Center for Independent Experts Independent Peer Review Report of: SEDAR 28: South Atlantic Cobia and Spanish Mackerel Review Workshop

Double Tree Hotel
Atlanta Georgia
Oct 29-Nov 2, 2012

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1. Executive summary

The meeting to review the assessments of South Atlantic Cobia and Spanish Mackerel was held in Atlanta, Georgia, from October 29 to November 2, 2012, and the main conclusions are given separately by species.

The South Atlantic cobia stock assessment presented by the SEDAR 28 Assessment Workshop (AW) provided the Review Panel (RP) with outputs and results from two assessments models. The primary model was the Beaufort Assessment Model (BAM), while a secondary, surplus-production model (ASPIC) provided a comparison of model results. The RP concluded that the BAM was the most appropriate model to characterize the stock status for management purposes.

The current stock status in the base run was estimated to be $SSB_{2011}/MSST=1.75$. The current level of fishing is $F_{2009\text{-}2011}/F_{MSY} = 0.599$, with $F_{2011}/F_{MSY} = 0.423$. Therefore, the RP concludes that the stock is not overfished and is not undergoing overfishing. The qualitative results on terminal stock status were similar across presented sensitivity runs, indicating that the stock status results were robust given the provided data and can be used for management. The outcomes of sensitivity analyses were in general agreement with those of the Monte Carlo Bootstrap analysis in BAM. The RP concluded that the ASPIC model results were not informative for stock status determination and fisheries management.

The South Atlantic Spanish mackerel stock assessment presented by the SEDAR 28 AW provided the RP with outputs and results from two assessments models. The primary model was the Beaufort Assessment Model (BAM), while a secondary, surplus-production model (ASPIC) provided a comparison of model results. The stock status results from ASPIC were qualitatively similar to those from BAM. The RP concluded that the BAM was the most appropriate model to characterize the stock status for management purposes.

The current stock status in the base run from the BAM was estimated to be $SSB_{2011}/MSST=2.29$. The current level of fishing is $F_{2009\text{-}2011}/F_{MSY} = 0.526$, with $F_{2011}/F_{MSY} = 0.521$. Therefore, the RP concluded that the stock is not overfished and is not undergoing overfishing. The qualitative results on terminal stock status were similar across presented sensitivity runs, indicating that the stock status results were robust given the provided data and can be used for management. The outcomes of sensitivity analyses carried out with BAM were in general agreement with those of the Monte Carlo Bootstrap analysis in BAM.

Evaluation of research requirements suggests that a tagging program for cobia and increased age sampling for both stocks would be particularly beneficial.

2. Background

SEDAR 28 provided compilation of data, an assessment of the stocks, and an assessment review conducted for South Atlantic Spanish mackerel and cobia. The Center for Independent Experts (CIE) peer review panel is ultimately responsible for ensuring that the best possible assessment has been provided through the SEDAR process. The stocks assessed through SEDAR 28 are within the jurisdiction of the South Atlantic Fisheries Management Council and states of Florida, Georgia, South Carolina, and North Carolina. The Terms of Reference (ToRs) of the peer review are attached in Annex 2 to Appendix 2. The agenda of the panel review meeting is attached in Annex 3 to Appendix 2 and the participants list is in Appendix 3.

Three CIE reviewers conducted an impartial and independent peer review during the SEDAR 28 review scheduled 29 October to 2 November 2012, The CIE reviewers were required to have the necessary qualifications to complete the tasks in accordance with the SoW and ToRs (Appendix 2). One of the selected CIE reviewers also participated as the CIE observer and was contracted to attend the SEDAR 28 assessment workshop in May 2012. The CIE reviewers were required to have expertise in stock assessment, statistics, fisheries science, and marine biology sufficient to complete the tasks of the peer-review.

3. Description of the reviewer's role in the review activities

I am an expert in both Fisheries Surveys and Stock Assessment and their use in fish stock management. My background is that of a senior fisheries scientist currently carrying out contracts for the European Commission dealing with management strategy evaluation (MSE) and Impact Assessment of fishery management plans. I obtained BSc. and MSc. degrees in the UK. Before recently joining the European Commission I had worked in fisheries research for 37 years at the Government Fisheries Research Laboratory Aberdeen in Scotland. I have worked with acoustic surveys for more than 30 years and carried out stock assessments involving acoustic-trawl, trawl and egg surveys for more than 16 years. I am co-author of books on Fisheries Acoustics (1991 and 2nd Edition 2005) and Geostatistics (2000). In addition to work in Aberdeen, Scotland, I have been involved in surveys off Morocco, Ecuador, Peru the South China Sea and in the Persian Gulf. Since 1990 I have developed extensive experience of fish stock assessment and fisheries management, chairing among other groups the ICES herring survey planning group 1991-95, the ICES Fisheries Acoustics working group 1993-96, the ICES Herring Assessment working group 1998-2000, and the ICES study group on Management Strategies from 2004-2009. In addition to a wide range of assessment work as part of the ICES assessment process, I have been responsible for developing approaches for combining acoustic-trawl, trawl and ichthyoplankton surveys in assessments for North

Sea herring North East Atlantic mackerel and Peruvian Anchovetta. I currently chair the European Commission STECF group that prepares evaluations of historic performance of management plans and the impact assessments for new multi-annual fisheries management plans.

I participated in all aspects of the review, paying particular attention to the stock assessment and the sensitivity analyses and Monte Carlo (MC) analyses, and the utility of the results for management of the populations of Spanish mackerel and cobia.

4. Findings by ToR

The report is organized as two individual sections that relate to the assessments of the two stocks; South Atlantic Cobia (*Rachycentron canadum*) Section 4.1 and South Atlantic Spanish Mackerel (*Scomberomorus maculatus*) Section 4.2. Issues for both species are dealt with in common in discussions of research recommendations (Section 5) and review of meeting process (Section 6). The detailed ToR that provided the structure for section 4.1 and 4.2 are provided in Appendix 2 Annex 2. The list of participants who attended the review is given in Appendix 3.

4.1. Cobia

Quality and applicability of data used in the assessment

In summary it was concluded that the data used in the assessment were the best available, but there was some concern that the limited age and discard information could be a problem and may make the assessment rather sensitive to additional data. However the clear progression of several cohorts through the time series of age composition in recreational catch was sufficient to support the view that an age based model could be appropriate considering the data sources. Some concern was expressed about the impact of the minimum landing size on the bias of the data, despite the use of the Diaz (2004) correction. The impact of the minimum landing size on the selectivity of discards and estimation of fraction mature should also be considered.

Life history strategies of cobia

Strengths

- Stock identity was considered and movement was also examined though tag studies.
- Estimates of age varying natural mortality were considered and provided.
- Discard mortality was considered and estimates used.
- The report highlighted and provided information on sexual dimorphism in growth.
- Information to derive alternative stock reproductive-potential indices was considered

Weaknesses

- The potential for tag studies or juvenile release events to monitor mortality was not fully explored, which is discussed below in the section on research recommendations.
- Age sampling was very poor and barely adequate even in recent years, the resources currently allocated to age-reading and sampling for age seem to be inadequate with respect to the utility of the information.
- Whilst discard mortality was considered, discard selectivity was not assessed well, weights, fraction mature and discarding should be estimated together with the Diaz (2004) bias correction.
- The number of observations that drive the maturity ogive was very low, even relative to the total number of Cobia aged.
- The growth modelling approach did not accommodate the potential for time trends in growth, maturity and weight to inform on environmentally driven changes.

Catch and landings data for cobia

Strengths

- The assessment included commercial and recreational landings.
- Commercial landings were available back to 1950.
- A combination of Marine Recreational Fisheries Statistical Survey (MRFSS) and Marine Recreational Information Program (MRIP) indices were used to examine recreational removals back to 1983.

