An Independent Peer Review of the Research Stream Stock Assessment of South Atlantic and Gulf of Mexico

Scamp Grouper (*Mycteroperca phenax*) *(SEDAR 68)*

Center for Independent Experts (CIE) Review prepared by:

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Executive Summary

An independent peer review of an assessment of Gulf of Mexico and South Atlantic Scamp (*Mycteroperca phenax*) was held virtually from Aug. 30-31 and Sept. 1-3, 2021. The document presented here was prepared under contract to the Center for Independent Experts, and responds to the Terms of Reference for the review.

The 2021 stock assessment is the first assessment completed for Scamp in the Gulf of Mexico and in the South Atlantic (separate assessments were prepared for each management unit). It was also a first of a new type of assessment, referred to as a Research Stream Assessment. A Research Stream Assessment is meant to integrate all available scientific information on a given species, and provide a base model to be applied during a later Operational Assessment, which is the basis for providing management advice.

Gulf of Mexico and South Atlantic Scamp can be described as a data-moderate species, and an impressive amount of new information (almost 90 documents) were available to support the assessments. The stock assessments used integrated statistical catch at age analyses to best reflect the uncertainty in the input data and analyses.

The review panel identified persistent issues with the assessment for both stocks, including mismatches between the estimated growth parameters and those obtained through examination of hard parts, unexplained stanzas in the length composition data which caused modeling issues, as well as a retrospective pattern that scaled trends in biomass and fishing mortality as years of data were removed. While the Review Panel suggested changes in model configurations, overall trends in biomass and fishing mortality remained generally unchanged. While the revisions to the assessment suggested by the Review Panel resulted in modest improvements to the original base model for both stocks, these major issues require further investigation prior to the operational assessment.

The review was conducted virtually, given the current restrictions on travel and in-person meetings. While virtual meetings are not the preferred mechanism for detailed and efficient review, the process still went smoothly and there was a thorough examination of the work undertaken, as well as the numerous additional analyses requested by the Review Panel. While recognizing there is more work to do (as summarized in the previous paragraph), I can state that with confidence that the assessment results represent the best available science at this time and provide an adequate basis for continued development of the base model in preparation for the operational assessment.

Background

The document presented here contains an independent peer review of a Research Stream Assessment of Scamp (*Mycteroperca phenax*) conducted as part of the SEDAR (Southeast Data, Assessment and Review) process. There were two stocks considered in this process: the South Atlantic (delimited at the north and south respectively by the Mid-Atlantic Fisheries Management Council and the Gulf of Mexico Fisheries Management Council boundaries), and the Gulf of Mexico. This review was prepared following a Center for Independent Experts (CIE) Review conducted (by Webinar) August 30-31 and September 1-3, 2021. It is prepared under contract to the Center for Independent Experts, following the Statement of Work contained in Appendix 2. The documents reviewed may be found in Appendix 1, with the main documents being draft reports of data workshops and stock assessments for Gulf of Mexico and South Atlantic Scamp and for the South Atlantic.

This assessment is unique, in that it is the first produced during a new process called "Research Stream Assessments". The intent of this new process is to provide a comprehensive review of all available scientific information, and develop a foundational model for application in operational assessments, which follow completion of the Research Stream Assessment. It is important to note that the products of the Research Stream Assessment are not used directly for management advice but rather to inform the finalization of the modeling framework in an operational assessment. The results of the operational assessment are used for operational advice. This is also the first assessment completed for Scamp in the Gulf of Mexico and in the South Atlantic.

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

My role in the process was as a CIE-appointed peer reviewer only. There were three independent experts comprising the review panel (Appendix 3). My role in the process was to prepare for the meeting by reading the extensive supplied materials (Appendix 1), attending the scheduled five-day long meeting by webinar, and to write a report summarizing my views according to the Terms of Reference.

During the course of the review, the review panel requested some additional analyses, which are described later in the response to Terms of Reference #3. The authors of the stock assessment provided comprehensive and timely responses to our requests, which were greatly appreciated. The additional analyses are discussed later in this report under the appropriate Term of Reference. I have structured the report to address each Term of Reference. The draft Summary Report is a consensus document, and I do not have any minority views to include here. However, there are some points that I will further emphasize below.

Summary of Findings for each ToR

I prepared initial drafts of the responses to Terms of Reference Numbers 1,2 and parts of 3 of the Panel's consensus report, so my comments in this Detailed Report are similar to those submitted in the consensus report. However, some points are explained further.

Evaluate the data used in the assessment, including discussion of the strengths and weaknesses of data sources and decisions. Consider the following:

- **Are data decisions made by the DW and AP sound and robust?**

The comments provided below apply to both the Gulf and South Atlantic Scamp assessments unless specified otherwise. I considered the data decisions to be generally sound and robust. I appreciated the thorough documentation of data decisions in the report from the Data Workshop and the many supporting Working Papers which made it easy to support the conclusions. Also, it was clear that influential data decisions were carefully considered by the assessment team members.

The decision on the stock structure/management boundaries has been made on largely pragmatic grounds. Similarly, the decision to combine Scamp and Yellowmouth Grouper landings is justifiable in a practical sense, given the difficulty in species identification and relatively small fraction of Scamp landings thought to be Yellowmouth. Decisions on life history parameters such as growth, maturity and natural mortality were supported by appropriate analyses. For landings and CPUE information, decisions on the start of landings time series were made appropriately with respect to the availability of species-specific data and considering the effects of significant management measures (but see some caveats later in this section). Appropriate standardizations were used for fishery-dependent indices of abundance (although incorporating depth or area fished in the CPUE standardizations may be helpful, see later recommendations). Discard information was available for both the commercial and recreational fleets and used appropriately.

One possible exception to my endorsement of the treatment of the input data is the assumption that otolith weight could serve as a satisfactory proxy for otolith ages for those years impacted by a problem with otolith sectioning methodology (2003 - 2012). The team justified this choice by referring to the Campana and Fowler (2012) publication that concluded that otolith weight was a useful proxy. However, that publication was based on the very fast-growing species silver hake (*Merluccius bilinearis*). I question whether otolith weights provide enough discrimination to

reliably identify ages (a slide presented on the last day illustrated the age-length key from BAM, and illustrated how the modes overlapped).

Still on the subject of age and growth, the Review Panel commented on the inclusion of seeming outliers in the age compositions, and asked the leader assessors if it is possible that those observations were included in error (perhaps even incorrect species). The lead assessors agreed to check this potential issue before the operational assessment.

While I did not raise this observation during the Review, it strikes me as surprising that such different start years were chosen for the assessments – 1969 for the South Atlantic and 1985 for the Gulf of Mexico. Given the similar (not identical) management regimes and input data availability for both stocks, it seems curious that start years were not more in agreement. The available length and age data for the South Atlantic are relatively few during the 1980s and earlier, and may be responsible for the difficulties in developing credible selectivities at age during the Review Panel's assessment.

As a comment on available data, I appreciated Fig. 1 in the Gulf assessment report. That figure gave a good overview of the input data used, including year ranges.

- **Are data uncertainties acknowledged, reported, and within normal or expected levels?**

Yes, data uncertainties are acknowledged, reported and within expected levels for both the Gulf and South Atlantic assessments. For the Gulf, annual estimates of recreational landings and discards were fixed at a higher standard error relative to that of the annual commercial landings. For the South Atlantic, both recreational and commercial landings were assigned annual CVs. For the Gulf, the lead analyst noted concerns about ageing error, especially for older fish. Concerns about age data from 2003-2012 led to the use of otolith weight as a proxy for age. Otoliths from that sample set will be reread and the data included in the upcoming operational assessment. There were relatively few length composition samples available in the earliest trimester of the South Atlantic assessment. The impact of aggregating Yellowmouth and Scamp, while thought to be slight, could be investigated further (see Recommendations).

