

Centre for Independent Experts

Independent Peer Review Report of the Northeast Regional Stock Assessment Review Committee Meeting (SARC) for Striped bass, *Morone saxatilis* Woods Hole, 26 – 30 November 2007

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Summary

The Northeast Regional Stock Assessment Review Committee Meeting (SARC) took place in Woods Hole on the 26 – 30 November 2007 (SARC46) to review the assessment of Striped bass, *Morone saxatilis*.

The SARC meeting was adeptly chaired by the SARC chair Michael Murphy and, in combination with the well organized facilities, resources and background support provided by NOAA staff, the meeting ran to schedule in a relaxed format, allowing sufficient time for clarification of questions on presentations, further analysis if required and detailed discussion on each TOR.

The assessment team was well prepared for the meeting and the presentations on data collection, raising, analysis and model outputs were well structured and consistent. The ability, attitude, and collaborative team-work demonstrated by the assessment team participants was of a comparable, high standard to those attending assessment meetings that I have participated in within the International Commission for the Exploration of the Sea (ICES), Canada, and the North Atlantic Fisheries Organization (NAFO).

The assessment team addressed and met all of its terms of reference and their conclusion that the stock is currently not over-fished and over-fishing is not occurring is appropriate. Based on the results of the catch at age analysis the bass spawning stock biomass is well above the biomass reference threshold and fishing mortality is currently at the target level and below the over fishing threshold.

The SARC Committee report was prepared after the meeting and discusses all of the issues raised by the review team. I contributed to and agree with all the comments and conclusions of that report and consider that it is an accurate description of the Committees views. I have no major additional issues on the assessment that I consider were omitted from the report and within this report mainly offer comments on the assessment and advisory process.

Chris Darby

1) Conduct of the meeting

The SARC meeting was competently chaired by Michael Murphy who kept the meeting on track and discussions relevant. The SARC had high-quality background support from the NOAA staff, prior to and during the meeting. The Web site and LAN arrangement for the meeting allowed rapid dissemination of information and results and were extremely useful.

The assessment co-ordinators were well prepared; the meeting presentations and discussions were open and balanced, and sufficient time was allowed for each issue. Suggestions and criticism were readily accepted and additional work required by the SARC was completed during the evenings, after the meetings, in time for review the next day. The ability, attitude, and team-work demonstrated by the assessment team was of a comparable, high, standard to assessment meetings that I have attended within ICES, Canada, and at NAFO.

It is unfortunate that the open meeting format was not taken up by the fishing industry or representatives of the sports fishers; this would have provided a useful opportunity for the stakeholders to contribute to the process and add their experience on the state of the stocks.

2) TOR 1 Characterize the commercial and recreational catch including landings and discards.

I have no additional issues on the data collection and collation that are not considered in the SARC Committee report, prepared after the meeting. I agree that this term of reference was met and with all the comments and conclusions within the section addressing this TOR within the Committee report.

The greater part of the data used in the assessment process was well characterized. The assessment team was conscious as to where gaps in databases require attention using additional information and is trying to address the shortcomings.

Comments

The assessment team is aware of the sensitivities of the assessment estimates and resulting management advice, to the data raising procedures that they apply. However, the uncertainties associated with them are not fully quantified; for example - the uncertainty introduced to the reference fishing mortality as a result of the errors associated with ageing of older fish and the raising of commercial discards using recreational data is unknown. A series of coordinated (across regions) short-term studies that quantify the uncertainty associated with each of the data raising procedures and fill-in assumptions would greatly help in the targeting of improvements to data collection

programs, assessment modeling and ultimately a better understanding of the information on which the management advice is based.

Fishing pressure has been increasing on the stock in recent years. It is likely that fishing mortality will exceed the reference target in the near future and it may therefore be timely to consider how recreational and commercial fisheries will be regulated when this occurs. Is the current sampling program sufficient to be able to quantify any change in fisher behavior as a result of increased regulations?

