

**Report on the SEDAR 10 Review Workshop for Gag
Grouper in the Gulf of Mexico and in the South Atlantic,
Atlanta, Georgia, June 26-30, 2006**

Jean-Jacques Maguire

CIE Reviewer

**Prepared for the Center for Independent Experts
University of Miami**

July 27, 2006

Executive summary of findings and recommendations

The SEDAR process is structurally sound by separating in distinct stages the choice of data, the completion of the assessments themselves, and the formulation of advice. Requesting an independent panel to write the advisory reports, based on the work of the previous two workshops, provides for greater neutrality of the advice, particularly if the panelists change from one assessment to the next as seems to be the case.

The data chosen by the Data Workshops and used by the Assessment Workshops are considered adequate, appropriate and properly used. However, in the assessment for the South Atlantic gag grouper, using both the headboat and handline cpue in the assessment is unlikely to be correct: the two indices are weakly negatively correlated and both are unlikely to be correct. For the Gulf of Mexico assessment, the age range should be extended to age 20 as is done in the SA assessment.

The forward projections statistical catch at age approach used in the two assessments is considered appropriate and superior to traditional VPA approaches. The models used should be incorporated in the NFT package to ensure that they conform to Model Acceptance note 1 of the Terms of References of the Assessment Workshops.

The results of the GOM assessment suggest that the main results of management appear to have been to increase mortality by increasing regulatory discards.

Standard fisheries methods based on yield per recruit analyses may not be appropriate for species that change gender during their lifetime. Spawner recruit analyses should consider males and females reproductive biomasses separately. In the case of gag grouper, male biomass may become limiting before female biomass does. In this context, projections of future population status should be provided by gender in the next assessment.

Information on the number, location and persistence of spawning aggregations should be obtained and presented in future assessments in order to identify essential habitat (if this information is not already available).

A further examination of stock structure should be completed before the next assessment, including a detailed analysis of existing tagging data and, possibly, the initiation of new tagging experiments to estimate mixing rates and the associated fishing mortality independent of the commercial fishing. This would necessitate an effective design for estimating tagging mortality, tagging shedding, reporting rates to increase confidence in the stock assessments.

Background

SEDAR (South East Data, Assessment, and Review) is a process for fisheries stock assessment development and review conducted by the South Atlantic, Gulf of Mexico, and Caribbean Fishery Management Councils; NOAA Fisheries Southeast Fisheries Science Center (SEFSC) and Southeast Regional Office (SERO); and the Atlantic and Gulf States Marine Fisheries Commissions. SEDAR is organized around three workshops: data, assessment, and review. Input data are compiled during the data workshop, population models are developed during the assessment workshop, and an independent peer review of the data, assessment models, and results is provided by the review workshop. SEDAR documents include working papers prepared for each workshop, supporting reference documents, and a SEDAR Stock Assessment Report. The SEDAR Stock Assessment Report consists of a data report produced by the data workshop, a stock assessment report produced by the assessment workshop, and a peer review consensus report and advisory report prepared by the review workshop.

SEDAR is a public process conducted by the Fishery Management Councils in the Southeast US. All workshops, including the review, are open to the public and noticed in the Federal Register. All documents prepared for SEDAR are freely distributed to the public upon request and posted to the SEDAR website. Public comment during SEDAR workshops is taken on an 'as needed' basis; the workshop chair is allowed discretion to recognize the public and solicit comment as appropriate during panel deliberations. The names of all participants, including those on the Review Panel, are revealed.

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, correction of errors, and sensitivity runs of the assessment model provided by the assessment workshop. The review panel is ultimately responsible for ensuring that the best possible assessment is provided through the SEDAR process. The review panel task is specified in Terms of Reference.

The SEDAR 10 review panel was composed of 3 CIE-appointed reviewers and a chair appointed by the SEFSC director. Council staff, Council members, and Council AP and SSC members attended as observers. Few members of the public attended the SEDAR 10 review workshop.

Description of the review activities

The assessments documents were received on June 12 and 13 and they were read and analyzed prior to the Review Workshop.

The SEDAR 10 Review Workshop took place in Atlanta, Georgia, June 26-30, 2006 and reviewed two gag groupers stock assessments one for South Atlantic gag grouper and one for Gulf of Mexico gag grouper. On Monday, June 26, the Review Workshop Panel

received a presentation from the South Atlantic gag grouper assessment team, and on Tuesday, June 27, a similar presentation from the Gulf of Mexico gag grouper assessment team. The balance of the week, through Thursday afternoon, was devoted to additional discussion with the assessment teams to refine and better understand the assessments. Draft versions of the two advisory reports were discussed on Thursday. All parts of the meeting, with the exception of Friday morning, were open to the public. On Friday, the Panel discussed initial drafts of the Consensus Summary documents.

The advisory and consensus reports were finalized on July 25, 2006.

The two assessment teams were very responsive to requests for additional analyses and clarifying information. All SEDAR 10 attendees provided helpful feedback and suggestions during discussion of initial drafts of Review Workshop documents.

The organization of SEDAR 10 in two gag grouper stocks assessed via a common Data Workshop and concurrent and complementary Assessment Workshops was considered useful as it allowed not only better understand the individual stock assessments but to make comparisons between the two stock areas.

