Center for Independent Experts (CIE) Peer Review Report of the 57th Northeast Regional Stock Assessment Review Committee (SARC 57)

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Executive Summary

The 57th Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC) met in Woods Hole, Massachusetts, from Tuesday, June 23rd, through Friday, June 27th, 2013, to review the benchmark stock assessments for striped bass and summer flounder.

The review committee was comprised of Cynthia Jones (member of the Mid-Atlantic Fishery Management Council's (MAFMC) Science and Statistical Committee (SSC) and professor at the Old Dominion University) and three scientists affiliated with the Center for Independent Experts: Robin Cook, John Simmonds, and Henrik Sparholt. The SARC was assisted by the Northeast Fisheries Science Center (NEFSC) Stock Assessment Workshop (SAW) Chairman, James Weinberg, and his staff.

Background information and the assessment of summer flounder were presented on behalf of the Southern Demersal Working Group by Mark Terceiro, NEFSC, and Jessica Coakley. The background information and the assessment of striped bass were presented by Gary Nelson, Stock Assessment Chair, Heather Corbett Tagging Committee Chair and Alexei Sharov, Technical Committee Chair.

The SARC requested a few additional sensitivity analyses to the assessment models and reference point estimates that were accommodated by the analytical team.

The SARC concluded that the work presented successfully met all of the terms of reference, except one of biological reference points for striped bass, which was met partly. The Review Panel was impressed with the scientific high level of the experts involved. This was well reflected in the assessments, which had a very high scientific quality. The scientific knowledge obtained over decades of research on both stocks is very impressive. The two stock assessments clearly represent very data rich cases. The extensive data available for the assessments appeared to be correctly compiled, and their use in the assessment and reference point analyses was in general accordance with best available science.

Given current estimates of the exploitation pressure and expected spawning stock biomass, neither the summer flounder stock nor the striped bass stock are experiencing overfishing and neither are they overfished.

Regarding research, it seems to be time now when the stocks are rebuilt, to focus research on density dependent growth and maturity issues as well as the role of the stocks in the ecosystem.

The documents for the review were very comprehensive and well structured, as was the overall review process. This made the meeting very productive.

1 Summer Flounder Assessment Review

1.1 Introduction

The 57th SARC (Stock Assessment Review Committee) met in Woods Hole, Massachusetts, from Tuesday, June 23rd, through Friday, June 27th, 2013, to review the assessment of Atlantic summer flounder (*Paralichthys dentatus*).

The review committee was composed of Cynthia Jones (member of the Mid-Atlantic Fishery Management Council's (MAFMC) Science and Statistical Committee (SSC) and professor at the Old Dominion University) and three scientists affiliated with the Center for Independent Experts: Robin Cook, John Simmonds, and Henrik Sparholt. The SARC was assisted by the NEFSC SAW Chairman, James Weinberg and his staff. The SAW was represented by Jessica Coakley, chair, and Mark Terciero.

About two weeks before the meeting, the assessment documents and supporting material were made available to the SARC via an internet server. On the morning before the meeting, the assessment review committee met with James Weinberg and Paul Rago, Northeast Fisheries Science Center (NEFSC), to discuss the meeting agenda, reporting requirements, and meeting logistics. During the SARC meeting, all documents were available electronically and it seems also in print.

The meeting opened with presentations on the Terms of Reference during which questions pertaining to the materials presented were open for question and clarification, followed by general open discussion on the Terms of Reference and concluding with dedicated, closed work sessions for the panel. The entire review committee participated in the review of each term of reference. The first 3 days of the meeting were open to the public and public comments were accepted during that time.

The first day of the meeting (Tuesday morning) was devoted to presentations made by Mark Terceiro, on behalf of the Working Group, which after an introduction, addressed the Terms of Reference.

The Stock Assessment Review Committee meeting provides an effective and productive mean of reviewing the assessments. Overall the Stock Assessment Review Committee was impressed by the nature of the process and the efforts that went into assessment development. The material mailed to the reviewers before the meeting was very comprehensive and appropriate. The organizers are greatly commended for that. I only lacked some more information about how the fisheries are conducted, where features like how targeted the fisheries are, would be useful know from the outset. The time available to go through all the material was a challenge. Maybe some of the older papers could have been made available several weeks earlier. Maybe two of the four external reviewers could be asked to concentrate on one of the stocks and the other two the other stock.

1.2 SARC findings by Term of Reference

1.2.1 Characterize the Catch

ToR1. Estimate catch from all sources including landings and discards. Describe the spatial and temporal distribution of landings, discards, and fishing effort. Characterize the uncertainty in these sources of data.

The catch and discard data were generally very comprehensive and well treated and documented.

The new approach for commercial discard estimation was regarded as an improvement of the previously used (much lower) estimates from recent years. It seems acceptable not to have discards data or assuming it was zero before 1989.

The recreational landings and discards were also well dealt with and the survival of 90% of discards was well justified although notoriously difficult to determine and an error here of a relatively small amount could influence the total removal estimate quite a lot, due to the large amount discarded. A quick run was made with discard survival of 80%, and it did not change the SSB assessed by more than a few percent. This was reassuring.

Quota systems often mean underestimating landings. This was recognized, but difficult to find out whether it was happening or not. Maybe some cooperation with the control agencies could be considered in the future.

The summer flounder assessment document on page 39 stated that:

> The divergence of OB and VTR live discard to total catch percentages compared to the estimated live discard to total catch percentages, and the persistent underestimation of the OB / VTR estimated landings compared to the Dealer reported landings, has raised concern that the live discard might be consistently underestimated since 2004. The underestimation appears to be mainly driven

> by the days fished effort metric, but it is unclear if the effort metric is simply biased low or if the relationship between effort and catch has somehow changed over time. This concern has prompted a re-examination of the previous discard estimates and consideration of alternative estimation methods.

This seems to be worthwhile. An alternative to effort measured directly could be to take it from the F value in the stock assessment split into trawling relative to scallop dredging.

The reduction in growth is explained as a stock-wide reduction in mean weight rather than a change in individual fish growth. This was questioned by the review panel. The statement by the assessment group that a reduction in F should benefit the slower growing specimens more than the faster growing ones, was especially questioned by the review panel. It should be the other way around. At high F the fast growing fish are harvested harder as they quickly gets into the size range of the fishery and high fishing thus favors slow growing individuals, and by deduction when F deceases from a high to a low level the faster growing individuals should benefit more than the slow growing ones. Analyzing tagging data, if available, might be a way forward to find out. The argument used by SAW that the K factor did not show much change was questioned by the Panel as an important indicator because K is usually a rather insensitive metric for reduced individual growth, which normally only reacts in quite extreme cases of food restrictions for example.

