

South East Data, Assessment, and Review #6 (SEDAR6)  
Goliath Grouper and Hogfish Review Workshop  
Tampa Airport Hilton  
Tampa, Florida  
January 27 - 30, 2004

Report Prepared

for

University of Miami Independent System for Peer Review

by

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## Executive Summary

- A Review Workshop for Goliath Grouper and Hogfish stock assessments (SEDAR6) was held at the Tampa Airport Hilton in Tampa, Florida from January 27 to 30, 2004.
- The Review Panel was asked to review the Goliath Grouper and Hogfish stock assessments as to completeness, correctness, and adequacy under the Sustainable Fisheries Act and to make recommendations for improvements in future data collection and assessments.
- This report provides a summary of the results and recommendations from the workshop. Detailed information is available in the Peer Review Panel Reports and Summary Stock Status Reports, generated as output from the meeting. Perceptions of the assessment process, which are the opinions of the author, are also provided.
- For Goliath Grouper in south Florida, the assessment indicated that these fish are overfished and overfishing may or may not be occurring. The Review Panel recommended that the current moratorium should be maintained at least until a future assessment shows that the biomass achieves the rebuilding target.
- The Hogfish assessment was not accepted. However, qualitative evidence suggests that Hogfish in waters off Florida may be experiencing growth overfishing. It is not known whether the stock is overfished or whether overfishing, relative to the Sustainable Fisheries Act criteria, is also occurring. The Review Committee recommended that yield might be increased by increasing the size limit.
- The SEDAR process, a multi step method to determine fish stock status, is structured around three workshops, a data workshop, a stock assessment workshop, and a review workshop. For Goliath Grouper there was no stock assessment workshop, and for Hogfish, neither a data nor a stock assessment workshop. The Review Panel was therefore presented with the difficult task of reviewing assessments that had not followed the prescribed review process and were not the product of assessment workshops.
- For both Goliath Grouper and Hogfish, the stock to be assessed was not adequately defined. Consequently, conclusions could only be made within the physical bounds of data collection.
- These assessments represented the first attempt to quantify current abundance of Goliath Grouper and Hogfish in Florida waters. Both assessments collated data from disparate sources and substantially advanced the knowledge of the population dynamics of these species in Florida waters.

## Background

The goal of the South East Data, Assessment, and Review (SEDAR) process is to provide an open and transparent process for developing and reviewing scientific information that is critical to management of fish species in the Southeastern United States, including the South Atlantic, Gulf of Mexico, and Caribbean.

The SEDAR Review Workshop is a forum for independent peer review of the data and of assessment methods for stock assessments under the jurisdiction of the South Atlantic Fishery Management Council, the Gulf of Mexico Fishery Management Council, and the Caribbean Fishery Management Council. The peer review panel consists of stock assessment experts, other scientists, and representatives of council, fishing industries, and non-governmental conservation organizations.

The Review Workshop is the third of a multi step process to assess fish stock status. A Data Workshop first reviews input data, including catch statistics, fishery sampling, population monitoring, and species life history. A Stock Assessment Workshop then develops stock assessment models, estimates values for population parameters and stock status benchmarks, and projects future population conditions.

The Review Workshop produces two reports to accompany each stock assessment. The first is a Peer Review Panel Report of the stock assessment that addresses the terms of reference and includes peer review comments on the assessment, the Review Panel's findings on stock and fishery status, and recommendations regarding biological benchmarks and status determination criteria necessary for management under the Sustainable Fisheries Act (SFA). The second is a Summary Stock Status Report that summarizes the status of the stock. These reports, from the Review Workshop, must then be certified by relevant Council Committees, such as the Science and Statistics committees, before becoming eligible for use in developing management actions.

The SEDAR6 Review Workshop was held at the Tampa Airport Hilton, in Tampa, Florida, from January 27 to 30, 2004. The Review Panel was asked to review Goliath Grouper and Hogfish stock assessments as to completeness, correctness, and adequacy under the Sustainable Fisheries Act. The Panel was asked to determine if the assessments used the best scientific information and techniques, both within the constraints of available time and manpower provided for the assessments. The panel was also asked to make recommendations for improvements in future data collection and assessments.