The Panel also noted in some cases, fixing parameter values and external smoothing can mask uncertainty that is inherent in the data, and this can result in some loss of credibility and confidence in the uncertainty estimates in the model results.

Some high CVs were associated with the annual mean weights for the charter/private and headboat sectors. Uncertainty in conversion of recreational landings from number to weight is considered an issue since allocations are

based on weight. Some very high CVs were associated with some derived values (higher than inputs).

- **Is the appropriate model applied properly to the available data?**

Yes, Stock Synthesis (SS) in the Gulf and Beaufort Assessment Model (BAM) in the South Atlantic are standard integrated statistical catch at age models with long histories of successful use in the SE Atlantic. Both models were applied properly for the respective data sets available to the analysts. Key advantages of these models include flexibility in estimation of time-varying selectivity, and accounting for imprecision of input data. These attributes are particularly important when developing a reliable operational assessment for management advice.

The lead assessors followed a practice of not applying bounds to the model inputs in the initial stages. This seemed like a good procedure (particularly for a research track assessment), as it allowed a more complete understanding of model uncertainty.

- **Are input data series sufficient to support the assessment approach?**

The assessment team described this stock as being data moderate compared with other assessments, pointing to the available fishery independent indices, relatively complete life history information and gear-specific information concerning post release mortality. I agree with this characterization, and I conclude that the available data are reliable and sufficient to support the assessment approach. But improvements are needed, as recognized by the assessment team and listed below (and see also Recommendations).

- Improvements needed in age data, including more ages and rereading of some Gulf 2003-2012 otoliths which were determined to have errors in some age assignments.

- Changes in the nationwide recreational survey methods and pooling of a number of other surveys of recreational landings contributes to imprecision in the series.

- Dockside sampling was not always randomly structured and in the past, some sampling was opportunistic. This is thought to have contributed to modeling issues, such as requiring conditional age-at-length data to be replaced with nominal commercial age compositions.

- Knowledge of the proportion of yellowmouth grouper over time was assumed to be small and non-varying over time.

Evaluate and discuss the strengths and weaknesses of the methods used to assess the stock, taking into account the available data. Consider the following:

- **Are methods scientifically sound and robust?**

  Yes. The methods (Stock Synthesis) are well described in the literature (Method and Wetzel 2013, Punt and Maunder 2013, and Zhu et al. 2016), and there have been broadly applied to a variety of fish species. Stock Synthesis is part of the NOAA Fish and Fisheries Toolbox (Fish-Tools https://nmfs-fish-tools.github.io/). Stock Synthesis is also in use with international fisheries organizations, such as ICCAT (International Commission for the Conservation of Atlantic Tunas), in the most recent Shortfin Mako assessment. (https://www.iccat.int/Documents/Meetings/Docs/2019/REPORTS/2019_SMA_SA_ENG.pdf).

  The Beaufort Assessment Model (BAM) is documented in SEDAR 24-RW-01.

- **Are priority modeling issues clearly stated and addressed?**

  Yes, the model appears to be configured properly and is informed with a considerable amount of scientific research, as evidenced by the more than 90 working papers supporting the assessments available on the SEDAR 68 web page. However, in spite of this and numerous additional runs at the Review Panel's request, there are issues with relatively poor fits to the indices, as indicated by time trends in the residuals, as well as persistent retrospective patterns. It is fair to say that important modeling issues have been clearly stated, but they remain to be addressed more completely prior to the operational assessment.

- **Are the methods appropriate for the available data?**

  The methods appear to be generally appropriate for the available data. However, the low numbers of length and age data in the South Atlantic prior to 1992 seemed to cause unresolved issues with that assessment.

- **Are assessment models configured properly and used in a manner consistent with standard practices?**

  Yes, the models for the Gulf and South Atlantic Scamp, based on Stock Synthesis and Beaufort Assessment Model, respectively, were configured properly and in a manner consistent with standard practices.

A point of discussion with the Review Panel was the choice of retention blocks in the South Atlantic. The decisions regarding retention blocks seemed to be "scamp-centric" and reflected management decisions for that species. However, the Panel heard on several occasions that management regulations set for other bottom fish species are often more consequential, as scamp are not generally targeted.

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

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

  The analysts used comprehensive and well-accepted methods to explore model uncertainty including residual plots, likelihood profiles, sensitivity runs, retrospective analysis and jitter analysis. However, the Panel noted that retrospective analyses and the Mohn's Rho test was originally developed for VPA assessments where model convergence occurs early in the time series. Their direct applicability to Stock Synthesis analyses was not always clear.

  In addition, for the Atlantic assessment, an ensemble modelling approach was undertaken. The Review Panel considered this was an important step forward in quantifying uncertainty. It considers imprecision in the catch and abundance indices as well as a number of parameters used in the model including natural mortality and discard survival. This provides a more comprehensive insight into the overall uncertainty in the assessment. The challenge with this approach is to identify a manageable range of models that adequately consider plausible differences in population dynamics and fleet behaviour.

  The panel requested a number of further runs of the assessments to examine specific issues.

  For the Gulf Scamp assessment, additional runs included:

  - Replacing the conditional age-at-length data with nominal commercial age compositions. Conditional age-at-length assumes each age observation is random but the analyst found, through the Trip Interview Program, that at least some samples were not random.

  - Removing the Reef Fish Observer Program index data as this survey appeared to show a conflicting trend compared with all other indices of abundance.

  - Including only Video and Reef Fish Observer Program indices/compositions to illustrate the impact of the RFOP in the absence of fishery dependent

indices. The review panel considered that the video survey was the preferred index, as it was a fishery independent index.

- Create a length plus group bin at 84 or 75 cm to examine the sensitivity of the model to the choice of the maximum length bin since most fish in the samples are below that cut-off point. The Panel commented that such a change generally improves the estimation of the selectivity parameters, especially the descending part of a double normal distribution.

- Set upper bound of Dirichlet at 5 as recommended by the Stock Synthesis manual.

- Fix Dirichlet parameters that are estimated at the upper bound as this has no impact on the model estimation but reduces the number of model parameters estimated (i.e. improves model parsimony).

Overall, the results of the sensitivity runs presented in the Assessment Report and the additional runs performed during the meeting suggested that the overall qualitative trend in the estimated biomass and fishing mortality were robust to these changes in model formulation. The various sensitivity configurations did, however, impact the scale of the biomass and the rate of biomass decline in recent years. Removal of the Reef Fish Observer Program survey, for example, suggests a greater decline in biomass as this survey, in contrast to all the others, has an increasing trend in recent years.

The jitter analysis for the base run in the Assessment Report showed that the objective function has a poorly defined minimum with a large number of runs failing to converge but no run having a smaller log likelihood than the base run. Estimated biomass and fishing mortality remained similar across jitter of runs that converged, although, a number of the model parameters relating to selectivity differed. This points to some parameters having substantial uncertainty. The Panel noted that while this does not impact the trend in spawning stock biomass and fishing mortality, it may have implications for reference point calculations and forward projections.

The Review Panel final base model for Gulf Scamp included the following changes to the original base model:

- Input recreational landings in numbers and fit to mean weight of landed fish for recreational fleets.
- Increased starting fishing mortality standard error for headboats from 0.01 to 0.05.
- Input commercial age composition instead of conditional age-at-length as these provide a better model fit.
- Estimate an extra standard deviation parameter for each index to allow poorly fit surveys to be downweighted.

- Create the length plus group bin = 84 cm FL to obtain a better fit to the length compositions and improve estimates of selectivity.
- Set upper bound of Dirichlet at 5, and fix Dirichlet parameters that are at upper bound.
- Natural mortality adjustment to account for pre-recruit mortality.
- Estimate inflection point for fishery retention curves to obtain a better model fit.
- Fix steepness at 0.69. This is a weighted mean of the estimate from FishLife and the South Atlantic estimate in the current assessment. It was used as steepness could not be estimated within the model.