Summary of findings

The SEDAR process is structurally sound by separating in distinct stages the choice of data, the completion of the assessments themselves, and the formulation of advice. Requesting an independent panel to write the advisory reports, based on the work of the previous two workshops, provides for greater neutrality of the advice, particularly if the panelists change from one assessment to the next, as seems to be the case.

Findings under each of the nine review workshop terms of references are provided below:

1. Evaluate the adequacy, appropriateness, and application of data used in the assessment.

The biological parameters (growth, maturity, natural mortality, gender changes) for the two stock areas appear sufficiently close that it could be worthwhile re-estimating them on pooled data and using the derived parameters for both stock areas.

In the South Atlantic, the age range tabulated in the analyses extends to age 20 while in the Gulf of Mexico (GOM) it extends to age 12. In the GOM, the age range used in the assessment could be extended to age 20, as in the assessment for the South Atlantic. The current age range in the GOM is close to the age at which gag grouper change gender. Extending the age range to age 20 could make it easier to estimate selectivity for older ages, should changes occur at or around gender change.

In the South Atlantic, there is a marginally significant negative correlation between the headboat and the commercial handline cpue indices. The two indices were incorporated in the same assessment model. Both indices are unlikely to be correct. Additional model runs made during the review workshop indicated that removing the headboat cpue resulted in rapidly increasing SSB in recent years, while removing the commercial handline CPUE resulted in the lowest SSB value in the terminal year (Figure 12 in the Advisory report). Both indices cannot be reliable indices of SSB and the average result obtained by including both indices is unlikely to be correct. A way of displaying the influence of each data source on the final assessment results should be found and shown in the next assessment.

The data chosen by the Data Workshops and used by the Assessment Workshops are considered adequate, appropriate and properly used.

2. Evaluate the adequacy, appropriateness, and application of methods used to assess the stock.

The main assessment model for both stock areas is a statistical catch at age model, but the implementations differ. For the South Atlantic a customized model has been developed using ADMB while for the Gulf of Mexico, an existing software (CASAL (C++ algorithmic stock assessment laboratory) can be downloaded from <ftp://ftp.niwa.co.nz/software/casal>) was used. CASAL was one of several integrated assessment software recently evaluated by the IATTC; the report can be downloaded at <http://www.iattc.org/PDFFiles2/Assessment-methods-WS-Nov05-ReportENG.pdf>. For the South Atlantic, a production model (ASPIC) was also run and for the Gulf of Mexico two VPA's were run: one was a strict continuity run and the other one was parameterized to mimic the CASAL run. VPA was not used in the South Atlantic because of insufficiently complete catch at age information. The statistical catch at age approach has better statistical foundations and more flexibility in the type of information that can be used than VPA or general production models. Alternate assessment approaches (ASPIC for the South Atlantic and VPA for the Gulf of Mexico) should continue to be used in parallel and the results should be presented in the report of the Assessment Workshops. Standard inputs (catch at age, length at age, weights at age, indices of stock size (by age and length if appropriate) and outputs (population numbers at age, population biomass at age, spawning biomass, fishing mortality at age) should be provided in a format easily readable by spreadsheet programs. Neither of the assessments considers gender explicitly. Given that the species does change gender during its development, explicit consideration of gender should be included in future assessments, particularly in projections.

Although the approach has been used in the assessment of other species, it is not clear that the ADMB statistical catch at age implementation for the South Atlantic gag grouper conforms to the Model Acceptance Note 1 in the ToRs of the AW. The assessment team is encouraged to provide the required documentation and work towards including the assessment in the NFT packages. Presumably, the

evaluation performed by the IATTC implies that the CASAL software used for the GOM gag grouper does conform to the Model Acceptance Note 1. If this is the case, perhaps CASAL should be included in the NFT package as well.

A method to show the influence of each data sources in the final results of the assessment should be developed and used in the next assessment.

Overall, the methods used are considered adequate, appropriate and properly used.

3. Recommend appropriate estimates of stock abundance, biomass, and exploitation.

The estimates of stock abundance, biomass and exploitation provided by the constant catchability runs are considered useful descriptions of the dynamics of the stocks for both the South Atlantic and the Gulf of Mexico gag groupers. Although there is no doubt that catchability has changed over time, it is unlikely that a constant 2% increase per year adequately describes the changes in catchability that are likely to have occurred. Step changes with the introduction of new equipment or management measures are more likely than monotonic changes. Learning and technological changes in navigation, fish detection and catching equipment have no doubt increased the efficiency of nominal fishing effort. However, management measures (increases in minimum size, time and area closures, bag limits) and changes in fishing behavior (moving on when “enough” fish have been caught) would be expected to result in decreased catchability. Overall, catchability is likely to have increased and a special workshop should be convened to estimate and quantify changes in catchability over the last 25 to 30 years. Such a workshop should involve people from the fishing sector, and social science methods (e.g. Delphi) could be used to obtain estimates of the effect of management measures and technological changes.

For both stock areas, the assessments show a retrospective pattern whereby adding more data to the assessment results in higher estimates of population size and lower estimates of exploitation rates. Retrospective patterns in that direction are not cause for concern from a conservation perspective as subsequent assessments show that the stocks were larger than previously thought. However, they may be a cause for concern from a credibility perspective and the reasons for the retrospective pattern should be investigated.

