Review of the stock assessment of Atlantic blueline tilefish (SEDAR 50)

August 29–31, 2017
Atlantic Beach, North Carolina

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For **Center for Independent Experts (CIE) Independent System for Peer Review**

Executive summary

From 29-31 August 2017, the stock assessment of Atlantic blueline tilefish was reviewed at the SEDAR 50 Review Workshop in Atlantic Beach, North Carolina. Atlantic blueline tilefish is fished commercially and recreationally primarily with hand lines and long lines. I was one of three CIE reviewers in a panel of five who reviewed the stock assessment.

Two stocks were assessed, one south of Cape Hatteras to the Florida Keys, and the other north of Cape Hatteras. The original stock hypothesis was for a single coast wide stock, but the data were not adequate to support such a stock assessment. A pragmatic decision was made by the Assessment team to split the stock at Cape Hatteras, which allowed a southern stock to be assessed using a catch history, CPUE indices, and length frequencies. The northern stock was assessed using data limited methods as only a catch history and some length frequencies were available.

The application of data limited methods to the northern stock was appropriate and the necessarily very uncertain results suggest that recent catches may not be sustainable. Management action to constrain catches may be necessary. This conclusion is as robust as it can be given the very limited data.

The southern stock was assessed using a biomass dynamic model (BDM) with supporting analysis from an age structured model. The preference of the Assessment team for the BDM was in contrast to the Panel who generally preferred the use of the age-structured model as it allowed explicit exploration of the consequences of uncertainties in the life history parameters. The Panel developed a reference run using the age-structured model and requested numerous sensitivities to the reference model to investigate the robustness of the conclusions from the Assessment team's base BDM model.

It was found that the conclusions from the base model, that the stock was not overfished and that overfishing was not occurring, were robust to almost all sensitivities considered. The only exception was when the large spike in catches in the early 1980s was eliminated from the catch history. The magnitude of the catch spike is uncertain as, at the time, tilefish catches were not split by species (and golden tilefish was reportedly said to be fetching a much higher price than blueline tilefish). If the spike in catches is 50% of that estimated, then the stock is still in good shape. It is only when the spike in catches is entirely removed that there is any question of a cause for concern.

The preparation of data for the assessment was adequate, but could have been substantially improved. The use of a BDM is within the scope of current practice but was not the best choice. The assessment reaches the right conclusions, but I do not consider it to be the best available science.

Background

From 29-31 August 2017, the stock assessment of blueline tilefish was reviewed at the SEDAR 50 Review Meeting in Atlantic Beach, NC. Blueline tilefish is a relatively small scale fishery mainly executed with hand line and longline gear, both commercially and recreationally. The main assessment was performed using a surplus production model or biomass dynamic model (BDM) implemented in ASPIC.

I was one of three CIE reviewers in a panel of five reviewers. The meeting was chaired by Dr. Scott Crosson from the SAFMC SSC and the stock assessment modelling presentations were made by Dr. Nikolai Klibansky (*see* Appendix 3 for a full list of participants). This report presents my review findings and recommendations in accordance with the Terms of Reference for the review (*see* Appendix 2). A joint summary report was also produced for the meeting.

Review Activities

Pre-meeting

Meeting documents and materials were made available in electronic form in advance of the meeting (*see* Appendix 1). I familiarized myself with the background material and read the main data and assessment documents in detail prior to the meeting. I was not able to participate in the pre-meeting conference call, as it was scheduled for the very early hours of the morning in New Zealand. However, I did consult the summary of the conference call that was made available.

Meeting

The meeting loosely followed the agenda (Appendix 2). On the first day stock structure and data were discussed including the reasons why the ageing had failed. The stock assessment modelling for the stock south of Cape Hatteras was presented. Most members of the Panel were somewhat uncomfortable with the use of a BDM when there was an age-structured model available and also considerable length frequency data. We shifted the focus of discussions to the so called Age Structured Production Model (ASPM) as this allowed uncertainties in life history parameters to be explicitly explored. We developed a reference model and several sensitivity runs with which to explore the robustness of the conclusions from the base BDM/ASPIC model.

I commented on the absence of any presentation on the CPUE indices. I found this inexplicable. The assessment results obviously depend on the biomass indices and yet there was to be no presentation on the methods used to derive them. It was pointed out that there were three documents on their derivation, which indicated that the "handle had been turned" and the results produced. The analysis was barely adequate and the documentation was at best confusing (it appeared that the documents contained preliminary results before the change in stock structure, but I was assured that they had the final results).

On the second day, we started with a presentation of the results from the requested reference run and sensitivities. The results all supported the conclusion of the base BDM/ASPIC model of "not overfished" and "not overfishing". The main sensitivity was to the scale of the spike in catches in the early 1980s. Fishermen at the meeting contended that the spike was actually mainly golden tilefish, as at the time the price for golden tilefish was four times that for blueline tilefish. The catches of tilefish were not partitioned by species at that time. No doubt the division of the catch was made using data from a later period, which may well have over-estimated the proportion of blueline tilefish in the catch.

I brought up the issue of the poor analysis and documentation of the CPUE indices again. Of some concern to me was the cutoff years that had been assumed for the CPUE indices – they seemed to be rather arbitrary and there was the possibility that the upturn in some of the indices in the final years of the time series was just down to increased targeting of blueline tilefish. I suggested that the quickest way to dispose of this concern was to do a sensitivity run (to the ASPM reference model) deleting the last three points of each CPUE time series. This run produced very similar results to the reference run, which was comforting.

There was concern raised by the Chair that our focus on the ASPM was shifting the assessment to such an extent that we were actually rejecting the Assessment Team's base model. I suggested that we be sure to simply use the ASPM results to support the conclusions from the BDM base model rather than replacing it. However, I did suggest that a BDM model run that used both the hand line and the longline CPUE time series should be produced (giving each time series equal weight within the model – through equal and constant CVs; 20% was used by the Assessment team, which was a bit low given the longline CVs from observation error alone were above 20%, but at least the two CPUE time series got equal weight). The Assessment team's base model was actually an average of two separate models that used the hand line and long line CPUE time series individually (which is not a good approach – either the runs should be kept separate, if they give contrary results, or the two CPUE time series should be used together in the same run). The new run gave very similar results to the BDM base model, and it was later adopted as a new base model (with the Assessment Team's agreement).

The stock assessment for north of Cape Hatteras was presented. The Panel were happy with the approach taken – no data to speak of other than the catch history and some length frequencies, so the use of DLMtools seemed appropriate.

There was some Panel discussion with regard to the TORs and what we would write. Panel members volunteered for particular writing tasks and a start was made during the meeting. I wrote some draft text for TOR 2.

On the morning of the final day, I suggested that it would be useful to see the results of projections for the reference ASPM model using $F_{30\%}$ and $F_{40\%}$. The use of F_{MSY} was obviously going to be far too aggressive as B_{MSY} was 22% B_0 (which is far too close to the often used limit reference point of 20% B_0). I expressed concern about using

projections for a BDM model, which had simplistic population dynamics and an arbitrarily assigned B_{MSY} equal to 50% of carrying capacity. I asked if we could perhaps support the conclusions of the BDM base model but recommend the use of projections from the ASPM reference model, for reference fishing mortality levels of $F_{30\%}$ or $F_{40\%}$. There seemed to be some agreement that this was possible.

Post-meeting

I contributed text to the Chair for the Summary report on TORs 2 and 7. Other Panel members also contributed their text to the Chair. However, the Chair notified the Panel that there would likely be a delay to the production of the Summary Report as he was in Atlanta, sheltering from hurricane Irma, which had probably put his lab under water. At the time of writing this report it is unknown when the Summary Report will be produced.