For the South Atlantic Scamp assessment, additional runs included:

- Combined dead discards with landings to avoid modelling separate fleets for for the two components of the catch. This change should improve parsimony given that discards account for only a very small fraction of the catch.

- Theoretical works have shown that selectivity in models like the Beaufort Assessment Model (i.e. gear selectivity plus fish availability) are typically dome shaped but the extent of the dome might vary. Thus, selectivity for the recreational and commercial sectors was modelled with a double normal, which does not *a priori* impose any particular shape to the selectivity but is allowed to be determined by the data.

- The two time blocks were removed, as well as increased to six time blocks to investigate the apparently inconsistent selection patterns in each block. Here the later period selection pattern is expected to lie to the right of the early period but the base model estimates the reverse. The underlying issues may be due to an absence of direct of ageing in the earlier years.

- Aging error matrix selectivity included as there is evidence of uncertainty in age determination especially in older fish.

In common with the Gulf assessment, the results of the sensitivity runs presented in the assessment report and the additional runs performed during the meeting suggested that the overall qualitative trend in the estimated biomass and fishing mortality were robust to the changes in the model formulation. However, removal of time blocks resulted in a greater decline in estimated biomass and a much reduced estimate of steepness which the panel felt was unrealistic. While the inclusion of time blocks improved the estimate for steepness, the estimated selectivity for each block was apparently not consistent with the change in the size regulations for which the blocks were designed. However, at least part of this disparity was partially attributed to compliance being based on total length while the model was run with fork lengths.

The assessment is heavily conditioned on the commercial landings data as these are assumed to have very low observation error. Relaxing this assumption has some impact on the model results. However, for the time being, the final base model assumes a low observation error for commercial landings.

The Review Panel final base model for South Atlantic Scamp included the following changes to the original base model:

- Combined dead discards with landings.
- Dome shaped selectivity for recreational and commercial sectors.
- Time blocks were retained in the final model because their removal resulted in unusually low estimates of steepness.

- **Comment on the likely relationship of this variability with possible ecosystem or climate factors and possible mechanisms for encompassing this into management reference points.**

Apart from a comparison of areas of hypoxia associated with red tide events and the spatial distribution of scamp in the Gulf of Mexico, a comprehensive examination of ecosystem or climate related factors on scamp productivity was not undertaken. However, the Panel noted that work is ongoing to describe system dynamics for Gulf and South Atlantic scamp populations. This work should generate plausible hypotheses for incorporation of ecosystem considerations in the assessment process.

A recent climate vulnerability assessment for South Atlantic Scamp has rated the species Very High in Overall Climate Vulnerability, because of climate change threats to its habitat and prey species, and its narrow temperature preferences.

Scamp is an included species in the South Atlantic Region Ecosystem Diet Model for the Ecopath with Ecosim Model of the South Atlantic Region. This model offers promise for inclusion of additional ecosystem parameters in future stock assessments for Scamp.

4. Provide, or comment on, recommendations to improve the assessment.

- **Consider the research recommendations provided by the Data and Assessment workshops in the context of overall improvement to the assessment, and make any additional research recommendations warranted.**

I support the research recommendations identified by the Data and Assessment stages for the Gulf of Mexico and South Atlantic assessment processes.

In particular, the following recommendations are emphasized:

- the recommendations to develop AI, image processing and additional automation for reading and analysis of video, otoliths, gonad sections and other samples that contribute to Scamp stock assessments.

- Continued work on MRIP imputed lengths and weighting factors could be especially important for assessments

I further recommend:

(Short-term, within 6 months)

1. Fleet-specific plots of the spatial distribution of the fisheries in both the Gulf and S. Atlantic could help interpret changes in length and age composition over time, and improve catch rate standardizations. There was testimonial provided by an industry representative about changes in the spatial distribution of fisheries that seems particularly important to follow up on.

2. Should the mapping work described above indicate a change in fleet spatial distribution, appropriate adjustment of fishery-dependent indices of abundance should be pursued.

3. Dockside sampling was not randomly structured and in the past, sampling was opportunistic. Investigate modeling issues that may have occurred as a consequence of this. Given the earlier start date of the assessment, this may be particularly important for the South Atlantic assessment.

4. For the Gulf, investigate apparent differences in the von Bertalanffy model parameters estimated by the model and those provided by the Life History Working Group.

5. Further investigation of size and age composition data in the South Atlantic is desirable. Consider "borrowing" length and age composition samples from the Gulf to address poorly sampled strata in the South Atlantic. This assumes that during the historical period, fishery regulations by fleet may have been comparable between the two management units.

6. Further investigate time blocks in the length frequency data (commercial and recreational fisheries) for the South Atlantic stock. Unexplained patterns remain in the data which cannot readily be accounted for by changes in management. As an example, see the remarkably consistent length frequencies observed in the commercial fishery, highlighted below. Is it possible that those distributions are an artifact of how the available length samples were expanded to reflect the fishery?

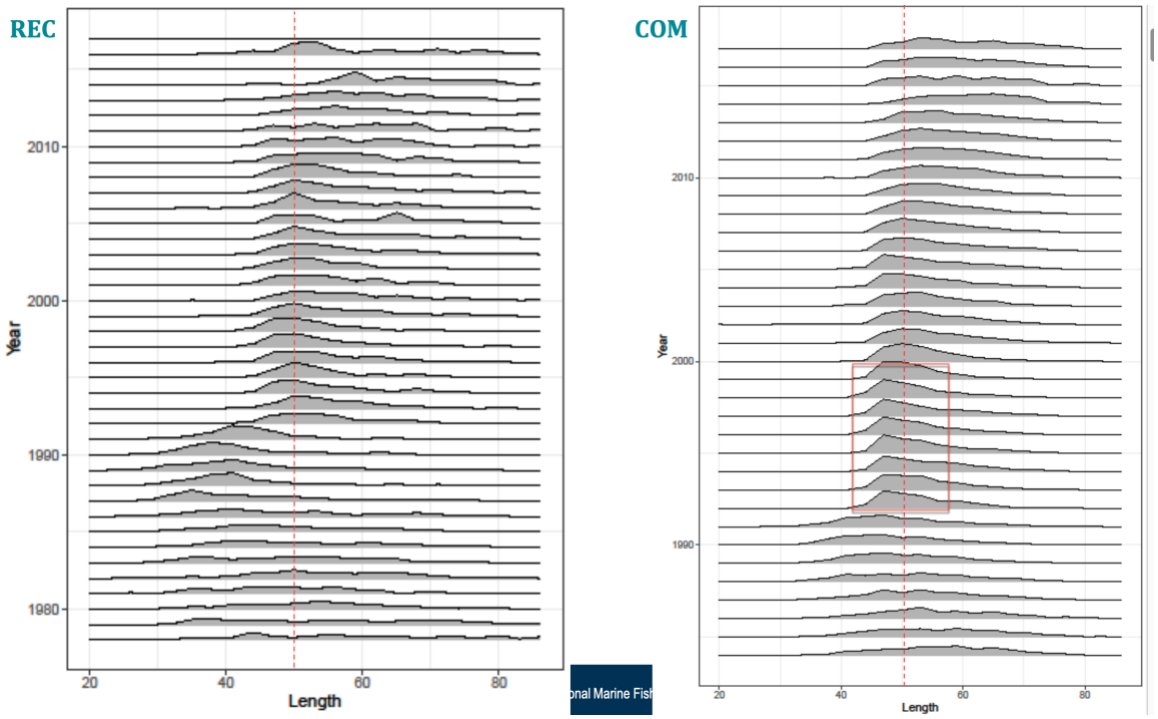

Figure 1: Length composition information for the South Atlantic recreational and commercial fisheries. The years that appear unexpectedly consistent are highlighted with a red rectangle (figure from a presentation given on the final day of the review by the lead assessor).