For both stock areas (see Summary comparison of the assessment results for the two stock areas later in this report), initially, increased fishing mortality resulted in decreased SSB from the early 1960s to the mid 1970s, for the GOM, and to the mid 1980s for the South Atlantic. However, although F has remained high since the early 1980s, SSB has been increasing. It is not impossible that for a species like gag grouper, increasing exploitation, up to a point, may increase production. In the GOM, neither F_{MSY} nor B_{MSY} were stable under the various sensitivity runs. In this context, it might be more instructive to look empirically at the history of the

fishery and of the reconstituted stock trajectories in the assessment. Doing this shows that the SSB is estimated to have been increasing since the early 1990s at fishing mortality rates in the order of $F = 0.30$. Defining the Maximum Fishing Mortality Threshold at a value about half the F at which the SSB has been observed to increase may be overly conservative, particularly if the abundance of large male groupers were a limiting factor on productivity.

The results of the GOM assessment suggest that the main results of management appear to have been to increase mortality by increasing regulatory discards.

4. Evaluate the methods used to estimate population benchmarks and management parameters (*e.g.*, MSY , F_{msy} , B_{msy} , $MSST$, $MFMT$, or their proxies); provide values for management benchmarks, range of ABC, and declarations of stock status.

In both stock areas, the stock and recruitment scatter plot do not suggest that recruitment is strongly linked with SSB. In the South Atlantic, the Beverton and Holt relationship indicates little change in recruitment for a wide range of SSB's and B_{MSY} falls in the range of SSB's observed in the past. The Ricker relationship indicates that maximum recruitment occurs at SSBs lower than those observed over the period of the assessment, which implies that B_{MSY} would also be lower than those observed in the period of the assessment. In the Gulf of Mexico both the Beverton and Holt and Ricker relationships suggest that considerably higher recruitment would result from larger SSBs and B_{MSY} is estimated to be higher than SSB's observed in the past. The stock recruitment relationships in the two stock areas are equally uncertain. The derived benchmarks are considered useful for management in the South Atlantic, because they are within the range of past observed values. In the Gulf of Mexico, more stock and recruitment observations are necessary to confirm that the benchmarks estimated in the current assessment are indeed attainable.

$MSST$, defined as $(1-M) * B_{MSY}$, would be very close to B_{MSY} because $M = 0.14$ is used. Given the uncertainties in the assessment, the biomass would be expected to be estimated to fall below $MSST$ with a relatively high frequency even if in fact the real biomass was close to B_{MSY} . In addition, $MSST$ as currently defined may be overly conservative for the South Atlantic. There are no indications of impaired recruitment at the lowest observed SSB (around 5 million lbs) and the $MSST$ could be set at 5 million lbs as an operational definition to be re-examined at the next assessment. In the Gulf of Mexico, there are indications that recruitment could become impaired below 20 million lbs and $MSST$ could be set at 20 million lbs as an operational definition to be re-examined at the next assessment.

For the Gulf of Mexico, the numerical value for the $MFMT$ ($F_{30\%SPR}$ ($FMSY$ Proxy)) estimated in the current assessment (0.17) is not consistent with the dynamics of gag grouper: the stock has apparently increased as a result of good recruitment under estimated fishing mortality rates that have fluctuated around an

average value of $F = 0.30$ since the early 1980s. Although advice on MFMT cannot be provided, it would be prudent to reduce fishing mortality below $F = 0.30$.

Yield per recruit analyses used to calculate the FMSY proxy mentioned above could be seriously misleading for a species like gag grouper that changes gender during its lifetime. Y/R analyses are intrinsically biased towards the protection of juveniles – they suggest that juveniles should be allowed to grow in order to harvest more weight from a given number of fish. For species with balanced sex ratio by age and size, Y/R do provide an economical way of identifying biological reference points. However, for a species like gag grouper where individuals are all born females and subsequently change gender to become male, maximizing the mass harvested, regardless of gender would imply harvesting most individuals before they change gender to become males, with possible negative consequences on the reproductive potential of the resource. This is unlikely in these cases, as the Y/R analyses suggest low fishing mortality, but if the selectivities at age were modified to maximize yield per recruit, other results could be obtained. Reference points for species that change gender during their lifetime should explicitly take into account this feature. In particular, it would be necessary to find out when males are expected to become a limiting factor.

Standard fisheries methods based on yield per recruit analyses may not be appropriate for species that change gender during their lifetime. Spawner recruit analyses should consider male and female reproductive biomasses separately. In the case of gag grouper, male biomass may become limiting before female biomass does.

5. Evaluate the adequacy, appropriateness, and application of the methods used to project future population status; recommend appropriate estimates of future stock condition.

For the South Atlantic, the projections were done using population numbers from the preferred run (constant catchability)

For the Gulf of Mexico, initial attempts to use the CASAL software to make the projections using a different stock recruitment relationship than that used in the assessment portion of the modeling resulted in the recalculation of all the population estimates for 1963 to 2004. Therefore, the projections could not be completed during the Review Workshop, and those were calculated subsequent to the Review Workshop using population numbers from the (constant catchability) preferred run and provided to the Panel.

