SARC and the note made that the SDWG treated the term of reference as relating to indices rather than tows. The two issues are quite different and it was beyond the scope of the SARC to consider the missing tows issue in detail; however, as advised by the SARC, consistent use of techniques that separate presence/absence (binomial model) and catch rate when present (typically Gaussian) is the obvious way forward. The SARC reviewed the background to the term of reference (2006 S&T) and noted the utility of further consideration of how zero tows are handled in the different surveys. It was unclear during the review how different state surveys are analysed and it would be helpful for future reviews (and credibility) to know that appropriate and consistent approaches are adopted.

Concerning the treatment of zero indices, and not knowing if these are real zeros or an artefact of how individual surveys are analysed, I agree with the SDWG and SARC that the appropriate approach is to treat zeros as missing values. It is well known that adding arbitrary constants to deal with zero or missing values can introduce bias and this should be avoided. However, especially with the adoption of assessment modelling packages that allow alternative error structures, exploration of error structure models that accommodate zeros might be considered.

3. *Evaluate the feasibility of implementing alternative approaches to assess status of summer flounder stock and comment on any potential effects on estimates of F, SSB, and BRPs. Alternative approaches could consider:*
 - a. *Separate Catch at age matrices for commercial and recreational fisheries, and resulting partial recruitment vectors for each fishery.*
 - b. *Regional differences (north, south) in catch at age matrices.*
 - c. *Potential gender differences in life span, growth rate, and natural mortality and implications of these factors for observed age- and length-specific sex ratios.*
 - d. *Strength of evidence for natural mortality rate used in the assessment; Update the estimate if appropriate.*

Term of reference 3 was adequately addressed.

a) The SDWG explored a range of models using SS2 that included separated catch-at-age information (up to 6 “fleets”). This allowed examination of the potential

to fit multiple selectivity patterns. The SDWG also explored a range of alternative ADAPT VPA and ASAP-implemented assessments to consider best estimation periods for selectivity. It was clear that the information content of the available data does not permit the use of multiple fleets at this time. For the final benchmark assessment, the SDWG split the catch-at-age data in to separate landings and discards components with each component covering commercial and non-commercial catches despite the major differences in selectivity that must exist given the different catch methods. The SDWG did not separate catch-at-age for recreational and commercial fisheries, as suggested for consideration in the term of reference.

Overall, I am not convinced as to the utility of the adopted catch-at-age split – it is neither a natural split given the fishery characteristics, nor a useful one for informing detailed management interventions. Although the sensitivity of management advice does not appear dramatic at this time, care needs to be taken with future model development not to upset the consistency of advice by changes in model structure and assumption. Changing future catch-at-age splits could have this effect and, although the adopted split is not “natural”, change should be avoided without careful exploration of the consequences.

b) This was explored to an extent using the six fleet SS2 model (unsuccessful) but primarily by analysis of survey data and commercial landings. Further characterisation of the fishery as suggested above would help with interpretation of regional differences and development of appropriate spatially explicit assessment models. It should be remembered that the purpose of assessments is to guide management. To achieve that aim assessments need to balance what can be estimated given available data and reasonable assumption, and at what scale advice needs to be delivered in order to underpin viable management interventions. The data available for summer flounder assessment is extensive but probably does not contain information to allow credible assessment at a scale much less than the stock level. Unless there is a strong management desire to manage at a finer scale, there may be little benefit in pursuing finer-scale assessments.

c and d) There are clearly differences in male and female lifespan, growth rate and hence natural mortality rate. These differences alone imply expected differences in sex ratio-at-age. Together with apparent strong male dominance in the first year (based on surveys), there is a significant change in sex ratio through time. Unfortunately, neither catch nor inshore survey data are disaggregated by sex, rendering sex and age-disaggregated assessments untenable.

The SDWG considered all available data on natural mortality and invested considerable time evaluating and discussing an appropriate value to be used in the benchmark assessment. The choice of M to be used in the benchmark assessment was made based on a range of biological considerations, exploratory modelling (in SS2) and likelihood profiling. Overall, the strength of evidence for the adopted

value is not strong but the evidence considered suggested the value was unlikely to be below the previously assumed value of 0.2 and could be higher than the newly assumed value of 0.25. The SARC was in no better a position to determine an alternative value and accepted the SDWG-adopted value of 0.25 but subject to investigating the way in which the assessment and management advice are sensitive to the assumption.