Weaknesses

- The absence of commercial discard data was of concern. However, it was noted that commercial landings represented a small part of the recent catch with discards a smaller portion of that. Discarding would not be a concern for stock assessment provided that they have a similar discard survival to the recreational fishery.

Commercial length and age of landings

Cobia commercial length compositions were updated to 2011. Annual length compositions (originally 1-cm bins) were combined into 3-cm bins with a minimum size of 20 cm and a maximum size of 149 cm. Commercial length compositions were pooled across all years (1982 - 2011) and weighted by the annual number of trips sampled due to low sample sizes. Commercial age compositions were also pooled across years (1986 – 2011) due to low sample sizes and weighted by the annual number of fish sampled (number of trips was not available for age compositions). Cobia aged 12-15 were pooled as a plus group.

Strengths and weaknesses

- This procedure removes any contrast in age and length data by year allowing only mean values for the period to be estimated. This is clearly a weakness but given the proportion of catch taken in the commercial fishery it may not be a major problem.

Recreational catch Length and Age composition

Cobia recreational length compositions were updated to include 2011 data. Recreational age compositions from the headboat survey (SRHS) and MRFSS were combined. Following a review, unweighted age compositions with annual sample sizes equal to the number of fish were used in the statistical catch-at-age model.

Strengths and weaknesses:

- The provision of age data for the assessment is regarded as a particularly important part of the information on catches. Modeling population growth and mortality through length alone for cobia is unlikely to lead to precise estimates of population parameters as there is considerable overlap between length at age 2 and older making the separation of cohorts difficult.
- Information on catch at age in the recreational fishery has improved considerably with increased sampling to a level of 200 trips in 2007 onwards. Before this the numbers aged were lower and in some years inadequate. However, 200 trips with just over 1 fish per trip is still a relatively small number of aged individuals to apportion among 12 age classes. Increasing the number of individuals used to estimate age proportions in the recreational fishery is identified as one of the ways to improve the assessment.

Indices of Abundance

Strengths

- Three fishery dependent indices are available for potential use in the cobia stock assessment.
- Indices are available since 1981 (recreational headboat index).
- Two indices cover the entire stock area (recreational headboat and MRFSS indices) one the central portion of the stock (SCDNR charterboat index).
- Fishery-dependent indices are based on selected data (e.g., selected headboat vessels with consistent catches of cobia).
- Fishery-dependent indices are standardized to account for factors not related to relative abundance using conventional statistical analyses (e.g., delta-GLM with year, location, season effects and bootstrap estimates of precision).
- Trends in the recreational headboat index are considered to represent resource trends, because the fishery does not target cobia.
- The recreational headboat index and SCDNR charterboat logbook program are considered to be a census for those fleets.

Weaknesses

- There are no fishery-independent indices of abundance available. Such an index may be difficult to design given low catch rates in the fishery and the absence of concentrations that could be detected without fishing.

- Fishery catchability may not be constant or linear, as assumed in the assessment.
- Standardization of fishery-dependent indices may not remove the effect of technological improvements in fishing efficiency.
- Regulatory changes may influence fishery catch rates.
- MRFSS statistics for rarely caught species, like cobia, are less reliable than for other species.
- MRFSS and MRIP statistics have been combined into a single series, but CPUE from the two programs may not be comparable leading to a trend in the tuning series.
- Correlation among indices is poor, suggesting assumptions may not be as correct as assumed. This has led one index (MRFSS) to be removed from the stock assessment.

Quality and applicability of methods used to assess the stock

It is concluded that the BAM model in the configuration presented was the best available considering the data. BAM can utilize the dynamics between cohorts whereas the ASPIC model cannot, as it is biomass based. There was some concern that the conclusion on stock status and other assessment results from the BAM are dependent to some extent on the steepness assumption in the S-R function.

The assessment report provided an extensive range of sensitivity tests to validate the utility of the assessment. (4 options for M, 2 limit options for steepness, 2 alternative index weighting options, 2 inclusion of indices individually, 1 catchability trend in CPUE, and 1 accounting separately for a stocking program). In addition, a retrospective analysis indicated that the model gave stable results over the last 3-4 years, but not longer. A number of other aspects were requested during the review and considered.

Choice of domed or logistic selection function in the recreational fishery

Rationale: It was noted that the proposed assessment model was based on an assumption that the dominant fishery, i.e. the recreational fishery, was modeled with selectivity at age based on a logistic curve asymptotic to full selection. However, the fishery was reported to be diverse with respect to variation in population density with season, latitude and onshore offshore variability. The interaction of such in year variability in stock and fishery might be expected to be characterized by a dome shaped selection function even though the gear interaction could be considered logistic (Sampson and Scott 2011). To evaluate the sensitivity of F/Fmsy and SSB/SSBmsy to the selectivity assumption the analysts were requested to test this and the outcome indicated that the alternative assumption on selection resulted in very similar residual patterns between modeled and observed catch at age (Figure 1) and very similar overall fit, indicating that the data may not be sufficient to differentiate between the two alternative assumptions. Further exploration using a single parameter to determine the rate of decline in selection above the fitted peak suggests a rather flat likelihood surface but does show a minimum in the likelihood that occurs with some doming. Dome shaped selection does not change the general perception of stock status with respect to ‘over fished’ or ‘over fishing’ criteria (see text table below). However, use of dome shaped selection supports a perception that F/Fmsy is lower and SSB/SSBmsy is greater.

	Fmsy	SSBmsy	MSY	Fend/Fmsy	SSBend/MSST	steep	R0
Logistic	0.46	536.8	808	0.599	1.75	0.75	136548
Dome-fit	0.466	1072.7	1624	0.188	3.58	0.75	288706

Figure 1 Residuals on dome shaped and logistic selection functions
For recreational fishery data.

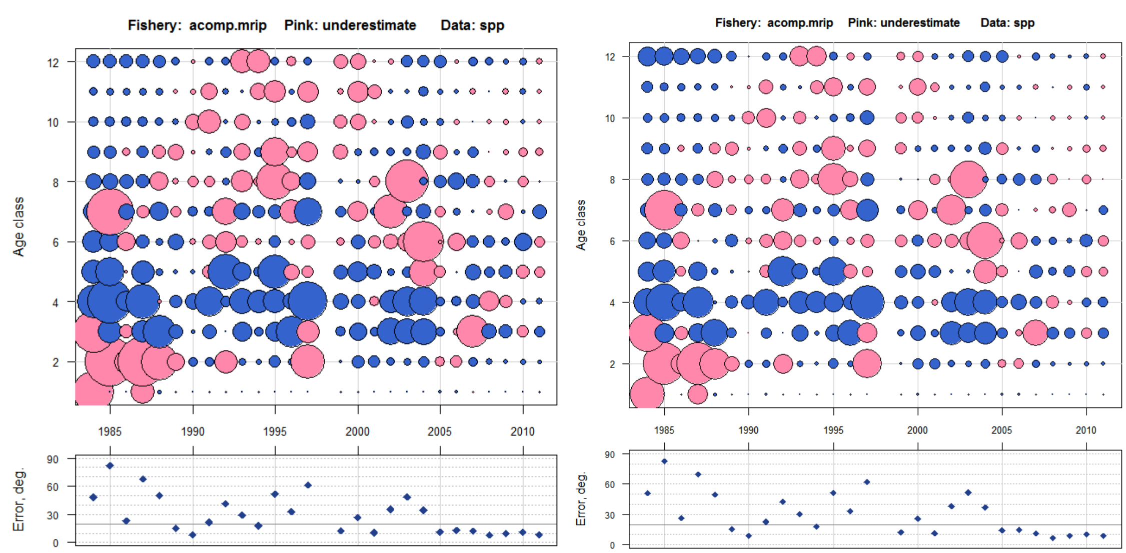


Figure 2 Mean F dome shaped selection logistic selection functions.

