CIE Independent Peer Review Report SEDAR 17 Review Workshop. South Atlantic Vermilion Snapper and South Atlantic Spanish Mackerel

Dr. Noel Cadigan
Fisheries and Oceans Canada,
Northwest Atlantic Fisheries Center
St. John's, NL, Canada

Executive Summary

The review panel partially accepted the Spanish mackerel stock assessment. The panel concluded that over-fishing was not occurring; however, annual estimates of fishing mortality were not accepted due to model uncertainty. Stock projections were not accepted and over-fished status could not be determined from the assessment due to model uncertainty/sensitivity.

The panel accepted the vermilion snapper stock assessment, and concluded that the stock was not over-fished. However, the panel concluded that over-fishing was occurring but this conclusion was highly uncertain due to a lack of robustness to key model assumptions.

The review panel made the following recommendations, mostly in terms of the Spanish mackerel assessment, but many are generic and seem to apply to the vermillion snapper assessment as well.

1. The Data Workshop should provide recommendations about appropriate values for steepness in the stock-recruitment relationship. Species experts may have insight on this topic based on their knowledge of the species biology and if not, possibly supply values for similar stocks/species.
2. A proper statistical framework should be used for the catch-at-age models. This would allow alternative parameterizations to be evaluated in terms of AIC or some other statistical criteria, and the calculation of standardized residuals (which allows the appropriateness of relative data weightings to be judged).
3. When using subjective weighting of data components in the catch-at-age model, base models should use multipliers of one and weights should be adjusted, if necessary, using effective sample sizes and CVs.
4. A bootstrap approach should be explored for the next assessment to account for uncertainty in model inputs, and
5. Better methods to include the uncertainty in landings history are required.
6. Managers should specify exactly what measures of uncertainty they require and for which parameters or management variables.
7. The standardization of fishery catch data to derive CPUE was poorly described. It is necessary to have more information available on how indices were derived to evaluate if they are included appropriately in the assessment model. This information should include summary statistics from the standardization (e.g. ANOVA-type tables), and a description of covariates excluded from the standardization (e.g. vessels, vessel class).
8. The three salt-water surveys should be examined in detail by recreational fishery survey experts to examine the potential magnitude of recall and non-response bias. Effort information would be quite valuable to extrapolate estimates to other years and for

comparison with more recent estimates of recreational catch. Research into estimating historical recreational catch should continue.

9. Estimation of shrimp by-catch data resulted in a highly variable time-series, which was not fully justified. Lack of consistency with historical data requires clarification. Better documentation of the shrimp by-catch estimation procedure would be useful.

Additional recommendations in my CIE review are:

1. The ToR's are usually appropriate, but not always adequate. ToR 3 should include reference to recent trends in stock size and fishing mortality. Tor 5 should include short term trends in stock size and fishing mortality.
2. Particularly for the Spanish mackerel assessment, a model utilizing only the recent and better sampled data may be useful to project stock biomass trends for proposed management options, although not in relation to Bmsy. Regardless of whether the stocks are over-fished (B<Bref) or if there is over-fishing (F>Fref), it is useful to inform managers if the short-term projected trends in stock size will be positive or negative under current quotas or with status-quo F.
3. The Data Workshop should recommend or provide advice on what the age and length selectivity patterns in the fisheries may be. For example, are there known reasons to expect "domed" selectivity patterns?
4. Both assessments require a fishery independent index of abundance, preferably with adequate age compositions. Suggestions are provided in the discussion of ToR 1.
5. Both assessments need to move away from fitting to extrapolated catches. I would prefer extrapolations be done within the assessment model. This is described further for ToR 9.
6. Bubble plots, or something similar, of time-series of age compositions would be useful for checking if cohorts are tracked by indices, or the fishery. If cohorts are not tracked then it is important to understand the reasons for this.
7. For the results of both assessments to be considered robust and reliable I think the assessment models should be applied to simulated data from a realistic range of operating models producing noisy data. The purpose would be to check that the main conclusions regarding stock status relative to reference levels are estimated with reasonable accuracy. However, this standard is rarely applied in the stock assessments I am familiar with, and it is unfair to say that best practice requires such simulations.
8. The convergence of the catch-at-age estimates should be tested by "jittering" starting values, and checking that final values are the same.
9. A simpler age-based model like Adapt could also help defend the catch-at-age assessments. Also, CSA (Catch survey analysis) should be considered.
10. Both assessments should give assurances that benchmarks and management parameters were not overly sensitive to the assumed parametric form for the stock-recruitment relationship.
11. A more objective approach to sensitivity analyses would be useful. A possible approach is discussed for ToR 6.

Background

SEDAR 17 addressed stock assessments for the South Atlantic stocks of vermilion snapper and Spanish mackerel. The **Terms of Reference** (**ToRs**) for the **Review Workshop** (**RW**) are presented below. The RW panel was tasked with preparing an Assessment Summary Report that summarized the primary assessment findings, and a Consensus Report for both stocks.

The goal of the RW was to ensure that the assessment was scientifically sound, that results were reliable, and that managers were provided adequate advice regarding stock status, management benchmarks, and the general directionality of appropriate future management actions. The RW

Panel had limited authority to request additional analyses, corrections of existing analyses and sensitivity runs.

The panel was composed of a Chair and three reviewers appointed by the **CIE** (**Center for Independent Experts**). All reviewers were independent, meaning that they did not contribute to the assessment under review and did not have a role in any management actions that may stem from the assessment.

The RW was held in Savannah, Georgia during October 20-24, 2008.

Role of reviewer

My basic role in the RW was to review the findings of the **Assessment Workshop** (**AW**) and **Data Workshop** (**DW**). Before the RW I read the stock assessment reports for Spanish mackerel and vermillion snapper, associated supporting documents from the DW and AW, and RW instructions including the ToRs. During the review meeting I participated in panel discussions on assessment methods, data, validity, results, recommendations, and conclusions, according to the ToRs. I served as the assessment leader for producing the Peer Review Consensus Report for Spanish mackerel. This included a detailed summary of findings, conclusions, and recommendations.

Summary of RW findings

Spanish Mackerel

- The stock assessment as presented by the AW was partially accepted.
- It was concluded that overfishing is not occurring.
- No annual estimates of fishing mortality were accepted due to model uncertainty.
- Stock projections were not accepted due to model uncertainty.
- Overfished status could not be determined from the assessment due to model uncertainty/sensitivity.

Vermilion Snapper

- The stock assessment as presented by the AW was accepted.
- It was concluded that the stock is not overfished.
- The determination was made that the stock is subject to overfishing. However, this conclusion is highly uncertain due to a lack of robustness to key model assumptions.

Summary of conclusions and recommendations

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

Panel Conclusions: Spanish Mackerel

The assessment included commercial catch statistics for 1950-2007, with information on gear types, discards, and size and age compositions. Recreational catch statistics were also available for 1981-2007, and three estimates of recreational catch were available for 1960, 1965, and 1970. By-catch estimates of Spanish mackerel taken in shrimp fisheries were made for 1998-2004, and 2006. Seven fishery-dependent and two fishery-independent indices of stock size were used. In addition, appropriate estimates of natural mortality, maturation, and growth rates were provided by the Data Workshop (DW).

The catch data were appropriate for the assessment; however, not all data were adequate. In particular, by-catch statistics from shrimp fisheries were not available for most years, and only three estimates of recreational catch were available for the 31 year period, 1950-1980. The missing catch information was inferred from the small amount of data available to the assessment, and this is a major source of uncertainty in this assessment. Suggested improvements to the data are covered under section 2.1.8: Additional information or assistance to improve Review Workshops.

The application of the data in the assessment was clear and reasonable in many instances, although improvements were possible, as usual (see section 2.1.8).

Panel Conclusions: Vermilion Snapper

The Data Workshop provided adequate stock assessment data for use in the assessment. The Panel considered that the best available data were made available to the assessment workshop and that appropriate life history parameters were supplied. Suggested improvements to the output of the data workshop are covered under Section 2.1.8.

Reviewer Discussion

Both the Spanish mackerel and vermillion snapper assessments depended heavily on fishery catch rate indices. Such indices involve well known problems (Q-creep, hyper-stability). For example, with vermillion snapper the AW made a fairly arbitrary assumption of a 2% annual increase in catchability, whereas the AW assumed no change for Spanish mackerel. Relying on CPUE indices usually makes stock assessment more difficult. The trap-based fishery-independent indices had their own problems (small sample sizes, variable catchability because of species interactions) and the AW seemed to think they were less reliable than some of the fishery-dependent indices. Hence, better stock-size indices are required. Egg surveys were mentioned at the RW. I am not that familiar with these, but they are often considered to be useful for providing an SSB index for pelagic stocks. Areal surveys of number and size of stock “patches” can provide useful information as well. Another approach, and one that may be more cost effective, is to develop an index fisherman program to provide standardized age-based catch rates. How to do this will of course depend on the specifics of the stock, but the goal is to get standardized catch rates (i.e. based on the same gear, locations, effort, no trip limits, etc) that indicate changes in stock size and not changes in management or fisherman behavior.

Spatial plots of indices would help in gauging the quality of an index and why different indices may indicate different trends. If possible, provide color-coded maps of CPUE by statistical area. Also, it would be useful to provide information on the spatial-distribution of the stock, and whether this depends on age, particularly with respect to the spatial distribution of the fishery (see text for ToR2 on expected fishery selectivity patterns). For example, are young fish distributed shallower than older fish, and thereby not selected by the fishery? In this respect, it would be valuable if the DW could recommend or provide advice on what the age and length selectivity patterns in the fisheries may be. For example, are there known reasons to expect "domed" selectivity patterns?

Bubble plots, or something similar, of time-series of age compositions would be useful for checking if cohorts are tracked by indices, or the fishery. If cohorts are not tracked then it is important to understand the reasons for this.

There is a need to continue to collect more, and more representative, age samples.

Florida trip ticket indices excluded many days and gears when trips limits likely affected catch rates. If the proportion of sets affected by trip limits changed over time then excluding this information could bias an index. Within a period of constant trip limits, changes in the number of trips that hit limits are informative about stock size. A better approach to deal with trip limits may be censored-regression (see next paragraph) which, although commonly used in medical studies etc., would appear to be a novel application in catch rate standardization.