My view is that the use of $M=0.25$ for assessment, reference point calculation and stock status determination is justifiable, although the strength of evidence (as identified in the specific term of reference) for the specific value is weak.

4. *Compare results from alternative modeling approaches with those from the VPA model, to evaluate the robustness of VPA model results. Perform retrospective analyses of F , SSB , and recruitment for the models, and describe potential effects of retrospective patterns on assessment and rebuilding.*

The term of reference was addressed satisfactorily.

The SDWG expended considerable effort investigating alternative assessment models, including using new integrated catch-at-age assessments implemented using ASAP and SS2 frameworks. The SS2 framework was used extensively to explore alternative models. As noted by the SARC, this was a useful exercise and could be continued with a view to improving understanding of the data sets and their information content and the possible future improvement of the assessment. At this time, however, there is no obvious advantage to moving to more complex models.

The SARC noted difficulties following/understanding the model building processes followed by SDWG. This is not a criticism of SDWG. The materials provided were extensive and covered considerable ground on ADAPT VPA as well as ASAP and SS2 implemented models. During the SARC, Mark Terceiro in particular provided much needed additional insight as to how the model development and selection process proceeded. This was much appreciated. My view of the process was that the software being used provided much useful material to the analysts involved but did not easily allow consideration of models by others. It would help in future when multiple models are being considered to be able to see synoptic comparisons between models. Standardised outputs showing, for example, graphical fits and observed data (or residuals) for key data sets, or tables of likelihood components, would be helpful. Much work has already gone into development of the ASAP framework; it is worth considering whether to build additional components into ASAP or, more realistically, separately (e.g., as R scripts) to enable easier model comparison and selection.

Extensive modelling was undertaken to reveal output dependency on model structure, assumptions and data updates, as well as goodness of fit. The final choice of benchmark assessment is a departure from the previously used VPA and

provides a more flexible framework for future assessments. This is a potential technical benefit that needs to be carefully managed – as will be seen under term of reference 7, SSB and F determination, and biological reference point definition, are sensitive to changes in models and assumptions as well as data updates.

All assessments conducted by the SDWG, regardless of software package used, structure, assumption and data, display retrospective patterns. The patterns arise because of the mismatch in information between well-fit fishery catch-at-age data and fishery independent surveys. The survey data all suggest greater biomasses in recent years than the fishery data. Explanations for this disparity in information are various and no single convincing explanation was provided to the SARC. However, the new benchmark assessment appears to display a less strong retrospective pattern than observed in recent assessments. The SARC did not agree with previous comments about the need to “fix” projections to account for retrospective patterns, preferring that the cause of patterns needs to be determined and dealt with directly in the assessment. Such an approach (see also term of reference 5) would lead to a better characterisation of uncertainty both in estimates of SSB, F, reference points and projected states.

5. *Based on the “best” model or models, estimate fishing mortality rate, recruitment, spawning stock biomass, and total stock biomass for the current year and characterize the uncertainty of those estimates. If possible, also include estimates for earlier years with uncertainty estimates.*

The term of reference was addressed.

The method used to estimate uncertainty on current year estimates of SSB, recruitment and F was different to that used to estimate it historically. As it is available within ASAP, MCMC could, with appropriate definition of priors, be used to estimate credible intervals for SSB, R and F in all years. It is unclear why this was not done. It is also unclear how the MCMC has been set up and whether or not it was run satisfactorily. As for model development and comparison in general, it would be helpful to develop appropriate tools to display model results. My general impression was that uncertainty in estimates is not fully characterised; this has implication both for status determination and for forecasting.

6. *Examine and evaluate the role of the environment on past and present summer flounder recruitment success.*

The term of reference was satisfactorily addressed.

7. *Biological Reference Points*

- a. *Update or redefine biological reference points (BRPs; proxies for B_{MSY} and F_{MSY}), taking into account conclusions from earlier assessments and findings from TOR 6 (i.e., recruitment and the environment). Estimate uncertainty in BRPs. Comment on the scientific adequacy of existing and redefined BRPs.*
- b. *Evaluate current stock status with respect to the existing BRPs, as well as with respect to updated or redefined BRPs (from TOR 7a).*

a) The term of reference was adequately addressed; suitable reference points have been defined to guide management advice and stock status relative to those defined reference points has been determined. Environmental influences on recruitment and reference points were considered and it was deemed unnecessary to amend reference points to take account of environmental factors. Uncertainty in reference points was not fully characterised.

