54th Northeast Regional Stock Assessment Workshop
(SAW 54)

Stock Assessment Review Committee (SARC) Meeting
5 - 9 June 2012
Northeast Fisheries Science Center
Wood's Hole, Mass

SARC 54 PANEL SUMMARY REPORT

27 June 2012

Review Panel
R. O'Boyle (chair)
C. Francis
N. Hall
N. Klaer

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INTRODUCTION

Background

The Stock Assessment Review Committee (SARC) of the 54th Stock Assessment Workshop (SAW 54) met at the Northeast Fisheries Science Center (NEFSC), Woods Hole, MA during 5th – 9th June 2012 to review Northeast regional benchmark stock assessments of Atlantic Herring *(Clupea harengus)* and Southern New England / Mid-Atlantic Bight Yellowtail Flounder (*Limanda ferruginea*), guided by the SAW 54 Terms of Reference (Annex 2 of the SAW 54 Statement of Work provided below).

The SARC review panel (herein called the "Panel") consisted of R. O'Boyle (Beta Scientific Consulting, Canada) and three scientists affiliated with the Center of Independent Experts: C. Francis, N. Hall and N. Klaer. R. O'Boyle is also a member of the New England Fisheries Management Council's Scientific and Statistical Committee (SSC).

The SARC was assisted by the NEFSC SAW Chairman, J. Weinberg, A. O'Brien, and P. Rago (NEFSC). Documentation for the herring assessment was prepared by the NEFSC Herring Working Group (HWG), and the presentations at the meeting were made by J. Deroba (NEFSC). Documentation for the yellowtail assessment was prepared by the NEFSC Southern Demersal Working Group (SDWG), and the presentation at the meeting was made by L. Alade (NEFSC).

The rapporteurs who recorded the discussion to assist the Panel in its deliberations were T. Chute (herring) and J. Blaylock (yellowtail).

Review of Activities

The Northeast Regional Stock Assessment Workshop (SAW) is a process consisting of three phases:

1. preparation of stock assessments by SAW Working Groups and/or by ASMFC Technical Committees / Assessment Committees
2. SARC peer review of assessments by a panel of external experts who judge the adequacy of the assessments as a basis of scientific advice to managers
3. presentation of the results and reports to the Northeast Region's fishery management bodies

Regarding the first phase of the SAW process, the previous herring assessment was conducted during 8 – 11 June 2009 by the Transboundary Resource Assessment Committee (TRAC), which in turn used the model formulation developed at a 2006 TRAC benchmark review. To prepare the herring assessment, the HWG held a data review meeting (30 Jan – 3 Feb 2012) and a models meeting (9 – 13 April 2012). The previous SNE/MAB yellowtail assessment benchmark was conducted during the November 2007 – August 2008 GARM III review. To prepare the yellowtail assessment, the SDWG held an industry meeting (27 February 2012), a data review meeting (2 – 4 April 2012) and a models meeting (30 April – 4 May 2012).

Regarding the second phase of the SAW process, in May 2012, the NEFSC provided the Panel with background documentation on each species. The first assessment reports from the working groups were made available to the Panel on 18 May 2012 with a complete set of working papers available soon thereafter (see bibliography below).

The SARC was convened during 5th – 9th June 2012, the agenda of which is summarized in Table 1 (see full agenda in annex 3 of the SAW Statement of Work below).

Table 1. Summary of SARC/SAW 54 Agenda during 5th – 9th June 2012

<table>
<tr><th></th><th>5th June
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<tr><td>Summary Report Review</td><td>Panel Report Discussion (closed meeting)</td></tr>
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The Panel devoted Friday afternoon and Saturday morning to developing consensus points for each stocks' Terms of Reference as well as observations on the SARC process. It was agreed that each panelist would use these points to draft a section of this report, which would then be compiled and edited by the SARC chair. The report was distributed to the Panel for final review before being submitted to the NEFSC.

SARC Process

The Panel reached consensus on all Terms of Reference for each stock. It acknowledges the significant work that the two assessment working groups had undertaken to prepare for the SARC review. It also appreciates the professionalism and cooperation of NEFSC staff at the SARC meeting which significantly assisted the peer review. Notwithstanding this, during the course of the review, issues came the attention of the Panel which were not specific to the assessment of either species, resolution of which would assist future SARC reviews. These relate to both the terms of reference of reviews and the presentation of assessment results.

The terms of reference of the herring and yellowtail assessments required a review of their stock definitions. These were conducted during the data meetings of each species, the results of which were brought forward to the assessment meeting. Changes in stock definition have consequences throughout the management system and should not be undertaken without significant consideration of all sources of information. One could expect that there would be considerable reluctance to change stock definition without substantial evidence to the contrary. The Panel considers that reviews of stock definition would more productively be undertaken outside of the normal assessment process and on a schedule which would allow significant changes if these were felt warranted. The review of stock definition needs to highlight the uncertainties in the interactions amongst

populations that might influence the interpretation of data during an assessment. This review also needs to determine the catch and indices appropriate for the stock(s) in question.

The term of reference for each stock included review of the data (e.g. catch, indices) to be used in the assessments. Consideration should be given to formally separating the data review from that of the assessment, similar to the SEDAR process conducted by the NMFS Southeast Fisheries Science Center. This would allow the peer review of the assessment to fully devote its attention to determination of stock status, reference points and projections. The data reviews could be undertaken on groups of species (e.g. groundfish, pelagics) to obtain data perspectives across stocks. These reviews would indicate the relative reliability of various datasets (e.g. survey indices) and clearly specify which data and their uncertainties should be brought forward to the assessment review.

While it was evident that the HWG and SDWG had spent considerable time preparing the documents and presentations for the SARC 54, there was unevenness in the relative content of each. In one stock, information was summarized in the working papers that were not summarized in the presentations at the SARC review while in the other stock, the reverse was the case. Greater detail was sometimes available in the presentation than was in the working papers. It would assist future peer reviews if the evidence supporting the conclusions of a working group were both presented in the assessment report and the presentation such that panel reviewers may assess whether or not the conclusions are justified.

On some of the figures describing current stock status, both the posterior distribution of the relevant indicator (e.g. spawning stock biomass), as determined through an MCMC process, and point estimates were displayed. Where MCMC was used to provide distributions of current stock status, these should be used to provide metrics and their uncertainty required by the management system. In this case, coefficients of variations based on the Hessian matrix are not required to be reported.

In both assessments, historical trends in spawning stock biomass and fishing mortality were illustrated along with current estimates of the biological reference points (BRPs). However, as highlighted by both assessments, temporal changes in population processes can dramatically change the BRPs. Changes in growth and fishery selectivity can also change the BRPs. There are a number of ways temporal changes in BRPs can be displayed (annually, smoothed over a number of years, by decade, etc). It would be useful for the NEFSC to develop a policy for the estimation and presentation of temporal changes in BRPs to both avoid future confusion and promote transparent communication with stakeholders and managers on long-term productivity and fisheries changes.

ATLANTIC HERRING

Synopsis of Panel Review

The Panel reached consensus on all terms of reference for this stock.

