Reviewer's Report of SEDAR 22 Assessment Review Workshop (RW) of Gulf of Mexico Yellowedge Grouper and Tilefish

By

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Prepared for

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Contents

Executive Summary

I. Tilefish and Yellowedge grouper assessments were reviewed as part of the SEDAR 22 process by a panel of four experts including three independent experts from the CIE. The review took place in Tampa, FL from 14th-17th February 2011.

II. The consultant reviewed the available documents before the meeting, participated in the review workshop and contributed to the Summary report.

III. Data used in the assessment were appropriate and consisted of landings, discards, commercial CPUE, survey CPUE, length compositions and age compositions. All data sources are subject to high uncertainty.

IV. The main assessment was Stock Synthesis (SS3), an age structured forward projection model with observation error and is therefore both adequate and appropriate for the assessment. Additional assessments were carried out using a stochastic stock reduction analysis (SRA).

V. The base assessments from the SS3 runs were considered appropriate for estimates of abundance, biomass and exploitation, though they represent just one of many plausible interpretations of the data.

VI. In view of the uncertainty in the estimation of the Beverton-Holt stock-recruitment curve, MSY benchmarks are not considered reliable and SPR proxies are preferable. Using SPR40%, tilefish appear not to be overfished but overfishing is occurring. For Yellowedge Grouper the stock status is unclear but at SPR40% appears to be overfished and overfishing is occurring.

VII. Methods to project future population status were considered to be adequate and appropriate but with some concern that the level of uncertainty in the projections was too low because of the large range of possible states of nature. The longer term projections are probably only indicative of stock trajectories and should not be regarded as accurate estimates.

VIII. Uncertainty was examined using MCMC on the assessment, a sensitivity analysis and the use of alternative assessment models. These provide good indicators of uncertainty.

IX. The SEDAR process worked well with the documentation well prepared and good meeting facilities.

X. Research recommendations from the data and assessment workshops were supported by the Review Panel.

Background

1. The National Marine Fisheries Service's (NMFS) Office of Science and Technology coordinates and manages a contract providing external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of NMFS scientific projects. SEDAR 22 is a project comprising a compilation of data, a benchmark assessment of stocks, and an assessment review conducted for Gulf of Mexico Yellowedge Grouper and Tilefish. This report deals with the findings by the author concerning the review workshop which provided an independent peer review of the two stock assessments which had been completed shortly before the review panel meeting.

2. The SEDAR 22 Review Panel meeting took place in Tampa, Florida from the 14th -17th February 2011.

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

3. Prior to the meeting the reviewer accessed documents from the SEDAR ftp site and reviewed the main assessment reports. Immediately before the meeting commenced the reviewer met with the chair and the other Panel members to agree on responsibilities during the meeting. During the meeting the reviewer participated in the discussions and agreed to additional analysis requests with the Panel. Following the conclusion of the plenary session, the reviewer prepared draft text for the summary report. In the days following the meeting the reviewer corresponded with the chair and panel members to reach final agreement on the Summary Report.

Summary of Findings

(i) Tilefish

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

4. The assessment used catch data in biomass, age compositions, length compositions a commercial CPUE index and a fishery independent CPUE index. The data were split between two areas, Eastern and Western Gulf.

5. The catch data come mainly from the commercial fishery. Recreational fishery landings and discards are small and were simply added to the total. For early years where records of landings to species level are absent much of the data is derived. This means that early catch data are not precise and should be regarded as illustrative. An important point to note is that when fitting the assessment models the catch data are treated as error free, which is a strong assumption given the way these data are derived.

6. Some age and length data were available and were included in the assessment. To avoid using data twice, age data were included as conditioned on length rather than as separate age compositions. This is a valid way of using the data. The accuracy of age determination is not high which means that the ability of the assessment to detect year classes and hence recruitment variability will be low.

7. CPUE indices of abundance were available: one from the commercial fishery and the other a fishery independent source (NMFS Bottom Longline Survey). They were standardized using a widely used delta-lognormal model. The model included an area*year interaction term which does raise questions about the nature of abundance signal being measured.

8. While there are clearly weaknesses in the data, they should be regarded as appropriate and adequate to perform an assessment though it is inevitable that the confidence in the assessment results will not be high.

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

9. The stock has relatively sparse data and the principal assessment model (SS3) is able to make good use of this limited information to gain insight into the longest possible time series of population estimates. SS3 is an age structured forward projection model with observation error and is therefore both adequate and appropriate for the assessment.

10. The complexity of SS3 and the absence of hard information on certain quantities (e.g. natural mortality, recruitment variability, etc) mean that a number of pragmatic assumptions have to be made to run the model and this will inevitably lead to debate about the validity of the assumptions. In my view the simplifying assumptions made are all defendable and while alternative assumptions could be made, these would not necessarily provide a better assessment. I was concerned, however, about the assumption that the catches are precisely known. The catches provide the only information to scale the stock estimates and therefore may merit high weight. While the scaling issue is important, the influence of the catch data on the assessment merits much more analysis as they drive the assessment yet are quite uncertain for early years.

11. While the basic data used in the assessment are split by area, the assessment model makes certain assumptions about the stock and fishery dynamics that are not area specific. In particular, fleet selectivity is assumed the same for both areas and the assessment model imposes the same stock recruit function for both regions. It is perhaps worth considering the extent to which these assumptions are useful. If it is believed the areas are sufficiently divergent to split the data, then it might be more realistic to treat the two areas as separate assessments where the recruitment dynamics are allowed to differ. One possible problem with the model configuration used is that the age composition data in each area my not be consistent in trying to estimate a universal set of recruitment deviations for the combined area. Alternatively, if in fact the biological and fishery characteristics are not that divergent, then a unified area may avoid unnecessary model complexity.

12. The assessment model accommodates the transition of females to males as fish get older. Inspection of the sex ratio by age does not suggest this is a major effect in this species and it might be simpler to assume a 50:50 sex ratio for the purposes of the assessment model and avoid unnecessary complexity.

13. In addition to the SS3 assessment, a simpler stock reduction analysis (SRA) was also applied using the catch and CPUE indices. Although SRA is not able to make use of age structured and length structured data, it is an appropriate assessment tool since it avoids having to make a number of assumptions to configure the model as is the case with SS3. It is also appropriate for exploring model uncertainty. The SRA model was applied appropriately and provided insights into the influence of the age and length data in SS3. The SRA runs gave a more optimistic interpretation of recent stock trends with biomass showing a gradual increase, a trend that is evident in some of the CPUE indices.