The SEDAR6 Review Panel consisted of twelve members, three from the Gulf of Mexico Fisheries Management Council (GMFMC) Advisory Panel, three from the GMFMC Finfish Assessment Panel, one from the GMFMC Science and Statistics Panel, one from Ocean Conservation Florida, two from the National Marine Fisheries Service Northeast Fisheries Science Center, and two (including myself) from the Center for Independent Experts.

## **Description of Review Activities**

The SEDAR Coordinator, John Carmichael, distributed electronic copies of the terms of reference (Appendix 1) and all working papers (Appendix 2) approximately ten days prior to the meeting. Upon receipt of the working papers and prior to the meeting, I made hard copies, read each of the documents, summarized results, and developed questions to ask during the meeting.

For both of the stock assessments, a detailed presentation was given by a lead researcher. This was followed by an extensive question and discussion period. On occasion, the lead researcher was asked to provide further analyses which were subsequently reviewed during the meeting. Before the meeting ended, a Peer Review Panel Report and Summary Stock Status Report were completed for each assessment. This involved drafting and reviewing these documents sentence by sentence until a consensus was reached by the Panel.

In this report, I have included conclusions and recommendations with the Summary of Findings. I have also divided the Summary of Findings into two parts: 1) a summary for each of the two assessed stocks, and 2) my perceptions of the process. The first part addresses the terms of reference of the meeting and follows closely from the respective Peer Review Panel Reports and Summary Stock Status Reports. The second part is based mostly upon my observations during the meeting and as such, represents my personal views. Acknowledging that they are personal views, I hope that they will provide an independent perspective to the SEDAR process and will aid in the development of the process.

The Review Panel Chair, Michael Kingsley (CIE Reviewer) must be congratulated. He was thoroughly prepared prior to the meeting with an in-depth knowledge and background of each of the assessments. While controlling the flow of the meeting, he was adept at developing a consensus without imposing his own views. He also took the lead in preparing the Peer Review Panel Reports and Summary Stock Status Reports and made required changes during the meeting under a very restrictive time schedule.

## **Summary of Findings**

### 1) Goliath Grouper

#### *Background*

Goliath Grouper are a long-lived, solitary, and sedentary reef fish that can grow to several hundred pounds. They are easy targets for spear fishing and are also susceptible to hook and line. Without being formally assessed, they were considered to be overfished and were placed under a moratorium by the respective Fisheries Management Councils in 1990. Having been identified as a species of concern, Goliath Grouper were proposed for SEDAR assessment. A Data Workshop was convened in March 2003, which concluded that the available data were not adequate for an assessment. However, subsequently, a new data source was identified which was considered to be potentially useful for assessment purposes. These data were incorporated in the current assessment. The SEDAR process was not

followed as no Assessment Workshop was held to examine the assessment model or examine alternatives to it. Instead, the current Review Workshop was convened to examine and review the new assessment.

*Evaluate the adequacy and appropriateness of fishery-dependent and fishery-independent data used in the assessment (i.e., are the input data sound and up to date?).*

Two census type time series of fishery-independent and one series of fishery-dependent data were used in the assessment. The first independent series consisted of observations by one individual (Mr. D. DeMaria) over a 21-year time period (1982 - 2002) at a maximum of five sites, within a small geographic area relatively distant to the coast of the eastern Gulf of Mexico (SEDAR6-RW-1). The second independent series, by the Reef Educational and Environmental Foundation (REEF), consisted of standardized observations by many individuals over a 9-year time period (1994 - 2002) at many sites, relatively close to land in the reefs off the east coast of Florida and the southern edge of the Florida Keys (SEDAR6-RW-1). The fishery-dependent data consisted of catch and effort for juvenile Goliath Grouper from a 26-year creel survey series (1973 - 1999) in the Everglades National Park (ENP) (SEDAR6-RW-2).

After much discussion, the Review Panel concluded that the data used were scientifically sound. However, they were very limited in scope and consequently restricted the type of assessment model that could be used and any conclusions that could be drawn.

