Independent Peer Review Report of the spiny dogfish and Atlantic bluefish Research Track Peer Review

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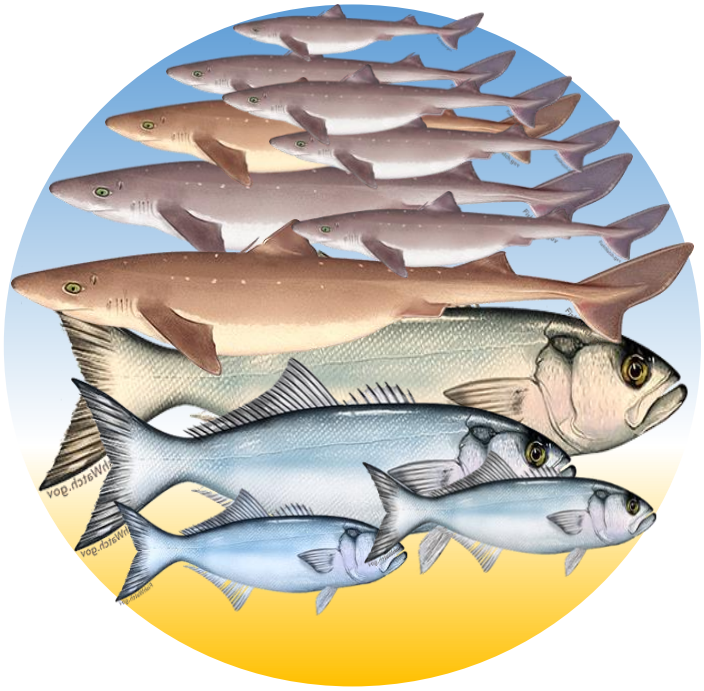

Prepared for
Center for Independent Experts
Independent System for Peer Review

Contents

Executive summary

i) A review of spiny dogfish and Atlantic bluefish research track assessments was carried out at Wood's Hole, MA from the 5-9th December 2022 with a panel of three experts, chaired by a member of the MAMFC SSC.

ii) Both working groups presented an impressive amount of supporting research and analysis in the development of new assessments for their respective stocks. In each case the assessments represent a substantial step forward compared to previous work.

Spiny dogfish

iii) The biology of the stock was reviewed with updates made to natural mortality and maturity. Catch data were updated and revised. These include estimates of landings and discards.

iv) A range of surveys were reviewed but only the NEFSC spring survey was retained for the assessment. Other surveys were rejected on the grounds of area coverage and encounter rate.

v) As aging dogfish is difficult, the assessment was based on length frequency data separated by sex. The assessment was implemented in Stock Synthesis (SS3). This is appropriate given the available data and the established use of the platform. The model treats the catch data as exact although high CV are apparent in the discard and recreational catch estimates. This may lead to incorrect weighting of the composition and abundance data.

vi) The model diagnostics indicate a somewhat poor fit to the composition data and the NESFC survey. The survey had a more or less constant fitted value for all years.

vii) The assessment is sensitive to assumptions on growth and the stock-recruitment relationship, both of which are not well established.

viii) The choice of fleet definitions that treat the landings and discards as autonomous fleets should be reviewed as it may lead to unintended bias in estimates of selectivity that could affect projections that deviate from status quo F.

ix) The choice of SPR60% as the basis for reference points is sound.

x) Despite the limitations of the SS3 assessment it is appropriate for use in operational assessments. In view of the uncertainty, however, it would be worthwhile calculating the stochastic estimator and I-smooth catch in future assessments for comparison.

Atlantic bluefish

xi) The biology of the stock was reviewed with updates made to natural mortality. Catch data were updated and revised. These include estimates of landings and discards.

xii) A range of state and Federal surveys were reviewed. Most were included in the assessment, but two surveys were rejected on the grounds of area coverage. The Marine Recreational Information Program (MRIP) survey, previously influential in the assessment, was completely revised. Survey age compositions were derived from multinomial age-length keys to account for sparse sampling. This may have implications for data weighting in the assessment model objective function.

xiii) The proposed base model assessment transitioned from Age-Structured Assessment Program (ASAP) to the Woods Hole Assessment Model (WHAM) with careful stepwise changes to demonstrate comparability with earlier assessments. The model had good diagnostics and retrospective pattern. It is, however, sensitive to the

PSIGNS survey which has a very restricted area coverage. Omitting it leads to a lower SSB and higher F.

xiv) The choice of SPR35% as the basis for reference points is sound. The suggested projection method uses the WHAM model and it therefore internally consistent and can propagate uncertainty appropriately.

xv) The suggested base model is suitable for use in operational assessments. The backup method, I-smooth was shown to predict similar ABCs to previous assessments but it does not appear likely that this approach will be necessary,

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 the nation's marine living resources based upon the best scientific information available (BSIA). NMFS science products require scientific peer reviews that are strictly independent of all outside influences. External reviews are essential to strengthening scientific quality assurance for fishery conservation and management actions.

This meeting was a Research Track Peer Review by four experts to appraise stock assessments and models. The results of the review will be incorporated into future management track assessments, which serve as the basis for developing fishery management recommendations.

The subjects of this review were spiny dogfish (*Squalus acanthius*) and Atlantic bluefish (*Pomatomus saltatrix*) stocks. A virtual meeting by WebEx was held from the 5-9 December 2022 to evaluate assessments carried out by working groups lead by the NEFSC at Wood's Hole, MA.

Description of the individual reviewers' roles in the review activities

Approximately 10 days prior to the meeting reports and supporting documents for the two assessments were available from the NMFS website. These are listed in Appendix 1. A few days before the full review meeting a preliminary virtual meeting was held with the Panel chair and NEFSC staff to discuss meeting arrangements and any issues of concern. During the main review meeting the reviewer participated fully and contributed to discussions. The meeting attendance and Panel membership is listed in Appendix 3.

Following the meeting the reviewer assisted with drafting and finalisation of the Summary Report. The performance work statement, including the terms of reference, is given in Appendix 2.

Summary of findings

Spiny dogfish

ToR 1: Identify relevant ecosystem and climate influences on the stock. *Characterize the uncertainty in the relevant sources of data and their link to stock dynamics. Consider findings, as appropriate, in addressing other ToRs. Report how the findings were considered under impacted ToRs.*

The ToR was met. The WG considered movement and migrations, environmental influences on abundance and distribution, recruitment, growth and maturity. There are seasonal migrations along the coast with some offshore movement. Depth was found to be the most significant covariate for distribution. No significant environmental covariates could be found for growth or recruitment. Maturity shows a long term decline with fish maturing at a smaller size. Growth was estimated from ageing using spines. However, age determination was subject to large errors, especially at higher ages, and the new estimates of growth were not used in the assessment.

