Report of the SEDAR 58 Cobia Stock ID Review

By

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Prepared for
Center for Independent Experts
Independent System for Peer Review

Contents

Executive Summary

1. A peer review of the SEDAR 58 Cobia stock identification workshop was conducted in Charleston SC on the 5-7th June 2018. A panel of seven experts reviewed the science and recommendations presented by members of the analytical team.
2. Analyses presented comprised genetic studies, the results of tagging experiments and life history data.
3. Genetics studies suggest at least two populations with a regional separation between the Atlantic and the Gulf Mexico. The area on the east coast of Florida northward to southern Georgia represents a zone of uncertainty where population structure cannot be clearly identified.
4. Tagging studies use data from conventional tags, acoustic tags and pop-up satellite tags. Results from these studies support the genetic study results. Fish tagged in the Atlantic north of Florida are rarely recaptured in the Gulf, while fish tagged in south Florida are not recaptured to the North. Fish tagged on the central east coast of Florida move both north and south.
5. Life history studies did not reveal any population structuring, but there were differences in growth between the Gulf (where fish grow faster) and the Atlantic.
6. The review panel concurred with the main recommendation of the workshop that there were two populations of Cobia with a zone of uncertainty on the east coast of Florida.
7. The workshop recommendation that the assessment should comprise two separate stocks with a boundary at the Florida/Georgia boundary is reasonable and pragmatic given the remit of the group. However, a final decision on the choice of assessment unit needs to take into account other information such as management boundaries, fishery distribution and data available for stock assessment.
8. It is recommended that future research focuses on improving the understanding of population structure in the zone of uncertainty and appropriate methods of stock assessment that can accommodate two spawning populations of Cobia.
9. Stock assessment would benefit from more robust life history data. There may be value in more detailed studies of growth using hierarchical models. More information on size/age at maturity would be beneficial.

Background

Cobia is a widely distributed species throughout the world. It is found in US waters both along the Atlantic and Gulf of Mexico coasts. It is the subject of both recreational and commercial fisheries and is considered of high value, though the total weight caught is small compared with many high volume fisheries.

The SouthEast Data, Assessment, and Review (SEDAR) is the cooperative process by which stock assessment projects are conducted in NMFS' Southeast Region. SEDAR 58 Cobia Stock Identification (ID) Workshop reviewed and evaluated all available and relevant information on Cobia stock structure to develop recommendations for the biological and assessment unit stock structure in advance of the Atlantic and Gulf of Mexico Cobia stock assessments. The review workshop conducted an independent peer review to determine whether the stock structure recommendations from the Stock ID Workshop are reasonable and appropriate to use for the SEDAR 58 Cobia assessment. The Stock ID Process included the jurisdictions of the South Atlantic Fishery Management Council, Mid-Atlantic Fishery Management Council, Gulf of Mexico Fishery Management Council, Atlantic States Marine Fisheries Commission, and the states of Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, Virginia, Pennsylvania, New York, New Jersey, Maryland, Delaware, and New York. The Terms of Reference (TORs) of the peer review are listed in Annex 2 (in Appendix 2).

Individual reviewer's role

Documents relating to the meeting were made available in the four weeks prior to the meeting and these were reviewed as appropriate. A few days before the meeting, the reviewer participated in a conference call to discuss the meeting agenda and any particular concerns of the reviewers. I requested additional information on the Cobia fishery to be briefly presented at the meeting and the request was accommodated. During the meeting the reviewer participated in discussions and discussed aspects of the workshop ID report with the Panel and the analytical team. It was agreed at the end of the meeting that each panelist would send individual draft findings to the Panel chair within a week for compilation into a summary report. Draft comments were sent to the chair within the agreed time frame.

Summary of findings for each TOR

TOR 1. Review the recommendations of the SEDAR 58 Cobia Stock ID workshop.

Recommendations from the stock ID workshop were reviewed by a panel of seven experts at a meeting in North Charleston, SC from the 5-7th June 2018. Presentations covering the main analyses were made by members of the analytical team and the workshop chair. These included an overview of the genetic studies, life history analysis and the results of tagging programs. The results were discussed by the review panel who sought further clarification on a number of issues. This included further information on the analytical methods used and more detailed examination of the tagging data. During the meeting, the results of the scientific analysis and the recommendations of the workshop were discussed in depth.

TOR 2. Determine whether the stock structure recommended by the SEDAR 58 Stock ID Workshop is reasonable and appropriate to use for the SEDAR 58 assessment unit stock.