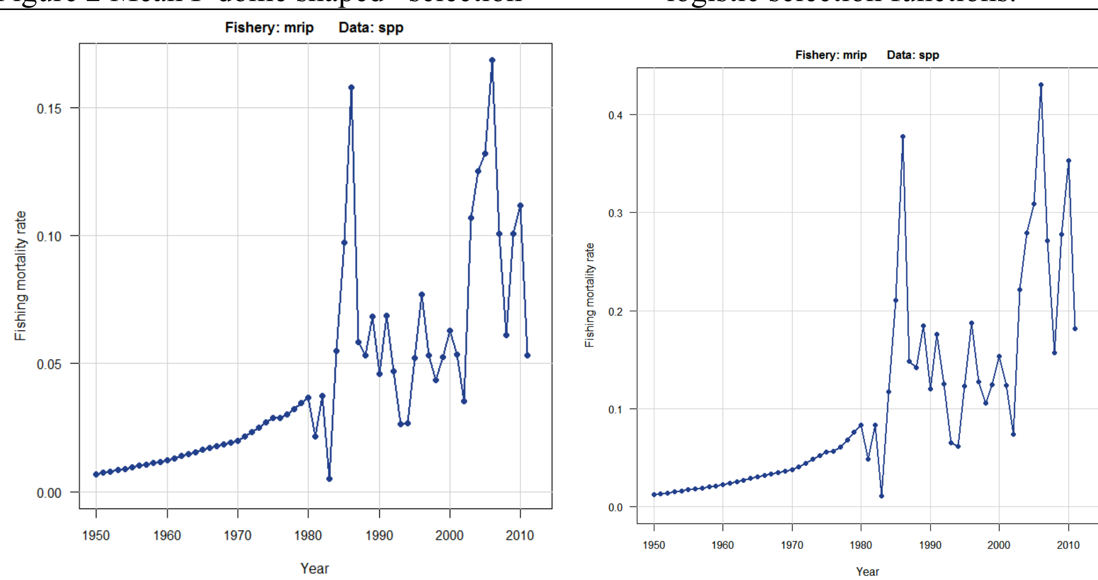
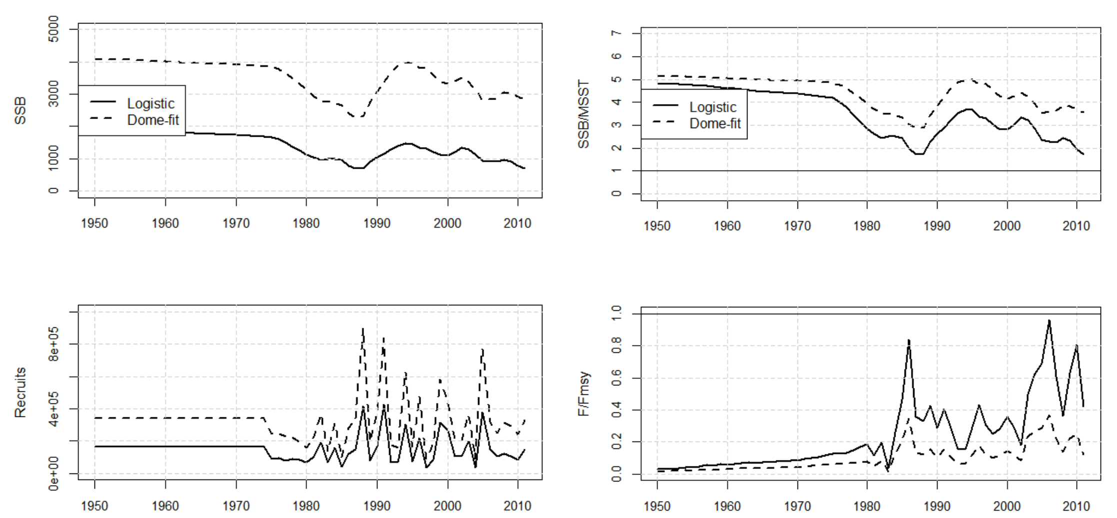


Figure 3 Comparison of stock and status parameters for domed and logistic functions



Evaluation of alternative S-R model (Ricker)

Rational: It was noted that the proposed assessment model was based on an assumption that the S-R model was the Beverton/Holt form. Examination of the SSB-R pairs with the BH model (Figure 4a) indicate a decline in recruitment with increasing SSB across the observed range of SSB and the resulting difficulty in fitting steepness for the BH model. The sensitivity of F/Fmsy and SSB/SSBmsy to an alternative S-R assumption was tested by choosing an alternative (Ricker) model in the assessment.

The alternative assumption on S-R model resulted in closer fit to the S-R pairs, a slightly poorer overall model fit but only because an additional parameter estimating steepness could now be fitted in the model. However, the value of the new steepness parameter, now fitted, does not come from information on slope to the origin, rather from the mathematical construct of the Ricker model and the information on the decline in recruitment at higher biomass, and only implies the steepness through the model formulation. With the Ricker model the perception of stock status with respect to 'over fished' or 'over fishing' criteria was unchanged, (See text table below) however, the use of Ricker S-R model results in a perception that F/Fmsy is slightly lower and SSB/SSBmsy is slightly greater. The greatest changes occur at low exploitation rates. It is suggested that S-R model choice is best selected based on an understanding of population biology rather than just fit criteria alone. However, the understanding of mechanisms for reduced recruitment at high biomass will be difficult to obtain in the near future. The other perhaps more appropriate approach would be to allow both (or more) S-R functional forms in the assessment model and simulate the bootstrap/MC with proportions of the populations coming from different models (Simmonds et al 2011)

Run	Fmsy	SSBmsy	MSY	Fend/Fmsy	SSBend/MSST	Steepness	R0
B-H	0.461	536.8	808	0.599	1.75	0.75	136548
Ricker	0.586	649.2	1182	0.405	1.77	2.15	-

Figure 4 Comparison of BH and Ricker S-R model fit and SSB and Recruit pairs

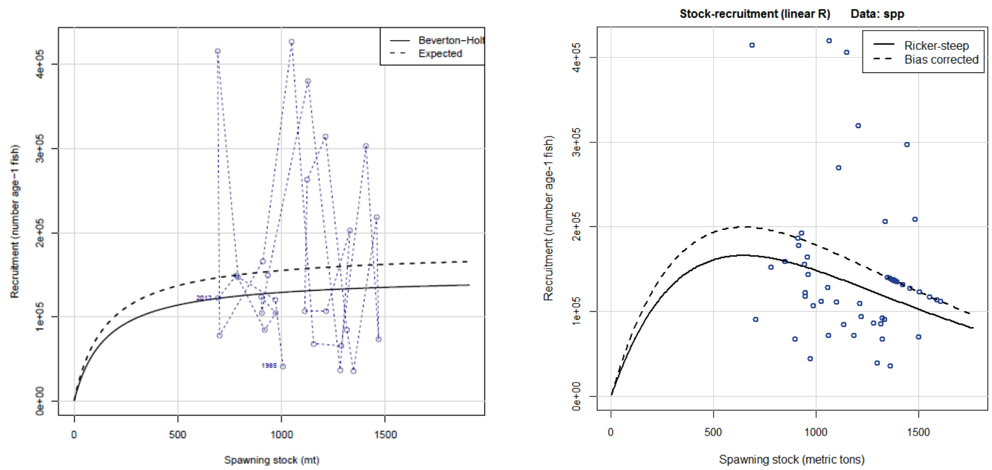
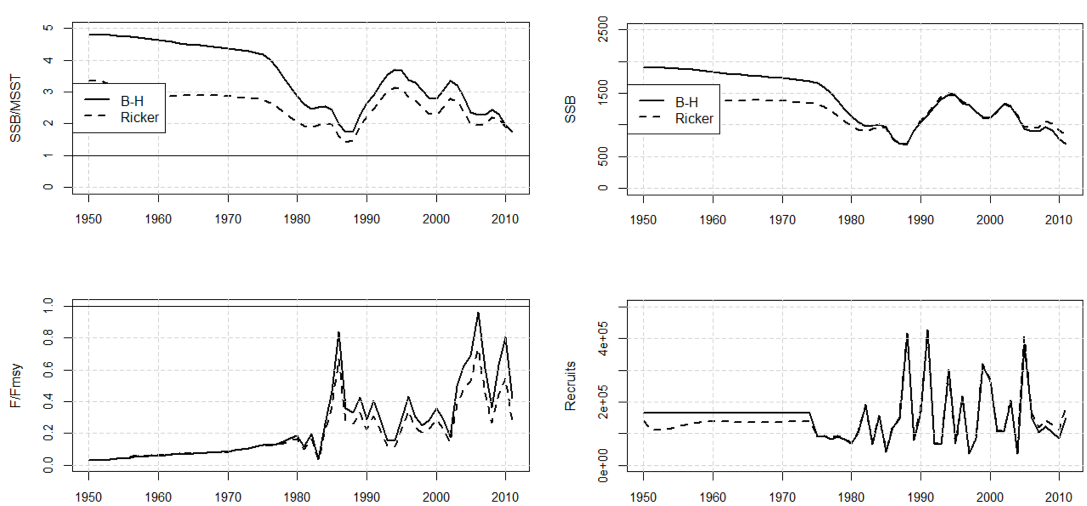