The spatial and temporal distribution was well described and analyzed, and the statement of a northern shift seems well justified. Larvae showed no change.

1.2.2 Fishery Independent Surveys

ToR 2. Present the survey data available for use in the assessment (e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, etc.), and explore standardization of fishery-independent indices. Investigate the utility of commercial or recreational LPUE as a measure of relative abundance. Characterize the uncertainty and any bias in these sources of data. Describe the spatial distribution of the stock over time.*

Regarding the new versus the old trawl survey, it was suggested whether to split in two surveys would be better. It was replied that this has been tried and at the moment with only four years of data from the new survey is was a “fifty fifty” situation. The conversion factors were quite extreme in both ends of the length distribution and it was suggested that it might be better to assume no increase as these anyway are based on few fish and thus are very uncertain. In a few years time the new time series will be long enough to stand alone and therefore conversion factors will not be needed.

The Delaware survey seems to represent two groups of data: before and after 2003, and it was considered that the ship was changed, so it was judged acceptable to delete the index from the assessment.

The task to explore standardization of fishery-independent indices was not finally addressed and work is still ongoing. There seems to be potential benefits from coordinating the state surveys so that they can be regarded as one survey covering the entire area.

The spatial distribution of the stock over time was very well analyzed and documented. Appropriate metrics were used. The conclusion was drawn that there is a more northern distribution now and that temperature seems not to be the main reason. Rather it is a demographic effect of more large fish in the stock and these always move around more, but especially towards the north outside the spawning season. More analysis is needed to clarify more fully the environmental effects.

Fishery dependent CPUEs were looked into at depth using various appropriate methods. There were generally a lack of useful series as regulations over time could not be well modelled, effort data seems to be strange in some cases, and accuracy of some of the data is doubtful. The issue seems to be exhausted for some years, until there are more years of data.

1.2.3 Alternative Assessment Approaches with sex

ToR 3. Review recent information on sex-specific growth and on sex ratios at age. If possible, determine if fish sex, size and age should be used in the assessment.*

(*: Completion of specific sub-task is contingent on analytical support from staff outside of the NEFSC.)

On page 6 of the summer flounder assessment report, it is stated that the "decrease in fishing mortality over the last decade may have been sufficient to allow slower growing and maturing fish of both sexes to survive to older ages over that time frame, thus lowering the mean lengths and weights". This seems illogical, because the faster growing individuals will also survive better, and to a larger extent as they are exposed to fisheries at an earlier age than the slow growing ones. A much more likely explanation is density dependent effects. More males at old ages seems a bit of a mystery – maybe it is like eels in that sex is not determined until a certain size and that if the density is high more males are "created". It could also just be due to sampling errors that previously old males were so rare that none were sampled.

Fig A180-182 are intriguing as it must be a very complex relationship between selectivity, spatial distribution by sex of the stock and the spatial distribution of fisheries if these graphs are to be regarded as consistent. Maybe temporal distributions are also involved. The assessment team came back and had reflected on this and it was agreed that the causes were still a bit unclear.

1.2.4 Assessment Approach

ToR 4. Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series (integrating results from TOR-3), and estimate their uncertainty. Explore

inclusion of multiple fleets in the model. Include both internal and historical retrospective analyses to allow a comparison with previous assessment results and previous projections.

The model runs made were very appropriate and the selected one well justified. The multi-fleet approach seems to be an improvement.

The surveys were included as aggregate ones instead of age separated ones, which seems to be an improvement compared to the previous assessment.

The discards fleet for commercial fisheries was treated as a separate fleet in the assessment. It was mentioned that in some way this "fleet" is linked to the commercial landings "fleet" – it must be the same fleet physically.

Penalty functions for deviating too much from the input CV was a subjective part of the objective function and this seems appropriate.

Several versions of the base run were done, exploring various model structure differences and input data. They did not deviate from each other a lot and the run selected by the SAW was considered appropriate. The approach of having two phases in the development of the final model seem constructive and makes it more clear which element in the change contributes to the change. An implicit aim was also to end up with a model that is a kind of contemporary way of modeling, and the analysis done showed that such a model gave quite sensible results when judged by the usual metrics for making such judgments, such as a retrospective analysis. After all, to do all possible permutations of model structures would be impossible to explore and probably not give a different end result.

The effective sample size concept is complex and not easy to judge, but it seems to have been dealt with in a reasonable way.

The sensitivity analysis of various natural mortality M values was appropriate. However, it was strange that the terminal year SSB was the same in all three runs M=0.2, 0.25 and 0.3 No other explanation of this could be given than just chance.

The retrospective pattern seen in previous assessments is now reduced, although not completely eliminated as may be indicated in the SAW report.

The plots of survey data versus predicted values indicate a good fit of the model to these data.

The recruitment (YOY) indices and the lack of correlation to the estimated recruitment could be either because there are relatively little dynamics in the time series or because the surveys are just "random" numbers. This might matter for forecasts, but needs further study. Maybe the retrospective analysis of estimated recruitment in the terminal year can be used to give CV of recruitment estimates for forecasting uncertainties.

1.2.5. Stock status definitions

ToR 5. State the existing stock status definitions for "overfished" and "overfishing". Then update or redefine biological reference points (BRPs; point estimates or proxies for B_{MSY}, $B_{THRESHOLD}$, F_{MSY} and MSY) and provide estimates of their uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for BRPs. Comment on the scientific adequacy of existing BRPs and the "new" (i.e., updated, redefined, or alternative) BRPs.

The Panel had an extensive discussion on MSY reference points. The assessment team was asked to make calculations based on an F30% value in addition to the calculations already made based on F30%. These were presented the following day.

I had a minority viewpoint around using either F30% or F35% as a proxy for Fmsy, but did not find the difference between the two large enough to insist on a minority statement about it. This should also be seen in the light of factors like reduced growth and maturity at large stock sizes (i.e. density dependent life history factors), which were not considered in any of the two alternatives. My point was that the F30% was a better proxy for Fmsy as it gave a higher F (0.38) than F35% (F=0.30), which better agreed with the simulation done with the assessment data. These indicated that Fmsy is very high although the actual value could not be used as it was unrealistically high (Fmsy=3.0 constraint by the boundaries). Also the historical "reality check" indicates that the stock is really robust as it has withstood very high Fs (between 1.0-1.5) over a number of years without collapsing and has been able quickly to rebound when the fishing pressure was reduced. This is likely due to the high recruitment observed in the past at low SSBs, which again might be linked to maturing very early in life, with some fish already mature at age 1 (which is unusual for a fast growing and long living fish). The arguments presented in the report against F30% as a proxy for Fmsy is that it only gives a 5% higher yield and that it has a "cost" of a 14% reduction in SSB. My opinion is that we should not mix concepts (and Fmsy is the F which gives the highest sustainable yield independent on whether it means a low SSB or not) and that it is up to managers to decide how to use the Fmsy proxy, but we should not let it influence the actual estimate of the best Fmsy proxy. The other CIE panel members did not share this point of view and preferred to keep the F35%.