In making this determination consider whether available scientific data have been taken into account and analyzed properly by the Stock ID Workshop, and whether conclusions based on those data are reasonable given the current fisheries data.

The Review Panel should consider the following in making its conclusions:

(a) Inclusion of data

The range of data considered was substantial and appropriate for the TORs of the workshop. Available data were reviewed in February 2018 in advance of the workshop meeting. Some datasets were excluded mainly because sample sizes were considered too small (e.g., only a few individual fish sampled) or were not relevant to the main issues. The range of data covered population genetics, tagging, and life history characteristics and is listed in the workshop report (S58_CobiaStckIDReport) and supporting working papers. Otolith chemistry, oceanographic data and habitat data mentioned in the workshop ToRs were not included for analysis in order to allow focus on the main issues relating to stock ID and make the task of the workshop manageable.

The purpose of the ID workshop was to propose appropriate units for stock assessment. In this context some review of the data and methods pertaining to stock assessment would be useful since this will constrain what can be implemented in practice, biological factors notwithstanding. In addition, given the very large geographical range of the species there may be important differences in the exploiting fleets which could be relevant to choice of assessment unit. There may be value in considering these questions in when deciding on the optimum assessment units given the biological and fishery structures in existence.

(b) Data analysis

The workshop considered three main areas for analysis. These were population genetics, life history and spatial distribution. Overall, the analyses were relevant and appropriate for the objectives of the workshop.

Genetics

The workshop subgroup focused on two main studies by McDowell (SEDAR58-SID-03) and Darden *et al.* (SEDAR58-SID-04). These analyses are based on microsatellite DNA sampling from sites along the Atlantic and Gulf coasts. The McDowell study is based on a smaller number of samples, but a larger number of loci compared with the Darden *et al*. report. Both analyses used the STRUCTURE analytical package to identify the ancestry of fish across the region. They suggest at least two main population components. These are an Atlantic population ranging from Virginia southward to the east coast of Florida and a second population stretching from the east coast of Florida around the Florida peninsula and westward along the Gulf coast to Mexico. The Darden *et al.* analysis indicates a zone along the east coast in the Florida area where the distinction between the two populations is unclear. This is partly because the number of samples in this region is low, but may be the result of mixing between the populations. Metrics such as F_{st} and AMOVA support similar conclusions from the STRUCTURE analysis.

The Darden *et al.* study suggested up to four spawning units could be distinguished from the STRUCTURE analysis but the largest difference was between the Atlantic and the Gulf. Further work would be required to delineate these additional populations which occur in the Atlantic. The sampling

level in the Gulf was lower but with more intensive sampling it is possible further population substructure might be detected.

Life history

The life history traits considered were length-weight relationships, maximum age, size at age and reproductive biology. There was little evidence of differences between the regions except for growth which is more rapid in the Gulf of Mexico. This is an important difference from a stock assessment perspective but does not necessarily indicate population differentiation. It does, however, indicate that any approach to stock assessment will need to account for growth differences between the Gulf and Atlantic regions.

The analysis of growth data was based around fitting models separately to Gulf and Atlantic data. There may be some advantage in fitting a hierarchical model to the full dataset with random effects in the growth parameters to account for gender, area and season. This might allow strength to be drawn from a larger sample. For example, the gender effect may be common to both areas, so including all the data to estimate this effect may improve the precision of the parameters.

Although the maximum age observed in samples from the two main areas differ, the sample sizes are generally too small to draw any conclusions, the position reached by the workshop. It is probably unwise to use maximum age as an indicator of differences between populations since old fish are rare and are subject to greater errors in age determination making the detection of differences a statistical challenge, especially when samples are few. Furthermore, the regression of maximum age on sample size reported in the ID workshop report is unreliable because the statistical assumption of normality is not satisfied. Hence the conclusion that sample size can explain the difference in observed maximum age is not supported. An alternative would be to try to compare the full age compositions to investigate differences in recruitment patterns which might be possible by considering the reconstructed populations for the Gulf and Atlantic stock assessments conducted as part of SEDAR 28. However, the precision of such estimates will be heavily dependent on adequate age sampling from both the Gulf and the Atlantic regions and this does not appear to be the case at present.

No new biological samples on reproductive biology since SEDAR 28 were available and the workshop was not able to discern differences between the regions. The dependence on samples from commercial fishing meant that smaller fish were not adequately represented and made the determination of age at maturity problematic.

The overall conclusion from the workshop that life history data did not provide information on stock structure is correct.