Projections should be done by gender in future assessments.

6. Ensure that stock assessment results are clearly and accurately presented in the Stock Assessment Report and that reported results are consistent with Review Panel recommendations.

The assessment reports available at the Review Workshop were reasonably clear but would benefit from a one page summary of the main results of the assessment.

The Review Panel, with the help of the assessment teams, has attempted to write the advisory reports in as clear and succinct a language as is possible.

There are no mechanisms for the Review Panel to ensure that the stock assessment reports, which are the responsibility of the assessment teams and, possibly, completed after the Review Workshop, are consistent with the Review Panel recommendations. However, the assessment teams were responsive to our recommendations and we have every reason to believe that they will be incorporated in addenda to the assessment documents.

7. Evaluate the performance of the Data and Assessment Workshops with regard to their respective Terms of Reference; state whether or not the Terms of Reference for those previous workshops were met and are adequately addressed in the Stock Assessment Report.

The terms of reference of the Data and Assessment Workshops were met and were adequately addressed in the Stock Assessment Report.

8. Review research recommendations provided by the Data and Assessment workshops and make any additional recommendations warranted.

The recommendations made in the Data and Assessment workshops are reasonable but need to be prioritized.

Additional recommendations are provided below.

Information on the number, location and persistence of spawning aggregations should be obtained and presented in future assessments in order to identify essential habitat (if this information is not already available).

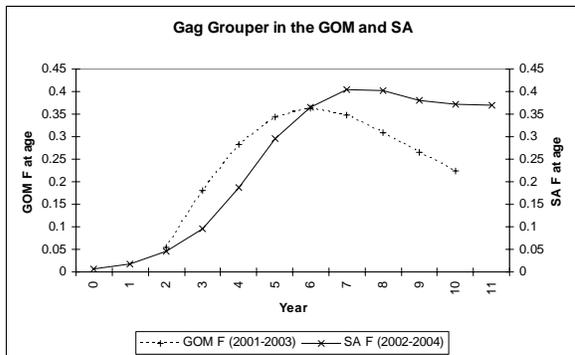
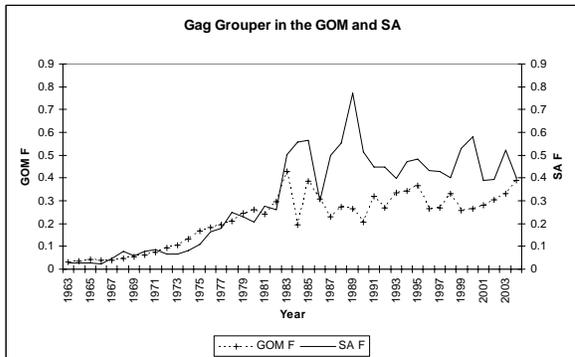
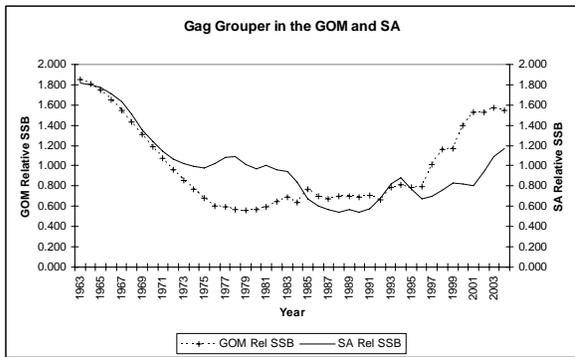
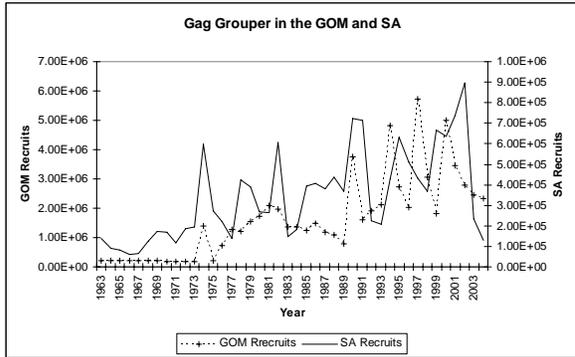
A further examination of stock structure should be completed before the next assessment, including a detailed analysis of existing tagging data and, possibly, the initiation of new tagging experiments to estimate mixing rates and the associated fishing mortality independent of the commercial fishing. This would necessitate an effective design for estimating tagging mortality, tagging shedding, reporting rates to increase confidence in the stock assessments.

9. Prepare a Peer Review Consensus Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference.

Prepare an Advisory Report summarizing key assessment results. (Reports to be drafted by the Panel during the review workshop with a final report due two weeks after the workshop ends.)

The Advisory Reports were prepared by the Review Workshop with considerable help from the assessment teams. The text of both Advisory Reports was finalized by e-mail by the Review Workshop Panel. Consensus summaries summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference were drafted during the Review Workshop and finalized by e-mail by the Review Workshop panelists on July 25, 2006.

Summary comparison of the assessment results for the two stock areas.



The development of the stocks has been similar, presumably because the fisheries have followed similar paths.

In both stock areas, recruitment has increased in recent years, although the increase is more pronounced in the Gulf of Mexico than in the South Atlantic. Recruitment is estimated to have been about 5 times higher, on average, in the Gulf of Mexico than in the Atlantic.

