Reviewers Report if SEDAR 21 Data Workshop (DW)
HMS sandbar, dusky, and blacknose shark assessment

By

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Prepared for

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Contents

1. Executive Summary

i. The CIE reviewer participated in a Data Review Workshop for Blacknose, Sandbar and Dusky shark assessments in Charleston SC from 21-25 June 2010. The reviewer participated mainly in subgroup discussions on abundance indices and in plenary.

ii. The Data Workshop provided a productive environment in which stakeholders and scientists shared knowledge to optimize the information available for assessment. The quality of science was high and appropriate for the purpose of stock assessment.

iii. Abundance indices were available from commercial CPUE data, including logbooks and observer programs. A small number of fishery independent surveys were also available. All had been standardized using a delta lognormal model which is appropriate for the data.

iv. Although there is a large quantity of abundance index information the quality of these data are limited by the amount of fishery independent information or spatial coverage of the survey. Preliminary inspection of the indices at the meeting suggested that there was little similarity of trends suggesting they have high uncertainty.

v. There is a risk that the assessments might be driven arbitrarily by one of the time series if it happened to have low estimated CVs. I would **recommend that more exploratory analyses are done with the CPUE indices to try to identify those which contribute most information on stock trends over the area of the assessment.**

vi. During the meeting some time was devoted to filling out a 'report card' for each series. This checked the documentation of the statistical analysis which was generally good. In order to save time I **would recommend that the report card is completed by the author and that more time at the meeting is devoted to assessing the value of each time series for the assessment.**

vii. The catch data suffer from a high degree of uncertainty. As much of the uncertainty relates to historical records there is not much that can be done to improve them. However, I would **recommend that an analysis is performed to try to quantify the uncertainty in the time series of catch data.** This would help in characterizing the overall uncertainty in the assessment.

viii. The frequency of spawning by female sharks may be an important factor in estimating the spawning potential of the stock. In the absence of definitive

information on spawning frequency I would **recommend that female sharks are examined in the spawning period to determine the proportion of spawning females**. While this will not provide an estimate of spawning frequency, it may provide sufficient information to estimate annual spawning biomass.

ix. Estimates of discard survival proved an area of disagreement between scientists and fishing industry representatives. This was in part a result of differing perceptions of the meaning of discard survival. It is important that such disagreements don't lead to negotiated values that have no scientific basis. I would **recommend that a desk study is undertaken to examine whether the choice of discard survival has a significant bearing on the estimated status of the stock in relation to MSY reference points.**

x. There may be a case for assessment analysts at the workshop to be more active in explaining whether certain biological effects can usefully be incorporated into assessments. Some biological phenomena may be statistically significant in their own right but have little importance in determining the assessment outcome. Similarly added biological realism in an assessment model may be negated by the added uncertainty in input parameter values.

2. Background

The SEDAR 21 process involves a compilation of data, a benchmark assessment of the stock, and an assessment review conducted for HMS sandbar, dusky, and blacknose shark A CIE expert was appointed to participate as an independent peer reviewer during the data compilation processes. This was based in part on a recent SEDAR assessment panel recommendation that the review panel include an independent expert peer review person to serve as a workshop panelist during the process leading to an Assessment Review Workshop. It was envisaged that the independent expert would not contribute to the production of science products but provide peer review advice regarding technical details of the methods used in SEDAR assessments and decisions related to model configuration during the workshop.

3. Description of the Individual Reviewer's Role in the Review Activities

The SEDAR21 Data Workshop was convened in Charleston SC on 21st -25th June 2010. Participants included scientists from federal and state government laboratories, university scientists, fishing industry representatives, NGOs and members of the South Atlantic Fisheries Management Council. The format of the meeting comprised three working groups that prepared data on catches, life history parameters and abundance indices. These groups worked throughout the week compiling relevant information that was discussed periodically at plenary sessions involving all participants.

Prior to the meeting working documents were made available on an FTP site. While the majority of these papers were available for download before the meeting was convened a number were not. These became available during and after the meeting.

Where documents were available they were reviewed by the reviewer in preparation for the meeting. At the meeting the Convener indicated that the reviewer should participate in any of the three working groups. I elected to participate in the abundance index working group and therefore had least input into the life history and catch groups.

The most controversial issues were discussed at plenary and provided an opportunity for the reviewer to offer comment.