Spatial distribution and movement

Presence/absence data show that the species is distributed along the US coast from Mexico along the Gulf coast to the Atlantic and northward to Virginia but, unsurprisingly, does not offer any clear distinction between populations or stocks.

A variety of tagging data was reviewed which generally is in agreement with the population structure emerging from the genetics studies. Tagging data consisted of conventional tags, acoustic tags, and pop-up satellite tags (PSAT).

Analyses of conventional tags suggests that fish tagged in the Gulf are not recaptured north of the central east coast of Florida (SEDAR58-SID-04), while fish tagged in the northern section of the Atlantic coast are rarely recaptured in the Gulf. However, fish tagged on the east coast of Florida were recaptured both to the north in the Atlantic and west into the Gulf. This is consistent with the genetic analyses that suggest fish in this area are not clearly identifiable to an Atlantic or Gulf population.

Acoustic tagging results are in agreement with conventional tag analyses (SEDAR58-SID-08). Network analyses indicate some separation between south and central Florida fish from Georgia and South Carolina fish. This is consistent with a perceived population stretching from the Gulf to central east Florida and an Atlantic population from Georgia northward.

The tagging analyses also document seasonal movements along the coast with the PSAT tags indicating that overwintering may occur offshore where fish may find warmer water in the Gulf Stream.

(c) appropriateness of conclusions regarding recommended stock unit(s) and associated spatial structure

Workshop ID recommendations:

Genetics data, suggested two distinct spawning stocks at the regional scale: the Gulf of Mexico (extending up to Fort Pierce, FL) and the Atlantic (VA to Port Royal Sound, SC).

Genetics data suggested a spawning stock transition zone within the range from Savannah, GA through Brevard County, FL (Brevard/Indian River county line).

These two recommendations flow directly from the analyses discussed above and are appropriate. The specifics of the boundary may be open to discussion but nevertheless are indicative of the likely area where any boundary may exist. There is some debate as to the correct interpretation of the "transition zone". This may indeed represent a transition between two genotypes but, given the limited sampling in the area, it may simply reflect an area of uncertainty where we have little understanding of the population structure.

Workshop ID recommendation:

Life history data were generally insufficient to provide information on stock structure of Cobia.

The review panel agreed with this conclusion. With the exception of differences in growth between the Gulf and the Atlantic, the data analyzed did not support any regional dissimilarities. Differences in growth may be attributed to environmental factors such as temperature or diet. While not necessarily indicating separate populations, the growth differences are important factors to account for in assessment modelling since they will influence estimates of stock reference points.

Workshop ID recommendation: ***Biological stock structure***

The SEDAR 58 Cobia Stock ID Workshop Panel recommended that Cobia be considered two distinct biological stocks at the regional scale: the Gulf of Mexico stock (south of Brevard/Indian River FL county line) and the Atlantic stock (from north of Glynn/Camden county GA line).

The Panel agreed with the workshop recommendation. The broad agreement between the tagging and the genetics analyses in supporting the presence of two regional populations is important because two independent sources reach similar conclusions, which adds confidence in the results.

Workshop ID recommendations:

Spatial tagging data also suggested the existence of two distinct biological stocks at the regional scale: the Gulf of Mexico stock (south of Brevard County, FL) and the Atlantic stock (from north of Brunswick, GA).

Consistent with the conclusions of the Genetics Working Group, spatial tagging data suggested a transition zone between Brevard County, FL and Brunswick, GA

The Panel agreed with this recommendation. Both genetics studies indicated at least two distinct populations corresponding to the Atlantic and the Gulf. While there is likely to be additional genetic structuring within these broad populations, current data are insufficient to identify these with confidence. The tagging analyses also support the two-population recommendation. There remains an area of uncertainty in the area of east Florida northward to southern Georgia where it is unclear how the populations differentiate.

Workshop ID recommendation: Assessment unit structure

The Panel recommended that Cobia be considered two assessment unit stocks: the Gulf of Mexico stock and the Atlantic stock. Data support a separation within a transition zone between Brevard County, FL to Glynn/Camden County, GA. However the data did not identify a specific boundary within this transition zone separating the two biological stocks. The current management boundary at the FL/GA line lies within the transition zone, thus the Panel recommends the use of the FL/GA line as a boundary between the Gulf of Mexico and the Atlantic assessment unit stocks

The panel generally supported this recommendation but with some qualification. The workshop ToR required the group to recommend assessment units and this was appropriately fulfilled in the report. With the data and analyses considered at the workshop, the recommendation is both pragmatic and practical. The final choice of assessment units, however, should take into account a number of other factors such as the availability of data for stock assessment, management applicable in different areas, the characteristics of the fishery in space and time, and available stock assessment methodology. For example, it may be possible to assess the species as a single stock but with two biological populations that overlap in the Florida east coast area. This is a potential area for further research.