For both stocks, relative SSB's were high in the early 1960s, declined more or less regularly until the early 1990s when both started to increase. The 2004 SSB in the Gulf of Mexico is almost 60% above average, close to the maximum observed in the early 1960s, while for the South Atlantic, the 2004 SSB is 20% above average.

Estimated fishing mortality increased at a very similar rate from the early 1960s to the early 1980s. Since then, both have fluctuated without a clear trend around an average of 0.48 in the South Atlantic and about 0.30 in the Gulf of Mexico.

Average fishing mortality at age (2001-2003 for the GOM, 2002-2004 for the SA) show different patterns. F's are higher at age 3-5 in the Gulf of Mexico than in the South Atlantic but at older ages the pattern is the opposite. The F at age pattern is clearly dome shaped in the Gulf of Mexico and nearly flat topped in the South Atlantic.

Conclusion and Recommendations

The SEDAR process is structurally sound by separating in distinct stages the choice of data, the completion of the assessments themselves, and the formulation of advice. Requesting an independent panel to write the advisory reports, based on the work of the previous two workshops, provides for greater neutrality of the advice, particularly if the panelists change from one assessment to the next as seems to be the case.

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Appendix 1 – Bibliography of material reviewed

The following is the list of material available. Not all working papers were consulted, but the assessment documents were read, and relevant working papers consulted. In addition, previous assessments were consulted for both stock areas.

SEDAR10 Gulf of Mexico and South Atlantic Gag Grouper Final Workshop Document List

Document #	Title	Authors
Documents Reviewed at the Data Workshop		
SEDAR10-DW1	Metadata for gag tagging data	McGovern, J., P. Harris
SEDAR10-DW2	Age, Length, and Growth of Gag from the NE Gulf of Mexico 1979-2005	Lombardi-Carlson, L. A., G. R. Fitzhugh, B. A. Fable, M. Ortiz, C. Gardner
SEDAR10-DW3	Update of gag reproductive parameters: Eastern Gulf of Mexico	Fitzhugh, G. R., H. M. Lyon, L. A. Collins, W. T. Walling, L. Lombardi Carlson
SEDAR10-DW4	Standardized Catch Rates of Gag from the United States headboat fishery in the Gulf of Mexico during 1986-2004	Brown, C. A.
SEDAR10-DW5	Description of MARMAP sampling program	Harris, P.
SEDAR10-DW6	Analysis of Preliminary Results for the Release of Satellite-Tracked Drifters over Gag Spawning Sites	Lesher, A. T., G. R. Sedberry
SEDAR10-DW7	Preliminary Notes on FL Gag Data and Trip Ticket Map	Brown, S.
SEDAR10-DW8	Review of Tagging Data for gag grouper from the Southeastern Gulf of Mexico region 1985-2005	Ortiz, M. K. Burns, J. Sprinkel
SEDAR10-DW9	Standardized catch rates for gag grouper from the MRFSS	Ortiz, M.
SEDAR10-DW10	Standardized catch rates for gag grouper from the United States Gulf of Mexico handline fishery during 1993-2004	McCarthy, K. J.
SEDAR10-DW11	Estimates of gag grouper discard by vessels with Federal Permits in the Gulf of Mexico	McCarthy, K. J.

SEDAR10-DW12	NOAA Fisheries Reef Fish Video Surveys: Yearly indices of abundance for Gag	Gledhill, C. T., G. W, Ingram, K. R. Rademacher, P. Felts, B. Trigg.
SEDAR10-DW-13	Report of a gag age workshop	Reichert, M., G. Fitzhugh, J. Potts
SEDAR10-DW-14	QA/QC procedures used for TIP online data	Gloeckner, D.
SEDAR10-DW-15	Analytical report on the age, growth, and reproductive biology of gag from the Southeastern United States	Reichert, M. , D. Wyanski
SEDAR10-DW-16	Gag history of management in the Gulf of Mexico	Rueter, J.
SEDAR10-DW-17	Overview of gag material in Draft SAFMC Snapper-Grouper Amendment 13B	Waugh, G.
SEDAR10-DW-18	Standardized catch rate indices for gag grouper landed by the US Gulf of Mexico longline fishery during 1993-2004	Cass-Calay, S. L.
SEDAR10-DW-19	Standardized catch rates of gag from the commercial handline fishery off the Southeastern United States	Shertzer, K.
SEDAR10-DW-20	Standardized catch rates of gag from the headboat fishery off the Southeastern United States	Cheshire, R., K. Shertzer
SEDAR10-DW-21	Recreational landings and length data summary for South Atlantic gag (DELETED FOLLOWING WORKSHOP DUE TO INCLUSION OF CONFIDENTIAL DATA)	Cheshire, R, and D. Vaughan
SEDAR10-DW-22	Commercial landings and length data summary for South Atlantic gag. (DELETED FOLLOWING WORKSHOP DUE TO INCLUSION OF CONFIDENTIAL DATA)	Gloeckner, D., D. Vaughan
SEDAR10-DW-23	Effect of some variations in sampling practices on the length frequency distribution of gag groupers caught by commercial fisheries in the Gulf of Mexico	Chih, C-P
SEDAR10-DW-24	Estimation of species misidentification in the commercial landing data of gag groupers and black groupers in the Gulf of Mexico	Chih, C-P., S. Turner
SEDAR10-DW-25	Habitat use by juvenile gag in subtropical Charlotte Harbor, FL.	Casey, J. P., G. R. Poulakis, P. W. Stevens