Given the limited geographic range of observations, the DeMaria independent series was questioned with regard to how well it reflected abundance or density of the species over its range in south Florida waters. It was uncertain if the observation sites represented the predominant range of the species in the long term. However, anecdotal information suggested that trends at the observation sites were similar to those in other areas further north in western Florida waters and the overall series trend was supported by the ENP creel survey series.

The assessment excluded the 1982 and 1983 data points from the DeMaria independent time series on the grounds that a substantial reduction in numbers of fish observed from 1982 to 1984 reflected a localized effect due to the discovery of these fishing sites and subsequent intensive fishing pressure on them. The Review Panel concluded that the 1982 datum point should be excluded due to its small sample size but the 1983 point should be included in the assessment.

The REEF diver survey was conducted over a broad geographic area but mostly along the fringe of the species distribution. This was considered to be advantageous as trends in the data may help track abundance trends of the species through more of its range.

Questions were raised regarding the treatment of the fishery-dependent data from the ENP creel survey. Data were restricted to include trips that reported catching Goliath Grouper or species deemed to be associated with Goliath Grouper. There were suggestions that some of the associated species were biologically unconvincing; however, no consensus could be reached for changing the association threshold.

The ENP data were also used to calculate age-specific vulnerabilities to the fishery prior to the moratorium and relative abundance after the moratorium for the age classes represented by the ENP data (ages 0 to 5). It was questioned whether vulnerability in the pre-moratorium fishery may have peaked as late as age 9 or 10; sensitivity of the assessment to such a change was investigated and the Review Panel concluded that the original vulnerability curve be retained.

Natural mortality was estimated from an empirically derived value for longevity. It was pointed out that the longevity estimate was obtained from an exploited population and could possibly underestimate the true natural longevity.

*Evaluate the adequacy, appropriateness, application, and results of models used to assess stocks (e.g., measures of exploitation, abundance, and biomass).*

The Review Panel considered that the models used were appropriate for the available data, and adequately addressed questions of exploitation and relative abundance, within the limits of the data (SEDAR6-RW-3).

However, the stock was not adequately defined and available data were limited to southern Florida waters. Therefore, conclusions from the assessment must be restricted to areas covered by the data, i.e., south of 26°N.

Also, there were no absolute abundance measures for any stock segment. Consequently, all deductions on abundance from the assessment are relative estimates, compared to a pristine stock state.

The assessment model tracked stock abundance from an assumed pristine state in 1950 to low stock levels prior to the 1990 moratorium and subsequent rebuilding since then. Three sensitivity analyses were conducted during the Review Workshop. The year at which the stock state was assumed to be pristine was changed from 1950 to 1900. This resulted in a lengthened recovery period (by several years); the Review Panel recommended retention of the 1950 starting point. The age of full selectivity was increased from 6 years to approximately 10 years. This resulted in a shortened recovery period with 50% probability that rebuilding would have occurred by 2002; the Review Panel recommended retention of the age of full selectivity at age 6. When it was assumed that the moratorium was only 80% effective, i.e., a reduction of fishing mortality to 20% of pre-moratorium levels, the model suggested that the stock would be unlikely to recover.

The Review Panel recognized the sensitivity of estimating post-moratorium fishing mortality in trying to predict rebuilding times. However, due to lack of data, it could not reach a consensus on the magnitude of such mortality. It therefore decided to bracket a range at end points of 10% and 1% of pre-moratorium fishing mortality to provide an illustrative range of rebuilding time predictions.

*Evaluate the adequacy, appropriateness, application, and results of models used to estimate population benchmarks and Sustainable Fisheries Act status determination criteria (e.g., MSY,  $F_{msy}$ ,  $B_{msy}$ , MFMT, MSST, and OY).*

The Review Panel concluded that the model, and available data, are adequate for estimating fishing mortality reference points, such as fishing mortality corresponding to any percentage of SPR. However, in the absence of biomass estimates, MSY and other benchmarks, referencing absolute biomass could not be estimated. An MSST relative to pristine stock state could be estimated.  $F_{msy}$  could not be reliably estimated due to concerns over selectivity and the stock-recruitment relationship.