Recommendations on Assessment Unit Stock Structure:

Based on the data reviewed by the Stock ID Workshop Panel, changes to the definition of the Atlantic Cobia unit stock were not required

Within the scope of the workshop ID remit this is an appropriate recommendation which has the clear advantages of simplicity and consistency with previous assessments. It is also consistent with the new and updated data reported by the workshop. In the light of comments on the recommendation above, further consideration should be given to the choice of assessment approach when taking into account wider fishery issues and assessment methodology.

Workshop ID recommendation:

However, the extensive additional information provided and analyses conducted during the SEDAR 58 Stock ID Workshop process have substantially improved our understanding of spatial dynamics of Cobia in US waters, and have identified important areas for further research

The panel concurred with this recommendation.

TOR 3. Prepare a report documenting the Review Panel's findings and recommendations regarding the SEDAR 58 assessment unit stock.

Following the meeting each reviewer sent draft findings to the Panel chair for the preparation of a final summary report. The draft report was reviewed and finalized.

Conclusions and recommendations

The Cobia Stock ID workshop has performed a thorough analysis of the data available that relate to stock identification. It can be considered the best scientific information available. The agreement between the genetic and tagging studies gives a high degree of confidence that two regional populations, Atlantic and Gulf of Mexico, exist. While further population sub-structure may exist, current data are unable to identify this with confidence. There remains an area from the central east coast of Florida to southern Georgia where it is unclear how to assign fish to the two regional populations. This may represent an area of uncertainty or a transition zone where the two populations mix. Further work is required to understand the implication of this zone of uncertainty to the assessment and management of the stock.

The life history data do not in general show any evidence that would support separate spawning populations. This is not surprising as life history traits are plastic and may be heavily influenced by environmental factors. Nevertheless, observed differences in traits such as growth, age at maturity and natural mortality may be very important in stock assessment and may require stock boundaries to be chosen to account for these differences. Apart from growth, the workshop results did not indicate any change of stock boundary based on life history traits, but the absence of information on age at maturity is a concern as this may have a profound effect on biological reference points.

The workshop was asked to recommend stock assessment units and suggested two stocks with a boundary at the Florida/Georgia boundary. This is appropriate and pragmatic in the light of the available

data. In the opinion of this reviewer, however, the final choice of assessment unit should only be made after due consideration of the relevant management regimes operating in the areas concerned and the fisheries that exploit the species in space and time. When all the relevant information is considered, it should then be possible to make a fully informed decision as how best to develop a stock assessment approach that takes into account the population biology and management requirements.

There are perhaps three important areas for further work.

(a) the area of uncertainty on the east coast of Florida where the population mix or overlap should be investigated to determine how best to model the population dynamics. I would recommend a multifaceted study that brought together genetics, tagging and biological studies with the common objective of identifying the characteristics of the population in the area.
(b) The most effective assessment approach that models the population dynamics as realistically as possible accounting for the known level of differentiation should be investigated. It may not be necessary to split the stock into two separate stocks, but to model the whole stock as two components with differing fisheries and biology. Observed catches from the zone of uncertainty could be treated as a mixture of both components to avoid assigning them to an individual stock.
(c) While not directly related to stock identification, the life history data are important for assessment purposes. The analyses revealed in the workshop report highlight weaknesses in the maturity information and that more detailed modelling of growth may be beneficial. Where size structured assessment models are used (such as Stock Synthesis) good estimates of growth may be critical to the assessment. I would recommend that further research is conducted on growth using hierarchical models for growth and that efforts are made to improve estimates of maturity at age or length.

NMFS review process

The SEDAR58 was an effective way to review stock identity of Cobia. The review workshop was well organized with material available in advance of the meeting which facilitated productive discussions at the meeting. The meeting facilities were good and the work was conducted in a positive and fruitful manner. The analytical team provided excellent co-operation. The review panel comprised experts with a wide range of relevant expertise that covered the main disciplines involved in the analysis. No major disagreements emerged during the meeting.

My main comment on the review is to question whether the scale of the review was somewhat elaborate in relation to the scientific issues. There was very little public comment which appeared to indicate that the issues were not of great concern. Given the relatively uncontroversial nature of the science it may have been possible to mount a simpler review, but perhaps that is a judgment made with the benefit of hindsight.