4. Summary of Findings

The statement of work asks for commentary for each of the terms of reference of the Data Workshop. However, this is problematic for two main reasons. Firstly the structure of the meeting only allowed participation in one subgroup at a time in the meeting preventing full engagement by the reviewer with all the data discussions. Secondly while much of

the work required was completed at the meeting not all of the terms of reference were completed, notably the completion of the summary report. The deadline for completion of the summary report occurs a number of weeks after the required deadline for the reviewer's report. Consequently, this report focuses on the main issues that arose during the abundance indices working group and the issues brought to plenary from the other two data working groups.

4.1. Abundance Indices

The shark species concerned are in scientific survey terms 'rare animals'. This does not mean rare in conservation terms but that there is a low encounter rate. This makes it difficult to quantify their abundance using conventional trawl surveys that work well for abundant groundfish, for example. As a result of their rarity, much of the data for these shark species is derived from commercial catch and effort data that offer larger sample sizes. Commercial CPUE data have the advantage of good spatial and temporal coverage but suffer weaknesses especially in terms of survey design, species identification and precision of reporting. To some degree the latter problems can be overcome by observer programs where a trained observer on a commercial fishing trip can record more detailed information that may contribute to more accurate indices of abundance. Such programs were available for the species under consideration at this workshop and relevant indices were compiled.

As well as commercial CPUE data and observer program data, there are a small number of NMFS surveys that cover a large portion of the assessment area. This includes, for example, the NEFSC Long Line survey which covers most of the Atlantic East coast, and while somewhat intermittent in frequency (every 2-3 years), it covers a good range of years from the 1980s. Such surveys are probably the most valuable series as they have well designed sampling protocols and good spatial and temporal coverage.

Survey information was also available from state surveys (Alabama and Georgia) as well as some universities (North Carolina and Virginia Institute for Marine Science). Typically these surveys are limited in their spatial coverage and are usually restricted to the inshore area. While some time series are very short, others offer some of the longest available abundance indices. The surveys are of high quality with good design but their localized areal coverage raises serious issues about their applicability for assessments that seek to describe population dynamics over a very wide area.

In almost every case the data were standardized using a delta lognormal GLM where the presence/absence data were modeled using a binomial distribution and non-zero samples were modeled using a lognormal distribution. This approach is appropriate for the data and the consistency of method made comparison of indices much more straightforward. For each index series a 'report card' was prepared that was used to check the documentation of the analysis. This is a useful way of ensuring that analyses conform to a proper standard as well as guiding authors on the documentation required. It appeared that for most time series a standard SAS script had been used to perform the model

fitting. In one case it emerged that the script being used was obsolete and had resulted in incorrectly calculated CVs. This is perhaps an indication that care is required in ensuring quality control on the software being used.

While the Report Card is a necessary and desirable instrument to ensure good documentation it only sets a minimum standard for inclusion of a data set in an assessment. During the working group discussions consideration was given to the recommended use of the index. Each index was considered for inclusion in the 'base' assessment, for sensitivity analysis or 'not recommended'. Roughly, these categories corresponded to 'high', 'medium' and 'low' suitability for the assessment. Positive attributes for inclusion were area coverage, length of time series and detailed information (e.g., better species identification that might be obtained from observers). Negative attributes were limited area coverage, short time series, fixed station sampling design and commercial logbook data where reported information may be less detailed (such as species identification or location reporting). Where CPUE data were derived from both logbook and observer data from the same commercial fleet, the observer data were preferred. In general these criteria for selecting indices were appropriate. At the conclusion of the meeting the process of selection was not complete. It was also proposed to rank those indices considered suitable for the base assessment but this ranking was not complete at the end of the meeting.

In general the criteria for selection were appropriate. One might question whether a fixed station sampling design really is a significant weakness. Such designs may be prone to bias, especially in the estimation of CVs, but provided sample size and coverage are large it is questionable that fixed stations perform less well than random stations.

The most serious issue in the selection of indices is the spatial coverage. The assessment area for all three shark species is very large and they are migratory. Indices derived from a limited range have a high risk of violating the assessment model assumptions by reflecting local population abundance rather than total stock abundance. There is an added problem that in some cases the precision of these spatially limited indices is high and they cover a longer time range. Inclusion of such series runs the risk of driving the assessment with a misleading population trend. Considerable care is needed in the inclusion of these indices for an assessment.