There was a rigorous analysis and review of all datasets considered for the assessment model with good justification given for the inclusion or exclusion of each. One of the datasets, that of the acoustic survey, received special attention and based on issues such as coverage, was not used in the assessment. The Panel had concerns that it was not possible to include uncertainty in some of the survey calibration coefficients (e.g. Bigelow to Albatross) in the assessment model. As well, the magnitude of the NMFS survey catchability increase due to the trawl door change in 1985 was very different for the spring and fall surveys, which requires further examination.

The Panel accepted the new ASAP base case assessment model as the most plausible to inform management decisions. The new model employed a new age and time-specific natural mortality (M), but the Panel, while accepting the increase in the long-term average M from 0.2 to 0.3, considered that the application of an age and time-specific pattern based on Lorenzen (1996) went beyond the data and was unnecessary. The key feature of this new assessment model is the 50% increase in natural mortality over the long-term average (0.3) since 1996, which is consistent with data on herring predation and largely resolves the retrospective pattern which has been a prominent feature of previous assessments. The Panel highlights the significant work undertaken by the HWG to document long-term trends in herring consumption by predators which allowed consideration of the increased M hypothesis. The biological reference points were derived assuming that the 50% increase in M due to herring consumption will continue over the next 3 – 5 years. Monitoring is required to determine whether or not this increase will continue over the longer term and if the reference points will continue to be appropriate.

Another source of uncertainty in the stock projections is the size of the 2008 year-class, which has been assessed as being almost twice as large as the next largest (1994). This year-class is prominent in the recent stock biomass increase and will be a significant component of projected yield over the immediate future. It will be important to monitor the size of this year-class to confirm its strength. Notwithstanding the uncertainties, the Panel concurred with the HWG that the stock is not overfished and that overfishing is not occurring.

The Panel considered that the response of the management system to uncertainties caused by high recent M and other processes is most appropriately examined using Management Strategy Evaluation. Some work on aspects of this has been undertaken; the Panel strongly encourages its further pursuit.

Evaluation of Terms of Reference

1. *Estimate catch from all sources including landings and discards. Describe the spatial distribution of fishing effort. Characterize uncertainty in these sources of data.*

The Panel concluded that this term of reference had been successfully completed.

The spatial distribution of fishery landings by month from 2006 to 2011 was described in detail. US catch data from fixed and mobile fishing gears and catch data from the New Brunswick weir fishery were collated to produce time series of catch data from the mobile and fixed gear fleets for the Gulf of Maine/Georges Bank Atlantic herring stock complex. Given the decision on stock boundary, the HWG has done a good job in compiling catch landings and discards within the stock boundary separated into fixed and mobile gear types.

Length and age sampling was extensive except for US fixed gear in more recent years. There were major differences in length frequencies shown by gear type, but not for the same gear in different areas, so the data were not compiled by individual areas. There was clear evidence of strong and weak year classes in the composition data, giving some indication of good data quality.

Recent observer coverage has been in the order of 30% overall, 100% in closed area 1 and 80% on Georges Bank. The coverage rate 10 years ago was 5-15%. Discards are less than 1% of landings, and observer coverage is adequate to give confidence in that figure.

Some account of uncertainty in catch was made for each fleet through the CV on total landed catch, and tuning of the effective sample size on proportions at age. However, greater uncertainty of catches from the stock may be due to the decision on placement of the stock boundary. In particular, the influence of catches in the Scotian Shelf region on the stock is unknown. It would be possible to develop alternative catch series that take some account of the uncertainty in the stock boundary. Such alternatives were not developed, so the current assessment does not fully consider uncertainty in catch, discards, or the spatial distribution of the fishery.

2. *Present the survey data being used in the assessment (e.g., regional indices of abundance, recruitment, state surveys, larval surveys, age-length data, predator consumption rates, etc.). Investigate the utility of commercial LPUE as a measure of relative abundance, and characterize the uncertainty and any bias in these sources of data.*

The Panel concluded that this term of reference has been successfully completed.

Abundance indices of Atlantic herring derived from the NMFS spring, fall, winter, and summer shrimp surveys, a larval index derived from NMFS ichthyoplankton surveys, and abundance indices derived from the Massachusetts Division of Marine Fisheries and the joint Maine/New Hampshire bottom trawl surveys were presented and the utility of each index was examined. The Panel noted that indices from the winter survey were not employed in the assessment because of inconsistent spatial coverage and lack of fit. The larval index was not used because the relationship between the index and spawning stock biomass was confounded by predation of herring eggs and the relationship of the larval index to recruitment of age-1 recruits was unclear. The MA DMF and ME/NH were not used due to poor coverage of the stock. The Panel endorsed the decision to use the NMFS spring, fall, and shrimp bottom trawl surveys, and not use the winter, larval, and state-run surveys.

The use of commercial LPUE as an index of abundance was discounted because of the effect of fishing regulations on locations fished, hyperstability arising from use of

sonar to track schools of fish, and the difficulty of identifying "herring trips" because of target switching within trips. The Panel agreed that LPUE would not provide a useful index of abundance.

The Panel strongly endorsed the decision to stop applying commercial age-length keys to estimate age compositions from survey length composition data.

The Panel noted that the consistency of surveys had been affected by changes to nets (e.g., use of Yankee 41 for spring surveys between 1973 and 1981 rather than standard Yankee 36 net), trawl gear (e.g., change of trawl door in 1985), and survey vessels (e.g., use of FRV Delaware II rather than FRV Albatross IV for spring surveys in 1973, 1979-1982, 1989-1991, 1994, and 2003 and fall surveys in 1977-1978, 1980-1981, 1989-1991, and 1993, and change from FRV Albatross IV to FSV Henry B. Bigelow in 2009), and that uncertainty is present in the estimates of the calibration factors used to standardize survey data to FRV Albatross IV equivalent data. The value of the spring and fall surveys is reduced by the substantial uncertainties in their calibration. The Panel observed that the length-specific Bigelow-Albatross calibration for the fall survey seems unnecessarily and implausibly complex, but recognized that this is inconsequential and would be likely to have only a negligible effect on the results of the assessment. The Panel was concerned that, because of the paucity of data for Atlantic herring in paired-tow experiments, a calibration factor could not be determined to convert survey data collected using the Yankee 41 net to Yankee 36 equivalent values.

The Panel concluded that, overall, the survey indices selected for use in the model were adequate for the current assessment.

3. *Evaluate the utility of the NEFSC fall acoustic survey to the stock assessment of herring. Consider degree of spatial and temporal overlap between the survey and the stock. Compare acoustic survey results with measures derived from bottom trawl surveys.*

The Panel concluded that this term of reference had been successfully completed.

The Panel concurred with the decision not to use the NEFSC fall acoustic survey index. The marked decline in the values of the acoustic index following the first three years of the survey was inconsistent with the trends exhibited by the other indices, and the model could not explain the drop. Various hypotheses were proposed as to why the decline in the values of the index might be an artifact rather than a reflection of the true trend in abundance, e.g., difference in fish behavior and vertical distribution during the time of the acoustic survey. Back-calculated estimates of spawning time derived from data collected in the larval study provided little support for the hypothesis that the decline was due to differences in the relationship of spawning time with the time at which the survey was undertaken.

The temporal and spatial extent of survey was considered in relation to the distribution of Atlantic herring. The survey was seen to cover a limited spatial area that was not representative of the entire stock.

4. *Evaluate the validity of the current stock definition, and determine whether it should be changed. Take into account what is known about migration among stock areas.*

The Panel concluded that this term of reference had been successfully completed.