Appendix 1. Bibiogaphy

SEDAR 58

Atlantic Cobia

Workshop Document List

Document #	Title	Authors
Documents Prepared for the Stock ID Workshop (StID)		
SEDAR58-SID-01	Predicting the distribution of cobia, *Rachycentron canadum*, seasonally, for mid-century, and for the end-of-century	Crear et al. 2018
SEDAR58-SID-02	Use of Pop-Up Satellite Archival Tags (PSATs) to Investigate the Movements, Habitat Utilization, and Post-Release Survival of Cobia (*Rachycentron canadum*) that Summer in Virginia Waters	Jensen & Graves 2018
SEDAR58-SID-03	Summary results of a genetic-based investigation of cobia (*Rachycentron canadum*)	McDowell et al. 2018
SEDAR58-SID-04	Population Genetic Analysis of Cobia within U.S. Coastal Waters	Darden et al. 2018
SEDAR58-SID-05	Evaluation of cobia movements using tag-recapture data from the Gulf of Mexico and South Atlantic coast of the United States	Perkinson et al. 2018
SEDAR58-SID-06	Summary Report of the North Carolina Division of Marine Fisheries Cobia (*Rachycentron canadum*) Acoustic Tagging	Poland 2018
SEDAR58-SID-07	A brief summary of scientifically collected distribution data for cobia (*Rachycentron canadum*) in US waters of the Atlantic and Gulf of Mexico	Klibansky 2018
SEDAR58-SID-08	Cobia Telemetry Working Paper (revised 4/10/2018)	Young et al. 2018
SEDAR58-SID-09	Distribution and abundance of cobia (*Rachycentron canadum*) larvae captured in ichthyoplankton samples during National Marine Fisheries Service and Southeast Area Monitoring and Assessment Program fishery-independent resource surveys	Hanisko et al. 2018
SEDAR58-SID-10	Spatial and Temporal Distribution of Cobia, Southeast US and Gulf of Mexico	Wrege 2018
SEDAR58-SID-11	VIMS Cobia Tagging Program	Weng et al. 2018

Documents Prepared for the Data Workshop (DW)		
Document #	Title	Authors
SEDAR58-DW01		
Documents Prepared for the Assessment Workshop		
SEDAR58-AW01		
Documents Prepared for the Review Workshop		
SEDAR58-RW01		
Final Assessment Reports		
SEDAR58-SAR1	Assessment of Atlantic Cobia	To be prepared by SEDAR 58
Reference Documents		
SEDAR58-RD01	SEDAR 28 South Atlantic Cobia Stock Assessment Report	SEDAR 28
SEDAR58-RD02	SEDAR 28 Gulf of Mexico Cobia Stock Assessment Report	SEDAR 28
SEDAR58-RD03	List of documents and working papers for SEDAR 28 (South Atlantic Cobia and Spanish Mackeral) – all documents available on the SEDAR website.	SEDAR 28
SEDAR58-RD04	Managing A Marine Stock Portfolio: Stock Identification, Structure, and Management of 25 Fishery Species along the Atlantic Coast of the United States	McBride 2014
SEDAR58-RD05	Chapter 22: Interdisciplinary Evaluation of Spatial Population Structure for Definition of Fishery Management Units (excerpt from Stock Identification Methods – Second Edition)	Cadrin et al. 2014

SEDAR58-RD06	Mitochondrial DNA Analysis of Cobia *Rachycentron canadum* Population Structure Uisng Restriction Fragment Length Polymorphisms and Cytochrome B Sequence Variation	Hrincevich 1993
SEDAR58-RD07	Population Genetic Comparisons among Cobia from the Northern Gulf of Mexico, U.S. Western	Gold et al. 2013

