

Report to CIE

of

**SEDAR Grouper Assessment Review
May 8 - 10, 2007
Tampa, Florida**

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Executive summary

A Review Panel was convened from May 10 - 12, 2007, to review the work of an Evaluation Panel (EP) that had reviewed the assessment of three grouper stocks from SEDAR 10 and 12 earlier in 2007. The three stocks under review were Gulf of Mexico and South Atlantic gag grouper and Gulf of Mexico red grouper. The EP had produced a report and had requested some analysis to be performed, principally on the estimation of discard death at age.

Most of the issues were related to the disparate approaches taken among the assessments regarding assessment models, data preparation and model assumptions. The most important of these is probably the estimation of deaths due to discarding. The other topics were the initialization of the modeled populations and length of the data series included, handling natural mortality, how to model catchability and its change over time and the appropriateness of some of the recommended reference points.

The Review Panel considered all materials available and requested some additional analysis. All requests were promptly carried out. [The Review Panel report provides a complete and accurate summary of the discussion and conclusions reached. As it is a consensus document, all minor and divergent points of view could not be incorporated. The few points that I feel need expansion or emphasis are noted below in the report.](#) A consensus report was drafted on the last day of the meeting. It received minor changes after the meeting via e-mail.

The [Review Panel](#) concluded that the EP had met its Terms of Reference. It also prepared recommendations for the short term that are to be done before the generation of advice from the gag and red grouper assessments. A more extensive list of recommendations was also made for the longer term, some of which would benefit from wider participation and be applicable to other stocks as well.

Background

The Review Panel (RP) Workshop took place in St Petersburg, Florida to review the work of an earlier Evaluation Panel (EP) that had considered red and gag grouper assessments from SEDAR 10 and 12. The meeting lasted two days from 1:00 pm on May 9 to about noon on May 11, 2007. As well as the EP report, the RP reviewed work that the EP had requested. As well some new information requested by the RP was presented at the Workshop. The Workshop was tasked with preparing the proceedings and a preliminary draft of a consensus report was completed before adjournment. The main issues were consistency among assessments of both data and analytical approaches and the preparation of discard estimates and the survivorship of these discards. Also of concern were the correction of catch rate data for increasing catchability over time and suitability of reference points in the assessments. These stocks underwent three workshops in the preparation of advice for management: data, assessment and review workshops. Following that process, there was an Evaluation Panel reviewing the assessments and finally this Workshop was convened focusing mainly on the Evaluation Report and the work that had been requested for this review.

The meeting was well conducted and progressed smoothly aided by the fact that there were few divergences of opinion. It was fortunate to have Dr. Methot as Chair as he kept the Workshop on agenda and was well versed in the grouper assessments and their issues, having attended a recent SEDAR. Staff, either presenters or other interested personnel, were all most helpful and responsive to the few requests made. John Carmichael of SEDAR began the meeting with

opening comments and then the Chair opened the agenda. Staff presented an overview of each of the three assessments and then there was a presentation of the Evaluation Panel Report.

The Panel membership is given in Appendix C.

Description of review activities

All the supplied material was reviewed before the Workshop. This led to several requests for more information or clarifications. These were requests which were promptly attended to by the assessment staff at the Workshop. There was a wealth of background technical information made available at the SEDAR site, principally, the three assessments and their supporting documentation. Each of the assessments was hundreds of pages long and it was difficult to optimise the preparation for the meeting. The review was essentially non-technical, so much of the information was not addressed. The arrival of the EP report and then the Gulf gag analysis document greatly helped in addressing the issues and structuring the preparation for the Workshop.

The RP Workshop Terms of Reference were to review the EP report, review any work arising from that report and to prepare a consensus summary. These were all done. As well several requests for additional analysis were made during the Workshop and these were reviewed as well.

The Review Panel considered all materials available and requested some additional analysis. All requests were promptly carried out. A consensus report was drafted on the last day of the meeting. It received minor changes after the meeting via e-mail.