There are at least three major sub-stocks of herring within the defined boundaries of the management region encompassing the Gulf of Maine / Georges Bank stock complex with known mixing at the northern and southern boundaries. Given the requirement for an assessment of the stock, one major sub-stock confined within the Gulf of Maine/Georges Bank region and uncertainty in the level of mixing of the other two sub-stocks, the Panel agrees with the HWG decision to maintain the current stock definition for management purposes.

Although the HWG has stated that separation of catches and catch composition information by sub-stocks is not possible at present, the Panel believes that such data separation is one of the major barriers to improving the stock assessment, and agrees with the HWG that future research should be directed towards data separation by sub-stock. For example, movement rates from tagging studies may be used to create generalized sub-stock mixing rates which could then be used in a multi-substock assessment, or used directly to separate assessment input data by sub-stock.

Sub-stock mixing at the southern and particularly northern stock boundaries introduces one of the major uncertainties into the stock assessment. Scenarios should be developed that account for this uncertainty that can be carried through to the stock assessment. One such approach is to develop alternative catch scenarios as discussed under term of reference 1.

5. *Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series (integrating results from TOR-6), and estimate their uncertainty. Include a historical retrospective analysis to allow a comparison with previous assessment results and previous projections.*

The Panel concluded that this term of reference was successfully completed.

It accepted the base case assessment model as the most plausible model to inform management decisions. The key features of the base case model are a long-term average natural mortality (M) over age of 0.3 and a 50% increase in this M since 1996. It is rare that such an hypothesis of increased M is used in stock assessments but the temporal trend in predator consumption of herring and the positive effect on retrospective patterns justifies its use.

The assessment model underwent many significant changes since the 2009 assessment (TRAC, 2009). The continued use of the ASAP forward-projecting statistical catch at age model is supported by the Panel. The key innovation in the current formulation is the change to M, which is undertaken in two components. The first is age and time-specific and is related to life history and is applied to the assessment's time series (1965-2011). The second is associated with the consumption of herring by predators (see term of reference 6) and is additional to the long-term M during 1996 – 2011.

The long-term average M was estimated (0.3) by the method of Hoenig (1983) modified by an age and time-specific pattern estimated from weight at age by the method of Lorenzen (1996). The Panel noted that the latter method was intended to describe broad trends in ecosystems between species body weight and natural mortality and is ill-suited to the current task. It noted that the HWG had conducted assessment model runs,

which had indicated that use of an age and time specific pattern in M provided similar results as using a fixed M based on Hoenig (1986) alone. The Panel considers that use of an age and time-specific pattern in M goes beyond the resolution of the data and is inconsequential to the assessment.

The use of a post-1995 increased M is consistent with the herring predation data and largely resolves the retrospective pattern that has been a prominent feature of previous assessments. During the review, the change in model likelihood, Mohn's Rho and average (GM) 1996 – 2010 consumption was estimated for a range of percent increases in post-1995 M. This indicated that the 50% increase used in the base model was appropriate and plausible.

The Panel noted that a profile of likelihoods over the steepness of the Beverton and Holt (BH) stock – recruitment relationship indicated the low precision in this parameter, with a 95% confidence interval ranging from less than 0.35 to 0.85. The model indicates a recent increase in stock biomass, largely driven by the large 2008 year-class, estimated to be almost twice as large as the next largest (1994) year-class. During the review, an exploratory run was undertaken with the CV on the recruitment deviations about the BH relationship set to that produced by the base model. While the size of the 2008 year-class was reduced somewhat, it still remained by far the strongest in the assessment time series.

The Panel considers that the uncertainties in the assessment were well characterized by the MCMC analyses and runs of alternate formulations. There are, however, some issues that require future attention. It was unfortunate that it was not possible to include uncertainties in the survey calibrations (e.g. Bigelow to Albatross) in the assessment. There was also a concern on the extent of the NMFS spring and fall survey catchability (q) increase (2.64 for spring and 13.6 for fall) due to a trawl door change in 1985. It is difficult to understand why the q change would be so different between spring and fall and the mechanism that would cause this.

6. *Consider the implications of consumption of herring, at various life stages, for use in estimating herring natural mortality rate (M) and to inform the herring stock-recruitment relationship. Characterize the uncertainty of the consumption estimates. If possible integrate the results into the stock assessment.*

The Panel concluded that this term of reference had been, for the most part, successfully completed. Uncertainty of the consumption estimates for fish and highly migratory species (HMS) predation was not discussed in the assessment report.

Estimates of consumption of Atlantic herring were used to inform the decision to increase post-1995 natural mortality in the base assessment model. The Panel noted that, although it is unusual to consider annual consumption as a mechanism for adjustment of natural mortality in a stock assessment, it was justified in this case because of the wealth of available annual information from stomach contents for a wide range of herring predators (fish, mammals, other), and annual abundance estimates of those predators.

The information on annual consumption of Atlantic herring was obtained from a comprehensive examination of predator and associated consumption data. The predators comprised 13 fish species, which accounted for 97% of all occurrences of herring in gut contents, two highly migratory species, which are the primary large pelagic predators of

herring in the region, marine mammals, and sea birds. The total annual herring consumption by each predator was estimated from a combination of data on consumption per predator, diet composition, and predator abundance. Examination of the resulting consumption estimates indicated that most of the signal in the annual consumption of herring was derived from stomach contents rather than predator abundance. However, although uncertainty was mentioned in the sections of the assessment report relating to predation by marine mammals and sea birds, the uncertainty of the consumption estimates for fish and HMS predation was not discussed.

Despite high uncertainty in the resulting estimates of annual herring consumption, the data provided good evidence that consumption of herring had increased since 1996. The Panel noted, however, that (1) the later peak in the time series of annual consumption estimates was driven by the very high abundances of two individual predator species, but similar high levels of abundance for those species were not present in adjacent years; (2) abundance estimates of some predator species were calculated from swept area calculations, rather than assessment models; (3) the consumption estimates used in this assessment were likely to be underestimates of total consumption; and (4) estimates of consumption were included in an exploratory run of the assessment model but did not improve model fit.

Based on the advice that was presented during the review meeting, the Panel agreed that herring consumption was likely to remain high in the immediate future given the trends in the abundance of predator populations.

7. *State the existing stock status definitions for "overfished" and "overfishing". Then update or redefine biological reference points (BRPs; point estimates or proxies for BMSY, BTHRESHOLD, FMSY and MSY) and provide estimates of their uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for BRPs. Comment on the scientific adequacy of existing BRPs and the "new" (i.e., updated, redefined, or alternative) BRPs.*

The Panel concluded that this term of reference had been successfully completed.

The Panel endorsed the redefinition of the biological reference points to those derived using the base model from this assessment.

The Panel noted that the updated value that defines the overfished level of spawning stock biomass (SSB) is considerably less than the existing value of this reference point. This is due to the fact that existing biological reference points had been derived using an age-aggregated rather than age-structured model, and had been based on an analysis of catch data aggregated over gear types rather than an analysis that employed catches by mobile or fixed gear. The updated reference points were analytically derived using the parameters of a BH stock-recruitment relationship fitted internally in the base assessment model.