	Atlantic, and Southeast Asia	
SEDAR58-RD08	Population genetics of Cobia (*Rachycentron canadum*): implications for fishery management along the coast of the southeastern United States	Darden et al. 2014
SEDAR58-RD09	Growth, mortality, and movement of cobia (*Rachycentron canadum*)	Dippold et al. 2017
SEDAR58-RD10	Assessment of cobia, *Rachycentron canadum*, in the waters of the U.S. Gulf of Mexico	Williams, 2001
SEDAR58-RD11	Life history of Cobia, *Rachycentron canadum* (Osteichthyes: Rachycentridae), in North Carolina waters	Smith 1995
SEDAR58-RD12	A review of age, growth, and reproduction of cobia *Rachycentron canadum*, from US water of the Gulf of Mexico and Atlantic ocean	Franks and BrownPeterson, 2002
SEDAR58-RD13	An assessment of cobia in Southeast US waters	Thompson 1995
SEDAR58-RD14	Reproductive biology of cobia, *Rachycentron canadum*, from coastal waters of the southern United States	Brown-Peterson et al. 2001
SEDAR58-RD15	Age and growth of cobia, *Rachycentron canadum*, from the northeastern Gulf of Mexico	Franks et al. 1999
SEDAR58-RD16	Synopsis of biological data on the cobia *Rachycentron canadum* (Pisces: Rachycentridae)	Shaffer and Nakamura 1989
SEDAR58-RD17	Age, growth, and reproductive biology of greater amberjack and cobia from Louisiana waters	Thompson et al. 1991
SEDAR58-RD18	Cobia (*Rachycentron canadum*) stock assessment study in the Gulf of Mexico and in the South Atlantic	Burns et al. 1998
SEDAR58-RD19	Gonadal maturation in the cobia, *Rachycentron canadum*, from the northcentral Gulf of Mexico	Lotz et al. 1996
SEDAR58-RD20	Length-weight relationships, location and depth distributions for select Gulf of Mexico reef fish species	Pulver & Whatley 2016
SEDAR58-RD21	Inshore spawning of cobia (*Rachycentron canadum)* in South Carolina	Lefebvre & Denson 2012

SEDAR58-RD22	Determining the stock boundary between South Atlantic and Gulf of Mexico managed stocks of Cobia, *Rachycentron canadum*, through the use of telemetry and population genetics	Perkinson et al. 2018
SEDAR58-RD23	SAFMC Mackerel Cobia Advisory Panel and Cobia Sub-Panel Cobia Fishery Performance Report April 2017	SAFMC Mackerel Cobia AP & Cobia Sub-Panel 2017
SEDAR58-RD24	Spawning of the Cobia, *Rachycentron canadum*, in	Joseph et al. 1964
	the Chesapeake Bay Area, with Observations of Junevile Specimens	

Appendix 2: Statement of Work

Performance Work Statement (PWS)

National Oceanic and Atmospheric Administration (NOAA)

National Marine Fisheries Service (NMFS)

Center for Independent Experts (CIE) Program

External Independent Peer Review

SEDAR 58 Cobia Stock ID Review

Background

The National Marine Fisheries Service (NMFS) is mandated by the Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, and Marine Mammal Protection Act to conserve, protect, and manage our nation's marine living resources based upon the best scientific information available (BSIA). NMFS science products, including scientific advice, are often controversial and may require timely scientific peer reviews that are strictly independent of all outside influences. A formal external process for independent expert reviews of the agency's scientific products and programs ensures their credibility. Therefore, external scientific peer reviews have been and continue to be essential to strengthening scientific quality assurance for fishery conservation and management actions.

Scientific peer review is defined as the organized review process where one or more qualified experts review scientific information to ensure quality and credibility. These expert(s) must conduct their peer review impartially, objectively, and without conflicts of interest. Each reviewer must also be independent from the development of the science, without influence from any position that the agency or constituent groups may have. Furthermore, the Office of Management and Budget (OMB), authorized by the Information Quality Act, requires all federal agencies to conduct peer reviews of highly influential and controversial science before dissemination, and that peer reviewers must be deemed qualified based on the OMB Peer Review Bulletin standards[1]. Further information on the Center for Independent Experts (CIE) program may be obtained from www.ciereviews.org.

[1] http://www.cio.noaa.gov/services_programs/pdfs/OMB_Peer_Review_Bulletin_m05-03.pdf

Scope

The **SouthEast Data, Assessment, and Review (SEDAR)** is the cooperative process by which stock assessment projects are conducted in NMFS' Southeast Region. SEDAR was initiated to improve planning and coordination of stock assessment activities and to improve the quality and reliability of assessments. The SEDAR 58 Cobia Stock ID Workshop will review and evaluate all available and relevant information on Cobia stock structure to develop recommendations for the biological and assessment unit stock structure in advance of the Atlantic and Gulf of Mexico Cobia stock assessments. The review workshop will provide an independent peer review and determine whether the stock structure recommendations from the Stock ID Workshop are reasonable and appropriate to use for the SEDAR 58 Cobia assessment. In making this determination, the reviewers would be asked to consider whether available scientific data have been taken into account and analyzed properly by the Stock ID Workshop, and whether conclusions based on those data are reasonable given the current fisheries data – considering inclusion of data, data analysis, and appropriateness of conclusions regarding recommended stock unit(s) and associated spatial structure. The Stock ID Process will include the jurisdictions of the South Atlantic Fishery Management Council, Mid-Atlantic Fishery Management Council, Gulf of Mexico Fishery Management Council, Atlantic States Marine Fisheries Commission, and the states of Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, Virginia, Pennsylvania, New York, New Jersey, Maryland, Delaware, and New York. . The specified format and contents of the individual peer review reports are found in **Annex 1**. The Terms of Reference (TORs) of the peer review are listed in **Annex 2**. Lastly, the tentative agenda of the panel review meeting is attached in **Annex 3**.