4.2. Biological parameters

Most stock assessments require a number of biological parameters to be input. These include information on growth rates, natural mortality, maturity etc. A sub-group at the meeting was tasked with compiling the relevant information for these assessments.

Natural mortality rates were estimated from published methods that use age and growth information. The favored method used at the workshop was the Lorenzen method which

gave plausible values especially for the youngest ages. These estimates were modified at higher ages if the asymptotic value was higher than the value estimated from the Hoenig method. Estimates of growth parameters were taken from published studies. There was a supporting consensus for the values arrived at by the group.

There was some controversy over the periodicity of spawning in sandbar shark. There was good evidence that these sharks do not spawn every year but agreement on the frequency led to considerable debate. Much of this revolved around the question of whether unpublished studies could be used to derive the relevant information. Some scientists argued that only peer reviewed literature was admissible while others argued that all relevant data should be used. It was my view that the quality of expertise at the meeting, and the depth of review of new data, offered a more demanding review than would normally be given to a published paper. It would be preferable, therefore to use unpublished new information provided it passed review at the meeting.

The need to have estimates of the frequency of spawning relates to the estimation of the size of the spawning biomass in any year. Estimating frequency of spawning is difficult and perhaps one way around the problem may be to estimate directly from observation during the spawning period the proportion of females that are producing pups.

Another area of controversy was the estimate of the survival of sharks that are discarded at sea. There were good estimates of the proportion of sharks that are brought aboard alive but no studies of post discard survival for the species concerned. Fishing industry experts argued the values for this mortality was very low, usually less that 5%. This is probably an estimate of the immediate release mortality and will not reflect mortality attributable to capture over ensuing days and weeks. Only one study on Blue sharks was available which suggested that post discard mortality was about 19% and a figure close to this value was proposed by scientists. The discussion became polarized around these two values and then began to develop into a negotiation heading towards ‘splitting the difference’. Clearly discard survival is not a value amenable to negotiation because in this instance it is not a matter of reconciling different observations of the same phenomenon but of reaching a common understanding of the quantity in question. The discussion of this issue illustrates an important problem in deriving objective values for scientific purposes where stakeholder groups have very different perceptions of the nature of the science.

My view was that the discard mortality was almost certainly higher than the 5% proposed and that it would be letter to try to use the Blue shark mortality as a proxy, though it would need to be modified to account for different ‘robustness’ of the sharks considered in this workshop. It might be possible to do this by using the proportion of sharks being brought onto the vessel that are alive as a measure of their robustness.

4.3. Catch estimates

The estimation of catches for these species, especially older historical values, is difficult because landings records may be incomplete and do not record shark landings to species level. In compiling catch data a number of necessary but inherently unverifiable assumptions have been used. For example, assumptions are made about the year the fishery started and that effort increased linearly to the point where records began. Data on bycatch, especially from the shrimp trawl fishery are uncertain and information from the recreational fishery is also regarded as highly uncertain. While the assumptions made are undoubtedly reasonable there is no avoiding the problem that the estimates suffer from considerable uncertainty. Indeed in the case of Dusky shark it was generally accepted that the catch estimates were sufficiently uncertain as to make them of doubtful utility for the assessment. Where catches are to be used for assessment, it is important that some attempt is made to quantify the uncertainty because certain assessment models actually assume that the catch values are error free. It is of course very difficult to do this but minimum estimates might be obtained by assigning CVs to the expansion factors used to derive the data and hence derive an overall CV for the estimates.

4.4. General

Overall the Data Workshop functioned well and provided a productive environment where stakeholders and scientists contributed their collective knowledge to the improvement of the data for the assessment. It is important to focus on the point of using knowledge to improve data for the assessment. I would say there are two areas where the process is perhaps somewhat vulnerable. Firstly, as described in section 4.2 there is a danger that different perceptions about biology and assessment may result in negotiating values for input rather than basing estimates on objective data. This requires patience and care in ensuring that all players understand the issues on a common basis to avoid unnecessary disagreement.