The sensitivity of the BRPs to uncertainty associated with age-specific M, various levels of percentage increase in M since 1995, and steepness of the BH stock-recruitment relationship were examined by the Panel. The Panel concluded that the BRPs calculated using the base model, i.e., with a base level of M = 0.3 and a post-1995 increase in M of 50% due to consumption by predators, were appropriate for the immediate future (3 to 5 years). The Panel recommended, however, that monitoring of predation be continued due

to large uncertainty in the assumption that consumption of Atlantic herring by predators would remain at current levels in the longer-term.

8. *Evaluate stock status with respect to the existing model (from previous peer reviewed accepted assessment) and with respect to a new model, should one be developed for this peer review. In both cases, evaluate whether the stock is rebuilt (if in a rebuilding plan).*
    - *When working with the existing model, update it with new data and evaluate stock status (overfished and overfishing) with respect to the existing BRP estimates.*
    - *Then use the newly proposed model and evaluate stock status with respect to "new" BRPs and their estimates (from TOR-7).*

The Panel concluded that this term of reference was successfully completed.

It concurs with the HWG's conclusion that, while there is uncertainty in the reference points, the stock is not overfished and that overfishing is not occurring.

Current status was determined using the previous model assumptions as not overfished and overfishing was not occurring.

Status was determined using the new model and updated data under a range of M (both age and time – specific and post-1995) and BH steepness options and, except for the unlikely case where steepness was assumed to be 0.35, the current status was estimated to be not overfished and overfishing was not occurring. It was reassuring that, although resulting biological reference points varied greatly in response to the changes in steepness, conclusions regarding current stock status remained unchanged from that of the base model except in the (rather unlikely) case of a steepness of 0.35, where overfishing (but not overfished) was indicated.

9. *Using simulation/estimation methods, evaluate consequences of alternative harvest policies in light of uncertainties in model formulation, presence of retrospective patterns, and incomplete information on magnitude and variability in M*

The Panel concluded that this term of reference was not completed, but that some initial work was underway.

The task described in this term of reference is very substantial, and probably more than can be accomplished within the timeframe of a stock assessment. Further, it is a task that cannot be usefully completed by scientists alone. It requires close engagement and extensive consultation with both managers and stakeholders in order to elicit the quantifiable management objectives and performance measures that would provide the framework for the simulation study. Such consultation would establish what sort of harvest policies could be acceptable to managers and stakeholders, and some of the criteria by which they should be evaluated. Then, these policies must be structured as formal harvest control rules so as to be incorporated in a simulation study. The assessment report briefly mentions several research projects which relate to this term of reference, but these all focus on assessment problems (e.g., retrospective patterns and mis-specification of natural mortality) rather than alternative harvest policies that might be robust to them.

The Panel considers that the study described in this term of reference could be of great help in the management of Atlantic herring, particularly considering the uncertainty about how long the current high level of herring consumption may persist.

10. Develop approaches and apply them to conduct stock projections and to compute the pdf (probability density function) of the OFL (overfishing level) and candidate ABCs (Acceptable Biological Catch; see Appendix to the SAW TORs).

- *Provide numerical annual projections (3 years). Each projection should estimate and report annual probabilities of exceeding threshold BRPs for F, and probabilities of falling below threshold BRPs for biomass. Use a sensitivity analysis approach in which a range of assumptions about the most important uncertainties in the assessment are considered (e.g., terminal year abundance, variability in recruitment).*
- *Comment on which projections seem most realistic. Consider the major uncertainties in the assessment as well as sensitivity of the projections to various assumptions.*
- *Describe this stock's vulnerability (see "Appendix to the SAW TORs") to becoming overfished, and how this could affect the choice of ABC.*

The Panel concluded that this term of reference was successfully completed.

The projection methods were sound, and were applied to a wide range of scenarios that successfully spanned the plausible range of uncertainty. Key sources of this stock's vulnerability to becoming overfished (e.g., contributions from other herring stocks, and uncertainty about the strength of the 2008 year class and the persistence of high natural mortality) were identified and well described.

11. For any research recommendations listed in recent peer reviewed assessment and review panel reports, review, evaluate and report on the status of those research recommendations. Identify new research recommendation

The Panel concluded that this term of reference had been successfully completed.

There were no research recommendations from previous assessments.

The HWG compiled a new list of recommendations as part of the most recent assessment. Those recommendations can be assigned to groupings: (1) improve incorporation of sub-stocks in the assessment (a,b,c); (2) improve diet composition information (d,j,k,l,m); (3) examine novel data collection procedures or indices (e,i,n); and (4) examine improved assessments methods (g,h,o). In terms of priority, the herring assessment has the most scope for improvement through additional support for the M adjustment (group 2) and to better account for sub-stock structure (group 1).

The Panel suggests that recommendation f could be modified to "Determine the depth distribution of Atlantic herring and the factors that influence that distribution", and that recommendation g should be made more specific.

In addition, the Panel recommends:

- Alternative catch scenarios be developed to account for uncertainty in the stock boundary, particularly including catches from the Scotian Shelf. This would also

allow examination of whether catch underestimation (e.g. inclusion of Scotian shelf catch) can contribute to the reduction in the retrospective pattern and contribute to or explain the need for increased M.

- Look at the effect of adding a penalty to encourage the NMFS survey trawl door-change q ratios to be similar in spring and fall.

- Using simulation/estimation methods, evaluate consequences of alternative harvest policies in light of uncertainties in model formulation, presence of retrospective patterns, and incomplete information on magnitude and variability in M (see term of reference 9).

YELLOWTAIL FLOUNDER

Synopsis of Panel Review

The Panel reached consensus on all terms of reference for this stock.

There was a significant revision of most of the assessment's data sets. The numbers at age in landings were revised upward by an average of 11% while the discards were re-estimated using a spatial and temporal stratification of the observer information. As well, discard mortality was estimated as 90% based on a new (RAMP) method and allowing for post-release mortality. There was good justification provided for inclusion or exclusion of the various data sources. The Panel, however, had concerns that it was not possible to include uncertainty in some of the survey calibration coefficients (e.g. trawl door change in 1985) in the assessment model.

The Panel accepted the new ASAP base case assessment model as a good basis for management decisions. Adoption of ASAP over the previous VPA will allow greater flexibility to explore different assessment formulations. The Panel compliments the SDWG for its bridging analyses between the previous VPA and current ASAP model.

The new model employed a new age-specific, time invariant natural mortality (M), but the Panel, while accepting the increase in long-term average M from 0.2 to 0.3, considered that the application of an age-specific pattern based on Lorenzen (1996) went beyond the data and was unnecessary.

The key result of the new assessment was a marked decline in recruitment since 1990. Two stock – recruitment scenarios were developed to account for this. The two-stanza scenario assumed that recruitment is a function of spawning stock biomass (SSB) and that below about 4300t SSB, average recruitment is very low. The recent recruitment scenario assumed that since 1990, the strength of incoming year-classes has been weak due to non-SSB related processes. The Panel compliments the SDWG for undertaking a number of analyses which attempted to explain the reduction in stock productivity by oceanographic processes, particularly the cold pool. None of these could convincingly explain the sudden drop in recruitment since 1990 although evidence of broader ecosystem changes, which may be related to yellowtail productivity, was suggestive. Neither scenario could be ruled out. However, based on the weight of evidence presented during the review, the Panel considered a reduction in yellowtail productivity since 1990 (recent recruitment scenario) the more likely of the two scenarios.

