Independent Peer Review Report

SEDAR 38 South Atlantic and Gulf of Mexico King Mackerel Assessment Review

Miami, Florida, 12–14 August 2014

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Prepared for:

The Center for Independent Experts

Contents

Executive Summary

The SEDAR 38 review workshop (RW) was a comprehensive evaluation of revised stock assessment methods for the king mackerel stocks in the South Atlantic and Gulf of Mexico. The main findings were that both stocks are estimated as neither overfished nor subject to overfishing, and the assessment methods were found to be appropriate for the available data.

The overall uncertainty in the assessments is considerable, with no survey of the adult population, and estimated dome-shaped selectivities with resulting cryptic biomass (40% of SSB). Technical changes to the assessment model were recommended during the RW, specifically to fix the stock-recruitment selectivity at 0.99 since it was not estimable from the data. As the model was changed during the RW, there was not enough time to conduct the full diagnostics and uncertainty analysis for the final model.

The assessment models could be simplified, by estimating unisex length-based selectivities, and possibly using only age data instead of length data. Markov-Chain Monte Carlo (MCMC) analysis might be useful to evaluate the uncertainty in this assessment, and diagnose model convergence problems.

1 Background

Earlier assessment reviews were conducted in SEDAR 5 (2004) and SEDAR 16 (2008). The main changes have been how the winter mixing area has been handled, and the a gradual move from a VPA model to a Stock Synthesis model fitted to length composition data.

In SEDAR 38, Stock Synthesis is the base model and VPA is run as a diagnostic comparison. MSY proxy reference points (SPR30%) have been used in past assessments, but in SEDAR 38, an (aborted) attempt was made to estimate steepness in a move towards evaluating MSY reference points.

2 Review Activities

Following the Statement of Work (see Appendix 2), this reviewer read the documents deemed necessary in preparation for the review, participated actively in the review meeting, conducted profile likelihood analysis of stock-recruitment steepness, authored TOR 5 of the panel summary report and contributed to TOR 2, participated in email discussions to finalize the panel summary report, and authored this independent review report.

3 Findings

TOR 1 - Data

Evaluate the data used in the assessment, addressing the following:

a) Are data decisions made by the DW and AW sound and robust?

The data decisions made by the DW and AW were sound. The definitions of the Atlantic and Gulf stocks are based on a careful evaluation of all available biological and oceanographic information. The general approach in the assessments is to use all available datasets, including many CPUE series, as there is no a priori reason to prefer one series over the others.

b) Are data uncertainties acknowledged, reported, and within normal or expected levels?

All input data were reported with the assumed uncertainties, which were within expected levels. An overarching uncertainty in the data is that there is no fisheries-independent survey measuring the adult population.

c) Are data applied properly within the assessment model?

The input data were applied properly in the assessment models.

d) Are input data series reliable and sufficient to support the assessment approach and findings?

The fisheries-dependent CPUE indices may not reliably reflect the population trends, as the fisheries may operate differently from one year to another. This is an inherent problem with the data, but the subsequent analysis makes the best use of the information available.

TOR 2 - Methods

Evaluate the methods used to assess the stock, taking into account the available data.

a) Are methods scientifically sound and robust?

The assessment platform, Stock Synthesis, can accommodate the available data in a flexible and statistically sound model. Its main drawback is that by being relatively complex, the dynamics and results can become somewhat opaque and unintuitive when fitting a model to many kinds of data. This drawback was addressed by fitting a simpler VPA model to the datasets, which proved to be a helpful diagnostic.

b) Are assessment models configured properly and used consistent with standard practices?

The models were configured to allow dome-shaped selectivities, estimated separately for males and females. Steepness was estimated in the models, using a uniform prior for the Atlantic stock and an informative prior for the Gulf stock. The validity and effect of these configurations were examined in some detail, and the main conclusion was that steepness could not be estimated from the available data and should be fixed at 0.99 instead. This model configuration is referred to as the 'RW recommended model'. The lack of information about the relationship between SSB and recruitment prevents the evaluation of MSY-related reference points. This is a well-known situation in stock assessment and this final model configuration is consistent with standard practice, although other equally imperfect modelling options exist as well.

c) Are the methods appropriate for the available data?