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

14. It proved very difficult to choose a singe realization that could be regarded as being 'best' and at the time of writing this report the summary report was not agreed in this aspect. Much of the debate centered on the wide range of uncertainty in parameters such as natural mortality and recruitment variability. For pragmatic reasons the SS3 central run is suggested here as the run from which to use estimates of abundance, biomass and exploitation. It is very important to appreciate that the central run is only one of many equally plausible runs and it is suggested mainly because it makes use of the best expert knowledge in configuring the model.

15. The way output is generated from SS3 can give the impression that the values in the whole time series of population estimates are all equally valid. In practice, prior to the mid 1980s when scientific data improve the amount of information for the model, the early year values are predicated on assumptions of historical constancy in the fishery and the stock.

Evaluate the methods used to estimate population benchmarks and management parameters (e.g., MSY, OFL, Fmsy, Bmsy, MSST, MFMT, or their proxies); recommend appropriate management benchmarks and provide estimated values for management benchmarks, a range of ABC, and declarations of stock status.

16. The MSY benchmarks were calculated using a Beverton-Holt recruitment curve estimated from within the model. The Beverton-Holt curve has a number computationally convenient attributes that make it the curve of choice for many assessments. Unfortunately most stock-recruitment curves cannot be estimated with any precision and this assessment is no exception. Consequently there is a doubt about the reliability of the MSY values. It was generally agreed that SPR proxies are preferable for this stock due to these uncertainties. There was some discussion about the appropriate %SPR for the stock including a suggestion that SPR20% may be more realistic if species interaction were considered. In my view the choice of level is a matter for managers since the higher the %SPR value the lower the biological risk. However, such risks need to be evaluated in relation to the risks to the fishery and would require a bio-economic analysis.

17. The various sensitivity runs tend to place the stock in the 'not overfished but experiencing overfishing' category on the basis of SPR40%. Without more specific evidence to the contrary, it seems most likely that the stock is not overfished but overfishing is occurring.

Evaluate the adequacy, appropriateness, and application of the methods used to project future population status; recommend appropriate estimates of future stock condition (e.g., exploitation, abundance, biomass).

18. Projections were based on a selection of sensitivity runs and the central SS3 model results. These were intended to capture a range of likely uncertainty. The underlying projection model is simply an extension of the population dynamics model used in SS3. In order to generate uncertainty estimates for the quantities of interest, the whole assessment is subjected to a MCMC procedure. This is an appropriate method for projections though the uncertainty will be conditioned on the configuration of each assessment run. The speed of current technology means that performing a single MCMC run can take a few days which limits the number of runs that can be undertaken in a short time. Trying to capture the full uncertainty by examining a wide variety of possible models and states of nature is therefore prohibitive and the Panel limited the suggested scenarios.

19. It is inevitable that the projections soon become dominated by model generated values as the calculation moves forward in time and observed year classes drop out of the projected population. Given the very large uncertainty in recruitment on which the projections depend, it is unlikely that estimates beyond a few years have very much meaning and should be treated with appropriate caution.

Evaluate the adequacy, appropriateness, and application of methods used to characterize uncertainty in estimated parameters. Provide measures of uncertainty for estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.

20. Uncertainty in the SS3 assessment was characterized through the use of sensitivity analysis and SDs on the fitted parameter values. The parameter SDs probably do not capture the uncertainty adequately as they make assumptions about the model fit which are unlikely to have been met. Nevertheless they do offer a guide as to how well certain values are estimated.

21. The sensitivity analysis examined a wide range of alternative values which gives a fuller picture of the direction and rate of change of the assessment in response to modest changes to parameter values. Variables investigated included different values of M, steepness, recruitment variability, landings, selectivity and weight given to the CPUE indices. The analysis helps characterize uncertainty but because each variable is examined sequentially the extremes of possible uncertainty are not explored.

22. The SRA runs can be viewed as a means of looking at model uncertainty in the assessment given their somewhat different use of the data. These runs did show differences in the extent of over fishing and fished state and appear at least in part to be due to the dependence on

CPUE data. Examining alternative assessment models is an extremely useful way of exploring uncertainty and I would recommend the other model formulations are attempted in the future to gain more insight into the assessment results.

23. MCMC was also used to integrate uncertainty over a range of parameter values. This is a well established and powerful way to quantify probability distributions for quantities of interest.

24. Trying to capture a parsimonious range of uncertainty is very difficult. While there are inevitable shortcomings in the methods used, the analyses provided by the AP are adequate and appropriate to illustrate the uncertainties in the assessment.

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.

25. The Panel ensured this ToR was complied with.

Evaluate the SEDAR Process as applied to the reviewed assessments and identify any Terms of Reference which were inadequately addressed by the Data or Assessment Workshops.

26. The SEDAR process is mature and works well. Relevant documents were available approximately one week before the meeting which was adequate to review the main papers. It was not possible in the time available to review all the data workshop documents and given that the Data Workshop had been independently reviewed I assumed that there was little further need for review. I found the CIE data workshop review report particularly helpful.

27. No projections for the main assessment method were presented because the AP felt the assessment too uncertain. Whilst appreciating the analysts concerns, it might be better to run at least some projections if only to illustrate the application of the method so that the Review Panel can form an opinion on the method and the value of the projections and hence be better prepared to deal with the Terms of Reference. A simple 'status quo' projection might be a useful default.

28. The Review Panel is asked to make recommendations on benchmarks and stock status. In some respects this is quite difficult to do when unfamiliar with the technical aspects of the fishery management process. For example, some acronyms are not familiar; nor is the manner of their practical application familiar to the reviewers. As many reviewers are from outside the US fishery management system it might be useful to prepare a standard briefing document that provides an overview of the management process and defines the various reference values and how they are applied by managers. This might help the Panel in making more specific recommendations.

29. At this meeting there was still a significant amount of report content that was left unfinished. It might be worthwhile considering setting some time aside during the meeting for the review panel to work on the Summary Report rather than try to do this during plenary sessions. This

may help in speeding up the drafting of the report so that the post meeting work is minimized and consensus more readily arrived at.

Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted. Clearly denote research and monitoring needs that could improve the reliability of future assessments. Recommend an appropriate interval for the next assessment, and whether a benchmark or update assessment is warranted.

30. The panel reviewed the research recommendations listed in the assessments reports and supported these. They added additional recommendations.

Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference. Develop a list of tasks to be completed following the workshop.

31. A consensus summary report was prepared.

(ii) Yellowedge Grouper

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

32. The assessment used catch data in biomass, age compositions, length compositions a commercial CPUE index and a fishery independent CPUE index. The data we split between two areas, Eastern and Western Gulf. A three area split was investigated but insufficient data were available for a satisfactory assessment.