When the Panel received the deterministic projections for the ASPM reference run, I requested that projections also be done at $F_{40\%}$ for the ASPM model that had the early 1980s spike in catches removed. This was to demonstrate how the sensitivity to the magnitude of the spike in the catches flowed through into projected yields.

Summary of findings

Each of the Terms of Reference are considered below.

1. Evaluate the data used in the assessment, addressing the following: (a)-(d) (treated separately for the two stocks)

From the data workshop there was a recommendation that a single Atlantic coast stock be modelled. However, when this was attempted, the results were not credible as it suggested a complete collapse of the stock. The "collapse" was caused by a mismatch between the catches (which had increased and shifted north of Cape Hatteras in recent years) and the CPUE indices (which were (at best) tracking biomass south of Cape Hatteras). The Assessment team decided to model two stocks, with a division at Cape Hatteras.

I think this is a sensible pragmatic approach although there is some scope for using a spatial model of a single stock (with the spatial elements dealing with the apparent mismatch of indices and catches).

South of Cape Hatteras

A catch history and three CPUE time series were available for the BDM. For the ASPM there were also extensive time series of length frequencies.

a) Are data decisions made by the DW and AW sound and robust?

The data decisions were generally appropriate and sound. The exclusion of ageing data was certainly justifiable given the extensive difficulties encountered by the readers in trying to produce consistent results.

The headboat CPUE time series was extremely noisy and the Assessment team eliminated it from the base (BDM/ASPIC) model. This was justified on the grounds of changes in fishing behaviour and that the fishery operated on the margins of the fish distribution. I agree with the exclusion of the time series.

In the ASPM, the headboat time series was retained but its signal was weakened by splitting it into two periods with different fishing selectivities. It may have been better to remove it altogether, but in its weakened state it probably doesn't make too much difference.

b) Are data uncertainties acknowledged, reported, and within normal or expected levels?

Generally, the data uncertainties were acknowledged and within expected levels. However, there was an exception with the catch history.

The catch history for the stock South of Cape Hatteras included a large spike in catches in the early 1980s which, although probably genuine, may not be nearly as large as estimated. The magnitude of those catches is vitally important in determining the stock status and long-term yields – the lower the spike, the lower the stock status and long-term yield. The sensitivity of the ASPM results to the magnitude of this spike were investigated in two sensitivity runs requested by the Panel. The sensitivity had not been previously addressed by the Assessment team. This was an important uncertainty that should have been acknowledged and considered.

Also, there is a spike in recreational catches in Florida in 2013. As far as I could tell, nobody in the Review meeting considered that this estimate was sensible. It is not acceptable to just take official estimates as given and not question their veracity. Recreational catches are notoriously difficult to estimate and they can often be grossly inaccurate because of small sample sizes which get hugely scaled up. The Assessment team should be free to revise such unlikely estimates and put in something sensible.

c) Are data applied appropriately within the assessment model?

Generally, the data were used appropriately. However, the treatment of the CPUE indices was not ideal. See below under TOR 2 for a discussion of how the indices could have been used more appropriately in the assessment.

d) Are input data series reliable and sufficient to support the assessment approach and findings?

It is not clear that the CPUE indices or the length frequencies were adequately prepared. The standardisation methods used for the CPUE indices were barely adequate. Better methods are available and are suggested under TOR 7. The same applies to the preparation of the length frequencies. There needs to be careful analysis, stratification, and scaling (see recommendations under TOR 7).

North of Cape Hatteras

a) Are data decisions made by the DW and AW sound and robust?

The decision that no valid CPUE indices could be constructed for north of Cape Hatteras was only briefly discussed in the meeting. It was probably a valid decision, but there should have been a presentation in support of the decision.

b) Are data uncertainties acknowledged, reported, and within normal or expected levels?

There are very little data, essentially only a catch history. The lack of data and uncertainty in life history parameters was acknowledged.

c) Are data applied appropriately within the assessment model?

The data were appropriately supplied to DLMtools.

d) Are input data series reliable and sufficient to support the assessment approach and findings?

It is a very low information assessment. The catch history is recent and reliable. The length frequencies were probably not adequately prepared so the results that rely on them should be treated even more cautiously than they would otherwise (any estimates of current mortality based on only length frequencies are intrinsically dubious).

2. Evaluate the methods used to assess the stock, taking into account the available data.

South of Cape Hatteras

The Assessment team had been expecting to use a statistical catch-age model implemented using the Beaufort Assessment Model (BAM) software. However, with the absence of age data, the preferred approach of the Assessment team was to use an age-

aggregated surplus production model (also known as a Biomass Dynamic Model (BDM)) which was implemented in ASPIC. A supporting analysis was provided using what the Assessment team described as an age-structured production model (ASPM). The BDM used the catch history and two CPUE time series, but did not use estimates of life history parameters. Instead an "intrinsic rate of growth" (r) was estimated for the population within the model, together with a carrying capacity (K), with initial depletion (B_1/K) fixed equal to 1. The model was actually parameterised so that the free parameters were F_{MSY} and MSY but this is equivalent.

The ASPM is an age-structured model which used fixed values of life history parameters, which were estimated outside the model in a variety of ways (in the absence of valid age data). The growth parameters were estimated from length frequency data and a meta-analysis of growth models for related species. Maturity at age was estimated from maturity at length data and the growth parameters. The stock recruitment relationship was assumed to be Beverton-Holt with steepness from a prior developed by meta-analysis on related species. The data inputs included the catch history, CPUE indices, and a substantial number of length frequencies. Sensitivity runs were performed using alternative life history parameters.

It was not clear to me or the Panel why the Assessment team favored the BDM over the ASPM. One of the reasons cited by the Assessment team was that "the ASPM was very sensitivity to life history assumptions". However, this is the very reason why the ASPM should be preferred. The BDM hides the sensitivity of the assessment results to the poorly known life history parameters. The use of the ASPM allows full exploration of the sensitivity of results to life history parameters and the robustness of conclusions.

a) Are methods scientifically sound and robust? Do the methods follow accepted scientific practices?

The methods used were generally sound and robust. A BDM is often used when life history parameters are not well known and biomass indices and little other data are available. The use of the BDM in this case does come within accepted scientific practice. However, it was not the best choice.

The ASPM should be preferred over the BDM because it has more appropriate population dynamics, and it allows the consequences of uncertainties in the life history parameters to be fully explored. A BDM only has one type of biomass, which is particularly inappropriate if vulnerable biomass (that being selected by the fishery) is very different from mature biomass (which drives egg production). The BDM has no lag in recruitment, which is inappropriate for species which mature later than age 1. Also, in the BDM used, B_{MSY} was assumed to occur at 50% K. This is a very high value for B_{MSY} compared to any age-structured model using a Beverton-Holt stock recruitment relationship. This issue could have been addressed by including a shape parameter in the BDM, but ultimately the production curve is just mimicking an age-structured equilibrium surplus production, which is not appropriate when fitting to biomass indices.

The availability of considerable length frequency data also suggested the use of the ASPM as the base model. These data not only allowed the estimation of fishery selectivities, but also, in the runs requested by the Panel, allowed the growth parameters to be estimated within the ASPM model.

b) Are assessment models configured appropriately and applied consistent with accepted scientific practices?

Generally, the models were configured appropriately and applied within accepted scientific practices. However, a number of the choices made were not ideal.