Other aspects discussed about MSY was whether it had been considered to give MSY as a range instead of as one value (for Fmsy for instance). The answer was that it was at least implicit in the framework in USA that they should be points, so not much consideration had been given to a range approach.

The use of the FXX% approach to get proxies for Fmsy's was discussed. It was mentioned that the values used for XX, often 30% 35% or 40% , are based on very little actual data, mainly Mace and Sissenwine 1993 (who by the way suggested F20% and for cod-like stock a lower percent than 20%), and the FXX% approach has only only tested rarely since then on data rich stocks. In the ICES areas, calculations have been made that suggest that F10% (if based on single stock Y/R and SSB/R calculations) are appropriate for cod and plaice-like stocks. The use of the high percent Fs (like

F30%, F35% and F40%) seems to some extent to be the classic situation of an ill-founded statement being told sufficiently often that in the end it becomes the truth.

Also the steepness of the S-R curve at the origin was discussed in relation to MSY. Myers et al. (Myers, RA, Bowen KG, Barrowman NJ. 1999. Maximum reproductive rate of fish at low population sizes*. Can J Fish Aquat Sci.* 56: 2404-2419) calculated the steepness in a meta-analysis and found that for flatfish it should be 0.8+- 0.1 and for this stock the steepness was found to be higher (around 1.0). This was used as an argument for directing attention to Fxx% type proxies for Fmsy by the assessment group. This seems to me to be like throwing out the baby with the bathwater, because this assessment is data rich and it is clear that this summer flounder stock has very robust population dynamics. At least originally, the FXX% approach was meant for data poor stocks. My opinion about choosing F30% compared to F35% can probably also be seen in the light of implicitly accepting an S-R steepness closer to the high end of the range as the data from this stock clearly suggests, but still well below the 0.93 value.

Scientifically, this approach is a bit worrying - F30% type proxies are becoming self-supporting so to speak - the scientific basis is weak and the one which is put forward says that F20% is appropriate, so there is already a hidden precaution in using F30% and even more so in using F35%.

Now that stocks are being rebuilt in many areas this becomes an urgent issue. An ecosystem can only produce a certain amount of energy each year and if a lot of that is going to maintenance metabolism of big fish stocks there will be less available to production and thus less to harvest.

The apparent high M on males should mean that Fmsy for these fish is high. This difference between summer flounder males and females further complicates the Fmsy calculations.

1.2.6 Stock status

ToR 6. Evaluate stock status with respect to the existing model (from previous peer reviewed accepted assessment) and with respect to a new model developed for this peer review.
a. When working with the existing model, update it with new data and evaluate stock status (overfished and overfishing) with respect to the existing BRP estimates.
b. Then use the newly proposed model and evaluate stock status with respect to "new" BRPs and their estimates (from TOR-5).

This ToR was fully met. The existing and the new model in the current circumstances gave similar results, but as stated above the new model is regarded as the best one.

1.2.7 Stock projections

ToR 7 Develop approaches and apply them to conduct stock projections and to compute the statistical distribution (e.g., probability density function) of the OFL (overfishing level) and

candidate ABCs (Acceptable Biological Catch; see Appendix to the SAW TORs).

A. *Provide annual projections (3 years). For given catches, each projection should estimate and report annual probabilities of exceeding threshold BRPs for F, and probabilities of falling below threshold BRPs for biomass. Use a sensitivity analysis approach in which a range of assumptions about the most important uncertainties in the assessment are considered (e.g., terminal year abundance, variability in recruitment).*
B. *Comment on which projections seem most realistic. Consider the major uncertainties in the assessment as well as sensitivity of the projections to various assumptions.*
C. *Describe this stock's vulnerability (see "Appendix to the SAW TORs") to becoming overfished, and how this could affect the choice of ABC.*

This ToR was answered fully.

This is clearly a very resilient stock as it has withstood a very high fishing pressure and that it responded quickly when the fishing pressure was released, with a substantial increase in stock size.

Environmental effects at the southern border of the distribution of the stock seem to influence the distribution area as indicated in recent survey data from the Chesapeake Bay. However, an in depth analysis showed an only weak relationship in stock distribution to temperature or other environmental parameters.

1.2.9 Research Recommendations.

ToR 8. Review, evaluate and report on the status of the SARC and Working Group research recommendations listed in most recent SARC reviewed assessment and review panel reports, as well as MAFMC SSC model recommendations from 2012. Identify new research recommendations.

The funding of research and the purpose of this list was discussed. Funding some projects will probably prevent others issues from being dealt with. This assessment is quite good and might be appropriate for management in its current form.

However, density dependent growth and maturity could be looked into more as this stock shows clear indications of this phenomenon. This has important implications for reference points.

1.2.10. Public comments

Steven Martell, representing the Save the Summer Flounder Fishery Fund (SSFFF), presented a five-page summary of various points in the assessment and these were considered by the Panel, although no specific action was taken.

2 Striped bass Assessment Review

2.1 Introduction

The 57th SARC (Stock Assessment Review Committee) met in Woods Hole, Massachusetts, from Tuesday, June 23, through Friday, June 27, 2013, to review the assessment of striped bass (*Morone saxatilus*).

The review committee was composed of Cynthia Jones (Cynthia is a member of the Mid-Atlantic Fishery Management Council's (MAFMC) Science and Statistical Committee (SSC) and a professor at the Old Dominion University) and three scientists affiliated with the Center for Independent Experts: Robin Cook, John Simmonds, and Henrik Sparholt. The SARC was assisted by the NEFSC SAW Chairman, James Weinberg and his staff. The SAW was represented by Gary Nelson, Stock Assessment Chair, Heather Corbett Tagging Committee Chair and Alexei Sharov, Technical Committee Chair.