33. The catch data come mainly from the commercial fishery. Recreational fishery landings and discards are small and were simply added to the total. For early years where records of landings to species level are absent much of the data is derived. This means that early catch data are not precise and should be regarded as illustrative. An important point to note is that when fitting the assessment models the catch data are treated as error free which is a strong assumption given the way these data are derived.

34. A particular issue with the catch data concerned the early years when groupers taken in shallower areas were likely to have been mis-assigned to yellowedge. An alternative catch series (lower catches) was constructed to allow for this possibility and used in a sensitivity run.

35. Age and length data were available and were included in the assessment. To avoid using data twice, age data were included as conditioned on length rather than as separate age compositions. This is a valid way of using the data. The accuracy of age determination is not high which means that the ability of the assessment to detect year classes and hence recruitment variability will be low. A validation of the age reading had been performed which does give confidence in the general ability to age fish.

36. CPUE indices of abundance were available: one from the commercial fishery and the other a fishery independent source (NMFS Bottom Longline Survey). They were standardized using a widely used delta-lognormal model. The model included an area*year interaction term which does raise questions about the nature of abundance signal being measured.

37. While there are clearly weaknesses in the data, they should be regarded as appropriate and adequate to perform an assessment though it is inevitable that the confidence in the assessment results will not be high.

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

38. The stock has relatively sparse data and the principal assessment model (SS3) is able to make good use of this limited information to gain insight into the longest possible time series of population estimates. SS3 is an age structured forward projection model with observation error and is therefore both adequate and appropriate for the assessment.

39. The complexity of SS3 and the absence of hard information on certain quantities (e.g. natural mortality, recruitment variability, etc) means that a number of pragmatic assumptions have to be made to run the model and this will inevitably lead to debate about the validity of the assumptions. In my view the simplifying assumptions made are all defendable and while alternative assumptions could be made, these would not necessarily provide a better assessment. I was concerned, however, about the assumption that the catches are precisely known. The catches provide the only information to scale the stock estimates and therefore may merit high weight. While the scaling issue is important, the influence of the catch data on the assessment merits much more analysis as they drive the assessment yet are quite uncertain for early years.

40. While the basic data used in the assessment are split by area, the assessment model makes certain assumptions about the stock and fishery dynamics that are not area specific. In particular, fleet selectivity is assumed the same for both areas and the assessment model imposes the same stock recruit function for both regions. It is perhaps worth considering the extent to which these assumptions are useful. If it is believed the areas are sufficiently divergent to split the data, then it might be more realistic to treat the two areas as separate assessments where the recruitment dynamics are allowed to differ. One possible problem with the model configuration used is that the age composition data in each area may not be consistent in trying to estimate a universal set of recruitment deviations for the combined area. Alternatively, if in fact the biological and fishery characteristics are not that divergent, then a unified area may avoid unnecessary model complexity.

41. In addition to the SS3 assessment, a simpler stock reduction analysis (SRA) was also applied using the catch and CPUE indices. Although SRA is not able to make use of age structured and length structured data, it is an appropriate assessment tool since it avoids having to make a number of assumptions to configure the model as is the case with SS3. It is also appropriate for exploring model uncertainty. The SRA model was applied appropriately and provided insights into the influence of the age and length data in SS3. The SRA runs gave a more

optimistic interpretation of recent stock trends with biomass showing a gradual increase, a trend that is evident in some of the CPUE indices.

42. There was sufficient age data for early years to perform a catch curve analysis for an early and late time period in order to make estimates of M (when the fishery was very small) and recent fishing mortality. This is a very useful way of validating some of the SS3 inputs and F estimates.

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

43. It proved very difficult to choose a singe realization that could be regarded as being 'best' and at the time of writing this report the summary report was not agreed in this aspect. Much of the debate centered on the wide range of uncertainty in parameters such as natural mortality and recruitment variability. For pragmatic reasons the SS3 base run is suggested as the run from which to use estimates of abundance, biomass and exploitation. It is very important to appreciate that the base is only one of many equally plausible runs and it is suggested mainly because it makes use of the best expert knowledge in configuring the model.

44. The way output is generated from SS3 can give the impression that the values in the whole time series of population estimates are all equally valid. In practice, prior to the mid 1980s when catch and scientific data improve the amount of information for the model, the early year values are predicated on assumptions of historical constancy in the fishery and the stock.

Evaluate the methods used to estimate population benchmarks and management parameters (e.g., MSY, OFL, Fmsy, Bmsy, MSST, MFMT, or their proxies); recommend appropriate management benchmarks and provide estimated values for management benchmarks, a range of ABC, and declarations of stock status.

45. The MSY benchmarks were calculated using a Beverton-Holt recruitment curve estimated from within the model. The Beverton-Holt curve has a number computationally convenient attributes that make it the curve of choice for many assessments. Unfortunately most stock-recruitment curves cannot be estimated with any precision and this assessment is no exception. Consequently there is a doubt about the reliability of the MSY values. It was generally agreed that SPR proxies are preferable for this stock due to these uncertainties. There was some discussion about the appropriate %SPR for the stock including a suggestion that SPR20% may be more realistic if species interaction were considered. In my view the choice of level is a matter for managers since the higher the %SPR value the lower the biological risk. However, such risks need to be evaluated in relation to the risks to the fishery and would require a bio-economic analysis.

46. The base run tends to place the stock in the 'overfished with overfishing occurring' category on the basis of SPR40%. However, the sensitivity runs show that the estimated status of the stock is highly uncertain and is close to the boundary of overfished/overfishing. It is therefore difficult to make an unambiguous classification of status.

Evaluate the adequacy, appropriateness, and application of the methods used to project future population status; recommend appropriate estimates of future stock condition (e.g., exploitation, abundance, biomass).

47. Projections were based on a selection of sensitivity runs and the central SS3 model results. These were intended to capture a range of likely uncertainty. The underlying projection model is simply an extension of the population dynamics model used in SS3. In order to generate uncertainty estimates for the quantities of interest, the whole assessment is subjected to a MCMC procedure. This is an appropriate method for projections though the uncertainty will be conditioned on the configuration of each assessment run. The speed of current technology means that performing a single MCMC run can take a few days which limits the number of runs that can be undertaken in a short time. Trying to capture the full uncertainty by examining a wide variety of possible models and states of nature is therefore prohibitive and the Panel limited the suggested scenarios.

48. It is inevitable that the projections soon become dominated by model generated values as the calculation moves forward in time and observed year classes drop out of the projected population. Given the very large uncertainty in recruitment on which the projections depend, it is unlikely that estimates beyond a few years have very much meaning and should be treated with appropriate caution.