The RP concluded that the EP had met its Terms of Reference. It also prepared recommendations for the short term that are to be done before the generation of advice from the gag and red grouper assessments. A more extensive list of recommendations was also made for the longer term some of which would benefit from wider participation and be applicable other stocks as well.

Summary of presentations

After introductory remarks were made by a SEDAR staff member and the Chair, the three assessments were briefly reviewed. Then the EP report was presented. Two attributes of these stocks set them off from most of the assessments with which I am familiar. First their biology, all three of these groupers are protogynous hermaphrodites, which may present complications if standard assessment models are applied blindly, for example, the definition of spawning stock. Secondly, they have much higher discard rates. The high discarding means that the estimation of the percentage of the discards surviving is much more important than usual.

The first stock to be presented was Gulf of Mexico red grouper from SEDAR 12. It had previously been assessed in 2002 by the Reef Fish Stock Assessment Panel before SEDAR took over responsibility. The assessment model is an ASAP model having 179 parameters. A production model (ASPIC) was also run for SEDAR12 but the VPA used in earlier assessments was not. The assessment used new data and analysis but a continuity run was shown with the old model. The assessment model was tuned to 6 data sources, mostly fishery dependent supplemented by some video data. In 2005, discards represented about 16% (by weight) of the commercial landings and 14% of the recreational landings. Conversion of discards into numbers at age was done using a method of Goodyear's, which distributes numbers at length into numbers at age using a transformation growth matrix.

The second stock was South Atlantic gag grouper, which was assessed using a statistical catch-at-age model that has 356 parameters. There was less information on discard sizes than the GOM stock so a simpler approach was taken in which the selectivity curve was shifted to ages younger to approximate the removals by discarding. The discard rates in 2004 (the last year in the assessment document's summary table) for two recreational categories, headboats and MRFSS, were 90 and 194% respectively.

The third stock was Gulf of Mexico gag grouper. It is assessed using a CASAL model, and VPA runs were performed as well. A stock reduction analysis was also presented at SEDAR12 for this stock. The CASL model had either 82 or 164 parameters depending on the length of time in the reconstructed population (starting at 1963 or 1880). Discard rates in 2004 (the last year in the assessment document's summary table) for commercial and recreational categories, were 4 and 186 % respectively by weight. The discard rates in terms of numbers would be even higher as predominantly small fish are discarded. For this stock there is information available on discarding and survivorship of discards as a function of depth and length.

The EP Report was then presented. After an introduction, the first issue addressed was the length of time series used in each assessment and the desirability of homogenizing among the assessments. Related to this is the way in which data from the early periods to initialize the modeled populations are handled. This led to the bigger issue of disparate models (both assessment models and the analysis used to prepare the data) among the assessments. The next issue was the modeling of the catchability coefficient. In some cases a 2% non-compounded annual drift was included. In others it was held constant. The next issue was the estimation of discards at age and the fraction of these that survive. Again, this question was handled differently in each assessment. Part of the reason for this was the different data available on the length composition of these discards from stock to stock. The fourth issue was the way in which estimates of natural mortality were converted into functions of age. Again there were differences among the assessments on how this was to be done. And finally there was the question of whether the recommended reference points were consistent with formal requirements. The final presentation was of work requested by the EP, most of which focused on discarding.

In general the presentations were clear and concise. Were more time available, it would have been beneficial to delve into a couple of points more deeply. This was most evident in analysis related to discard data. Similarly, there was not much time available to propose additional analysis, either in terms of time to produce the analysis or to review the results.

Summary of findings

The Workshop produced a draft of a consensus document on the last morning of the meeting. The Chair ran the meeting well and the time was used efficiently. While there was not enough opportunity to go into technical details or to request and then review much analysis, myself, and indeed all reviewers, had ample opportunity to comment on the contents of the consensus document. I feel it captures the meeting well and I only wish to add a few points of expansion or emphasis.