Figure 5 Comparison of stock status and exploitation status with alternative BH or Ricker S-R relationships



Evaluation of state of stock from the assessment

Is the stock overfished?

It is concluded that there is a high probability that stock is not overfished.
This is based on:

the BAM base model;
the sensitivity analysis presented in the AW report;
the additional sensitivity tests carried out at the meeting and presented above;
the MC/Bootstrap analysis using the BAM model.

Is the stock undergoing overfishing?

It is concluded that there is a good probability that stock is not undergoing overfishing, but the exploitation rate is less certain than the SSB.

This is based on:

the BAM base model;
the sensitivity analysis presented in the AW report;
the additional sensitivity tests carried out at the meeting and presented above;
the MC/Bootstrap analysis using the BAM model.

Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions? Are quantitative estimates of the status determination criteria for this stock reliable?

It is interpreted that the latter question is: How reliable are the (MSY) reference points?

The BAM model indicates that the stock recruit relationship was not informative in the context of some of the parameters needed for management against MSY criteria. However, the model does indicate that the stock seems to be in a state of unimpaired recruitment, and in that sense, it is informative. That conclusion is robust to both BH and Ricker assumptions.

The analysis of a different stock recruit relationship (given above) did not have an effect on modeled trends in SSB or F, but did change location of F and SSB status but did not change the conclusion that F <Fmsy and SSB>SSBmsy.

The analyses presented indicate that the status is sensitive to the steepness value chosen as input to the model. However, the MC/bootstrap analyses indicated that uncertainty within the range may not change status determination or lead to a perception that there is a high probability that stock status is different from the point estimate. The assumed estimates of steepness appeared to be justified when the characteristics of cobia were compared to other estimates given in the literature.

If not, are there other indicators that may be used to inform managers about stock trends and condition?

Not Applicable

Adequacy, appropriateness, and application of the methods used to project future population status

It is concluded that since accepted practices were followed, the model was adequate and appropriate. It is noted that with the use of the BAM model, which provides a coherent set of estimates, reference points and forward projections, the forward projections reflect directly the management options selected. For example any deviation of management, implementation 'error' is not included in the scientific evaluation of future population status. If managers are aware of such affects or wish to test for robustness to non-compliance or variability in uptake of allocated catch, this has not, but could be included in the MC analysis.

Significant changes to the base model, or to the choice of alternate states of nature

Several alternative model assumptions were considered including:

- Domed selectivity based on a perception that the fishery might better be based on a domed selection pattern rather than a logistic function. The domed function fitted very slightly better but with a very flat uninformative likelihood function.
- An alternative S-R function (Ricker) which potentially fitted better than the B-H function was tested. However, the biological basis for the function was weak.

There are no proposals to change the base model presented in the AW report so the results and probability distributions provided are considered to be an acceptable representation of estimated stock status and its uncertainty.

Uncertainties in the assessment, and their potential consequences

There were two ways in which this was addressed in the assessment:

1) MC/bootstrap analysis including both data and parameterization of the model.
2) Alternatives to base assumptions. (4 options for M, 2 limit options for steepness, 2 alternative index weighting options, 2 indices individually, 1 catchability trend in CPUE, and 1 accounting separately for a stocking program)

In addition several extra runs were requested to explore the issues dealing with the choice of selection function, choice of stock recruit function and alternate starting points for the assessment.

From these analyses it is concluded that the degree of uncertainty that is represented by these methods is sufficient to address scientific uncertainty for management purposes and sufficient to give catch recommendations in the context of stock status relative to MSY in the short term. However, the estimates are conditional on the overall choice of the model dynamics, but this is acceptable practice. It was also noted that the management uncertainty is not included, but this was also not required. As the analysis is based on a few years of data showing retrospective stability of only around 3-4 years it is not recommended to use the model for more that 3-4 years into the future.
The implications of uncertainty in technical conclusions are clearly stated in the assessment document and in the consolidated review report.

4.2. Spanish mackerel

Quality and applicability of data used in the assessment

In summary it is concluded that, overall, the data used are the best available and appropriate for use in the assessment. The catch data are sufficient to describe a number of individual fleets. However, the information on shrimp by-catch is weak and an improvement in monitoring could improve information to the model. Overall, it is concluded that the data are appropriate for short-term management based on the outcome of the assessment.

Bycatch in the Shrimp fishery and lack of monitoring of this fishery was of particular concern. The current shrimp bycatch data were deemed marginally acceptable. The main reason why such limited data could be accepted was because they did not have a large effect on model outputs. In general the methods to estimate these removals are adequate, but the quantity of data needs to increase. This can be accomplished by increased on-board observer coverage as suggested under research recommendations (Section 6).

It would be helpful to improve the estimate of the selectivity function. The modelled selectivity at age shows that the change in the fishery following the closure of the Florida gill net fishery has resulted in substantial change in selectivity from the 1990s onwards. The selection at age is still changing by year due to changes in proportions of catch among different gear categories. This has two consequences:

- It requires the use of a model that allows separable modelling of the fishery data for multiple fleets or a time varying selection function of some considerable flexibility. This reinforces the need for sufficient age samples to characterize multiple fleets.
- Changing selectivity with time implies changing MSY targets with time, which limits the utility of target values into the future. If the changes in the relative contributions of the different gears does continue into the future it is expected the MSY targets will change.

Strengths and weaknesses of catch data

The strengths included commercial and recreational landings information. Commercial landings were available back to 1950 and a combination of MRFSS and MRIP were used to extend recreational removals back to 1983. Commercial discards were a concern, as these are not well estimated due to low sample sizes. Additionally discards were reconstructed from 1993 to 1983 using a fixed discard/ retained ratio further compounding this uncertainty. However, it was noted that discards contribute only a fraction of the commercial catch. This suggests that the overall importance of discards was small with respect to other inputs.