The assessment models seem to be perhaps more complicated than necessary or optimal. Sensitivity to initial parameter values and lack of convergence of specific parameters are signs of overparametrization. They could be slightly simplified by estimating a common length-based selectivity curve for both males and females. A more radical simplification would be to prepare a statistical catch-at-age model with Stock Synthesis that has fewer parameters and whose behavior is easier to understand. The panel did not suggest applying a statistical catch-at-age model in the short timeframe during the RW, but it would be tempting to explore in the near future whether a simpler assessment model might be more appropriate for the available data. On the whole, though, the assessment models are likely to capture the main dynamics and trends in the Atlantic and Gulf stocks, and are therefore useful models.

TOR 3 - Assessment Findings

Evaluate the assessment findings with respect to the following:

a) Are abundance, exploitation, and biomass estimates reliable, consistent with input data and population biological characteristics, and useful to support status inferences?

The assessments are subject to considerable uncertainty (unreliability) on the whole, as reflected in the changes in estimates between sensitivity runs. The perceived dome-shaped selectivities and the resulting cryptic biomass (40% of SSB for both Atlantic and Gulf stocks) represent an important element of risk. The final RW recommended model configuration fitted the data better than alternative models, but the fit through the different CPUE series was still not in close agreement with the observed data. It is difficult to say how the lack of fit is partitioned between observation noise in the data, process variability, and model misspecification.

b) Is the stock overfished? What information helps you reach this conclusion?

SSB for both the Atlantic and Gulf stocks are estimated above the $SSB_{SPR30\%}$ and $SSB_{SPR40\%}$ reference points, so neither of the stocks is estimated as overfished.

c) Is the stock undergoing overfishing? What information helps you reach this conclusion?

F for both the Atlantic and Gulf stocks are estimated below the $F_{SPR30\%}$ and $F_{SPR40\%}$ reference points, so neither of the stocks is estimated as undergoing overfishing.

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

This issue received special attention during the RW and it was clear that there was no informative or reliable stock-recruitment relationship for either stock.

e) Are the 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 conditions?

The SPR-based reference points are more reliable than MSY-based reference points for these stocks. The SPR-based reference points are still subject to considerable uncertainty, such as selectivities, M, maturity, and weights. Out of these terms, the estimated selectivities and assumed M at age are probably more uncertain than the maturity and weights.

TOR 4 - Stock Projections

Evaluate the stock projections, addressing the following:

a) Are the methods consistent with accepted practices and available data?

Different recruitment scenarios were considered for stock projections, based on the long-term average recruitment and on the lower recruitment from recent years. Both scenarios are consistent with accepted practice and the latter is obviously a more cautious approach.

b) Are the methods appropriate for the assessment model and outputs?

Projections based on the long-term average or recent years are both appropriate options to consider.

c) Are the results informative and robust, and useful to support inferences of probable future conditions?

The SEAMAP survey catches the very youngest fish, so there is some information about the size of the most recent cohorts. Nevertheless, it is clear that estimation of future conditions is even less reliable than that of current conditions.

d) Are key uncertainties acknowledged, discussed, and reflected in the projection results?

Projections more than a couple of years into the future should be based on stochastic recruitment rather than deterministic point estimates. The stock projections were generally presented as deterministic trajectories, rather than confidence limits based on stochastic recruitment. An estimate of the recruitment variability was presented on the last day for the Atlantic stock, and it was not clear why the estimate (sigmaR of 0.83) was so different from the empirical recruitment variability (sigmaR of 0.43).

TOR 5 - Uncertainty

Consider how uncertainties in the assessment, and their potential consequences, are addressed.

• *Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty in the population, data sources, and assessment methods.*

• *Ensure that the implications of uncertainty in technical conclusions are clearly stated.*

A variety of methods were used to evaluate the uncertainty about the model structure, key parameters, stock status, projections, and reference points. On the whole, diagnostic sensitivity runs indicated considerable uncertainty, as the results proved in many cases sensitive to alternative modelling choices. The RW recommended model configuration (fixing steepness at 0.99) was based on profile likelihood external analysis of steepness based on the SSB and recruitment scatter (Figures 1 and 2).

