UM Independent System for Peer Reviews
Consultant Report on:

SEDAR 12 Stock Assessment Review
Gulf of Mexico Red Grouper
January 29 - February 2, 2007

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Executive Summary

The SEDAR 12 Gulf of Mexico red grouper stock assessment was updated and improved since the last assessment in 2002. This is the first time the stock assessment has been through the SEDAR process.

The SEDAR 12 Review Panel Report covers all comments on the review of the assessment results and the consensus scientific advice. This CIE report does not repeat anything in the consensus report, where the findings of the review will be found. This report mainly provides more detailed technical advice on the general recommendations in the consensus report:

- Research should focus on improving estimates on natural mortality and standardisations methods for the abundance indices. The results are sensitive to the uncertainties associated with these topics.
- The fact that red grouper is a protogynous hermaphrodite has implications for management, reference points and the assessment, which are not well understood. The current growth model could also be improved to take account possible life history characteristics, such density dependent growth.
- The method used to standardise the abundance indices could be improved. This report makes a series of suggestions on the model, likelihood and covariates used.
- Subjective estimates of the rate of change of the fishing power should be developed. It is quite possible that statistical standardisation cannot be achieved due to the lack of appropriate covariates. An approach for obtaining subjective parameter values is suggested.

Introduction

The red grouper stock assessed through the SEDAR 12 process is within the jurisdiction of the Gulf of Mexico Fishery Management Council and respective southeastern states. SEDAR is organized around three workshops: data, assessment, and review. This report concerns the review workshop, which took place at the Doubletree Buckhead Atlanta in Atlanta, GA, from 1:00 p.m. Monday, January 29, 2007 through 1:00 p.m. Friday, February 2, 2007. The independent peer review covers the data, assessment models, and results previously developed for and by the data and assessment workshops. The SEDAR documents include working papers prepared for each workshop, supporting reference documents, and a SEDAR Stock Assessment Report.

NMFS-SEFSC requested the assistance of three fisheries assessment scientists from the CIE to serve as technical reviewers that will consider the assessment of Gulf of Mexico red grouper. The review workshop produced a peer review consensus report and advisory report. The external reviewers were Stewart Frusher (Aus), John Casey (UK), and Paul Medley (UK) and the panel was chaired by Rick Methot (USA). The assessment team attending the workshop consisted of Craig Brown, Shannon Cass-Calay and Steve Turner.

The Review Panel Report covers all comments on the SEDAR review of the assessment results and the consensus scientific advice. This report does not repeat anything in this consensus report, and information on the findings of the review will be found there. This CIE report provides further more detailed advice which is not based on consensus, but may only be a personal view. The objective of this report is to be constructive in terms of recommendations for the future direction of research and development of the stock assessment.

Priority Research

While there are a number of recommendations in the Review Panel Report to increase the accuracy of the assessment, there are two which could change the qualitative results of the assessment.

1. Better estimates of natural mortality are required. Broadly, the total mortality is reasonably well understood through the age composition data. The allocation of this mortality between natural and fishing components is not properly estimated and therefore uncertain. How much is attributable to fishing has very great implications as to the status determination for the stock.
2. The fishery dependent abundance indices need improved standardisation. Whatever models or other aspects of the assessment are improved, the upward trend in abundance indices will always imply biomass is increasing and therefore the exploitation rate has been below MSY. If it turns out that the increasing trends are not due to abundance increases, but improved fishing power, the conclusion of the assessment will be quite different.

Research on these issues should be given priority over others, such as improving the model or the estimates of discard mortality. While other recommendations are important, they should improve the accuracy of the estimates of interest, but probably would not lead to significant shifts in determining the stock status.

Life History

Additional research is needed to estimate properly the potential recruit fecundity and to comprehend fully the impact of this reproductive strategy on the ability of such species to sustain fisheries. Red grouper are categorized as protogynous hermaphrodites, which first mature as females and then change to males. This has significant implications for growth and spawning indicators and reference points. Further research on the life history strategy of this species, perhaps through using individual-based models, could lead to improvements of the population model used.