We were tasked with assessing whether the EP's responses to its ToR's were "adequate, complete, and scientifically sound". During the preparation for the meeting I had difficulty with all three of these criteria. For instance, to what purpose were the EP's responses considered to be adequate? Also, could the EP report be adequate if the underlying assessments were not and we were not going to re-open the assessments? In a two day meeting reviewing three stocks whose

assessments total approximately a thousand pages, completeness seems a fairly high expectation. But again there is the distinction between the completeness of the EP and the assessments. And finally scientific soundness; there was simply not the time available to dig to the depths required to ascertain if the science were sound. Indeed, just the question of the divergent approaches to handling the discards in the three stocks could and should take the better part of week. This all being said, I felt the EP did fulfill its terms of reference. The SEDARs could not, and should not, have been re-run. Thus my endorsement carries the proviso that there is still some suspicion on my part as the assessments have to be taken as “complete and sound”. I like to get into re-runs, diagnostics and residuals, etc. whenever possible. The only criticism I made, and it is captured in the RP report, is that there was not enough care in preparing the package for external review. More synthesis and summaries should have been made to help reviewers who are not familiar with these stocks, fisheries or issues. For example, on page 5 on the EP report, it states that they “...noted agreements among base runs and sensitivity runs with various catch time series...” Just a list of the relevant figures and in what sense they agreed would have aided the review process. Even better would have been to have the curves superimposed into a single plot. The lack of synthesis somewhat reflects the lack of integration among the assessments, viz, separate assessment models, separate handling of discards, and handling of M.

It is of interest to apply these same criteria to the RP Workshop. I will leave it to others to determine if our review was adequate or not. But in my opinion, we did not have enough time to do a complete and scientifically sound review.

Conclusions/Recommendations

Although I was in general agreement with the conclusions drawn by the Workshop and indeed drafted a fair bit of the consensus document, a couple of points need to be expanded or emphasised.

First, why are these recommendations important? These three stocks have suffered from some degree of isolation in their assessments. Different data were examined with different suites of models. The importance of the disparate approaches and how to reconcile them was the main theme of the meeting. Also, as they were in our terms of reference for the review, they are of importance to NMFS. Secondly, they dominated the review and were of importance to our Panel as well. The recommendations are all requests for more analysis and more systematic analysis of the sensitivity and stability of the generation of assessment advice. Given that the questions to be addressed are important, the recommendations are avenues that may lead to better understanding of them. It was evident to me that a more systematic approach was called for than had been done before – at least based on what was presented to us. Of course they may not lead to definitive results, but at least future assessments will benefit from the investigation and future reviews can be referred to the work, should these questions come up again.

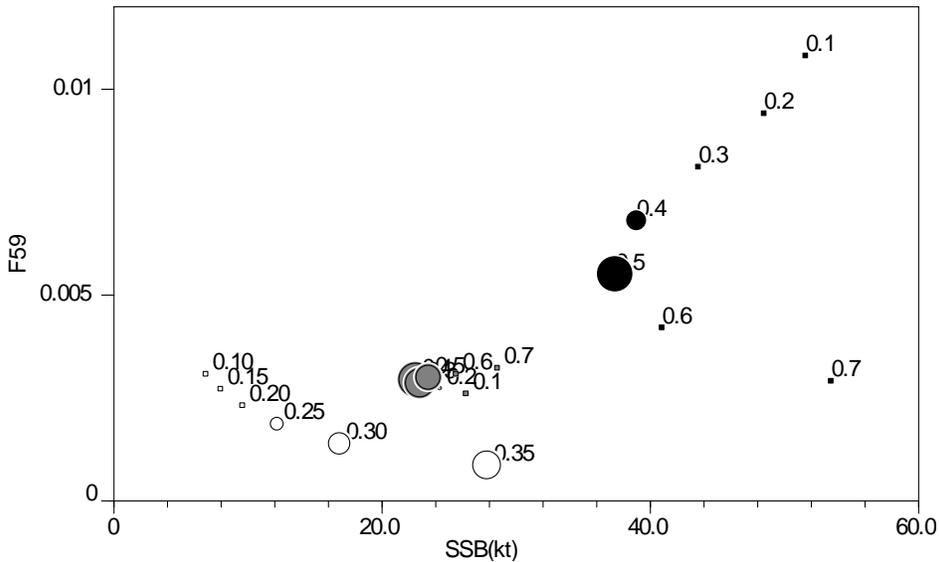
For example, The STAR process lumps similar stocks for a given review so that it is easier to pool expertise and at least do some “meta-thinking” on common or related issues. As SS2 is used in virtually all STAR assessments, data effects are easily identified.