Secondly, the focus on data brings together a range of scientists with particular expertise that have a good understanding of their own field but who do not necessarily have a good insight into the use of the data in the assessment. This can cause discussion about details that are not important for the assessment, but perhaps more importantly can result in a pressure on assessment analysts to carry out assessments that are sub-optimal. One example of this is where there are some data to suggest that a stock consists of geographically separate populations requiring the assessment analyst to divide the assessment into more than one unit. To a biologist this may be entirely reasonable but often, even where it is known that populations may be distinct, there are insufficient data to perform the assessment in this way and, while more realistic, this approach simply leads to even greater uncertainty in the assessment. It may be better to amalgamate populations into a single unit for a more robust assessment. In my view there is a better balance to be struck between the input from data experts and the assessment analysts, and

that the assessment analysts should be able to be more assertive in questioning the value of assessment options proposed by the data group.

5. Conclusions and Recommendations

The Data Workshop provides a productive environment in which stakeholders and scientists can share knowledge to optimize the information available for assessment. It also serves as a mechanism where differences of opinion can be resolved before assessments are completed. The quality of science was high and appropriate for the purpose of stock assessment.

Compared with many stocks the availability of data are comparatively limited, especially in relation to catches, whether landings or discards. Although there is a large quantity of abundance index information the quality of these data is limited by the amount of fishery independent information or spatial coverage of the survey. Preliminary inspection of the indices at the meeting suggested that there was very little similarity of trends suggesting they have high uncertainty. There is a danger that the assessment might be driven arbitrarily by one of the time series if it happened to have low estimated CVs. I would **recommend that more exploratory analyses are done with the CPUE indices to try to identify those which contribute the most information on stock trends over the area of the assessment.** One possible line of analysis would be to use factor analysis to see if a common annual signal could be extracted from the suite of indices.

During the meeting some time was devoted to filling out a 'report card' for each series. In order to save time I **would recommend that the report card is completed by the author and that more time at the meeting is devoted to assessing the value of each time series for the assessment.** The latter should include participation by assessment analysts.

The catch data suffer from a high degree of uncertainty. As much of the uncertainty relates to historical records there is not much that can be done to improve them. However, I would **recommend that an analysis is performed to try to quantify the uncertainty in the time series of catch data.** This would help in characterizing the overall uncertainty in the assessment.

The frequency of spawning by female sharks may be an important factor in estimating the spawning potential of the stock. Biological examination of female sharks appears to be able to determine that some species spawn less often that annually but the actual frequency cannot yet be established. In the absence of definitive information on spawning frequency I would **recommend that female sharks are examined in the spawning period to determine the proportion of spawning females**. While this will not provide an estimate of spawning frequency, it may provide sufficient information to estimate annual spawning biomass.

Estimates of discard survival proved an area of disagreement between scientists and fishing industry representatives. This was in part a result of differing perceptions of the meaning of discard survival. It is important that such disagreements don't lead to negotiated values that have no scientific basis. It might be worth investing in further discussion with the industry to reach a common understanding of the parameter in question. It might also help if **a desk study was undertaken to examine whether the choice of discard survival has a significant bearing on the estimated status of the stock in relation to MSY reference points.** If the sensitivity of the assessments to this quantity is low, it might defuse some of the polarization over the chosen values.

There may be a case for assessment analysts at the workshop to be more active in commenting whether certain biological effects can usefully be incorporated into assessments. This might be because some biological phenomena that are statically significant in their own right have little importance in determining the assessment outcome or where added biological realism in an assessment model is negated by the added uncertainty in input parameter values.