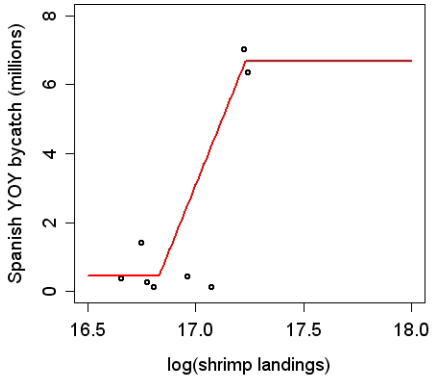
Some CPUE data were censored, and some biological data were truncated. Censoring means that the observation is really an interval containing the true value. Catch per trip is censored when there are trips limits. Had limits not been in place the catch-rate observation would be higher. The reported catch rate is a lower bound on what the catch rate would be without trip limits – which is what you really want to know. Size limits mean data are truncated. Small fish are not landed or recorded. These are omitted observations, not censored.

The delta-GLM (or lognormal) approach to develop indices of stock size is useful. I think the Negative Binomial distribution should also be considered. I would also like to see more summary information from the standardization. This should include ANOVA-type tables from the Binomial and positive analysis, showing the significance of effects, and also effect estimates plus standard errors. If the year effects in the positives are not significant then I would consider a model in which the mean of the positives is constant over time, and what varies from year to year is the probability of getting a non-zero set. This could be defended from a basin-attraction hypothesis in which fish density within patches is constant, but the number of patches changes from year to year.

The standardization of the headboat data for vermillion snapper had a large effect (see Figure 5.12 in DW report). This may be appropriate, but it is difficult to assess without information on the factors in the model that produced this change. There must be a change over time in the distribution of one of the model factors to cause the standardization to have a large effect, and it would be useful to have information on what changed.

There seemed to be little relationship between shrimp landings and Spanish mackerel YOY by-catch. Any model of the scant data will be speculative, and likely subject to substantial revisions in future assessments. The figure below (extracted from the RW presentation on the Spanish mackerel assessment) displays the relationship used to extrapolate by-catch. The residuals do not add to zero. By-catch was under-estimated in only 2 of 8 years. The first breakpoint seems like it should be further to the right, perhaps around 17.1 (26 000 kLB) instead of 16.8 (20 000 kLB), in which case the extrapolated by-catch in Table 1 of AW07 could be quite different because in 18 of 58 years the landings were between 20 000 – 26 000 kLB. These 18 years would be affected by a change in the breakpoint, and shifting the first breakpoint to 17.1 would result in lower estimates for these years. I am not arguing that this should have been done, but I

am demonstrating that there are other reasonable ways to construct historical by-catches that could lead to substantial differences in the assessment.



Little information was provided on changes in the ecosystem or species assemblages throughout the history of the assessment. It would be useful for the DW to provide some indication of this (even a narrative), and provide advice on how this might affect stock size, productivity, and mortality. For example, if natural predators declined in some time period we might expect M to have decreased as well.

The RW mentioned that non-response is also an important source of bias in mail or telephone surveys of recreational (or commercial) fisheries. Some references are:

Fisher, M. R. 1996. Estimating the Effect of Nonresponse Bias on Angler Surveys. *Transactions of the American Fisheries Society*, 125: 118–126.

Tarrant, M. A., Manfredo, M. J., Bayley, P. B., and Hess, R. 1993. Effects of Recall Bias and Nonresponse Bias on Self-Report Estimates of Angling Participation. *North American Journal of Fisheries Management*, 13: 217-222.

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

Panel Conclusions: Spanish Mackerel

The **assessment team** (**AT**) presented results from four assessment methods. The primary assessment method used a **statistical catch-at-age model** (**SCA**), and the supporting methods were: a **stock reduction mod**el (**SRA**); a **non-equilibrium production model** (**ASPIC**); and catch curve analysis (as a diagnostic for the SCA).

After considering the results of several requested sensitivity runs, the RP concluded that the SCA model was not adequate to fully address all ToR's. The RP concluded that the SCA model could only be used to determine the over-fishing status, but not annual estimates of F, biomass or if the stock is over-fished. The rationale for this conclusion was based on the degree of uncertainty in the input data, (i.e. historic recreational catch and by-catch in shrimp fisheries), sensitivity to model assumptions (e.g. uncertainty about how to weight different sources of information), and lack of fishery-independent indices of adult population size. Further rational and suggested improvements to the assessment methods are covered under section 2.1.8.

The ASPIC model was not adequate as a standalone stock assessment model because the combined tuning index generally followed a "one-way trip", which in this type of model is known to

produce poor results. In addition, because the ASPIC model did not use available age or length data, it was not appropriate for a “best-practice” stock assessment. The SRA was of intermediate complexity between the ASPIC and SCA models and was presented as a check of the SCA model; therefore, on its own the SRA was neither adequate nor appropriate for the stock assessment. Catch curves were highly variable and difficult to interpret in direct comparison to the SCA results.

Panel Conclusions: Vermilion Snapper

The AW presented results from four assessment methods. The primary assessment method used a “statistical catch-at-age” model (SCA), and the supporting methods were: a novel stock reduction method (SRA); a non-equilibrium production model (ASPIC); and catch curve analysis (as a diagnostic for the SCA). After considering the results of several requested sensitivity runs, the Panel concluded that the assessment methods were adequate but not appropriate to fully address all terms of references. Rational and suggested improvements to the assessment methods used are covered under Section 2.1.8.

Reviewer Discussion

I think it is useful, for both Spanish mackerel and vermillion snapper, to first develop a conceptual model to describe stock dynamics over the time period considered in the assessment. This would basically involve how spatial and size distributions change within and between years. Layered on this would be the processes (fisheries and surveys) that produce the assessment data (catches and indices). This could involve simple descriptions like location, season, and selectivity. The ambitious goal I propose is something similar to the annual sea surface temperature “movies” that we sometimes see, except the stock “movie” could be seasonal and annual, and also show where and when fisheries and surveys occur. The idea is to use the conceptual model to motivate the quantitative assessment model, something like “here is what we think happened, so here is how we will model it”.

Many assumptions were made in both assessments and it was difficult to assess the adequacy of the assessment models. The catch estimates during 1950-1980 for Spanish mackerel seemed too speculative to accept the SCA assessment model. This seemed to be less of a problem for vermillion snapper. This problem was not specific to the SCA approach; it affected the SRA and ASPIC models as well. However, the weightings given to the various inputs in the SCA were somewhat subjective, and the model results were shown to be sensitive to these weightings. This meant essentially that the model results were somewhat subjective. Both assessments seemed sensitive to the assumed model for the stock-recruit relationship. The empirical data showed no or little relationship. There is a real danger that a different assessment group could come to different conclusions about stock status.

I was surprised how the SCA estimated selectivity’s for vermillion snapper were strongly age-dependent for many gears. This did not make sense given the wide variation in length at age (see Figure 2.6.1 in DW Report). This led the RW to speculate about spatial differences in age distributions such that the fisheries could somehow avoid younger fish, even if they were almost as large as older fish. I am still unconvinced that these selectivity’s were appropriate, although a sensitivity analysis suggested that the main assessment results did not change substantially even if selectivity’s were constrained to be much flatter. Nonetheless, a mechanism needs to be proposed and defended to explain the age compositions of fishery catches given the wide variations in size at age.

For the results of both assessments to be considered robust and reliable I think the assessment models should have been applied to simulated data from a realistic range of operating models producing noisy data. The purpose would be to check that the main conclusions regarding stock status relative to reference levels were estimated with reasonable accuracy. However, this

standard is rarely applied in the stock assessments I am familiar with, and it is unfair to say that best practice requires such simulations.

The assessments were asked to estimate difficult quantities, like Fmsy and Bmsy. This forces the assessment scientists to "speculate" about historical stock size, even though there was little data available to speculate with. There should be two goals for the assessments: 1) **Stock size** (**B**) and **fishing mortality** (**F**) relative to reference values, and 2) recent trends in B and F. The first goal is difficult but the AW did their best to address it. The second goal is usually easier or more tangible, but was neglected by both assessments. I describe this in more detail for ToR 3 and 5.

According to the Guidelines for SEDAR 17:

1) complete documentation and code must be provided;
2) an executable version of the program and all necessary input and control files must be provided to workshop participants;
3) the custom code/application used must be validated through application of known outcome datasets and such results must be provided as part of the assessment documentation; (may be met through reference documents)
4) justification for use of custom programming in lieu of readily available models must be provided in the assessment documentation.

Both assessments met Guidelines 1) and 2), but not really 4); however, I don't think 4) is a big issue. Simplified versions of the SCA models were tested according to guideline 3). However, this guideline is not enough. I have worked with a highly parameterized model in which parameters were identified correctly with exact data (i.e. the same test the authors used), but were badly biased when reasonable amounts of noise (30% CV) was added to the data.

The convergence of the SCA estimates should be tested by "jittering" starting values, and checking that final values are the same.

The assessments utilized simpler models to defend the more detailed SCA approach. This was appropriate. I think a simpler age-based model like Adapt could also help defend the SCA assessments. Also, CSA (Catch survey analysis) should be considered. CSA requires an index of recruitment and exploitable stock size, and total catch. The CSA approach is of intermediate complexity between an age-structured model and age-aggregated model like ASPIC; however, unlike ASPIC, CSA can work for "one-way trip" data.

Both assessments needed better continuity runs, and better explanations for the changes in modeling approaches from the last assessment. This is a requirement in the Guidelines for SEDAR 17. Change should be motivated by more than personal choice.

The assessment would benefit from more peer review at the AW. This should include alternative approaches by different experts. It may not be enough for a small assessment team to try different approaches, because the teams usually promote one approach and may not give enough consideration to the alternatives.

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

Panel Conclusions: Spanish Mackerel

The RP did not accept estimates of stock abundance, biomass, and exploitation rates, due to concerns about robustness of the assessment to uncertainty in inputs and model assumptions.