How would the results be interpreted and acted upon? It is difficult to predict as it is somewhat dependent on the results. Most of the recommendations can be described as perturbation experiments. If the results show a clearly superior method, it should be adopted. If the results show that certain assumptions are critical, they should receive more attention. This sort of semi-subjective model selection is a common practice during assessments. But the more it can be made

objective, the more we move from the art of providing advice for resource management to the science.

1) Inter-stock comparison of assessment models.

This recommendation has two symmetric themes: 1) the application of several models to the data from a single stock and 2) the application of several data sets to a single, common model. The application of several analytical methods to a single stock gives insights into the uncertainty related to the model that cannot be gained any other way. An example from a cod stock of one method of displaying such information is given here:



Example of three assessment models being applied to catch and survey data from a single stock, Eastern Scotian Shelf cod. The points are the SSB and F averaged over ages 5-9 for the terminal year of the assessment. F's are very low as this fishery has been closed for over a decade. The solid circles are a profile of varying M's from a VPA and the size of the symbol reflects its likelihood. The open circles are from an age aggregated difference model and the grey circles are from a stock synthesis model. The distance between the larger circles in any group gives an estimate of the process uncertainty in M. The distance between the largest symbols for each set reflects the model uncertainty.

As the assessments of these three groupers have developed independently, the application of a single model would also afford a vehicle for comparison that does not currently exist. For most assessments, the hard part is getting the data together. Running it through a model is relatively less difficult.

I am not suggesting that the analysis of these stocks be constrained to one, and only one model. Rather that a variety of approaches needs to be performed at least intermittently. When it comes to the provision of advice multiple models make the summarization more difficult. Model averaging is one way to combine them. However, my preference is to pick the best and show the other as part of the quantification/qualification of uncertainty.

My request for symmetry was to isolate data effects from model effects. If a systematic symmetric approach is not taken the relative contributions of model and data effects cannot be disentangled. The significance of the insights (and these are scattered through my report) might be the identification of a single population dynamic's model that best serves all stocks. This would be expected to facilitate the exchange of data, analysis and reviews. Even if a common model could not be agreed upon as a base model, its performance with other stocks should give insights. I realise that this makes for more work up front in getting the various models to work in various environments. However, once done it need not be done annually and it is usually easy to update a year's worth or so of data.

A simpler instance of the value of the symmetric approach is the treatment of discards among the three stocks. If the simplest approach, which was a shift of the selectivity to younger ages were applied to all three stocks. It would show how well this approach works when data are available and how well the data support or reject a simple hypothesis.

This recommendation need not lead to a common base model, but at least a model that has been used with all the sets, which would be a basis for inter-communication. It may turn out that model choice is not important, but this cannot be established until a more rigorous approach has been conducted.

A symmetric approach also reduces the potential workload a bit. If one model and three datasets are run and then one dataset and three models, it completely spans the model-data space, but is not the full 3 x 3 design. Of course the number of models need not be 3.