Improved understanding of growth could be important in two ways. Firstly an accurate growth model is required for the interpretation of the length frequency data, which were under-used in this last assessment. Secondly, it was proposed that an apparent change in growth from the 1960s to the present was due to density dependent growth. Not taking into account density dependent growth could lead to a significant overestimate of the MSY reference points. The Review Panel Report recommends collecting otoliths from fish caught in the Dry Tortugas

marine reserve. This same sample could be used to improve the growth model, as the asymptotic size should be lower within the marine reserve if growth is affected by density dependence.

Standardising the Abundance Indices

The standardisation used in the red grouper assessment does not change the general trends in the nominal CPUE index, but is an attempt to try to make the index more accurate. The primary aim of standardisation is to remove all changes to indices of abundance due to changes in catchability. To accompany any standardisation model, at the very least, a narrative is required as to why the model is the form it is, and why it is not removing abundance related information from the index. This was absent in this case.

Overall, there was insufficient support for the GLM used to make it clear that the resulting indices are much better than the nominal CPUE. Technological change increasing fishing power, as considered through the sensitivity analysis, would be the main concern and needs to be addressed. To address changes in catchability, an additional 2% per year rate of increase was added to the catchability parameter to account for increases in fishing power. This was done because the Review Panel did not believe that the standardisation had achieved its main objective, to remove this effect.

I believe the most robust approach for calculating the indices is to adjust the nominal index (Y-variate) rather than use model parameter estimates. Using parameter estimates themselves as indicators, is more susceptible to errors from aliasing. If correlated parameters are used collectively, the final estimated index can be reasonable even if the individual parameter estimates are not. Generating indices in this way, for example, could allow year interaction terms in the standardising model, as long as the final indices would not be adjusted using these. The parameter correlation matrix would need to be inspected to ensure heavily correlated parameters are used together and not separated for calculating the standardised index.

Likelihood and Model Form

The following comments apply mainly to the commercial longline. However, the same principles apply to most gears in this fishery.

Ideally the GLM Y-variate should be the catch numbers of fish. Fish weights can be converted to numbers from average weight data, which should be able to adjust for annual, seasonal and location changes in size if necessary.

If possible standardisation should avoid using delta-lognormal approach that was used for standardising the red grouper indices. The best approach to the likelihood of the model would be based on either the binomial or poisson probability density functions. Taking the logarithm of the data is likely to lead to over-weighting smaller catches, and make dealing with zeros more complex than it needs be. Catching fish on hooks can be modelled as a poisson process (see Skellam 1958, Medley 1989), where species capture, bait loss and fish escape can be modelled as stochastic instantaneous rates. If hooks are distributed

randomly, the parameter rates interact to produce a probability of fish capture on each hook dependent on the hook soak time and average fish density across the area where the hooks were set. For a constant soak time and even density, the total catch in numbers of fish will form a binomial distribution where the number of trials is the number of hooks. Assuming fish aggregate and hooks are not set randomly, as in a longline, the catch can be modelled as a Markov chain, where the probability of a catch on any one hook can be made conditional on the catches on the previous run of hooks. The practical upshot of this is that if enough hooks are set, the total catch in numbers will asymptotically tend towards a poisson distribution (Cox and Miller 1965), where the mean is defined by the number of hooks multiplied by the overall probability that a hook catches a fish. This suggests a suitable GLM would be a quasi-likelihood binomial, multinomial or poisson model. Where the number of hooks are small in factor cells (including interaction term categories), a robust alternative likelihood model would be the beta-binomial. The beta-binomial requires an additional dispersion parameter, which would need to be fitted as a separate non-linear parameter. The GLM itself can be fitted using iteratively re-weighted least-squares in the normal way (McCullagh and Nelder 1989).

The effects on the catch rate are likely to be multiplicative, and therefore a log link function is appropriate. A good general form for the GLM linear predictor of longline catch would be:

$$lp = a\ln(Hooks) + \cdots$$

In this case, *a* could be either estimated close to 1.0 or forced to be 1.0, making catch proportional to the number of hooks in a multiplicative model. Estimating a value slightly less than 1.0 allows for local depletion and hook interference, and greater than 1.0 allows for targeting higher fish density. Values different from 1.0 are dangerous, however, as they may be attempting to explain changes in CPUE due to abundance where there has been a continuous change, as in this case. After $\ln(\text{hooks})$, the remaining linear predictor would represent the catch-per-hook and be directly interpretable as q. Any fit should also be presented with residuals plotted against expected values and other diagnostics.