Requirements

NMFS requires three (3) reviewers to conduct an impartial and independent peer review in accordance with the PWS, OMB guidelines, and the TORs below. The reviewers shall have a working knowledge in the application of fisheries stock identification and stock structure, fisheries stock assessment processes and results, fisheries science, and marine biology sufficient to complete the primary task of providing peer-review advice in compliance with the workshop Terms of Reference. Additionally, it will be helpful if the reviewers have a working knowledge of genetics and tagging (tag/recapture, acoustic telemetry, satellite tagging, etc.) data and analyses.

Tasks for Reviewers

1) Review the following background materials and reports prior to the review meeting:

SEDAR 58 Stock ID Workshop Report, Working Papers, and Reference Documents

- The SEDAR 58 Cobia Stock ID Workshop Report, working papers and reference documents will be available on the SEDAR website at the link below http://sedarweb.org/sedar-58-stock-id-process

2) Attend and participate in the panel review meeting. The meeting will consist of presentations by representatives from the Stock ID Workshop (to include NOAA, state agency, and university scientists) and others to facilitate the review, to answer any questions from the reviewers, and to provide any additional information required by the reviewers.

3) After the review meeting, reviewers shall conduct an independent peer review report in accordance with the requirements specified in this PWS, OMB guidelines, and TORs, in adherence with the required formatting and content guidelines; reviewers are not required to reach a consensus.

4) Each reviewer should assist the Chair of the meeting with contributions to the summary report.

5) Deliver their reports to the Government according to the specified milestones dates.

Foreign National Security Clearance

When 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 reviewers who are non-US citizens. For this reason, the 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/ and http://deemedexports.noaa.gov/compliance_access_control_procedures/noaa-foreign-national-registration- system.html. The contractor is required to use all appropriate methods to safeguard Personally Identifiable Information (PII).

Place of Performance

The place of performance shall be at the contractor's facilities, and in Charleston, SC.

Period of Performance

The period of performance shall be from the time of award through August 2018. The CIE reviewers' duties shall not exceed 14 days to complete all required tasks.

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

Within two weeks of award	Contractor selects and confirms reviewers
Approximately 2 weeks later	Contractor provides the pre-review documents to the reviewers
June 5-7, 2018	Panel review meeting
Approximately 3 weeks later	Contractor receives draft reports
Within 2 of receiving draft reports	Contractor submits final reports to the Government

Applicable Performance Standards

The acceptance of the contract deliverables shall be based on three performance standards:

(1) The reports shall be completed in accordance with the required formatting and content; (2) The reports shall address each TOR as specified; and (3) The reports shall be delivered as specified in the schedule of milestones and deliverables.

Travel

All travel expenses shall be reimbursable in accordance with Federal Travel Regulations (http://www.gsa.gov/portal/content/104790). International travel is authorized for this contract. Travel is not to exceed $9,700.

Restricted or Limited Use of Data

The contractors may be required to sign and adhere to a non-disclosure agreement.

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Annex 1: Peer Review Report Requirements

1. The report must 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 report must contain a background section, description of the individual reviewers' roles 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 must describe in their own words the review activities completed during the panel review meeting, including 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, but especially where there were divergent views.

   c. Reviewers should elaborate on any points raised in the summary report that they believe 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 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 report shall represent the peer review of each TOR, and shall not simply repeat the contents of the summary report.

3. The report shall include the following appendices:

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

Annex 2: Terms of Reference for the Peer Review

SEDAR 58 Cobia Stock ID Review

Cobia Stock ID Review Workshop

1) Review the recommendations of the SEDAR 58 Cobia Stock ID workshop.