2) Estimation of natural mortality

All three assessments used the Hoenig (1983) method to estimate M from the oldest animal observed. The Hoenig method gives a constant value, which the assessment teams distributed as a decreasing function of age using the curvature from Lorenzen (1996). Lorenzen did not advocate this rescaling but it was introduced to make the results more consistent with traditional values of M . The question of over how many ages the curve was to be spread over received considerable attention. The sensitivity of the results to the assumed starting age over which the M was to be spread (either 0 or 5) was considerable and the RP recommended that this be investigated further. But more work is required on the assignment (or estimation) of natural mortality. Other methods are available in the literature. Beverton and Holt (1959) regressed M against age of maturity and von Bertalanffy growth parameter. Pauly (1980) used a similar approach and added temperature to the growth parameters. Roff, Charnov and Jensen have commented and amended these approaches more recently in the literature. A more pervasive initiative is needed both on the determination and uncertainty of the M 's that are used and the sensitivity of Reference Points and stock status metrics to them. Short term recommendation 2) of the consensus report addresses one aspect of M , but more attention is needed on other aspects of it.

The production of discards at age for the three stocks was approached differently by each assessment team. The simplest method was that of South Atlantic in which the selectivity was shifted 2 ages younger. Figure 46 of the SA gag assessment shows 50% retention between ages 2 and 4. This simple approach seems like a good approximation considering the growth rate of the fish and that most discards are undersize. In the work requested by the EP a figure is given showing the results when the discards are shifted to smaller fish than was used in SEDAR 10 for GOM gag. (It is the figure before table 3, neither pages nor figures are numbered in the document.) Here, as expected, the right hand limb of the selectivities is depressed as expected. However, the left hand limb is not shifted except for MRFSS. This is puzzling and a satisfactory

explanation was not available at the RP. The shift to younger ages and the probabilistic Goodyear model should both be applied to all the stocks to assure that discard information is being handled well and to define the impact of each approach.

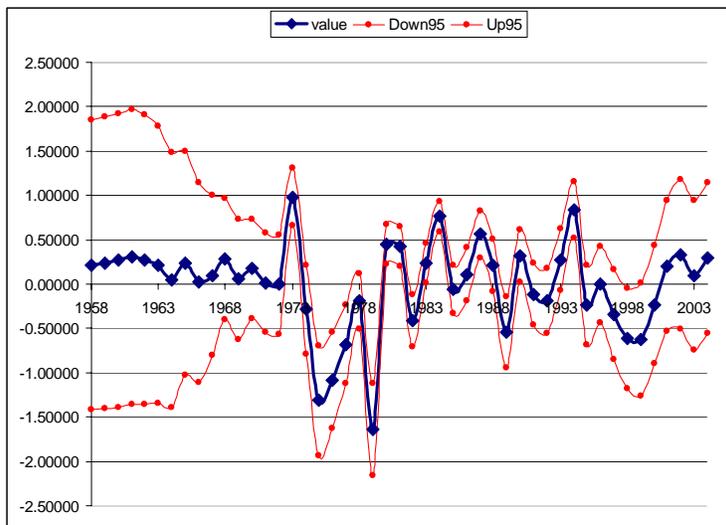
The estimation of natural mortality is likely to be more important in these stocks because the Lorenzen shape puts a high M on the younger fish which have been largely determined from reconstructed discards which compounds two large but poorly determined parameters. It was reported that attempts to estimate M within a model did not perform well.

3) More consistent analysis of starting years (RP Report recommendation 3))

There are three aspects of this recommendation. The first is an analysis of the contribution of the early data years, 1963 vs. 1964 etc. The second is how to handle the starting population. Some models go back to very early years and let the model reach an equilibrium before any tuning data exist. The third is to start near the data but have a scaling parameter for the initial population. Because of the virtual lack of fishery independent data these assumptions may be more important than in other assessments and both should be investigated.

This sort of analysis is standard during the examination of sensitivity runs. Also, the various data windows are the core of the widely used retrospective diagnostic. This recommendation is for a more formal approach in the spirit of some approaches to data windows and related diagnostics.

Another way of looking at the importance of the data window within the SS2 framework is shown in the following figure of recruitment deviations and their uncertainty from widow rockfish. (Pers. Comm.. Xi He.).