The Review Panel considered that OY, which depends on socioeconomic and other inputs, was outside the bounds of its mandate.

*Evaluate the adequacy, appropriateness, and application of models used for rebuilding analyses where appropriate, and estimate, to the extent possible, generation time and rebuilding time in the absence of fishing mortality.*

The Review Panel considered the assessment model to be adequate for estimating rebuilding times for any level of F. No consideration was given to scenarios where current or future fishing mortality is zero. Information on generation time was not reviewed.

*Develop recommendations for improving data collection and assessment and future research (both field and assessment).*

The Review Panel concurred with the recommendations of the Data Workshop regarding topics to be pursued in future research programs on Goliath Grouper. Recommendations were prioritized in order of the difficulty that the Review Panel encountered in treating these topics during its review of the assessment: 1) estimation of population size, 2) estimation of ongoing mortality, 3) investigations of stock structure, 4) monitoring of demographics, 5) reproductive biology, 6) historical abundance and exploitation, and 7) extension of survey data.

## 2) Hogfish

### *Background*

Hogfish, a protogynous serially hermaphroditic reef fish, is esteemed as a food fish. It is not vulnerable to angling, but is a popular target for spear-fishing. The species is intensively fished in Florida waters and there is some concern regarding the possibility of growth and/or spawning overfishing. The State of Florida Marine Research Institute contracted Dr. Jerald Ault, from the University of Miami, to conduct a stock assessment of Hogfish. The State of Florida then requested the respective Fisheries Councils and NOAA Fisheries to review the assessment. The SEDAR process was not followed; neither a Data Workshop nor Assessment Workshop was held. Instead, the current Review Workshop was convened to examine and review the assessment.

*Evaluate the adequacy and appropriateness of fishery-dependent and fishery-independent data used in the assessment (i.e., are the input data sound and up to date?).*

One census type series of fishery-independent and two series of fishery-dependent data were used in the assessment (SEDAR6-RW-4). The independent series (RVC) consisted of standardized observations by divers over a 24-year time period (1979 - 2002) in the reef tract of the Florida Keys. The first fishery-dependent series, the Marine Recreational Fisheries Statistics Survey (MRFSS), consisted of catch and effort from a 19-year creel survey series (1982 - 2001) conducted along the Florida coast. The second fishery-dependent series, the Florida Marine Research Institute (FMRI) trip ticket database, included catch and effort data from the commercial fishery over 16 years (1985 - 2001).

The Review Panel concluded that the independent RVC series was acceptable, with caveats regarding area and depth restrictions. However, the Panel could not accept either of the fishery-dependent series in their current form.

The MRFSS data set included catch and effort from 'valid' angling and spear-fishing trips. As Hogfish are very difficult to catch by angling, and few anglers either target or intend to catch them, the Review Panel concluded that angling trips should not be used to generate an index of abundance. Spear-fishing trips only should be used as their catch/effort ratios are more likely to be reflective of Hogfish density.

It was noted during discussion that the imposition of a minimum length limit in 1994 was likely to have biased commercial data in the FMRI database. The Review Panel concluded that the commercial effort series from 1994 onwards was adequate and appropriate. However, because of the introduction of the length limit and also due to inadequate information on gear type, data prior to 1994 should be excluded.

Two other fishery-based data series were used to generate information on lengths of landed fish. The Review Panel concluded that they provided useful information on the distribution of lengths, with appropriate reservations on the limited geographical scope of the data.

Age-length data were used to calculate von Bertalanffy growth curves. Separate growth curves were calculated for the eastern Gulf of Mexico and the Atlantic reef tract. The Gulf of Mexico growth curve was used in the assessment as it was concluded that it had less bias. The Review Panel concurred but suggested testing the effects of using a growth curve based upon the combined data sets.

*Evaluate the adequacy, appropriateness, application, and results of models used to assess stocks (e.g., measures of exploitation, abundance, and biomass).*

The Review Panel considered that the standardization method used in the assessment models was appropriate. However, because of limitations in the documentation and possible problems with some data series, the Review Panel could not assess the adequacy and appropriateness of the models and their results.