The first problem was that the CPUE indices were fitted using only observation error (with a CV as low as 6% in one case). Every potential biomass time series is likely to have a component of "process error", which is a consequence of assumptions being violated. In particular, and especially for CPUE, it is likely that the proportionality constant (q) for the assumed linear relationship between CPUE and biomass actually varies from year to year. This produces an additional component of variation that is not captured by estimates of observation error. Because the CVs of the CPUE indices were not inflated to allow for process error, the hand line index (which had the lowest CVs) dominated the longline CPUE index in the model where they were both fitted. This led the Assessment team to fit each index separately and then average the results from the two runs.

The averaging of results from two separate runs to provide a final assessment is not the best approach. If the two runs are telling "very different stories" then they need to be kept in separate runs (one of the runs may be providing the "truth"). If the two runs are not inconsistent, then there should just be a single run with all of the data included. The base model recommended by the Panel does include both CPUE time series where each time series is given equal weight (CVs = 20%).

The existing ASPM runs were generally appropriate, but the base ASPM model had full maturity at age 2. This had been calculated using the length at maturity data and the externally estimated growth parameters. However, it was the general feeling of the Panel and indeed the whole meeting that full maturity at age 2 years was very unlikely for this species. A new reference model was proposed by the Panel for exploring results from the ASPM that had full age at maturity at 6 years. This is a conservative value in that the younger the age of maturity, the more resilient the stock is to exploitation (according to the estimated fishing selectivities, fish are not exploited until about 6 years of age).

c) Are the methods appropriate for the available data?

The methods were defensible given the available data. The final base BDM model used the hand line and longline CPUE indices and excluded the problematic headboat time series. The BDM could not use the length frequencies, but these were fitted in the ASPM runs. The ASPM runs used all three CPUE time series, but the headboat series was split into two periods to account for changes in fishing practice (resulting in a change in selectivity).

North of Cape Hatteras

For the assumed stock to the north of Cape Hatteras only a catch history and some length frequencies were available. The life history estimates were borrowed from those used for south of Cape Hatteras. The R package DLMtool was used to provide TAC range estimates.

a) Are methods scientifically sound and robust? Do the methods follow accepted scientific practices?

Various data limited assessment methods exist and the DLMtool provides access to a number of such methods. It must be understood that where there are few data, any stock assessment results should be treated cautiously as they are, in reality, very uncertain. With this acknowledged, it is reasonable and scientifically defensible to use such a tool to provide some idea of the range of possible TACs. Six methods were used to provide alternative distributions describing possible TACs. Little is known about the relative performance of the individual methods, which will be highly case specific. The DLMtool does allow an MSE to be performed to test the alternative methods for the particular stock. However, an MSE is well outside the scope of this stock assessment project (and is unlikely to be useful in this case given the very limited information about the stock).

b) Are assessment models configured appropriately and applied consistent with accepted scientific practices?

Appropriate data and estimated CVs were supplied to the DLMtool.

c) Are the methods appropriate for the available data?

No biomass indices are available so the use of the DLMtool is appropriate.

3. Evaluate the assessment findings with respect to the following: (a)-(e)(treated separately for each stock)

South of Cape Hatteras

a) Are population estimates (model output – e.g. abundance, exploitation, biomass) reliable, consistent with input data and population biological characteristics, and useful to support status inferences?

Population estimates are not reliable as they are based on CPUE indices that may or may not track biomass and an uncertain catch history. However, extensive sensitivities have been performed with two different models exploring the numerous uncertainties. While estimates are not quantitatively reliable, they are qualitatively reliable – see below with regards to overfishing and overfished status.

b) Is the stock overfished? What information helps you reach this conclusion?

The stock does not appear to be over-fished as all model results (with one exception) show a stock that is at or above 50% of the virgin level (be it *K* in the BDM or SSB_0 in the ASPM)(Figures 1 and 2). The one exception is where the early catch history spike is eliminated entirely (Figure 2). This is an extreme run that shows the sensitivity, but it is not necessarily plausible.

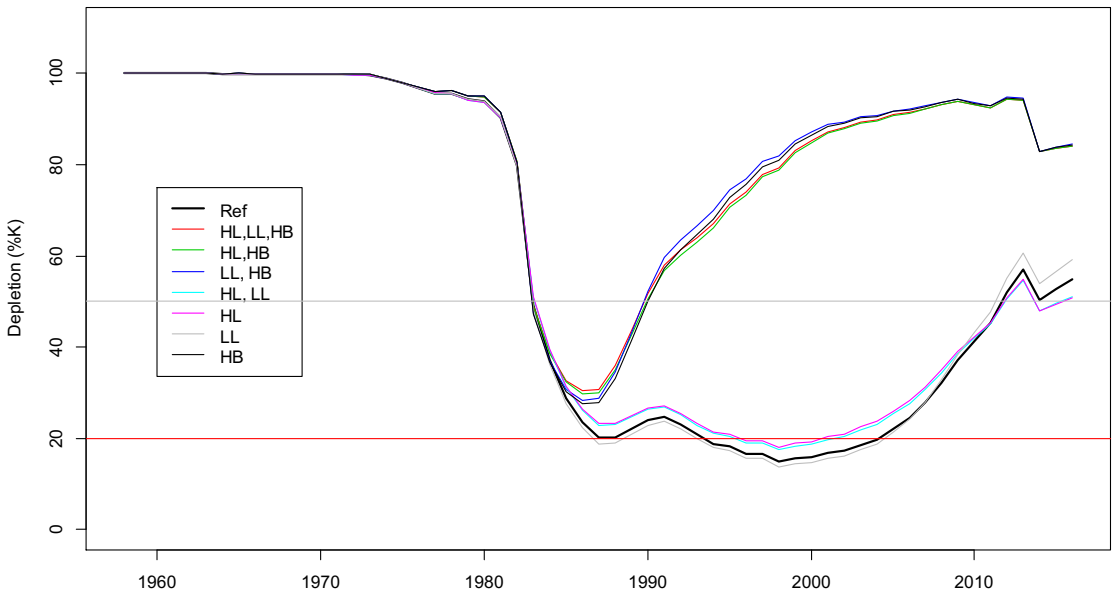

Figure 1: Depletion trajectories for the BDM/ASPIC model runs performed by the Assessment team. HL = hand line CPUE, LL = longline CPUE, HB = headboat CPUE. Ref is the reference run which includes HL and LL with equal weight. Horizontal lines at 20% *K* and 50% *K*.