It is seen that as more data are accumulated in the early years, the error on the recruitment deviations become smaller. It also shows that the most recent years are less well estimated. This helps in the definition of a data-based basis for the consideration of the data window.

4) Catchability analysis years (RP Report recommendation 4))

Some sort of meta- or integrated analysis might be beneficial. Such an analysis could consider these three stocks or others, especially those that are fished similarly. A signal of when a change

occurred might be too weak to be detected in a single stock but might be revealed in a broader analysis. The proposal for a meta-analysis including more, but similar stocks (in terms of biology and/or fishing practices) is in the hope of getting more power. These stocks are unusually dependent upon the estimation of discards and any insights into their magnitude and time course that could be gleaned from a more comprehensive investigation would be valuable.

It is hard to predict the benefits of this recommendation. If better discard estimates can be produced from a meta-analysis, they should be adopted. If the simpler South Atlantic gag model, which used age shifting, gives similar results when compared with a data-based model then there is no reason to look further. If they do not agree, then further investigation is required.

A small procedural recommendation is that requests made during the meeting be treated more formally. They should be written with the reason for the request and the response should be noted as well. This helps both the people carrying out the request and the reviewers. The requests that were made are given in the RP report but they lack the rationale and responses.

Appendix A. Bibliography of Materials Provided.

Before the review the Panel was provided with access to the SEDAR site (<http://www.sefsc.noaa.gov/sedar/>), which contained all the workshops and assessments for the stocks under consideration. I have not listed all the documents available for SEDAR 10 and 12, merely the assessments.

The assessment authors provided the PowerPoint files that they had used for their presentations during the Review Panel. They were provided via a LAN, which facilitated the document flow and availability during the meeting.

SEDAR Grouper Assessment Review. Evaluation Panel Report. 2007. 20pp.

Anon. Analysis of Gulf of Mexico gag grouper in response to the recommendations of the SEDAR Grouper Assessment Review Panel. 36pp.

Southeast Regional Office. Gag and aggregate grouper bag limits. 3pp.

Relevant Assessments made available

SEDAR 10 Stock Assessment Report 1. South Atlantic Gag Grouper. 2006. 485 pp.

SEDAR 10 Stock Assessment Report 2. Gulf of Mexico Gag Grouper. 2006. 250 pp.

SEDAR 12 Stock Assessment Report 1. Gulf of Mexico Red Grouper. 2006. 358 pp.

Appendix B

Consulting Agreement between the University of Miami and Robert Mohn

SEDAR Grouper Assessment Review Workshop Panel Tasks:

The SEDAR Grouper Assessment Review Workshop Panel will review the findings of the SEDAR Grouper Assessment ad hoc Evaluation panel with regard to gag and red grouper. The review will be guided by Terms of Reference that are specified below. The Review Workshop panel will document its findings in a Peer Review Consensus Summary (Annex 1). This document is a product of the SEDAR review panel and is not a product of the CIE. The CIE requires that each appointed reviewer prepare and submit a CIE reviewer report, as described in Annex II, to provide additional distinct, independent analyses of the technical issues discussed by the panel and addressed in the Peer Review Consensus Summary.

SEDAR Grouper Assessment Review Workshop Terms of Reference:

1. Review the Evaluation Panel report and determine whether the Panel's responses to its Terms of Reference¹ are adequate, complete, and scientifically sound.
2. Review any analyses prepared as a result of Evaluation Panel recommendations and determine whether such analyses are preferred for determining stock status and developing management references.
3. Document Panel discussions and recommendations in a Review Panel Consensus Summary Report.

1. Evaluation panel TORs are provided for reference as Annex III.

SEDAR Review Workshop Panel Supplementary Instructions

The review panel Chair is responsible for reading supporting documents prior to the workshop, working with SEDAR support staff and appointed reviewers in advance of the workshop to ensure panel responsibilities are understood, conducting the meeting during the workshop in an orderly fashion, and compiling and editing the Consensus Summary and submitting it to the SEDAR Coordinator by a deadline specified by the SEDAR Steering Committee. The review panel Chair may participate in panel discussions and deliberations when appropriate, and may assist the reviewers in documenting panel discussions.