ToR 2: Estimate catch from all sources including landings and discards. *Describe the spatial and temporal distribution of landings, discards, and fishing effort. Characterize the uncertainty in these sources of data.*

The ToR was met. The landings were compiled from official sources for commercial landings and surveys for the recreational catch. Early commercial catches were dominated by foreign fleets while more recent landings are predominantly for the US. The latter landings are considered as exact values. Dead discards were estimated from observer trips with assumptions made about discard survival based on gear type. Estimates of sampling error (PSE) for the discards are provided and can be large.

As no length data were available for the recreational catch, sink gillnet length frequencies were used for this component of the catch.

1989 was chosen as the base year for input data to the assessment as it corresponds to the earliest reliable estimates of discards.

ToR 3: Present the survey data used in the assessment *(e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, application of catchability and calibration studies, etc.) and provide a rationale for which data are used. Describe the spatial and temporal distribution of the data. Characterize the uncertainty in these sources of data.*

This ToR was met. A number of federal, state and Canadian surveys were considered. After evaluation, only the spring NEFSC survey was used in view of its higher encounter rate and area coverage. The fall NEFSC survey has a low encounter rate and a change in its timing so was not used although the trend in the index reflects that of the fall survey. Canadian surveys were ruled out on the basis that data were variable or not available for sufficient years. State surveys were considered too limited in coverage to be used. An abundance index using VAST to combine the available surveys was derived but is dominated by the spring NEFSC survey so did no provide additional abundance information.

ToR 4: Use appropriate assessment approach to estimate annual fishing mortality, recruitment and stock biomass *(both total and spawning stock) for the time series, and estimate their uncertainty. Compare the time series of these estimates with those from the previously accepted assessment(s). Evaluate a suite of model fit diagnostics (e.g., residual patterns, sensitivity analyses, retrospective patterns), and (a) comment on likely causes of problematic issues, and (b), if possible and appropriate, account for those issues when providing scientific advice and evaluate the consequences of any correction(s) applied.*

This ToR was met. However, while I would agree the assessment represents the best available, I believe there are a number of issues that undermine the robustness of the analysis.

Stock Synthesis (SS3) was chosen as the preferred assessment tool because it allows length composition data to be used directly and can accommodate separate sexes. These are important advantages given the uncertainty in dogfish aging and the difference in the exploitation rates of males and females. SS3 also allows individual fleets to be treated separately allowing overall fishery selectivity to respond to fleet activity changing over time and to more naturally model different observation errors associated with the fleet catch data.

SS3 is a well-established modelling framework and is widely used, especially for Pacific coast stocks.

Selectivity is a crucial element of SS3 making it important to model fleets appropriately. There are a number of issues about the modelling choices made by the SDWG in relation to fleet definitions and choice of selectivity functions that require further investigation.

Firstly, the SDWG separated the landings and discard components of the operating gears into separate fleets. This implies an individual vessel can freely re-allocate its effort between landings and discards while maintaining the same gear selectivity and retention ogive. Clearly this is not possible, and it means that the fully selected Fs for each fleet defined by the WG are not independent. This makes the interpretation of fleet selectivity unclear and is particularly relevant when using selectivity time blocks that are intended reflect effects such as management interventions. Since selectivity as applied by the WG is a function both of fishery selection at the point of capture and the post capture retention choice, a true selectivity change, resulting for example, from a catch limit, cannot easily be attributed to a "landings fleet" or a "discard fleet". The problem is further compounded by the grouping of different gears into the landings and discard fleets. While the use of these artificial fleet constructs probably does not affect the estimate of F for the whole fishery historically, it will make a difference in projections when non-status quo fishing multipliers are applied to estimate future catches. This is because the values of apical F and the fishing selection pattern as defined in the model are not independent.

Secondly, it is important to note that generally the shape of a particular fleet's selectivity can only be estimated reliably relative to a reference fleet. It is common practice to fix at least one fleet (generally a fishery independent survey) to have asymptotic selection. In an initial run using updated growth parameters, the WG allowed all the fleets including the survey to have dome shaped selectivity. Models of this type are often unstable and, in this case, because the selectivity of the survey was estimated to be domed, the newly estimated growth was rejected and older growth parameters from more than 30 years ago were adopted instead. It would be better to fix the shape of survey selectivity to logistic first and use the new growth parameters to see if the model performed adequately before rejecting them. Overall, I was not convinced that the decision to use older growth values for part of the time period but estimate them within the SS3 model for the remaining time period was the best one. As the sensitivity runs show, the model is sensitive to the growth assumption and further investigation of the problem is desirable.

It is a common assumption when using SS3 that catches are known exactly, and this is what was used for the dogfish assessment. Clearly the recreational catch and commercial discards are subject to quite large sampling errors. This matters when data are weighted by their precision in the objective function. In effect the catch data get very high weight compared to the length composition data. Since the catch contains some of the abundance signal, results will be heavily weighted towards the catch. It is noteworthy that the only abundance data in the objective function is the NEFSC survey index and this is not well fitted with the model values showing almost no signal. In future it would be desirable to allow the model to fit to the catch data with error, especially in relation to discard and recreational catch. In addition, sensitivity to the relative weight given to different data components needs to be explored.

While the model fitted the aggregate length composition data well, the fit to the individual years by fleet did not. There were strong patterns in the residuals with the tails of the length

frequencies being particularly poorly fit. There is a tendency for the fitted values to either miss or underestimate the peak of the length distribution.

Sensitivity runs were performed for a range of alternative assumptions. The most striking of these relates to the assumed stock-recruitment function where the choice of Beverton-Holt (BH) or Ricker curves gives very different biomass and recruitment trajectories from the base model survivorship assumption. While the shape of the biomass (quantified as spawning output) is similar, the long term trend is very different with an overall decline when using Ricker/BH and an increase using the survivorship function. This is likely to be due to the much lower steepness used for Ricker/BH runs compared to the base model and needs further consideration as it has profound implications for management.

The base run included Dirichlet-multinomial weighting. However, the sensitivity runs were all performed without data weighting and were compared to an alternate base run without data weighting. This means the sensitivity run comparisons are only meaningful within the class of unweighted models and are not strictly comparable to the preferred base run.

My overall impression of the SS3 assessment was that it represented a significant step forward with careful consideration given to the choice of growth, natural mortality and stock-recruitment. It also makes full use of length data which hitherto have not been fully utilised. Nevertheless, the model diagnostics do not inspire confidence and I believe more work is required to explore an optimal model configuration. With that in mind, it would be prudent to apply the base model alongside other approaches. I would suggest that the "stochastic estimator" is still calculated for comparative purposes. This is because the SS3 model more or less ignores the NEFSC survey and relies on the catches to drive the stock trajectory, while the stochastic estimator makes use of both the survey and the catches. I would also suggest that I-smooth be used for comparison because it is a pragmatic harvest control rule which, like the stochastic estimator uses both sources of information to estimate a sustainable catch. In addition, these simpler methods make no assumption about population dynamics and are not subject to misspecification of the stock recruitment function.