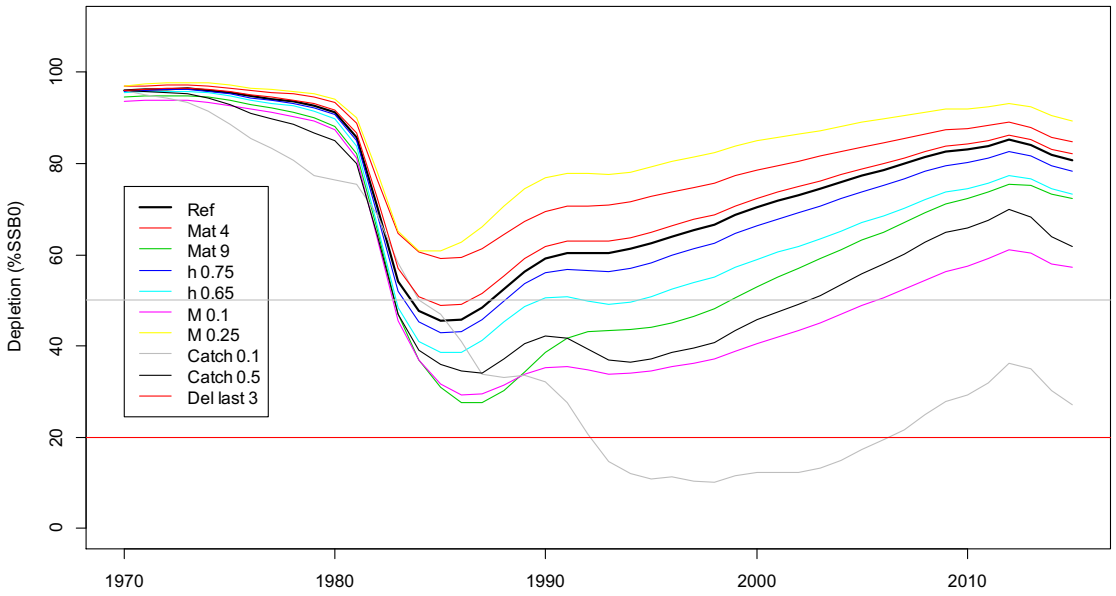

Figure 2: Depletion trajectories for the ASPM runs performed by the Assessment team. "Mat 4", "Mat 9" are full age at maturity at ages 4 and 9 respectively. "h" is steepness in the Beverton-Holt stock recruitment relationship. "M" is natural mortality. "Catch 0.1" has the spike in the early catch history multiplied by 10%. Similarly, "Catch 0.5" has it multiplied by 50%. "Del last 3" has the last three points in each CPUE time series removed. "Ref" is the reference run.

c) Is the stock undergoing overfishing? What information helps you reach this conclusion?

The stock does not appear to be undergoing overfishing as evidenced by the estimates of recent fishing mortality for all the model runs considered.

d) Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?

The stock recruitment curve is not well known. All that is available is an estimate of steepness from a meta analysis where a Beverton Holt relationship is assumed. This is not reliable although the conclusions with regards to overfished and overfishing are not sensitive to this uncertainty. F_{MSY} is poorly known, but is likely to be far too aggressive as a reference fishing mortality (especially if steepness is as high as it was estimated). The use of $F_{40\%}$ is recommended.

e) Are the quantitative estimates of the status determination criteria for this stock appropriate for management use? If not, are there other indicators that may be used to inform managers about stock trends and conditions?

The conclusions of "not overfished" and "not overfishing" are robust. The base model results should not be taken in isolation. The range of results across all sensitivities is the best guide to stock status and long-term yield. The stock is probably at a high current stock status, but may not be if the spike in early catches is not genuine (see Figure 2).

North of Cape Hatteras

a) Are population estimates (model output – e.g. abundance, exploitation, biomass) reliable, consistent with input data and population biological characteristics, and useful to support status inferences?

There is almost no data, so none of the estimates are reliable in any normal sense of the word.

b) Is the stock overfished? What information helps you reach this conclusion?

This is unknown.

c) Is the stock undergoing overfishing? What information helps you reach this conclusion?

This is unknown.

d) Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?

No.

e) Are the quantitative estimates of the status determination criteria for this stock appropriate for management use? If not, are there other indicators that may be used to inform managers about stock trends and conditions?

A range of estimates of TAC are available from the DLMtool. These estimates are very unreliable but are all that is available. They suggest that current catches may be too high and that some management action may be required.

4. Evaluate the stock projections, addressing the following:

South of Cape Hatteras

a) Are the methods consistent with accepted practices and available data?

The projection methods were adequate. Bootstrapping to capture uncertainty is not ideal but is sometimes done.

b) Are the methods appropriate for the assessment model and outputs?

Projections are sometimes done for a BDM, but it is unlikely that they are appropriate because the dynamics of a BDM are a poor approximation to reality. Ignoring age structure is not necessary and leads to potentially very different results than would be produced by an age structured model. Projections are particularly problematic as they are not supported by data but rely primarily on the dubious dynamics of the model.

Projections using the ASPM are to be preferred to those from the BDM. However, the projections from the reference model should not be used in isolation. The projections for the sensitivity where the early spike in the catch history is removed provides a lower bound on potential outcomes.

c) Are the results informative and robust, and useful to support inferences of probable future conditions?

The most robust results will come from the ASPM when projections using $F_{30\%}$ and $F_{40\%}$ are considered for the reference model and the sensitivity where the early catch history spike was removed.

d) Are key uncertainties acknowledged, discussed, and reflected in the projection results?

The final projections will use bootstrapping to capture uncertainty for individual runs. As stated above, the key uncertainty is in the magnitude of the spike in the early catch history – so projections from the reference run and the key sensitivity need to be considered.

The between model uncertainty is very large as the projected yields from the ASPM reference run at $F_{40\%}$ are more than five times higher than those for the sensitivity that removed the 1980s catch spike (Table 1). The projected yields for the BDM/ASPIC model at F_{targ} are less than half of those from the ASPM reference run (Table 1). Managers have a wide range to choose from. If the magnitude of the spike in the 1980s catch is genuine, then much higher catches than have recently been removed can be sustainably taken.

Table 1: Deterministic projected yields (t) using $F_{current}$ for 2016 and the indicated fishing mortality for 2017–2020. Estimates are given for the BDM/ASPIC base model, the ASPM reference run, and the ASPM that removed the spike in the early 1980s catches.

	ASPIC F_{targ}	ASPM ref $F_{40\%}$	ASPM no-spike $F_{40\%}$
2016	219	168	139
2017	180	569	73
2018	184	521	78
2019	187	484	82
2020	190	455	85

North of Cape Hatteras

No projections were performed, which is appropriate given the absence of a population model.

5. Consider how uncertainties in the assessment, and their potential consequences, are addressed.

∗ Comment on the degree to which methods used to evaluate uncertainty reflect and capture all sources of uncertainty in the population, data sources, and assessment methods

The uncertainty across different models was reasonably well considered with the two approaches (BDM and ASPM) and a number of sensitivities within each modelling approach. However, the key uncertainty in the early catch history was not addressed by the Assessment team (but was in the runs suggested by the Panel).

For within model uncertainty, the general approach adopted by the Assessment team is to bootstrap everything. There are different ways to bootstrap any particular problem, so the approach must be considered *ad hoc*. It is sometimes used and is an acceptable approach but it is not the best approach. It is better to use a formal likelihood approach with asymptotic approximations to confidence/credibility intervals or to adopt a formal Bayesian approach.

∗ Are the implications of uncertainty in technical conclusions clearly stated?

The documentation generally acknowledges uncertainty appropriately.

6. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.

** Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments.*

The collected research recommendations from the data and assessment workshops was an extensive list (see the Summary Report). In my opinion, there are three top priorities for this species:

- Reliable age reading is the top priority. Life history parameters need to be estimated and age frequency data need to be available for the assessments to avoid the assumption of deterministic recruitment.
- The second priority is to have fishery independent biomass indices available. This may be an expensive option, but it is necessary for reliable assessments of blueline tilefish and other associated species.
- The early catch history for South of Cape Hatteras should be reviewed to determine bounds on the magnitude of the spike in the early 1980s.

** Provide recommendations on possible ways to improve the SEDAR process.*

The SEDAR process is well established and provides a good framework within which to provide scientific advice to managers. I have no recommendations with regard to the process itself other than it should be a requirement that presentations are made to the Review Panel on all data inputs (this should be a given).

7. Provide suggestions on improvements in data or modeling approaches, which should be considered when scheduling the next assessment.