3) TOR 2 Characterize the fisheries independent and dependent indices of abundance.

I agree with the SARC Committee conclusion that this term of reference was met and with all the comments and conclusions within the section addressing this TOR within the Committee report.

Comments

There are a large number of fisheries independent surveys conducted for the provision of information on the local abundance of striped bass life history stages. A recent coordination meeting reduced the number of series used for the full stock assessment by excluding noisy surveys or those with contradictory trends to the assessment model population estimates.

Although this approach to reducing the complexity and uncertainty associated with fitting to numerous calibration series is appropriate in situations where each index is considered to provide independent information on the global stock trends, this does not seem to be appropriate for the bass complex of sub-stocks. Many of the surveys represent the dynamics of the local sub-stock. Therefore, comparisons with the stock trends resulting from the assessment model fit to the combined catch data set are likely to result in false negatives and the exclusion of locally valid information.

Collection of information on regional dynamics is extremely useful for the provision of provincial management advice and is fully supported. However, if the assessment model fitted to the stock continues to include all areas in the form of a single stock unit, it would be more appropriate to integrate across the survey series using a model that allows for spatial variation (for instance a GAM), in order to provide a combined survey index. The series excluded by the coordination meeting should be reexamined within the initial screening.

4) TOR 3 Evaluate the Statistical Catch at Age (SCA) model and its estimates of F, spawning stock biomass, and total abundance of Atlantic striped bass, along with the uncertainty of those estimates.

I agree with the SARC Committee conclusion that this term of reference was met and with all the comments and conclusions within the section addressing this TOR within the Committee report.

Assessment coordinators were well prepared and organized and the presentations of data and model results were well structured. The age-based models that were applied to assess the recent stock dynamics and provide comparative runs are standard methods that are routinely used within other fisheries management institutions. The review protocol adopted by the meeting was appropriate for those methods although as detailed in the SARC report more in-depth analysis of the model diagnostics is required (the conclusions drawn from the model fit would not be changed, but additional analysis would facilitate improved understanding).

The assessment team's conclusions that stock status should be based on the fit of the SCA model, and that the stock is currently not over-fished and over-fishing is not occurring, are appropriate. Based on the results of the catch at age analysis the bass spawning stock biomass is well above the biomass reference threshold and fishing mortality is currently at the target level and below the over fishing threshold.

Comments

There are several comments within the assessment report that refer to the retrospective pattern in the time series of fishing mortality and population estimates derived from successive fits of the SCA assessment model. The comments appear to imply that fishing mortality is always over estimated and that in time it will be estimated to be at a significantly lower level and therefore the current terminal estimate, which is at the reference target, will subsequently be estimated to be below that level. This makes the assumption that the historic data and model fits are "more accurate" or less biased than more recent values. Several studies have shown that in cases where catch at age data is affected by increased bias in recent years (e.g. increased levels of discarding) the most recent estimate in the assessment series is the most appropriate for management.

Similarly the assessment summary report refers to the retrospective reduction in the SCA estimates of fishing mortality eventually bringing the SCA values closer to those derived from the tagging studies. The model bias implied from the retrospective "correction" is not of sufficient magnitude to explain the difference in the time series of estimates in recent years between the two models (see TOR 5).

In common with the discussion on the spatial integration of the survey series (TOR 2), it is apparent that there is a difference between the spatial scale at which the SCA model is fitted and that at which the catch data and survey information is collected. The assessment model is attempting to integrate across (at least) a three sub-stock complex.

Each sub-stock could, potentially, have differing exploitation rates and spawning stock dynamics and whilst the combined stock could be regarded as healthy one of the components could be outside of safe levels. Therefore it is suggested that a regional assessment model that allows for differing dynamics in each area be examined for its potential to improve the fit to the spatially disaggregated data and to provide regional management advice. This is discussed further below under TOR 6.

5) TOR 4 Evaluate the Baranov's catch equation method and associated model components applied to the Atlantic striped bass tagging data. Evaluate estimates of F and abundance from coast-wide and Chesapeake Bay specific programs along with the uncertainty of those estimates.