(Longer-term Recommendations)

1. Conclude investigation of the taxonomic status of Yellowmouth Grouper. If it is deemed to be a separate species, develop a time series of the proportion of Yellowmouth Grouper over time, perhaps by sampling the catch in the fishery independent series (chevron traps).

2. Further investigate change in reporting of recreational landings and how the change contributes to imprecision in the assessment.

3. Consider the possibility that the ROV data reported in Lewis et al. (2020) could provide another fishery-independent abundance index in the Gulf. As shown below, there appears to be indices available for the 2009 to 2017. It would be interesting and important to ascertain if the surveys will be available for more recent years and for how long into the future.

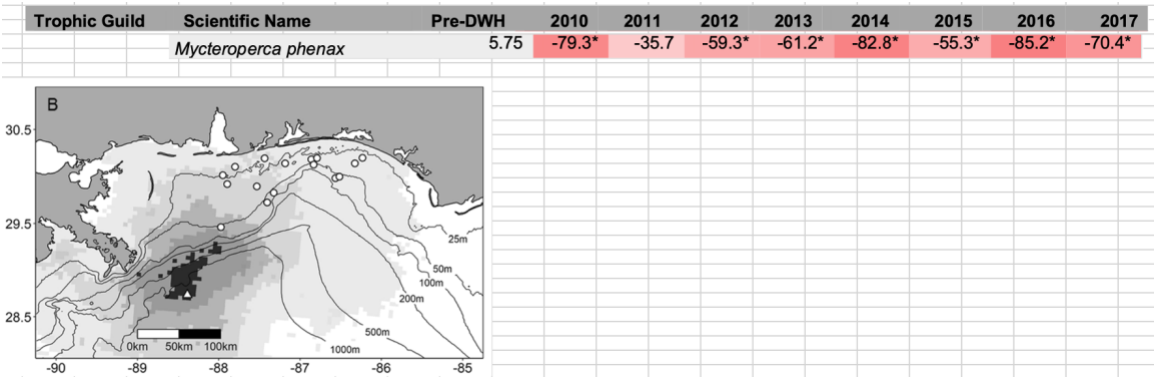

Figure 2: Scamp standardized densities from ROV surveys conducted in the Gulf of Mexico. The color coding compares the pre-oil spill density with subsequent annual values. From Lewis et al. 2020. Changes in Reef Fish Community Structure Following the Deepwater Horizon Oil Spill (SEDAR 68-RD44).

4. More effort should be given to formally evaluate and incorporate ecosystem considerations. For example, some jurisdictions now produce summary documents that provide overviews of the ocean environment, including time series of temperature, pH, measures of upwelling or transport and the like (for an example, see https://waves-vagues.dfo-mpo.gc.ca/Library/40801755.pdf. Given that we will be dealing with changing ocean environments in the near future, it seems to me to be important to explicitly plan to include such information in future research stream assessments.

   A further aspect of a more complete ecosystem approach would include data on scamp prey availability. It would be useful to know if such data are available.

5. I raised the observation that there is a synchrony of abundance signals from the fishery-independent surveys from the Gulf of Mexico and the Southern Atlantic (see below). The pattern of growth is assumed to be same between the two management units. Given these and other similarities (such as the lack of genetic heterogeneity between the two management units), there may be a plausible argument to investigate the feasibility of combining the two management units. Such a combination might help alleviate the problems of undersampling apparent in the early parts of the time series.

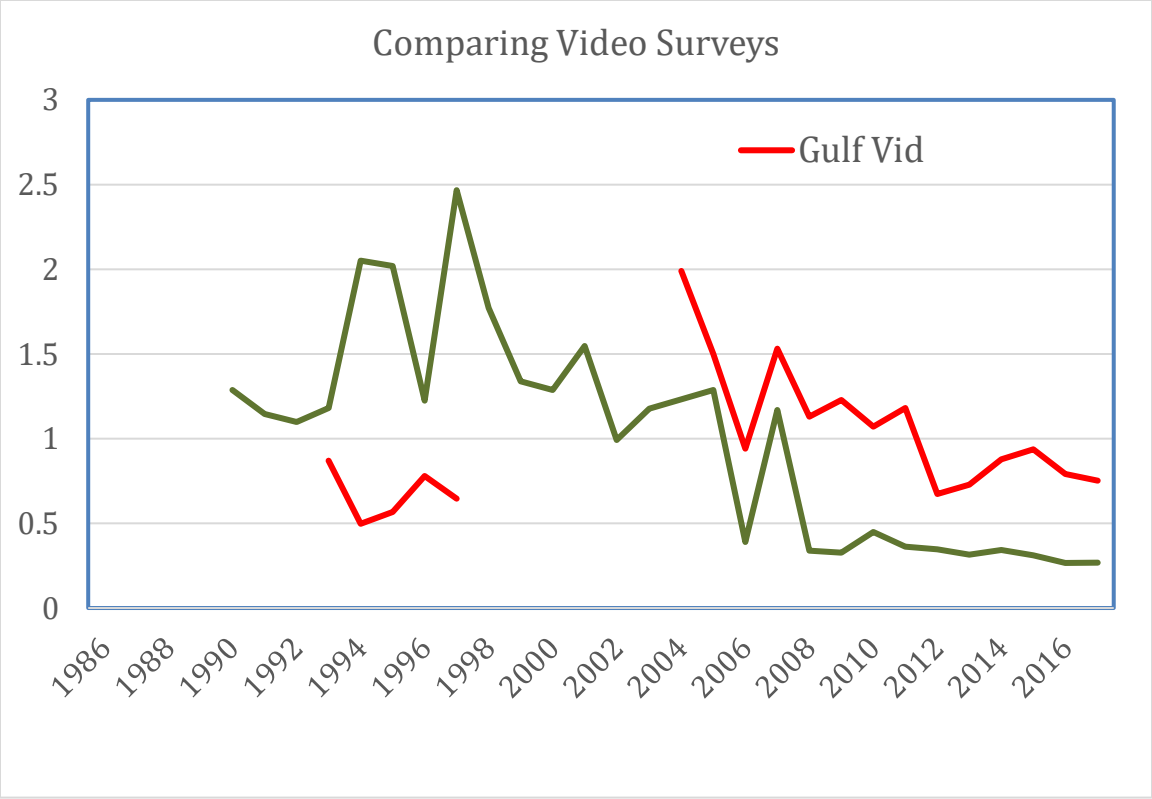

Figure 3; A comparison of fishery-independent indices for Scamp in the Gulf of Mexico and the South Atlantic. Note general agreement from 2005 on. Data provided courtesy of the lead analysts for the assessments.

5. Provide recommendations on possible ways to improve the Research Track Assessment process.

- Recognizing that the Research Track process is new, it would have been helpful if the assessment documents had provided further background on how the Research Track differs from other SEDAR assessments, including the expected frequency of re-evaluations. The assessment reports could be strengthened by the inclusion of introductory sections of the report, describing the biology and the fishery that are important for the assessment, including information on how management of other species may have affected the fishery in question. For example, in the current case, it was not clear until a late stage of the document that scamp are not often targeted in the fisheries.

- Having the involvement of the Chair of the Data Review Working Group could increase the efficiency of this stage of the review.

- As noted earlier, more formal inclusion of ecosystem considerations seems to be absolutely required as part of the new process.

- Industry involvement in this assessment was unfortunately limited. However, when a contribution was given, it was quite important (thinking of the person who

described recent changes in the spatial distribution of the headboat fleet). For future assessments, thought should be given to how to better incorporate industry perspectives.

6. Prepare a Review Workshop Summary Report describing the Panel's evaluation of the Research Track stock assessment and addressing each Term of Reference.