A high quality stock assessment requires careful data preparation as well as the use of appropriate modelling tools.

The length frequency data were not carefully analysed and may not have been appropriately stratified and scaled. An analysis of the variability of fish length within each fishery should be undertaken before the next stock assessment so that appropriately scaled length frequencies can be produced for the years within each fishery where there are adequate data.

The CPUE standardizations were not well documented and more work may have been done than was described. However, there is clearly the need for more detailed analysis. The catch and effort data should be fully investigated and explored before a standardization is attempted. Such a descriptive analysis provides the foundation for a standardization. Explanatory variables need to be carefully chosen and should include

effort variables. Hook hours may not be the best unit of effort as bait is not necessarily effective beyond 30 minutes. Also, interactions and/or nested effects need to be considered. For example, seasonal effects may differ by subarea. Area-year interactions especially need to be considered as different trends in different subareas will require an exploration of the effect of different weightings (of the trends across subareas to produce an overall trend).

Age data should be available for the next stock assessment and a statistical catch-at-age model will no doubt be used. Should there be a stock for which no age data are available it is still best to use an age-structured model and fit whatever data are available. Any sensitivities to poorly known life history parameters should be explored in an age-structured model rather than hidden by using a BDM.

Capturing the uncertainty in stock assessment results using bootstrap procedures is adequate but not ideal. There are many ways to bootstrap any particular problem, which means that the approach is necessarily *ad hoc*. It is better to use a formal likelihood approach with asymptotic approximations to confidence/credibility intervals or to adopt a formal Bayesian approach.

Stock structure is a source of uncertainty that wasn't explicitly considered. It would be worthwhile formulating alternative stock structure assumptions and doing sensitivity runs under those assumptions.

8. Prepare a Peer Review Summary of the Panel's evaluation of the stock assessment, addressing each Term of Reference. Develop a list of tasks to be completed following the workshop. Complete and submit the Peer Review Summary Report in accordance with the project guidelines.

The joint Summary Report from the Panel is being prepared although there will be a delay because of the impact of hurricane Irma on the Chair's laboratory in Miami.

Critique of the NMFS review process

This is covered in TOR 6 above.

Acknowledgements

I was impressed, and I know that other members of the Panel were impressed, by the lead analysts' composure and competence during the Review meeting. I offer a "very well done" to the Assessment team and Dr. Klibansky in particular.

Conclusions and Recommendations

The data preparation for the assessment was adequate but could have been substantially improved in two areas.

The length frequency data were not carefully analysed and may not have been appropriately stratified and scaled. An analysis of the variability of fish length within each fishery should be undertaken before the next stock assessment so that appropriately scaled length frequencies can be produced for the years within each fishery where there are adequate data.

Similarly, the analysis of the catch and effort data can be much improved. The catch and effort data should be fully investigated and explored before a standardization is attempted. Such a descriptive analysis provides the foundation for a standardization. Explanatory variables need to be carefully chosen and should include effort variables. Also, interactions and/or nested effects need to be considered.

The stock assessment modelling was adequate but could also have been improved. The choice of a BDM for the base model was not ideal. An age-structured model, as was demonstrated during the Review meeting, allows extensive and explicit exploration of life history parameter uncertainty. A move away from bootstrapping to a formal Bayesian assessment setting should be considered.

The assessment reaches the right conclusions but I do not consider it to be the best available science.

Appendix 1: Bibliography of supplied material

The two main documents for review were the Data Workshop report and the Assessment Workshop report:

Anon (2017a). SEDAR 50, Atlantic blueline tilefish. Section II: Data workshop report, March 2017. 191 p.

Anon (2017b). SEDAR 50, Atlantic blueline tilefish. Section III: Assessment workshop report, August 2017. 160 p.

There were also the background documents listed below:

Document #	Title	Authors
Documents Prepared for the Data Workshop (DW)		
SEDAR50-DW01	Brief Summary – Habitat and Developing Spatial Species Information for Blueline Tilefish in the South Atlantic Region	Pugliese 2016
SEDAR50-DW02	Summary of the 2015 blueline tilefish cooperative-with-industry data collection project	Kellison 2016
SEDAR50-DW03	A Preliminary Assessment of Reproductive Parameters for Blueline Tilefish in Atlantic Waters from Virginia to Florida **SEE SEDAR50-DW19 FOR FINAL REPRODUCTIVE ANALYSES**	Kolmos et al. 2016
SEDAR50-DW04	Distribution of scientifically collected blueline tilefish (*Caulolatilus microps*) in the Atlantic, and associated habitat	Klibansky 2016
SEDAR50-DW05	Summary of the results of a genetic-based investigation of blueline tilefish (*Caulolatilus microps*)	McDowell 2016
SEDAR50-DW06	Preliminary Genetic Population Structure of Blueline Tilefish *Caulolatilus microps* along the East Coast of the United States	O'Donnell and Darden 2016
SEDAR50-DW07	Description of age and growth for blueline tilefish, *Caulolatilus microps*, caught north and south of Cape Hatteras, NC	Schmidtke and Jones 2016
SEDAR50-DW08	Standard Operative Procedure for Embedding and Sectioning Blueline Tilefish (*Caulolatilus microps*)	Ostrowski 2016
SEDAR50-DW09	Summary of Northeast Fisheries Science Center Blueline Tilefish Survey Data	Nitschke and Miller 2016
SEDAR50-DW10	Summary of Mid-Atlantic Commercial Blueline Tilefish Data	Nitschke and Miller 2016
SEDAR50-DW11	Distribution of blueline tilefish (Caulolatilus	Farmer and

	microps) in the U.S. EEZ from fishery-dependent and fishery-independent data collections	Klibansky 2016
SEDAR50-DW12	Recommendations from the SEDAR 50 (Blueline Tilefish) Stock ID Work Group Meeting	SEDAR 50 Stock ID Work Group 2016
SEDAR50-DW13	Comparison of Blueline Tilefish Otolith Derived Ages: Comparing Increment Counts Derived by Readers from NMFS SEFSC-Beaufort and SCDNR Age Laboratories	Ballenger 2017
SEDAR50-DW14	TBD	TBD
~~SEDAR50-DW15~~	SEDAR 50 Public Comments – visit the following link to view public comments submitted for SEDAR 50 https://safmc.wufoo.com/reports/sedar-50-public-comments/	
SEDAR 50-DW16	SEDAR 50 Stock Identification Joint SSC Review Webinar Consensus Statements	Joint SSC Sub-Panel 2016 (Includes MAFMC, SAFMC, GMFMC representatives)
SEDAR 50-DW17	SEDAR 50 Stock Identification – Management/Science Call Recommendations	Council, Science Center, and Regional Office Leadership
SEDAR50-DW18	Blueline Tilefish Age Workshop II	Potts et al. 2016
SEDAR50-DW19	Reproductive parameters for Blueline Tilefish in Atlantic Waters from Virginia to Florida	Kolmos et al. 2017
SEDAR50-DW20	Virginia Blueline Tilefish Data Collection Summary	Cimino 2017
SEDAR50-DW21	Summary of the Blueline Tilefish meristic conversions using data from the entire US Atlantic and Gulf of Mexico	Ballew and Potts 2016
SEDAR50-DW22	SEDAR 50 Discard Mortality Ad-hoc Group Working Paper	Discard mortality ad-hoc group
SEDAR50-DW23	Estimating dispersal of blueline tilefish (*Caulolatilus microps*) eggs and larvae from drifter data	Klibansky 2017
SEDAR50-DW24	ToR #7 Ad Hoc Work Group Working Paper	ToR #7 Ad-Hoc Work Group
SEDAR50-DW25	Standardized catch rates of blueline tilefish (*Caulolatilus microps*) in the South Atlantic and Gulf of Mexico waters of the U.S. from recreational headboat logbook data	SFB-NMFS 2017
SEDAR50-DW26	Standardized catch rates of blueline tilefish	SFB-NMFS 2017