Seven commercial and two recreational gear types were considered in the assessment. In order to use the catch/effort ratios from these different gears in combination as time series of abundance indices, effort was standardized using an analysis of variance to estimate gear calibration factors.

The design of the assessment models was not clearly understood from the assessment document and the Review Panel recommended 13 points of clarification (Appendix 1 of Peer Review Panel Report).

$L_{\text{bar}}$  was used to estimate mortality in the assessment. During the discussion, it was noted that this assumes that population characteristics remain constant. However, survey indices indicate that recruitment has increased since 1987, thus possibly biasing total mortality estimates. Minimum size limits, imposed in 1994, may also affect  $L_{\text{bar}}$  estimates of  $Z$ . It was suggested that average size be smoothed in an appropriate way to minimize such biases.

The Review Panel was unable to make quantitative statements about parameters needed to determine current stock status. However, qualitatively, the RVC series indicates a recent increase in recruitment. This series also shows a truncated size distribution, indicating potential high levels of fishing.

*Evaluate the adequacy, appropriateness, application, and results of models used to estimate population benchmarks and Sustainable Fisheries Act status determination criteria (e.g.,  $MSY$ ,  $F_{msy}$ ,  $B_{msy}$ ,  $MFMT$ ,  $MSST$ , and  $OY$ ).*

A yield per recruit analysis was the only model used to estimate population benchmarks. The Review Panel considered it to be both appropriate and adequate to estimate parameters such as  $F_{\text{max}}$  and  $F_{0.1}$ .

*Evaluate the adequacy, appropriateness, and application of models used for rebuilding analyses where appropriate, and estimate, to the extent possible, generation time and rebuilding time in the absence of fishing mortality.*

Given that the Review Panel couldn't make quantitative statements about current stock status, it was unable to determine if the stock was overfished. Therefore, rebuilding times were not considered during the review.

*Develop recommendations for improving data collection and assessment and future research (both field and assessment).*

The Review Panel made three specific recommendations for improving data collection: 1) the use of reef-fish commercial logbooks as an additional commercial catch and effort data source, 2) the collection of length and weight data from the head-boat survey, and 3) the use of data from spear-fishing tournaments to calculate length-weight relationships.

The Review Panel also reiterated the importance of maintaining current data collection programs and of following the prescribed SEDAR review process, i.e., Data, Assessment, and Review workshops.

## Perceptions of the SEDAR Process

The South East Data and Review (SEDAR) process, as outlined in the “Background” section of this report, provides for a very thorough and open review of fish stock assessments. The three level approach (Data, Assessment and Review workshops) ensures that all facets of the assessments are reviewed at separate stages by a broad spectrum of scientific experts. The Data and Assessment workshops also ensure that the most appropriate data and assessment methods have been used prior to the final Review workshop.

Unfortunately, for SEDAR6, the three stage process was not followed for either of the two assessed species. For Goliath Grouper, a Data workshop was held and concluded that the available data were not adequate for an assessment. Subsequently, the Everglades National Park creel census data were identified as a potential index of abundance. These data were then incorporated in the current assessment. However, it was never made clear why the assessment was not then subjected to an Assessment workshop prior to the current review. For Hogfish, neither Data nor Assessment workshops were held. The assessment authors were hired under contract, by the State of Florida, to conduct the first quantitative assessment for Hogfish. Given the concerns expressed by the Review Panel, this assessment would have benefited greatly if it had been subjected to both a data and assessment review. It is unfair to expect the authors to correctly select all input parameters and develop an assessment model without such review. For the benefit of future Review Workshops and panellists, it is important that all assessments be subjected to the three stage process.

Ultimately, the question is, given that the SEDAR process was not followed, did the assessments of Goliath Grouper and Hogfish receive a thorough, fair and independent review? In my opinion, the answer for both assessments is an unequivocal ‘yes’. Within the time available to it, the Review Panel provided a thorough and impartial review of all available information.