ToR 5. Update or redefine status determination criteria *(SDC; point estimates or proxies for BMSY, BTHRESHOLD, FMSY and MSY reference points) and provide estimates of those criteria and their uncertainty, along with a description of the sources of uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for reference points. Compare estimates of current stock size and fishing mortality to existing, and any redefined, SDCs.*

The ToR was met. The SDWG proposed SPR60% as the foundation for reference points based on a minimum number of 2 pups per recruit. Given the low reproductive rate of dogfish this appears an appropriate choice. While the 2 pups per recruit is a defendable rationale, the calculation of the SPR60% values from the output of SS3 does raise some issues. There is an implicit assumption that the F multiplier and fishery selectivity are separable. This is not quite true in the SS3 configuration used due to the way fleets are defined as discussed above. Indeed, it is not clear that summing across fleet selectivities from the model output gives an unbiased estimate of total fishery selectivity because they are not independent and are confounded with differing groupings of gears. It would be better to re-run SS3 with fleets defined as true operational units and derive discards from a retention ogive. This would provide more useful and less biased estimates of selectivity.

Strictly speaking SPR60% is not necessarily related to MSY. A full MSY calculation could be performed using the estimated stock recruitment relationship from SS3. In a sense, therefore, using SPR60% as a proxy for Bmsy may not be consistent with the stock-recruitment relationship. Nevertheless, given the uncertainty the S-R functional form, SPR reference points may be more robust.

ToR 6. Define appropriate methods for producing projections; *provide justification for assumptions of fishery selectivity, weights at age, maturity, and recruitment; and comment on the reliability of resulting projections considering the effects of uncertainty and sensitivity to projection assumptions.*

This ToR was met. The SDWG used the projection tool within SS3. This rolls forward the model estimated within SS3 using the most recent population, selectivity, M, maturity and the estimated stock-recruitment. The procedure is standard in many fishery models and is appropriate contingent on the assessment model. As has already been discussed, the definition of fleets in the assessment raises issues about the assumption of separability in the F multiplier and the selection pattern. The problem will be greatest the further from the F=status quo assumption the F multiplier is. For this assessment the issues are likely to be small since FSPR60% is close to current F.

ToR 7. Review, evaluate, and report on the status of research *recommendations from the last assessment peer review, including recommendations provided by the prior assessment working group, peer review panel, and SSC. Identify new recommendations for future research, data collection, and assessment methodology. If any ecosystem influences from ToR 2 could not be considered quantitatively under that or other ToRs, describe next steps for development, testing, and review of quantitative relationships and how they could best inform assessments. Prioritize research recommendations.*

The ToR was met. The SDWG provided an update on how earlier research recommendations had been addressed and where new information had been included in the assessment. Topics covered included new analyses of dogfish distribution using VAST modelling, analysis of aging and growth, exploration of environmental covariates, changes in maturity and a review of natural mortality. The WG had also developed a new assessment model using the SS3 framework and explored data limited methods. The Panel supported the new research recommendations.

Clearly significant progress has been made in developing a length based model within the SS3 framework. As indicated under ToR 4, model development is still at an early stage, and I would recommend further research to address a number of issues. These are:

- Identify the most appropriate growth model;
- Establish the most robust stock-recruitment assumption;
- Rationalise the fleet definitions to represent homogenous vessel groups;
- Model discards as a function of a retention ogive rather than nesting it within fleet selection; and
- Allow observation errors in the catches.

I am somewhat skeptical that SS3 offers the best framework for further model development though it is undoubtedly a credible approach. There may be value in exploring state-space

alternatives such as LIME (Rudd and Thorson 2018) or the Kalman filter method suggested by Sullivan (1992).

ToR 8. Develop a backup assessment approach *to providing scientific advice to managers if the proposed assessment approach does not pass peer review or the approved approach is rejected in a future management track assessment.*

The ToR was met. The SDWG investigated any number of alternative data limited methods that included Depletion Corrected Average Catch (DCAC), Depletion based Stock Reduction Analysis and I-smooth. They also considered the "stochastic estimator" which is based on swept area estimates of the stock from the NEFSC spring survey. This was recommended as the preferred alternative if the SS3 assessment is rejected. I can support this proposal.

While there is currently no reason to reject the candidate SS3 assessment, it is also unwise in my opinion to rely solely on it for management advice. To do so does not adequately acknowledge model uncertainty. While an extensive sensitivity analysis has been done, it only illustrates model uncertainty within a class of SS3 models. I would therefore recommend that the stochastic estimator and the I-smooth approach are included in any stock assessment to better understand model uncertainty.

Bluefish

ToR 1: Identify relevant ecosystem and climate influences on the stock. *Characterize the uncertainty in the relevant sources of data and their link to stock dynamics. Consider findings, as appropriate, in addressing other ToRs. Report how the findings were considered under impacted ToRs.*

This ToR was met. A comprehensive set of analyses were undertaken in the form of an Ecosystem & Socioeconomic Profile (ESP). Included were analyses of surveys using VAST to examine distributions and their spatio-temporal changes. Details of spawning biology and natural mortality were reviewed with potential covariates examined. Growth, length-weight relationships, and maturity were also reviewed. Natural mortality was updated to use Lorenzen based values, while maturity was left unchanged.

An important analysis presented involved the derivation of a prey abundance index to investigate whether this might explain possible changes in catchability associated with the MRIP index of abundance. The index was used in a complementary assessment to the final WHAM assessment.

ToR 2: Estimate catch from all sources including landings and discards. *Describe the spatial and temporal distribution of landings, discards, and fishing effort. Characterize the uncertainty in these sources of data.*

This ToR was met. The BWG provided detailed information on catches by gear, area and season. Most of the catch is taken in the recreation fishery and is estimated using data from the MRIP survey. Commercial catches are much lower and have declined. Although commercial discards are very low, they were included in the assessment for completeness.

The MRIP survey has been redesigned and this has necessitated a revision of the historical estimates of the recreational catch as effort appears to have been under-estimated. Discarded fish from the recreational fishery have a high survival and estimates of dead discards require an estimate of release mortality. The BWG reviewed the available data on mortality and revised the value down to 9.4% from the previous value of 15%. The lower value is the result of excluding outliers in the meta-analysis.

ToR 3: Present the survey data used in the assessment *(e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, application of catchability and calibration studies, etc.) and provide a rationale for which data are used. Describe the spatial and temporal distribution of the data. Characterize the uncertainty in these sources of data.*

This ToR was met. A variety of state and federal surveys are available. State surveys tend to be limited in area coverage but sample young of the year (YOY). The BWG used the Conn method to combine these surveys into a single YOY index.

Abundance indices were calculated both from the survey design and GLM modelling. The design based indices were chosen to be used in the assessment model on the grounds that the times series would be easier to maintain and less prone to revision. Two state surveys (NJ Trawl and CT List) were omitted on the grounds of design and area coverage.