	(*Caulolatilus microps*) in the South Atlantic and Gulf of Mexico waters of the U.S. from commercial logbook handline data	
SEDAR50-DW27	Standardized catch rates of blueline tilefish (*Caulolatilus microps*) in the South Atlantic and Gulf of Mexico waters of the U.S. from commercial logbook longline data	SFB-NMFS 2017
SEDAR50-DW28	SEDAR 50 additional management actions provided by R. Hudson	Hudson 2017
Documents Prepared for the Assessment Workshop		
SEDAR50-AW01	South Atlantic U.S. Blueline Tilefish (*Caulolatilus microps*) length composition from the recreational fisheries	SFB-NMFS 2017
SEDAR50-AW02	Commercial length composition weighting for U.S. Blueline Tilefish (*Caulolatilus microps*)	SFB-NMFS 2017
SEDAR50-AW03	Additional Commercial Fishery Statistics: Landings in Weight and Number, Mean Weights, Update to Uncertainty, and Catch and Effort Maps	SEDAR 50 Commercial WG
Documents Prepared for the Review Workshop		
SEDAR50-RW01	Information to help interpret results from the data limited toolkit for Atlantic Blueline Tilefish north and south of Cape Hatteras	Ahrens 2017
Final Assessment Reports		
SEDAR50-SAR1	Assessment of Atlantic Blueline Tilefish	To be prepared by SEDAR 50
Reference Documents		
SEDAR50-RD01	SEDAR 32 South Atlantic Blueline Tilefish Stock Assessment Report	SEDAR 32
SEDAR50-RD02	List of documents and working papers for SEDAR 32 (South Atlantic Blueline Tilefish and Gray Triggerfish) – all documents available on the SEDAR website.	SEDAR 32
SEDAR50-RD03	Managing A Marine Stock Portfolio: Stock Identification, Structure, and Management of 25 Fishery Species along the Atlantic Coast of the United States	McBride 2014
SEDAR50-RD04	Workshop to Determine Optimal Approaches for Surveying the Deep-Water Species Complex Off the Southeastern U.S. Atlantic	Carmichael et al. 2015

	Coast	
SEDAR50-RD05	Report to Virginia Marine Resources Commission: Grant F-132-R-2 The Population Dynamics of Blueline and Golden Tilefish, Snowy and Warsaw Grouper and Wreckfish	Schmidtke et al. 2015
SEDAR50-RD06	Estimated Catch of Blueline Tilefish in the Mid-Atlantic Region: Application of the Delphi Survey Process	Allen et al. 2016
SEDAR50-RD07	MAFMC Memo: Blueline Tilefish Catch Series – Feb 23, 2016	Didden 2016
SEDAR50-RD08	Reproductive Biology of the Blueline Tilefish, Caulolatilus microps, off North Carolina and South Carolina	Ross and Merriner 1983
SEDAR50-RD09	Fish species associated with shipwreck and natural hard-bottom habitats from the middle to outer continental shelf of the Middle Atlantic Night near Norfolk Canyon	Ross et al. 2016
SEDAR50-RD10	Systematics and Biology of the Tilefishes (Perciformes: Branchiostegidae and Malacanthidae), with Descriptions of Two New Species	Dooley 1978
SEDAR50-RD11	Integrating DNA barcoding of fish eggs into ichthyoplankton monitoring programs	Lewis et al. 2015
SEDAR50-RD12	Age, growth, and reproductive biology of blueline tilefish along the southeastern coast of the United States, 1982-1999	Harris et al. 2004
SEDAR50-RD13	Description of the Circulation on the Continental Shelf	Bumpus 1973
SEDAR50-RD14	Spawning Locations for Atlantic Reef Fishes off the Southeastern U.S.	Sedberry et al. 2006
SEDAR50-RD15	Observations and a Model of the Mean Circulation over the Middle Atlantic Bight Continental Shelf	Lentz 2008
SEDAR50-RD16	Modeling larval connectivity of the Atlantic surfclams within the Middle Atlantic Bight: Model development, larval dispersal and metapopulation connectivity	Zhang et al. 2015
SEDAR50-RD17	Tilefishes of the Genus *Caulolatilus* Construct Burrows in the Sea Floor	Able et al. 1987
SEDAR50-RD18	Delineation of Tilefish, *Lopholatilus chamaeleonticeps*, Stocks Along the United States East Coast and in the Gulf of Mexico	Katz et al. 1983
SEDAR50-RD19	Chapter 22: Interdisciplinary Evaluation of Spatial Population Structure for Definition of Fishery Management Units (excerpt from	Cadrin et al. 2014

	Stock Identification Methods – Second Edition)	
SEDAR50-RD20	Overview of sampling gears and standard protocols used by the Southeast Reef Fish Survey and its partners	Smart et al. 2015
SEDAR50-RD21	Age, Growth, and Mortality of Blueline Tilefish from North Carolina and South Carolina	Ross and Huntsman 1982
SEDAR50-RD22	Radiocarbon from nuclear testing applied to age validation of black drum, *Pogonias cromis*	Campana and Jones 1998
SEDAR50-RD23	A long- lived life history for a tropical, deepwater snapper (*Pristipomoides filamentosus*): bomb radiocarbon and lead-radium dating as extensions of daily increment analyses in otoliths	Andrews et al. 2012
SEDAR50-RD24	Age and growth of bluespine unicornfish (*Naso unicornis*): a half-century life-span for a keystone browser, with a novel approach to bomb radiocarbon dating in the Hawaiian Islands	Andrews et al. 2016
SEDAR50-RD25	Age, growth and reproduction of the barrelfish *Hyperoglyphe perciformis* (Mitchill) in the western North Atlantic	Filer and Sedberry 2008
SEDAR50-RD26	Age, growth, and spawning season of red bream (Beryx decadactylus) off the southeastern United States	Friess and Sedberry 2011
SEDAR50-RD27	Great longevity of speckled hind (*Epinephelus drummondhayi*), a deep-water grouper, with novel use of postbomb radiocarbon dating in the Gulf of Mexico	Andrews et al. 2013
SEDAR50-RD28	Refined bomb radiocarbon dating of two iconic fishes of the Great Barrier Reef	Andrews et al. 2015
SEDAR50-RD29	Age validation of the North Atlantic stock of wreckfish (*Polyprion americanus*), based on bomb radiocarbon (^{14}C), and new estimates of life history parameters	Lytton et al. 2016
SEDAR50-RD30	Stock Complexes for Fisheries Management in the Gulf of Mexico	Farmer et al. 2016
SEDAR50-RD31	Modelling community structure and species co-occurrence using fishery observer data	Pulver et al. 2016
SEDAR50-RD32	Descriptions of the U.S. Gulf of Mexico Reef Fish Bottom Longline and Vertical Line Fisheries Based on Observer Data	Scott-Denton et al. 2011
SEDAR50-RD33	Natural mortality estimators for information-limited fisheries	Kenchington 2014
SEDAR50-RD34	The relationship between body weight and	Lorenzen 1996