Overall, the fishing mortality (F_{MSY}) reference point is relatively certain, and the Panel considers that overfishing is likely not occurring. However, the reference points associated with biomass (B_{MSY}) are more uncertain due to the productivity change issue. This implies considerable uncertainty as to whether or not the stock is overfished. Under the two-stanza scenario, the stock is overfished while under the recent recruitment scenario, it is not overfished. While the Panel considers that the recent recruitment scenario is more likely than not, the potential consequences of the uncertainty in current status and the reference points needs to be considered in management decisions.

Evaluation of Terms of Reference

1. *Estimate landings and discards by gear type and where possible by fleet, from all sources. Describe the spatial distribution of fishing effort. Characterize uncertainty in these sources of data.*

The Panel concluded that this term of reference had been successfully completed.

A significant revision of data and assumptions was completed by the SDWG including spatial stratification for discard rates, and revision of length-weight parameters and discard mortality rates.

A time series of total catches (landings + dead discards) of yellowtail flounder from the southern New England /Mid-Atlantic Bight (SNEMA) stock between 1973 and 2011 was constructed. During this period, the total catch has dropped from 22,000 mt to 290 mt.

Landings between 1994 and 2011 by commercial fishers employing trawl (catching 88 to 99% of the total), scallop dredge, gillnet, and other/unknown fishing gear and fishing in the area over which the stock is distributed were collated and reported. Catch at age for 1994 to 2011 was calculated using the revised length-weight relationship which produced an average 11% increase in landed numbers at age since the last assessment (NEFSC, 2008).

Since 2005, partly in response to restrictive trip limits, discards have increased to 50-60% from the 20-30% historical level. Most of the yellowtail flounder discards originated from the scallop fleet.

The total number of observed trips for trawls and scallop dredge ranged from a low of 23 trips in 1994 to a current high of 787 trips. Observer coverage of commercial trips is currently about 30%.

Discard mortality estimated using the RAMP method was 80-85%. To allow for additional post-release mortality of discarded fish, the discard mortality used in the assessment was 90%. Between 1994 and 2011, the CVs of estimated discards ranged from 14 to 75%.

The Panel agreed with the procedure used by the SDWG to produce best annual estimates of total landings and discards for the stock.

Total catch estimation errors are due to apportionment of landings by stock and species, misreporting on VTRs, discard estimates by gear and area and also the discard mortality rate (although 90% is already high). Such uncertainty in total catch can be accounted for by the construction of alternative catch histories that vary these assumptions. The Panel recommends that alternative plausible catch histories be developed so that this source of uncertainty can be carried into future stock assessments.

The Panel also recommends that a summary table of available age, length and weight samples by year should be prepared as part of the assessment documentation.

2. *Present the survey data being used in the assessment (e.g., regional indices of abundance, recruitment, state surveys, age-length data, etc.). Investigate the utility of commercial or recreational LPUE as a measure of relative abundance, and characterize the uncertainty and any bias in these sources of data.*

The Panel concluded that this term of reference had been successfully completed.

The Panel found that the treatment of surveys was adequate. The NMFS spring, fall, winter and larval surveys were considered by the SDWG for use in the assessment. The Panel endorsed the use of the NMFS spring, fall, and winter surveys, and the larval survey, and, because of poor sampling, the exclusion of the southern strata when calculating abundance indices for the winter survey. It was noted that the net type used for larval surveys changed following the MARMAP (1977-1987) survey. It was also noted that the NMFS spring and fall survey data had been adjusted to FRV Albatross IV equivalent values to account for changes in net type (Yankee 36/41), change in trawl doors, and change of survey vessel from the FRV Albatross IV to the FSV Henry B. Bigelow since 2009. The calibration factors used for some of the adjustments (i.e. trawl door) were determined in analyses conducted outside the model, which used experimental data that were not input to the model. Uncertainty in these calibration factors was not carried through into the stock assessment (see term of reference 9 for approach).

The substantial day/night differences in survey catch rates were not corrected for. The Panel found little support for the conclusion by the SDWG that estimates of abundance for bottom trawl survey tows undertaken during the day were similar to those taken during the night and that an aggregated index could be used. The fact that the abundance estimates for evening tows consistently exceeded those for daylight tows indicates that improved precision could be obtained by taking the time of day, i.e., day or night, into account (see term of reference 9 for approach).

The Panel acknowledged that commercial LPUE was unlikely to provide a useful index of abundance due to changes in management regulations, changes in reporting methodology, and the change from a directed to a bycatch fishery.

The Panel noted that the value of the spring and fall surveys was reduced by the substantial uncertainties in their calibration to account for changes in net type, trawl gear and survey vessel.

3. *Evaluate the validity of the current stock definition, and determine whether it should be changed. Take into account what is known about migration among stock areas.*

The Panel concluded that this term of reference had been successfully completed.

Fishing patterns, survey resource distributions, spawning and icthyoplankton distribution, genetics and spatial differences in growth rate combine to make a strong case for the SNEMA region being a single stock for management purposes. The Panel endorsed the SDWG conclusion that the SNEMA stock can be treated as a single unit for the purposes of management and assessment.

There is some tagging evidence for interchange of the SNEMA stock with fish further north. An early larval study (Yveseyenko and Nevinskiy 1981) suggested that there may be some larval leakage from Georges Bank to SNE. This uncertainty could be used in construction of alternative catch histories (see term of reference 1), or possibly alternative stock-recruitment relationships (e.g. larval leakage could suggest a stock-recruitment relationship that does not pass through the origin).

4. *Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series (integrating results from TOR-5), and estimate*

their uncertainty. Include a historical retrospective analysis to allow a comparison with previous assessment results and previous projections.

The Panel concluded that this term of reference was successfully completed.

The Panel considered the base case (run 26) as an adequate basis for management decisions. There were a number of significant improvements since the last (NEFSC 2008) assessment.

Regarding the data, an assessment time series (1973 – 2011) average was used to estimate maturity at age, which was important for the determination of annual spawning stock biomass. The annual average age natural mortality (M) was estimated (0.3) based on a consensus of a number of methods. The age – specific pattern of this M was based on Lorenzen (1996). The Panel considered that use of the Lorenzen method to compute an age – specific pattern in M goes beyond the data and is both unconvincing and likely unnecessary. The decision to use a Lorenzen curve to introduce a declining trend in M with age should be tested against the alternative hypothesis that M is age independent.

Regarding the assessment model, the bridging analyses with the VPA of NMFS (2008) was very informative and well done. The Panel concurred with the SDWG's decision to adopt the forward projecting statistical catch at age ASAP model as it allows greater flexibility in assessment uncertainties. However, there are concerns that the data weightings (e.g. doubling larval CVs, adding 0.1 to survey CVs) appear ad hoc. Improved description and justification of these weightings is required. Recognizing the changes to fisheries regulations that have taken place, but noting that an iterative process comparing model fit and residuals from a number of alternative runs was employed, the decision to use six fishery selectivity blocks in the base case that broadly matched the periods over which the various regulations applied was reasonable.

The Panel was reassured that the trends in spawning stock biomass and fishing mortality are comparable with those of previous assessments.