Panel Conclusions: Vermilion Snapper

The Panel supports the estimates from the AW base model. Estimates for 2007 are given below (*see* Table 3.6 of the AW report).

Year	*F*	F/F_{MSY}	*B* (mt)	$B/B_{unfished}$	SSB/SSB_{MSY}	*SSB/MSST*
2007	0.49	1.27	2966	0.283	0.861	1.10

Reviewer Discussion

The conclusions regarding Spanish mackerel may have been unnecessarily vague. This is because the valid concerns that caused the RP to not accept estimates were mostly related to the uncertainty in historical catch data (recreational and by-catch). However, an assessment model for recent data, although likely useless for determining stock status relative to reference points, may have be quite useful for describing recent trends in biomass (B) and F. This is important information to give. To a lesser extent this criticism applied to vermillion snapper.

Both stock assessments are deficient for not producing conclusions about the recent trends in B and F. Better wording for ToR 3, to include estimates of size and trends, may be required.

ToR 4: Evaluate the methods used to estimate population benchmarks and management parameters (e.g., MSY, Fmsy, Bmsy, MSST, MFMT, or their proxies); provide estimated values for management benchmarks, a range of ABC, and declarations of stock status.*

Panel Conclusions: Spanish Mackerel

Due to concerns about the robustness of estimates of population benchmarks and management parameters (see Summary Discussion below), these estimates were not accepted. However, the RP did accept that over-fishing is not occurring. In sensitivity analyses this conclusion, based on F2007/Fmsy, was robust even though estimates of F and Fmsy were not robust.

The RP concluded from trends in fishery-dependent data that there is an increasing biomass trend; however the last four years have seen a decline.

Panel Conclusions: Vermilion Snapper

The method of Shepherd (1982) was used to determine F_{MSY} and associated benchmarks and management thresholds. This is a traditional and defensible approach. However, the results from the method depend on biological and fishery parameters that may be poorly determined. Particularly in this stock assessment, the values of steepness are highly uncertain and, as a consequence, so are the estimated benchmarks. In these circumstances it may be more prudent to use proxies for F_{MSY} and B_{MSY} rather than values calculated from an assumed level of steepness. However, B_{MSY} and its proxies are sensitive to uncertainty in landings.

Despite the above comments, the Panel supports the estimates from the AW base model (*see* Table 3.16 of the AW report for estimated benchmarks; *see* Tables 3.17–3.22 for a range of ABC depending on the level of risk management wishes to adopt).

Declaration of stock status:

- The stock is not overfished. This conclusion is robust to most key model assumptions.
- The stock is subject to overfishing, but this conclusion is highly uncertain due to the lack of robustness to key model assumptions.

Reviewer Discussion

There was little evidence of a stock-recruitment relationship in the "real" model estimates of recruitment. This is not unusual. My experience with the Beverton-Holt model is that it is harder to estimate reliably from typical stock-recruit data compared to the Ricker or Hockey-Stick models. I think it would be useful if both assessments gave assurances that benchmarks and management parameters were not overly sensitive to the assumed parametric form for the stock-recruitment relationship.

Another generic concern I have is that measurement error in the stock axis results in over-estimation of the productivity of the resource based on estimated stock-recruitment relationships. This is an old problem, but still relevant. I am not sure how the assessments could address this problem, but advice should recognize it.

I am unconvinced that the bias correction used for the estimated stock-recruitment curve is necessary or a good idea. The correction involves an estimated variance parameter whose value can be quite uncertain. Many researchers are satisfied with the median unbiased property of the uncorrected curve.

ToR 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).*

Panel Conclusions: Spanish Mackerel

The projection method uses estimated numbers at age as a starting point and projects forward using stochastic recruitment. However, the average projection trajectory is defined to be deterministic (to ensure that the average trajectory is consistent with the deterministic benchmarks). This is an adequate approach for short term projections (1-3 years).

Due to concerns (see above) about the robustness of the stock assessment results, the AW projections were not accepted.

Panel Conclusions: Vermilion Snapper

The projection method uses estimated numbers at age as a starting point and projects forwards using stochastic recruitment. However, the average projection trajectory is defined to be deterministic (to ensure that the average trajectory is consistent with the deterministic benchmarks). This is an adequate approach for short term projections (1-3 years). However, any projection results should be treated with caution because of the uncertainty in base model results.

Estimates of future stock condition are contained in Tables 3.24 to 3.28 of the AW report.

Reviewer Discussion

My comments about ToR 3 also apply here. An assessment model utilizing only the recent and better sampled data may have been useful to project stock biomass trends for proposed management options, although not in relation to Bmsy. Regardless of whether the stocks are over-fished (B<Bref) or if there is over-fishing (F>Fref), it seems useful to me to inform managers if the short-term projected trends in stock size will be positive or negative under current quotas or with status-quo F.

ToR 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.*

Panel Conclusions: Spanish Mackerel

The RP concluded that methods to account for uncertainty were neither well developed nor adequate. The main approach was to examine the variations in point estimates based on sensitivity runs. In addition, the SCA model estimates were compared with those from simpler models (SRA and ASPIC). A partial bootstrap was used for projections, in which recruitments were sampled from the stock-recruit curve including model predicted deviations. Sensitivity analyses were also used to evaluate uncertainty/robustness in the conclusion regarding over-fishing and over-fished status.

Panel Conclusions: Vermilion Snapper

The methods used to characterize uncertainty were not considered entirely appropriate by the Panel. However, some guidance on the level of uncertainty can be obtained from the confidence intervals in the AW base model (Table 3.16 in the AW report) and the range of estimates from sensitivity runs (*see* Table 2.2.1 of this report). These results are likely to under-estimate the true level of uncertainty.

Reviewer Discussion

The SCA model used in the Spanish mackerel and vermillion snapper assessments was not statistical, and the few measures of uncertainty provided were ad hoc with an unclear basis. The AW should describe how to interpret any uncertainty intervals they provide. Otherwise they are just lines on a graph, subject to mis-interpretation. It is my experience that this simple step alone makes people think about what it is they have done, and whether it was sufficient for the objective. Managers and other stakeholders have a role to play here as well (see ToR 8 comments).

I naively thought that a strength of the SCA approach was the ability to incorporate error in landings information, in addition to errors in size compositions and abundance indices. This appears to not be the case. Given the speculative nature of some of the components of historical catches, this is a major inadequacy in characterizing uncertainty in estimated parameters. A full bootstrap of the SCA model may be a better way to quantify the precision of estimates. However, I recognize that there are many ways to bootstrap data and this would involve considerable investigation.

Uncertainty in catches was assessed using different catch “streams”. I do not feel this is an adequate method to account for this source of uncertainty. Nonetheless, if this is the approach used then the catch streams should be provided by the data workshop.

The main approach used to characterize uncertainty by the AW and RW was sensitivity analyses. This is a subjective way to characterize uncertainty, and prone to mis-interpretation. It is subjective because it involves choosing perturbations to model inputs or assumptions. It is prone to mis-interpretation because of the temptation to interpret the range of model outputs as an interval for what happened in the population. A sensitivity analysis does not directly provide an interval for important assessment quantities, at least not one with desirable properties. Sensitivity analyses usually focus on the impact of model mis-specification, which is a component of uncertainty.

Sensitivity analyses are important when “building” a stock assessment model. Ideally, a good stock assessment model produces intervals for parameters, and those intervals contain the parameter estimates obtained from most sensitivity analyses. A more objective approach to sensitivity analysis would be useful and, of course, less subjective. Cadigan and Farrell (2002, 2004) outlined an objective approach that is fairly simple to use, even for models that are time consuming to optimize. The approach is particularly easy to use if the assessment software gives derivatives automatically, like ADMB. I suggest that the sensitivity of B/Bref, F/Fref, F2007, and B2007 should be routinely assessed with respect to perturbations to steepness, catch, M, likelihood weights, and selectivity assumptions. This should save the AW and RW much time in doing re-runs, and allow the RW to focus on the assumptions that really count.

Cadigan, N. G. and Farrell, P. J. 2002. Generalized local influence with applications to fish stock cohort analysis. Appl. Statist. 51: 1-15.

Cadigan, N. G. and Farrell, P. J. 2004. Local Influence Diagnostics for the Retrospective Problem in Sequential Population Analysis . ICES Journal of Marine Science. 62: 256-265.

*ToR 7: Ensure that stock assessment results are clearly and accurately presented in the Stock Assessment Report and Advisory Report and that reported results are consistent with Review Panel recommendations**.*

This was completed after a draft Advisory report was received from the SEDAR Coordinator.

Reviewer Discussion

Draft Summary Reports for Spanish mackerel and vermillion snapper should have been developed for the RW. This would give the big picture and proposed “take-home” advice, and the AW report would then simply provide background for the Summary Reports.

ToR 8: Evaluate the SEDAR Process. Identify any Terms of Reference which were inadequately addressed by the Data or Assessment Workshops; identify any additional information or assistance which will improve Review Workshops; suggest improvements or identify aspects requiring clarification.

Comments from the Review Panel were provided after each Workshop ToR.

Panel Conclusions: Spanish Mackerel

I. Terms of Reference of Data Workshop

1. Characterize stock structure and develop a unit stock definition. Provide a map of species and stock distribution.

Maps of the region where the stocks are distributed were provided. Charts indicating the distribution of the catch would be useful. If available, charts showing the stock distribution and relative abundance based on survey results would also be of interest.

2. Tabulate available life history information (e.g., age, growth, natural mortality, reproductive characteristics, discard mortality rates); provide appropriate models to describe growth, maturation, and fecundity by age, sex, or length as applicable. Evaluate the adequacy of available life-history information for conducting stock assessments and recommend life history information for use in population modeling.

Life history information required for stock assessment is clearly provided without going into unnecessary detail. Guidance on steepness, the fraction of virgin recruitment expected at $0.2B_0$, would be helpful.

Estimation of the von Bertalanffy growth parameters within the assessment model may allow better estimation of fishery selectivity curves. The possibility of change in growth over time was not considered for Spanish mackerel.