Appendix 1. Workshop Document List

Document #	Title	Authors	Working Group
Documents Prepared for the Data Workshop			
SEDAR21-DW-01	Standardized catch rates of sandbar and blacknose shark from a fishery independent survey in northwest Florida, 1996-2009.	John Carlson and Dana Bethea	Indices
SEDAR21-DW-02	Standardized catch rates of sandbar, dusky and blacknose sharks from the Commercial Shark Fishery Longline Observer Program, 1994-2009	John Carlson, Loraine Hale, Alexia Morgan and George Burgess	Indices
SEDAR21-DW-03	Standardized Catch Rates of Blacknose Shark from the Southeast Shark Drift Gillnet Fishery: 1993-2009	John Carlson and Michelle Passerotti	Indices
SEDAR21-DW-04	Standardized Catch Rates of Blacknose Shark from the Southeast Sink Gillnet Fishery: 2005-2009	John Carlson and Michelle Passerotti	Indices
SEDAR21-DW-05	The effect of turtle excluder devices (TEDS) on the bycatch of small coastal sharks in the Gulf of Mexico Peneid shrimp fishery	S.W. Raborn, K.I. Andrews, B.J. Gallaway, J.G. Cole, and W.J. Gazey	Catch Statistics
SEDAR21-DW-06	Reproduction of the sandbar shark *Carcharhinus plumbeus* in the U.S. Atlantic Ocean and Gulf of Mexico	Baremore, I.E. and L.F. Hale	Life History
SEDAR21-DW-07	Description of data sources used to quantify shark catches in commercial and recreational fisheries in the U.S. Atlantic Ocean and Gulf of Mexico	Baremore, I.E., Balchowski, H., Matter, V, Cortes, E.	Catch Statistics
SEDAR21-DW-08	Standardized catch rates for dusky and sandbar sharks from the US pelagic longline logbook and observer programs using generalized linear mixed models.	Enric Cortés	Indices
SEDAR21-DW-09	Updated catches	Enric Cortés	Catch Statistics

SEDAR21-DW-10	Large and Small Coastal Sharks Collected Under the Exempted Fishing Program Managed by the Highly Migratory Species Management Division	Jackie Wilson	Catch Statistics
SEDAR21-DW-11	Abundance series from the MRFSS data set	Beth Babcock	Indices
SEDAR21-DW-12	Catches of Sandbar Shark from the Southeast US Gillnet Fishery: 1999-2009	Michelle S. Passerotti and John K. Carlson	Catch Statistics
SEDAR21-DW-13	Errata Sheet for 'CATCH AND BYCATCH IN THE SHARK GILLNET FISHERY: 2005-2006', NOAA Technical Memorandum NMFS-SEFSC-552	Michelle S. Passerotti and John K. Carlson	Catch Statistics
SEDAR21-DW-14	Data Update to Illegal Shark Fishing off the coast of Texas by Mexican Lanchas	Karyl Brewster-Geisz, Steve Durkee, and Patrick Barelli	Catch Statistics
SEDAR21-DW-15	An update of blacknose shark bycatch estimates taken by the Gulf of Mexico penaeid shrimp fishery from 1972 to 2009	W.J. Gazey and K. Andrews	Catch Statistics
SEDAR21-DW-16	A Negative Binomial Loglinear Model with Application for the Estimation of Bycatch of Blacknose Shark in the Gulf of Mexico Penaeid Shrimp Fishery	W.J. Gazey, K. Andrews, and B.J. Gallaway	Catch Statistics
SEDAR21-DW-17	Life history parameters for the sandbar shark in the Northwest Atlantic and Eastern Gulf of Mexico	Romine and Musick	Life History
SEDAR21-DW-18	Standardized catch rates of sandbar sharks and dusky sharks in the VIMS Longline Survey: 1975-2009	Romine, Parsons, Grubbs, Musick, and Sutton	Indices
SEDAR21-DW-19	Updating the blacknose bycatch estimates in the Gulf of Mexico using the Nichols method	Katie Andrews	Catch Statistics
SEDAR21-DW-20	Tag and recapture data for blacknose, *Carcharhinus acronotus*, sandbar, *C. plumbeus*, and dusky shark, *C. obscurus*, as kept in the NOAA Fisheries Southeast Fisheries Science	D. Bethea and Carlson, J.K.	Life History