Generally, the SDWG did not fully characterise uncertainty in current or historic variables, in reference points, or in forecasts. This is partly an artefact of historic use of methods that do not readily allow full characterisation and which do not ensure coherence between estimated quantities at each analytical stage. It is also a function, however, of the requirements of the management and decision-making processes. The adoption of integrated assessment approaches (ASAP and SS2 based) do potentially permit better uncertainty characterisation in future, particularly if Bayesian methods are used (MCMC in ASAP) and coherence is maintained between assessment, reference point definition and forecasting. However, what the scientific processes can deliver and what management processes require needs to be carefully considered. The request in the term of reference to characterise uncertainty is very unspecific and can be interpreted in a number of ways – would it really be helpful to move from a principally deterministic assessment and management regime to a fully probabilistic science advisory step unless the management and decision-making considerations and processes are appropriately modified?

Previously for summer flounder, reference points have been based on “non-parametric” methods – that is, per-recruit models using inputs derived from stock assessments (partial recruitment), sampled weight and maturity-at-age and assumed natural mortality. The approach is valid and used in many fisheries and can provide a credible basis for providing management advice. The choice of particular reference points from per-recruit models is not straightforward, however, and the SDWG has considered carefully how best to advise appropriately while remaining sensitive to management needs for reasonable consistency.

There are changes in the way per-recruit models were parameterised in 2008. One change is the use of partial recruitment derived from assessment estimated selectivity over an extended “time block” as opposed to previous practice of using the average estimated F-at-age for the past 3 years. This should introduce some

stability into per-recruit estimation and is preferable. Although the partial recruitment used is now more stable, the weight-at-age vector used in the model assumes a three-year average – this may be sensible for short/medium-term projection but for per-recruit modelling should be avoided in favour of a longer-term average. The major change in per-recruit modelling in 2008 is the adoption of $M=0.25$ (instead of $M=0.20$) for providing advice.

Previously, F_{max} was taken as a proxy for F_{msy} and reference points were calculated accordingly. At the time, F_{max} was reasonably well defined given the estimated partial recruitment and assumed natural mortality rate, M . With the new benchmark assessment, F_{max} is not a useful proxy for F_{msy} as it is poorly defined (note this is a function of new data, fleet definition and use of estimated fleet selectivities, not of changing from ADAPT VPA to an assessment implemented using ASAP, nor of changing the assumption on M). Not only would the continued use of F_{max} now imply a much less conservative management approach for marginal utilisation gain, but future estimates of F_{max} would likely be variable and therefore provide an unhelpful basis for future management decisions. The SDWG recommended adoption of the better-defined (and more robust) $F_{35\%}$ as a proxy for F_{msy} is therefore reasonable. Continued use of F_{max} -based reference is not advisable.

b) The term of reference was addressed.

I am comfortable that the SARC, with help from the SDWG, investigated sufficiently the sensitivity of reference points to model changes, data updates, and assumptions. Those investigations provide evidence that fishing mortality in summer flounder is continuing to decline and that SSB is stable and well positioned to increase with average or better incoming recruitment. This general picture is evident regardless of assessment model and assumption.

Previous reference points are no longer relevant and it is not appropriate to compare current estimated F and SSB with those points. However, whereas in 2006 the perceived stock status would have been unaffected by the choice of M (as either 0.20 or 0.25), under the new assessment structure and with updated data, the assumed value of M does affect the stock status perception in terms of possible F_{msy} reference points.

Regardless of choice of assumed M , SSB is still below SSB_{msy} and F is above $F_{40\%}$. If $F_{40\%}$ is taken as a target then there is still some further reduction in fishing mortality required. If M is assumed to be 0.20 then F is now estimated to be 14% greater than $F_{35\%}=F_{msy}$ (and overfishing would be deemed to be taking place). If M is assumed to be 0.25 then F is now estimated to be 7% below $F_{35\%}=F_{msy}$ (and overfishing would not be deemed to be taking place).

The assumption of $M=0.20$ would appear to be at the lower end of feasible values and $M=0.25$ appears to be a more reasonable benchmark assumption. Overall, the assumption of $M=0.25$ is considered reasonable and the stock should therefore be considered not subject to overfishing, still overfished but rebuilding and the current fishing mortality 13% over target (if $F_{40\%}$ is adopted for this purpose). The SSB prognosis would appear to be good and the MSY of the order of 13,000 tonnes.

If M is assumed to be 0.20 the stock would be considered still subject to overfishing, still overfished but rebuilding and the current fishing mortality 37% over target. The SSB prognosis would appear to be good and the MSY of the order of 17,000 tonnes.