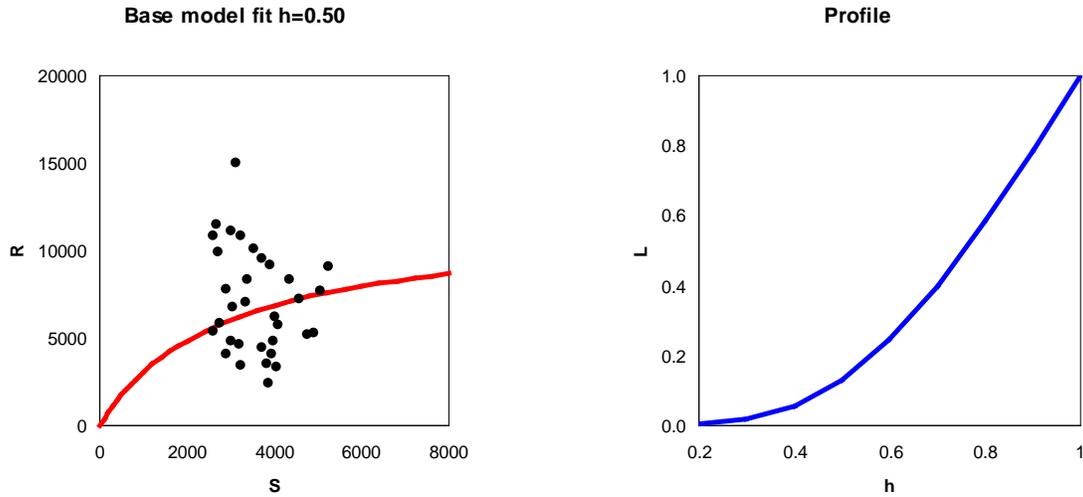**Figure 1.** [Atlantic stock] Stock-recruitment scatter (left panel) and profile likelihood of steepness (right panel).
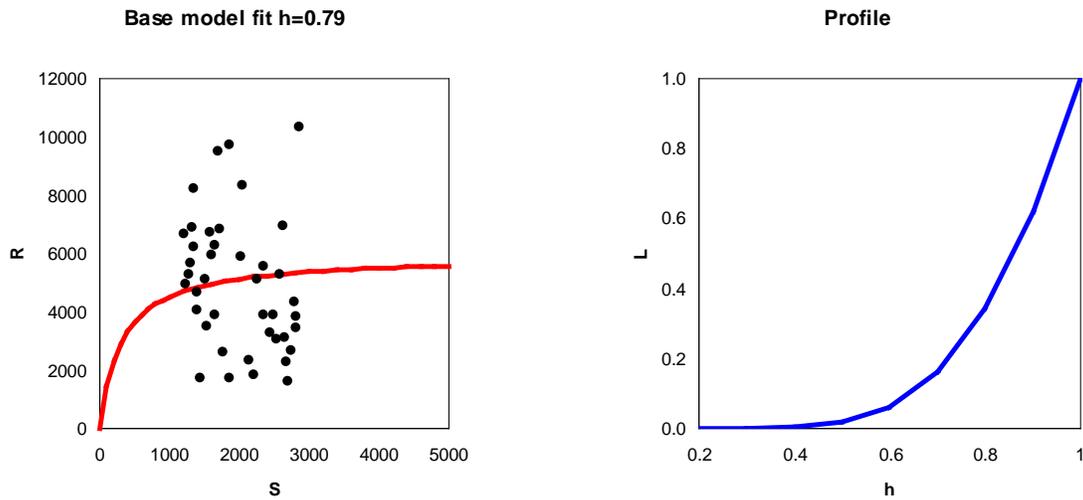

Figure 2. [Gulf stock] Stock-recruitment scatter (left panel) and profile likelihood of steepness (right panel).

As the RW recommended models were being developed near the end of the workshop, there was not enough time to repeat the general diagnostics and uncertainty analyses

(Table 1) for the final models. These would of course be very valuable before using them as the basis for management advice.