	Center Elasmobranch Tagging Management System, 1999-2009		
SEDAR21-DW-21	Age and growth of the sandbar shark, *Carcharhinus plumbeus*, in the Gulf of Mexico and southern Atlantic Ocean.	L. Hale and I. Baremore	Life History
SEDAR21-DW-22	Catch and bycatch in the bottom longline observer program from 2005 to 2009	Hale, L.F., S.J.B. Gulak, and J.K. Carlson	Catch Statistics
SEDAR21-DW-23	Identification and evaluation of shark bycatch in Georgia's commercial shrimp trawl fishery with implications for management	C. N. Belcher and C. A. Jennings	Catch Statistics
SEDAR21-DW-24	Increases in maximum observed age of blacknose sharks, *Carcharhinus acronotus*, based on three long term recaptures from the Western North Atlantic	Bryan S. Frazier, William Driggers, and Christian Jones	Life History
SEDAR21-DW-25	Catch rates and size distribution of blacknose shark *Carcharhinus acronotus* in the northern Gulf of Mexico, 2006-2009	J. M. Drymon, S.P. Powers, J. Dindo and G.W. Ingram	Indices
SEDAR21-DW-26	Reproductive cycle of sandbar sharks in the northwestern Atlantic Ocean and Gulf of Mexico	Andrew Piercy	Life History
SEDAR21-DW-27	Standardized catch rates for juvenile sandbar sharks caught during NMFS COASTSPAN longline surveys in Delaware Bay	Camilla T. McCandless	Indices
SEDAR21-DW-28	Standardized catch rates for sandbar and dusky sharks caught during the NEFSC coastal shark bottom longline survey	Camilla T. McCandless and Lisa J. Natanson	Indices
SEDAR21-DW-29	Standardized catch rates for sandbar and blacknose sharks caught during the Georgia COASTSPAN and GADNR red drum longline surveys	Camilla T. McCandless and Carolyn N. Belcher	Indices
SEDAR21-DW-30	Standardized catch rates for sandbar and blacknose sharks caught during the South Carolina COASTSPAN and SCDNR red drum surveys	Camilla T. McCandless and Bryan Frazier	Indices

SEDAR21-DW-31	Standardized catch rates of sandbar and dusky sharks from historical exploratory longline surveys conducted by the NMFS Sandy Hook, NJ and Narragansett, RI Labs	Camilla T. McCandless and John J. Hoey	Indices
SEDAR21-DW-32	Standardized catch rates of dusky and sandbar sharks observed in the gillnet fishery by the Northeast Fisheries Observer Program	Joseph J. Mello and Camilla T. McCandless	Indices
SEDAR21-DW-33	Standardized catch rates for blacknose, dusky and sandbar sharks caught during a UNC longline survey conducted between 1972 and 2009 in Onslow Bay, NC	Frank J. Schwartz, Camilla T. McCandless, and John J. Hoey	Indices
SEDAR21-DW-34	Sandbar and blacknose shark occurrence in standardized longline, drumline, and gill net surveys in southwest Florida coastal waters of the Gulf of Mexico	Robert Hueter, John Morris, and John Tyminski	Indices
SEDAR21-DW-35	Atlantic Commercial Landings of blacknose, dusky, sandbar, unclassified, small coastal, and requiem sharks provided by the Atlantic Coastal Cooperative Statistics Program (ACCSP)	Christopher Hayes	Catch Statistics
SEDAR21-DW-36	Life history and population structure of blacknose sharks, *Carcharhinus acronotus*, in the western North Atlantic Ocean	William B. Driggers III, John K. Carlson, Bryan Frazier, G. Walter Ingram Jr., Joseph M. Quattro, James A. Sulikowski and Glenn F. Ulrich	Life History
SEDAR21-DW-37	Movements and Environmental Preferences of Dusky Sharks*, Carcharhinus obscurus,* in the Northern Gulf of Mexico.	Eric Hoffmayer, James Franks, William Driggers, and Mark Grace	Life History
SEDAR21-DW-38	Preliminary Mark/Recapture Data for the Sandbar Shark (*Carcharhinus plumbeus*), Dusky	Nancy E. Kohler and Patricia A. Turner	Life History

	Shark (*C. obscurus*), and Blacknose Shark (*C. acronotus*) in the Western North Atlantic		

Appendix 2: Statement of Work for Dr. Robin Cook

External Independent Peer Review by the Center for Independent Experts

SEDAR 21 Data Workshop (DW)
HMS sandbar, dusky, and blacknose shark assessment

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 reviewer is 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. The 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.com.

Project Description: SEDAR 21 will be a compilation of data, a benchmark assessment of the stock, and an assessment review conducted for HMS sandbar, dusky, and blacknose shark under the SEDAR (Southeast Data, Assessment and Review) process. This proposal is for a CIE expert to be appointed to participate as a CIE independent peer reviewer on the Assessment Panel during the data compilation and assessment processes.