As an aside, it is interesting to note that the choice of M affects not only current perceptions but also future expectations. Although adoption of advice based on a new value of $M=0.25$ appears less precautionary in the short-term than assuming $M=0.20$ as in previous years, it is more precautionary in the long-term in that if the real M were lower, future yields would be constrained. Conversely, adopting $M=0.20$ if the true value were higher would in the long-term provide for yields greater than the true MSY.

8. *Stock Projections*

a. *Recommend what modeling approaches and data should be used for conducting single and multi-year stock projections, computing TACs or TALs, and measures of uncertainty.*

b. *If possible,*

I. Provide numerical examples of short term projections (2-3 years) of biomass and fishing mortality rate, and characterize their uncertainty, under various TAC/F strategies and

II. Compare projected stock status to existing rebuilding or recovery schedules, as appropriate.

a) The term of reference was addressed. Single year catch projections were made assuming $F_{rebuild}$ and F_{msy} .

Approaches to forecasting were kept simple with assessment and other outputs used to calculate deterministic reference points and a separate projection program used. Uncertainty would be better captured by integrating assessment, reference point calculation and projection to maintain coherency between possible population trajectories. This could be carried out in the ASAP package. Although possible, as noted above, what should be done depends on what is needed for management purposes. It is important to maintain reasonable consistency in the scientific methods used to provide robust management signals based on data-driven changes in stocks and fisheries. Movement to "improved" methods may be

technically preferable or scientifically desirable, but care needs to be taken to ensure the most appropriate outputs are available for management purposes.

bi) It was agreed that further projections would be made later in response to the SSC and Council. No further projections were conducted during the SARC.

bii) Minimal rebuilding scenarios were provided. It would be helpful potentially to consider a limited set of constant catch or constant F scenarios to inform management. This would provide information on possible variations in rebuild expectations.

9. Review, evaluate and report on the status of the Research Recommendations offered in recent SARC reviewed assessments and in the 2006 "Methot" Review.

The term of reference was addressed. I have no comments beyond those in the SARC report.

APPENDIX 1: Background material

#	Title	Author	
1	Estimation of Commercial Fishery Discards of Summer Flounder: Update 2007 or Revise the 1989-2007 Time Series?	anon.	
2	Discard Mortality of Summer Flounder in the Inshore Trawl Fishery	Emerson Hasbrouck Tara Froehlich Kristin Gerbino John Scotti	
3	Some Approaches to the Integration of Survey Abundance Indices used in VPA Calibration	Mark Terceiro	
4	Simulation Studies of Issues Associated with Filling Zeros in VPA Tuning Indices	Chris Legault Al Seaver	
5	Some More Thoughts on Filling Zeros in Tuning Indices: A Simple Regression Example	Chris Legault	
6	The Treatment of "Zero" Observations in the Summer Flounder ADAPT VPA Calibration	Mark Terceiro	
7	Evaluation of summer flounder life history parameters from NEFSC trawl survey data, 1992 – 2006.	Jeffrey C. Brust	
8	A Review of Natural Mortality of Summer Flounder	Rich Wong	
9	Analysis of Trends in Sex Ratio, Implications for Natural Mortality, and Variation in Age-Length Keys in Summer Flounder	Eric N. Powell Jason Morson	
10	Re-evaluation of Summer Flounder (<i>Paralichthys dentatus</i>) Stock Status Following Adjustments for Retrospective Bias and Inclusion of Trophic Effects	Victor Crecco	
11	Modeling environmental factors and summer flounder recruitment success	Mark Terceiro	
12	Wavelet Analysis of Trends in Summer Flounder YOY and Spawner-Recruit Relationships	Eric Powell	
13	Specifying Initial Conditions for Forecasting When Retrospective Pattern Present	Chris Legault and Mark Terceiro	

APPENDIX 2: Statement of Work

Statement of Work for Dr. Kevin Stokes

External Independent Peer Review by the Center for Independent Experts

SARC 47: Summer Flounder Benchmark Stock Assessment

Meeting Date: June 16 – 20, 2008

*Statement of Work (SOW) for CIE Panelists
(including a description of SARC Chairman's duties)*

General

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

The SARC47 review panel will be composed of three appointed reviewers from the Center of Independent Experts (CIE), and an independent chair from the South Atlantic Fishery Management Council. The panel will convene at the Woods Hole Laboratory of the Northeast Fisheries Science Center (NEFSC) in Woods Hole, Massachusetts during June 16-20, 2007 to review one assessment (Summer flounder, *Paralichthys dentatus*). In the days following the review of the assessment, the panel will write the SARC Summary Report and each CIE reviewer will write an individual independent review report.