One of the main issues discussed during the review in relation to this ToR was the use of smoothed age-length keys (ALKs) to derive the age compositions of the surveys. Sampling levels mean the ALKs are sparse or missing and if used in their raw state produce noisy estimates of the age composition. The BWG used a multinomial model with covariates to smooth ALKs and fill in missing data. There is little doubt that modelling of this type will produce better estimates of the ALKs and also the resulting age compositions. A criticism of the approach is that the WHAM model treats the pre-processed data as if they were direct observations and will regard them as more precise than they really are. One might argue that WHAM should be allowed do the smoothing given its assumed error structure. The potential problem with fitting to pre-processed data is that in the integrated assessment model (WHAM) undue weight will be given to the age composition data over the abundance data. This is an issue that merits careful thought and is discussed in the next term of reference.

In previous assessments, the MRIP index was influential and tends to have a longer age range than other surveys. The index was revised by choosing "bluefish" trips based on species association rather than purely bluefish presence/absence in the trip. This is a reasonable approach and should improve the index.

ToR 4: Use appropriate assessment approach to estimate annual fishing mortality, recruitment and stock biomass *(both total and spawning stock) for the time series, and estimate their uncertainty. Compare the time series of these estimates with those from the previously accepted assessment(s). Evaluate a suite of model fit diagnostics (e.g., residual patterns, sensitivity analyses, retrospective patterns), and (a) comment on likely causes of problematic issues, and (b), if possible and appropriate, account for those issues when providing scientific advice and evaluate the consequences of any correction(s) applied.*

The ToR was met. Previous assessments were performed using ASAP while the new proposed base model assessment is built in WHAM. In order to make this conversion the BWG undertook a series of stepwise changes to be able to distinguish between the effects of modelling changes and data revision/updates. The procedure included initially doing a continuity run in ASAP followed by a bridge model with revised configuration, still within ASAP, before finally running a similarly configured WHAM version. This provides reassurance that the new assessment is not the result of a change in modelling platform but is mainly due to data updates and new modelling choices. An important difference between the final bridge model in ASAP and the new base model is the inclusion of autoregressive random effects on the number at age by year and age in WHAM.

In general, the changes made to the model, such as the use of Lorenzen M and revised time blocks, improved convergence and led to a better retrospective pattern. In part this may be due to the use of random effects in WHAM that allows for more flexibility.

As noted above, the survey age compositions used in the model are derived from multinomial ALKs. These may result in overweighting the composition data. A run using raw ALKs produced a lower F and higher SSB. However, this model did not converge well.

A series of sensitivity runs exploring the survey data and natural mortality assumptions show that the PSIGNS index has the greatest effect on the model. Its exclusion leads to a lower SSB and higher F compared to most other runs. This is likely because this survey shows

some higher biomass values in recent years while the MRIP index shows a decline. Although the MRIP index is not fit well it does have larger spatial coverage, in contrast to the PSIGNS survey which is limited to Pamlico Sound. The influence of such a restricted survey on the model results is not reassuring because it affects the most recent years in the assessment that will have the greatest effect on projections and the evaluation of stock status.

Overall, I felt the model was built on a sound basis and is suitable for use in providing management advice subject to the reservations expressed above.

ToR 5 Update or redefine status determination criteria *(SDC; point estimates or proxies for BMSY, BTHRESHOLD, FMSY and MSY reference points) and provide estimates of those criteria and their uncertainty, along with a description of the sources of uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for reference points. Compare estimates of current stock size and fishing mortality to existing, and any redefined, SDCs.*

This ToR was met. The agreed basis for reference points, SPR35%, draws on existing literature and is widely accepted. Both F35% and SSB35% were calculated internally in WHAM using average recruitment over the time series (1985-2021), and 5-year averages for fishery selectivity, maturity, and weights-at-age for SSB per recruit calculations. This represents standard practice but does not, of course, explicitly take account of a stock recruitment relationship. There does appear to be an identifiable relationship between recruitment at age 1 and SSB and there may be merit in the future to explore whether this might be used to define MSY reference points.

Application of the current reference points to the research track assessment suggests there is an 87% chance that the bluefish stock is currently not overfished and over-fishing is not occurring. The facility in WHAM to calculate uncertainty in the assessment and the reference points provides a very useful Kobe plot with the envelope of uncertainty giving a clear visual summary of stock status.

ToR 6. Define appropriate methods for producing projections*; provide justification for assumptions of fishery selectivity, weights at age, maturity, and recruitment; and comment on the reliability of resulting projections considering the effects of uncertainty and sensitivity to projection assumptions.*

The ToR was met. Projections were performed essentially by rolling the WHAM model forward. This allows for uncertainty in the starting year and propagates random effects into the projection period. Five-year means were used for M, maturity, fishery selectivity and weights-at-age. The full time series of recruitment was included to characterise variable variability. This follows standard practice. In common with the comment above, given the apparent stock-recruitment relationship, there may be value exploring whether it provides a better predictor of recruitment than an average value.

ToR 7 Review, evaluate, and report on the status of research *recommendations from the last assessment peer review, including recommendations provided by the prior assessment working group, peer review panel, and SSC. Identify new recommendations for future research, data collection, and assessment methodology. If any ecosystem influences from ToR 1 could not be considered quantitatively under that or other ToRs, describe next steps for*

development, testing, and review of quantitative relationships and how they could best inform assessments. Prioritize research recommendations.

This ToR was met. The BWG provided a detailed summary of how previous research recommendations have been addressed and where new results have been used in the research track assessment. Overall, this was an impressive suite of research.

The BWG suggested a series of new recommendations which the Panel supported. The highest priority is given to improved sampling from the fishery, which I would support.

An innovative study on the forage fish index led to a proposal to use this as a covariate to help explain changes in survey catchability and continued work on this is proposed as a high priority. I do not necessarily disagree with this but do have some reservations unless there is an established causal link between prey abundance and catchability. Research in this area might benefit from finding evidence that the forage food abundance does indeed influence catchability.

As discussed above, the use of smoothed ALKs still merits some further research both to establish correct data weighting in the WHAM model and the most suitable method for ALK smoothing.

I tend to feel that modelling selectivity in discrete time blocks for commercial fleets is somewhat unsatisfactory as knife-edge transitions from one regime to another is rather unrealistic. Using the facilities in WHAM to allow selectivity to evolve with an autoregressive process is worth investigating and would overcome abrupt transitions.

ToR 8. Develop a backup assessment approach *to providing scientific advice to managers if the proposed assessment approach does not pass peer review or the approved approach is rejected in a future management track assessment.*

The ToR was met. The BWG considered a number of well-known data limited methods and provided a rationale for selecting I-smooth as the proposed back-up approach. The method has been tested and peer reviewed. Analysis by the BWG demonstrated that I-smooth tended to estimate similar ABCs to those derived from previous ASAP assessments. The method therefore provides a sound alternative in the event that the base model is rejected.

Conclusions

Both working groups presented an impressive amount of supporting research and analysis in the development of new assessments for their respective stocks. In each case the assessments represent a substantial step forward compared to previous work.

The spiny dogfish assessment is still subject to a lot of uncertainty. As this was the first time SS3 has been used for this stock there is further scope for development. Areas of focus for development are the definition of fleets, the way discards are modelled, growth and allowing for errors in the catch. While the SS3 assessment is appropriate in its present state, there is an argument to calculate the stochastic estimator and I-smooth in parallel in order to have a better indication of model uncertainty.