Evaluate the adequacy, appropriateness, and application of methods used to characterize uncertainty in estimated parameters. Provide measures of uncertainty for estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.

49. Uncertainty in the SS3 assessment was characterized through the use of sensitivity analysis and SDs on the fitted parameter values. The parameter SDs probably do not capture the uncertainty adequately as they make assumptions about the model fit which are unlikely to have been met. Nevertheless they do offer a guide as to how well certain values are estimated.

50. The sensitivity analysis examined a wide range of alternative values which gives a fuller picture of the direction and rate of change of the assessment in response to modest changes to parameter values. Variables investigated included different values of M, steepness, recruitment variability, landings, selectivity and weight given to the CPUE indices. The analysis helps characterize uncertainty but because each variable is examined sequentially the extremes of possible uncertainty are not explored.

51. The SRA runs can be viewed as a means of looking at model uncertainty in the assessment given their somewhat different use of the data. These runs did show differences in the extent of over fishing and fished state and appear at least in part to be due to the dependence on CPUE data. Examining alternative assessment models is an extremely useful way of exploring uncertainty and I would recommend the other model formulations are attempted in the future to gain more insight into the assessment results.

52. MCMC was also used to integrate uncertainty over a range of parameter values. This is a well established and powerful way to quantify probability distributions for quantities of interest.

53. Trying to capture a meaningful range of uncertainty is very difficult. While there are inevitable shortcomings in the methods used, the analyses provided by the AP are adequate and appropriate to illustrate the uncertainties in the assessment.

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.

54. The Panel ensured this ToR was complied with.

Evaluate the SEDAR Process as applied to the reviewed assessments and identify any Terms of Reference which were inadequately addressed by the Data or Assessment Workshops.

55. The SEDAR process is mature and works well. Relevant documents were available approximately one week before the meeting which was adequate to review the main papers. It was not possible in the time available to review all the data workshop documents and given that the Data Workshop had been independently reviewed I assumed that there was little further need for review. I found the CIE data workshop review report particularly helpful.

56. No projections for the main assessment method were presented because the AP felt the assessment was too uncertain. Whilst appreciating the analysts' concerns, it might be better to run at least some projections if only to illustrate the application of the method so that the Review Panel can form an opinion on the method and the value of the projections and hence be better prepared to deal with the Terms of Reference. A simple 'status quo' projection might be a useful default.

57. The Review Panel is asked to make recommendations on benchmarks and stock status. In some respects this is quite difficult to do when unfamiliar with the technical aspects of the fishery management process. For example, some acronyms are not familiar; nor is the manner of their practical application familiar to the reviewers. As many reviewers are from outside the US fishery management system, it might be useful to prepare a standard briefing document that provides an overview of the management process and defines the various reference values and how they are applied by managers. This might help the Panel in making more specific recommendations.

Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted. Clearly denote research and monitoring needs that could improve the reliability of future assessments. Recommend an appropriate interval for the next assessment, and whether a benchmark or update assessment is warranted.

58. The panel reviewed the research recommendations listed in the assessments reports and supported these. They added additional recommendations.

Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference. Develop a list of tasks to be completed following the workshop.

59. A consensus summary report was prepared.

Discussion

60. There are some issues that arise in both assessments that merit further discussion. In common with many other assessments in this region, practitioners have reconstructed a catch history for as many years as possible back to the time when the fisheries first began. This is highly desirable but in general it requires deriving species specific catches from aggregate catch information or incomplete records. Usually this involves the use of ratio estimators that are subject to uncertainty and possible bias. Despite this, it is common practice, as in this case to treat the catches as error free in the model. Given the widespread nature of this problem and the importance of the catch data in driving the assessment it would be highly desirable to try to get quantitative estimates of uncertainty and possible bias in the derived data. As the catch data are constructed according to specific recipes it should be possible to derive estimates of variance based on the ratio estimators and hence get a measure of uncertainty.

61. I felt that there was some ambiguity in the way sensitivity analysis was applied that perhaps leads to redundancy in the number of sensitivity runs performed. This arises because it is not clear whether the analysis is intended to show how sensitive the assessment is to certain parameters or whether alternative states of nature are being investigated and it may be worth making this distinction clearer. Is there, for example, any need to perform a high M and a low M run to investigate sensitivity? One option would be to estimate elasticities for all the quantities of interest by varying the input parameters sequentially by a small amount (10% perhaps) and reporting this in a table. This would show the rate and direction of change of critical parameters and might inform the areas were alternative states of nature need to be considered.

62. It was clear in both assessments that the signal in the age/length frequency data was not consistent with the CPUE data. Even the CPUE data indicate different trends. This problem is commonplace and is generally difficult to resolve. However, understanding the implications for the assessment of the various data sets is important. One way to investigate this is to perform the assessment separately for each major data set and compare the quantities of interest. This was partly achieved in the current assessments by comparing the SRA and SS3 runs which use the data differently, and by altering the emphasis on the CPUE likelihood component. A more systematic investigation of the influence of the data would be desirable so that the signal each data component contributes can be better understood. I would also suggest that such an analysis be done for each CPUE series separately.

63. For both the SRA and SS3 assessments, it would have been useful to see the likelihood function that was being maximized. While the specifics of the model formulation are available in other documents, the flexibility in the application of the models means that the

likelihood function is tailored to each specific assessment. To avoid ambiguity it would be useful to have the relevant likelihood written down so that the assessment results can be more readily interpreted.

Conclusions

64. The SEDAR process functions well in providing a participatory forum to prepare data, perform and review assessments.

65. Both assessments are relatively data poor with high uncertainty on the early catches and limited age and length compositions. There is probably sufficient data to give an adequate estimate of stock trends and fishing mortality rate but estimates for earlier years are likely to be unreliable and projections very uncertain.

66. Assessment methods used were advanced and comparable to state-of-the-art methods in many other assessments. Executing the main assessment model (SS3) requires a number of assumptions to be made that were tested using, *inter alia*, sensitivity analysis. These provide a good indicator of the local sensitivity but probably do not give an adequate measure of global sensitivity. A major source of uncertainty concerns the recruitment assumptions as this may influence the perception that the status of the stock. In the meantime MSY benchmarks are unreliable and SPR proxies should be used.

67. The SS3 assessment model was able to interpret the data in many different ways depending on its configuration. While the relative stock status for Tilefish did not change greatly, the point estimates of benchmarks, stock abundance and fishing mortality rate varied considerably. For Yellowedge grouper stock status was sensitive to model configuration. This is somewhat disconcerting and suggests that there is insufficient information in the data to obtain reliable estimates. It points to the need to explore model uncertainty more fully by using a greater variety of methods than was used in the assessment report.