There was some confusion over the inclusion of age 0 fish in the modelling of growth and maturity. It was unclear how the true age of the fish coincided with the fishing year criteria used in the assessment. It was suggested that the actual age of the fish (age 0.5, etc.) be considered when modelling growth.

3. Consider relevant fishery dependent and independent data sources to develop measures of population abundance. Document all programs used to develop indices; address program objectives, methods, coverage, sampling intensity, and other relevant characteristics. Provide maps of survey coverage. Develop values by appropriate strata (e.g., age, size, area, and fishery); provide measures of precision. Evaluate the degree to which available indices represent fishery and population conditions. Recommend which data sources should be considered in assessment modeling.

Sample sizes used to estimate length composition need to be characterized by the number of trips sampled rather than number of fish measured.

The Data Workshop presented the indicators of population abundance available and made recommendations for use in stock assessment. The Workshop preferences for particular indices (ranking) based on pros and cons presented could be helpful.

GLMs were used to construct the CPUEs but results and diagnostics were not fully documented. ANOVA tables should be provided to evaluate conclusions reached in the modelling. In addition, a step-wise regression should be considered to provide justification for the selection of explanatory variables. Factors associated with vessel type are often influential on CPUE but do not seem to have been evaluated in the GLM analysis.

4. Characterize commercial and recreational catch, including both landings and discard removals, in pounds and number. Discuss the adequacy of available data for accurately characterizing harvest and discard by species and fishery sector. Provide length and age distributions of the catch. Provide maps of fishery effort and harvest.

The DW provided the best available commercial and recreational catch data. Graphs representing the time-series of all removals in pounds and numbers by gear, including both recreational and commercial by-catch and discards were not presented. By-catch data from the shrimp fisheries was inferred from a small amount of available data. A more defensible statistical model to estimate missing points should be considered.

Linear interpolation of missing catch in the recreational fishery was also identified as a problem (*see* comments in section 2.1.8.2 below, (ToR 1)).

Maps of fishery effort and harvest would have helped visualisation of the fishery but were not presented.

5. Provide recommendations for future research in areas such as sampling, fishery monitoring, and stock assessment. Recommend sampling intensity by sector (fleet), area, and season.

Sampling recommendations were generally to increase sample sizes. Information on the methodology followed to determine adequate sample sizes for both length frequency and age samples would be useful.

Some recommendations for future research related to indicators of population abundance were outlined. However, for those to be useful, a clear statement of the problem, research objectives, methodology and identification of groups and/or projects that could undertake such research should be specified.

6. Develop a spreadsheet of assessment model input data that incorporates the decisions and recommendations of the Data Workshop. Review and approve the contents of the input spreadsheet within 6 weeks prior to the Assessment Workshop.

Completed as required.

7. Prepare complete documentation of workshop actions and decisions (Section II. of the SEDAR assessment report); prepare a list of tasks to be completed following the workshop, including deadlines and personnel assignments.

Adequately addressed. The list of pending tasks were itemised for the indicators of population abundance but no deadlines and personnel assignments were identified. In cases where no tasks were identified (i.e. commercial fishery) a statement saying so should be placed in the corresponding section of the report.

II. Terms of Reference of the Assessment Workshop

1. Review any changes in data following the data workshop, any analyses suggested by the data workshop, and provide estimated values for any required data in DW TOR 4 that are not available

from observations. Summarize data as used in each assessment model. Provide justification for any deviations from Data Workshop recommendations.

Since estimates of shrimp by-catch data for the early period of the fishery were unavailable, missing data were estimated. The function implemented resulted in a highly variable time-series which was not fully justified. Lack of consistency with historical data (1972 – 1997, document DW12) requires clarification. Better documentation of the shrimp by catch estimation procedure would be useful.

Catch estimates from the MRFSS are not available from pre-1981. Data for the period 1950 – 1980 was extrapolated from 3 data points (from 1960, 1965 and 1970). Although the estimates were on the order of 6 times those in recent years, which raised some concern, published material in the 1950s suggests large recreational catches of that same order or larger. Research into estimating historical recreational catch should continue.

2. Develop population assessment models that are compatible with available data and recommend which model and configuration is deemed most reliable or useful for providing advice. Document all input data, assumptions, and equations. Document model code in an AW working paper.

Population assessment models compatible with the data available were developed, input data, assumptions and equations provided. The equations in the AW report corresponding to the objective function need to specify the years across which summations were performed. The Statistical Catch at Age (SCA) model configurations were specified and justified although the implications of those choices were not fully explored (i.e. weight in the likelihood terms). The use of specified multipliers for each likelihood component in the SCA model undermines the statistical nature of the model. Standardized residuals cannot be calculated when the multipliers are not equal to 1. Therefore, the internal statistical consistency of the model cannot be verified – and data weightings are subjective. It is recommended that base models use multipliers of 1 (and weights be adjusted, if necessary, using effective sample sizes and CVs). However, it was noted that the experience with VPA's is that iterative re-weighting of data can lead to undesirable outcomes in some situations, placing too much weight on some data. Some subjective judgment of the "value" of data sources may still be required.

3. Provide estimates of stock population parameters (fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship, discard removals, etc) by age and other relevant categorizations (i.e., fleet or sector); include representative measures of precision for parameter estimates.

Provided as required.

4. Characterize uncertainty in the assessment and estimated values, considering components such as input data sources, data assumptions, modeling approach, and model configuration. Provide appropriate measures of model performance, reliability, and 'goodness of fit'.

Uncertainty was estimated in the SCA model by parametric bootstrap. It is not clear which parameters and their uncertainties were taken into account. Variances in parameter estimates do not reflect uncertainty in the catch data or structural uncertainty. Although sensitivity to key assumptions was explored through sensitivity tests, this approach does not provide information on precision of estimated parameters. Research into better methods to include the uncertainty in landings history is recommended.

It is also recommended that managers specify exactly what measures of uncertainty they require and for which parameters or management variables.

5. Provide yield-per-recruit, spawner-per-recruit, and stock-recruitment evaluations, including figures and tables of complete parameters.

Provided as required.

6. Provide estimates for SFA criteria consistent with applicable FMPs, proposed FMPs and Amendments, other ongoing or proposed management programs, and MSA National Standards. This may include: evaluating existing SFA benchmarks, estimating alternative SFA benchmarks, and recommending proxy values.

Existing benchmarks were evaluated. It was recognised that benchmarks would be sensitive to modelling assumptions. The implications for stock assessment were not fully explored (i.e. sensitivity to steepness). Proxy values were not recommended.

7. Provide declarations of stock status relative to SFA benchmarks; recommend alternative SFA benchmarks if necessary.

Provided as required.

8. Project future stock conditions. Provide estimates of exploitation, stock abundance and yield (discards and directed harvest) in pounds and numbers for a minimum of 10 years into the future. Fully document all projection assumptions (e.g., recruitment, selectivity, discard mortality). Develop rebuilding schedules if warranted; include estimated generation time. Stock projections shall be developed in accordance with the following:

A) If stock is overfished:
F=0, F=current, F=Fmsy, Ftarget (OY),
F=Frebuild (max that rebuild in allowed time)

B) If stock is overfishing
F=Fcurrent, F=Fmsy, F= Ftarget (OY)

C) If stock is neither overfished nor overfishing
F=Fcurrent, F=Fmsy, F=Ftarget (OY)

Performed as required. Projections were performed under the assumed functional form for stock and recruitment. The results were conditioned on the assessment.

9. Evaluate the impacts of past and current management actions on the stock, with emphasis on determining progress toward stated management goals and identifying possible unintended fishery or population effects.

The impact of past and current management actions was not evaluated.

10. Consider the data workshop research recommendations. Provide additional recommendations for future research and data collection (field and assessment); be as specific in describing sampling design and sampling intensity.

Recommendations from the DW were considered. In cases where the AW could not address those recommendations, i.e. creation of a Comprehensive Data and Assessment Archive, an alternative forum was identified.

11. Prepare an accessible, documented, labelled, and formatted spreadsheet containing all model parameter estimates and all relevant population information resulting from model estimates and any projection and simulation exercises. Include all data included in assessment report tables, all data that support assessment workshop figures, and those tables required for the summary report.

Prepared as requested.

12. Complete the Assessment Workshop Report (Section III of the SEDAR Stock Assessment Report), prepare a first draft of the Advisory Report, and develop a list of tasks to be completed following the workshop.

Completed as requested.

13. Perform a probabilistic analysis of proposed reference points and provide the probability of overfishing at various harvest or exploitation levels. (Added 7-2-08)

The probability of stock recovery to the SSB reference points by year was evaluated for a range of harvest levels.

Additional information or assistance to improve Review Workshops

The standardization of fishery catch data to derive CPUE was poorly described. Stock size indices should play an important role in stock assessment, and it is necessary to have more information available on how indices were derived to evaluate if they are included appropriately in the assessment model. This information should include summary statistics from the standardization (e.g. ANOVA-type tables), and a description of covariates excluded from the standardization (e.g. vessels, vessel class). Information on the annual geographic distribution of the various fisheries may provide information on changes in index catchability. Trends in fishery catch rates may depend on factors other than trends in population size. This problem was recognized by the assessment team.

Historic recreational fishery landings (1950-1980) were quite uncertain and difficult to use in the assessment. The three salt-water surveys should be examined in detail by recreational fishery survey experts to examine the potential magnitude of recall and non-response bias. Effort information would be quite valuable to extrapolate estimates to other years and for comparison with more recent estimates of recreational catch.

Spanish mackerel by-catch estimates in shrimp fisheries were poorly documented, uncertain, and difficult to use in the assessment. In a previous assessment (SEDAR 5) estimates of discards in shrimp trawls were considered too unreliable to include in the assessment. Shrimp boats could not be selected randomly for by-catch information; therefore, it is necessary to compare basic statistics on sampled trips (i.e. vessel tonnage, length, horsepower, number nets, etc.) with fleet-wide information in order to assess if the raising of sampled by-catch rates to the fleet, and to other years, is appropriate. A working paper (DW12) indicated historical (1972-1997) data, except in 1980, suggested few Spanish mackerel were caught in shrimp fisheries in those years. This is not consistent with the extrapolated by-catches used in the assessment, and needs clarification. The model used to extrapolate by-catches to unsampled years suggested a sharp increase in by-catches when shrimp landings increased from 20 000 to 30 000 lbs. This model over-estimated by-catch in 5 of 8 years, and under-estimated by-catch in only 2 of 8 years. A better fitting segmented regression model has the potential of greatly reducing the interpolated by-catches.