Under the leadership of the Review Panel Chairperson, the Panel completed this step after the virtual workshop was completed, and submitted its summary report as required.

The Review Process

In spite of the review process being virtual, I found the review process to be generally effective. There was adequate time for questions and comprehensive responses from the stock assessment team, including additional analyses as described earlier. The meeting agenda was logically organized. I do think that including the Chair from the Data Workshop could add to the meeting materially. I also noted that compared with some other reviews I have attended, industry involvement was very minimal. However, when an industry member spoke, he made an important contribution (changes in fleet distribution and targeting).

The meeting Chair and the SEDAR coordinator did a good job in keeping the meetings working efficiently and used available tools to ensure that participants had ample notification of the upcoming meetings, break timings and overall requirements from the participants. The lead scientists for both stocks did an excellent job in responding to the requests for further work and summarizing and presenting their work. In particular, I noted that the lead analysts were careful and considerate in fully explaining the rationale and logic of their approaches. While this made for long presentations, it was time well spent.

From the perspective of a CIE reviewer, the same contractual arrangements were made for these research stream assessments compared with more typical assessments required on a more frequent basis. Given the amount of material available for reviewers to read to thoroughly prepare, the CIE should consider more contract time for these special detailed assessments.

In contrast with other science reviews that I have been part of recently, the review workshop asked panelists to turn on their video cameras. I was somewhat concerned with this initially, but audience members commented that it made the discussions easier to follow. Presenters appreciated seeing visual feedback to their work, and the Chair commented that it was easier to identify someone that wished to make a point.

While the virtual platform worked quite well, there is no doubt that in-person meetings are still preferred for these types of reviews. In-person meetings allow more efficient exchange of ideas and ultimately result in a more thorough review.

The SEDAR website for document sharing worked well, and it was convenient to have access to the material before, during and after the meeting.

Conclusions

While the population models for both stocks require some additional work following the recommendations of the Panel and those presented here, they provide an adequate foundation for developing an operational model for Scamp in the South Atlantic and the Gulf of Mexico.

It was a pleasure to be a part of this review, and I thank the CIE and the meeting organizers for the opportunity.

Appendix 1: Bibliography of materials provided for review

Document #	Title	Authors	Date Submitted
Documents Prepared for the Stock ID Process			
SEDAR68-SID-01	Brief Summary of FWRI-FDM Tag Recapture Program	Rachel Germeroth	8 April 2019 Updated: 3 September 2019
SEDAR68-SID-02	Larval dispersal of scamp (*Mycteroperca phenax*) in the waters off the southeastern United States: Connectivity within and between the Gulf of Mexico and Atlantic Ocean	J. R. Brothers, M. Karnauskas, C.B. Paris, and K.W. Shertzer	28 September 2019
SEDAR68-SID-03	Preliminary Genetic Stock Assessment of Scamp (Mycteroperca phenax) in Florida Waters	Elizabeth Wallace	26 July 2019 Updated: 20 September 2019
SEDAR68-SID-04	Population Genetic Analyses of Scamp	Darden, T. and M. Walker	26 July 2019 Updated: 22 August 2019
SEDAR68-SID-05	Gulf of Mexico and Atlantic Scamp Stock ID Process Final Report	Stock ID Panel	31 March 2020
Documents Prepared for the Data Workshop			
SEDAR68-DW-01	Standardized video counts of Southeast U.S. Atlantic scamp and yellowmouth grouper (*Mycteroperca phenax* and *Mycteroperca interstitialis*) from the Southeast Reef Fish Survey	Rob Cheshire and Nathan Bacheler	7 February 2020
SEDAR68-DW-02	Standardized catch rates of scamp and yellowmouth grouper (*Mycteroperca phenax* and *Myteroperca interstitialis*) in the southeast U.S. from headboat logbook data	Sustainable Fisheries Branch	4 March 2020
SEDAR68-DW-03	Standardized catch rates of scamp and yellowmouth grouper (*Mycteroperca phenax* and *Myteroperca interstitialis*) in the southeast U.S. from commercial logbook data	Sustainable Fisheries Branch	2 March 2020 Updated: 9 March 2020; 13 April 2020

SEDAR68-DW-04	Scamp/Yellowmouth Grouper Fishery-Independent Indices of Abundance in US South Atlantic Waters Based on a Chevron Video Trap Survey and a Short Bottom Longline Survey	Walter J. Bubley, Dawn Glasgow, and Tracey I. Smart	20 February 2020

SEDAR68-DW-05	Reproductive Parameters for South Atlantic Scamp and Yellowmouth Grouper in Support of the SEDAR 68 Research Track Assessment	David M. Wyanski, Dawn M. Glasgow, Keilin R. GamboaSalazar, and Wally J. Bubley	4 March 2020 Updated: 31 October 2020
SEDAR68-DW-06	Fisheries-independent data for Scamp (*Mycteroperca phenax*) from reef-fish visual surveys in the Florida Keys and Dry Tortugas, 1999-2018	Jessica Keller, Jennifer Herbig, and Alejandro Acosta	19 February 2020
SEDAR68-DW-07	Indices of abundance for Scamp (*Mycteroperca phenax*) using combined data from three independent video surveys	Kevin A. Thompson, Theodore S. Switzer, Mary C. Christman, Sean F. Keenan, Christopher Gardner, Katherine E. Overly, Matt Campbell	19 February 2020 Updated: 21 October 2020
SEDAR68-DW-08	Recreational Survey data for Scamp and Yellowmouth Grouper in the South Atlantic	Vivian M. Matter and Matthew A. Nuttall	2 March 2020 Updated: 11 March 2020 Updated: 25 August 2020 Updated: 27 October 2020
SEDAR68-DW-09	Recreational Survey data for Scamp and Yellowmouth Grouper in the Gulf of Mexico	Vivian M. Matter and Matthew A. Nuttall	2 March 2020 Updated: 11 March 2020 Updated: 25 August 2020 Updated: 27 October 2020
SEDAR68-DW-10	SEFSC computation of variance estimates for custom data aggregations from the Marine Recreational Information Program	Kyle Dettloff, Vivian M. Matter, and Matthew Nuttall	11 March 2020

SEDAR68-DW-11	Estimates of Historic Recreational Landings of Scamp and Yellowmouth Grouper in the South Atlantic Using the FHWAR Census Method	Ken Brennan	25 February 2020 Updated: 29 May 2020
SEDAR68-DW-12	Estimates of Historic Recreational Landings of Scamp and Yellowmouth Grouper in the Gulf of Mexico Using the FHWAR Census Method	Ken Brennan	25 February 2020 Updated: 29 May 2020
SEDAR68-DW-13	Marine Recreational Information Program Metadata for the Atlantic, Gulf of Mexico, and Caribbean regions	Vivian M. Matter and Matthew A. Nuttall	2 March 2020

SEDAR68-DW-14	SEAMAP Reef Fish Video Survey: Relative Indices of Abundance of Scamp	Matthew D. Campbell, Kevin R. Rademacher, Paul Felts, Brandi Noble, Joseph Salisbury, and John Moser	20 February 2020
SEDAR68-DW-15	Scamp (*Mycteroperca phenax*) age comparisons between aging labs in the Gulf of Mexico and South Atlantic	Andrew D. Ostrowski, Jennifer C. Potts, and Eric Fitzpatrick	31 March 2020
SEDAR68-DW-16	Commercial Discard Length Composition for South Atlantic Scamp and Yellowmouth Grouper	Sarina F. Atkinson	5 March 2020 Updated: 27 August 2020
SEDAR68-DW-17	Commercial Discard Length Composition for Gulf of Mexico Scamp and Yellowmouth Grouper	Sarina F. Atkinson	5 March 2020 Updated: 27 August 2020
SEDAR68-DW-18	Standardized Catch Rate Indices for Scamp (*Mycteroperca phenax*) and Yellowmouth Grouper (*Mycteroperca interstitialis*) during 1986-2017 by the U.S. Gulf of Mexico Headboat Recreational Fishery	Gulf and Caribbean Branch	2 March 2020 Updated: 9 June 2020 Updated: 10 December 2020
SEDAR68-DW-19	Scamp grouper reproduction on the West Florida Shelf	Susan LowerreBarbieri, Hayden Menendez, Ted Switzer, and Claudia Friess	4 March 2020 Updated: 2 April 2020
SEDAR68-DW-20	Summary of preliminary age, length, and reproduction data for U.S. Gulf of Mexico scamp, *Mycteroperca phenax*, submitted for SEDAR68	Veronica Beech, Laura Thornton, Beverly Barnett	3 March 2020