Strengths and weaknesses of length and age composition data

Length Data

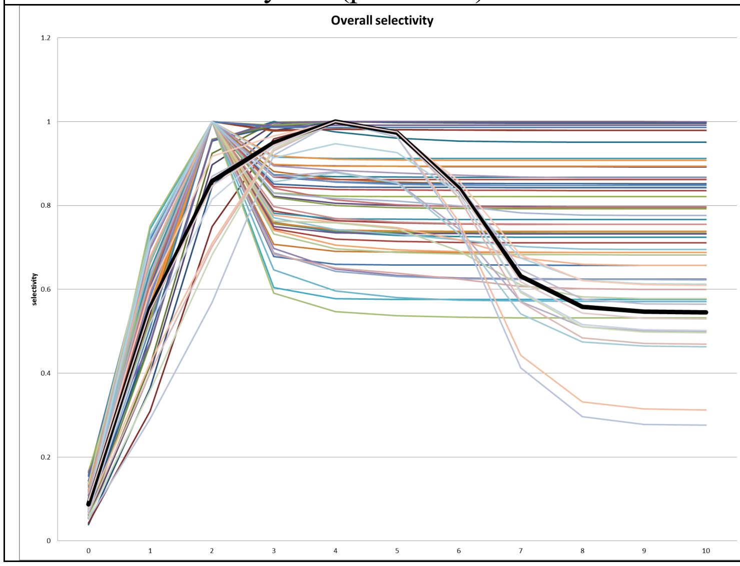
Length data were not used to inform the model for a number of reasons. The data are more noisy than informative, and lack any good information of distinct size classes moving through the population. Since age composition data are available, and are comprised of directly aged samples, the AW decided to not use the length compositions for the assessment.

Age Composition

Age data were available from the commercial handline, pound net, gill net, cast net and recreational sampling programs. The annual age compositions were developed for Spanish mackerel by the SEDAR-28 DW. The AW preferred to weight the age composition by the length composition for years where adequate samples were available. Ages greater than 10 were pooled to age 10 creating a plus group.

Strengths and weaknesses:
Length data are clearly identified as insufficient for population modelling purposes, however, parameters such as selection and maturity are thought to be length dependant rather than age dependant. It seems unlikely that increased sampling for length will solve this issue, except where collected with the dependant variable such as maturity (see other section). Increased length sampling is not specifically recommended. In contrast, collection of age data is identified as critical for the assessment. An examination of the change in overall selection pattern with year (Figure 6) indicates that selection at age in the fishery has changed considerably in recent years due to changes in catch proportion by fleet following the closure of the gillnet fishery in Florida. This demonstrates the continuing need to obtain age data by fleet in order to model selectivity in the fishery. The current level of sampling seems adequate for this purpose, though for the smaller fisheries such as pound net, numbers of samples are low. It is noted that by taking such small numbers of samples it is difficult to characterize fisheries except at an annual and global scale. Increased sampling would allow for acknowledged spatial and seasonal aspects to be documented.

Figure 6 changes in selection with time, dome shaped selection in recent years, peaked selection in earlier years (pre 1990s)



Strengths and weaknesses of the data related to Life History Strategies

Strengths

- Stock identity was considered.
- Estimates of age varying natural mortality were considered and provided.
- Discard mortality was considered.
- Reasonable coverage of age sampling, but number of samples could be improved.
- The report highlighted, and provided information on, sexual dimorphism in growth.

Weaknesses

- Stock identity considerations reported using relatively out of date techniques.
- The considerations on natural mortality provided an estimate of generic variability in M, however justification for its use for sensitivity analysis for the total population was weak.
- Whilst discard mortality was considered, discard selectivity was not assessed.
- If management was to use an alternative reproductive-potential proxy than female biomass, the existing information base appears weak.
- There was no provision of information in the report of time trends in growth, maturity and weight to inform on environmentally driven changes in sustainable exploitation benchmarks.

Indices of Abundance

Strengths

- One fishery-independent index is used in the Spanish mackerel stock assessment (SEAMAP ages 0).

- Two fishery-dependent indices are used in the stock assessment (MRFSS and FL trip ticket handline/trolling).
- Indices are available since 1982 (MRFSS).
- Indices cover the entire stock area (SEAMAP age-0 and MRFSS) or the central portion of the resource (FL trip ticket handline/trolling).
- All indices are standardized to account for factors not related to relative abundance using conventional statistical analyses (e.g., delta-GLM with bootstrapping).
- Assessment results (e.g., stock status) are relatively robust to the relative weighting of indices.

Weaknesses

- Fishery and survey catchability may not be constant or linear, as assumed in the assessment.
- Standardization of fishery-dependent indices does not remove the effect of technological improvements in fishing efficiency.
- Regulatory changes may influence fishery catch rates.
- MRFSS statistics are not necessarily relevant to fishing effort directed toward Spanish mackerel.
- MRFSS and MRIP statistics are combined into a single series, but CPUE from the two programs may not be comparable.
- Correlation among indices is weak.

Quality and applicability of methods used to assess the stock

It is concluded that the BAM model was appropriate and the preferred model. The ASPIC approach provided supporting information as to the stock status, and indicated that the recent trends shown by BAM were also indicated by ASPIC. However, the ASPIC model delivered unrealistically narrow estimates of precision as the method does not provide facilities to include any of the uncertainties included in BAM.

The sex specific modelling as presented for this stock is acceptable. However, given the direct parameter links between the separate sex components and the small impact of sex-specific differences, it may not be a useful addition. As such it is suggested that future benchmarks examine the need to model sexes in the stock separately; and if so re-examine the treatment of sex-specific growth and its impact on selectivity.

It was observed that the confidence and precision of the ASPIC model was much higher relative to the BAM. This increased precision, however, is because ASPIC uses only a bootstrapped methodology to resample the residuals of predicted vs. fitted yield (Aspic manual) using the variability in the indices. Thus ASPIC assumes other sources of uncertainty do not exist. In contrast, BAM uses an MC approach and accounts for additional parameter uncertainty in many assumed and estimated parameters not included by ASPIC. Therefore it was concluded that the BAM estimates of uncertainty were more realistic than ASPIC; with the later underestimating the true variability.

The main reasons for accepting the model were that it was supported by a good sensitivity analysis covering a reasonable range of other options and, most importantly, it had good retrospective performance. It was noted that the report did not provide a comparison with the previous assessment. Normal practice should be to run the previous assessment with each element of input data updated in turn, and then with any new model being proposed. I understand this was not possible. Without this information the retrospective analysis was used to evaluate changes in the stock assessment over recent years' data and to conclude that the assessment was acceptably stable to use for advice.

Evaluate the assessment with respect to the following:

Is the stock overfished?

It is concluded that the probability of the stock being overfished is low.

This is based on:

the BAM base model;
the sensitivity analysis presented in the AW report;
the additional sensitivity tests carried out at the meeting and presented above;
the MC/Bootstrap analysis using the BAM model.

Is the stock undergoing overfishing?

It is concluded that the probability of overfishing is low.

This is based on:

the BAM base model;
the sensitivity analysis presented in the AW report;
the additional sensitivity tests carried out at the meeting and presented above;
the MC/Bootstrap analysis using the BAM model.

Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?

It is concluded that the stock recruit relationship has information, but steepness was not well estimated. However, there is sufficient information in the context of the parameters needed for management against MSY criteria. In addition, it is informative in the sense that the stock seems to be in a state where recruitment is not impaired.

Are quantitative estimates of the status determination criteria for this stock reliable?

The RP interpreted this TOR as: How reliable are the reference points?

A number of comments were provided above. In addition, it is suggested to investigate comparisons with other stock assessments giving MSY values for similar species.

The analyses presented indicate that the status is sensitive to steepness chosen as input to the model. However, the MC/bootstrap analyses indicated that uncertainty within the range may not change status determination or lead to a perception that there is a high probability that stock status is different from the point estimate. The assumed estimates of steepness appeared to be justified when the characteristics of Spanish mackerel were compared to other estimates given in the literature.