SEDAR assessments typically involve an assessment panel composed of assessment analysts named by the lead SEDAR cooperator, fishery scientists as SSC members, and fishery managers. This proposal is based in part on a recent SEDAR assessment panel recommendation that the assessment panel include an independent expert peer review person to serve as a workshop panelist during the process leading to an Assessment Review Workshop. While the independent expert will not contribute to the production of science products, he or she can be valuable by providing peer review advice regarding technical details of the methods used in SEDAR assessments and decisions related to model configuration during the workshop. In providing peer review advice during the assessment workshop, the independent expert can improved the overall assessment process by advising the analysts regarding issues that might become points of contention in the formal peer review workshop—at which time it would be too late to revise the actual assessment (assessment data decisions, assumptions, models, modifications, etc. are confined to the assessment process before the peer review workshop). It is anticipated that the independent expert will contribute to the process by providing expert peer review

advice during the actual assessment work, thereby improving the assessment being undertaken using the best available science for fisheries management decisions. The Terms of Reference (ToRs) of the peer review are attached in **Annex 2**. The tentative agenda of the panel review meeting is attached in **Annex 3**.

Requirements for CIE Reviewer: One CIE reviewer shall conduct an impartial and independent peer review in accordance with the SoW and ToRs herein. CIE reviewer shall have working knowledge and recent experience in the application of stock assessment, statistics, fisheries science, and marine biology sufficient to complete the task of participation in discussions of technical details of the data and methods used for this SEDAR assessment and decisions related to model configuration in compliance with the workshop's Terms of Reference.
The 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: The CIE reviewer shall conduct an independent peer review during the panel meeting scheduled in Charleston, South Carolina during June 21-25 2010.

Statement of Tasks: The 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 reviewer. The NMFS Project Contact is responsible for providing the CIE reviewer 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 reviewer 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 reviewer who if a non-US citizens. For this reason, the CIE reviewer 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/sponsor.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 reviewer 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 reviewer is responsible only for the pre-review documents that are delivered to the reviewer in accordance to the SoW scheduled deadlines specified herein. The CIE reviewer shall read all documents in preparation for the peer review.

Panel Review Meeting: The 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. **The CIE reviewer serves only as a peer reviewer in accordance with the SoW, and shall not serve as an analyst during the workshop. Modifications to the SoW and ToRs can 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.** The 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 reviewer 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 Report: The CIE reviewer shall complete an independent peer review report in accordance with the SoW. The CIE reviewer shall complete the independent peer review according to required format and content as described in Annex 1. The CIE reviewer shall complete the independent peer review addressing each ToR as described in Annex 2.

Other Tasks – Contribution to Summary Report: The 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 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 Reviewer: The following chronological list of tasks shall be completed by The 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 meeting at the Charleston, SC during June 21-25, 2010 and conduct an independent peer review in accordance with the ToRs (**Annex 2**).

3) No later than the July 9, 2010, the 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 David Sampson, CIE Regional Coordinator, via email to david.sampson@oregonstate.edu. The 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.

May 10, 2010	CIE sends reviewer contact information to the COTR, who then sends this to the NMFS Project Contact
June 7, 2010	NMFS Project Contact sends the CIE Reviewer the pre-review documents
June 21-25, 2010	The reviewer participates and conducts an independent peer review during the panel meeting
July 9, 2010	CIE reviewer submit draft CIE independent peer review report to the CIE Lead Coordinator and CIE Regional Coordinator
July 23, 2010	CIE submits CIE independent peer review report to the COTR
July 30, 2010	The COTR distributes the final CIE report to the NMFS Project Contact and regional Center Director

Modifications to the Statement of Work: Requests to modify this SoW must be approved by the Contracting Officer at least 15 working days prior to making any permanent substitutions. The Contracting Officer will notify the COTR within 10 working days after receipt of all required information of the decision on substitutions. 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 reviewer 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 report by the CIE Lead Coordinator, Regional Coordinator, and Steering Committee, the report 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 report) 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 report 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 report in *.PDF format to the COTR. The COTR will distribute the CIE report to the NMFS Project Contact and Center Director.