68. Projections from the assessment should be regarded as indicative of trends but not accurate estimates of the probability of attaining management targets. Shorter term projections of up to five years may be more reliable as these will be driven by year classes that have been estimated from real data.

Recommendations

69. It is perhaps worth considering the extent to which the area split assumptions are useful. If it is believed the areas are sufficiently divergent to split the data, then it might be more realistic to treat the two areas as separate assessments where the recruitment dynamics are allowed to differ.

70. The influence of the catch data on the assessment merits much more analysis as they drive the assessment yet are quite uncertain for early years. Given the widespread nature of this

problem for stocks in this region and the importance of the catch data in driving the assessment, it would be highly desirable to try to get quantitative estimates of uncertainty and possible bias in the derived data. As the catch data are constructed according to specific recipes it should be possible to derive estimates of variance based on the ratio estimators and hence get a measure of uncertainty.

71. There was some discussion about the appropriate %SPR for the stock including a suggestion that SPR20% may be more realistic if species interaction were considered. In my view the choice of level is a matter for managers since the higher the %SPR value the lower the biological risk. Such risks need to be evaluated in relation to the risks to the fishery and would require a bio-economic analysis. In order to address this issue I would suggest a bio-economic analysis be conducted for these fisheries to identify a satisfactory level for benchmarks.

72. Examining alternative assessment models is an extremely useful way of exploring uncertainty and I would recommend the other model formulations are attempted in the future to gain more insight into the assessment results.

73. As many reviewers are from outside the US fishery management system it might be useful to prepare a standard briefing document that provides an overview of the management process and defines the various reference values and how they are applied by managers. This might help the Panel in making more specific recommendations.

74. It might be worthwhile considering setting some time aside during the meeting for the review panel to work on the Summary Report rather than try to do this during plenary sessions. This may help in speeding up the drafting of the report so that the post meeting work is minimized and consensus more readily arrived at.

75. I would recommend a local sensitivity analysis to estimate elasticities for all the quantities of interest by varying the input parameters sequentially by a small amount (10% perhaps) and reporting this in a table. This would show the rate and direction of change of critical parameters and might inform the areas were alternative states of nature need to be considered.

76. A more systematic investigation of the influence of the data would be desirable so that the signal each data component contributes can be better understood. I would also recommend that such an analysis be done for each CPUE series separately.

77. To avoid ambiguity I recommend that the relevant likelihood be written down for each assessment model so that the assessment results can be more readily interpreted.

Appendix 1: Bibliography of materials provided for review

SEDAR 22
Gulf of Mexico Yellowedge Grouper and Tilefish
Workshop Document List

Document #	Title	Authors	Working Group
Documents Prepared for the Data Workshop			
SEDAR22-DW-01	Golden tilefish (*Lopholatilus chamaeleonticeps*) age, growth, and reproduction from the northeastern Gulf of Mexico: 1985,1997-2009	Linda Lombardi, Gary Fitzhugh, Hope Lyon	Life History
SEDAR22-DW-02	Commercial longline vessel standardized catch rates of yellowedge grouper in the Gulf of Mexico	Neil Baertlein and Kevin McCarthy	Indices
SEDAR22-DW-03	Golden tilefish and blueline tilefish standardized catch rates from commercial longline vessels in the Gulf of Mexico	Kevin McCarthy	Indices
SEDAR22-DW-04	Discards of yellowedge grouper, golden tilefish, and blueline tilefish from commercial fishing vessels in the Gulf of Mexico	Kevin McCarthy	Catch Statistics
SEDAR22-DW-05	Explorations of habitat associations of yellowedge grouper and golden tilefish	John F Walter, Melissa Cook, Brian Linton, Linda Lombardi, and John A. Quinlan	Life History
SEDAR22-DW-06	Abundance Indices of subadult Yellowedge Grouper, *Epinephelus flavolimbatus*, Collected in Summer and Fall Groundfish Surveys in the northern Gulf of Mexico	Adam G. Pollack and G. Walter Ingram, Jr.	Indices
SEDAR22-DW-07	Abundance Indices of Yellowedge Grouper and Golden Tilefish Collected in NMFS Bottom Longline Surveys in the northern Gulf of Mexico	G. Walter Ingram, Jr. and Adam G. Pollack	Indices
SEDAR22-DW-08	Yellowedge grouper (Epinephelus flavolimbatus) age, growth and reproduction from the northern Gulf	Melissa Cook and Michael Hendon	Life History

	of Mexico		
SEDAR22-DW-09	Observed Length frequency distributions and otolith sampling issues for yellowedge groupers caught in the Gulf of Mexico from 1984 to 2009.	Ching-Ping Chih	Life History/ Catch Statistics
SEDAR22-DW-10	Observed Length frequency distributions and otolith sampling issues for tile fish caught in the Gulf of Mexico from 1984 to 2009	Ching-Ping Chih	Life History/ Catch Statistics
SEDAR22-DW-11	Length frequency distributions for blue line tile fish caught in the Gulf of Mexico from 1984 to 2009	Ching-Ping Chih	Life History/ Catch Statistics
SEDAR22-DW-12	Estimation of species misidentification in the commercial landing data of tile fish in the Gulf of Mexico from 1984 to 2009	Ching-Ping Chih	Catch Statistics
SEDAR22-DW-13	Estimation of species misidentification in the commercial landing data of yellowedge groupers in the Gulf of Mexico from 1984 to 2009	Ching-Ping Chih	Catch Statistics
SEDAR22-DW-14	Evidence of hermaphroditism in Golden Tilefish (*Lopholatilus chamaeleonticeps*) in the Gulf of Mexico	Hope Lyon	Life History
SEDAR22-DW-15	Recreational Survey Data for Yellowedge Grouper, Tilefish (golden), and Blueline Tilefish in the Gulf of Mexico	Vivian M. Matter	Catch Statistics
SEDAR22-DW-16	Estimated Recreational Catch in Weight: Method for Filling in Missing Weight Estimates from the Recreational Surveys	Vivian M. Matter	Catch Statistics
SEDAR22-DW-17	Commercial Landings of Yellowedge Grouper, Golden Tilefish, and Blueline Tilefish from the Gulf of Mexico region	Refik Orhun	Catch Statistics
Documents Prepared for the Assessment Process			
SEDAR22-AP-01	United States Commercial Longline Vessel Standardized Catch Rates of Golden and Blueline Tilefish in the Gulf of Mexico, 1992-2009: Revised	Kevin McCarthy	
SEDAR22-AP-02	United States Commercial Longline Vessel Standardized Catch Rates of	Neil Baertlein and Kevin McCarthy	