The bluefish assessment has the advantage of age data which greatly simplifies the assessment as growth does not need to be estimated within the model and cohorts are more transparent. In this assessment there is a need to ensure the ALK smoothing is not interfering with the weighting of data in the objective function and whether the PSIGNS survey is having undue influence on the results. There is also scope to explore random effects especially in relation to selectivity and if this might overcome the need for discrete time blocks.

Comments on the review process

The review was very well organised and supported. The meeting ran smoothly with speakers making good quality clear presentations that adhered to the agenda time schedule. There was excellent cooperation from the analyst teams. The meeting was effectively and efficiently chaired. This was a WebEx meeting which generally functioned well, but inevitably places some limitations on personal interactions.

References

Rudd, M. B., and J. T. Thorson. 2018. Accounting for variable recruitment and fishing mortality in length-based stock assessments for data-limited fisheries. Canadian Journal of Fisheries and Aquatic Sciences, 75:1019–1035.

Sullivan, P. J. 1992. A Kalman Filter Approach to Catch-at-Length Analysis. Biometrics, 48: 237-257.

Appendix 1: Bibliography of materials provided for review

Spiny Dogfish

Assessment Report

"Spiny_Dogfish_SAW_SARC_2022_FINAL.pdf" = Main assessment document

Background

"Read Me.pdf" – Document and materials guide, as well as a repository of any report revisions.

"plots_v3.6.2_1.5_fnum_a12.zip" - This zip file contains the base case model figures and files produced from SS3. Within this zip file, there is a file labeled '_SS_output.html', which is an html that allows for viewing SS3 produced plots and results in an organized fashion (i.e. by various data type or model result).

Working Papers

Anstead K. 2022a. Natural mortality estimates for spiny dogfish.

Anstead K. 2022b. Two data poor methods applied to spiny dogfish.

Chang J-H, Hart D and McManus MC. 2022. Stock synthesis for Atlantic spiny dogfish.

Hansell A and McManus C. 2022. Spatio-temporal dynamics of spiny dogfish (Squalus acanthias) in US waters of the northwest Atlantic.

Hart DR, and Chang J-H. 2022. Per recruit modeling and reference points for spiny dogfish.

Hart DR, and Sosebee K. 2022. Length/Weight/Fecundity relationships for Atlantic spiny dogfish.

Jones AW. 2022. Exploring vessel trip report and observer based fishery information for spiny dogfish.

Jones AW, Didden JT, McManus MC, and Mercer AJ. 2022. Exploring commercial CPUE indices for the spiny dogfish in the northeast U.S.

McCandless C. 2022. Preliminary spiny dogfish movements and growth estimates from NEFSC mark recapture data.

McManus MC, Sosebee K, and Rago P. 2022. Biological Reference Points for Spiny Dogfish: Revisiting Rago and Sosebee (2010).

Neiland JL and McElroy WD. 2022. NEFSC Gulf of Maine Bottom Longline Survey Data and Analyses for Spiny Dogfish

Passerotti MS, and McCandless CT. 2022. Updated age and growth estimates for spiny dogfish Squalus acanthias.

Sosebee KA. 2022a. Maturity of spiny dogfish in US waters from 1998-2021.

Sosebee KA. 2022b. Spiny dogfish catch summary and derivation of catch at length and sex.

Bluefish

Assessment Report

Bluefish_SAW_SARC_2022_FINAL.pdf = Main assessment document

Background

readme.docx – document guide and repository of any report revisions.

Background Documents

The 2015 bluefish peer review report

Stock and Miller 2021 -> describes the Woods Hole Assessment Model (WHAM) framework and software package

Technical documentation for ASAP 3 -> technical documentation related to ASAP software used as part of early model exploration

User manual for ASAP 3 -> technical documentation related to ASAP software used as part of early model exploration

Ng et al. 2021 -> used as a guide for early development of the forage fish index

Thorson 2019 -> used to help guide VAST modelling

Working Papers

Tyrell et al. 2022. Bluefish Ecosystem and Socioeconomic Profile.

Valenti 2022a. The Spatial Distribution of Bluefish (Pomatomus saltatrix): Insights from American Littoral Society Fish Tagging Data

Tyrell 2022. Bluefish VAST Index Exploration.

Gaichas et al. 2022. Vector Autoregressive Spatio-Temporal (VAST) modeling of piscivore stomach contents, 1985-2021.

Truesdell et al. 2022. Life History Analyses for Bluefish.

Tyrell and Truesdell 2022. Natural mortality of bluefish.

Celestino et al. 2022a. Index of abundance exploration and development by the Bluefish Working Group's Fishery Independent Data Group.

Wood 2022a. ToR 2: Commercial and Recreational Data Collection and Analysis.

Drew 2022a. Recreational Data Changes for Bluefish, 2012-2021.

Drew 2022b. The Spatial Distribution of Bluefish (Pomatomus saltatrix): Insights from MRIP Data.

Valenti 2022b. Catch-and-Release Recreational Angling Mortality of Bluefish (Pomatomus saltatrix): Updated Analysis for 2022

Drew 2022c. Development of the Composite YOY Index for Bluefish.

Drew 2022d. A Fishery-dependent CPUE index for bluefish derived from MRIP data.

Celestino et al. 2022b. Development of Bluefish Age-Length Keys.

Wood 2022b. Bluefish Model Bridge-Building in ASAP.

Wood 2022c. ASAP diagnostic plots.

Wood 2022d. WHAM diagnostic plots.
Truesdell 2022. Alternative assessment plan.

Other References

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Northeast Fisheries Science Center (NEFSC). 2015. 60th Northeast Regional Stock Assessment Workshop (60th SAW) Assessment Report. US Dept Commerce, Northeast Fish Sci Cent Ref Doc. 15-08; 870 p.

Northeast Fisheries Science Center (NEFSC). 2019. Operational Assessment of the Black Sea Bass, Scup, Bluefish, and Monkfish Stocks, Updated Through 2018. US Dept Commerce, Northeast Fish Sci Cent Ref Doc. 20-01; 164 p.

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Miller, T.J., O'Brien, L., and Fratantoni, P.S. 2018. Temporal and environmental variation in growth and maturity and effects on management reference points of Georges Bank Atlantic cod. Canadian Journal of Fisheries and Aquatic Sciences 75(12): 2159-2171. Doi:10.1139/cifas-2017-0124

Appendix 2: Performance work statement

Performance Work Statement (PWS)

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

Bluefish and Spiny Dogfish Research Track Peer Review
December 5-9, 2022

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[1].

Scope

The Research Track Peer Review meeting is a formal, multiple-day meeting of stock assessment experts who serve as a panel to peer-review tabled stock assessments and models. The research track peer review is the cornerstone of the Northeast Region Coordinating Council stock assessment process, which includes assessment development, and report preparation (which is done by Working Groups or Atlantic States Marine Fisheries Commission (ASMFC) technical committees), assessment peer review (by the peer review panel), public presentations, and document publication. The results of this peer review will be incorporated into future management track assessments, which serve as the basis for developing fishery management recommendations.