The assessment would benefit from simulation testing of the proposed assessment model or as a preferred alternative, on realistic operating models.

The stock assessment could benefit from additional simple data explorations and stock assessment models. Better plots of changes in age and length distributions, better calculations of Z from catch curves (e.g. Chapman-Robson), and simple age-based methods (separable catch at age) or other methods (CSA – catch survey analysis) may provide additional insights and better justification for the SCA approach.

Panel Conclusions: Vermilion Snapper

I. Terms of Reference of Data Workshop

1. Characterize stock structure and develop a unit stock definition. Provide a map of species and stock distribution.

The DW defined the stock structure of vermilion snapper and a justification for the delineation. A map of the geographic distribution of snapper catches would have been helpful for understanding the fisheries.

2. Tabulate available life history information (e.g., age, growth, natural mortality, reproductive characteristics, discard mortality rates); provide appropriate models to describe growth, maturation, and fecundity by age, sex, or length as applicable. Evaluate the adequacy of available life-history information for conducting stock assessments and recommend life history information for use in population modeling.

Life history information, based on empirical data as well as literature references, was compiled as required by the term of reference. Future consideration should be given to estimating growth (simultaneously with other parameters) within the SCA model (with the inclusion of conditional age at length data). In addition the DW should provide guidance for analysts regarding the steepness parameter for stock-recruitment, based on their knowledge of the biology of the species. The high variability in the length at age should be further explored with regards to geographic variation in growth rates. In addition, distribution of fish by age should be examined for implications in fisheries selectivity (e.g. are age 1 fish inshore, older fish vulnerable to the fishery further offshore).

3. Consider relevant fishery dependent and independent data sources to develop measures of population abundance. Document all programs used to develop indices; address program objectives, methods, coverage, sampling intensity, and other relevant characteristics. Provide maps of survey coverage. Develop values by appropriate strata (e.g., age, size, area, and fishery); provide measures of precision. Evaluate the degree to which available indices represent fishery and population conditions. Recommend which data sources should be considered in assessment modeling.

Available fishery independent and dependent data were developed as measures of abundance and reasonably well documented. The addition of simple ANOVA output tables from the GLM analysis would provide reviewers with additional diagnostic information. Consideration should also be given to use of a stepwise regression as a method for determining the relevance of ancillary variables. Potential environmental/oceanographic explanatory variables should also be considered.

4. Characterize commercial and recreational catch, including both landings and discard removals, in pounds and number. Discuss the adequacy of available data for accurately characterizing harvest and discard by species and fishery sector. Provide length and age distributions of the catch. Provide maps of fishery effort and harvest.

Recreational landings prior to the initiation of the MRFSS program were inferred from three surveys of recreational landings in 1960, 1965 and 1970. Any additional information to substantiate these estimates, such as results from the Schlitz tagging programs of the 1960s, would be beneficial.

The use of length and age data in the SCA model requires that such data are representative of the catch. The assumption is that these data were collected randomly from all fisheries sampled, but no information to substantiate this assumption is provided. If landings are sorted into market

category and sampling done randomly within a category, then weighting by proportion of each category would be required. Whether this was done, or necessary, was not well documented.

Although not required by the model used in the assessment, development of a catch at age matrix could provide a useful tool for evaluation. With such information, cohort strength, changes in selectivity, etc. could be examined for comparison to model results. Additionally, maps of fishing effort and catch as requested in the term of reference would have been helpful.

5. Provide recommendations for future research in areas such as sampling, fishery monitoring, and stock assessment. Recommend sampling intensity by sector (fleet), area, and season.

Useful recommendations were provided by the DW.

6. Develop a spreadsheet of assessment model input data that incorporates the decisions and recommendations of the Data Workshop. Review and approve the contents of the input spreadsheet within 6 weeks prior to the Assessment Workshop.

Completed as required.

7. Prepare complete documentation of workshop actions and decisions (Section II. of the SEDAR assessment report); prepare a list of tasks to be completed following the workshop, including deadlines and personnel assignments.

Completed as required.

II. Terms of Reference of Assessment Workshop

1. Review any changes in data following the data workshop, any analyses suggested by the data workshop, and provide estimated values for any required data in DW TOR 4 that are not available from observations. Summarize data as used in each assessment model. Provide justification for any deviations from Data Workshop recommendations.

Completed as required.

2. Develop population assessment models that are compatible with available data and recommend which model and configuration is deemed most reliable or useful for providing advice. Document all input data, assumptions, and equations. Document model code in an AW working paper.

Model code was provided. Population models were developed to characterize the stock status as a basis for providing management advice. Documentation of the input, assumptions and equations were either provided with the results or in references from previous analyzes. However, in the SCA model, the use of specified multipliers for each likelihood component undermines the statistical nature of the model. Standardized residuals cannot be calculated when the multipliers are not equal to 1. Therefore, the internal statistical consistency of the model cannot be verified – and data weightings are subjective. It is recommended that base models use multipliers of 1 (and weights be adjusted, if necessary, using effective sample sizes and CVs).

3. Provide estimates of stock population parameters (fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship, discard removals, etc) by age and other relevant categorizations (i.e., fleet or sector); include representative measures of precision for parameter estimates.

Appropriate measures of population parameters were provided by the AW. Additional clarification concerning the summation of fishing mortality across gear types with different selectivity's would be helpful.

4. Characterize uncertainty in the assessment and estimated values, considering components such as input data sources, data assumptions, modeling approach, and model configuration. Provide appropriate measures of model performance, reliability, and 'goodness of fit'.

Uncertainty in the base model results were provided as partial-bootstrap distributions of critical parameters (using the uncertainty in recruitment deviations). Robustness to model assumptions was evaluated with sensitivity runs. Alternative estimation models were also used. The AW made a genuine attempt to quantify estimation and model uncertainty. However, they failed to capture an appropriate level of uncertainty.

The base model had subjective weights for the different data sources. Therefore, it is not necessarily a good base about which to test sensitivities to model assumptions. Also, the bootstrap distributions do not include the full scope of observation error in the input data – indeed, there is only a tenuous link between the variance assumptions of the input data and the variance of parameter estimates. Research into better methods to include the uncertainty in landings history is recommended.

It is also recommended that managers specify exactly what measures of uncertainty they require and for which parameters or management variables.

5. Provide yield-per-recruit, spawner-per-recruit, and stock-recruitment evaluations, including figures and tables of complete parameters.

Appropriate information was provided by the AW. However, as noted the DW should consider making recommendations for appropriate steepness parameters.

6. Provide estimates for SFA criteria consistent with applicable FMPs, proposed FMPs and Amendments, other ongoing or proposed management programs, and MSA National Standards. This may include: evaluating existing SFA benchmarks, estimating alternative SFA benchmarks, and recommending proxy values.

A proxy value for Fmsy of F40% was recommended by the AW.

7. Provide declarations of stock status relative to SFA benchmarks; recommend alternative SFA benchmarks if necessary.

Estimates for vermilion snapper were provided as required.

8. Project future stock conditions. Provide estimates of exploitation, stock abundance and yield (discards and directed harvest) in pounds and numbers for a minimum of 10 years into the future. Fully document all projection assumptions (e.g., recruitment, selectivity, discard mortality). Develop rebuilding schedules if warranted; include estimated generation time. Stock projections shall be developed in accordance with the following:

A) If stock is overfished:
F=0, F=current, F=Fmsy, Ftarget (OY),
F=Frebuild (max that rebuild in allowed time)

B) If stock is overfishing
F=Fcurrent, F=Fmsy, F= Ftarget (OY)

C) If stock is neither overfished nor overfishing
F=Fcurrent, F=Fmsy, F=Ftarget (OY)

Projections were made as required by the ToR.

9. Evaluate the impacts of past and current management actions on the stock, with emphasis on determining progress toward stated management goals and identifying possible unintended fishery or population effects.

Impacts from past management actions were not considered explicitly, however the time series of model results reflect past management actions.

10. Consider the data workshop research recommendations. Provide additional recommendations for future research and data collection (field and assessment); be as specific in describing sampling design and sampling intensity.

Specific recommendations for changes or addition of data collection were not provided by the assessment workshop.

11. Prepare an accessible, documented, labeled, and formatted spreadsheet containing all model parameter estimates and all relevant population information resulting from model estimates and any projection and simulation exercises. Include all data included in assessment report tables, all data that support assessment workshop figures, and those tables required for the summary report.

Completed as required.

12. Complete the Assessment Workshop Report (Section III of the SEDAR Stock Assessment Report), prepare a first draft of the Advisory Report, and develop a list of tasks to be completed following the workshop.

Completed as required.

13. Perform a probabilistic analysis of proposed reference points and provide the probability of overfishing at various harvest or exploitation levels. (Added 7-2-08)

Completed as required.

Reviewer Discussion

The RW provided a good critique of the potential inadequacies in the DW and AW ToR's. In my comments on ToR's 1-7 I identified some additional information or assistance to improve the RW. In the following discussion I consider improvements to the SEDAR process.

As previously mentioned, some additional information in background documents on CPUE calculations would be useful. However, I must note that the SEDAR background documentation was exceptionally good compared to other assessment processes I have been involved in. The SEDAR standards would be hard to achieve for some other organizations.

The ToR's were usually appropriate, but not always adequate. ToR 3 should include reference to recent trends in stock size and fishing mortality. Tor 5 should include short term trends in stock size and fishing mortality. ToR 6, or somewhere in the SEDAR guidelines, should contain more specific objectives for characterizing uncertainty. This should not be completely left to the AW discretion. I was not sure what was required. There needs to be dialogue between the AW and stakeholders on what properties measures of uncertainty should have. This may be beyond the grasp of many managers and scientists, but there are people on both sides who understand what is useful, and they should make recommendations for AW's to follow.