I agree with the SARC Committee conclusion that this term of reference was met and with all the comments and conclusions within the section addressing this TOR within the Committee report. Comments on the two approaches to modeling the tag returns discussed within TOR 5.

6) TOR 5 Review the Instantaneous Rates Tag Return Model Incorporating Catch-Release Data (IRCR) and estimates of F on Atlantic striped bass. Provide suggestions for further development of this model for future use in striped bass stock assessments.

I agree with the SARC Committee conclusion that this term of reference was met and with all the comments and conclusions within the section addressing this TOR within the Committee report.

Comments on TOR 4 and 5

The tagging model estimates declining or stable fishing mortality rates in recent years during which catch has been increasing and all of the young of the year surveys indicate stable levels of recruitment since the mid 1990's. These are not consistent and therefore the tagging model estimates of fishing mortality should not be used for management until this discrepancy has been investigated further.

The tagging model is analyzing reported tag recapture data. The majority of the decline in the tag numbers is subdivided into mortality rates that have been assumed to be related to fishing and natural mortality. However, it could also be explained by changes in the rate reporting of tags, high grading of catch and other causes of unaccounted mortality. Changes in rates that are assumed constant within the model fit, could result in an artificially inflated estimate of natural mortality.

To the SARC committee it was not clear that other forms of tag decline within the population have been fully explored; such as a decline in reporting rate, increase in tag

loss etc. Monitoring of the values assumed to be constant within the tagging model using regular programs with high value and double tagging experiments could be incorporated in order to prevent introduction of model misspecification bias.

7) TOR 6 Review the Forward-Projecting Statistical Catch-At-Age Model Incorporating the Age-Independent Instantaneous Rates Tag Return Model (SCATAG) and estimates of F, spawning stock biomass, and total abundance of striped bass. Provide suggestions for further development of this model for future use in striped bass stock assessments.

I agree with the SARC Committee conclusion that this term of reference was met and with all the comments and conclusions within the section addressing this TOR within the Committee report.

Comments on TOR 6

Integrating the tagging data with the catch at age analysis is appropriate and has been used in other studies to combine information from a variety of data sources. This should be encouraged and will in the long run provide improved estimates for management. Unfortunately, the current approach does not seem appropriate in that it links models fitted to two information sources using a single time series of fishing mortality which may have differing meaning (scale) for each of the two data sources (discussed under TOR 5).

Here scale refers to the assumption that F on the tag population maps directly into F in the SCA model at the same magnitude (scale). I would have assumed that the year effects were the same (this year's F is twice last years) allowing similar annual dynamics but that the impact of fishing on the population of tags could be different from that on the total population. This is similar to a catchability and would allow for tag loss or differing reporting rates related to F. Forcing the scaling of the two fishing mortality effects to unity seems a severe initial assumption for a constraint to me.

As discussed under TOR 3 there is a difference between the spatial scale at which the SCA model is fitted and that at which the catch, survey and tagging data are collected. In isolation the current implementations of the SCA and the tagging models are trying to integrate information collected from (at least) a three sub-stock components. Due to the species reliance on estuarine habitats for spawning and the juvenile development, each sub-stock is likely to have a unique contribution to the productivity of the population. High levels of exploitation on one component are likely to put that part of the stock at risk whilst the overall stock situation may be regarded as within safe limits.

A regional assessment model that allows for differing dynamics in each area would be expected to improve the model fit to the regional data sets discussed under TOR 1 and 2 and improve the utility of the assessment advice to managers. In the literature, there have

been several attempts to model stocks that include multiple components and in general they suffer from a lack of information on migration / mixing rates and the contribution of each component to catches removed in any area. In this respect the striped bass tagging data provides an extremely rich source of information for movement vector analysis. Studies by Noel Cadigan on 3ps cod around Newfoundland would provide a starting place for further research.