The purpose of this meeting will be to provide an external peer review of the spiny dogfish and bluefish stocks. The requirements for the peer review follow. This Performance Work

[1] https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2005/m05-03.pdf

Statement (PWS) also includes: **Annex 1**: ToRs for the research track, which are the responsibility of the analysts; **Annex 2:** a draft meeting agenda; **Annex 3:** Individual Independent Review Report Requirements; and **Annex 4:** Peer Reviewer Summary Report Requirements.

Requirements

NMFS requires three reviewers under this contract (i.e. subject to CIE standards for reviewers) to participate in the panel review. The chair, who is in addition to the three reviewers, will be provided by either the New England or Mid-Atlantic Fishery Management Council's Science and Statistical Committee; although the chair will be participating in this review, the chair's participation (i.e. labor and travel) is not covered by this contract.

Each reviewer will write an individual review report in accordance with the PWS, OMB Guidelines, and the ToRs below. Modifications to the PWS and ToRs cannot be made during the peer review, and any PWS or ToRs modifications prior to the peer review shall be approved by the Contracting Officer's Representative (COR) and the CIE contractor. All ToRs must be addressed in each reviewer's report. The reviewers shall have working knowledge and recent experience in the use and application of index-based, age-based, and state-space stock assessment models, including familiarity with retrospective patterns and how catch advice is provided from stock assessment models. In addition, knowledge and experience with simulation analyses and elasmobranchs is required.

Tasks for Reviewers

- Review the background materials and reports prior to the review meeting
    - Two weeks before the peer review, the Assessment Process Lead will electronically disseminate all necessary background information and reports to the CIE reviewers for the peer review.
- Attend and participate in the panel review meeting
    - The meeting will consist of presentations by NOAA and other scientists, stock assessment authors and others to facilitate the review, to provide any additional information required by the reviewers, and to answer any questions from reviewers
- Reviewers shall conduct an independent peer review in accordance with the requirements specified in this PWS and ToRs, in adherence with the required formatting and content guidelines; reviewers are not required to reach a consensus.
- Each reviewer shall assist the Peer Review Panel (co)Chair with contributions to the Peer Reviewer Summary Report
- Deliver individual Independent Reviewer Reports to the Government according to the specified milestone dates
- This report should explain whether each research track Term of Reference was or was not completed successfully during the peer review meeting, using the criteria specified below in the "Tasks for Peer Review Panel."
- If any existing Biological Reference Points (BRP) or their proxies are considered inappropriate, the Independent Report should include recommendations and justification for suitable alternatives. If such alternatives cannot be identified, then the report should indicate that the existing BRPs are the best available at this time.

- During the meeting, additional questions that were not in the Terms of Reference but that are directly related to the assessments and research topics may be raised. Comments on these questions should be included in a separate section at the end of the Independent Report produced by each reviewer.
- The Independent Report can also be used to provide greater detail than the Peer Reviewer Summary Report on specific stock assessment Terms of Reference or on additional questions raised during the meeting.

Tasks for Review panel

- During the peer review meeting, the panel is to determine whether each research track Term of Reference (ToR) was or was not completed successfully. To make this determination, panelists should consider whether the work provides a scientifically credible basis for developing fishery management advice. Criteria to consider include: whether the data were adequate and used properly, the analyses and models were carried out correctly, and the conclusions are correct/reasonable. If alternative assessment models and model assumptions are presented, evaluate their strengths and weaknesses and then recommend which, if any, scientific approach should be adopted. Where possible, the Peer Review Panel chair shall identify or facilitate agreement among the reviewers for each research track ToR.
- If the panel rejects any of the current BRP or BRP proxies (for B_{MSY} and F_{MSY} and MSY), the panel should explain why those particular BRPs or proxies are not suitable, and the panel should recommend suitable alternatives. If such alternatives cannot be identified, then the panel should indicate that the existing BRPs or BRP proxies are the best available at this time.
- Each reviewer shall complete the tasks in accordance with the PWS and Schedule of Milestones and Deliverables below.

Tasks for Peer Review Panel chair and reviewers combined:
Review the Report of spiny dogfish and bluefish Research Track Working Groups.

The Peer Review Panel Chair, with the assistance from the reviewers, will write the Peer Reviewer Summary Report. Each reviewer and the chair will discuss whether they hold similar views on each research track Term of Reference and whether their opinions can be summarized into a single conclusion for all or only for some of the Terms of Reference of the peer review meeting. For terms where a similar view can be reached, the Peer Reviewer Summary Report will contain a summary of such opinions.

The chair's objective during this Peer Reviewer Summary Report development process will be to identify or facilitate the finding of an agreement rather than forcing the panel to reach an agreement. Again, the CIE reviewers are not required to reach a consensus. The chair will take the lead in editing and completing this report. The chair may express their opinion on each research track Term of Reference, either as part of the group opinion, or as a separate minority opinion. The Peer Reviewer Summary Report will not be submitted, reviewed, or approved by the Contractor.

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, country of birth, country of citizenship, country of permanent residence, country of current residence, dual citizenship (yes, no), passport number, country of passport, travel dates.) to the NEFSC Assessment Process Lead 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 hybrid, both at the contractor's facilities, and at the Northeast Fisheries Science Center in Woods Hole, Massachusetts, and via WebEx video conferencing. **CIE reviewers may attend virtually dependent on conditions of the COVID 19 pandemic.**

Period of Performance
The period of performance shall be from the time of award through February, 2023. Each reviewer's 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 2 weeks of award	Contractor selects and confirms reviewers
Approximately 2 weeks later	Contractor provides the pre-review documents to the reviewers
December 5-9, 2022	Panel review meeting
Approximately 2 weeks later	Contractor receives draft reports
Within 2 weeks of receiving draft reports	Contractor submits final reports to the Government

* The Peer Reviewer Summary Report will not be submitted to, reviewed, or approved by the Contractor.

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 $15,000.00.

Restricted or Limited Use of Data
The contractors may be required to sign and adhere to a non-disclosure agreement.