About two weeks before the meeting, assessment documents and supporting materials were made available to the SARC via an internet server. On the morning before the meeting, the assessment review committee met with James Weinberg and Paul Rago, NEFSC, to discuss the meeting agenda, reporting requirements, and meeting logistics. During the SARC meeting, all documents were available electronically and in print.

The meeting format opened with presentations on the Terms of Reference during which questions pertaining to the materials presented were open for question and clarification, followed by general open discussion on the Terms of Reference and concluding with dedicated, closed work sessions for the panel. The entire review committee participated in the review of each term of reference. The first three days of the meeting were open to the public and public comments were accepted during that time.

2.2 SARC findings by Term of Reference

ToR 1. Investigate all fisheries independent and dependent data sets, including life history, indices of abundance, and tagging data. Discuss strengths and weaknesses of the data sources. Evaluate evidence for changes in natural mortality in recent years.

Data:

It was questioned whether the switch from MRFSS to MRIP was an issue for this stock, and the answer was no, because the raw intercept data were used.

The survey series selected seem appropriate and useful for the assessment.

The data seem to be appropriate for doing the assessment.

Natural mortality:

The new M by age compared to constant M by age made a large difference in the SB calculated. It was based on tagging data and an assumption of Z equal M for those years and ages that were considered, which seems fair enough. However, the values were very high, around 0.4 for age 3, which is very high for such a large fish (over 40cm). However, it is clear that M on males must be high as there are very few individuals reaching age 7. This might reflect high spawning mortality.

ToR 2. Estimate commercial and recreational landings and discards. Characterize the uncertainty in the data and spatial distribution of the fisheries.

This seems to have been done appropriately given the data sources.

However, the point of discard mortality of recreational catches and the points of constant sex ratio by age across years seem to be critical, but were dealt with in the best way given the data and information available.

The catch data seem to have been well sampled with regard to age and length.

Discards in the commercial fishery are mostly alive. The values used for survival after discarding were around 90- 95%, which if too optimistic could mean quite substantially more mortality than accounted for in the data and assessment.

For recreational discards the survival of 91% also means that if this is too optimistic it could mean substantially more mortality than accounted for in the data and assessment.

It was suggested that it might be fruitful to include the live discards data directly in the assessment model, and combine it with tag data to estimate survival.

ToR 3. Use the statistical catch-at-age model to estimate annual fishing mortality, recruitment, total abundance and stock biomass (total and spawning stock) for the time series and estimate their uncertainty. Provide retrospective analysis of the model results and historical retrospective. Provide estimates of exploitation by stock component, where possible, and for total stock complex.

The term “fleet” that is used in the assessment rather represents areas and the type of catch than a physical fleet of boats. This complication reduces the transparency of the assessment, but is good for using the model software optimally.

The sex ratio is dependent on F (and probably related to the higher M on males) and thus forecasts, which are based on fixing this ratio, become insensitive to F varying in the model. The change in F over time observed for this stock may offer the possibility for estimating sex ratio variation as a function of F.

The fit to the catch data was good except for 1982, for which no explanation could be given. The fit to the survey data were more variable and the fit to one was quite bad (MDSSN).

The F by year shows a very high value in the first year 1982 and this is likely an artifact. It seems problematic with respect to the presentation of the assessment. It was mentioned that the high initial F had puzzled the assessment experts for years and they had not yet gotten around to finding the exact observation or input data that had created this, if any. Maybe it has something to do with a very small year class and a small catch and thus large uncertainties.

How can it be that the increased M from 1996, due to disease, resulted in higher SSB many years prior to the event? This was difficult to answer, and probably show that the model is so complex that transparency is "suffering".

The multi-nominal approach for age distribution and how this handles the CVs, which are larger at young and old ages, and if that is dealt with appropriately were raised as an uncertainty.

The otolith based age determination resulted in more old fish and thus a higher SSB in the assessment. This is important for the assessment in terms of reference point estimation, natural mortality estimations, Y/R calculations and the like, but is not important for the current stock status situation because at constant and low F it just scales the biomass up similarly for both the stock status and the SSB reference points. However, it will mean a different quantity of yield in the forecast calculations.

ToR 4. Use the Instantaneous Rates Tag Return Model Incorporating Catch-Release Data (IRCR) and associated model components applied to the Atlantic striped bass tagging data to estimate F and abundance from coast wide and producer area tag programs along with the uncertainty of those estimates. Provide suggestions for further development of this model.

Datasets used in the analyses included only first recapture events. Quite a few fish (3455) were recaptured twice and the information from the second recapture could be considered in the assessment as well, both for fishing mortality estimates and for discard mortality estimates.

Captures close to the tagging sites are often a problem. Here we were informed that this is not normally the case with striped bass.

The data analysis was considered appropriate.

It is reassuring that this tag assessment confirmed the base assessment.

ToR 5. Update or redefine biological reference points (BRPs; point estimates or proxies for B_{MSY}, SSB_{MSY}, F_{MSY}, MSY). Define stock status based on BRPs.

This ToR was only partly answered.

The new approach for defining reference points seems a bit biased towards a too low Fmsy value. This is judged based on the lack of density dependent factors considered. Of these, cannibalism might be high in the rivers as there is overlap time-wise between age-1 and spawners in spring. Striped bass are known to eat also around spawning time. Reduced growth has been seen at high densities in Chesapeake Bay. Disease is usually not considered in reference point setting, but it is a general phenomenon that diseases play a rule in population regulation and the spreading of diseases is easier at high population densities.

The ad hoc approach of choosing the 1995 SSB is rather well justified and based on a very long index time series from back to the mid-1950 and stable stock situations in 1960s to 1970s, and that the index reached the 1960s and 1970s value again in 1995.

The presentation given at the meeting contained the following table:

2013 updated reference points for alternative recruitment models

	B-H bias corrected	B-H no bias correction	Shepherd bias corrected	Shepherd no bias correction
F_{msy}	0.22	0.23	0.38	0.21
F40%	0.12	0.12	0.12	0.12
F30%	0.17	0.17	0.17	0.17
MSY	24,454	18,287	26,393	18,446
SSB_{msy}	81,301	55,800	41,127	64,112
SSB_{target}	72,370	71,514	71,153	71,695
SSB_{lim}	57,904	57,211	56,923	57,356

This table was revised during the meeting due to problems discovered with the bias corrections. A new table was presented with these errors corrected and the mean R used across calculations was presented to confirm that the recruitment data used are comparable across options.

There was an extended discussion about this table and whether the MSY part of the ToRs could be answered. After long discussion it was agreed that there had been a lot of good work done in order to try to reach MSY estimates, but that we are not there yet, so that the ad hoc target SSB

(1995) was considered appropriate for management, even though its link to MSY could not be fully established. This means the current reference points might represent over-exploitation, under-exploitation, or be appropriate - it is not fully known at the moment.