8) TOR 7 Evaluate the current biological reference points for Atlantic striped bass from Amendment 6 and determine stock status based on those reference points.

I agree with the SARC Committee conclusion that this term of reference was met and with all the comments and conclusions within the section addressing this TOR within the Committee report.

Comments on TOR 7

Comparisons were made in the presentations between reference levels of fishing mortality and biomass based on calculations derived from catch at age analysis and the point estimates of current stock and fishing mortality from the tagging model. This is inadvisable. The two models are using differing approaches to estimate the fishing mortality metrics but it is not clear that the scales are directly comparable.

Reference point levels should be calculated relative to the time series of estimates resulting from each model fit independently, for instance SSB relative to SSB₁₉₉₅. The reference levels will then be model specific and therefore directly comparable with the current estimate of stock status.

9) General comments on the assessment and advisory process

Currently stock status is defined at a global scale, but management is empowered and implemented within states using a variety of local regulations. Fishing mortality has been increasing in recent years and it is likely that it will exceed the target in the near future. When this occurs there is likely to be a requirement for the assessment and advisory system to provide guidance on the effects of regional management measures on local exploitation rates and abundance.

It appeared to me that the assessment team might have difficulty providing an evaluation of the impact of regulations in one area on the remainder of the stock due to the global nature of their current assessment model. The spatial model discussed earlier would provide one approach to improving management advice when it is available. In the interim I would recommend that as a preparatory exercise the team begin to discuss with managers their likely reaction when the fishing mortality reference levels are exceeded. They can then consider whether they will be able to provide the required support at a

global scale or whether their regional catch and tagging information could be utilized at a finer spatial scale to provide local management advice on the productivity, status and impact of regulations on of each of the stock components.

10) Comments on the SARC process

I thoroughly enjoyed the SARC striped bass review meeting. The facilities and technical and secretarial support were of high-quality. The assessment team, reviewers and participating audience all contributed to discussions that were open, relevant and scientifically stimulating. I considered the meeting format provided a suitable opportunity for all interested parties to participate and contribute and will recommend the format as an example to other fisheries institutions.

Chris Darby
16/12/2007

Appendix 1. Bibliography

A1	Assessment Summary Report		Summary; primarily used for management.
A2	Assessment Report		Text of Scientific report -- 2007 assessment.
A2	Assessment Report		Tables of Scientific report.
A2	Assessment Report		Figures of Scientific report.
A2	Assessment Report	Appendix 1	Documentation of Mixed Stock status and GIS
A2	Assessment Report	Appendix 2	Commercial Landings data sources.
A2	Assessment Report	Appendix 3	Estimation of Virginia and NC harvests.
A2	Assessment Report	Appendix 4	Recreational Fishery Monitoring.
A2	Assessment Report	Appendix 5	Analysis and discussion of 1998-2002 coast-wide weight at age.
A2	Assessment Report	Appendix 6	VPA indices workshop.
A2	Assessment Report	Appendix 7	AD Model Builder code for Stat. Catch at Age Model.
A2	Assessment Report	Appendix 8	Plots of SCA Model O-put
A2	Assessment Report	Appendix 9	ADAPT VPA
A2	Assessment Report	Appendix 10	Age-Structured Assessment Program (ASAP).
A2	Assessment Report	Appendix 11	Catch Curve Analysis.
A2	Assessment Report	Appendix 12	Estimation of F on Ages 8+, from landings and survey indices, 1982-2006.
A2	Assessment Report	Appendix 13	Input Tagging Matrices for MARK/Catch Method etc.
A2	Assessment Report	Appendix 14	Tables about Tagging Data.
A2	Assessment Report	Appendix 15	AD Model Builder code for Instant rates catch/release model (IRCR).
A2	Assessment Report	Appendix 16	Plots of results from SCATAG model.
	Background		Large pdf file with background papers from earlier work; previous assessment.