The SEDAR guidelines were helpful. I particularly appreciated the advice on how far a RW could go in terms of changing an assessment. I agree that a RW should not substantially change an assessment, because we are not the local experts.

The RW did not, in my opinion, have clear criteria for rejecting or accepting an assessment. I acknowledge this is difficult to do, and some subjectivity will always be required. It would be useful if the SEDAR guidelines could provide some advice in this regard.

The Rapporteur provided to the RW was good, but there was a need to focus more on critical discussion. The chair should play a greater role in this respect, and indicate to the Rapporteur important points to record.

Some parts of the RW report are not as strong as I would have liked. I think there were issues that the panel reached consensus on, but because one panel member had a different (possibly legitimate) point of view, the consensus was not communicated. We used terms like 'Some panel members felt …', when we should have said 'Most panel members felt …', which is the same as 'The consensus of the panel was …'. The interpretation of consensus could be clarified in the SEDAR guidelines.

ToR 9: Review the research recommendations provided by the Data and Assessment workshops and make any additional recommendations warranted. Clearly indicate the research and monitoring needs that may appreciably improve the reliability of future assessments. Recommend an appropriate interval for the next assessment.

Panel Conclusions: Spanish Mackerel

The DW provided useful recommendations regarding Life History, commercial and indices. However, some of these recommendations need to be more specific and deadlines and personnel assignments identified. The need of a fishery independent index of the adult population was mentioned but ways forward were not spelled clearly enough. No research recommendations were provided by the Recreational Workgroup.

In light of the uncertainty in the assessment results, it is suggested that the Spanish mackerel assessment be re-evaluated within a timeframe that allows for necessary management advice. The focus of the re-evaluation should be revised input data, principally catch estimates and fishery independent indices, as well as changes in the assessment method as suggested by reviewers.

Panel Conclusions: Vermilion Snapper

The numerous research recommendations from the DW and AW were not explicitly discussed at the RW. Individual panelists reviewed the recommendations and were in broad agreement with the suggestions. However, there is a clear need for the recommendations to be prioritized. Also, the Panel recommended that a proper statistical framework be used for the catch-at-age models. This would allow alternative parameterizations to be evaluated in terms of AIC or some other statistical criteria, and the calculation of standardized residuals (which allows the appropriateness of relative data weightings to be judged).

The AW base model estimates that over-fishing is occurring and that stock size is close to the over-fished threshold. This suggests that the next assessment should be sooner than the normal timeframe for assessment updates.

Reviewer Discussion

Additional research recommendations have been provided in my discussion following ToR's 1-7. The main recommendations are:

1. Both Spanish mackerel and vermillion snapper require a fishery independent index of abundance, preferably with adequate age compositions. Suggestions were provided in the discussion of ToR 1.

2. I appreciate the need to incorporate as much data on the stock history as possible; however, the assessments need to move away from fitting to extrapolated catches. I would prefer this to be done within the assessment model. For example, recreational fishing mortality could be considered as a random walk and the model fitted only to the observed data in the historical period (i.e. 1960, 1965, and 1970), as well as the more recent annual estimates. The correlation in annual recreational F's in the recent period (i.e. with annual data) would be used to "bracket" the uncertainty about F's in the historical period for years in which no estimates were available. My description is vague, but a more rigorous description of such a state-space approach will be available in the 2008 report of the ICES Working Group on Methods of Fish Stock Assessment. The proponents of state-space models argue that such approaches provide more statistically valid inferences about stock size, and I find their arguments convincing.

ToR 10: Prepare a Peer Review Consensus 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. Complete and submit the Consensus Report within 3 weeks of workshop conclusion.

Panel Conclusions: Spanish Mackerel

Completed as required.

Panel Conclusions: Vermilion Snapper

Completed as required.

Reviewer Discussion

No comments.

Appendix1: CIE Statement of work

Attachment A: Statement of Work for Dr. Noel Cadigan

External Independent Peer Review by the Center for Independent Experts

SEDAR 17 Stock Assessment Review

South Atlantic Vermilion Snapper and Spanish Mackerel

October 20 - 24, 2008

Savannah, 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 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. Verbal 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. Written comments are accepted in accordance with existing Council operating procedures. 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, error corrections and sensitivity runs of the assessment models provided by the assessment workshop panel. 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 (ToR).

The SEDAR 17 review panel will be composed of three Center for Independent Experts (CIE)-appointed reviewers, one reviewer appointed by the South Atlantic Council, 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.

Overview of CIE Peer Review Process:

The Office of Science and Technology implements measures to strengthen the National Marine Fisheries Service's (NMFS) Science Quality Assurance Program (SQAP) to ensure the best available science for fisheries management. For this reason, the NMFS Office of Science and Technology coordinates and manages a contract for obtaining external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of stock assessments and various scientific research projects. The primary objective of the CIE peer review is to provide an impartial review, evaluation, and recommendations in accordance to the Statement of Work (SoW), including the Terms of Reference (ToR) herein, to ensure the best available science is utilized for the National Marine Fisheries Service management decisions.

The NMFS Office of Science and Technology serves as the liaison with the NMFS Project Contact to establish the SoW which includes the expertise requirements, ToR, statement of tasks for the CIE reviewers, and description of deliverable milestones with dates. The CIE, comprised of a Coordination Team and Steering Committee, reviews the SoW to ensure it meets the CIE standards and selects the most qualified CIE reviewers according to the expertise requirements in the SoW. The CIE selection process also requires that CIE reviewers can conduct an impartial and unbiased peer review without the influence from government managers, the fishing industry, or any other interest group resulting in conflict of interest concerns. Each CIE reviewer is required by the CIE selection process to complete a Lack of Conflict of Interest Statement ensuring no advocacy or funding concerns exist that may adversely affect the perception of impartiality of the CIE peer review. The CIE reviewers conduct the peer review, often participating as a member in a panel review or as a desk review, in accordance with the ToR producing a CIE independent peer review report as a deliverable. At times, the ToR may require a CIE reviewer to produce a CIE summary report. The Office of Science and Technology serves as the COTR for the CIE contract with the responsibilities to review and approve the deliverables for compliance with the SoW and ToR. When the deliverables are approved by the COTR, the Office of Science and Technology has the responsibility for the distribution of the CIE reports to the Project Contact.

CIE Reviewer Requirements:

The CIE shall provide three CIE reviewers to conduct independent peer reviews in accordance with the Statement of Tasks, Schedule of Milestones and Deliverables, and SEDAR ToR herein. Each CIE reviewer's duties shall not exceed a maximum of 14 days for pre-review preparations, conducting the peer review at the SEDAR 17 panel review meeting, completion of the CIE independent peer review reports in accordance with the ToR, and assurance that final review comments and edits are provided to the chair. The CIE reviewers shall participate as technical reviewers on the SEDAR 17 review panel that will consider assessments of South Atlantic vermilion snapper and South Atlantic Spanish mackerel, and these stocks are assessed within the jurisdiction of the South Atlantic Fishery Management Council and the states of North Carolina, South Carolina, Georgia, and Florida. The CIE reviewers shall have expertise in stock assessment, statistics, fisheries science, and marine biology to complete their primary task of conducting an impartial and independent CIE peer review report in accordance with the ToR to determine if the best available science is utilized for fisheries management. The CIE reviewers shall not provide comments on fisheries management decisions.

Statement of Tasks for CIE Reviewers:

The CIE reviewers shall complete the following tasks and responsibilities as described in the SoW and Schedule herein.

1. CIE shall provide the CIE reviewers' contact information (name, affiliation, address, email, and phone) to the Office of Science and Technology COTR no later than the date as specified in the SoW, and the COTR will forward this information to the Project Contact.

2. Approximately two weeks before the peer review, the Project Contact will send the CIE reviewers the necessary documents for the peer review, including supplementary documents for background information. The CIE reviewers shall read the pre-review documents in preparation for the peer review to gain an in-depth understanding of the stock assessment, the resources and information considered in the assessment, and responsibilities as reviewers. Meeting materials will be forwarded electronically to review panel members and made available through the internet (http://www.sefsc.noaa.gov/sedar/), and printed copies of any documents are available by request. The names of reviewers will be included in workshop briefing materials. The list of pre-review documents may be updated prior to the panel review meeting.

3. Each CIE reviewer shall participate on the SEDAR 17 workshop panel (refer to attached agenda) to conduct an impartial and independent peer review with the purpose of determining whether the best available science was utilized. CIE reviewers shall conduct an independent peer review and participate in panel discussions on assessment methods, data, validity, results, uncertainties, recommendations, and conclusions as guided by the terms of reference.

4. Each CIE reviewer shall produce an independent peer review report addressing each of the ToR 1-9 specified herein. The CIE independent peer review report shall be completed in accordance with the Schedule of Milestones and Deliverables specified herein. These reports shall be submitted to the CIE regional coordinator, Dr. David Sampson, via email to David.Sampson@oregonstate.edu, and to CIE lead coordinator, Mr. Manoj Shivlani, via email to shivlanim@bellsouth.net. See Annex II for complete details on the independent peer review report outline.

5. The CIE reviewers will also participate in development of a peer review consensus report for each assessment reviewed, in accordance with ToR 10 and as described in Annex I. CIE reviewers may be asked to serve as an assessment leader during the review to facilitate preparing first drafts of review summary reports. Following the review workshop, CIE reviewers will assist the chair in the development of the peer review consensus reports.

The review workshop will take place at the Hampton Inn and Suites, Savannah Historic District, 201 Martin Luther King Boulevard, Savannah, GA, from 1:00 p.m. Monday, October 20, 2008 through 1:00 p.m. Friday, October 24, 2008. The Project Contact is responsible for the facility arrangements.
Please contact Dale Theiling (SEDAR Coordinator); (843) 571-4366, Dale.Theiling@safmc.net) or John Carmichael, (Science and Statistics Program Manager); (843) 571-4366, John.Carmichael@safmc.net) for additional details.

Hotel arrangements:

Hampton Inn and Suites, Savannah Historic District
201 Martin Luther King Boulevard
Savannah, GA 31401
(912) 721-1600
"SEDAR" Group rate: $ 111.24; rate is guaranteed through September 8, 2008.