ToR 6. Provide annual projections of catch and biomass under alternative harvest scenarios. Projections should estimate and report annual probabilities of exceeding threshold BRPs for F and probabilities of falling below threshold BRPs for biomass. Use a sensitivity analysis approach covering a range of assumptions about the most important sources of uncertainty, including potential changes in natural mortality.

This ToR was completed well.

There were some doubts about the consistency in the use of recruitment assumption in the linking of an F reference point to the SSB 1995 reference point and in the projections.

There are difficulties in translating the forecast into a quota for the commercial fisheries as this will depend on the catch of the recreational fisheries, which is not regulated by a quota.

ToR 7. Review and evaluate the status of the Technical Committee research recommendations listed in the most recent SARC report. Indentify new research recommendations. Recommend timing and frequency of future assessment updates and benchmark assessments.

Monitoring in rivers at spawning sites seems to be a potential possibility using some of the techniques from salmon research like Didson acoustic monitoring of fish migrating upstream for spawning.

It might be useful for a long term strategy to consider doing assessments on each of the three separate stocks: Hudson river, Delaware river and Chesapeake Bay river. Maybe genetic identification of catches in the ocean could be used to split the catches into stocks. This has the advantage, compared incorporating the stocks in the current model as spatial elements, that it is a biological standard approach and reference points can be defined for each of the three stocks.

It is suggested that it might be fruitful to have a simple two-area element in the model to see in a simple way what sex differences in life history and spatial distribution mean for the assessment and maybe for how this can best be resolved in future modeling.

3. Summary reports

The Panel went through the draft summary reports for both species. It was checked that the contents reflected the agreed assessments. They were also edited paragraph by paragraph. For summer flounder the section of Special Comments was expanded with uncertainties in the modeling, sex and growth problems.

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Appendix 2

Statement of Work

57th Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC): Benchmark stock assessments for striped bass and summer flounder

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

BACKGROUND

The National Marine Fisheries Service's (NMFS) Office of Science and Technology coordinates and manages a contract providing external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of NMFS scientific projects. The Statement of Work (SoW) described herein was established by the NMFS Project Contact and Contracting Officer's Representative (COR), and reviewed by CIE for compliance with their policy for providing independent expertise that can provide impartial and independent peer review without conflicts of interest. CIE reviewers are independently selected by the CIE Steering Committee and CIE Coordination Team to conduct the independent peer review of NMFS science in compliance the predetermined Terms of Reference (ToRs) of the peer review. Each CIE reviewer is contracted to deliver an independent peer review report to be approved by the CIE Steering Committee and the report is to be formatted with content requirements as specified in **Annex 1**. This SoW describes the work tasks and deliverables of the CIE reviewer for conducting an independent peer review of the following NMFS project. Further information on the CIE process can be obtained from www.ciereviews.org.

SCOPE

Project Description: 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. This review determines whether the scientific assessments are adequate to serve as a basis for developing fishery management advice. Results provide the scientific basis for fishery management in the northeast region.

The purpose of this panel review meeting will be to provide an external peer review of stock assessments for striped bass (*Morone saxatilis*) and summer flounder (*Paralichthys dentatus*). Striped bass and summer flounder are commercially and recreationally important species found along the US east coast. This review determines whether the scientific assessments are adequate to serve as a basis for developing fishery management advice.

OBJECTIVES

The SARC review panel will be composed of three appointed reviewers from the Center of Independent Experts (CIE), and an independent chair from the SSC of the New England or MidAtlantic Fishery Management Council. The SARC panel will write the SARC Summary Report and each CIE reviewer will write an individual independent review report.

Duties of reviewers are explained below in the "**Requirements for CIE Reviewers**", in the "**Charge to the SARC Panel**" and in the "**Statement of Tasks**". The stock assessment Terms of Reference (ToRs) are attached in **Annex 2**. The draft agenda of the panel review meeting is attached in **Annex 3**. The SARC Summary Report format is described in **Annex 4.**

Requirements for the reviewers: Three reviewers shall conduct an impartial and independent peer review of the striped bass and summer flounder stock assessments, and this review should be in accordance with this SoW and stock assessment ToRs herein. The reviewers shall have working knowledge and recent experience in the application of modern fishery stock assessment models. Expertise should include statistical catch-at-age, state-space and index methods. Reviewers should also have experience in evaluating measures of model fit, identification, uncertainty, and forecasting. Reviewers should have experience in development of Biological Reference Points that includes an appreciation for the varying quality and quantity of data available to support estimation of Biological Reference Points. For both striped bass and summer flounder, it is desirable to have knowledge of stock assessments involving spatially distributed populations, migratory behavior, and natural mortality rates that vary with time or sex.

PERIOD OF PERFORMANCE

The contractor shall complete the tasks and deliverables as specified in the schedule of milestones within this statement of work. Each reviewer's duties shall not exceed a maximum of 16 days to complete all work tasks of the peer review described herein.

Not covered by the CIE, the SARC chair's duties should not exceed a maximum of 16 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).

PLACE OF PERFORMANCE AND TRAVEL

Each reviewer shall conduct an independent peer review during the panel review meeting scheduled in Woods Hole, Massachusetts during July 23-26, 2013.

STATEMENT OF TASKS

Charge to SARC panel: During the SARC meeting, the panel is to determine and write down whether each stock assessment Term of Reference (ToR) of the SAW (see **Annex 2**) was or was not completed successfully. 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. **If alternative assessment models and model assumptions are presented, evaluate their strengths and weaknesses and then recommend which, if any, scientific approach should be adopted.** Where possible, the SARC chair shall identify or facilitate agreement among the reviewers for each stock assessment Term of Reference of the SAW.

If the panel rejects any of the current BRP or BRP proxies (for B_{MSY} and F_{MSY} and MSY), the panel should explain why those particular BRPs or 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 or BRP proxies are the best available at this time.

Each reviewer shall complete the following tasks in accordance with the SoW and Schedule of Milestones and Deliverables herein.