Reviewers are responsible for reading supporting documents prior to the workshop, participating in workshop discussions addressing the terms of reference, preparing a consensus report during the workshop, and finalizing Panel documents within two weeks of the conclusion of the workshop. Each reviewer appointed by the CIE is responsible for preparing and submitting to the CIE an additional CIE Reviewer Report as described in Annex II.

The review panel should not provide specific management advice. Such advice will be provided by existing Council Committees, such as the Science and Statistical Committee and Advisory Panels, following completion of the assessment.

Statement of Tasks for Technical Reviewers:

Roles and responsibilities:

1. Approximately 2 weeks prior to the meeting, the CIE reviewers shall be provided with the stock assessment reports of SEDAR 10 and 12, associated supporting documents, and review workshop instructions including the Terms of Reference. Reviewers shall read these documents to gain an in-depth understanding of the stock assessment, the resources and information considered in the assessment, and their responsibilities as reviewers.
2. During the Review Panel meeting, reviewers shall participate in panel discussions on assessment methods, data, validity, results, recommendations, and conclusions as guided by the Terms of Reference. The reviewers shall collectively prepare a Peer Review Consensus Summary report as described in Annex I.
3. Following the Review Panel meeting, the reviewers shall work with the chair to complete and review the Peer Review Panel Consensus report. Reports shall be completed, reviewed by all 3 panelists, and comments submitted to the Chair within 1 week of the conclusion of the workshop (May 17, 2007).
4. Following the Review Panel meeting, each reviewer shall prepare an individual CIE Reviewer Report. These reports shall be submitted to the CIE no later than May 24, 2007, addressed to the "University of Miami Independent System for Peer Review," and sent to Dr. David Sampson, via email to David.Sampson@oregonstate.edu, and to Mr. Manoj Shivlani, via email to mshivlani@rsmas.miami.edu. See Annex II for complete details on the report outline.

The duties of each Review Panelist shall occupy a maximum of 12 workdays; several days prior to the meeting for document review; three days at the SEDAR meeting, and several days following the meeting to ensure that final review comments on documents are provided to the Chair and to complete a CIE review report.

Workshop Final Reports:

The SEDAR Coordinator will send copies of the final Review Panel Consensus Report and Advisory Report to Mr. Manoj Shivlani at the CIE.

Submission and Acceptance of CIE Reports:

The CIE shall provide via e-mail the individual CIE Reviewer Reports to the COTR, Dr. Stephen Brown (stephen.k.brown@noaa.gov) for review and approval, based on compliance with this Statement of Work, by June 7, 2007. The COTR shall notify the CIE via e-mail regarding acceptance of the reports within two working days of receipt. Within two working days of the COTR's approval, the CIE shall provide the final individual CIE Reviewer Reports to the COTR in pdf format.

The COTR shall provide the final CIE Reviewer Reports to:

SEFSC Director: Alex Chester, NMFS Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL 33149 (email, alex.chester@noaa.gov)

SEDAR Program Manager: John Carmichael, SAFMC, 4055 Faber Place, Suite 201,
North Charleston, SC 29405 (email, John.Carmichael@safmc.net)
CIE Reviewer Reports become part of the SEDAR Administrative Record and are
therefore available for public distribution.

Annex I. SEDAR Review Workshop Documents Contents

Consensus Summary Outline

I. Statements Addressing Terms of Reference

List each Term of Reference, and include a summary of the Panel discussion regarding the particular item. Include a clear statement indicating whether or not the criteria in the Term of Reference are satisfied.

II. Further Analyses and Evaluations

Summary presentation of any review panel analytical requests not previously addressed in TOR discussion above.

III. Additional Comments

Provide a summary of any additional discussions not captured in the Terms of Reference statements.