The fish capture on hooks could be modelled using a multinomial. This model would estimate the catch of red grouper conditional on the total catch (all species) and the total catch conditional on the number of hooks. A multinomial multivariate model could be used for all species (red and gag grouper) simultaneously using the same conditional likelihood.

Covariates

If year-interaction terms are used in a model, having them as random effects (as in this assessment) is probably the best option. However, the additional random effects assumption does not eliminate the problem of the potential bias in the estimated trend if the year main effects terms are being used as the index. If the year main-effect estimates are being used, it is probably best not to have interaction terms at all.

The fishery independent longline survey, as well as being useful in the ways indicated in the Review Panel Report, could also be useful in helping to develop a good standardisation methodology for the commercial data. Analysis of the longline survey data could help to identify appropriate covariates which could be requested from commercial fishermen.

The hook type may affect the rate at which fish escape from the line. Circular hooks significantly reduce fish escaping once they have taken the bait. The line material will affect the fish loss and attractiveness of the hook, but it is likely that monofilament line will be standard and change little from vessel to vessel. Bait will effect the attractiveness of the hook, but again may not vary much among commercial vessels. The effect of GPS on catch rates is not clear. GPS and GIS provide a way of accumulating knowledge of when and where to fish, so use of GPS may not have an immediate effect on catch rates, but allow knowledge to increase more rapidly.

There are many potential covariates, but they would only prove useful if they are recorded and they exhibit sufficient variation to explain different catch rates. Speed of set and haul and hook soak time will determine how long each hook remains in the water. As it is likely that whether a hook has a fish is determined by a series of rates (the rate at which bait is lost, empty hooks catch fish of each species, and fish escape), soak time will be an important factor. The weather, tides and moon phase may affect fish activity and the effective fishing area of the hook. The depth and habitat would most likely reflect fish density.

Including area fished can raise the accuracy of the index as it removes the effect of permanent features within a region treated as a homogeneous stock. Fishermen use permanent oceanographic features (e.g. patch reefs) to raise their catch rates, although they may also make sets in different areas for operational reasons and reasons of cost. Accounting for catch rates in different areas generally helps remove these sorts of effects.

However, it is worth considering developing a habitat area weighted index instead of using the natural weight based on sample sizes. Using a weighting approach makes more sense if the catch rates reflect the population distribution. In contrast, the GLM approach is more appropriate if catch rates reflect some other factor dependent on the area, such as aggregating oceanographic features, bait loss to smaller fish, hooked fish loss to sharks and other predators and so on. It is not clear which of these apply in this case, but habitat mapping data is available so this approach could be looked at as an alternative.

Subjective Standardisation

If GLM cannot provide satisfactory results in that it is believed that available covariates cannot capture changes in fishing power, the assessment must resort to subjective information. The worst way to do this, which was necessary for this assessment, is to use the Review Panel's "consensus" value for the rate of catchability increase. The reviewers are not in a good position to provide this information. While in this case the sensitivity analyses ensured the likely range was covered, a more well-founded approach needs to be developed.

A subjective estimate of the catchability rate of change can be obtained from interviews with fishermen and others with the relevant experience (Bayesian subjective prior; Press, 1989 Chapter IV). This is appropriate for decision making in particular. An interview question might be based on the perceived change since a year on or after 1986, but before the present, with which the interviewee is familiar. The interviewee is asked what catch rate they expected at that time (per day, per set or per hook as appropriate), and what they might have expected had they had all the modern equipment they use now, including current knowledge of good fishing locations. It may be found easier to reverse the question, assuming that the previous equipment and knowledge is applied in the present day, how much lower catch rates might be. In any case, the appropriate question should be tested on a few subjects before the full sampling is undertaken. As the state of the stock would be the same in both cases, the only relevant change would be the catchability. The parameter estimate of the catchability for each fisherman interviewed can then be calculated as:

$$\partial_q = -\ln\left(\frac{CPUE_{-t}}{CPUE_0}\right)\Big/ t$$

The set of values obtained from each fisherman not only can be used for giving a point estimate, but also estimate the uncertainty for the parameter, either as a confidence range or full Bayesian prior using a density estimation procedure (Silverman 1986; Wand and Jones 1995).