	Yellowedge Grouper (*Epinephelus flavolimbatus*) for Three Regions in the Gulf of Mexico, 1991-2009	
SEDAR22-AP-03	Pre-review draft of the tilefish assessment report (23 Nov 2010)	
SEDAR22-AP-04	Pre-review draft of the yellowedge grouper assessment report (23 Nov 2010)	
Documents Prepared for the Review Workshop		
SEDAR22-RW-01		
Final Stock Assessment Reports		
SEDAR19-SAR1	Yellowedge Grouper	
SEDAR19-SAR2	Golden Tilefish	
Reference Documents		
SEDAR22-RD01	Lead-radium dating of golden tilefish (*Lopholatilus chamaeleonticeps*)	Allen Andrew
SEDAR22-RD02	Status of the yellowedge grouper fishery in the Gulf of Mexico	Shannon L. Cass-Calay and Melissa Bahnick
SEDAR22-RD03	Yellowedge grouper (*Epinephelus flavolimbatus*) and golden tilefish (*Lopholatilus chamaeleonticeps*) distributions, habitat preferences and available biological samples	Melissa Cook and Linda Lombardi-Carlson
SEDAR22-RD04	Validation of yellowedge grouper, *Epinephelus flavolimbatus*, age using nuclear bomb-produced radiocarbon	Melissa Cook & Gary R. Fitzhugh & James S. Franks
SEDAR22-RD05	Population dynamics structure, and per –recruit analyses of yellowedge grouper, *Epinephelus flavolimbatus* from the northern Gulf of Mexico	Melissa Cook
SEDAR22-RD06	Reproduction of yellowedge grouper *Epinephelus flavolimbatus*, from the eastern Gulf of Mexico	Bullock, L. H., M. F. Godcharles and R. E. Crabtree
SEDAR22-RD07	Burrow utilization by yellowedge grouper, *Epinephelus flavolimbatus*, in the northwestern Gulf of Mexico	Jones, R. S., E. J. Gutherz, W. R. Nelson and G. C. Matlock
SEDAR22-RD08	Age and growth of the yellowedge grouper, *Epinephelus flavolimbatus*, and the yellowmouth grouper, *Mycteroperca interstitialis*, off Trinidad and Tobago	Manickchand-Heileman, S. C. and D. A. T. Phillip

SEDAR22-RD09	A descriptive survey of the bottom longline fishery in the Gulf of Mexico	Prytherch, H. F.
SEDAR22-RD10	Comparison of Two Techniques for Estimating Tilefish, Yellowedge Grouper, and Other Deepwater Fish Populations	Matlock, Gary C., Walter R. Nelson, Robert S. Jones, Albert W. Green, Terry J. Cody, Elmer Gutherz, and Jeff Doerzbacher
SEDAR22-RD11	Deep-water sinkholes and biotherms of South Florida and the Pourtales Terrace – Habitat and Fauna	John K. Reed, Shirley A. Pomponi, Doug Weaver, Charles K. Paull, and Amy E. Wright
SEDAR22-RD12	Tilefishes of the genus *Caulolatilus* construct burrows in the sea floor	K.W. Able, D.C. Twichell, C.B. Grimes, and R.S. Jones
SEDAR22-RD13	Spawning Locations for Atlantic Reef Fishes off the Southeastern U.S.	GEORGE R. SEDBERRY, O. PASHUK, D.M. WYANSKI, J.A. STEPHEN, and P. WEINBACH
SEDAR22-RD14	Trends in tilefish distribution and relative abundance off South Carolina and Georgia	Charles A. Barnes and Bruce W. Stender
SEDAR22-RD15	Age, growth, and reproductive biology of blueline tilefish along the Southeastern coast of the United States, 1982-1999	Patrick J. Harris, David M. Wyanski, and Paulette T. Powers Mikell
SEDAR22-RD16	Temporal and spatial variation in habitat characteristics of tilefish (Lopholatilus chamaeleonticeps) off the east coast of Florida	Kenneth W. Able, Churchill B. Grimes, Robert S. Jones and David C. Twichell
SEDAR22-RD17	The Complex Life History of Tilefish *Lopholatilus chamaeleonticeps* and Vulnerability to Exploitation	Churchill B. Grimes and Stephen C. Turner
SEDAR22-RD18	The fishery for tilefish, *Lopholatilus chamaeleonticeps*, off South Carolina and Georgia	Bob Low, Glenn Ulrich, and Frank Blum
SEDAR22-RD19	Tilefish off South Carolina and Georgia	R.A. Low, Jr., G.F. Ulrich, and F. Blum
SEDAR22-RD20	Spawner-recruit relationships of demersal marine fishes: Prior distribution of steepness for possible use in SEDAR stock assessments	SEDAR 24−AW−06 - Sustainable Fisheries Branch

Appendix 2: CIE Statement of Work

Statement of Work for Dr. Robin Cook

External Independent Peer Review by the Center for Independent Experts

SEDAR 22 Gulf of Mexico Yellowedge Grouper and Tilefish Review Workshop

Scope of Work and CIE Process: The National Marine Fisheries Service's (NMFS) Office of Science and Technology coordinates and manages a contract providing external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of NMFS scientific projects. The Statement of Work (SoW) described herein was established by the NMFS Project Contact and Contracting Officer's Technical Representative (COTR), and reviewed by CIE for compliance with their policy for providing independent expertise that can provide impartial and independent peer review without conflicts of interest. CIE reviewers are selected by the CIE Steering Committee and CIE Coordination Team to conduct the independent peer review of NMFS science in compliance the predetermined Terms of Reference (ToRs) of the peer review. Each CIE reviewer is contracted to deliver an independent peer review report to be approved by the CIE Steering Committee and the report is to be formatted with content requirements as specified in **Annex 1**. This SoW describes the work tasks and deliverables of the CIE reviewer for conducting an independent peer review of the following NMFS project. Further information on the CIE process can be obtained from www.ciereviews.org.

Project Description: SEDAR 22 will be a compilation of data, a benchmark assessment of the stock, and an assessment review conducted for Gulf of Mexico Yellowedge Grouper and Tilefish. The review workshop provides an independent peer review of SEDAR stock assessments. The review panel is ultimately responsible for ensuring that the best possible assessment is provided through the SEDAR process. The stocks assessed through SEDAR 22 are within the jurisdiction of the Gulf of Mexico Fishery Management Council and the states of Texas, Louisiana, Mississippi, Alabama, and Florida. The Terms of Reference (ToRs) of the peer review are attached in **Annex 2**. The tentative agenda of the review meeting is in **Annex 3**.