Overview of CIE Peer Review Process

The Office of Science and Technology implements measures to strengthen the National Marine Fisheries Service's (NMFS) Science Quality Assurance Program (SQAP) to ensure the best available high quality science for fisheries management. For this reason, the NMFS Office of Science and Technology coordinates and manages a contract for obtaining external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of stock assessments and various scientific research projects. The primary objective of the CIE peer review is to provide an impartial review, evaluation, and recommendations in accordance to the Statement of Work (SoW), including the Terms of Reference (ToR) herein, to ensure the best available science is utilized for the National Marine Fisheries Service management decisions.

The NMFS Office of Science and Technology serves as the liaison with the NMFS Project Contact to establish the SoW which includes the expertise requirements, ToR, statement of tasks for the CIE reviewers, and description of deliverable milestones with dates. The CIE, comprised of a Coordination Team and Steering Committee, reviews the SoW to ensure it

meets the CIE standards and selects the most qualified CIE reviewers according to the expertise requirements in the SoW. The CIE selection process also requires that CIE reviewers can conduct an impartial and unbiased peer review without the influence from government managers, the fishing industry, or any other interest group resulting in conflict of interest concerns. Each CIE reviewer is required by the CIE selection process to complete a Lack of Conflict of Interest Statement ensuring no advocacy or funding concerns exist that may adversely affect the perception of impartiality of the CIE peer review. The CIE reviewers conduct the peer review, often participating as a member in a panel review or as a desk review, in accordance with the ToR producing a CIE independent peer review report as a deliverable. The Office of Science and Technology serves as the COTR for the CIE contract with the responsibilities to review and approve the deliverables for compliance with the SoW and ToR. When the deliverables are approved by the COTR, the Office of Science and Technology has the responsibility for the distribution of the CIE reports to the Project Contact.

Requirements for CIE Reviewers

CIE reviewers shall have working knowledge and recent experience in the application of modern fishery stock assessment models and Biological Reference Points. Expertise should include both the use of statistical catch-at-age and traditional VPA approaches. Experience with comparative studies of these approaches is especially valuable. Reviewers should also have experience in evaluating measures of model fit, identifiability, uncertainty, and forecasting. Experience with flatfish population dynamics would be useful.

Specific Activities and Responsibilities

The CIE's deliverables shall be provided according to the schedule of milestones listed on Page 6. The CIE reviewers, along with input and leadership from the SARC Chairman, will write the SARC Summary Report. In addition, each CIE reviewer will write an individual independent review report. These reports will provide peer-review information for a presentation to be made by NOAA Fisheries at meetings of the New England and Mid-Atlantic Fishery Management Councils in 2008. The SARC Summary Report shall be an accurate representation of the SARC panel viewpoint on how well each SAW Term of Reference was completed (please refer to Annex 1 for the SAW Terms of Reference).

The three CIE reviewers shall conduct an impartial and independent peer review in accordance with the Terms of Reference (ToR) herein. The three SARC CIE reviewers' duties shall occupy a maximum of 14 days per person (i.e., several days prior to the meeting for document review; the SARC meeting in Woods Hole; and several days following the open meeting to contribute to the SARC Summary Report and to produce the Independent CIE Reports).

Not covered by the CIE, the SARC chair's duties shall occupy a maximum of 15 days (i.e., several days prior to the meeting for document review; the SARC meeting in Woods Hole; several days following the open meeting for SARC Summary Report preparation.)

Charge to SARC panel

The panel is to determine and write down whether each Term of Reference of the SAW (see Annex 1) was or was not completed successfully during the SARC meeting. To make this determination, panelists should consider whether the work provides a scientifically credible basis for developing fishery management advice. Criteria to consider include: whether the data were adequate and used properly, the analyses and models were carried out correctly, and the conclusions are correct/reasonable. Where possible, the chair shall identify or facilitate agreement among the reviewers for each Term of Reference of the SAW.

If the panel rejects any of the current Biological Reference Point (BRP) proxies for B_{MSY} and F_{MSY} , the panel should explain why those particular proxies are not suitable and the panel should recommend suitable alternatives. If such alternatives cannot be identified, then the panel should indicate that the existing BRPs are the best available at this time.