Some time was spent during the meeting establishing the magnitude of the variability in M that was applied, following some initial confusion over the actual variance applied in the MC evaluations. The description did provide the limits used, but not the variance applied in this context. It might be useful to state the CV or variance actually applied as well as the limits, thus reducing the possibility for confusion. There was some concern over whether the interpretation of variability in M should be applied as population variability or as annual variability. The cited reports giving values of M were examined (Hoenig 1982, Hewitt and Hoenig 2005, and NOAA 2011) and the basis for variability in M appears to vary among approaches perhaps expressing both among year and among population variability. However, following some clarification of the magnitude of the CV used and further discussion it was considered that the spread of M used was appropriate.

If not, are there other indicators that may be used to inform managers about stock trends and condition?

Not Applicable

Adequacy, appropriateness, and application of the methods used to project future population status

It was concluded that, since accepted practices were followed, the methods were adequate and appropriate. It was noted that, management of this stock, based on this current assessment, should be limited temporally. There are two reasons for this; the changes in selectivity with time are to be expected given the changes in catch proportion by fleet, and secondly the sparse catch at age data makes the assessment sensitive to the addition of a new year of data. However, retrospective performance indicates reasonable stability thus it is recommended to be acceptable to use this method for at least 4 years without further update or review.

Significant changes to the base model, or to the choice of alternate states of nature

Several options for the assessment model were discussed, changes in selectivity and priors on the selectivity parameters examined. However, no new model was proposed so there are no significant changes to the assessment model.

Uncertainties in the assessment, and their potential consequences

It was concluded that uncertainty was addressed well by the assessment team by analyzing both MCMC and sensitivity analysis. Some concerns were raised that the natural mortality used in the MCMC were drawn from a very wide range, giving the appearance of more uncertainty than appropriate (see above). However, following some clarification and discussion it was considered that the spread of M used was applicable. It is agreed that the methods and sensitivities chosen where appropriate. A comparison of the assumed distribution in estimates of M (mean of 0.35 with 95% confidence limits of 0.16 to 0.54) is generally consistent with the alternative estimates of M reported in the Data Workshop report.

The degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty

It is concluded that the degree of uncertainty included is sufficient to address scientific uncertainty for management (ABC) recommendations (see discussions above). However, they are conditional on the overall choice of the dynamics modeled, but this is regarded as acceptable practice. It is noted that management uncertainty is not included, though it will have an impact on the SSB and F predicted in the forecasts.

5. Research recommendations

Tagging program for cobia

It is suggested that a tagging program may also help to inform the cobia stock assessment. The fishery and biology of cobia seems to be conducive for a successful tagging program. The fishery for cobia is currently dominated by a recreational fishery with a two-fish bag limit and a minimum landing size, resulting in a large portion of discarded catch. Discarded cobia appear to have high survival (e.g., 95% discard survival assumed in the assessment). Therefore, a tagging program conducted as an industry partnership could release tagged fish from normal fishing operations. Few cobia are discarded per trip, so the additional costs and resources required per trip would be expected to be small, and the data recording aspects at sea would be minimal. The impact on the fishing operations would be anticipated to be negligible. The major costs would be organization, tags, data collation, outreach, a reporting system for recaptured tags, and subsequent data analysis. Industry participation rates might be high if information is provided back to participants, and their collaboration improves stock assessment and fishery management.

This information should improve estimates of discard numbers and potentially fish sizes. Estimates of discard mortality may be possible from initial Z from early returns compared with Z on later returns, though this will be compounded with selection. Estimates of Z or tag recovery rate on older ages will help to inform the appropriate selection function to be used in the assessments. The Z could be obtained from ratio of tag returns from one year to the next. Using tag return data the total mortality Z(i,j,y) between year i and year j, of fish belonging to year class y is obtained using the Jolly-Seber estimator (see Ricker, 1975):

$$Z(i,j,y) = \log\{r(i,k,y)/r(j,k,y)*R(j,y)/R(i,y)\} \qquad (1)$$

where

R(i,y) is the number of tagged fish of year class y that were released in year i ,
R(j,y) is the number of tagged fish of the same year class that were released in year j (j>i)
r(j,k,y) is the numbers of such tagged fish that were recaptured in the years k summed over all k > j.

This approach solves some of the inherent distributional and sampling problems associated with tagging, however variability may still be caused by variation in initial tagging losses, small numbers of recovered tags and errors in ageing (Antsalo, 2006). The major issue for such a program is it requires a continued commitment to tag. Each missing year of tagging results in two missed mortality estimates. However, if the tagging and recovery is based on the recreational fishery it is possible that continuation will be easier (once agreed) than if tagging must be based directly on annually funded scientific programs.

If resources are available consideration should be given to coupling two types of tagging: 1) high volume, low cost tagging would be most informative for estimates of Z that would help with population level estimates of total mortality and possibly selection and natural mortality; 2) high cost, electronic tagging might give more detail on migration. Of the two methods, the high volume approaches are more likely to be informative for management parameters at a population level.

Discard data for Spanish mackerel

Improved discard data, in particular linked to bycatch in the shrimp fishery, would be helpful to be sure that this is not a significant source of mortality. Increased onboard sampling would be an appropriate data collection method.

Increased age sampling for cobia and Spanish mackerel

Both assessments are age based with a dependence on age sampling for the catch matrix. In the case of cobia 12 ages are estimated from around 200 fish per year. For Spanish mackerel the varying selectivity at age requires selection to be modeled by fleet, requiring more age samples. Superficially both assessments appear to be short of age samples; given the likely cost of aging such a small number of fish there seems considerable scope for increased sampling. Cost benefit analysis would indicate which sources of data would benefit from increased sampling.

Critically, for cobia more information on catch at age would allow better evaluation of mortality at older ages and potentially inform on the most appropriate form of the selection function.

Organization of data preparation and assessment workshops

From the reports provided to the RP on Data and Assessment it is clear that data preparation is not well coupled to the timing of assessment work. Quite extensive amounts of important 2011 data were being assembled after the data workshop and throughout the assessment modeling. This results in considerable reprocessing of information and quite a number of assessment runs with substantively incomplete data. From discussions there does not really seem to be any specific reason for this, and it results in less than optimal use of staff time. It may be worthwhile examining the timetabling of the data workshop. First, taking account of when the assessment results are required, obtaining agreement from all involved when the most recent data will be available and holding a data workshop to finalize all the assessment input data at that stage. This would maximize the benefit from the data workshop and allow the assessments to proceed more effectively, potentially freeing up resources for other assessments.

5.1. Panel review proceedings

I was impressed overall with the quality of this review and all who participated in it, I would like to thank all involved for their efforts. In particular I would like to thank the presenters for their clear and well prepared presentations and the chairman for his work guiding the review and for the work assembling and editing the RP report.

All the data and assessment reports were provided on time. Though some of the CIE information, such as ToR and the statement of work for the reviewers, arrived only shortly before the meeting, this did not have any direct impact as the ToR were fairly standard and could easily be anticipated.

6. Conclusion

The reports and presentations have provided an excellent basis to evaluate the performance of the assessment. The science reviewed was of a high standard and could be classed as 'of the best scientific information available'. Comments given through the report should not be read as direct criticism of what has been done, but rather ideas of areas for development. In retrospect one can always find room for improvement, and as such minor suggestions have been made throughout this report.

7. References

Antsalo, M. 2006. Abundance estimation of the Northeast Atlantic mackerel (Scomber scombrus) with use of Norwegian tag data. University of Bergen, Department of Biology Bergen Norway. Dissertation 64 pp.

Diaz, G.A., C.E. Porch, and M. Ortiz. 2004. Growth models for red snapper in US Gulf of Mexico Waters estimated from landings with minimum size limit restrictions. NMFS/SFD Contribution SFD-2004-038. SEDAR7-AW01.

Hewitt, D.A and Hoenig J.M, 2005. Comparison of two approaches for estimating natural mortality based on longevity Fish. Bull. 103:433–437.