SEDAR10-DW-26	Recreational survey data for gag and black grouper in the Gulf of Mexico.	Phares, P., V. Matter, S. Turner
SEDAR10-DW-27	Spatial distribution of headboat trips from the Florida Keys	Matter, V. M.
SEDAR10-DW-28	Species ID south Atlantic – ETA 1 week post workshop	Chih
SEDAR10-DW-29	Council Boundaries	anon
SEDAR10-DW-30	Annual indices of abundance for gag from Florida Estuaries	Igram, W., T. Macdonald, L. Barbieri
SEDAR10-DW-31	Age composition information South Atlantic	Potts, J.
ASSESSMENT WORKSHOP DOCUMENTS		
SEDAR10-AW1	SEDAR 10 stock assessment model, US South Atlantic gag	Williams, Erik H.
SEDAR10-AW2	Preliminary status of gag grouper in the Gulf of Mexico: continuity run VPA, SEDAR 10	Ortiz, M.
SEDAR10-AW3	Preliminary status of gag grouper in the Gulf of Mexico, SEDAR 10	Ortiz, M.
REVIEW WORKSHOP DOCUMENTS		
SEDAR10-RW01	Virtual population analysis of the Gulf of Mexico gag grouper stock: the continuity case.	Sladek-Nowlis, J.
SEDAR10-RW02	Status review of gag grouper in the US Gulf of Mexico, SEDAR 10.	Ortiz, M
FINAL SEDAR REPORTS		
SEDAR10-SAR1	South Atlantic Gag Grouper SEDAR Assessment Report	
SEDASR10-SAR2	Gulf of Mexico Gag Grouper SEDAR Assessment Report	
Research Documents		
SEDAR10-RD01	Exegeses on Linear Models	Venables, W.N.
SEDAR10-RD02 1977	A reformulation of Linear Models J. Royal Stat. Soc. A 140(1):48-77	Nelder, J. A.

SEDAR10-RD03 1999	Stock identification of gag along the Southeast coast of the United States Mar. Biotechnol. 1, 137-146.	Chapman, R. W., Sedberry, G. R. , C. C. Koenig, B. M. Eleby
SEDAR10-RD04 2005	A tag and recapture study of gag off the Southeastern US Bull Mar Sci 76(1)47-59.	McGovern, J. C., et al
SEDAR10-RD05 1983	Empirical use of longevity data to estimate mortality rates FishBull 82(1)898-903	Hoenig, J.M.
SEDAR10-RD06 2005	Bycatch, discard composition, and fate in the snapper grouper commercial fishery, North Carolina NCSU/CMAST Proj 04-FEG-08	Rudershausen, P. J., A. Ng, A. Ng, J. A. Buckel
SEDAR10-RD07 2007	CASAL users manual version 2.07-2005/08/21 NIWA Tech Rpt.127. ISSN 1174-2631	Bull, B. et al
SEDAR10-RD08 1994	Simulation of the impact of fishing on reproduction of a protogynous grouper, the graysby. NAJFM 14:41-52	Huntsman, G. R. and W. E. Schaaf.
SEDAR10-RD09	Review of effects from fishing mortality on protogynous species and implications for management	SEFSC/MIA SFD Presentation
SEDAR10-RD10 2006	Models to compare management options for a protogynous fish. Ecolog. Apps. 16(1):238-249	Heppell, S. S. et al
SEDAR10-RD11 2004	The effects of size-selective fisheries on the stock dynamics of and sperm limitation in sex changing stocks. Fish Bull 102(1):1-13.	Alonzo, S. H., M. Mangel.
SEDAR10-RD12 2001	Effects of fishing on a protogynous hermaphrodite CJFAS. 58:568-578.	Armsworth, P. R.
SEDAR10-RD13 1996	Production Functions of the Norwegian bottom trawl fisheries of cod in the Barents Sea th 84 ICES Statutory Meeting	Skjold, F., A. Eide, O. Flaaten
SEDAR10-RD14 1998	The impact of global positioning systems and plotters on fishing power in the northern prawn fishery, Australia Can. J. Fish. Aquat. Sci. 55 : 1645.1651	Robins, C. M., Y.-G. Wang, D. Die

SEDAR10- RD15 1998	Changes in the sex ratio and size at maturity of gag, <i>Mycteroperca microlepis</i> , from the Atlantic Coast of the Southeastern United States, 1976-1995 Fish Bull 96:797-807	McGovern et al.
SEDAR10- RD16	Release mortality of undersized fish from the snapper-grouper complex off the North Carolina Coast. NC SEAGRANT 03-FEG-21	Overton, A. S., J. Zabawski

Appendix 2 – Statement of work

Consulting Agreement Between the University of Miami and Jean-Jacques Maguire

**Statement of Work
SEDAR 10 Stock Assessment Review
Gulf of Mexico Gag Grouper and South Atlantic Gag Grouper
June 26 - 30, 2006
Atlanta, Georgia**