	natural mortality in juvenile and adult fish: a comparison of natural systems and aquaculture	
SEDAR50-RD35	Mortality Rate of Fishes in the Pelagic Ecosystem	Peterson and Wroblewski 1984
SEDAR50-RD36	A Mathematical Model of Some Aspects of Fish Growth, Respiration, and Mortality	Ursin 1967
SEDAR50-RD37	MAFMC Memo: Blueline Tilefish Catch Series – Mar 14, 2016	Didden 2016
SEDAR50-RD38	Mid-Atlantic Fishery Management Council SSC Memo: Proposed BLT Subcommittee Report – March 22, 2016	Miller 2016
SEDAR50-RD39	Hierarchical analysis of multiple noisy abundance indices	Conn 2010
SEDAR50-RD40	Using demographic methods to construct Bayesian priors for the intrinsic rate of increase in the Schaefer model and implications for stock rebuilding	McAllister et al. 2001
SEDAR50-RD41	Evaluating methods for setting catch limits in data-limited fisheries	Carruthers et al. 2014
SEDAR50-RD42	Technical guidance on the use of precautionary approaches to implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act	Restrepo et al. 1998
SEDAR50-RD43	A simple method for estimating MSY from catch and resilience	Martell and Froese 2012
SEDAR50-RD44	Estimating mortality from mean length data in nonequilibrium situations, with application to the assessment of goosefish	Gedamke and Hoenig 2006

Appendix 2: Statement of Work for Patrick Cordue

National Oceanic and Atmospheric Administration (NOAA)
National Marine Fisheries Service (NMFS)
Center for Independent Experts (CIE) Program
External Independent Peer Review

SEDAR 50 Atlantic Blueline Tilefish Assessment Review

Background

The National Marine Fisheries Service (NMFS) is mandated by the Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, and Marine Mammal Protection Act to conserve, protect, and manage our nation's marine living resources based upon the best scientific information available (BSIA). NMFS science products, including scientific advice, are often controversial and may require timely scientific peer reviews that are strictly independent of all outside influences. A formal external process for independent expert reviews of the agency's scientific products and programs ensures their credibility. Therefore, external scientific peer reviews have been and continue to be essential to strengthening scientific quality assurance for fishery conservation and management actions.

Scientific peer review is defined as the organized review process where one or more qualified experts review scientific information to ensure quality and credibility. These expert(s) must conduct their peer review impartially, objectively, and without conflicts of interest. Each reviewer must also be independent from the development of the science, without influence from any position that the agency or constituent groups may have. Furthermore, the Office of Management and Budget (OMB), authorized by the Information Quality Act, requires all federal agencies to conduct peer reviews of highly influential and controversial science before dissemination, and that peer reviewers must be deemed qualified based on the OMB Peer Review Bulletin standards.
(http://www.cio.noaa.gov/services_programs/pdfs/OMB_Peer_Review_Bulletin_m05-03.pdf).
Further information on the CIE program may be obtained from www.ciereviews.org.

Scope

SEDAR 50 will be a compilation of data, an assessment of the stock, and CIE assessment review conducted for Atlantic Blueline Tilefish. 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 panel. The review panel is ultimately responsible for ensuring that the best possible assessment is provided through the SEDAR process. The stock assessed through SEDAR 50 are within

the jurisdiction of the South Atlantic Fishery Management Council, Mid-Atlantic Fishery Management Council, and the states of Florida, Georgia, South Carolina, North Carolina, Virginia, Pennsylvania, New York, New Jersey, Maryland, and Delaware. The Terms of Reference (ToRs) of the peer review and the tentative agenda of the panel review meeting are below.

Requirements

NMFS requires three (3) CIE reviewers to conduct an impartial and independent peer review in accordance with the SoW, OMB guidelines, and the ToRs below. CIE reviewers shall have a working knowledge in the application of fisheries stock assessment processes and results, statistics, fisheries science, and marine biology sufficient to complete the primary task of providing peer-review advice in compliance with the workshop Terms of Reference. Additionally, it will be helpful if the reviewers have a working knowledge of data limited stock assessment approaches.

Tasks for reviewers

1) Review the following background materials and reports prior to the review meeting:

SEDAR 50 Workshop Reports and Working Papers

- Data Workshop Report and Working Papers will be available at the following link: http://sedarweb.org/sedar-50-data-workshop
- Assessment Workshop Report and Working Papers will be available at the following link: http://sedarweb.org/sedar-50-assessment-process
- Review Workshop Working Papers will be available at the following link: http://sedarweb.org/sedar-50-review-workshop

2) Attend and participate in the panel review meeting. The meeting will consist of presentations by NOAA scientists, stock assessment authors and others to facilitate the review, to answer any questions from the reviewers, and to provide any additional information required by the reviewers.

3) After the review meeting, reviewers shall conduct an independent peer review report in accordance with the requirements specified in this SoW, OMB guidelines, and ToRs, in adherence with the required formatting and content guidelines; reviewers are not required to reach a consensus.

4) Each reviewer should assist the Chair of the meeting with contributions to the summary report.

5) Deliver their reports to the Government according to the specified milestones dates.

Foreign National Security Clearance
When reviewers participate during a panel review meeting at a government facility, the NMFS Project Contact is responsible for obtaining the Foreign National Security Clearance approval for reviewers who are non-US citizens. For this reason, the reviewers shall provide requested information (e.g., first and last name, contact information, gender, birth date, passport number, country of passport, travel dates, country of citizenship, country of current residence, and home country) to the NMFS Project Contact for the purpose of their security clearance, and this information shall be submitted at least 30 days before the peer review in accordance with the NOAA Deemed Export Technology Control Program NAO 207-12 regulations available at the Deemed Exports NAO website: http://deemedexports.noaa.gov/ and http://deemedexports.noaa.gov/compliance_access_control_procedures/noaa-foreign-national-registration-system.html. The contractor is required to use all appropriate methods to safeguard Personally Identifiable Information (PII).

Place of Performance
The place of performance shall be at the contractor's facilities, and at Atlantic Beach, NC.

Period of Performance
The period of performance shall be from the time of award through October 27, 2017. The CIE reviewers' duties shall not exceed 14 days to complete all required tasks.

Schedule of Milestones and Deliverables: The contractor shall complete the tasks and deliverables in accordance with the following schedule.

Within two weeks of award	Contractor selects and confirms reviewers
Approximately 2 weeks later	Contractor provides the pre-review documents to the reviewers
August 29 - 31, 2017	Panel review meeting
Approximately 3 weeks later	Contractor receives draft reports
Within 2 of receiving draft reports	Contractor submits final reports to the Government

Applicable Performance Standards
The acceptance of the contract deliverables shall be based on three performance standards:

(1) The reports shall be completed in accordance with the required formatting and content (2) The reports shall address each ToR as specified (3) The reports shall be delivered as specified in the schedule of milestones and deliverables.

Travel
All travel expenses shall be reimbursable in accordance with Federal Travel Regulations (http://www.gsa.gov/portal/content/104790). International travel is authorized for this contract. Travel is not to exceed $10,000.

Restricted or Limited Use of Data

The contractors may be required to sign and adhere to a non-disclosure agreement.

NMFS Project Contact:
Julia Byrd
SEDAR Coordinator
4055 Faber Place Drive, Suite 201
North Charleston, SC 29405
(843) 571-4366
julia.byrd@safmc.net

Peer Review Report Requirements

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

2. The report must contain a background section, description of the individual reviewers' roles in the review activities, summary of findings for each ToR in which the weaknesses and strengths are described, and conclusions and recommendations in accordance with the ToRs.

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

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

   c. Reviewers should elaborate on any points raised in the summary report that they believe might require further clarification.