Tasks prior to the meeting: The contractor shall independently select qualified reviewers that do not have conflicts of interest to conduct an independent scientific peer review in accordance with the tasks and ToRs within the SoW. Upon completion of the independent reviewer selection by the contractor's technical team, the contractor shall provide the reviewer information (full name, title, affiliation, country, address, email, and FAX number) to the COR, who will forward this information to the NMFS Project Contact no later than the date specified in the Schedule of Milestones and Deliverables. The contractor shall be responsible for providing the SoW and stock assessment ToRs to each reviewer. The NMFS Project Contact will be responsible for providing the reviewers with the background documents, reports, foreign national security clearance, and other information concerning pertinent meeting arrangements. The NMFS Project Contact will also be responsible for providing the Chair a copy of the SoW in advance of the panel review meeting. Any changes to the SoW or ToRs must be made through the COR prior to the commencement of the peer review.

Foreign National Security Clearance: The reviewers shall participate during a panel review meeting at a government facility, and the NMFS Project Contact will be responsible for obtaining the Foreign National Security Clearance approval for the reviewers who are non-US citizens. For this reason, the reviewers shall provide by FAX (or by email if necessary) the requested information (e.g., 1.name [first middle and last], 2.contact information, 3.gender, 4.country of birth, 5.country of citizenship, 6.country of permanent residence, 7.whether there is dual citizenship, 8.country of current residence, 9.birth date [mo, day, year], 10.passport number, 11.country of passport) to the NMFS Project Contact for the purpose of their security clearance, and this information shall be submitted at least 30 days before the peer review in accordance with the NOAA Deemed Export Technology Control Program NAO 207-12 regulations available at the Deemed Exports NAO website: http://deemedexports.noaa.gov/.

Pre-review Background Documents and Working Papers: Approximately two weeks before the peer review, the NMFS Project Contact will send (by electronic mail or make available at an FTP site) to the SARC chair and CIE reviewers the necessary background information and reports (i.e., working papers) for the peer review. In the case where the documents need to be mailed, the NMFS Project Contact will consult with the COR on where to send documents. The reviewers are responsible only for the pre-review documents that are delivered to the contractor in accordance to the SoW scheduled deadlines specified herein. The reviewers shall read all documents deemed as necessary in preparation for the peer review.

Tasks during the panel review meeting: Each reviewer shall conduct the independent peer review in accordance with the SoW and stock assessment ToRs, and shall not serve in any other role unless specified herein. **Modifications to the SoW and ToRs shall not be made during the peer review, and any SoW or ToRs modifications prior to the peer review shall be approved by the COR and contractor.** Each CIE reviewer shall actively participate in a professional and respectful manner as a member of the meeting review panel, and their peer review tasks shall be focused on the stock assessment ToRs as specified herein. The NMFS Project Contact is responsible for any facility arrangements (e.g., conference room for panel review meetings or teleconference arrangements). The NMFS Project Contact is responsible for ensuring that the Chair understands the contractual role of the CIE reviewers as specified herein. The CIE Lead Coordinator can contact the Project Contact to confirm any peer review arrangements, including the meeting facility arrangements.

(SARC chair)
Act as chairperson, where duties include control of the meeting, coordination of presentations and discussions, making sure all stock assessment Terms of Reference of the SAW are reviewed, control of document flow, and facilitation of discussion. For each assessment, review both the Assessment Report and the draft Assessment Summary Report. The draft Assessment Summary Report is reviewed and edited to assure that it is consistent with the outcome of the peer review, particularly statements that address stock status and assessment uncertainty.

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 stock assessment 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 or BRP proxy to be inappropriate, the reviewer should try to recommend an

alternative, should one exist. Review both the Assessment Report and the draft Assessment Summary Report. The draft Assessment Summary Report is reviewed and edited to assure that it is consistent with the outcome of the peer review, particularly statements that address stock status and assessment uncertainty.

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.

Tasks after the panel review meeting:

SARC CIE reviewers:
Each CIE reviewer shall prepare an Independent CIE Report (see **Annex 1**). This report should explain whether each stock assessment 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 Points (BRP) or their 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 stock assessment 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 stock assessment 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 (see **Annex 4**).

SARC chair and CIE reviewers:
The SARC Chair, with the assistance from the CIE reviewers, will prepare the SARC Summary Report. Each CIE reviewer and the chair will discuss whether they hold similar views on each stock assessment 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 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 SARC 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 4** for information on contents) should address whether each stock assessment 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 Points (BRP) or 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).

DELIVERY

Each reviewer shall complete an independent peer review report in accordance with the SoW. Each reviewer shall complete the independent peer review according to required format and content as described in **Annex 1**. Each reviewer shall complete the independent peer review addressing each stock assessment ToR listed in **Annex 2**.

Specific Tasks for CIE Reviewers: The following chronological list of tasks shall be completed by each CIE reviewer in a timely manner as specified in the **Schedule of Milestones and Deliverables**.

1) Conduct necessary pre-review preparations, including the review of background material and reports provided by the NMFS Project Contact in advance of the peer review.
2) Participate during the panel review meeting at the Woods Hole, Massachusetts scheduled during July 23-26, 2013.
3) Conduct an independent peer review in accordance with this SoW and the assessment ToRs (listed in **Annex 2**).

4) No later than August 9, 2013, each CIE reviewer shall submit an independent peer review report addressed to the "Center for Independent Experts," and sent to Mr. Manoj Shivlani, CIE Lead Coordinator, via email to shivlanim@bellsouth.net, and to Dr. David Sampson, CIE Regional Coordinator, via email to david.sampson@oregonstate.edu. Each CIE report shall be written using the format and content requirements specified in **Annex 1**, and address each assessment ToR in **Annex 2**.

Schedule of Milestones and Deliverables: The contractor shall complete the tasks and deliverables described in this SoW in accordance with the following schedule.

June 19, 2013	Contractor sends reviewer contact information to the COR, who then sends this to the NMFS Project Contact
July 9, 2013	NMFS Project Contact will attempt to provide reviewers the pre-review documents
July 23-26, 2013	Each reviewer participates and conducts an independent peer review during the panel review meeting in Woods Hole, MA
July 26, 2013	SARC Chair and CIE reviewers work at drafting reports during meeting at Woods Hole, MA, USA
August 9, 2013	Reviewers submit draft independent peer review reports to the contractor's technical team for independent review
August 9, 2013	Draft of SARC Summary Report, reviewed by all CIE reviewers, due to the SARC Chair *
August 16, 2013	SARC Chair sends Final SARC Summary Report, approved by CIE reviewers, to NEFSC contact (i.e., SAW Chairman)
August 23, 2013	Contractor submits independent peer review reports to the COR who reviews for compliance with the contract requirements
August 30, 2013	The COR distributes the final reports to the NMFS Project Contact and regional Center Director

* 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.