The major uncertainties in the assessment were well characterised by the MCMC analyses and alternate model runs. The retrospective pattern is improved over that of NEFSC (2008). There are some issues, however, that require future attention. It was not possible to incorporate the uncertainties in some of the survey calibrations (e.g. trawl door change in 1985) in the assessment. As well, the Panel considered that the effect of uncertainty in catch history (particularly discards) was not explored. Further, the uncertainty of assessment model outputs with respect to the choice of the M to which the age-specific pattern (i.e. Lorenzen curve) was applied needs to be carried through into the assessment.

5. *Investigate causes of annual recruitment variability, particularly the effect of temperature. If possible, integrate the results into the stock assessment (TOR-4).*

The Panel concluded that this term of reference was successfully completed.

Since yellowtail is at the southern edge of its distributional range, its recruitment may well be sensitive to oceanographic conditions. After considering a range of environmental variables, the SDWG focused on the most promising one, which indexes variation in the cold water pool. This is a summertime feature of Southern New England and Mid-Atlantic Bight shelf water whose variation has been linked to recruitment of

several cold-temperate fish species. The cold water pool did seem to show correlation with variation in yellowtail recruitment, but it did not explain the dominant feature in this variation: the step-like decline that occurred around 1990. Thus, although it was successfully incorporated in one run of the assessment model, it was not used in the base run, with which the Panel concurs.

Overall, while the Panel was made aware of a number of sources of information, which document oceanographic changes and which could influence yellowtail productivity, an explanation for the sudden and sustained drop in recruitment since 1990 has not yet been found.

6. *State the existing stock status definitions for "overfished" and "overfishing". Then update or redefine biological reference points (BRPs; point estimates or proxies for BMSY, BTHRESHOLD, FMSY and MSY) and provide estimates of their uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for BRPs. Comment on the scientific adequacy of existing BRPs and the "new" (i.e., updated, redefined, or alternative) BRPs.*

The Panel concluded that this term of reference was successfully completed.

In calculating BRPs, the SDWG considered two alternative scenarios to explain the step-like drop in yellowtail recruitment that occurred about 1990:

- the 'two-stanza' scenario, which links the drop to a decrease in SSB, positing that expected recruitment falls when SSB is less than about 4300 t
- the 'recent' scenario, in which the drop was deemed to be unrelated to SSB, but was a productivity shift caused by unknown environmental changes.

Since neither scenario could be ruled out by the available evidence, the Panel endorsed the SDWG's decision to present BRPs (based on the $F_{40\%}$ proxy) for both. Values of MSY and B_{MSY} for the two scenarios were quite different, but $F_{40\%}$ was the same for both.

The Panel advocated that a weight of evidence approach be used to decide whether a species has undergone a productivity shift. It considered the following criteria:

- A long period of observed above or below average recruitment;
- A long period of above or below average recruitment residuals should be observed that cannot be corrected by simple re-specification of the stock-recruitment relationship;
- Error in estimated model inputs such as total catch, abundance indices or catch age/size composition can be ruled out as a cause; and
- A plausible mechanism has been found that is based on environmental or ecological conditions.

After discussion of these criteria, the Panel concluded that the evidence was 60:40 in favour of the 'recent' scenario. It noted that this weight of evidence approach would be valuable in future such situations in which consideration is being given to significant

departure from conventional hypotheses. It is important that assessment teams clearly articulate the competing hypotheses and the supporting evidence for each. This will greatly aid future panels in their review.

The Panel emphasizes that, whereas the biomass RPs are uncertain (with those based on the recent reduced recruitment scenario more likely than not), the fishing mortality RPs (e.g. F_{MSY}) are relatively certain.

The Panel noted that the values of MSY and B_{MSY} calculated under the two-stanza scenario were surprisingly different from those calculated (during the review meeting) using a modeling approach (with a BH stock-recruit relationship) that is more conventional in other fora. This difference needs further investigation (see term of reference 9).

7. *Evaluate stock status with respect to the existing model (from previous peer reviewed accepted assessment) and with respect to a new model, should one be developed for this peer review. In both cases, evaluate whether the stock is rebuilt (if in a rebuilding plan).*
    a. *When working with the existing model, update it with new data and evaluate stock status (overfished and overfishing) with respect to the existing BRP estimates.*
    b. *Then use the newly proposed model and evaluate stock status with respect to "new" BRPs and their estimates (from TOR-6).*

The Panel concluded that this term of reference was successfully completed.

Current stock status was evaluated with both the existing and new models, with the assumptions on a change in stock productivity since about 1990 influential on status determination.

There are a number of hypotheses which could explain the step-like drop in recruitment since 1990, including those associated with oceanographic processes (see term of reference 5), unreported catch including discards and increased natural mortality. As yet, the mechanism causing this decline has not been identified although a change in stock productivity is considered likely.

Current status was determined in relation to the two-stanza and recent recruitment scenario reference points (see term of reference 6). When evaluated against the BRPs derived from the two-stanza recruitment scenario, the stock is found to be overfished but when evaluated using the BRPs derived from the recent recruitment scenario, the stock is not overfished. Under both scenarios, overfishing is not occurring. During the review, a model was run which included a BH stock-recruitment relationship which is a parametric alternative to the two-stanza non-parametric scenario. Despite a large difference in the B_{MSY} estimate (with that of the BH model being about 50% of the two-stanza model), current status was determined to be the same under both formulations. The large difference in B_{MSY} estimates from the two models requires further exploration.

The main uncertainty in the assessment is whether or not the step-like drop in recruitment since 1990 is due to a change in stock productivity not associated with spawning biomass and is rather caused by some as yet unidentified oceanographic process. This is influential on determination of current stock status. While the Panel

considers that the drop in recent recruitment is more likely than not due to a productivity change (see term of reference 6), the alternate hypothesis cannot be ruled out.

8. *Develop approaches and apply them to conduct stock projections and to compute the pdf (probability density function) of the OFL (overfishing level) and candidate ABCs (Acceptable Biological Catch; see Appendix to the SAW TORs).*
    a. *Provide numerical annual projections (3 years). Each projection should estimate and report annual probabilities of exceeding threshold BRPs for F, and probabilities of falling below threshold BRPs for biomass. Use a sensitivity analysis approach in which a range of assumptions about the most important uncertainties in the assessment are considered (e.g., terminal year abundance, variability in recruitment, and recruitment as a function of stock size).*
    b. *Comment on which projections seem most realistic. Consider the major uncertainties in the assessment as well as sensitivity of the projections to various assumptions.*
    c. *Describe this stock's vulnerability (see "Appendix to the SAW TORs") to becoming overfished, and how this could affect the choice of ABC.*

The Panel concluded that this term of reference was, for the most part, successfully completed. Although confidence intervals were calculated for annual SSB, the probabilities that these fell below the threshold BRP were not calculated.

The projection methods used in the assessment were sound, and were applied to two alternative scenarios: 'recent' and 'two-stanza' (see term of reference 6). Under the former, the stock has already rebuilt; under the latter, it cannot rebuild by 2014, even with no fishing. The Panel reiterates its conclusion that the evidence is 60:40 in favour of the 'recent' scenario (see term of reference 6). It would have been good if other sources of uncertainty (e.g., the value of natural mortality) could have been carried through to the projections, but the existing projections do cover the main source of uncertainty.

As noted above, although confidence intervals were calculated for annual SSB, the probabilities that these fell below the threshold BRP were not calculated. This should be addressed in future assessments.