Table 1. List of main issues of uncertainties that were examined.

Model structure	SS vs. VPA, data components, unisex selectivities
Key parameters	dome-shaped selectivities, steepness, M, time-varying growth
Stock status	SSB confint, F confint, retrospective analysis
Projections	SSB, catch
Reference points	$B_{SPR40\%}$, $F_{SPR40\%}$, B_{MSY}, F_{MSY}

TOR 6 - Recommendations I

Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.

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

A tagging programme could give information about several aspects of the stocks, helping to choose between different assumptions regarding the stock structure, M at age, dome-shaped selectivities, growth, etc.

• *Provide recommendations on possible ways to improve the SEDAR process.*

It was somewhat unclear what the end result of the assessment was supposed to be. An estimate of the current biomass, projections of different harvest policies under different model scenarios (states of nature), a recommended harvest rate, or something else. This made the discussion near the end of the workshop a bit confusing. It was unclear whether the panel was supposed to recommend future recruitment scenarios and reference points, or whether SSC members were just thinking aloud about their upcoming decisions. This was also relevant to deciding how much effort was appropriate to spend on last-minute changes to modelling choices regarding steepness and recruitment variability.

TOR 7 - Recommendations II

Provide guidance on key improvements in data or modeling approaches which should be considered when scheduling the next assessment.

It would be advantageous to compare the based model to a statistical catch-at-age model, possibly implemented in Stock Synthesis. This would remove the need for a VPA model, which proved difficult to compare for several reasons: fishing mortalities vs. exploitation rate, major differences in assumptions and statistical approach, etc. Likelihoods and estimated quantities are easier to compare between two models that are implemented in the same modelling platform, in this case Stock Synthesis. The base model could also be simplified by modelling unisex length-based selectivities. MCMC might be useful, not only to express uncertainty, but also to identify problematic parameters and which modelling options cause convergence problems.

4 Conclusions and Recommendations

- Full diagnostics and uncertainty analysis should be conducted for the final RW models.
- The base models should be compared to statistical catch-at-age models instead of VPA.
- The main objective and end result of the assessments should be clarified: is it the estimation of current SSB and harvest rate, optimal harvest rate or other reference points, projections based on different catch options, catch advice, or something else.

A1 Bibliography of Materials Provided for Review

Document #	Title	Authors	Date Submitted
Documents Prepared for the Data Workshop			
SEDAR38-DW-01	King mackerel (Scomberomorus cavalla) larval indices of relative abundance from SEAMAP Fall Plankton Surveys, 1986 to 2012	David S. Hanisko and Joanne Lyczkowski-Shultz	10 Dec 2013
SEDAR38-DW-02	King mackerel abundance indices from SEAMAP groundfish surveys in the Northern Gulf of Mexico	Adam G. Pollack and G. Walter Ingram, Jr.	10 Dec 2013 Addendum – 30 Dec 2013
SEDAR38-DW-03	King mackerel abundance indices from NMFS small pelagics trawl surveys in the Northern Gulf of Mexico	Adam Pollack and G. Walter Ingram, Jr.	10 Dec 2013
SEDAR38-DW-04	Standardized catch indices of king mackerel from the U.S. Marine Recreational Fisheries Statistics Survey, 1981 to 2012	Matthew Lauretta and John F. Walter	22 Nov 2013
SEDAR38-DW-05	SEDAR standardized report cards used for review of indices of abundance for Atlantic and Gulf of Mexico king mackerel	SEDAR 38 Indices Working Group	7 January 2014
SEDAR38-DW-06	Standardized catch rates of Atlantic king mackerel (Scomberomorus cavalla) from the North Carolina Commercial fisheries trip tickets 1994-2013	John Walter and Stephanie McInerny	22 Nov 2013
SEDAR38-DW-07	Analysis of environmental factors affecting king mackerel landings along the east coast of Florida	Peter J. Barile	22 Nov 2013
SEDAR38-DW-08	Analysis of annual, monthly and weekly king mackerel landings in the east FL "mixing zone": evidence	Peter J. Barile	22 Nov 2013