Support Personnel:

William Michaels, Contracting Officer's Technical Representative (COTR)
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Key Personnel - NMFS Project Contact:

Julie Neer, SEDAR 21 Coordinator
South Atlantic Fishery Management Council,
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Julie.Neer@SAFMC.net Phone: 843-571-4366

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

   d. Reviewer 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 21 Data Workshop (DW)
HMS sandbar, dusky, and blacknose shark assessment

1. Characterize stock structure and develop a unit stock definition. Provide maps of species and stock distribution.
2. Review, discuss and tabulate available life history information (e.g., age, growth, natural mortality, reproductive characteristics); provide appropriate models to describe growth, maturation, and fecundity by age, sex, or length as applicable. Evaluate the adequacy of available life-history information for conducting stock assessments and recommend life history information for use in population modeling.
3. Provide measures of population abundance that are appropriate for stock assessment. Consider and discuss all available and relevant fishery dependent and independent indices. Document all programs evaluated, addressing program objectives, methods, coverage, sampling intensity, and other relevant characteristics. Provide maps of survey coverage. Develop CPUE and index values by appropriate strata (e.g., age, size, area, and fishery); characterize uncertainty. Evaluate the degree to which available indices adequately represent fishery and population conditions. Consider implications of changes in gear, management, fishing effort, etc. in relationship to the different indices. Recommend which indices are considered statistically adequate and biologically plausible for use in assessment modeling.
4. Characterize commercial and recreational catch by gear. Include both landings and discards, in pounds and number by gear type as feasible. Provide estimates of dead discard proportions by fishery and other strata as appropriate or feasible. Evaluate and discuss the adequacy of available data for accurately characterizing fishery removals by species, area, gear type, and fishery sector. Consider implications of changes in gear, management, fishing effort, etc. in reconstructing historic catches. Provide length and age distributions if feasible. To provide context and spatial scale of species distribution, fishery effort, and data coverage, provide maps of fishery effort and harvest, as available.
5. Provide recommendations for future research in areas such as sampling, fishery monitoring, and stock assessment. Include specific guidance on sampling intensity (number of samples including age and length structures) and appropriate strata and coverage.
6. Develop a spreadsheet of assessment model input data that reflects the decisions and recommendations of the Data Workshop. Review and approve the contents of the input spreadsheet.
7. Prepare the Data Workshop report providing complete documentation of workshop actions and decisions (Section II. of the SEDAR assessment report). Provide a list of tasks that were not completed during the meeting week, who is responsible for completing each task, and when each task will be completed.

Annex 3: Tentative Agenda for SEDAR 21 Data Workshop, Charleston, SC during 21-25 June 2010

SEDAR 21. HMS Sandbar, Dusky, and Blacknose Sharks Data Workshop Daily Schedule and Tasks.
The goals of the data workshop are to compile life history information, abundance indices, and catch statistics; evaluate and critique available datasets; provide data for assessment analyses, and draft the data workshop reports. Much of the workshop will be devoted to workgroup sessions where data will be compiled and documented. Plenary sessions to resolve issues will be scheduled as needed based on group progress. Consensus databases should be available at the end of the workshop

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Daily Goals	*Develop group issues*	*Present workgroup issues to Plenary. Data Compilations*	*Finalize data recommendations*	*All data compiled 1st Draft workgroup reports*	*Review workgroup Report sections.*
Morning 8:30 – 11:30		Plenary: Present initial issues and task list (workgroup leaders).	Workgroup Session	Workgroup session	(8:00 – 1:00) 1. Review reports 2. Research recd's 3. Task List Compiled
Afternoon 1:00 – 6:00	1. Introduction 2. Overview & TOR 3. Progress Report: Group leaders 4. Group work session	Workgroup session	Plenary: Presentation and resolution of data issues.	Plenary: Review of documents, TORs, Consensus recommendations	
Evening 8:00 – 10:00	Workgroup Session	Workgroup session	Workgroup session	Workgroup session or continue Plenary	
Milestones	1.Review working papers 2. Develop initial list of issues, decisions, tasks	1. Major issues presented 2.Basic data compiled	1. All data decisions completed. 2. Draft text of plenary decisions	1.Final data compiled 2. Plenary Recd's 3. Workgroup drafts distributed.	1.**Final Group Reports** **2. Complete Datasets**
Homework	Document Review	Begin drafting initial workgroup report sections. Evaluations, analyses	Review Document Sections. Draft decision summary	Review document sections. Review recommendations	Review Reports Review submitted data

Appendix 3: Panel membership

The meeting was convened and chaired by Dr Julie Neer of the South Atlantic Fishery Management Council. Participants comprised scientists from the NMFS South East Fishery Center, scientist from universities and research institutes, fishing industry representatives and NGOs.