The interview should also consider test questions to check that the interviewee understands what they are being asked, and that estimates given are consistent with the underlying model above. Incidentally, the same interview can also be used as a vehicle to identify appropriate covariates that can be used in the standardisation using GLMs.

There are two further considerations.

1. The catchability rate of change parameter may be better considered on the log-scale, so the appropriate central point of the distribution would be the geometric mean, and the estimates should be logged before density estimation. If negative or zero estimates for the parameter are given, this may need to be reconsidered; either a small limiting log value or delta-log approach might suffice.
2. The estimates of the parameters are given by individual fishermen for themselves, not the mean for the fleet. The model needs an estimate of the mean for all fishermen, so individual estimates are probably over dispersed. To better represent the uncertainty, the individual estimates ($[\ ]_j$) can be regressed towards the mean:

   $$\left[\hat{\partial}_q\right]_j = \left(\left[\partial_q\right]_j + \left(\sqrt{N} - 1\right)\overline{\partial_q}\right)\Big/\sqrt{N}$$

   where N = number of interviews, and $\overline{\partial_q}$ = mean value of the interviews.

   The estimates can be regressed equally well on the log or linear scale, as appropriate.

The catchability rate of increase should be applied to an unstandardised (nominal) CPUE index in the stock assessment model. Standardisation should not attempt to include a correction for catchability changes, although there might still be some justification for improving the accuracy of estimates through a GLM excluding factors related to catchability.

SEDAR Process

Improving communication between managers and the various workshops in the SEDAR process could avoid problems, and help improve management. The process currently provides scientific advice to managers, with the advice being based on definitions from the appropriate legislation. I believe that the SEDAR process might be improved if it could incorporate more two-way communication, more closely resembling a feedback cycle. Once the stock assessment settles down to a consistent form, management may wish SEDAR to address the costs and benefits from various management control options, such as catch limits, minimum size, closed area and effort limits, perhaps using decision tables. For this to be effective, the various working groups will need to know what management measures are being considered, how risk averse managers are and what the different objectives might be. There appears to be no way to obtain this information from managers at present.

An example of where problems might arise due to the lack of communication would be where managers decide to introduce controls, which impact the monitoring and data collection. Undermining the abundance indices could effectively prevent reliable assessments and the evaluation of the management measures. For example, age compositions have been affected by changing the minimum size limit in 1990. Other changes, fortunately, so far appear not to have been important. However, the trip limits introduced in 2005 could interfere with the effort measure for some fleets, as the amount of fishing within the trips may change in response. The full implication of measures needs to be considered.

References

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McCullagh P, Nelder JA (1989) Generalized linear models. Second Edition. Chapman and Hall, New York.

Medley, PAH (1989) Interaction between longline and purse seine in the south-west pacific tuna fishery. PhD Thesis, Imperial College, London.

Press, SJ (1989) Bayesian Statistics: Principles, models and applications. Wiley Series in Probability and Mathematics, John Wiley and Sons, New York.

Silverman, BW (1986) Density Estimation for Statistics and Data Analysis. Mongraphs on Statistics and Applied Probability 26. Chapman and Hall, London.

Skellam, JG (1958) The mathematical foundations underlying the use of line transects in animal ecology. Biometrics, 14.

Wand, MP, Jones, MC (1995) Kernel Smoothing. Mongraphs on Statistics and Applied Probability 60. Chapman and Hall, London.

Appendix I: SEDAR 12 Gulf of Mexico Red Grouper
Workshop Document List

Data Workshop Documents

SEDAR12-DW1 The use of an otolith reference collection to monitor age reader precision for red grouper (Epinephelus morio). Palmer, C. L., Farsky, R., A., Gardner, C., and Lombardi-Carlson, L. A.

SEDAR12-DW2 Bottom longline fishery bycatch of red grouper from observer data. Hale, L.