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

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

3. The report shall include the following appendices:

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

Terms of Reference for the Peer Review

SEDAR 50 Atlantic Blueline Tilefish Assessment Review

1. Evaluate the data used in the assessment, addressing the following:
   a) Are data decisions made by the DW and AW sound and robust?
   b) Are data uncertainties acknowledged, reported, and within normal or expected levels?
   c) Are data applied appropriately within the assessment model?
   d) Are input data series reliable and sufficient to support the assessment approach and findings?
2. Evaluate the methods used to assess the stock, taking into account the available data.
   a) Are methods scientifically sound and robust? Do the methods follow accepted scientific practices?
   b) Are assessment models configured appropriately and applied consistent with accepted scientific practices?
   c) Are the methods appropriate for the available data?
3. Evaluate the assessment findings with respect to the following:
   a) Are population estimates (model output – e.g. abundance, exploitation, biomass) reliable, consistent with input data and population biological characteristics, and useful to support status inferences?
   b) Is the stock overfished? What information helps you reach this conclusion?
   c) Is the stock undergoing overfishing? What information helps you reach this conclusion?
   d) Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?
   e) Are the quantitative estimates of the status determination criteria for this stock appropriate for management use? If not, are there other indicators that may be used to inform managers about stock trends and conditions?
4. Evaluate the stock projections, addressing the following:
   a) Are the methods consistent with accepted practices and available data?
   b) Are the methods appropriate for the assessment model and outputs?

c) Are the results informative and robust, and useful to support inferences of probable future conditions?
d) Are key uncertainties acknowledged, discussed, and reflected in the projection results?

5. Consider how uncertainties in the assessment, and their potential consequences, are addressed.
   - Comment on the degree to which methods used to evaluate uncertainty reflect and capture all sources of uncertainty in the population, data sources, and assessment methods
   - Are the implications of uncertainty in technical conclusions clearly stated?
6. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.
   - Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments.
   - Provide recommendations on possible ways to improve the SEDAR process.
7. Provide suggestions on improvements in data or modeling approaches, which should be considered when scheduling the next assessment.
8. Prepare a Peer Review Summary of the Panel's evaluation of the stock assessment, addressing each Term of Reference. Develop a list of tasks to be completed following the workshop. Complete and submit the Peer Review Summary Report in accordance with the project guidelines.

Tentative AGENDA

SEDAR 50 Atlantic Blueline Tilefish Review Workshop

Atlantic Beach, North Carolina
August 29 - 31, 2017

Tuesday

9:00 a.m.	**Convene**	
9:00 – 9:30 a.m.	**Introductions and Opening Remarks**	
	Coordinator /	
	- Agenda Review, ToR, Task Assignments	**Chair**
9:30 a.m. – 12 p.m.	**Assessment Presentation**	**TBD**
12:00 p.m. – 1:30 p.m.	**Lunch Break**	
1:30 p.m. – 3.30 p.m.	**Panel Discussion**	**Chair**
	- Assessment Data & Methods	
	- Identify additional analyses, sensitivities, corrections	
3:30 p.m. – 4:00 p.m.	**Break**	
4:00 p.m. – 5:30 p.m.	**Continue Panel Discussion**	**Chair**
5:30 p.m. – 6:00 p.m.	**Public Comment**	

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

Wednesday

8:30 a.m. – 11:30 a.m.	**Panel Discussion**	**Chair**
	- Continue deliberations	
	- Review additional analyses	
11:30 a.m. – 1:00 p.m.	**Lunch Break**	
1:30 p.m. – 3:30 p.m.	**Panel Discussion**	**Chair**
	- Continue deliberations	
	- Review additional analyses	
3:30 p.m. – 4:00 p.m.	**Break**	
4:00 p.m. – 5:30 p.m.	**Panel Discussion or Work Session**	**Chair**
	- Recommendations and comments	
5:30 p.m. – 6:00 p.m.	**Public Comment**	

***Wednesday Goals*:** Preferred models selected, projection approaches approved, Report drafts begun

Thursday

8:30 a.m. – 10:30 a.m.	**Panel Discussion**	**Chair**
	- Review additional analyses, final sensitivities	
	- Projections reviewed.	
10:30 a.m. – 10:45 p.m.	**Break**	
10:45 a.m. – 12:30 p.m.	**Panel Discussion or Work Session**	**Chair**
	- Review Consensus Reports	
12:30 p.m. – 1:00 p.m.	**Public Comment**	**Chair**
1:00 p.m.	**ADJOURN**	

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

Appendix 3: Panel membership and meeting participants

Appointee	Function	Affiliation
REVIEW PANEL		
Scott Crosson	Review Panel Chair	SAFMC SSC
Churchill Grimes	Reviewer	SAFMC SSC
Laura Lee (not able to participate)	Reviewer	SAFMC SSC
Yan Jiao	Reviewer	MAFMC SSC
Patrick Cordue	CIE Reviewer	CIE
Jamie Gibson	CIE Reviewer	CIE
Paul Medley	CIE Reviewer	CIE
ANALYTICAL REPRESENTATIVES		
Nikolai Klibansky	Lead analyst	SEFSC Beaufort
Kevin Craig	Assessment Team	SEFSC Beaufort
Paul Nitschke	Assessment team	NEFSC
Kyle Shertzer	Assessment Team	SEFSC Beaufort
Erik Williams	Assessment Team	SEFSC Beaufort
APPOINTED OBSERVERS		
Skip Fuller	For-hire	VA
Jeff Gutman	For-hire	NJ
Rusty Hudson	Recreational/Commercial	FL / SFA
Andy Piland	For-hire	NC
COUNCIL REPRESENTATIVES		
Tony DiLernia	Council member	MAFMC
Dewey Hemilright	Council member	MAFMC
Anna Beckwith	Council member	SAFMC
Mark Brown	Council member	SAFMC
COUNCIL AND AGENCY STAFF		
Julia Byrd	Coordinator	SEDAR
Kimberly Cole	Admin	SEDAR/SAFMC
Myra Brouwer	SAFMC lead	SAFMC
John Carmichael	SAFMC	SAFMC
Jason Didden/Matt Seeley	MAFMC lead	MAFMC
Mike Errigo	Fishery Biologist	SAFMC
Nick Farmer/Jeff Pulver	Fishery Biologist	SERO

South Atlantic Update Stock Assessments*

Workshop Participants

Acronyms

AP .....Advisory Panel
ASMFC.....Atlantic States Marine Fisheries Commission
CIE… .....Center for Independent Experts
FL FWCC… ..... Florida Fish and Wildlife Conservation Commission
GADNR… .....Georgia Department of Natural Resources
GARFO… ..... Greater Atlantic Regional Fisheries Office, NMFS
GMRI… .....Gulf of Maine Research Institute
MAFMC .....Mid-Atlantic Fishery Management Council
NEFSC… ..... Northeast Fisheries Science Center, NMFS
NCDMF… ..... North Carolina Division of Marine Fisheries
NMFS.....National Marine Fisheries Service
SAFMC.....South Atlantic Fishery Management Council
SCDNR… .....South Carolina Department of Natural Resources
SEDAR ..... Southeast Data, Assessment, and Review
SEFSC..... Southeast Fisheries Science Center, NMFS
SERO ..... Southeast Regional Office, NMFS
SFA ..... Southeastern Fisheries Association
SSC .....Science and Statistics Committee
TBD..... To be determined
VIMS .....Virginia Institute of Marine Science
VMRC.....Virginia Marine Resources Commission