The success of the review was facilitated by the expertise of various review panellists. Without singling out too many individuals, the analytical expertise of Jon Brodziak and Mike Murphy was invaluable to the panel. Similarly the species-specific scientific expertise of Debra Murie and Julie Neer was very important. The panel was also strengthened by the expertise and local knowledge of three commercial fishermen (Don DeMaria, Eddie Toomer, and Ralph Allen). On numerous occasions throughout the review, they were able to provide anecdotally important observations. Although not on the panel, Steve Atran from the Gulf of Mexico Fisheries Management Council provided valuable insights on management protocols.

The presentation of the Goliath Grouper assessment was clear and concise. The model involved a complex analysis which maximized the use of data from a data poor assessment. The author was able to answer most questions and was very receptive to incorporating changes. In its current form, the model cannot provide population numbers, only relative estimates compared to a pristine state. This should be further investigated prior to the next assessment of the stock. Unfortunately, the authors of one working paper (ENP creel survey) were not present at the Review Workshop. Their attendance would have been beneficial to the Panel as data from this survey formed an important new abundance index in the assessment model.

Conversely, the presentation of the Hogfish assessment was neither clear nor concise. Data sources and the manipulation of these data were presented in great detail. However, the assessment models and results were neither clearly explained in the document nor in the presentation. The structure of the assessment models was eventually determined through diligent questioning by the Review Panel. The fact that the assessment had been conducted under contract also proved to be troublesome. The Review Panel was uncertain if the authors could be asked to conduct sensitivity analyses given that they were no longer under contract. It was also unclear who would conduct any subsequent re-assessment.

For both assessments, the stock area to be assessed was not clearly defined. In the report from the Goliath Grouper Data Workshop, distribution was discussed, but more in terms of distribution of the data rather than the species. This was a major issue of discussion for the Review Panel and the lack of a stock definition severely restricted the interpretation of results. For future assessments, this issue should be more closely examined at the Data workshop stage.

The Peer Review Panel Reports included a section for Stakeholder Comments. This section, independent of and unedited by the Review Panel, provided meeting participants (other than the Review Panel) with a venue to express their views. Given the active participation of certain stakeholders during the workshop, I consider this to be an important and positive feature of these reports.

In the course of this review, I participated as a Review Panellist during the Review Workshop for both Goliath Grouper and Hogfish and actively participated during the meeting in writing the Peer Review Panel Reports and Summary Stock Status Reports. Subsequent to the Review Workshop, I provide additional comments to the Chair in finalizing these reports.

In closing, all those involved with the assessments of both Goliath Grouper and Hogfish should be congratulated. This represented the first attempt at a quantitative assessment of either species in Florida waters. Both assessments collated data from many disparate sources and substantially advanced the knowledge of the population dynamics of these species.

## Appendix 1. SEDAR6 Review Workshop Terms of Reference

The task of the SEDAR Assessment Review Panel is to review the Goliath Grouper and Hogfish stock assessments as to completeness, correctness, and adequacy under the Sustainable Fisheries Act. Do the assessments use the best available scientific information and techniques, both within the constraints of available time and manpower provided for the assessments? The Panel should also make recommendations for improvements in future data collection and assessments. The Review Panel will provide two reports to accompany the stock assessment report. The first is a consensus summary of the stock assessment that addresses the Terms of Reference and includes the peer review comments on the assessment, the Panel's findings on stock and fishery status, and recommendations regarding biological benchmarks and status determination criteria necessary for management under SFA guidelines. The second is an Advisory Report that summarizes the status of the stock.

1. Evaluate the adequacy and appropriateness of fishery-dependent and fishery-independent data used in the assessment (i.e., are the input data scientifically sound and up to date?).
2. Evaluate the adequacy, appropriateness, application and results of models used to assess Goliath Grouper and Hogfish stocks (e.g., measures of exploitation, abundance, and biomass).
3. Evaluate the adequacy, appropriateness, application, and results of models used to estimate population benchmarks and Sustainable Fisheries Act status determination criteria (e.g.,  $MSY$ ,  $F_{msy}$ ,  $B_{msy}$ ,  $MFMT$ ,  $MSST$ , and  $OY$ ).
4. Evaluate the adequacy, appropriateness, and application of models used for rebuilding analyses where appropriate, and estimate, to the extent possible, generation time and rebuilding time in the absence of fishing mortality.
5. Develop recommendations for improving data collection and assessment and future research (both field and assessment).
6. Prepare a Consensus Summary report summarizing the peer review panel's evaluation of the Goliath Grouper and Hogfish assessments and addressing the Terms of Reference. (Drafted during the Review Workshop, final report due two weeks later - February 12, 2004).
7. Prepare an Advisory Report on Stock Status, including summaries of fishery and population status and recommendations for biological benchmarks and SFA parameters. (Drafted during the Review Workshop, final report due two weeks later - February 12, 2004).