	of stock migrations and a "resident" population on the east coast of FL		
SEDAR38-DW-09	Sampling History of the King Mackerel Commercial Fisheries in the Southeastern United States by the Federal Trip Interview Program (TIP)	Courtney R. Saari	22 Nov 2013
SEDAR38-DW-10	Standardized catch rates of from commercial logbook data for king mackerel from the United States Gulf of Mexico, South Atlantic, and Mixing Zone, 1993-2013	John F. Walter and Kevin J. McCarthy	6 January 2014
SEDAR38-DW-11	King mackerel index of abundance in coastal US South Atlantic waters based on a fishery-independent trawl survey	Tracey I. Smart and Jeanne Boylan	22 Nov 2013 Addendum – 30 Dec 2013 Addendum Updated – 26 March 2014
SEDAR38-DW-12	Trends from Non-CPUE Standardized King mackerel Landing Logs from Long Bay, South Carolina Recreational Pier Fishery	Christian Johnson	22 Nov 2013
SEDAR38-DW-13	King Mackerel Historical Pictures Summary	Rusty Hudson	22 Nov 2013
SEDAR38-DW-14	SEDAR 16 King Mackerel Review Panel Information Provided by Ben Hartig	Ben Hartig	29 Nov 2013
SEDAR38-DW-15	A review of Gulf of Mexico and Atlantic king mackerel (Scomberomorus cavalla) age data, 1986 – 2013, from the Panama City Laboratory, Southeast Fisheries Science Center, NOAA Fisheries Service	Chris Palmer, Doug DeVries, Carrie Fioramonti, and Hannah Lang	3 Dec 2013 Addendum: 7 January 2014

SEDAR38-DW-16	Updated standardized catch rates of king mackerel (Scomberomorus cavalla) from the headboat fishery in the U.S. Gulf of Mexico and U.S. South Atlantic	Matt Lauretta and Shannon L. Cass-Calay	6 Dec 2013 Addendum: 3 January 2014
SEDAR38-DW-17	Historical For-Hire Fishing Vessels South Atlantic Fishery Management Council 1930s to 1985	Rusty Hudson	3 January 2014
SEDAR38-DW-18	Historical photographs of For-Hire Fishing Vessels 1930s to 1985	Rusty Hudson	3 January 2014
Documents Prepared for the Assessment Process			
SEDAR38-AW-01	Growth models for king mackerel from the south Atlantic and Gulf of Mexico	Linda Lombardi	7 March 2014 Addendum: 9 May 2014
SEDAR38-AW-02	Addendum to "SEDAR 38-10": New South Atlantic logbook index based upon revised mixing zone definition and new indices for the Gulf and South Atlantic using only trolling gear	John Walter	10 March 2014
SEDAR38-AW-03	The NMFS-SEFSC must account for climate change and inter-annual environmental variability in all South Atlantic stock assessments	Peter J. Barile	10 March 2014
SEDAR38-AW-04	Can climate explain temporal trends in king mackerel (Scomberomorus cavalla) catch-per-unit-effort and landings?	Harford, W.J, Sagarese, S.R., Nuttall, M.A., Karnauskas, M., Liu, H., Lauretta, M., Schirripa, M. & Walter, J.F.	20 March 2014 Updated 14 July 2014
SEDAR38-AW-05	Age frequency distributions, age length keys, length at ages, and sex ratios for king mackerels in the Gulf	Ching-Ping Chih	20 March 2014