The Panel noted that uncertainty about the cause of the step-like decline in recruitment that occurred around 1990 is a source of vulnerability for this stock.

9. *Review, evaluate and report on the status of research recommendations listed in most recent peer reviewed assessment and review panel reports. Identify new research recommendations.*

The Panel concluded that this term of reference had been successfully completed.

The SDWG produced a comprehensive list of previous research recommendations from SAW36, GARM II, and GARM III and responses to them. All previous research recommendations were addressed either completely, or to some degree. There were five research recommendations from SAW54, but the SDWG completed two and partially completed a further two in the period between SAW54 and the current review, leaving three active recommendations:

a) Update the length-weight parameters used to convert commercial landings (in weight) into numbers of fish. This could be accomplished by expanding existing data collection programs (e.g., Cooperative Research, Industry Based Surveys, NEFSC port sampling) to collect individual fish weights while collecting length and age data. This research recommendation is applicable to numerous species/stocks in the northeast, not just SNEMA yellowtail flounder (partly completed in this assessment based on data available).

b) The work on the influence of the cold pool and associated environmental parameters on yellowtail population dynamics has not been fully developed, and merits further research (the SDWG explored the application of the cold pool index in this assessment by explicitly incorporating the cold pool index in the ASAP model although this could not explain the step-like drop in recruitment since 1990).

c) If the volume of commercial landings increases in the future, ensure that adequate samples of the landings are obtained for all market categories on at least a quarterly basis (quarterly resolution was not explored in this assessment for deriving fishery catch data).

The Panel notes that the major uncertainty in the yellowtail flounder assessment is whether there is sufficient evidence to accept that there was shift in stock productivity. Research that helps to illuminate this question should be of the highest priority, so gives priority to item b in the list above.

The Panel makes some further research recommendations:

- Data
  - Exploration of alternative catch history (possible explanation of apparent productivity shift)
  - Adjust NMFS survey indices for day/night variation in catch rates using GAM or GLM
  - Explore incorporation of inclusion of pre-1973 data in ASAP
  - Compile independent evidence for or against productivity shift (including trends in other commercial species in the same stock region)
- Model
  - Further explore SR models which incorporate oceanographic processes
  - Explore why the 2-stanza BRPs are so different from those from the ASAP model incorporating a BH stock – recruitment relationship (the more conventional approach in other fora), and determine which approach is more appropriate for this stock
  - Survey *q* ratio to incorporate survey gear/operation changes into assessment (see detail below)
  - Use iterative reweighting of sample size based on fit to mean age rather than using the approach of McAllister and Ianelli (1997).

The Panel recommends that the use of *q*-ratio priors be considered in future assessments of both stocks as a means of ensuring that the uncertainty in the fall and

spring survey calibration constants is carried through to the assessment. For example, consider the calibration constant of 1.22, which was used to scale up yellowtail survey indices to compensate for the change in trawl doors in 1985, and suppose that the s.e. of this constant was 0.1. The idea is to split the survey time series at 1985, so that ASAP estimates a separate catchability constant, q, for pre- and post-1985, but to apply a normal (say) prior with mean 1.22 and s.d. 0.1 to the ratio of these qs to discourage q estimates whose ratio differs substantially from 1.22. This involves adding a term $0.5[((q_1/q_2)-1.22)/0.1]^2$ to the objective function. An approach like this has been used in some New Zealand assessments and is implemented (in a slightly more complicated form) in CASAL (see section 6.7.5 in Bull et al. 2012).

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STATEMENT OF WORK

(v 15 March 2012)

External Independent Peer Review by the Center for Independent Experts 54th Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC): Southern New England yellowtail flounder and Atlantic herring.

Statement of Work (SOW) for CIE Panelists (including a description of SARC Chairman's duties)

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

Project Description: The purpose of this meeting will be to provide an external peer review of stock assessments for Southern New England yellowtail flounder (*Pleuronectes ferrugineus*) and Atlantic herring (*Clupea harengus*). Yellowtail flounder is a demersal flatfish distributed from Labrador to Chesapeake Bay generally at depths between 40 and 70 m (20 to 40 fathoms). Off the U.S. coast, three stocks are considered for management purposes: Cape Cod/Gulf of Maine, Georges Bank, and Southern New England/ Mid-Atlantic. The principal fishing gear used to catch yellowtail flounder is the otter trawl. The last peer reviewed assessment of Southern New England yellowtail flounder was in 2008 as part of the GARM III. Atlantic herring is a pelagic fish that is widely distributed in continental shelf waters of the Northeast Atlantic, from Labrador to Cape Hatteras. Important commercial fisheries for juvenile herring (ages 1 to 3) exist along the coasts of Maine and New Brunswick. Development of large-scale fisheries for adult herring is comparatively recent, primarily occurring in the western Gulf of Maine, on Georges Bank, and on the Scotian Shelf. The last peer reviewed assessment of Atlantic herring was in 2009 as part of the TRAC. Yellowtail flounder and Altantic herring are managed by the New England Fishery Management Council. Results of the 2012 peer review will form the scientific basis for fishery management in the northeast region.

Duties of reviewers are explained below in the "**Requirements for CIE Reviewers**", in the "**Charge to the SARC Panel**" and in the "**Statement of Tasks**". The stock

assessment Terms of Reference (ToRs), which are carried out by the SAW Working Groups, are attached in **Annex 2**. The tentative agenda of the panel review meeting is attached in **Annex 3**. The SARC Summary Report format is described in **Annex 4.**

The SARC 54 review panel will be composed of three appointed reviewers from the Center of Independent Experts (CIE), and an independent chair from the SSC of the New England or Mid-Atlantic Fishery Management Council. The SARC panel will write the SARC Summary Report and each CIE reviewer will write an individual independent review report.

Requirements for CIE Reviewers: Three CIE reviewers shall conduct an impartial and independent peer review of the stock assessments that are provided, and this review should be in accordance with this SoW and stock assessment ToRs herein. CIE reviewers shall have working knowledge and recent experience in fish stock assessments. For yellowtail, familiarity with forward projecting models and estimation is desirable. For herring, familiarity with pelagic fish and acoustic surveys is desirable. For both stocks, experience with time- and sex-specific natural mortality rate is desirable.

In general, CIE reviewers for SARCs shall have working knowledge and recent experience in the application of modern fishery stock assessment models. Expertise shall include statistical catch-at-age, state-space and index methods. Reviewers shall also have experience in evaluating measures of model fit, identification, uncertainty, and forecasting. Reviewers shall have experience in development of Biological Reference Points that includes an appreciation for the varying quality and quantity of data available to support estimation of BRPs.

Each CIE reviewer's duties shall not exceed a maximum of 15 days to complete all work tasks of the peer review described herein.

Not covered by the CIE, the SARC chair's duties should not exceed a maximum of 15 days (i.e., several days prior to the meeting for document review; the SARC meeting in Woods Hole; several days following the open meeting for SARC Summary Report preparation).

Location and Date of Peer Review: Each CIE reviewer shall conduct an independent peer review during the panel review meeting scheduled in Woods Hole, Massachusetts during June 5-9, 2012 (Tuesday through Saturday).