Roles and responsibilities

(1) Prior to the meeting

(SARC chair and CIE reviewers)

Review the reports produced by the Working Groups and read background reports.

(2) During the Open meeting

(SARC chair)

Act as chairperson, where duties include control of the meeting, coordination of presentations and discussion, making sure all Terms of Reference of the SAW are reviewed, control of document flow, and facilitation of discussion. For the assessment, review both the Assessment Report and the Assessment Summary Report.

During the question and answer periods, provide appropriate feedback to the assessment scientists on the sufficiency of their analyses. It is permissible to discuss the stock assessment and to request additional information if it is needed to clarify or correct an existing analysis and if the information can be produced rather quickly.

(SARC CIE reviewers)

For each stock assessment, participate as a peer reviewer in panel discussions on assessment validity, results, recommendations, and conclusions. From a reviewer's point of view, determine whether each Term of Reference of the SAW was

completed successfully. Terms of Reference that are completed successfully are likely to serve as a basis for providing scientific advice to management. If a reviewer considers any existing Biological Reference Point proxy to be inappropriate, the reviewer should try to recommend an alternative, should one exist.

During the question and answer periods, provide appropriate feedback to the assessment scientists on the sufficiency of their analyses. It is permissible to request additional information if it is needed to clarify or correct an existing analysis and if the information can be produced rather quickly.

(3) After the Open meeting

(SARC CIE reviewers)

Each reviewer shall prepare an Independent CIE Report (see Annex 2). This report should explain whether each Term of Reference of the SAW was or was not completed successfully during the SARC meeting, using the criteria specified above in the “Charge to SARC panel” statement.

If any existing Biological Reference Point (BRP) proxies are considered inappropriate, the Independent CIE Report should include recommendations and justification for suitable alternatives. If such alternatives cannot be identified, then the report should indicate that the existing BRPs are the best available at this time.

During the meeting, additional questions that were not in the Terms of Reference but that are directly related to the assessments may be raised. Comments on these questions should be included in a separate section at the end of the Independent CIE Report produced by each reviewer.

The Independent CIE Report can also be used to provide greater detail than the SARC Summary Report on specific Terms of Reference or on additional questions raised during the meeting.

(SARC chair)

The SARC chair shall prepare a document summarizing the background of the work to be conducted as part of the SARC process and summarizing whether the process was adequate to complete the Terms of Reference of the SAW. If appropriate, the chair will include suggestions on how to improve the process. This document will constitute the introduction to the SARC Summary Report.

(SARC chair and CIE reviewers)

The SARC Chair and CIE reviewers will prepare the SARC Summary Report. Each CIE reviewer and the chair will discuss whether they hold similar views on

each Term of Reference and whether their opinions can be summarized into a single conclusion for all or only for some of the Terms of Reference of the SAW. For terms where a similar or a consensual view can be reached, the SARC Summary Report will contain a summary of such opinions. In cases where multiple and/or differing views exist on a given Term of Reference, the SARC Summary Report will note that there is no agreement and will specify - in a summary manner – what the different opinions are and the reason(s) for the difference in opinions.

The chair’s objective during this Summary Report development process will be to identify or facilitate the finding of an agreement rather than forcing the panel to reach an agreement. The chair will take the lead in editing and completing this report. The chair may express the chair’s opinion on each Term of Reference of the SAW, either as part of the group opinion, or as a separate minority opinion.

The SARC Summary Report (please see Annex 3 for information on contents) should address whether each Term of Reference of the SAW was completed successfully. For each Term of Reference, this report should state why that Term of Reference was or was not completed successfully. The Report should also include recommendations that might improve future assessments.

If any existing Biological Reference Point (BRP) proxies are considered inappropriate, the SARC Summary Report should include recommendations and justification for suitable alternatives. If such alternatives cannot be identified, then the report should indicate that the existing BRP proxies are the best available at this time.

The contents of the draft SARC Summary Report will be approved by the CIE reviewers by the end of the SARC Summary Report development process. The SARC chair will complete all final editorial and formatting changes prior to approval of the contents of the draft SARC Summary Report by the CIE reviewers. The SARC chair will then submit the approved SARC Summary Report to the NEFSC contact (i.e., SAW Chairman).

Schedule

The milestones and schedule are summarized in the table below. No later than July 7, 2008, the CIE reviewers shall submit their Independent CIE Reports to the CIE lead coordinator Mr. Manoj Shivlani via e-mail to shivlanim@bellsouth.net and CIE regional coordinator Dr. David Sampson via e-mail to David.Sampson@oregonstate.edu.