Modifications to the Statement of Work: Requests to modify this SoW must be approved by the Contracting Officer at least 15 working days prior to making any permanent substitutions. The Contracting Officer will notify the COR within 10 working

days after receipt of all required information of the decision on substitutions. The COR can approve changes to the milestone dates, list of pre-review documents, and ToRs within the SoW as long as the role and ability of the reviewers to complete the deliverable in accordance with the SoW is not adversely impacted. The SoW and ToRs shall not be changed once the peer review has begun.

Acceptance of Deliverables: The deliverables shall be the final peer review report from each reviewer that satisfies the requirements and terms of reference of this SoW. The contract shall be successfully completed upon the acceptance of the contract deliverables by the COR based on three performance standards:

(1) each report shall be completed with the format and content in accordance with **Annex 1**,
(2) each report shall address each stock assessment ToR listed in **Annex 2**,
(3) each report shall be delivered in a timely manner as specified in the schedule of milestones and deliverables.

Upon the acceptance of each independent peer review report by the COR, the reports will be distributed to the NMFS Project Contact and pertinent NMFS science director, at which time the reports will be made publicly available through the government's website.

The contractor shall send the final reports in PDF format to the COR, designated to be William Michaels, via email William.Michaels@noaa.gov

Support Personnel:

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Annex 1: Format and Contents of Independent Peer Review Report

1. The independent peer review report shall be prefaced with an Executive Summary providing a concise summary of whether they accept or reject the work that they reviewed, with an explanation of their decision (strengths, weaknesses of the analyses, etc.).

2. The main body of the report shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Findings of whether they accept or reject the work that they reviewed, and an explanation of their decisions (strengths, weaknesses of the analyses, etc.) for each ToR, and Conclusions and Recommendations in accordance with the ToRs. For each assessment reviewed, the report should address whether each ToR of the SAW was completed successfully. For each ToR, the Independent Review Report should state why that ToR was or was not completed successfully. To make this determination, the SARC chair and reviewers should consider whether the work provides a scientifically credible basis for developing fishery management advice.

   a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including a concise summary of whether they accept or reject the work that they reviewed, and explain their decisions (strengths, weaknesses of the analyses, etc.), conclusions, and recommendations.

   b. Reviewers should discuss their independent views on each ToR even if these were consistent with those of other panelists, and especially where there were divergent views.

   c. Reviewers should elaborate on any points raised in the SARC Summary Report that they feel might require further clarification.

   d. Reviewers shall provide a critique of the NMFS review process, including suggestions for improvements of both process and products.

   e. The independent report shall be a stand-alone document for others to understand the proceedings and findings of the meeting, regardless of whether or not others read the SARC Summary Report. The independent report shall be an independent peer review of each ToR, and shall not simply repeat the contents of the summary report.

3. The reviewer report shall include the following appendices:

   Appendix 1: Bibliography of materials provided for review
   Appendix 2: A copy of this Statement of Work
   Appendix 3: Panel Membership or other pertinent information from the panel review meeting.

Annex 2: 57th SAW/SARC Stock Assessment Terms of Reference

(file vers.: 12/18/2012)

A. Summer flounder

1. Estimate catch from all sources including landings and discards. Describe the spatial and temporal distribution of landings, discards, and fishing effort. Characterize the uncertainty in these sources of data.

2. Present the survey data available for use in the assessment (e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, etc.), and explore standardization of fishery-independent indices*. Investigate the utility of commercial or recreational LPUE as a measure of relative abundance. Characterize the uncertainty and any bias in these sources of data. Describe the spatial distribution of the stock over time.

3. Review recent information on sex-specific growth and on sex ratios at age. If possible, determine if fish sex, size and age should be used in the assessment*.

4. Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series (integrating results from TOR-3), and estimate their uncertainty. Explore inclusion of multiple fleets in the model. Include both internal and historical retrospective analyses to allow a comparison with previous assessment results and previous projections.

5. State the existing stock status definitions for "overfished" and "overfishing". Then update or redefine biological reference points (BRPs; point estimates or proxies for B_{MSY}, $B_{THRESHOLD}$, F_{MSY} and MSY) and provide estimates of their uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for BRPs. Comment on the scientific adequacy of existing BRPs and the "new" (i.e., updated, redefined, or alternative) BRPs.

6. Evaluate stock status with respect to the existing model (from previous peer reviewed accepted assessment) and with respect to a new model developed for this peer review.
    a. When working with the existing model, update it with new data and evaluate stock status (overfished and overfishing) with respect to the existing BRP estimates.
    b. Then use the newly proposed model and evaluate stock status with respect to "new" BRPs and their estimates (from TOR-5).

7. Develop approaches and apply them to conduct stock projections and to compute the statistical distribution (e.g., probability density function) of the OFL (overfishing level) and candidate ABCs (Acceptable Biological Catch; see Appendix to the SAW TORs).
    a. Provide annual projections (3 years). For given catches, each projection should estimate and report annual probabilities of exceeding threshold BRPs for F, and probabilities of falling below threshold BRPs for biomass. Use a sensitivity analysis approach in which a range of assumptions about the most important uncertainties in the assessment are considered (e.g., terminal year abundance, variability in recruitment).
    b. Comment on which projections seem most realistic. Consider the major uncertainties in the assessment as well as sensitivity of the projections to various assumptions.
    c. Describe this stock's vulnerability (see "Appendix to the SAW TORs") to becoming overfished, and how this could affect the choice of ABC.

8. Review, evaluate and report on the status of the SARC and Working Group research recommendations listed in most recent SARC reviewed assessment and review panel reports, as well as MAFMC SSC model recommendations from 2012. Identify new research recommendations.

(*: Completion of specific sub-task is contingent on analytical support from staff outside of the NEFSC.)

Annex 2 (cont.):

B. Striped bass**

1. Investigate all fisheries independent and dependent data sets, including life history, indices of abundance, and tagging data. Discuss strengths and weaknesses of the data sources. Evaluate evidence for changes in natural mortality in recent years.

2. Estimate commercial and recreational landings and discards. Characterize the uncertainty in the data and spatial distribution of the fisheries.

3. Use the statistical catch-at-age model to estimate annual fishing mortality, recruitment, total abundance and stock biomass (total and spawning stock) for the time series and estimate their uncertainty. Provide retrospective analysis of the model results and historical retrospective. Provide estimates of exploitation by stock component, where possible, and for total stock complex.

4. Use the Instantaneous Rates Tag Return Model Incorporating Catch-Release Data (IRCR) and associated model components applied to the Atlantic striped bass tagging data to estimate F and abundance from coast wide and producer area tag programs along with the uncertainty of those estimates. Provide suggestions for further development of this model.