SEDAR Review Workshop Panel Tasks:

The SEDAR 17 review workshop panel will evaluate assessments of South Atlantic vermilion snapper and South Atlantic Spanish mackerel. During the evaluation the panel will

consider 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 regarding each assessment in a peer review consensus report (Annex I). (Note that the consensus report is a SEDAR product, not a CIE product.) CIE reviewers shall participate on the SEDAR 17 workshop panel, conduct independent peer reviews, and produce CIE independent peer review reports to provide distinct, independent analyses of the technical issues and of the SEDAR process (refer to Statement of Tasks for CIE Reviewers). Each CIE reviewer shall contribute to a SEDAR consensus report in accordance with Annex I that will be compiled by the review panel Chair, and shall produce a CIE independent peer review report in accordance with Annex II.

Terms of Reference:

SEDAR 17 Review Workshop Terms of Reference (apply to each stock):

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 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 Advisory Report and that reported results are consistent with Review Panel recommendations**.
8. Evaluate the SEDAR Process. Identify any Terms of Reference which were inadequately addressed by the Data or Assessment Workshops; identify any additional information or assistance which will improve Review Workshops; suggest improvements or identify aspects requiring clarification.
9. Review the research recommendations provided by the Data and Assessment workshops and make any additional recommendations warranted. Clearly indicate the research and monitoring needs that may appreciably improve the reliability of future assessments. Recommend an appropriate interval for the next assessment.
10. Prepare a Peer Review Consensus 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. Complete and submit the Consensus Report within 3 weeks of workshop conclusion.

* 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.

These Terms of Reference may be modified prior to the Review Workshop. If so, 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 reviewing documents prior to the workshop, conducting the workshop in an orderly fashion, compiling and editing the peer review consensus report for each species assessed and submitting it to the SEDAR Coordinator by a deadline determined by the SEDAR Steering Committee and specified in the Schedule of Deliverables. The review panel chair will work with SEDAR staff to complete the SEDAR summary report. The review panel chair may participate in panel deliberations and contribute to report preparation.

Review panel members are responsible for: (1) reviewing documents prior to the workshop, (2) participating in workshop discussions addressing the terms of reference, (3) preparing assessment summaries and consensus reports during the workshop, and (4) finalizing SEDAR documents within three weeks of the conclusion of the workshop. Each reviewer appointed by the CIE is responsible for preparing an independent CIE peer review report.

The chair and SEDAR coordinator will work with the appointed reviewers to assign tasks during the workshop. For example, the chair may appoint one panelist to serve as assessment leader for each assessment covered by the review, with the leader responsible for providing an initial draft consensus report text for consideration by the panel. Reviewers may alternatively be assigned particular terms of reference to address initially. Regardless of how initial drafting is accomplished, all panelists are expected to participate in discussion of all terms of reference and contribute to all aspects of the review.

The review panel's primary responsibility is to determine if 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: (1) modifying the assessment configuration and assumptions, (2) requesting a reasonable number of sensitivity runs, (3) requesting additional details and results of the existing assessments, and (4) 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 SEDAR coordinator and technical staff present to determine which requests can be accomplished and to 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 consult with technical staff present and the SEDAR coordinator to develop an acceptable process for reviewing the final results within the time allotted for completion of the project.

The review panel should not provide advice addressing specific management actions. Such advice will be provided by existing Council committees, such as the Science and Statistical Committee and advisory panels, following completion of the assessment. The review panel is free to point out items of concern regarding past or present management actions that relate to population conditions or data collection efforts.

If the review panel finds an assessment deficient to the extent that technical staff present cannot resolve 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.

Workshop Final Reports:

The SEDAR coordinator will send copies of the final review panel consensus report and the complete SEDAR stock assessment report for each stock assessed to Mr. Manoj Shivlani at the CIE.

Submission and Acceptance of CIE Reports:

Upon review and acceptance of the CIE reports by the CIE Coordination and Steering Committees, CIE shall send via e-mail the CIE reports to the COTR (William Michaels William.Michaels@noaa.gov at the NMFS Office of Science and Technology by the date in the Schedule of Deliverables. The COTR will review the CIE reports to ensure compliance with the SoW and ToR herein, and have the responsibility of approval and acceptance of the deliverables. Upon notification of acceptance, CIE shall send via e-mail the final CIE report in *.PDF format to the COTR. The COTR at the Office of Science and Technology have the responsibility for the distribution of the final CIE reports to the project contacts.

The COTR shall provide the final CIE reviewer reports to:

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

SEDAR Coordinator: Dale Theiling, SAFMC, 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405 (email, Dale.Theiling@safmc.net). (SEDAR shall provide the final CIE Reviewer Reports to the SEDAR Steering Committee and Executive Directors of those Councils having jurisdiction over the included stocks.)

Schedule of Milestones and Deliverables:

September 15, 2008:	CIE will provide the CIE reviewer contact information to the COTR who will in turn forward this to the Project Contact.
October 6, 2008:	The CIE reviewers will receive the pre-meeting documents from the Project Contact in preparation for the SEDAR 17 panel review meeting.
October 20-24, 2008:	The CIE reviewers shall participate during the SEDAR 17 panel review meeting, and conduct an independent peer review in accordance with the ToR.
October 24, 2008:	The CIE reviewers shall assist Chair in the development of the first draft of review panel consensus report(s) at the conclusion of the review workshop.
November 7, 2008:	Review panel members submit final review panel consensus report(s) contributions to workshop Chair.
November 14, 2008:	Workshop Chair submits final review panel consensus report(s) and SEDAR summary reports to SEDAR Coordinator.
November 14, 2008:	CIE reviewers shall submit their independent peer review reports to CIE.
December 1, 2008:	SEDAR Coordinator submits final review panel consensus report(s) and SEDAR stock assessment report(s) to CIE.
December 1, 2008:	CIE submits individual CIE reviewer reports to the COTR.
December 5, 2008:	COTR notifies CIE regarding individual reviewer report acceptance.
December 8, 2008:	CIE provides final individual CIE reviewer reports to COTR.
December 15, 2008:	COTR provides final CIE reviewer reports to SEFSC (Acting) Director and SEDAR Coordinator.
December 19, 2008:	SEDAR submits individual CIE reviewer reports to the SEDAR Steering Committee and Councils.

Key Personnel:

Contracting Officer's Technical Representative (COTR):

William Michaels
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

Stephen K. Brown
NMFS Office of Science and Technology
1315 East West Hwy, SSMC3, F/ST4, Silver Spring, MD 20910
Stephen.K.Brown@noaa.gov Phone: 301-713-2363 ext 133

Contractor Contacts:

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

SEDAR Project Contact (or Emergency):

Dale Theiling, 4055 Faber Place Drive, Suite 201, North Charleston, SC 29405
Dale.Theiling@safmc.net Phone: 843-571-4366.

Request for Changes:

Requests for changes shall be submitted to the Contracting Officer at least 15 working days prior to making any permanent substitutions. The Contracting Officer will notify the Contractor within 10 working days after receipt of all required information of the decision on substitutions. The contract will be modified to reflect any approved changes. The Terms of Reference (ToR) and list of pre-review documents herein may be updated without contract modification as long as the role and ability of the CIE reviewers to complete the SoW deliverable in accordance with the ToR are not adversely impacted.

DRAFT AGENDA

SEDAR 17 REVIEW WORKSHOPS

South Atlantic Vermilion Snapper
South Atlantic Spanish Mackerel

October 20 - 24, 2008
Hampton Inn and Suites, Savannah, GA

Dr. TBN, Chair

Monday, October 20, 2008

1:00 p.m.	**Convene**	
1:00 – 1:30	**Introductions and Opening Remarks**	**Mr. Dale Theiling**
	- Agenda review, TOR review, and Task assignments	**Chair**
1:30 – 3:30	**Vermilion Snapper Presentation**	**Dr. Kyle Shertzer**
3:30 – 3:45	**Break**	
3:45 – 6:00	**Vermilion Snapper Discussion** *- Data, Methods and Results evaluation* *- Identify additional analyses, sensitivities, and corrections*	**Chair**

Tuesday, October 21, 2008

8:00 a.m. – 12:00 p.m.	**Vermilion Snapper Discussion** *- Review additional analyses and sensitivities* *- Initial recommendations and comments*	**Chair**
12:00 p.m. – 2:00 p.m.	**Lunch Break**	
2:00 p.m. – 4:00 p.m.	**Spanish Mackerel Assessment Presentation**	**Dr. Paul Conn**
4:00 p.m. – 4:15 p.m.	**Break**	
4:15 p.m. – 6:15 p.m.	**Spanish Mackerel Discussion** *- Data, Methods and Results evaluation* *- Identify additional analyses, sensitivities, and corrections*	**Chair**

Wednesday, October 22, 2008

8:00 a.m. – 12:00 p.m.	**Spanish Mackerel Discussion** *- Review additional analyses and sensitivities* *- Initial recommendations and comments*	**Chair**
12:00 p.m. – 2:00 p.m.	**Lunch Break**	
2:00 p.m. – 4:00 p.m.	**Vermilion Snapper and Spanish Mackerel Discussion as needed**	**Chair/ Stock Leaders**
4:00 p.m. – 4:15 p.m.	**Break**	
4:15 p.m. – 6:15 p.m.	**Vermilion Snapper and Spanish Mackerel Discussion as needed**	**Chair/ Stock Leaders**

Thursday, October 23, 2008

8:00 a.m. – 12:00 p.m.	**Review Workshop Consensus Summary** **Chair/Stock** *- Review draft Consensus Report sections* **Leaders**	
12:00 p.m. – 2:00 p.m.	**Lunch Break**	
2:00 p.m. – 5:00 p.m.	**Review Workshop Advisory Report** **Chair/Stock** *Review draft Summary Reports* **Leaders**	

Friday, October 24, 2008

8:00 a.m. – 12:00 p.m.	**Final Review of Panel Documents** *- Final review of Consensus Reports and Summary Reports*	**Chair**
12:00 p.m.	**ADJOURN**	

The timing of particular events is tentative, and the Chair may modify this schedule during the workshop as needed to complete stated tasks. However, to accommodate travel planning the workshop will start as scheduled and will conclude no later than the stated time.