Appendix 2. Statement of work

Subcontract between NTVI and Cefas (Dr. Chris Darby)

Statement of Work

November 14, 2007

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 SARC46 review panel will be composed of three appointed reviewers from the Center of Independent Experts (CIE), and an independent chair from the Florida Fish and Wildlife Conservation Commission. The panel will convene at the Woods Hole Laboratory of the Northeast Fisheries Science Center (NEFSC) in Woods Hole, Massachusetts, from November 26 - 30, 2007 to review one assessment (Striped bass, *Morone saxatilis*). In the days following the review of the assessments, the panel will write the SARC Summary Report and each CIE reviewer will write an individual independent review report.

Specific Activities and Responsibilities

The CIE's deliverables shall be provided according to the schedule of milestones listed on Page 5. The CIE reviewers, along with input 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 and fair 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 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 each 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.

If a reviewer feels that his/her comments are adequately expressed in the SARC Summary Report, it will not be necessary to repeat the same comments in the Independent CIE Report. In that case, the Independent CIE Report can be used to provide greater detail 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 if it cannot reach one. 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 December 17, 2007, the CIE reviewers shall submit their Independent CIE Reports to the CIE Program manager Dr. Manoj Shrivani via e-mail to mshrivani@rsmas.miami.edu

Milestone	Date
Open workshop at Northeast Fisheries Science Center (NEFSC) (begin writing reports, as soon as open Workshop ends)	November 26-28, 2007
SARC Chair and CIE reviewers work at the NEFSC drafting reports	November 28-30
Draft of SARC Summary Report, reviewed by all CIE reviewers, due to the SARC Chair **	December 17
CIE reviewers submit Independent CIE Reports to CIE for approval	December 17
SARC Chair sends Final SARC Summary Report, approved by CIE reviewers, to NEFSC contact (i.e., SAW Chairman)	December 24
CIE provides reviewed Independent CIE Reports to NMFS COTR for approval	December 31
COTR notifies CIE of approval of reviewed Independent CIE Reports	January 7, 2008 *
COTR provides final Independent CIE Reports to NEFSC contact	January 7, 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 December 31, 2007, 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 January 7, 2008, and then distribute the reports to the NEFSC contact person.

ANNEX 1:

Terms of Reference

for the 46th Northeast Regional Stock Assessment Workshop on

**ATLANTIC STRIPED BASS, *Morone saxatilis*
2007 Stock Assessment & Peer Review**

Terms of Reference

1. Characterize the commercial and recreational catch including landings and discards.
2. Characterize the fisheries independent and dependent indices of abundance.
3. Evaluate the Statistical Catch at Age (SCA) model and its estimates of F, spawning stock biomass, and total abundance of Atlantic striped bass, along with the uncertainty of those estimates.
4. Evaluate the Baranov's catch equation method and associated model components applied to the Atlantic striped bass tagging data. Evaluate estimates of F and abundance from coastwide and Chesapeake Bay specific programs along with the uncertainty of those estimates.
5. Review the Instantaneous Rates Tag Return Model Incorporating Catch-Release Data (IRCR) and estimates of F on Atlantic striped bass. Provide suggestions for further development of this model for future use in striped bass stock assessments.
6. Review the Forward-Projecting Statistical Catch-At-Age Model Incorporating the Age-Independent Instantaneous Rates Tag Return Model (SCATAG) and estimates of F, spawning stock biomass, and total abundance of striped bass. Provide suggestions for further development of this model for future use in striped bass stock assessments.
7. Evaluate the current biological reference points for Atlantic striped bass from Amendment 6 and determine stock status based on those reference points.

ANNEX 2: 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.

If a reviewer feels that his/her comments are adequately expressed in the SARC Summary Report, it will not be necessary to repeat the same comments in the Independent CIE Report. In that case, the Independent CIE Report can be used to provide greater detail on specific Terms of Reference or 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.

ANNEX 3: 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 46, 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 46, including any changes to the Terms of Reference or specific topics/issues directly related to the assessments and requiring Panel advice.