5. Update or redefine biological reference points (BRPs; point estimates or proxies for B_{MSY}, SSB_{MSY}, F_{MSY}, MSY). Define stock status based on BRPs.

6. Provide annual projections of catch and biomass under alternative harvest scenarios. Projections should estimate and report annual probabilities of exceeding threshold BRPs for F and probabilities of falling below threshold BRPs for biomass. Use a sensitivity analysis approach covering a range of assumptions about the most important sources of uncertainty, including potential changes in natural mortality.

7. Review and evaluate the status of the Technical Committee research recommendations listed in the most recent SARC report. Indentify new research recommendations. Recommend timing and frequency of future assessment updates and benchmark assessments.

(**: These TORs were developed by the ASMFC Striped Bass Stock Assessment Subcommittee and Tagging Subcommittee, with approval from the Technical Committee and Management Board.)

Annex 2 (cont.):

Appendix to the SAW Assessment TORs:

Clarification of Terms used in the SAW/SARC Terms of Reference

Appendix to the Assessment TORs:

Explanation of "Acceptable Biological Catch" (DOC Natl. Standard Guidelines, Fed. Reg., vol. 74, no. 11, 1/16/2009):

> *Acceptable biological catch (ABC)* is a level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of [overfishing limit] OFL and any other scientific uncertainty…" *(p. 3208) [In other words, OFL ≥ ABC.]*
>
> *ABC for overfished stocks.* For overfished stocks and stock complexes, a rebuilding ABC must be set to reflect the annual catch that is consistent with the schedule of fishing mortality rates in the rebuilding plan. *(p. 3209)*
>
> NMFS expects that in most cases ABC will be reduced from OFL to reduce the probability that overfishing might occur in a year. (p. 3180)
>
> ABC refers to a level of ''catch'' that is ''acceptable'' given the ''biological'' characteristics of the stock or stock complex. As such, [optimal yield] OY does not equate with ABC. The specification of OY is required to consider a variety of factors, including social and economic factors, and the protection of marine ecosystems, which are not part of the ABC concept. (p. 3189)

Explanation of "Vulnerability" (DOC Natl. Standard Guidelines, Fed. Reg., vol. 74, no. 11, 1/16/2009):

> *"Vulnerability.* A stock's vulnerability is a combination of its productivity, which depends upon its life history characteristics, and its susceptibility to the fishery. Productivity refers to the capacity of the stock to produce MSY and to recover if the population is depleted, and susceptibility is the potential for the stock to be impacted by the fishery, which includes direct captures, as well as indirect impacts to the fishery (e.g., loss of habitat quality)." (p. 3205)

Rules of Engagement among members of a SAW Assessment Working Group:

> Anyone participating in SAW assessment working group meetings that will be running or presenting results from an assessment model is expected to supply the source code, a compiled executable, an input file with the proposed configuration, and a detailed model description in advance of the model meeting. Source code for NOAA Toolbox programs is available on request. These measures allow transparency and a fair evaluation of differences that emerge between models.

Annex 3: Draft Agenda

57th Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC): Benchmark stock assessments for summer flounder and striped bass

July 23-26, 2013

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

AGENDA* (version: 28 Feb. 2013)

TOPIC	PRESENTER(S)	SARC LEADER	RAPPORTEUR

Tuesday, July 23

10 – 10:30 AM

Welcome	**James Weinberg**, SAW Chair
Introduction	**Cynthia Jones**, SARC Chair
Agenda	
Conduct of Meeting	

10:30 – 12:30 PM Assessment Presentation (Stock A.)
TBD TBD **TBD**

12:30 – 1:30 PM Lunch

1:30 – 3:30 PM Assesssment Presentation (Stock A.)
TBD TBD **TBD**

3:30 – 3:45 PM Break

3:45 – 4 PM Public Comments

4 - 6 PM SARC Discussion w/ Presenters (Stock A.)
Cynthia Jones, SARC Chair **TBD**

TOPIC	PRESENTER(S)	SARC LEADER	RAPPORTEUR

Wednesday, July 24

9 – 10:45 AM	Assessment Presentation (Stock B.)		
	TBD	TBD	**TBD**
10:45 – 11 AM	Break		
11 – 12:30 PM	(cont.) Assessment Presentation (Stock B.)		
	TBD	TBD	**TBD**
12:30 – 1:45 PM	Lunch		
1:45 – 2 PM	Public Comments		
2 – 3:30 PM	SARC Discussion w/presenters (Stock B.)		
	Cynthia Jones, SARC Chair		**TBD**
3:30 -3:45 PM	Break		
3:45 – 6 PM	Revisit with presenters (Stock A.)		
	Cynthia Jones, SARC Chair		**TBD**
7 PM	**(**Social Gathering **)**		

TOPIC	PRESENTER(S)	SARC LEADER	RAPPORTEUR

Thursday, July 25

8:30 – 10:15	Revisit with presenter (Stock B.) **Cynthia Jones**, SARC Chair		**TBD**
10:15 – 10:30	Break		
10:30 – 12:45	Review/edit Assessment Summary Report (Stock B.) **Cynthia Jones**, SARC Chair		**TBD**
12:45 – 2 PM	Lunch		
2 – 2:45 PM	(cont.) edit Assessment Summary Report (Stock B.) **Cynthia Jones**, SARC Chair		**TBD**
2:45 – 3:00 PM	Break		
3:00 – 6:00 PM	Review/edit Assessment Summary Report (Stock A.) **Cynthia Jones**, SARC Chair		**TBD**

Friday, July 26

9:00 AM – 5:00 PM	SARC Report writing. (closed meeting)		

*All times are approximate, and may be changed at the discretion of the SARC chair. The meeting is open to the public, except where noted.

The NMFS Project contact will provide the final agenda by May, 2013.

Reviewers must attend the entire meeting.

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 Working Group 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 Points (BRP) or BRP proxies are considered inappropriate, include recommendations and justification for alternatives. If such alternatives cannot be identified, then indicate that the existing BRPs or BRP proxies are the best available at this time.

3.

The report shall also include the bibliography of all materials provided during the SAW, and relevant 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 assessment Terms of Reference used for the SAW, including any changes to the Terms of Reference or specific topics/issues directly related to the assessments and requiring Panel advice.

Appendix 3 Panel Membership or other pertinent information from the panel review meeting.

Members of SARC 57:

Cynthia Jones, chair
Robin Cook
John Simmonds
Henrik Sparholt

57th SAW/SARC, List of Attendees

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