Milestone	Date
CIE reviewers attend the SARC workshop to conduct peer review at Northeast Fisheries Science Center (NEFSC) in Woods Hole, MA, USA	June 16-19
SARC Chair and CIE reviewers work at the NEFSC drafting reports	June 19-20

Draft of SARC Summary Report, reviewed by all CIE reviewers, due to the SARC Chair **	July 7
CIE reviewers submit Independent CIE Reports to CIE for approval	July 7
SARC Chair sends Final SARC Summary Report, approved by CIE reviewers, to NEFSC contact (i.e., SAW Chairman)	July 14
CIE provides reviewed Independent CIE Reports to NMFS COTR for approval	July 21
COTR notifies CIE of approval of reviewed Independent CIE Reports	July 28, 2008 *
COTR provides final Independent CIE Reports to NEFSC contact	July 28, 2008

* Assuming no revisions are required of the reports.

** The SARC Summary Report will not be submitted, reviewed, or approved by the CIE.

The SAW Chairman 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 make the final SARC Summary Report available to the public. 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 SAW Chairman:

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

Submission and Acceptance of CIE Reports

No later than July 21, 2008, the CIE shall provide via e-mail the final independent CIE reports and the CIE chair's summary report to the COTR William Michaels (William.Michaels@noaa.gov) at NOAA Fisheries. The COTR and alternate COTR Dr. Stephen K. Brown (Stephen.K.Brown@noaa.gov) will review the CIE reports to determine that the Term of Reference was met, notify the CIE program manager via e-mail regarding acceptance of the reports by July 28, 2008, and then distribute the reports to the NEFSC contact person.

ANNEX 2

DRAFT Assessment Terms of Reference for SAW/SARC-47 in June, 2008 (Last Revised: Sept. 27, 2007)

Summer flounder

1. Characterize the commercial and recreational catch, effort and CPUE, including descriptions of landings, discards and discard mortality.
2. Review methods for using fishery-independent surveys as abundance indices in assessment models.
 - a. Evaluate whether to combine several of the surveys into a composite survey index. If appropriate, implement this approach.
 - b. Develop and implement an appropriate statistical method to account for the probability of observing zeros in NEFSC survey tows.
3. Evaluate the feasibility of implementing alternative approaches to assess status of summer flounder stock and comment on any potential effects on estimates of F, SSB, and BRPs. Alternative approaches could consider:
 - a. Separate Catch at age matrices for commercial and recreational fisheries, and resulting partial recruitment vectors for each fishery.
 - b. Regional differences (north, south) in catch at age matrices.
 - c. Potential gender differences in life span, growth rate, and natural mortality and implications of these factors for observed age- and length-specific sex ratios.
 - d. Strength of evidence for natural mortality rate used in the assessment; Update the estimate if appropriate.
4. Compare results from alternative modeling approaches with those from the VPA model, to evaluate the robustness of VPA model results. Perform retrospective analyses of F, SSB, and recruitment for the models, and describe potential effects of retrospective patterns on assessment and rebuilding.
5. Based on the “best” model or models, estimate fishing mortality rate, recruitment, spawning stock biomass, and total stock biomass for the current year and characterize the uncertainty of those estimates. If possible, also include estimates

for earlier years with uncertainty estimates.

6. Examine and evaluate the role of the environment on past and present summer flounder recruitment success.
7. Biological Reference Points
 - a. Update or redefine biological reference points (BRPs; proxies for B_{MSY} and F_{MSY}), taking into account conclusions from earlier assessments and findings from TOR 6 (i.e., recruitment and the environment). Estimate uncertainty in BRPs. Comment on the scientific adequacy of existing and redefined BRPs.
 - b. Evaluate current stock status with respect to the existing BRPs, as well as with respect to updated or redefined BRPs (from TOR 7a).
8. Stock Projections
 - a. Recommend what modeling approaches and data should be used for conducting single and multi-year stock projections, computing TACs or TALs, and measures of uncertainty.
 - b. If possible,
 - I. Provide numerical examples of short term projections (2-3 years) of biomass and fishing mortality rate, and characterize their uncertainty, under various TAC/F strategies and
 - II. Compare projected stock status to existing rebuilding or recovery schedules, as appropriate.
9. Review, evaluate and report on the status of the Research Recommendations offered in recent SARC reviewed assessments and in the 2006 “Method” Review.