SEDAR68-DW-21	Summary of preliminary age and length data for U.S. Gulf of Mexico yellowmouth grouper, *Mycteroperca interstialis*, submitted for SEDAR68	Laura Thornton, Veronica Beech, Beverly Barnett	3 March 2020
SEDAR68-DW-22	Preliminary Non-Technical Fishery Profile and Limited Data Summary for Scamp, Mycteroperca phenax with Focus on the West Florida Shelf: Application of Electronic Monitoring on Commercial Snapper Grouper Bottom Longline Vessels	Carole L. Neidig, Daniel Roberts, Max Lee, Ryan Schloesser	12 March 2020
SEDAR68-DW-23	Scamp Length Frequency Distributions from At-Sea Headboat Surveys in the South Atlantic, 2005 to 2017	Dominique Lazarre, Chris Wilson, Kelly Fitzpatrick	1 April 2020
SEDAR68-DW-24	A Summary of Observer Data from the Size Distribution and Release Condition of Scamp Discards from Recreational Fishery Surveys in the Eastern Gulf of Mexico	Dominique Lazarre	1 April 2020
SEDAR68-DW-25	Summary of the SAFMC Scamp Release Citizen Science Pilot Project for SEDAR 68	Julia Byrd	16 April 2020 Updated: 26 August 2020
SEDAR68-DW-26	Voluntary reports of Scamp caught by private recreational anglers in MyFishCount for SEDAR 68	Chip Collier	7 April 2020
SEDAR68-DW-27	Assigning fates in telemetry studies using hidden Markov models: an application to deepwater groupers released with descender devices	Brendan J. Runde, Theo Michelot, Nathan M. Bacheler, Kyle W. Shertzer, and Jeffrey A. Buckel	27 February 2020
SEDAR68-DW-28	Scamp grouper reproduction in the Gulf of Mexico	Susan Lowerre-Barbieri, Veronica Beech, and Claudia Friess	22 May 2020 Updated: 2 September 2020
SEDAR68-DW-29	Standardized Catch Rate Indices for Scamp (*Mycteroperca phenax*) and Yellowmouth Grouper (*Mycteroperca interstitialis*) during 1993-2017 by the U.S. Gulf of Mexico Vertical Line and Longline Fisheries	Gulf and Caribbean Branch, SFD	11 September 2020
SEDAR68-DW-30	CPUE Expansion Estimation for Commercial Discards of Gulf of Mexico Scamp & Yellowmouth Grouper	Steven G. Smith, Kevin J. McCarthy, Stephanie Martinez	23 September 2020

SEDAR68-DW-31	SEFSC Computation of Uncertainty for Southeast Regional Headboat Survey and Total Recreational Landings Estimates, with Applications to SEDAR 68 Scamp and Yellowmouth Grouper	Matthew A Nuttall, Kyle Dettloff, Kelly E Fitzpatrick, Kenneth Brennan, and Vivian M Matter	27 October 2020
SEDAR68-DW-32	Discards of scamp (*Rhomboplites aurorubens*) for the headboat fishery in the US South Atlantic	Fisheries Ecosystems Branch, National Marine Fisheries Service, Southeast Fisheries Science Center, Beaufort, NC	30 October 2020
SEDAR68-DW-33	Discards of scamp (*Mycteroperca phenax*) for the headboat fishery in the US Gulf of Mexico	Fisheries Ecosystems Branch, National Marine Fisheries Service, Southeast Fisheries Science Center, Beaufort, NC	30 October 2020
SEDAR68-DW-34	South Atlantic U.S. scamp (*Mycteroperca phenax*) age and length composition from the recreational fisheries	Fisheries Ecosystems Branch, National Marine Fisheries Service, Southeast Fisheries Science Center	10 December 2020
SEDAR68-DW-35	Commercial age and length composition weighting for Southeast U.S. scamp and yellowmouth grouper (*Mycteroperca phenax and Mycteroperca interstitialis)*	Sustainable Fisheries Branch, National Marine Fisheries Service, Southeast Fisheries Science Center	12 November 2020
	Documents Prepared for the Assessment Process		
SEDAR68-AP-01	Gulf of Mexico Scamp (*Mycteroperca phenax*) and Yellowmouth Grouper (*Mycteroperca interstitialis*) Commercial and Recreational Length and Age Compositions	Molly H. Stevens	27 January 2021

SEDAR68-AP-02	A description of system dynamics of scamp populations in the Gulf of Mexico and South Atlantic to support ecosystem considerations in the assessment and management process	Matt McPherson and Mandy Karnauskas	29 January 2021
SEDAR68-AP-03	SEDAR 68 Commercial Discard Mortality Estimates Based on Observer Data	Jeff Pulver	9 March 2021
SEDAR68-AP-04	Estimation of a Commercial Abundance Index for Gulf of Mexico Scamp & Yellowmouth Grouper Using Reef Fish Observer Data	Steven G. Smith, Skyler Sagarese, Stephanie MartinezRivera, Kevin J. McCarthy	29 March 2021
Documents Prepared for the Review Workshop			
SEDAR68-RW-01	Modeling of recreational landings in Gulf stock assessments	Gulf Branch – Sustainable Fisheries Division	10 August 2021
Final Stock Assessment Reports			
SEDAR68-SAR1	Gulf of Mexico Scamp	SEDAR 68 Panels	
SEDAR68-SAR2	Atlantic Scamp	SEDAR 68 Panels	
Reference Documents			
SEDAR68-RD01	A retrospective (1979-1996) multispecies assessment of coral reef fish stocks in the Florida Keys	Ault et al. 1997	
SEDAR68-RD02	Spawning Locations for Atlantic Reef Fishes off the Southeastern U.S.	Sedberry et al. 2006	
SEDAR68-RD03	Site Fidelity and Movement of Reef Fishes Tagged at Unreported Artificial Reef Sites off NW Florida	Addis et al. 2007	
SEDAR68-RD04	Implications of reef fish movement from unreported artificial reef sites in the northern Gulf of Mexico	Addis et al. 2013	
SEDAR68-RD05	Comparison of scamp grouper (*Mycteroperca phenax*), growth off of the West Florida shelf and the coast of Louisiana	Bates 2008	

SEDAR68-RD06	Aspects Of The Life History Of The Yellowmouth Grouper, *Mycteroperca interstitialis*, In The Eastern Gulf Of Mexico	Bullock and Murphy, 1994
SEDAR68-RD07	Memoirs of the Hourglass Cruises: Seabasses (Pisces: Serranidae)	Bullock and Smith, 1991
SEDAR68-RD08	Groupers on the Edge: Shelf Spawning Habitat in and Around Marine Reserves of the Northeastern Gulf of Mexico	Coleman et al. 2014
SEDAR68-RD09	Decadal fluctuations in life history parameters of scamp (*Mycteroperca phenax*) collected by commercial handline vessels from the west coast of Florida	Lombardi-Carlson et al.
SEDAR68-RD10	A Description of Age, Growth, and Reproductive Life History Traits of Scamps from the Northern Gulf of Mexico	Lombardi-Carlson et al. 2012
SEDAR68-RD11	Incorporating Mortality from Catch and Release into Yield-per-Recruit Analyses of Minimum-Size Limits	Waters and Huntsman 1986
SEDAR68-RD12	Population genetic analysis of red grouper, *Epinephelus morio*, and scamp, *Mycteroperca phenax*, from the southeastern U.S. Atlantic and Gulf of Mexico	Zatcoff et al. 2004
SEDAR68-RD13	Population Assessment of the Scamp, *Mycteroperca phenax*, from the Southeastern United States	Mancooch et al. 1998
SEDAR68-RD14	A Preliminary Assessment of the Populations of Seven Species of Grouper (Serranidae, Epinephelinae) in the Western Atlantic Ocean from Cape Hatteras, North Carolina to the Dry Tortugas, Florida	Huntsman et al.