	of Mexico and South Atlantic from 1986-2013		
SEDAR38-AW-06	Length frequency distributions for king mackerels in the Gulf of Mexico and South Atlantics from 1978-2013	Ching-Ping Chih	20 March 2014
Documents Prepared for the Review Workshop			
SEDAR38-RW-01	South Atlantic Shrimp fishery bycatch of king mackerel	Walter, J. and J. Isely	6 August 2014
SEDAR38-RW-02	Methods Used to Compile South Atlantic Shrimp Effort Used in the Estimation of King Mackerel Bycatch in the South Atlantic Shrimp Fishery	Gloeckner, D.	5 August 2014
SEDAR38-RW-03	Virtual population analysis for Atlantic king mackerel	Matthew Lauretta	4 August 2014
SEDAR38-RW-04	Virtual population analysis of Gulf of Mexico king mackerel	Matthew Lauretta	4 August 2014
SEDAR38-RW-05	King Mackerel and Spanish Mackerel larval data on the northeast U.S. Shelf	Harvey J. Walsh, David E. Richardson, Katrin E. Marancik, and Jon A. Hare	22 July 2014
SEDAR38-RW-06	Public comments received during the SEDAR 38 Process		8 August 2014
SEDAR38-RW-07	NMFS Trip Intercept Program (TIP) data indicates significant Atlantic King Mackerel recruitment of new age classes into the East Florida commercial handline fishery in April 2014	Peter J. Barile	7 August 2014
Final Stock Assessment Reports			
SEDAR38-SAR1	King mackerel: Gulf of Mexico Migratory Group	SEDAR 38 Panels	

SEDAR38-SAR2	King mackerel: South Atlantic Migratory Group	SEDAR 38 Panels	
Reference Documents			
SEDAR38-RD01	Spatial and temporal variability in the relative contribution of king mackerel (Scomberomorus cavalla) stocks to winter mixed fisheries off South Florida	Todd R. Clardy, William F. Patterson III, Douglas A. DeVries, and Christopher Palmer	
SEDAR38-RD02	King mackerel population dynamics and stock mixing in the United States Atlantic Ocean and Gulf of Mexico	Katherine E. Shepard	
SEDAR38-RD03	A Cooperative Research Approach to Estimating Atlantic and Gulf of Mexico King Mackerel Stock Mixing and Population Dynamics Parameters	William F. Patterson III and Katherine E. Shepard	
SEDAR38-RD04	Contemporary versus historical estimates of king mackerel (Scomberomorus cavalla) age and growth in the U.S. Atlantic Ocean and Gulf of Mexico	Katherine E. Shepard, William F. Patterson III, Douglas A. DeVries, and Mauricio Ortiz	
SEDAR38-RD05	Trends in Atlantic contribution to mixed-stock king mackerel landings in South Florida inferred from otolith shape analysis	Katherine E. Shepard, William F. Patterson III, and Douglas A. DeVries	
SEDAR38-RD06	Coastal upwelling in the South Atlantic Bight: A revisit of the 2003 cold event using long term	Kyung Hoon Hyun and Ruoying He	

	observations and model hindcast solutions		
SEDAR38-RD07	FishSmart: An Innovative Role for Science in Stakeholder-Centered Approaches to Fisheries Management	Thomas J. Miller, Jeff A. Blair, Thomas F. Ihde, Robert M. Jones, David H. Secor & Michael J. Wilberg	
SEDAR38-RD08	FishSmart: Harnessing the Knowledge of Stakeholders to Enhance U.S. Marine Recreational Fisheries with Application to the Atlantic King Mackerel Fishery	Thomas F. Ihde, Michael J. Wilberg, David H. Secor, and Thomas J. Miller	
SEDAR38-RD09	SEDAR 16 Final Document List	SEDAR 16 Panels	
SEDAR38-RD10	History of fishing in Ponce Inlet	The Quarterly Newsletter of the Ponce de Leon Inlet Lighthouse Preservation Association, Inc.	
SEDAR38-RD11	Biological-Statistical Census of the Species Entering Fisheries in the Cape Canaveral Area	William W. Anderson and Jack W. Gehringer	
SEDAR38-RD12	Impacts of Interannual Environmental Forcing and Climate Change on the Distribution of Atlantic Mackerel on the U.S. Northeast Continental Shelf	W. J. Overholtz, J. A. Hare and C. M. Keith	

SEDAR38-RD13	Characterization of the near-shore commercial shrimp trawl fishery from Carteret County to Brunswick County, North Carolina	Kevin Brown	
SEDAR38-RD14	South Atlantic Shrimp System		
SEDAR38-RD15	SEAMAP (Gulf of Mexico) Field Operations Manual for Collection of Data	NMFS	