ANNEX 3

Contents of SARC CIE Independent Reports

1. For each assessment reviewed, the report should address whether each Term of Reference of the SAW was completed successfully. For each Term of Reference, state why that Term of Reference was or was not completed successfully. To make this determination, CIE reviewers should consider whether the work provides a scientifically credible basis for developing fishery management advice. Scientific criteria to consider include: whether the data were adequate and used properly, the analyses and models were carried out correctly, and the conclusions are correct/reasonable.

The report may include recommendations on how to improve future assessments.

The Independent CIE Report might also be used to provide greater detail than the SARC Summary Report on specific Terms of Reference or on additional questions raised during the meeting.

2. If any existing Biological Reference Point (BRPs) proxies are considered inappropriate, include recommendations and justification for alternative proxies. If such alternatives cannot be identified, then indicate that the existing BRPs are the best available at this time.

3. Any independent analyses conducted by the CIE reviewers as part of their responsibilities under this agreement should be incorporated into their Independent CIE Reports. It would also be helpful if the details of those analyses (e.g, computer programs, spreadsheets etc.) were made available to the respective assessment scientists.

4. Additional questions that were not in the Terms of Reference but that are directly related to the assessments. This section should only be included if additional questions were raised during the SARC meeting.

5. The report shall include a list of all background material provided, a copy of the Statement of Work with Terms of Reference, and meeting agenda attached as separate appendices.

ANNEX 4

Contents of SARC Summary Report

1. The main body of the report shall consist of an introduction prepared by the SARC chair that will include the background, a review of activities and comments on the appropriateness of the process in reaching the goals of the SARC. Following the introduction, for each assessment reviewed, the report should address whether each Term of Reference of the SAW was completed successfully. For each Term of Reference, the SARC Summary Report should state why that Term of Reference was or was not completed successfully.

To make this determination, the SARC chair and CIE reviewers should consider whether the work provides a scientifically credible basis for developing fishery management advice. Scientific criteria to consider include: whether the data were adequate and used properly, the analyses and models were carried out correctly, and the conclusions are correct/reasonable. If the CIE reviewers and SARC chair do not reach an agreement on a Term of Reference, the report should explain why. It is permissible to express majority as well as minority opinions.

The report may include recommendations on how to improve future assessments.

2. If any existing Biological Reference Point (BRP) proxies are considered inappropriate, include recommendations and justification for alternative proxies. If such alternatives cannot be identified, then indicate that the existing BRPs are the best available at this time.

3. The report shall also include the bibliography of all materials provided during SAW 47, and any papers cited in the SARC Summary Report, along with a copy of the CIE Statement of Work.

The report shall also include as a separate appendix the Terms of Reference used for SAW 47, including any changes to the Terms of Reference or specific topics/issues directly related to the assessments and requiring Panel advice.

ANNEX 5

DRAFT AGENDA (5-28-08)

**47th Northeast Regional Stock Assessment Workshop (SAW 47)
Stock Assessment Review Committee (SARC) Meeting**

Stephen H. Clark Conference Room – Northeast Fisheries Science Center Woods Hole,
Massachusetts

June 16 - 20, 2008

Sessions are open to the public, except where indicated.

TOPIC PRESENTERS RAPPORTEUR

Monday, 16 June (1:00 – 5:00 PM).....

Welcome **James Weinberg**, SAW Chairman Introduction **John Carmichael**, SARC
Chairman Agenda Conduct of Meeting

Summer flounder (A) M. Terceiro, J. Coakley, M. Maunder Rich Wong

SARC Discussion John Carmichael

Tuesday, 17 June (9 AM – Noon).....

Summer flounder (A) – finish presentations.

M. Terceiro, J. Coakley, M. Maunder Rich Wong

SARC Discussion **John Carmichael**

Tuesday, 17 June (1:15 PM – 5 PM).....

Q&A #1 between Reviewers and All Presenters, clarification of any issues. (Open Meeting)

Rich Wong

SARC Discussion **John Carmichael**

Wednesday, 18 June (9 AM – Noon)

SARC Panel deliberations/report writing (Closed Meeting).

Wednesday, 18 June (1:15 PM – 4 PM).....

Q&A #2 between Reviewers and All Presenters, clarification of any issues. (Open Meeting)

Rich Wong

SARC Discussion **John Carmichael**

Wednesday, 18 June (4 PM – 5 PM)

SARC Report writing (Closed Meeting).

Thursday, 19 June (and possibly 20 June AM).....

SARC Report writing (Closed Meeting).