V. Reviewer Statements

Each individual reviewer should provide a statement attesting whether or not the contents of this report provides an accurate and complete summary of their views on the issues covered in the review. Reviewers may also make any additional individual comments or suggestions desired.

ANNEX II: Contents of CIE Reviewer Report

1. The reviewer report shall be prefaced with an executive summary of findings and/or recommendations.
2. The main body of the reviewer report shall consist of a background, description of review activities, summary of findings, and conclusions/recommendations. Reviewers are encouraged to elaborate on any points raised in the Consensus Summary Report that they feel might require further clarification. Reviewers are also encouraged to provide any criticisms and suggestions for improvement of the SEDAR process. Reviewers are not required to duplicate the report prepared for SEDAR in response to the review Terms of Reference
3. The reviewer report shall include as separate appendices a copy of the CIE Statement of Work and a bibliography that includes all materials provided for review.

Please refer to the following website for additional information on report generation:
<http://www.rsmas.miami.edu/groups/cie>.

Annex III. SEDAR Grouper Assessment ad hoc Evaluation Panel

Terms of Reference

1. Review SEDAR 10 and SEDAR 12 assessment reports, relevant supporting documents, and recommendations, along with any additional research available since the SEDAR assessments. Address the following specific topics with:
 - A. The length of the time series to be used for the base cases in each assessment (Gulf gag, Atlantic gag and Gulf red grouper).
 - B. The treatment of the catchability coefficient for fishery-dependent indices of abundance in each assessment.
 - C. The estimation of the number and size composition of discarded fish, as well as the fraction of the discards that die in each assessment.
 - D. The treatment of the natural mortality rate and, in particular, the method used to scale the Lorenzen curve in each assessment.
 - E. Recommended reference points (minimum stock size threshold, maximum fishing mortality threshold and optimal yield) and whether those choices are consistent with the goals of the respective Fishery Management Plans and the Magnuson-Stevens Reauthorization Act.
2. Discuss how consistency in methodology should be balanced against the need to address differences in the data, fisheries and biology of the three stocks in question. Include in this discussion the significance of using different stock assessment algorithms for each stock.
3. Formulate recommendations for any additional analyses, sensitivity runs, or changes to the base cases that need to be made to the Gulf gag, Atlantic gag, and Gulf red grouper assessments based on the reviews of the specific issues addressed in TOR #1 and given the conclusions reached during the discussion of TOR #2.
4. Prepare a consensus report documenting committee discussions and recommendations. The report should be drafted during the workshop and finalized within one week of workshop conclusion.

Appendix C. Membership of review Panel and other attendees

The following table was provided to the Review Panel.

NAME **Affiliation**

Workshop Panel

Richard Methot, Chair NMFS NWFS
 Robert Mohn CIE
 Mike Murphy FL FWCC FWRI
 Graham Pilling CIE

Clay Porch NMFS SEFSC
 Bob Zales, II GMFMC AP
 Bill Teehan FL FWCC /GMFMC
 Dennis O’Hern GMFMC AP
 Erik Williams SEFSC/SAFMC SSC
 Gary Fitzhugh SEFSC/Panama City

Mark Robson FL FWCC /SAFMC
 Martin Fisher GMFMC AP
 Mauricio Ortiz NMFS SEFSC
 Robert Mohn CIE
 Shannon Cass-Calay NMFS SEFSC
 Tom Burgess SAFMC AP

Observers

Andy Strelcheck NMFS SERO
 Beverly Sauls FL FWCC FWRI
 Libby Fetherston The Ocean Conservancy
 Luiz Barbieri FL FWCC FWRI
 Joe O’Hop FL FWCC FWRI
 Jim Gray CCA FL/SAFMC AP
 Peter Hood NMFS SERO
 Steve Bramstetter NMFS SERO

Staff

John Carmichael SEDAR
 Rachael Lindsay SEDAR
 Rick DeVictor SAFMC
 Stu Kennedy GMFMC
 Tyree Davis NMFS SEFSC