Requirements for CIE Reviewers: Three CIE reviewers shall conduct an impartial and independent peer review in accordance with the SoW and ToRs herein. CIE reviewers shall have expertise, working knowledge, and recent experience in stock assessment, statistics, fisheries science, and marine biology sufficient to complete the primary task of reviewing the technical details of the methods used for the assessment. Each CIE reviewer's duties shall not exceed a maximum of 14 days to complete all work tasks of the peer review described herein.

Location of Peer Review: Each CIE reviewer shall conduct an independent peer review during the panel review meeting scheduled in Tampa, Florida during 14-17 February 2011.

Statement of Tasks: Each CIE reviewers shall complete the following tasks in accordance with the SoW and Schedule of Milestones and Deliverables herein.

Prior to the Peer Review: Upon completion of the CIE reviewer selection by the CIE Steering Committee, the CIE shall provide the CIE reviewer information (full name, title, affiliation, country, address, email) to the COTR, who forwards this information to the NMFS Project Contact no later the date specified in the Schedule of Milestones and Deliverables. The CIE is responsible for providing the SoW and ToRs to the CIE reviewers. The NMFS Project Contact is responsible for providing the CIE reviewers with the background documents, reports, foreign national security clearance, and other information concerning pertinent meeting arrangements. The NMFS Project Contact is also responsible for providing the Chair a copy of the SoW in advance of the panel review meeting. Any changes to the SoW or ToRs must be made through the COTR prior to the commencement of the peer review.

Pre-review Background Documents: Two weeks before the peer review, the NMFS Project Contact will send (by electronic mail or make available at an FTP site) to the CIE reviewers the necessary background information and reports for the peer review. In the case where the documents need to be mailed, the NMFS Project Contact will consult with the CIE Lead Coordinator on where to send documents. CIE reviewers are responsible only for the pre-review documents that are delivered to the reviewer in accordance to the SoW scheduled deadlines specified herein. The CIE reviewers shall read all documents in preparation for the peer review.

Panel Review Meeting: Each CIE reviewer shall conduct the independent peer review in accordance with the SoW and ToRs, and shall not serve in any other role unless specified herein. **Modifications to the SoW and ToRs can not be made during the peer review, and any SoW or ToRs modifications prior to the peer review shall be approved by the COTR and CIE Lead Coordinator.** Each CIE reviewer shall actively participate in a professional and respectful manner as a member of the meeting review panel, and their peer review tasks shall be focused on the ToRs as specified herein. The NMFS Project Contact is responsible for any facility arrangements (e.g., conference room for panel review meetings or teleconference arrangements). The NMFS Project Contact is responsible for ensuring that the Chair understands the contractual role of the CIE reviewers as specified herein. The CIE Lead Coordinator can contact the Project Contact to confirm any peer review arrangements, including the meeting facility arrangements.

Contract Deliverables - Independent CIE Peer Review Reports: Each CIE reviewer shall complete an independent peer review report in accordance with the SoW. Each CIE reviewer shall complete the independent peer review according to required format and content as described in Annex 1. Each CIE reviewer shall complete the independent peer review addressing each ToR as described in Annex 2.

Other Tasks – Contribution to Summary Report: Each CIE reviewer may assist the Chair of the panel review meeting with contributions to the Summary Report, based on the terms of reference of the review. Each CIE reviewer is not required to reach a consensus, and should provide a brief summary of the reviewer's views on the summary of findings and conclusions reached by the review panel in accordance with the ToRs.

Specific Tasks for CIE Reviewers: The following chronological list of tasks shall be completed by each CIE reviewer in a timely manner as specified in the **Schedule of Milestones and Deliverables**.

1) Conduct necessary pre-review preparations, including the review of background material and reports provided by the NMFS Project Contact in advance of the peer review.
2) Participate during the panel review meeting in Tampa, Florida during 14-17 February 2011.
3) During 14-17 February 2011 in Tampa, Florida as specified herein, conduct an independent peer review in accordance with the ToRs (**Annex 2**).
4) No later than 3 March 2011, each CIE reviewer shall submit an independent peer review report addressed to the "Center for Independent Experts," and sent to Mr. Manoj Shivlani, CIE Lead Coordinator, via email to shivlanim@bellsouth.net, and CIE Regional Coordinator, via email to David Sampson david.sampson@oregonstate.edu. Each CIE report shall be written using the format and content requirements specified in Annex 1, and address each ToR in **Annex 2**.

Schedule of Milestones and Deliverables: CIE shall complete the tasks and deliverables described in this SoW in accordance with the following schedule.

11 January 2011	CIE sends reviewer contact information to the COTR, who then sends this to the NMFS Project Contact
1 February 2011	NMFS Project Contact sends the CIE Reviewers the pre-review documents
14-17 February 2011	Each reviewer participates and conducts an independent peer review during the panel review meeting
3 March 2011	CIE reviewers submit draft CIE independent peer review reports to the CIE Lead Coordinator and CIE Regional Coordinator
17 March 2011	CIE submits CIE independent peer review reports to the COTR
24 March 2011	The COTR distributes the final CIE reports to the NMFS Project Contact and regional Center Director

Modifications to the Statement of Work: Requests to modify this SoW must be approved by the Contracting Officer at least 15 working days prior to making any permanent substitutions. The Contracting Officer will notify the COTR within 10 working days after receipt of all required information of the decision on substitutions. The COTR can approve changes to the milestone dates, list of pre-review documents, and ToRs within the SoW as long as the role and ability of the CIE reviewers to complete the deliverable in accordance with the SoW is not adversely impacted. The SoW and ToRs shall not be changed once the peer review has begun.

Acceptance of Deliverables: Upon review and acceptance of the CIE independent peer review reports by the CIE Lead Coordinator, Regional Coordinator, and Steering Committee, these reports shall be sent to the COTR for final approval as contract deliverables based on compliance with the SoW and ToRs. As specified in the Schedule of Milestones and Deliverables, the CIE

shall send via e-mail the contract deliverables (CIE independent peer review reports) to the COTR (William Michaels, via William.Michaels@noaa.gov).

Applicable Performance Standards: The contract is successfully completed when the COTR provides final approval of the contract deliverables. The acceptance of the contract deliverables shall be based on three performance standards:
(1) each CIE report shall completed with the format and content in accordance with **Annex 1**,
(2) each CIE report shall address each ToR as specified in **Annex 2**,
(3) the CIE reports shall be delivered in a timely manner as specified in the schedule of milestones and deliverables.