Each individual panelist will receive the stock assessments and other appropriate documents on these species for review approximately 10 days before the Panel meets.

The Panel's primary duty is to review the existing assessments. In the course of this review, the Chair may request a reasonable number of sensitivity runs, additional details of the

existing assessments, or similar items from technical staff. However, the Review Panel is neither authorized to conduct nor review an alternative assessment, nor to request an alternative assessment from the technical staff present. To do so would invalidate the transparency of the SEDAR process. If the Review Panel determines that the assessment models and results are not adequate and appropriate, then the Panel shall outline in its report the remedial measures that the Panel proposes to rectify those shortcomings.

**Appendix 2. List of References Provided**

SEDAR6-RW-1	Standardized visual counts of goliath grouper off south Florida and their possible use as indices of abundance.	Porch, C. E., and A.M. Eklund
SEDAR6-RW-2	Standardized catch rates of juvenile goliath grouper from the everglades national park creel survey, 1973-1999.	Cass-Calay, S. L, T. W. Schmidt
SEDAR6-RW-3	An assessment of rebuilding times for Goliath Grouper.	Porch, C.; A. M. Eklund, and G. P. Scott.
SEDAR6-RW-4	Florida hogfish fishery stock assessment.	Ault, J. S., S.G. Smith, G. A. Diaz, and E. Franklin.
SEDAR6-RW-5	Hogfish Florida Commercial Landings.	Bohnsack, J.
Supporting Documents		
NOAA Tech Memo 468	Site Characterization for Biscayne National Park: Assessment of Fisheries Resources and Habitats <a href="http://www.sefsc.noaa.gov/PDFdocs/468techmemo.pdf">http://www.sefsc.noaa.gov/PDFdocs/468techmemo.pdf</a>	Ault et al.
NOAA Tech Memo 487	Baseline Multispecies Coral Reef Fish Stock Assessment for the Dry Tortugas. <a href="http://www.sefsc.noaa.gov/PDFdocs/487techmemo.pdf">http://www.sefsc.noaa.gov/PDFdocs/487techmemo.pdf</a>	Ault et al.
Fishery Bulletin V.96:395-414	A retrospective multispecies assessment of coral reef fish stocks in the Florida keys.	Ault, J. S, C. Bohnsack, and Meester.
SEDAR3-DW1	Goliath Grouper Data Workshop Report	anon.
NEFSC Ref. Doc 02-07	34 <sup>th</sup> SAW Advisory Report	anon.

## **Appendix 3. Statement of Work**

### **General**

South East Data, Assessment, and Review (SEDAR) is a process in the southeast for stock assessment and review. The program provides a framework for independent peer review of stock assessments undertaken jointly by NMFS-SEFSC, three Regional Fishery Management Councils, two Interstate Fishery Commissions, and state fishery agencies in the southeast. SEDAR uses a three-phase approach: a data workshop, an assessment workshop, and a peer review panel workshop. The peer review panel is composed of stock assessment experts, other scientists, and representatives of council, fishing industries, and non-governmental conservation organizations. Final SEDAR documents include a stock assessment report from the assessment workshop, a review panel report evaluating the assessment (drafted during the review panel workshop), a report that presents the peer-reviewed assessment results, and collected stock assessment documents considered in the SEDAR process.

Goliath Grouper and Hogfish stocks under assessment are within the jurisdiction of the South Atlantic and Gulf of Mexico Fishery Management Councils and respective southeastern states and fishery commissions. The Review Workshop for the Goliath Grouper and Hogfish stock assessments will take place at the Tampa Airport Hilton in Tampa, FL from January 27, 2004 (beginning at 2:00 p.m.) through January 30, 2004 (ending at 3:00 p.m.).