SEDAR12-DW3 Temporal and spatial trends in red grouper (Epinephelus morio) age and growth from the northeastern Gulf of Mexico: 1979-2005 Lombardi-Carlson, L., C. Palmer, C. Gardner and B. Farsky

SEDAR12-DW4 An update of Gulf of Mexico red grouper reproductive data and parameters for SEDAR 12 Fitzhugh , G.R., H.M. Lyon, W.T. Walling, C.F.Levins, and L.A. Lombardi-Carlson

SEDAR12-DW5 Catch rates, distribution and size/age composition of red grouper, *Epinephelus morio*, collected during NOAA Fisheries Bottom Longline Surveys from the U.S. Gulf of Mexico Ingram, W., M. Grace, L. Lombardi-Carlson and T. Henwood

SEDAR12-DW6 SEAMAP Reef Fish Survey of Offshore Banks: Yearly Indices of Abundance for red grouper (*Epinephelus morio*) Gledhill, C. T., G. W. Ingram, Jr., K. R. Rademacher, P. Felts, B. Trigg, and L. Lombardi-Carlson

SEDAR12-DW7 Research Trawl and Shrimp Bycatch Results Relevant to Red Grouper Nicholls, S.

SEDAR12-DW8 Spatial and temporal patterns in demographics and catch rates of red grouper from a fishery-independent trap survey in the northeast Gulf of Mexico, 2004-2005 De Vries, D.

SEDAR12-DW9 Length frequency distributions for red groupers caught by commercial fisheries in the Gulf of Mexico from 1984 to 2005 Chih, C-P.

SEDAR12-DW10 Selected sampling issues regarding the length/age frequency distributions of red groupers caught by commercial fisheries in the Gulf of Mexico from 1984 to 2005 Chih, C-P.

SEDAR12-DW11 Quantitative Historical Analysis of the United States and Cuban Gulf of Mexico Red Grouper Commercial Fishery Saul, S.

SEDAR12-DW12 Length Frequency Analysis of the Gulf of Mexico Recreational Red Grouper Fishery Saul, S.

SEDAR12-DW-13 Trends in Red Grouper Mortality Rates Estimated from Tag Recaptures (1990-2006) Porch, C. E.

SEDAR12-DW-14 Recreational Survey Data for Red Grouper in the Gulf of Mexico Matter, V. M.

SEDAR12-DW-15 Backcalculation of recreational catch of red grouper from 1945 to 1985 Walter, J. F.

SEDAR12-DW-16 Standardized catch rates for red grouper from the United States Gulf of Mexico handline, longline, and trap fisheries, 1990-2005 McCarthy, K. and S. Cass- Calay

SEDAR12-DW-17 Calculated red grouper discards by vessels with Federal permits in the Gulf of Mexico. McCarthy, K.

Assessment Workshop Documents

SEDAR12-AW02 Standardized Catch Rates Of Red Grouper (*Epinephelus Morio*) From The U.S. Headboat Fishery In The Gulf Of Mexico, 1986-2005. SFD-2006- 036. Cass-Calay, S

SEDAR12-AW03 Standardized Catch Rates Of Red Grouper (*Epinephelus Morio*) From The U.S. Recreational Fishery In The Gulf Of Mexico, 1986-2005. SFD-2006-037. Cass-Calay, S

SEDAR12-AW04 Discard Calculations McCarthy, K.

SEDAR12-AW05 Construction of a fisheries independent index of red grouper using data from the Dry Tortugas National Park, 1994-2004. anon

SEDAR12-AW06 Derived and observed catch at age from the Gulf of Mexico red grouper stock Nowlis, J. S. & 5 coauthors

SEDAR12-AW07 Age data evaluation Lombardi-Carlson, L

SEDAR12-AW08 Comparison of ALK and RAS methods for deriving age frequency distributions of red grouper caught by commercial fisheries in the Gulf of Mexico Chih, C-P.

Review Workshop Documents

SEDAR12-RW01 Gulf Council RFSAP report excerpts regarding red grouper assessments, 1999-2002. anon.