SEDAR Overview:

South East Data, Assessment, and Review (SEDAR) is a process for fisheries stock assessment development and review conducted by the South Atlantic, Gulf of Mexico, and Caribbean Fishery Management Councils; NOAA Fisheries Southeast Fisheries Science Center (SEFSC) and Southeast Regional Office (SERO); and the Atlantic and Gulf States Marine Fisheries Commissions. SEDAR is organized around three workshops: data, assessment, and review. Input data are compiled during the data workshop, population models are developed during the assessment workshop, and an independent peer review of the data, assessment models, and results is provided by the review workshop. SEDAR documents include working papers prepared for each workshop, supporting reference documents, and a SEDAR Stock Assessment Report. The SEDAR Stock Assessment Report consists of a data report produced by the data workshop, a stock assessment report produced by the assessment workshop, and a peer review consensus report and advisory report prepared by the review workshop.

SEDAR is a public process conducted by the Fishery Management Councils in the Southeast US. All workshops, including the review, are open to the public and noticed in the Federal Register. All documents prepared for SEDAR are freely distributed to the public upon request and posted to the SEDAR website. Public comment during SEDAR workshops is taken on an 'as needed' basis; the workshop chair is allowed discretion to recognize the public and solicit comment as appropriate during panel deliberations. The names of all participants, including those on the Review Panel, are revealed.

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, correction of errors, and sensitivity runs of the assessment model provided by the assessment workshop. The review panel is ultimately responsible for ensuring that the best possible assessment is provided through the SEDAR process. The review panel task is specified in Terms of Reference.

The SEDAR 10 review panel will be composed of 3 CIE-appointed reviewers and a chair appointed by the SEFSC director. Council staff, Council members, and Council AP and SSC members will attend as observers. Members of the public may attend SEDAR review workshops.

CIE Request:

NMFS-SEFSC requests the assistance of three fisheries assessment scientists from the CIE to serve as technical reviewers for the SEDAR 10 review panel that will consider assessments for Gulf of Mexico gag grouper and South Atlantic gag grouper. Reviewer tasks are listed below.

The species assessed through SEDAR 10 are within the jurisdiction of the Gulf of Mexico Fishery Management Council, the South Atlantic Fishery Management Council, and respective southeastern states.

The review workshop will take place at the Doubletree Buckhead Atlanta, from 1:00 p.m. Monday, June 26, 2006 through 1:00 p.m. Friday, June 30, 2006.

Meeting materials will be forwarded electronically to review panel participants and made available through the internet (<http://www.sefsc.noaa.gov/sedar/>); printed copies of any documents are available by request. The names of reviewers will be included in workshop documents.

Please contact John Carmichael (SEDAR Coordinator; 843-571-4366 or John.Carmichael@safmc.net) for additional details.

Hotel arrangements:

Doubletree Buckhead
3342 Peachtree Road NE
Atlanta, GA 30326

(800) 222-8733; (404) 231-1234

FAX (404) 231-5236

Group Rate \$115 + 15% tax (\$17.25) = \$132.25; guaranteed through Monday, June 5, 2006.

SEDAR Review Workshop Panel Tasks:

The SEDAR 10 Review Workshop Panel will evaluate assessments of Gulf of Mexico and South Atlantic gag grouper. During the evaluation the panel will consider input data, assessment methods, and model results. The evaluation will be guided by Terms of Reference that are specified in advance. For each stock assessed the Review Workshop panel will document its findings in a Peer Review Consensus Summary and summarize assessment results in a Peer Review Advisory Report.

SEDAR 10 Review Workshop Terms of Reference (apply to each assessment):

1. Evaluate the adequacy, appropriateness, and application of data used in the assessment.
2. Evaluate the adequacy, appropriateness, and application of methods used to assess the stock.
3. Recommend appropriate estimates of stock abundance, biomass, and exploitation.
4. Evaluate the methods used to estimate population benchmarks and management parameters (*e.g., MSY, Fmsy, Bmsy, MSST, MFMT, or their proxies*); provide values for management benchmarks, a range of ABC, and declarations of stock status.

5. Evaluate the adequacy, appropriateness, and application of the methods used to project future population status; recommend appropriate estimates of future stock condition.
6. Ensure that reported results are consistent with Review Panel recommendations.
7. Evaluate the SEDAR Process. Review performance of the Data and Assessment Workshops with regard to their respective Terms of Reference; state whether or not the Terms of Reference for those previous workshops were met and are adequately addressed in the Stock Assessment Report; suggest any changes or improvements to the process.
8. Review research recommendations provided by the Data and Assessment workshops and make any additional recommendations warranted.
9. Prepare a Peer Review Consensus Summary for each assessment summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference. Prepare an Advisory Report for each assessment summarizing key assessment results. (Reports to be drafted by the Panel during the review workshop. Final drafts are due to the Chair within 2 weeks (July 14, 2006). Final reports are due to the SEDAR Coordinator one week later (July 21, 2006).

NOTE: These Terms of Reference may be modified prior to the Review Workshop. Final Terms of Reference will be provided to the Reviewers with the workshop briefing materials.