A2 Statement of Work

Attachment A: Statement of Work for Arni Magnusson

External Independent Peer Review by the Center for Independent Experts

SEDAR 38 South Atlantic and Gulf of Mexico King Mackerel 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 Representative (COR), and reviewed by CIE for compliance with their policy for providing independent expertise that can provide impartial and independent peer review without conflicts of interest. CIE reviewers are 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 38 will be a compilation of data, benchmark assessments of the stocks, and an assessment review conducted for South Atlantic and Gulf of Mexico king mackerel. The review panel is ultimately responsible for ensuring that the best possible assessments are provided through the SEDAR process. The stocks assessed through SEDAR 38 are within the jurisdiction of the South Atlantic and Gulf of Mexico Fishery Management Councils, and the state waters of Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, and North Carolina. The Terms of Reference (ToRs) of the peer review are attached in **Annex 2**.

Requirements for CIE Reviewers: Three CIE reviewers shall have the necessary qualifications to complete an impartial and independent peer review in accordance with the tasks and ToRs described in the SoW herein. The CIE reviewers shall have expertise in stock assessment, statistics, fisheries science, and marine biology sufficient to complete the tasks of the scientific 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 SEDAR 33 panel review meeting scheduled in Miami, Florida during August 12-14, 2014.

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

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

Foreign National Security Clearance: The reviewers shall participate during a panel review meeting at a government facility, and the NMFS Project Contact will be responsible for obtaining the Foreign National Security Clearance approval for the reviewers who are non-US citizens. For this reason, the reviewers shall provide by FAX (not by email) the 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/.

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

Tasks during the panel review meeting: Each reviewer shall conduct the independent peer review in accordance with the SoW and stock assessment ToRs, and shall not serve in any other role unless specified herein. **Modifications to the SoW and ToRs shall not**

be made during the peer review, and any SoW or ToRs modifications prior to the peer review shall be approved by the COR and contractor. Each reviewer shall actively participate in a professional and respectful manner as a member of the meeting review panel, and their peer review tasks shall be focused on the stock assessment ToRs as specified herein. The NMFS Project Contact will be responsible for any facility arrangements (e.g., conference room for panel review meetings or teleconference arrangements). The NMFS Project Contact will also be responsible for ensuring that the Chair understands the contractual role of the reviewers as specified herein. The contractor can contact the COR and NMFS Project Contact to confirm any peer review arrangements, including the meeting facility arrangements.

Tasks after the panel review meeting: Each reviewer shall prepare an independent peer review report, and the report shall be formatted as described in **Annex 1**. This report should explain whether each stock assessment ToR was or was not completed successfully during the SEDAR meeting. If any existing BRP or their proxies are considered inappropriate, each independent report shall include recommendations and justification for suitable alternatives. If such alternatives cannot be identified, then the report shall indicate that the existing BRPs are the best available at this time. Additional questions and pertinent information related to the assessment review addressed during the meetings that were not in the ToRs may be included in a separate section at the end of an independent peer review report.

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.

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 Miami, Florida during August 12-14, 2014.
3) Conduct an independent peer review in accordance with the ToRs (**Annex 2**).
4) No later than August 25, 2014, 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 at 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**.

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

6 July 2014	CIE sends reviewer contact information to the COR, who then sends this to the NMFS Project Contact
29 July 2014	NMFS Project Contact sends the stock assessment report and background documents to the CIE reviewers.
12-14 August 2014	Each reviewer shall conduct an independent peer review during the panel review meeting in Miami, Florida
25 August 2014	CIE reviewers submit draft CIE independent peer review reports to the CIE Lead Coordinator and CIE Regional Coordinator
8 September 2014	CIE submits CIE independent peer review reports to the COR
15 September 2014	The COR 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 COR within 10 working days after receipt of all required information of the decision on changes. The COR can approve changes to the milestone dates, list of pre-review documents, and ToRs within the SoW as long as the role and ability of the 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 COR 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 COR (William Michaels, via William.Michaels@noaa.gov).