### **SEDAR Assessment Review Panel Tasks:**

The SEDAR Assessment Review Panel will evaluate the Goliath Grouper and Hogfish assessments, input data, assessment methods, and model results as put forward in stock assessment reports. The Assessment Review Panel will:

Specifically, the review panel will:

1. Evaluate the adequacy and appropriateness of fishery-dependent and independent data used in the assessment (i.e., was the best available data used in the assessment).
2. Evaluate the adequacy, appropriateness and application of models used to assess these species and to estimate population benchmarks (MSY, Fmsy, Bmsy and MSST, i.e., Sustainable Fisheries Act items).
3. Evaluate the adequacy, appropriateness, and application of models used for rebuilding analyses.
4. Develop recommendations for future research for improving data collection and the assessment.
5. Prepare a report summarizing the peer review panel's evaluation of the goliath grouper and hogfish stock assessments. (Drafted during the Assessment Review Panel workshop with a final report due two weeks after the workshop ends)
6. Prepare a summary stock status report including management recommendations. (Drafted during the Assessment Review Panel workshop with a final report due two weeks after the workshop ends)

It is emphasized that the panel's primary duty is to review the existing assessment. In the course of this review, the Chair may request a reasonable number of sensitivity runs, additional details of the existing assessment, or similar items from technical staff. However, the Review Panel is not authorized to conduct an alternative assessment, or to request an alternative assessment from the technical staff present. To do so would invalidate the transparency of the SEDAR process. If the review panel finds that the assessment does not meet the standards outlined in points 1 through 3, above, the Panel shall outline in its report the remedial measures that the panel proposes to rectify those shortcomings.

The Review Panel Report is a product of the overall Review Panel, and is NOT a CIE product. The CIE will not review or comment on the Panel's report, but shall be provided a courtesy copy, as described below under "Specific Tasks." The CIE product to be generated is the review panelist's report, also discussed under Specific Tasks.

### **Specific Tasks**

The CIE designee will serve as a Review Panelist of a SEDAR Stock Assessment Review Panel workshop for Goliath Grouper and Hogfish, January 27-30, 2004. The Workshop Panel will review stock assessments for Goliath Grouper and Hogfish in the jurisdiction of the South Atlantic and Gulf of Mexico Fishery Management Councils and applicable southeastern states and fisheries commissions.

It is estimated that the Review Panelist duties will occupy a maximum of 14 workdays; several days prior to the meeting for document review; four 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.

Roles and responsibilities:

1. Prior to the meeting the CIE reviewer shall be provided with the stock assessment reports and associated documents for Goliath Grouper and Hogfish. The reviewer shall read these documents to gain an in-depth understanding of the stock assessment and the resources and information considered in the assessment.
2. During the Review Panel meeting, the reviewer shall participate, as a peer, in panel discussions on assessment validity, results, recommendations, and conclusions. The reviewer also shall participate in the development of the Peer Review Panel Report and Summary Stock Status Report.
3. Following the Review Panel meeting, the reviewer shall review and provide comments to the Panel Chair on the Draft Peer Review Panel Report and Summary Stock Status Report.
4. No later than February 13, 2004, the reviewer shall submit a written CIE Reviewer Report<sup>1</sup> consisting of the findings, analysis, and conclusions, addressed to the "University of Miami Independent System for Peer Review," and sent to Dr. David Sampson, via email

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<sup>1</sup> The written Reviewer report will undergo an internal CIE review before it is considered final. After completion, the CIE will create a PDF version of the Reviewer report that will be submitted to NMFS and the consultant.

to [David.Sampson@oregonstate.edu](mailto:David.Sampson@oregonstate.edu), and to Mr. Manoj Shivlani, via email to [mshivlani@rsmas.miami.edu](mailto:mshivlani@rsmas.miami.edu). The report shall address points 1-4 under the heading: SEDAR Assessment Review Panel Tasks. See Annex I for details on the report outline.