SEDAR12-RW02

SEDAR12-RD01 2006 FishBull 104:343-349 Depredation of catch by bottlenose dolphins (*Tursiops truncatus* in the Florida king mackerel (*Scomberomorus cavalla*) troll fishery. Zollet, E. A. and A. J. Read

SEDAR12-RD02 2002 SFD-01/02-175rev Draft status of red grouper in United States waters of the Gulf of Mexico during 1986-2001 SEFSC anon

SEDAR12-RD03 2002 PCL Cont. 2002-06 Red Grouper age-length structure and description of growth from the eastern Gulf of Mexico: 1992-2001 Lombardi-Carlson, L. A., G. R. Fitzhugh, and J. J. Mikulas

SEDAR12-RD04 1991 SFD 90/91-86 The red grouper fishery of the Gulf of Mexico Goodyear, C. P., and M. J. Schirripa

SEDAR12-RD05 1999 SFD 98/99-56 The red grouper fishery of the Gulf of Mexico: Assessment 3.0 Schirripa, M. J., C. M. Legault, and M. Ortiz.

SEDAR12-RD06 ICCAT SCRS/1998/058 A flexible forward age-structured assessment program Legault, C. M. and V. R. Restrepo

SEDAR12-RD07 MIA 92/93-75. 1993. The red grouper fishery of the Gulf of Mexico. Goodyear, C. P. and M. J. Schirripa.

SEDAR12-RD08 MIA 93/94-60. 1994 Biological reference points for red grouper: uncertainty about growth. Goodyear, C. P

SEDAR12-RD09 SFD 98/99-57 1999 Trends in red grouper mortality rate estimated from tagging data Legault et al

SEDAR12-RD10 unpub. SEFSC manu. no date Red grouper mean size at age: An evaluation of sampling strategies using simulated data Goodyear, C. P.

Appendix II: Consulting Agreement between the University of Miami and Dr. Paul Medley

January 5, 2007

SEDAR 12 Stock Assessment Review
Gulf of Mexico Red Grouper
January 29 - February 2, 2007
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 publicly accessible 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 12 review panel will be composed of three Center for Independent Experts (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 12 review panel that will consider the assessment of Gulf of Mexico red grouper. Reviewer tasks are listed below.

The red grouper stock assessed through SEDAR 12 is within the jurisdiction of the Gulf of Mexico Fishery Management Council and respective southeastern states.

The review workshop will take place at the Doubletree Buckhead Atlanta in Atlanta, GA, from 1:00 p.m. Monday, January 29, 2007 through 1:00 p.m. Friday, February 2, 2007.

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 briefing materials.

Please contact John Carmichael (SEDAR Program Manager; 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, January 8, 2007

SEDAR Review Workshop Panel Tasks:

The SEDAR 12 Review Workshop Panel will evaluate the assessment of Gulf of Mexico red grouper (see attached agenda). 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. The Review Workshop panel will document its findings in a Peer Review Consensus Summary and summarize assessment results in a Peer Review Advisory Report (Annex I). These documents are products of the SEDAR review panel, but are NOT products of the CIE. Separate CIE reviewer reports will also be produced, as described in Annex II, to provide distinct, independent analyses of the technical issues and of the SEDAR 12 process.

SEDAR 12 Review Workshop Terms of Reference:

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 Allowable Biological Catches (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; recommend additional documentation as appropriate.
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 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. Contents of these reports are described in Annex I. Final drafts are due to the Chair within 2 weeks (February 16, 2007). Final reports are due to the SEDAR Coordinator one week later (February 23, 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 SEDAR 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 II.

The Chair and SEDAR Coordinator will appoint one panelist to serve as assessment leader for the review. 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 are expected to 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 the 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 CIE 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, 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 a Peer Review Consensus Summary report and the Peer Review Advisory Reports, as described in Annex I. Reviewers may be asked to serve as an assessment leader during the review to facilitate preparing first drafts of review reports.

3. Following the Review Panel meeting, the reviewers shall work with the chair to complete and review the Peer Review Panel Reports. Reports shall be completed, reviewed by all 3 panelists, and comments submitted to the Chair by February 16, 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 February 23, 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; 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 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 March 9, 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 (Acting), NMFS Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL 33149 (email, Alex.Chester@noaa.gov)

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

Gulf of Mexico Fishery Management Council: Wayne Swingle, Executive Director, 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.