Hoenig J.M 1982 Empirical use of longevity data to estimate mortality rates. Fish Bull 82 1 898-903.

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Sampson D. B. and Scott R. D., 2011, A spatial model for fishery age-selection at the population level Can. J. Fish. Aquat. Sci. 68: 1–10

Ricker, W.E., 1975. Computation and interpretation of biological statistics of fish populations. Bull. Fish. Res. Board Can. 191: 1–382.

Simmonds, E. J., Campbell, A., Skagen, D., Roel, B. A., and Kelly, C. 2011. Development of a stock–recruit model for simulating stock dynamics for uncertain situations: the example of Northeast Atlantic mackerel (Scomber scombrus). ICES Journal of Marine Science, 68(5), 848–859.

Appendix 1: Bibliography of materials provided for review

Primary Documents

SEDAR28-RW02 Development and diagnostics of the Beaufort assessment model applied to Cobia

SEDAR28-RW04 Development and diagnostics of the Beaufort assessment model applied to Spanish mackerel

SEDAR 28-RW Southeast Data, Assessment, and Review South Atlantic Report for Cobia SECTION II: Data Workshop Report May 2012

SEDAR 28-RW Southeast Data, Assessment, and Review South Atlantic Report for Spanish mackerel SECTION II: Data Workshop Report May 2012

Background documents

SEDAR 25-RW-01 The Beaufort Assessment Model (BAM) with application to cobia: mathematical description, implementation details, and computer code

SEDAR 28-RW-03 The Beaufort Assessment Model (BAM) with application to Spanish mackerel: mathematical description, implementation details, and computer code
1

Appendix 2: Statement of Work

External Independent Peer Review by the Center for Independent Experts

SEDAR 28 South Atlantic Spanish mackerel and cobia assessment review

Scope of Work and CIE Process: 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 Technical Representative (COTR), 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 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.

Project Description SEDAR 28 will be a compilation of data, an assessment of the stocks, and an assessment review conducted for South Atlantic Spanish mackerel and cobia. The CIE peer review panel is ultimately responsible for ensuring that the best possible assessment has been provided through the SEDAR process. The stocks assessed through SEDAR 28 are within the jurisdiction of the South Atlantic Fisheries Management Councils and states of Florida, Georgia, South Carolina, and North Carolina. The Terms of Reference (ToRs) of the peer review are attached in **Annex 2**. The agenda of the panel review meeting is attached in **Annex 3**.

Requirements for CIE Reviewers: Three CIE reviewers shall conduct an impartial and independent peer review during the SEDAR 28 review scheduled in 29 October - 2 November 2012, and the CIE reviewers shall have the necessary qualifications to complete the tasks in accordance with the SoW and ToRs herein. *One of the selected CIE reviewers will be the CIE observer contracted to attend the SEDAR 28 assessment workshop in May 2012.* The CIE reviewers shall have expertise in stock assessment, statistics, fisheries science, and marine biology sufficient to complete the tasks of the peer-review described herein. Each CIE reviewer's duties shall not exceed a maximum of 14 days to complete all work tasks of the peer review described herein.

Location of Peer Review: Each CIE reviewer shall participate and conduct an independent peer review during the panel review meeting scheduled in Atlanta, Georgia during October 29 through November 2, 2012.

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

Prior to the Peer Review: Upon completion of the CIE reviewer selection by the CIE Steering Committee, the CIE shall provide the CIE reviewer information (full name, title, affiliation, country, address, email) to the COTR, who forwards this information to the NMFS Project Contact no later the date specified in the Schedule of Milestones and Deliverables. The CIE is responsible for providing the SoW and ToRs to the CIE reviewers. The NMFS Project Contact is responsible for providing the CIE reviewers with the background documents, reports, foreign national security clearance, and other information concerning pertinent meeting arrangements. The NMFS Project Contact is also 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 COTR prior to the commencement of the peer review.

Foreign National Security Clearance: When CIE reviewers participate during a panel review meeting at a government facility, the NMFS Project Contact is responsible for obtaining the Foreign National Security Clearance approval for CIE reviewers who are non-US citizens. For this reason, the CIE reviewers shall provide requested information (e.g., first and last name, contact information, gender, birth date, passport number, country of passport, travel dates, country of citizenship, country of current residence, and home country) 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/
http://deemedexports.noaa.gov/compliance_access_control_procedures/noaa-foreign-national-registration-system.html

Pre-review Background Documents: Two weeks before the peer review, the NMFS Project Contact will send (by electronic mail or make available at an FTP site) to the CIE reviewers the necessary background information and reports for the peer review. In the case where the documents need to be mailed, the NMFS Project Contact will consult with the CIE Lead Coordinator on where to send documents. CIE reviewers are responsible only for the pre-review documents that are delivered to the reviewer in accordance to the SoW scheduled deadlines specified herein. The CIE reviewers shall read all documents in preparation for the peer review.

Panel Review Meeting: Each CIE reviewer shall conduct the independent peer review in accordance with the SoW and 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 COTR and CIE Lead Coordinator.** 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 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.

Contract Deliverables - Independent CIE Peer Review Reports: Each CIE reviewer shall complete an independent peer review report in accordance with the SoW. Each CIE reviewer shall complete the independent peer review according to required format and content as described in Annex 1. Each CIE reviewer shall complete the independent peer review addressing each ToR as described in Annex 2. *One of the selected CIE reviewers will be the CIE observer contracted to attend the SEDAR 28 assessment workshop in May 2012, and the CIE observer's report will be reviewed and distributed as an addendum to the final independent CIE peer review report for that CIE reviewer.*

Other Tasks – Contribution to Summary Report: Each CIE reviewer may assist the Chair of the panel review meeting with contributions to the Summary Report, based on the terms of reference of the review. The Summary Report is not reviewed by the CIE, therefore is not a CIE product. Each CIE reviewer is not required to reach a consensus, and should provide a brief summary of the reviewer's views on the summary of findings and conclusions reached by the review panel in accordance with the ToRs.

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 Atlanta, Georgia during October 29 through November 2, 2012.
3) In Atlanta, Georgia during October 29 through November 2, 2012 as specified herein, conduct an independent peer review in accordance with the ToRs (**Annex 2**).
4) No later than November 16, 2012, 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 CIE Regional Coordinator, via email to Dr. David Sampson david.sampson@oregonstate.edu. Each CIE report shall be written using the format and content requirements specified in Annex 1, and address each ToR in **Annex 2**.

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

21 September 2012	CIE sends reviewer contact information to the COTR, who then sends this to the NMFS Project Contact

15 October 2012	NMFS Project Contact sends the CIE Reviewers the pre-review documents
29 October – 2 November 2012	Each reviewer participates and conducts an independent peer review during the panel review meeting
16 November 2012	CIE reviewers submit draft CIE independent peer review reports to the CIE Lead Coordinator and CIE Regional Coordinator
30 November 2012	CIE submits CIE independent peer review reports to the COTR
7 December 2012	The COTR distributes the final CIE reports to the NMFS Project Contact and regional Center Director

Modifications to the Statement of Work: This 'Time and Materials' task order may require an update or modification due to possible changes to the terms of reference or schedule of milestones resulting from the fishery management decision process of the NOAA Leadership, Fishery Management Council, and Council's SSC advisory committee. A request to modify this SoW must be approved by the Contracting Officer at least 15 working days prior to making any permanent changes. The Contracting Officer will notify the COTR within 10 working days after receipt of all required information of the decision on changes. The COTR 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 CIE 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: Upon review and acceptance of the CIE independent peer review reports by the CIE Lead Coordinator, Regional Coordinator, and Steering Committee, these reports shall be sent to the COTR for final approval as contract deliverables based on compliance with the SoW and ToRs. As specified in the Schedule of Milestones and Deliverables, the CIE shall send via e-mail the contract deliverables (CIE independent peer review reports) to the COTR (William Michaels, via William.Michaels@noaa.gov).