SEDAR Review Workshop Panel Supplementary Instructions

The review panel Chair is responsible for conducting the meeting during the workshop in an orderly fashion. The Chair is responsible for compiling and editing the Peer Review Consensus Summary and Peer Review Advisory Report for each species assessed and submitting them to the SEDAR Coordinator by a deadline specified by the SEDAR Steering Committee.

Review panel reviewers are responsible for reviewing documents prior to the workshop, participating in workshop discussions addressing the terms of reference, preparing assessment summaries and consensus reports during the workshop, and finalizing workshop documents within two weeks of the conclusion of the workshop. Each reviewer appointed by the CIE is responsible for preparing an additional CIE Reviewer Report as described in Annex 1.

The Chair and SEDAR Coordinator will appoint one panelist to serve as assessment leader for each assessment reviewed. The leader will be responsible for providing an initial draft of consensus and advisory report text for consideration by the panel. However, as stated above, all panelists shall participate in preparation of report text.

The Review Panel's primary responsibility is to ensure that assessment results are based on sound science, appropriate methods, and appropriate data. During the course of review, the panel is allowed limited flexibility to deviate from the assessment provided by the Assessment Workshop. This flexibility may include modifying the assessment configuration and assumptions, requesting a reasonable number of sensitivity runs, requesting additional details and results of the existing assessments, or requesting

correction of any errors identified. However, the allowance for flexibility is limited, and the review panel is not authorized to conduct an alternative assessment or to request an alternative assessment from the technical staff present. The Review Panel is responsible for applying its collective judgment in determining whether proposed changes and corrections to the presented assessment are sufficient to constitute an alternative assessment. The Review Panel Chair will coordinate with the technical staff present to determine which requests can be accomplished and prioritize desired analyses.

Any changes in assessment results stemming from modifications or corrections solicited by the review panel will be documented in an addendum to the assessment report. If updated estimates are not available for review by the conclusion of the workshop, the review panel shall agree to a process for reviewing the final results.

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.

If the Review Panel finds an assessment deficient to the extent that technical staff present cannot correct the deficiencies during the course of the workshop, or the Panel deems that desired modifications would result in a new assessment, then the Review Panel shall provide in writing the required remedial measures, including an appropriate approach for correcting and subsequently reviewing the assessment.

Statement of Tasks for Technical Reviewers:

Roles and responsibilities:

1. Approximately 3 weeks prior to the meeting the CIE reviewers shall be provided with the stock assessment reports, 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, the reviewers shall participate in panel discussions on assessment methods, data, validity, results, recommendations, and conclusions as guided by the Terms of Reference. The reviewers also shall participate in the development of Peer Review Consensus Summary reports and the Peer Review Advisory Reports. Reviewers may be asked to serve as assessment leaders during the review to facilitate preparing first drafts of review reports.
3. Following the Review Panel meeting, the reviewers shall review and provide comments to the Panel Chair on the Peer Review Panel Reports. Final review panel documents shall be provided to the Chair by July 14, 2006.
4. Following the Review Panel meeting, the reviewers shall prepare a CIE Reviewer Report. This report shall be submitted to CIE no later than July 14, 2006, 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 Shivilani, via email to mshivilani@rsmas.miami.edu. See Annex I for complete details on the report outline.

It is estimated that the Review Panelist duties will occupy a maximum of 12 workdays each; several days prior to the meeting for document review; five 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 Shivilani at the CIE.

Submission and Acceptance of CIE Reports

The CIE shall provide via e-mail the three final CIE reviewer reports in pdf format to the NOAA Fisheries' COTR, Dr. Stephen K. Brown at Stephen.K.Brown@noaa.gov for review for compliance with this Statement of Work by July 28, 2006. The COTR shall notify the CIE via e-mail regarding acceptance of these reports by August 2, 2006. Following the COTR's approval, the CIE will provide pdf versions of the CIE reports with a digitally signed cover letter to the COTR via e-mail by August 4, 2006.

Once finalized and accepted by NOAA Fisheries, the CIE reviewer reports shall be distributed to:

SEFSC Director: Nancy Thompson, NMFS Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL 33149 (email, Nancy.Thompson@NOAA.gov)

SEDAR Coordinator: John Carmichael, SAFMC, One Southpark Circle, Suite 306, Charleston, SC 29407 (email, John.Carmichael@safmc.net)

Gulf of Mexico Fishery Management Council: Wayne Swingle, GMFMC, 2203 N. Lois Avenue, Suite 1100, Tampa, FL 33607 (email (Wayne.Swingle@gulfcouncil.org))

For Additional Information or Emergency:

SEDAR contact: John Carmichael, One Southpark Circle, Suite 306, Charleston, SC 29407. Phone: 843-571-4366; cell phone (843) 224-4559. Email: John.Carmichael@safmc.net.

ANNEX I: Contents of CIE Reviewer Reports

1. The reviewer reports 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. The summary of findings shall address the workshop Terms of Reference 1- 8 under the above heading "SEDAR Review Workshop Panel Tasks". Each reviewer's report shall address both

stocks. Reviewers are also encouraged to provide any criticisms and suggestions for improvement of the SEDAR process.

3. The reviewer report shall include as separate appendices the bibliography of materials provided for review and a copy of the CIE Statement of Work.