SEDAR is a public process, and the public is welcome to attend SEDAR workshops. Although no formal public comment period is scheduled, the workshop Chair will allow opportunity during the meeting for the public in attendance to comment on discussion items.

Annex I. SEDAR Review Panel Consensus Summary Report Contents

I. Terms of Reference

List each Term of Reference and provide a summary of Panel discussions and recommendations 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 TOR discussion above.

III. Additional Comments

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. Reviewer Statements

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

ANNEX II: Contents of CIE Independent Peer Review Report

1. The reviewer report shall be prefaced with an executive summary of findings and recommendations.

2. The main body of the reviewer report shall consist of a background, description of the individual reviewer's role in the review activities, a summary of findings, and summary of conclusions and recommendations in accordance with the ToR. Reviewers shall elaborate on any points raised in the Consensus Summary Report that they feel might require further clarification. Reviewers shall provide a critique of the SEDAR process including suggestions for improvements of both process and products. Reviewers should not simply repeat the contents of the consensus summary reports.

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.

ANNEX II: Contents of CIE Independent Peer Review Report, as amended - October 20, 2008

1. The reviewer report shall be prefaced with an executive summary of findings and recommendations.

2. The main body of the reviewer report shall consist of a background, description of the individual reviewer's role in the review activities, a summary of findings, and summary of conclusions and recommendations in accordance with the ToR.

a. Reviewers should described in their own words the review activities completed during the meeting, including providing a detailed summary of findings, conclusions, and recommendations.
b. Reviewers should discuss their views on each ToR even if these were consistent with those of the panel 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 SEDAR process including suggestions for improvements of both process and products.
e. While it is expected that reviewers would not simply repeat the contents of the summary report,, the report is to represent a stand-alone document that could be used by others who may not have read the summary report to be able to understand the proceedings and findings of the meeting. .

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.

Appendix2: Bibliography of review material

Document #	Title	Authors
Documents Prepared for the Data Workshop		
SEDAR17-DW01	South Atlantic Vermilion Snapper Management Information Worksheet	J. McGovern (SERO) R. DeVictor (SAFMC)
SEDAR17-DW02	South Atlantic Spanish Mackerel Management Information Worksheet	J. McGovern (SERO) R. DeVictor (SAFMC)
SEDAR17-DW03	South Atlantic Vermilion Snapper Assessment History	D. Vaughan (SEFSC)
SEDAR17-DW04	South Atlantic Spanish Mackerel Assessment History	D. Vaughan (SEFSC)
SEDAR17-DW05	South Atlantic Vermilion Snapper Commercial Chapter	D. Vaughan (SEFSC)
SEDAR17-DW06	South Atlantic Spanish Mackerel Commercial Chapter	D. Vaughan (SEFSC)
SEDAR17-DW07	A review of Spanish mackerel (*Scomberomorus maculatus)* age data, 1987-2007, Atlantic collections only, from the Panama City Laboratory, SEFSC, NOAA Fisheries Service	C. Palmer, D. DeVries, C. Fioramonti and L. Lombardi-Carlson (SEFSC)
SEDAR17-DW08	Vermilion Snapper Length Frequencies and Condition of Released Fish from At-Sea Headboat Observer Surveys in the South Atlantic, 2004 to 2007	B. Sauls, C. Wilson, D. Mumford, and K. Brennan (SEFSC)
SEDAR17-DW09	Development of Conversion Factors for Different Trap Types used by MARMAP since 1978.	P. Harris (MARMAP)
SEDAR17-DW10	Discards of Spanish Mackerel and Vermilion Snapper Calculated for Commercial Vessels with Federal Fishing Permits in the US South Atlantic	K. McCarthy (SEFSC)
SEDAR17-DW11	Standardized catch rates of vermilion snapper from the headboat sector: Sensitivity analysis of the 10-fish-per-angler bag limit	Sustainable Fisheries Branch (SEFSC)
SEDAR17-DW12	Estimation of Spanish mackerel and vermilion snapper bycatch in the shrimp trawl fishery in the South Atlantic (SA)	K. Andrews (SEFSC)
Documents Prepared for the Assessment Workshop		
SEDAR17-AW01	SEDAR 17 South Atlantic Vermilion Snapper Stock Assessment Model	To be prepared by SEDAR 17
SEDAR17-AW02	SEDAR 17 South Atlantic Spanish Mackerel Stock Assessment Model	To be prepared by SEDAR 17
SEDAR17-AW03	Development of an aging error matrix for the vermilion snapper catch-at-age stock assessment model	E. Williams (SEFSC)

SEDAR17-AW04	Catch curve analysis of age composition data for Spanish mackerel	E. Williams (SEFSC)
SEDAR17-AW05	Catch curve analysis of age composition data for vermilion snapper	E. Williams (SEFSC)
SEDAR17-AW06	Methods for combining multiple indices into one, with application to south Atlantic (U.S.) Spanish mackerel	P. Conn (SEFSC)
SEDAR17-AW07	Extrapolation of Spanish mackerel bycatch by commercial shrimp trawl fisheries	P. Conn (SEFSC)
SEDAR17-AW08	A Bayesian approach to stochastic stock reduction analysis, with application to south Atlantic Spanish mackerel	P. Conn (SEFSC)
SEDAR17-AW09	Preliminary Surplus–production Model Results of Vermilion Snapper off the Southeastern United States	R. Cheshire (SEFSC)
SEDAR17-AW10	Preliminary Surplus–production Model Results of Spanish Mackerel off the Southeastern United States	R. Cheshire (SEFSC)
SEDAR17-AW11	AD Model Builder code to implement catch-age assessment model of vermilion snapper	K. Shertzer (SEFSC)
SEDAR17-AW12	AD Model Builder code to implement catch-age assessment model of Spanish mackerel	P. Conn (SEFSC)

Documents Prepared for the Review Workshop

SEDAR17-RW01	SEDAR 17 South Atlantic Vermilion Snapper Document for Peer Review	To be prepared by SEDAR 17
SEDAR17-RW02	SEDAR 17 South Atlantic Spanish Mackerel Document for Peer Review	To be prepared by SEDAR 17

Final Assessment Reports

SEDAR17-AR01	Assessment of the Vermilion Snapper Stock in the US South Atlantic	To be prepared by SEDAR 17
SEDAR17-AR02	Assessment of the Spanish Mackerel Stock in the US South Atlantic	To be prepared by SEDAR 17

Reference Documents

SEDAR17-RD01	South Atlantic Vermilion Snapper Stock Assessment Report, SEDAR 2, 2003	SEDAR 2
SEDAR17-RD02	Update of the SEDAR 2 South Atlantic Vermilion Snapper Stock Assessment, 2007	SEDAR

SEDAR17-RD03	Fishery Management Plan for Spanish Mackerel, Atlantic States Marine Fisheries Commission, 1990	L. P. Mercer L. R. Phalen J. R. Maiolo
SEDAR17-RD04	Mitochondrial and nuclear DNA analysis of population subdivision among young-of-the-year Spanish mackerel (*Scomberomorus maculatus*) from the western Atlantic and Gulf of Mexico	V. P. Buonaccorsi E. Starkey J. E. Graves
SEDAR17-RD05	George Fishes MD TAFS 28 1-49	W. A. George
SEDAR17-RD06	Excerpt – Goode 1878 stats 7-1-99	Goode
SEDAR17-RD07	Excerpt – Henshall Comparative Excellence TAF 13 1-115	Henshall
SEDAR17-RD08	Stock Assessment Analyses on Spanish and King Mackerel Stocks, April 2003	Sustainable Fisheries Div, SEFSC
SEDAR17-RD09	Hooking Mortality of Reef Fishes in the Snapper-Grouper Commercial Fishery of the Southeastern United States	D.V. Guccione Jr.
SEDAR17-RD10	Effects of cryptic mortality and the hidden costs of using length limits in fishery management Lewis G Coggins Jr	L. G. Coggins Jr. and others
SEDAR17-RD11	Discard composition and release fate in the snapper and grouper commercial hook-and-line fishery in North Carolina, USA	P. J. Rudershausen and J. A. Buckel
SEDAR17-RD12	A multispecies approach to subsetting logbook data for purposes of estimating CPUE	A. Stephens and A. MacCall
SEDAR17-RD13	The 1960 Salt-Water Angling Survey, USFWS Circular 153	J. R. Clark
SEDAR17-RD14	The 1965 Salt-Water Angling Survey, USFWS Resource Publication 67	D. G. Deuel and J. R. Clark
SEDAR17-RD15	1970 Salt-Water Angling Survey, NMFS Current Fisheries Statistics Number 6200	D. G. Deuel
SEDAR17-RD16	User's Guide: Delta-GLM function for the R Language /environment (Version 1.7.2, revised 07-06-2006)	E. J. Dick (SWFSC/NMFS)
SEDAR17-RD17	Reproductive biology of Spanish mackerel, *Scomberomorus maculatus*, in the lower Chesapeake Bay. M.A. Thesis, Virginia Institute of Marine Science. (Selective pages)	C. L. Cooksey
SEDAR17-RD18	The summer flounder chronicles: Science, politics, and litigation, 1975–2000	M. Terceiro
SEDAR17-RD19	Use of Angler Diaries to Examine Biases Associated with 12-Month Recall on Mail Questionnaires	N. Connelly and T. Brown
SEDAR17-RD20	Comparing 1994 Angler Catch and Harvest Rates from On-Site and Mail Surveys on Selected Maine Lakes	B. Roach
SEDAR17-RD21	Response Errors in Canadian Waterfowl Surveys	A. Sen
SEDAR17-RD22	Exaggeration of Walleye Catches by Alberta Anglers	M. Sullivan
SEDAR17-RD23	Effects of Recall Bias and Non-response Bias on Self-	M. A. Tarrant and M.

	Report Estimates of Angling Participation	J. Manfredo
SEDAR17-RD24	Influence of Survey Method on Estimates of Statewide Fishing Activity	T. Thompson
SEDAR 17-RD25	Final Amendment 6 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region	SAFMC, 2004