Applicable Performance Standards: The contract is successfully completed when the COR 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 COR, the CIE Lead Coordinator shall send via e-mail the final CIE reports in *.PDF format to the COR. The COR will distribute the CIE reports to the NMFS Project Contact and Center Director.

Support Personnel:

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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. The CIE independent report shall be a stand-alone document for others to understand the weaknesses and strengths of the science reviewed. The CIE independent report shall be an independent peer review of each ToRs.

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

Annex 2: Tentative Terms of Reference for the Peer Review

SEDAR 38 South Atlantic and Gulf of Mexico King Mackerel Assessment Review

1. Evaluate the data used in the assessment, addressing the following:

   a) Are data decisions made by the DW and AW sound and robust?

   b) Are data uncertainties acknowledged, reported, and within normal or expected levels?

   c) Are data applied properly within the assessment model?

   d) Are input data series reliable and sufficient to support the assessment approach and findings?

2. Evaluate the methods used to assess the stock, taking into account the available data.

   a) Are methods scientifically sound and robust?

   b) Are assessment models configured properly and used consistent with standard practices?

   c) Are the methods appropriate for the available data?

3. Evaluate the assessment findings with respect to the following:

   a) Are abundance, exploitation, and biomass estimates reliable, consistent with input data and population biological characteristics, and useful to support status inferences?

   b) Is the stock overfished? What information helps you reach this conclusion?

   c) Is the stock undergoing overfishing? What information helps you reach this conclusion?

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

   e) Are the 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 conditions?

4. Evaluate the stock projections, addressing the following:

   a) Are the methods consistent with accepted practices and available data?

   b) Are the methods appropriate for the assessment model and outputs?

   c) Are the results informative and robust, and useful to support inferences of probable future conditions?

   d) Are key uncertainties acknowledged, discussed, and reflected in the projection results?

5. Consider how uncertainties in the assessment, and their potential consequences, are addressed.

   - Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty in the population, data sources, and assessment methods.

   - Ensure that the implications of uncertainty in technical conclusions are clearly stated.

6. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.

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

   - Provide recommendations on possible ways to improve the SEDAR process.

7. Provide guidance on key improvements in data or modeling approaches which should be considered when scheduling the next assessment.

8. Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference.

   - 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.

Annex 3: Tentative Agenda for

SEDAR 38 South Atlantic and Gulf of Mexico King Mackerel Assessment Review

Tentative Agenda

Miami, Florida
12-14 August 2014

Tuesday

9:00 a.m.	**Introductions and Opening Remarks**	
	Coordinator	
	- Agenda Review, TOR, Task Assignments	
9:30 a.m. – 11:30 a.m.	**Assessment Presentations**	**TBD**
11:30 a.m. – 1:00 p.m.	**Lunch Break**	
1:00 p.m. – 6:00 p.m.	**Continue Presentations/ Panel Discussion**	**Chair**
	- *Assessment Data & Methods*	
	- Identify additional analyses, sensitivities, corrections	

*Tuesday Goals***:** Initial presentations completed, sensitivity and base model discussion begun

Wednesday

8:00 a.m. – 11:30 a.m.	**Panel Discussion**	**Chair**
	- *Assessment Data & Methods*	
	- Identify additional analyses, sensitivities, corrections	
11:30 a.m. – 1:00 p.m.	**Lunch Break**	
1:00 p.m. – 6:00 p.m.	**Panel Discussion/Panel Work Session**	**Chair**
	- Continue deliberations	
	- Review additional analyses	
	- Recommendations and comments	

*Wednesday Goals***:** sensitivities and modifications identified, preferred models selected, projection approaches approved, Report drafts begun

Thursday

8:00 a.m. – 11:30 a.m.	**Panel Discussion**	**Chair**
	- Final sensitivities reviewed.	
	- Projections reviewed.	**Chair**
11:30 a.m. – 1:00 p.m.	**Lunch Break**	
1:00 p.m. – 5:00 p.m.	**Panel Discussion or Work Session**	**Chair**
	- Review Reports	
5:00 p.m.	**ADJOURN**	

Thursday Goals: Complete assessment work and discussions, final results available. Draft Reports reviewed.