Distribution of Approved Deliverables: Upon acceptance by the COTR, the CIE Lead Coordinator shall send via e-mail the final CIE reports in *.PDF format to the COTR. The COTR will distribute the CIE reports to the NMFS Project Contact and Center Director.

Support Personnel:

William Michaels, Contracting Officer's Technical Representative (COTR)
NMFS Office of Science and Technology
1315 East West Hwy, SSMC3, F/ST4, Silver Spring, MD 20910
William.Michaels@noaa.gov Phone: 301-713-2363 ext 136

Manoj Shivlani, CIE Lead Coordinator
Northern Taiga Ventures, Inc.
10600 SW 131st Court, Miami, FL 33186
shivlanim@bellsouth.net Phone: 305-383-4229

Roger W. Peretti, Executive Vice President
Northern Taiga Ventures, Inc. (NTVI)
22375 Broderick Drive, Suite 215, Sterling, VA 20166
RPerretti@ntvifederal.com Phone: 571-223-7717

Key Personnel:

NMFS Project Contact:

Julie A Neer, SEDAR Coordinator

4055 Faber Place Drive, Suite 201, North Charleston, SC 29405

Julie.neer@safmc.net Phone: 843-571-4366

Annex 1: Format and Contents of CIE Independent Peer Review Report

1. The CIE independent report shall be prefaced with an Executive Summary providing a concise summary of the findings and recommendations, and specify whether the science reviewed is the best scientific information available.

2. The main body of the reviewer report shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Summary of Findings for each ToR in which the weaknesses and strengths are described, and Conclusions and Recommendations in accordance with the ToRs.

   a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including providing a brief summary of findings, of the science, conclusions, and recommendations.

   b. Reviewers should discuss their independent views on each ToR even if these were consistent with those of other panelists, and especially where there were divergent views.

   c. Reviewers should elaborate on any points raised in the Summary Report that they feel might require further clarification.

   d. Reviewers shall provide a critique of the NMFS review process, including suggestions for improvements of both process and products.

   e. The CIE independent report shall be a stand-alone document for others to understand the weaknesses and strengths of the science reviewed, regardless of whether or not they read the summary report. The CIE independent report shall be an independent peer review of each ToRs, and shall not simply repeat the contents of the summary report.

3. The reviewer report shall include the following appendices:

   Appendix 1: Bibliography of materials provided for review
   Appendix 2: A copy of the CIE Statement of Work
   Appendix 3: Panel Membership or other pertinent information from the panel review meeting.

Annex 2: Tentative Terms of Reference for the Peer Review

SEDAR 22 Gulf of Mexico Yellowedge Grouper and Tilefish Review Workshop

Yellowedge Grouper:

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, OFL, Fmsy, Bmsy, MSST, MFMT, or their proxies*); recommend appropriate management benchmarks and provide estimated 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 (e.g., exploitation, abundance, biomass).
6. Evaluate the adequacy, appropriateness, and application of methods used to characterize uncertainty in estimated parameters. Provide measures of uncertainty for estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.
7. 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.
8. Evaluate the SEDAR Process as applied to the reviewed assessments and identify any Terms of Reference which were inadequately addressed by the Data or Assessment Workshops.
9. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted. Clearly denote research and monitoring needs that could improve the reliability of future assessments. Recommend an appropriate interval for the next assessment, and whether a benchmark or update assessment is warranted.
10. Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference. Develop a list of tasks to be completed following the workshop.

The review panel may request additional sensitivity analyses, evaluation of alternative assumptions, and correction of errors identified in the assessments provided by the assessment workshop panel; the review panel may not request a new assessment. Additional details regarding the latitude given the review panel to deviate from assessments provided by the assessment workshop panel are provided in the *SEDAR Guidelines* and the *SEDAR Review Panel Overview and Instructions*.

** The panel shall ensure that corrected estimates are provided by addenda to the assessment report in the event corrections are made in the assessment, alternative model configurations are recommended, or additional analyses are prepared as a result of review panel findings regarding the TORs above.**

Tilefish:

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, OFL, Fmsy, Bmsy, MSST, MFMT, or their proxies*); recommend appropriate management benchmarks and provide estimated 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 (e.g., exploitation, abundance, biomass).
6. Evaluate the adequacy, appropriateness, and application of methods used to characterize uncertainty in estimated parameters. Provide measures of uncertainty for estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.
7. 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.
8. Evaluate the SEDAR Process as applied to the reviewed assessments and identify any Terms of Reference which were inadequately addressed by the Data or Assessment Workshops.
9. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted. Clearly denote research and monitoring needs that could improve the reliability of future assessments. Recommend an appropriate interval for the next assessment, and whether a benchmark or update assessment is warranted.
10. Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference. Develop a list of tasks to be completed following the workshop.

The review panel may request additional sensitivity analyses, evaluation of alternative assumptions, and correction of errors identified in the assessments provided by the assessment workshop panel; the review panel may not request a new assessment. Additional details regarding the latitude given the review panel to deviate from assessments provided by the assessment workshop panel are provided in the *SEDAR Guidelines* and the *SEDAR Review Panel Overview and Instructions*.

** The panel shall ensure that corrected estimates are provided by addenda to the assessment report in the event corrections are made in the assessment, alternative model configurations are recommended, or additional analyses are prepared as a result of review panel findings regarding the TORs above.**

Annex 3: Tentative Agenda

SEDAR 22 Gulf of Mexico Yellowedge Grouper and Tilefish Review Workshop

Tampa, Florida
14-17 February 2011

Monday

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

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** *- Assessment Data & Methods* *- Identify additional analyses, sensitivities, corrections*	**TBD**
3:30 p.m. – 4:00 p.m.	**Break**	
4:00 p.m. – 6:00 p.m.	**Panel Discussion** *- Continue deliberations* *- Review additional analyses*	**Chair**

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

Wednesday

8:30 a.m. – 11:30 a.m.	**Panel Discussion** *- Review additional analyses, sensitivities* *- recommendations and comments*	**Chair**
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, Report drafts begun

Thursday

8:30 a.m. – 11:30 a.m.	**Panel Discussion** *- Final sensitivities reviewed.* *- Projections reviewed.*	**Chair**
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** *- Review Reports*	**Chair**

Thursday Goals: Complete assessment work and discussions. Final results available. Draft Reports reviewed.

Appendix 3: Panel Membership

Doug Gregory (Chair)

Steve Szedlmayer, Auburn University

Paul Medley, CIE

Henrik Sparholt, CIE

Robin Cook, CIE