NMFS Project Contact
Michele Traver, NEFSC Assessment Process Lead
Northeast Fisheries Science Center
166 Water Street, Woods Hole, MA 02543
Michele.Traver@noaa.gov

Annex 1. Generic Research Track Terms of Reference

1. Identify relevant ecosystem and climate influences on the stock. Characterize the uncertainty in the relevant sources of data and their link to stock dynamics. Consider findings, as appropriate, in addressing other ToRs. Report how the findings were considered under the ToRs.
2. Estimate catch from all sources including landings and discards. Describe the spatial and temporal distribution of landings, discards, and fishing effort. Characterize the uncertainty in these sources of data.
3. Present the survey data used in the assessment (e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, application of catchability and calibration studies, etc.) and provide a rationale for which data are used. Describe the spatial and temporal distribution of the data. Characterize the uncertainty in these sources of data.
4. Use appropriate assessment approach to estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series, and estimate their uncertainty. Compare the time series of these estimates with those from the previously accepted assessment(s). Evaluate a suite of model fit diagnostics (e.g., residual patterns, sensitivity analyses, retrospective patterns), and (a) comment on likely causes of problematic issues, and (b), if possible and appropriate, account for those issues when providing scientific advice and evaluate the consequences of any correction(s) applied.
5. Update or redefine status determination criteria (SDC; point estimates or proxies for BMSY, BTHRESHOLD, FMSY and MSY reference points) and provide estimates of those criteria and their uncertainty, along with a description of the sources of uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for reference points. Compare estimates of current stock size and fishing mortality to existing, and any redefined, SDCs.
6. Define appropriate methods for producing projections; provide justification for assumptions of fishery selectivity, weights at age, maturity, and recruitment; and comment on the reliability of resulting projections considering the effects of uncertainty and sensitivity to projection assumptions.
7. Review, evaluate, and report on the status of research recommendations from the last assessment peer review, including recommendations provided by the prior assessment working group, peer review panel, and SSC. Identify new recommendations for future research, data collection, and assessment methodology. If any ecosystem influences from ToR 2 could not be considered quantitatively under that or other ToRs, describe next steps for development, testing, and review of quantitative relationships and how they could best inform assessments. Prioritize research recommendations.
8. Develop a backup assessment approach to providing scientific advice to managers if the proposed assessment approach does not pass peer review or the approved approach is rejected in a future management track assessment.
9. Identify and consider any additional stock specific analyses or investigations that are critical for this assessment and warrant peer review, and develop additional ToR(s)* to address as needed.

Research Track ToRs:

General Clarification of Terms that may be Used in the Research Track Terms of Reference

Guidance to Peer Review Panels about "Number of Models to include in the Peer Reviewer Report":

In general, for any ToR in which one or more models are explored by the Working Group, give a detailed presentation of the "best" model, including inputs, outputs, diagnostics of model adequacy, and sensitivity analyses that evaluate robustness of model results to the assumptions. In less detail, describe other models that were evaluated by the Working Group and explain their strengths, weaknesses and results in relation to the "best" model. If selection of a "best" model is not possible, present alternative models in detail, and summarize the relative utility each model, including a comparison of results. It should be highlighted whether any models represent a minority opinion.

On "Acceptable Biological Catch" (DOC Nat. Stand. Guidelines. Fed. Reg., v. 74, no. 11, 1-16-2009):

Acceptable biological catch (ABC) is a level of a stock or stock complex's annual catch that accounts for the scientific uncertainty in the estimate of Overfishing Limit (OFL) and any other scientific uncertainty…" *(p. 3208) [In other words, OFL ≥ ABC.]*

ABC for overfished stocks. For overfished stocks and stock complexes, a rebuilding ABC must be set to reflect the annual catch that is consistent with the schedule of fishing mortality rates in the rebuilding plan. *(p. 3209)*

NMFS expects that in most cases ABC will be reduced from OFL to reduce the probability that overfishing might occur in a year. (p. 3180)

ABC refers to a level of ''catch'' that is ''acceptable'' given the ''biological'' characteristics of the stock or stock complex. As such, Optimal Yield (OY) does not equate with ABC. The specification of OY is required to consider a variety of factors, including social and economic factors, and the protection of marine ecosystems, which are not part of the ABC concept. (p. 3189)

On "Vulnerability" (DOC Natl. Stand. Guidelines. Fed. Reg., v. 74, no. 11, 1-16-2009):

"Vulnerability. A stock's vulnerability is a combination of its productivity, which depends upon its life history characteristics, and its susceptibility to the fishery. Productivity refers to the capacity of the stock to produce Maximum Sustainable Yield (MSY) and to recover if the population is depleted, and susceptibility is the potential for the stock to be impacted by the fishery, which includes direct captures, as well as indirect impacts to the fishery (e.g., loss of habitat quality)." (p. 3205)

Participation among members of a Research Track Working Group:

Anyone participating in peer review meetings that will be running or presenting results from an assessment model is expected to supply the source code, a compiled executable, an input file with the proposed configuration, and a detailed model description in advance of the model meeting. Source code for NOAA Toolbox programs is available on request. These measures allow transparency and a fair evaluation of differences that emerge between models.

Annex 2. Draft Review Meeting Agenda

{Final Meeting agenda to be provided at time of award}

Spiny Dogfish and Bluefish Track Assessment Peer Review Meeting

December 5-9, 2022

WebEx link: TBD

DRAFT AGENDA* (v. 6/21/2022)

**All times are approximate, and may be changed at the discretion of the Peer Review Panel chair. The meeting is open to the public; however, during the Report Writing sessions we ask that the public refrain from engaging in discussion with the Peer Review Panel.*

Monday, December 5, 2022

Time	Topic	Presenter(s)	Notes
9 a.m. - 9:30 a.m.	Welcome/Logistics Introductions/Agenda/ Conduct of Meeting	Michele Traver, Assessment Process Lead Russ Brown, PopDy Branch Chief Panel Chair	
9:30 a.m. - 10:30 a.m.	ToR #1		Spiny dogfish
10:30 a.m. - 10:45 a.m.	Break		
10:45 a.m. - 11:45 a.m.	ToR #2		
11:45 a.m. - 12:15 p.m.	Discussion/Summary	Review Panel	
12:15 p.m. - 12:30 p.m.	Public Comment	Public	
12:30 p.m. - 1:30 p.m.	Lunch		
1:30 p.m. - 3 p.m.	ToR #3		
3 p.m. - 3:15 p.m.	Break		
3:15 p.m. - 4:15 p.m.	ToR #4		
4:15 p.m. - 4:45 p.m.	Discussion/Summary	Review Panel	
4:45 p.m. - 5 p.m.	Public Comment	Public	
5 p.m.	Adjourn		

Tuesday, December 6, 2022

Time	Topic	Presenter(s)	Notes

9 a.m. - 9:15 a.m.	Welcome/Logistics	Michele Traver, Assessment Process Lead Panel Chair	Spiny dogfish cont.
9:15 a.m. - 10:30 a.m.	ToR #5		
10:30 a.m. - 10:45 a.m.	Break		
10:45 a.m. - 11:45 a.m.	ToR #6		
11:45 a.m. - 12:15 p.m.	Discussion/Summary	Review Panel	
12:15 p.m. - 12:30 p.m.	Public Comment	Public	
12:30 p.m. - 1:30 p.m.	Lunch		
1:30 p.m. - 3 p.m.	ToR #7		
3 p.m. - 3:15 p.m.	Break		
3:15 p.m. - 4:15 p.m.	ToR #8-9		
4:15 p.m. - 4:45 p.m.	Discussion/Summary	Review Panel	
4:45 p.m. - 5 p.m.	Public Comment	Public	
5 p.m.	Adjourn		