SEDAR68-RD15	Color Variation And Associated Behavior In The Epinepheline Groupers, *Mycteroperca microlepis* (Goode And Bean) And *M. Phenax* Jordan And Swain	Gilmore and Jones 1992
SEDAR68-RD16	Age, Growth, and Reproduction of Scamp, *Mycteroperca phenax*, in the Southwestern North Atlantic, 1979 – 1997	Harris et al. 2002

SEDAR68-RD17	Age, Growth, Mortality, Food and Reproduction of the Scamp, *Mycteroperca phenax*, Collected off North Carolina and South Carolina	Matheson et al. 1986
SEDAR68-RD18	Tagging Studies and Diver Observations of Fish Populations on Live-Bottom Reefs of the U.S. Southeastern Coast	Parker 1990
SEDAR68-RD19	Age and growth of the yellowedge grouper, *Epinephelus flavolimbatus*, and the yellowmouth grouper, *Mycteroperca interstitialis*, off Trinidad and Tobago	Manickchand-Heileman and Phillip 2000
SEDAR68-RD20	Multi-decadal decline in reef fish abundance and species richness in the southeast USA assessed by standardized trap catches	Bachelor and Smart 2016
SEDAR68-RD21	Aspects Of The Life History Of The Yellowmouth Grouper, *Mycteroperca interstitialis*, In The Eastern Gulf Of Mexico	Bullock and Murphy 1994
SEDAR68-RD22	Age, Growth, and Mortality of Yellowmouth Grouper from the Southeastern United States	Burton et al. 2014
SEDAR68-RD23	South Carolina Marine Game Fish Tagging Program 1978 -2009	Robert K. Wiggers
SEDAR68-RD24	Decadal-scale decline of scamp (Mycteroperca phenax) abundance along the southeast United States Atlantic coast	Nathan M. Bacheler and Joseph C. Ballenger
SEDAR68-RD25	Timing and locations of reef fish spawning off the southeastern United States	Nicholas A. Farmer, William D. Heyman, Mandy Karnauskas, Shinichi Kobara, Tracey I. Smart, Joseph C. Ballenger, Marcel J. M. Reichert, David M. Wyanski, Michelle S. Tishler, Kenyon C. Lindeman, Susan K. Lowerre-Barbieri, Theodore S. Switzer, Justin J. Solomon, Kyle McCain, Mark Marhefka, George R. Sedberry
SEDAR68-RD26	Developmental patterns within a multispecies reef fishery: management applications for essential fish habitats and protected areas	Kenyon C. Lindeman, Roger Pugliese, Gregg T. Waugh, and Jerald S. Ault
SEDAR68-RD27	Ingress of postlarval gag, Mycteroperca microlepis (Pisces: Serranidae)	Paula Keener, G. David Johnson, Bruce

		W Stender, Edward B. Brothers and Howard R. Beatty
SEDAR68-RD28	Survival estimates for demersal reef fishes released by anglers	Mark R. Collins
SEDAR68-RD29	Commercial catch composition with discard and immediate release mortality proportions off the southeastern coast of the United States	Jessica A. Stephen, Patrick J. Harris
SEDAR68-RD30	Discard composition and release fate in the snapper and grouper commercial hook-and-line fishery in North Carolina, USA	P.J. Rudershausen, J.A. Buckel, and E.H. Williams
SEDAR68-RD31	Sink or swim? Factors affecting immediate discard mortality for the Gulf of Mexico commercial reef fish fishery	J.R. Pulver
SEDAR68-RD32	SEDAR 33-DW-19: A meta-data analysis of discard mortality estimates for gag grouper and greater amberjack	Linda Lombardi, Matthew D. Campbell, Beverly Sauls, and Kevin J. McCarthy
SEDAR68-RD33	Potential survival of released groupers caught deeper than 40 m based on shipboard and in-situ observations, and tag-recapture data	Raymond R. Wilson, Jr. and Karen M. Burns
SEDAR68-RD34	Scamp Fishery Performance Report	SAFMC Snapper Grouper Advisory Panel
SEDAR68-RD35	Hierarchical analysis of multiple noisy abundance indices	Paul B. Conn
SEDAR68-RD36	SAFMC SSC MRIP Workshop Report	SAFMC SSC
SEDAR68-RD37	Catch Characterization and Discards within the Snapper Grouper Vertical Hook-and-Line Fishery	Gulf and South Atlantic Fisheries Foundation
SEDAR68-RD38	A Continuation of Catch Characterization and Discards within the Snapper Grouper Vertical Hook-and-Line Fishery	Gulf and South Atlantic Fisheries Foundation
SEDAR68-RD39	Continuation of Catch Characterization and Discards within the Snapper Grouper Vertical Hook-and-Line Fishery	Gulf and South Atlantic Fisheries Foundation
SEDAR68-RD40	Descender Devices are Promising Tools for Increasing Survival in Deepwater Groupers	Brendan J. Runde and Jeffrey A. Buckel
SEDAR68-RD41	Something's Fishy with Scamp Response Summary	GMFMC

SEDAR68-RD42	Application of three-dimensional acoustic telemetry to assess the effects of rapid recompression on reef fish discard mortality	Erin Collings Bohaboy, Tristan L. Guttridge, Neil Hammerschlag, Maurits P. M. Van Zinnicq Bergmann, and William F. Patterson III1
SEDAR68-RD43	Length selectivity of commercial fish traps assessed from in situ comparisons with stereo-video: Is there evidence of sampling bias?	Tim J. Langlois, Stephen J. Newman, Mike Cappo, Euan S. Harvey, Ben M. Rome, Craig L. Skepper, Corey B. Wakefield
SEDAR68-RD44	Changes in Reef Fish Community Structure Following the Deepwater Horizon Oil Spill	Justin P. Lewis, Joseph H. Tarnecki, Steven B. Garner, David D. Chagaris &William F. Patterson III

Appendix 2: Performance Work Statement

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 68 Atlantic and Gulf of Mexico Scamp Assessment 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. (http://www.cio.noaa.gov/services_programs/pdfs/OMB_Peer_Review_Bulletin_m05-03.pdf).
Further information on the CIE program may be obtained from www.ciereviews.org.

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.

SEDAR 68 will be a CIE assessment review conducted for Atlantic and Gulf of Mexico Scamp Grouper. There are two separate models to be reviewed: one for the US Atlantic, and one for the Gulf of Mexico. The review workshop provides an independent peer review of SEDAR stock assessments. The term review is applied broadly, as the review panel may request additional analyses, error corrections and sensitivity runs of the

assessment models provided by the assessment panel. The review panel is ultimately responsible for ensuring that the best possible assessment is provided through the SEDAR process. 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**. The tentative agenda of the panel review meeting is attached in **Annex 3** and the technical specifications required for this review are listed in **Annex 4.**

Requirements

NMFS requires three (3) reviewers to conduct an impartial and independent peer review in accordance with the Performance Work Statement (PWS), OMB guidelines, and the TORs below. The reviewers shall have a working knowledge in stock assessment, statistics, fisheries science, and marine biology sufficient to complete the primary task of providing peer-review advice in compliance with the workshop Terms of Reference fisheries stock assessment.