Applicable Performance Standards: The contract is successfully completed when the COTR provides final approval of the contract deliverables. The acceptance of the contract deliverables shall be based on three performance standards:
(1) The CIE report shall completed with the format and content in accordance with **Annex 1**,
(2) The CIE report shall address each ToR as specified in **Annex 2**,
(3) The CIE reports shall be delivered in a timely manner as specified in the schedule of milestones and deliverables.

Distribution of Approved Deliverables: Upon acceptance by the COTR, the CIE Lead Coordinator shall send via e-mail the final CIE reports in *.PDF format to the COTR.

The COTR will distribute the CIE reports to the NMFS Project Contact and Center Director.

Support Personnel:

William Michaels, Program Manager, COTR
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Key Personnel:

NMFS Project Contact:

Ryan Rindone, SEDAR Coordinator
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Ryan.Rindone@gulfcouncil.org Phone: 813-348-1630

Annex 1: Format and Contents of CIE Independent Peer Review Report

1. The CIE independent report shall be prefaced with an Executive Summary providing a concise summary of the findings and recommendations, and specify whether the science reviewed is the best scientific information available.

2. The main body of the reviewer report shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Summary of Findings for each ToR in which the weaknesses and strengths are described, and Conclusions and Recommendations in accordance with the ToRs.

   a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including providing a brief summary of findings, of the science, 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 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 CIE independent report shall be a stand-alone document for others to understand the weaknesses and strengths of the science reviewed, regardless of whether or not they read the summary report. The CIE independent report shall be an independent peer review of each ToRs, 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 the CIE Statement of Work
   Appendix 3: Panel Membership or other pertinent information from the panel review meeting.

Annex 2: Terms of Reference for the Peer Review

SEDAR

SEDAR 28: South Atlantic Cobia and Spanish Mackerel
Review Workshop Terms of Reference

1. Evaluate the quality and applicability of data used in the assessment.
2. Evaluate the quality and applicability of methods used to assess the stock.
3. Evaluate the assessment with respect to the following:
   - Is the stock overfished? What information helps you reach this conclusion?
   - Is the stock undergoing overfishing? What information helps you reach this conclusion?
   - Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?
   - Are quantitative estimates of the status determination criteria for this stock reliable? If not, are there other indicators that may be used to inform managers about stock trends and condition?
4. Evaluate the adequacy, appropriateness, and application of the methods used to project future population status with regard to accepted practices and data available for this assessment.
5. If there are significant changes to the base model, or to the choice of alternate states of nature, then provide a probability distribution function for the base model, or a combination of models that represent alternate states of nature, presented for review. Provide justification for the weightings used in producing the combinations of models.
6. Consider how uncertainties in the assessment, and their potential consequences, have been addressed.
   - Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty.
   - Ensure that the implications of uncertainty in technical conclusions are clearly stated.
7. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.

- Clearly denote research and monitoring needs that could improve the reliability of, and information provided by, future assessments.

8. Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference. Develop a list of tasks to be completed following the workshop. Complete and submit the Peer Review Summary Report in accordance with the project guidelines.
   - Each CIE reviewer may assist the Chair of the panel review meeting with contributions to the Summary Report, based on the terms of reference of the review.
   - Each CIE reviewer is not required to reach a consensus, and should provide a brief summary of the reviewer's views on the summary of findings and conclusions reached by the review panel in accordance with the ToRs.

The review panel may request additional sensitivity analyses, evaluation of alternative assumptions, and correction of errors identified in the assessments provided by the assessment workshop panel; the review panel may not request a new assessment. Additional details regarding the latitude given the review panel to deviate from assessments provided by the assessment workshop panel are provided in the SEDAR Guidelines and the SEDAR Review Panel Overview and Instructions.

** The panel shall ensure that corrected estimates are provided by addenda to the assessment report in the event corrections are made in the assessment, alternative model configurations are recommended, or additional analyses are prepared as a result of review panel findings regarding the TORs above.**

Annex 3: Agenda for the SEDAR 28 Review

Atlanta, GA - October 29 through November 2, 2012

<u>Monday</u>

1:00 p.m.	**Convene**	
1:00 – 1:30	**Introductions and Opening Remarks** **Coordinator** *- Agenda Review, TOR, Task Assignments*	
1:30 – 5:00	**Assessment Presentations and Discussions**	**TBD**
5:00 p.m. - 6:00 p.m.	**Panel Work Session**	**Chair**

<u>Tuesday</u>

8:00 a.m. – 11:30 a.m.	**Assessment Presentations**	**TBD**
11:30 a.m. – 1:00 p.m.	**Lunch Break**	
1:00 p.m. – 3:30 p.m.	**Panel Discussion** **-** *Assessment Data & Methods* *- Identify additional analyses, sensitivities, corrections*	**Chair**
3:30 p.m. – 3:45 p.m.	**Break**	
3:45 p.m. – 5:00 p.m.	**Panel Discussion** *- Continue deliberations* *- Review additional analyses*	**Chair**
5:00 p.m. - 6:00 p.m.	**Panel Work Session**	**Chair**

***Tuesday Goals*:** Initial presentations completed, sensitivities and modifications identified.

<u>Wednesday</u>

8:00 a.m. – 11:30 a.m.	**Panel Discussion** *- Review additional analyses, sensitivities* *- Consensus recommendations and comments*	**Chair**
11:30 a.m. – 1:00 p.m.	**Lunch Break**	
1:00 p.m. – 3:30 p.m.	**Panel Discussion**	**Chair**
3:30 p.m. – 3:45 p.m.	**Break**	
3:45 p.m. – 5:00 p.m.	**Panel Discussion**	**Chair**
5:00 p.m. - 6:00 p.m.	**Panel Work Session**	**Chair**

Wednesday Goals: Final sensitivities identified, preferred models selected, projection approaches approved, Summary report drafts begun

<u>Thursday</u>

8:00 a.m. – 11:30 a.m.	**Panel Discussion** *- Final sensitivities reviewed.* *- Projections reviewed.*	**Chair**
11:30 a.m. – 1:00 p.m.	**Lunch Break**	
1:00 p.m. – 3:30 p.m.	**Panel Discussion or Work Session**	**Chair**
3:30 p.m. - 3:45 p.m.	**Break**	
3:45 p.m. - 6:00 p.m.	**Panel Work Session** *- Review Consensus Reports*	**Chair**

Thursday Goals: Complete assessment work and discussions. Final results available. Draft Summary Report reviewed.

<u>Friday</u>

8:00 a.m. – 1:00 p.m.	**Panel Work Session**	**Chair**
1:00 p.m.	**ADJOURN**	

Appendix 3: Participants

1.1.3 List of Participants

Panelists		
Marcel Reichert	Review Panel Chair	SA SSC
Steve Cadrin	Reviewer	SA SSC
Matt Cieri	Reviewer	CIE
Mark Dickey-Collas	Reviewer	CIE
John Simmonds	Reviewer	CIE
Analytical Team		
Katie Andrews	Lead Analyst SASM	NMFS Beaufort
Kevin Craig	Lead Analyst SAC	NMFS Beaufort
Kyle Shertzer	Analyst	NMFS Beaufort
Erik Williams	Analyst	NMFS Beaufort
Council Members		
Ben Hartig	Council Rep	SAFMC
Anna Beckwith	Council Rep	SAFMC
Observers		
None		
Staff and Agency		
Ryan Rindone	SEDAR 28 RW Coordinator	SEDAR
Julia Byrd	SEDAR Coordinator	SEDAR
Andrea Grabman	Administrative Support	SEDAR
Mike Errigo	Fishery Biologist	SAFMC