2) Determine whether the stock structure recommended by the SEDAR 58 Stock ID Workshop is reasonable and appropriate to use for the SEDAR 58 assessment unit stock. In making this determination consider whether available scientific data have been taken into account and analyzed properly by the Stock ID Workshop, and whether conclusions based on those data are reasonable given the current fisheries data. The Review Panel should consider the following in making its conclusions: 1) inclusion of data, 2) data analysis, and 3) appropriateness of conclusions regarding recommended stock unit(s) and associated spatial structure.

3) Prepare a report documenting the Review Panel's findings and recommendations regarding the SEDAR 58 assessment unit stock.

Annex 3: Tentative Agenda - *SEDAR 58 Cobia Stock ID Review*

Charleston, SC
June 5-7, 2018

Tuesday

1:30 p.m.	**Convene**	
1:30 – 2:30 p.m.	**Introductions and Opening Remarks**	**Coordinator /**
	- Agenda Review, TOR, Task Assignments	**Chair**
2:30 p.m. – 3:45 p.m.	**Cobia Stock ID Presentations**	**Stock ID**
	-Representatives will present recommendations and findings from the Stock ID Workshop, including summaries of the available data sources and analyses	**Workshop Reps**
3:45 p.m. – 4:00 p.m.	**Break**	
4:00 p.m. – 5:30 p.m.	**Continue Cobia Stock ID Presentations**	**Stock ID**
	- *Representatives will continue presentations*	**Workshop Reps**
5:30 p.m. – 6:00 p.m.	**Public Comment**	

***Tuesday Goals*:** Initial presentations on Stock ID Workshop recommendations and findings complete.

Wednesday

9:00 a.m. – 10:30 a.m.	**Panel Discussion**	**Chair**
	- Evaluate Stock ID recommendations	
	-Identify additional data/analysis requests	
10:30 a.m. – 10:45 a.m.	**Break**	
10:30 a.m. – 12:00 p.m.	**Panel Discussion**	**Chair**
	- Continue deliberations	

12:00 p.m. – 1:30 p.m.	**Lunch Break**	
1:30 p.m. – 3:30 p.m.	**Panel Discussion**	**Chair**
	- Continue deliberations	
	- Review additional data/analyses	
	- Recommendations and comments	
3:30 p.m. – 3:45 p.m.	**Break**	
3:45 p.m. – 5:00 p.m.	**Panel Discussion or Work Session**	**Chair**
	- Continue deliberations	
	- Begin to draft summary report	
5:00 p.m. – 5:30 p.m.	**Public Comment**	

***Wednesday Goals*:** Additional data/analyses requests identified; begin to develop Panel recommendations and comments; Report drafts begun

Thursday

9:00 a.m. – 10:30 a.m.	**Panel Discussion**	**Chair**
	- Review and finalize recommendations and comments	
10:30 a.m. – 10:45 p.m.	**Break**	
10:45 a.m. – 12:30 p.m.	**Panel Discussion or Work Session**	**Chair**
	- Review Summary Reports	
12:30 p.m. – 1:00 p.m.	**Public Comment**	**Chair**
1:00 p.m.	**ADJOURN**	

Thursday Goals: Complete discussions and evaluation of Stock ID; final recommendations and comments available; Draft Summary Report reviewed.

Appendix 3: Meeting Participants

Appointee	Function	Affiliation
REVIEW PANEL		
Luiz Barbieri	Review Panel Chair	GMFMC/SAFMC SSCs
Mary Christman	Reviewer	GMFMC SSC
Churchill Grimes	Reviewer	SAFMC SSC
David Kazyak	Reviewer	USGS
Dave Secor	Reviewer	University of MD
David Stewart	Reviewer	USFWS
Robin Cook	CIE Reviewer	CIE
Gary Melvin	CIE Reviewer	CIE
STOCK ID WORKSHOP REPRESENTATIVES		
Nikoali Klibansky	Stock ID Workshop Chair	SEFSC Beaufort
Tanya Darden	Genetics WG rep	SCDNR
Matt Perkinson	Spatial Dist/Mvmt WG rep	SCDNR
APPOINTED OBSERVERS		
Wes Blow	Fisherman	VA
Bill Gorham	Fishermen	NC
Ira Laks	Fisherman	FL
COUNCIL REPRESENTATIVES		
Anna Beckwith	Council member	SAFMC
COUNCIL AND AGENCY STAFF		
Julia Byrd		SEDAR
John Carmichael		SAFMC/SEDAR
Mike Errigo		SAFMC
Mike Larkin		SERO
Ryan Rindone		GMFMC
Mike Schmidtke		ASMFC