Wednesday, December 7, 2022

Time	Topic	Presenter(s)	Notes
9 a.m. - 9:15 a.m.	Welcome/Logistics	Michele Traver, Assessment Process Lead Panel Chair	Bluefish
9:15 a.m. - 10:30 a.m.	ToR #1		
10:30 a.m. - 10:45 a.m.	Break		
10:45 a.m. - 11:45 a.m.	ToR #2		
11:45 a.m. - 12:15 p.m.	Discussion/Summary	Review Panel	
12:15 p.m. - 12:30 p.m.	Public Comment	Public	
12:30 p.m. - 1:30 p.m.	Lunch		
1:30 p.m. - 3 p.m.	ToR #3		
3 p.m. - 3:15 p.m.	Break		
3:15 p.m. - 4:15 p.m.	ToR #4		

4:15 p.m. - 4:45 p.m.	Discussion/Summary	Review Panel	
4:45 p.m. - 5 p.m.	Public Comment	Public	
5 p.m.	Adjourn		

Thursday, December 8, 2022

Time	Topic	Presenter(s)	Notes
9 a.m. - 9:15 a.m.	Welcome/Logistics	Michele Traver, Assessment Process Lead Panel Chair	Bluefish
9:15 a.m. - 10:30 a.m.	ToR #5		
10:30 a.m. - 10:45 a.m.	Break		
10:45 a.m. - 11:45 a.m.	ToR #6		
11:45 a.m. - 12:15 p.m.	Discussion/Summary	Review Panel	
12:15 p.m. - 12:30 p.m.	Public Comment	Public	
12:30 p.m. - 1:30 p.m.	Lunch		
1:30 p.m. - 3 p.m.	ToR #7		
3 p.m. - 3:15 p.m.	Break		
3:15 p.m. - 4:15 p.m.	ToR #8-9		
4:15 p.m. - 4:45 p.m.	Discussion/Summary	Review Panel	
4:45 p.m. - 5 p.m.	Public Comment	Public	
5 p.m.	Adjourn		

Friday, December 9, 2022

Time	Topic	Presenter(s)	Notes
9 a.m. - 5 p.m.	Report Writing	Review Panel	

Annex 3. Individual Independent Peer Reviewer Report Requirements

1. The independent Peer Reviewer report shall be prefaced with an Executive Summary providing a concise summary of whether they accept or reject the work that they reviewed, with an explanation of their decision (strengths, weaknesses of the analyses, etc.).

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. The independent report shall be an independent peer review, and shall not simply repeat the contents of the Peer Reviewer Summary Report.

   a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including a concise summary of whether they accept or reject the work that they reviewed, and explain their decisions (strengths, weaknesses of the analyses, etc.), 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 Peer Reviewer Summary Report that they believe might require further clarification.

   d. The report may include recommendations on how to improve future assessments.

3. The report shall include the following appendices:

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

Annex 4. Peer Reviewer Summary Report Requirements

1. The main body of the report shall consist of an introduction prepared by the Research Track Peer Review Panel chair that will include the background and a review of activities and comments on the appropriateness of the process in reaching the goals of the peer review meeting. Following the introduction, for each assessment /research topic reviewed, the report should address whether or not each Term of Reference of the Research Track Working Group was completed successfully. For each Term of Reference, the Peer Reviewer Summary Report should state why that Term of Reference was or was not completed successfully. It should also include whether they accept or reject the work that they reviewed, with an explanation of their decision (strengths, weaknesses of the analyses, etc.)

   To make this determination, the peer review panel chair and reviewers should consider whether or not the work provides a scientifically credible basis for developing fishery management advice. If the reviewers and peer review panel chair do not reach an agreement on a Term of Reference, the report should explain why. It is permissible to express majority as well as minority opinions.

   The report may include recommendations on how to improve future assessments.

2. If any existing Biological Reference Points (BRPs) or BRP proxies are considered inappropriate, include recommendations and justification for alternatives. If such alternatives cannot be identified, then indicate that the existing BRPs or BRP proxies are the best available at this time.

3. The report shall also include the bibliography of all materials provided during the peer review meeting, and relevant papers cited in the Peer Reviewer Summary Report, along with a copy of the CIE Performance Work Statement.

4. The report shall also include as a separate appendix the assessment Terms of Reference used for the peer review meeting, including any changes to the Terms of Reference or specific topics/issues directly related to the assessments and requiring Panel advice.

Appendix 3: Panel membership and attendance

Spiny Dogfish/Bluefish Research Track Peer Review Attendance
December 5-9, 2022

GARFO - Greater Atlantic Regional Fisheries Office
MADMF - Massachusetts Division of Marine Fisheries
MAFMC - Mid Atlantic Fisheries Management Council
MDNR - Maryland Department of Natural Resources
NEFMC - New England Fisheries Management Council
NEFSC - Northeast Fisheries Science Center
NCDMF - North Carolina Division of Marine Fisheries
NJFW - New Jersey Fish and Wildlife
NYSDEC - New York State Department of Environmental Conservation
RIDEM - Rhode Island Department of Environmental Management
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Yan Jiao - Chair
Joe Powers - CIE Panel
Robin Cook - CIE Panel
Paul Medley - CIE Panel

Russ Brown - NEFSC, Population Dynamics Branch Chief
Michele Traver - NEFSC, Assessment Process Lead

Abby Tyrell - NEFSC
Alan Bianchi - NCDMF
Alex Dunn - NEFSC
Alex Hansell - NEFSC
Alexei Sharov - MDNR
Andy Jones - NEFSC
Anna Mercer - NEFSC
Brandon Muffley - MAFMC staff
Brian Linton - NEFSC
Cami McCandless - NEFSC
Charles Adams - NEFSC
Charles Perretti - NEFSC
Chris Legault - NEFSC
Conor McManus - RIDEM
Cynthia Ferrio - GARFO
Dave McElroy - NEFSC
Dvora Hart - NEFSC
Eric Robillard - NEFSC
Greg DiDomenico - Lunn's Fisheries
Hannah Hart - MAFMC staff
James Fletcher - United National Fishermen's Association
Jason Didden - MAFMC staff
John Maniscalco - NYSDEC
Jose Montanez - MAFMC staff
Jui-Han Chang - NEFSC
Julie Nieland - NEFSC
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Karson Cisneros - MAFMC staff
Kathy Sosebee - NEFSC
Katie Drew - ASMFC staff
Kiersten Curti - NEFSC
Kristen Anstead - ASMFC
Larry Alade - NEFSC
Liz Brooks - NEFSC
Mark Terceiro - NEFSC
Mike Celestino - NJFW
Michelle Passerotti - NEFSC
Paul Nitschke - NEFSC
Rich McBride - NEFSC
Ricky Tabandera - NEFSC
Sam Truesdell - MADMF
Samantha Werner - NEFSC
Sarah Gaichas - NEFSC
Scott Large - NEFSC
Tim Miller - NEFSC
Toni Chute - NEFSC
Tony Wood - NEFSC