Draft Agenda

SEDAR 12: Gulf of Mexico Red Grouper

January 29 - February 2, 2007

Monday

1:00 p.m.	**Convene**	
1:00 – 1:30	**Introductions and Opening Remarks**	
	Coordinator	
	- Agenda Review, TOR, Task Assignments	
1:30 – 3:30	**Assessment Data Presentation**	**TBD**
3:30 – 4:00	**Break**	
4:00 – 6:00	**Continue Presentation/Discussion**	**Chair**
	- Data	

Tuesday

8:30 a.m. – 11:30 a.m.	**Assessment Presentation**	**Chair**
11:30 a.m. – 1:30 p.m.	**Lunch Break**	
1:30 p.m. – 3:30 p.m.	**Panel Discussion**	**TBD**
	- Assessment Methods	
	- identify additional analyses, sensitivities, corrections	
3:30 p.m. – 4:00 p.m.	**Break**	
4:00 p.m. – 6:00 p.m.	**Panel Discussion**	**Chair**
	- Continue deliberations	
	- Review additional analyses	

***Tuesday Goals*:** Initial presentation completed, sensitivities and modifications identified.

Wednesday

8:30 a.m. – 11:30 a.m.	**Panel Discussion**	**Chair**
	- Review additional analyses, sensitivities	
	- Consensus recommendations and comments	
11:30 a.m. – 1:30 p.m.	**Lunch Break**	
1:30 p.m. – 3:30 p.m.	**Panel Discussion**	**TBD**
3:30 p.m. – 4:00 p.m.	**Break**	
4:00 p.m. – 6:00 p.m.	**Panel Discussion**	**Chair**

Wednesday Goals: Final sensitivities identified, Preferred models selected, Projection approaches approved, Consensus report drafts begun

Thursday

8:30 a.m. – 11:30 a.m.	**Panel Discussion**	**Chair**
	- Final sensitivities reviewed.	
	- Projections reviewed.	
11:30 a.m. – 1:30 p.m.	**Lunch Break**	
1:30 p.m. – 3:30 p.m.	**Panel Discussion or Work Session**	**Chair**
3:30 p.m. - 4:00 p.m.	**Break**	
4:00 p.m. - 6:00 p.m.	**Panel Work Session**	**Chair**
	- Review Consensus Reports	
	- Discuss Advisory Reports Contents	

Thursday Goals: Complete assessment work and discussions. Final results available. Drafts of Consensus Reports and Advisory Reports Reviewed.

Friday

8:30 a.m. – 1:00 p.m.	**Panel Work Session**	**Chair**
1:00 p.m.	**ADJOURN**	

Annex I. SEDAR Review Workshop Document Contents

Consensus Summary Outline

I. 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 and findings of review panel analytical requests not previously addressed in Term of Reference discussion above.

III. Additional Comments

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

IV. Recommendations for Future Workshops

Panelists are encouraged to provide general suggestions to improve the SEDAR process.

V. CIE Reviewer Statements

Each individual reviewer provided by the CIE shall provide a statement attesting whether or not the contents of the Consensus Report provides an accurate and complete summary of their views on the issues covered in the review, including for all he Terms of Reference. Reviewers may also make any additional individual comments or suggestions desired.

Advisory Report Outline

Stock Distribution and Identification

Summary of the unit stock and its geographic distribution.

Assessment Methods

Summary of the assessment method.

Assessment Data

Summary of input data sources.

Catch Trends

Summary of catches by fishery

Fishing Mortality Trends

Summary of fishing mortality estimates

Stock Abundance and Biomass Trends

Summary of abundance, biomass, and recruitment

Status Determination Criteria

Summary of SFA and management criteria.

Stock Status

Declaration of stock status.

Projections

Summary of stock projections.

Special Comments

Additional comments of importance

Sources of Information

Source of results contained in advisory report (i.e., workshop report or addendum)

Tables:

Catch and Status

The Catch and Status table summarizes recent stock and fishery conditions. Items listed in the table typically include: catch and discards by fishery sector, fishing mortality estimates, stock abundance and biomass, spawning stock biomass, recruitment, and stock status relative to benchmark values (e.g., F/Fmsy, B/Bmsy). Values will be provided by the analytical team.

Stock Status Criteria

Summary of recommended or mandated benchmarks and estimated values.

FIGURES:

1. Landings
2. Exploitation
3. Stock Biomass
4. Stock-Recruitment
5. Control Rule
6. Projections

ANNEX II: 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 reports 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.

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.