Tasks for Reviewers

1) Two weeks before the peer review, the Project Contacts will send (by electronic mail or make available at an FTP site) to the CIE reviewers the necessary background information and reports for the peer review. In the case where the documents need to be mailed, the Project Contacts will consult with the contractor on where to send documents. CIE reviewers are responsible only for the pre-review documents that are delivered to the reviewer in accordance to the PWS scheduled deadlines specified herein. The CIE reviewers shall read all documents in preparation for the peer review.
2) Additionally, during the week of August 16, 2021 prior to the peer review, the CIE reviewers will participate in a test to confirm that they have the necessary technical (hardware, software, etc.) capabilities to participate in the virtual panel in advance of the review meeting. This review's Project Contacts will provide the information for the arrangements for this test.
3) Attend and participate in a virtual review meeting. The meeting will consist of presentations by NOAA and other scientists, stock assessment authors and others to facilitate the review, to answer any questions from the reviewers, and to provide any additional information required by the reviewers.
4) 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.
5) Each reviewer should assist the Chair of the meeting with contributions to the summary report.
6) Deliver their reports to the Government according to the specified milestones dates.

Place of Performance
The place of performance shall be online via GoToWebinar.

Period of Performance
The period of performance shall be from the time of award through October 2021. Each CIE reviewer's 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.

Schedule	Milestones and Deliverables
Within two weeks of award	Contractor selects and confirms reviewers
2 weeks prior to the panel review	Contractor provides the pre-review documents to the reviewers
August 30-31 and September 1-3 2021	Panel will attend and participate in review webinars lasting approximately four and a half hours each day held between the hours of 8 am -8 pm CT
Approximately 3 weeks later	Contractor receives draft reports
Within 2 weeks 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
Since this is a virtual panel review travel is neither required nor authorized for this contract.

Restricted or Limited Use of Data
The contractors may be required to sign and adhere to a non-disclosure agreement.

Project Contacts:
Larry Massey – NMFS Project Contact
150 Du Rhu Drive, Mobile, AL 36608
(386) 561-7080
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Science and Statistics Program

South Atlantic Fishery Management Council
4055 Faber Place Drive, Suite 201 North Charleston, SC 29405
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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 Performance Work Statement
   Appendix 3: Panel membership or other pertinent information from the panel review meeting.

Annex 2: Terms of Reference for the Peer Review

SEDAR 68 Atlantic and Gulf of Mexico Scamp Assessment Review Workshop Terms of Reference

Review Workshop Terms of Reference

1. Evaluate the data used in the assessment, including discussion of the strengths and weaknesses of data sources and decisions. Consider the following:
   - Are data decisions made by the DW and AW justified?
   - Are data uncertainties acknowledged, reported, and within normal or expected levels?
   - Is the appropriate model applied properly to the available data?
   - Are input data series sufficient to support the assessment approach?

2. Evaluate and discuss the strengths and weaknesses of the methods used to assess the stock, taking into account the available data. Consider the following:
   - Are methods scientifically sound and robust?
   - Are priority modeling issues clearly stated and addressed?
   - Are the methods appropriate for the available data?
   - Are assessment models configured properly and used in a manner consistent with standard practices?

3. Consider how uncertainties in the assessment, and their potential consequences, are addressed.
   - Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty in the population, data sources, and assessment methods.
   - Comment on the likely relationship of this variability with possible ecosystem or climate factors and possible mechanisms for encompassing this into management reference points.

4. Provide, or comment on, recommendations to improve the assessment
   - Consider the research recommendations provided by the Data and Assessment workshops in the context of overall improvement to the assessment, and make any additional research recommendations warranted.
   - If applicable, provide recommendations for improvement or for addressing any inadequacies identified in the data or assessment modeling. These recommendations should be described in sufficient detail for application, and should be practical for short-term implementation (e.g., achievable within ~6 months). Longer-term recommendations should instead be listed as research recommendations above.

5. Provide recommendations on possible ways to improve the Research Track Assessment process.

6. Prepare a Review Workshop Summary Report describing the Panel's evaluation of the Research Track stock assessment and addressing each Term of Reference.

Annex 3: Tentative Agenda - SEDAR 68 Atlantic and Gulf of Mexico Scamp Assessment Review

Via webinar

August 30 - September 3, 2021

Each of the first two days will likely consist of a 7-hour long webinar held between the times of 8 am and 8 pm ET
The remaining days will likely consist of 4.5 hour long webinars
The start and end times of each webinar are dependent on CIE and analyst availability

August 30- Introductions and Opening Remarks		
	Coordinator	
	- Agenda Review, TOR, Task Assignments	
	Assessment Presentations	Lead Analysts
August 31 – Assessment Presentation continued		Lead Analysts

August 30 - 31 Goals: Initial presentations completed, sensitivities and modifications identified.

September 1 -	Panel Discussion	Chair
	- Review additional analyses, sensitivities	
	- Consensus recommendations and comments	Chair

September 1 Goals: Final sensitivities identified, preferred models selected, projection approaches approved, Summary report drafts begun

September 2 - Panel Discussion		Chair
	- Final sensitivities reviewed.	
	- Projections reviewed.	
September 3 Panel Discussion or Work Session		Chair
	- Review Consensus Reports	

September 2 and 3 Goals: Complete assessment work and discussions. Final results available. Draft Summary Report reviewed.

Annex 4: SEDAR 68 Atlantic and Gulf of Mexico Scamp Review Workshop minimum technical requirements

1. Computer
2. Microphone and speakers (headset recommended)
3. GoToWebinar desktop app (JavaScript enabled) available for download here: https://support.goto.com/webinar/help/download-now-g2w010002
4. Internet: 1 Mbps or better (wired preferred)
5. Web browser:
    a. Google Chrome v57 or later
    b. Mozilla Firefox v52 or later
    c. Internet Explorer v10 or later
    d. Microsoft Edge v12 or later
    e. Apple Safari v10 or later
6. Operating system
    a. Windows 7 - Windows 10
    b. Mac OS X 10.9 (Mavericks) - macOS 10.15 (Catalina)
7. 2GB of RAM (minimum), 4GB or more of RAM (recommended)
8. Smart phone for use as audio backup and internet hotspot (recommended)

Appendix 3: CIE Panel Membership

Reviewer	Affiliation
Robin Cook	University of Strathclyde, Scotland
John Neilson	Independent Fisheries Scientist
Massimiliano Cardinale	Swedish University of Agricultural Sciences

Additional Literature Cited

Campana, S.E. and Fowler, G.M. (2012) Age Determination without tears: statistical estimation of silver hake (*Merluccius bilinearis*) age composition on the basis of otolith weight and fish length. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/079. Ii + 19 p.

Methot, Richard D. Jr., and Wetzel Chantell R. 2013, Stock synthesis: A biological and statistical framework for fish stock assessment and fishery management. Fisheries Research.

National Academies of Sciences, Engineering, and Medicine 2017. Review of the Marine Recreational Information Program. Washington, DC: The National Academies Press. https://doi.org/10.17226/24640.

Punt, André E., Maunder, Mark N. 2013. A review of integrated analysis in fisheries stock assessment. 2012. Fisheries Research.

SEDAR 24-RW-01. The Beaufort Assessment Model (BAM) with application to red snapper: mathematical description, implementation details, and computer code.

Zhu, J., Maunder, M. N., Aires-da-Silva, A. M., Chen, Y. 2016. Estimation of growth within Stock Synthesis models: Management implications when using length-composition data. Fisheries Research.