Charge to SARC panel: During the SARC meeting, the panel is to determine and write down whether each stock assessment Term of Reference of the SAW (see **Annex 2**) 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. Where possible, the SARC chair shall identify or facilitate

agreement among the reviewers for each stock assessment Term of Reference of the SAW.

If the panel rejects any of the current Biological Reference Points (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.

Statement of Tasks:

1. Prior to the meeting

(SARC chair and CIE reviewers)
Review the reports produced by the Working Groups and read background reports.

Each CIE reviewer shall complete the following tasks in accordance with the SoW and Schedule of Milestones and Deliverables herein:

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

Foreign National Security Clearance: When CIE 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 CIE reviewers who are non-US citizens. For this reason, the CIE reviewers shall provide by FAX the 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/.
http://deemedexports.noaa.gov/compliance_access_control_procedures/noaa-foreign-national-registration-system.html

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

2. During the Open meeting

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

(SARC chair)
Act as chairperson, where duties include control of the meeting, coordination of presentations and discussion, making sure all stock assessment Terms of Reference of the SAW are reviewed, control of document flow, and facilitation of discussion. For each assessment, review both the Assessment Report and the draft Assessment Summary Report.

During the question and answer periods, provide appropriate feedback to the assessment scientists on the sufficiency of their analyses. It is permissible to discuss the stock assessment and to request additional information if it is needed to clarify or correct an existing analysis and if the information can be produced rather quickly.

(SARC CIE reviewers)
For each stock assessment, participate as a peer reviewer in panel discussions on assessment validity, results, recommendations, and conclusions. From a reviewer's point of view, determine whether each stock assessment Term of Reference of the SAW was completed successfully. Terms of Reference that are completed successfully are likely to serve as a basis for providing scientific advice to management. If a reviewer considers any existing Biological Reference Point or BRP proxy to be inappropriate, the reviewer should try to recommend an

alternative, should one exist. Review both the Assessment Report and the draft Assessment Summary Report.

During the question and answer periods, provide appropriate feedback to the assessment scientists on the sufficiency of their analyses. It is permissible to request additional information if it is needed to clarify or correct an existing analysis and if the information can be produced rather quickly.

3. After the Open meeting

(SARC CIE reviewers)

Each CIE reviewer shall prepare an Independent CIE Report (see **Annex 1**). This report should explain whether each stock assessment Term of Reference of the SAW was or was not completed successfully during the SARC meeting, using the criteria specified above in the "Charge to SARC panel" statement.

If any existing Biological Reference Points (BRP) or their proxies are considered inappropriate, the Independent CIE 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 may be raised. Comments on these questions should be included in a separate section at the end of the Independent CIE Report produced by each reviewer.

The Independent CIE Report can also be used to provide greater detail than the SARC Summary Report on specific stock assessment Terms of Reference or on additional questions raised during the meeting.

(SARC chair)

The SARC chair shall prepare a document summarizing the background of the work to be conducted as part of the SARC process and summarizing whether the process was adequate to complete the stock assessment Terms of Reference of the SAW. If appropriate, the chair will include suggestions on how to improve the process. This document will constitute the introduction to the SARC Summary Report (see **Annex 4**).

(SARC chair and CIE reviewers)

The SARC Chair, with the assistance from the CIE reviewers, will prepare the SARC Summary Report. Each CIE reviewer and the chair will discuss whether they hold similar views on each stock assessment 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 SAW. For terms where a similar view can be reached, the SARC Summary Report will contain a summary of such opinions. In cases where multiple and/or differing views exist on a given Term of Reference,

the SARC Summary Report will note that there is no agreement and will specify - in a summary manner – what the different opinions are and the reason(s) for the difference in opinions.

The chair's objective during this SARC Summary Report development process will be to identify or facilitate the finding of an agreement rather than forcing the panel to reach an agreement. The chair will take the lead in editing and completing this report. The chair may express the chair's opinion on each Term of Reference of the SAW, either as part of the group opinion, or as a separate minority opinion.

The SARC Summary Report (please see **Annex 4** for information on contents) should address whether each stock assessment Term of Reference of the SAW was completed successfully. For each Term of Reference, this report should state why that Term of Reference was or was not completed successfully. The Report should also include recommendations that might improve future assessments.

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

The contents of the draft SARC Summary Report will be approved by the CIE reviewers by the end of the SARC Summary Report development process. The SARC chair will complete all final editorial and formatting changes prior to approval of the contents of the draft SARC Summary Report by the CIE reviewers. The SARC chair will then submit the approved SARC Summary Report to the NEFSC contact (i.e., SAW Chairman).

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

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

1) Conduct necessary pre-review preparations, including the review of background material and reports provided by the NMFS Project Contact in advance of the peer review.
2) Participate during the panel review meeting at the Woods Hole, Massachusetts during June 5-9, 2012 (Tuesday through Saturday).

3) Conduct an independent peer review in accordance with this SoW and the assessment ToRs (listed in **Annex 2**).
4) No later than June 25, 2012, each CIE reviewer shall submit an independent peer review report addressed to the "Center for Independent Experts," and sent to Mr. Manoj Shivlani, CIE Lead Coordinator, via email to shivlanim@bellsouth.net, and to David Sampson, CIE Regional Coordinator, via email to david.sampson@oregonstate.edu. Each CIE report shall be written using the format and content requirements specified in **Annex 1**, and address each assessment ToR in **Annex 2**.

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

30 April 2012	CIE sends reviewer contact information to the COTR, who then sends this to the NMFS Project Contact
22 May 2012	NMFS Project Contact will attempt to provide CIE Reviewers the pre-review documents by this date
5-9 June 2012	Each reviewer participates and conducts an independent peer review during the panel review meeting in Woods Hole, MA
9 June 2012	SARC Chair and CIE reviewers work at drafting reports during meeting at Woods Hole, MA, USA
25 June 2012	CIE reviewers submit draft CIE independent peer review reports to the CIE Lead Coordinator and CIE Regional Coordinator
26 June 2012	Draft of SARC Summary Report, reviewed by all CIE reviewers, due to the SARC Chair *
29 June 2012	SARC Chair sends Final SARC Summary Report, approved by CIE reviewers, to NEFSC contact (i.e., SAW Chairman)
9 July 2012	CIE submits CIE independent peer review reports to the COTR
16 July 2012	The COTR distributes the final CIE reports to the NMFS Project Contact and regional Center Director

* The SARC Summary Report will not be submitted, reviewed, or approved by the CIE.

The SAW Chairman will assist the SARC chair prior to, during, and after the meeting in ensuring that documents are distributed in a timely fashion.

NEFSC staff and the SAW Chairman will make the final SARC Summary Report available to the public. Staff and the SAW Chairman will also be responsible for

production and publication of the collective Working Group papers, which will serve as a SAW Assessment Report.

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

Acceptance of Deliverables: Upon review and acceptance of the CIE independent peer review reports by the CIE Lead Coordinator, Regional Coordinator, and Steering Committee, these reports shall be sent to the COTR for final approval as contract deliverables based on compliance with the SoW and ToRs. As specified in the Schedule of Milestones and Deliverables, the CIE shall send via e-mail the contract deliverables (CIE independent peer review reports) to the COTR (William Michaels, via William.Michaels@noaa.gov).

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

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

Support Personnel:

William Michaels, Program Manager, COTR
NMFS Office of Science and Technology
1315 East West Hwy, SSMC3, F/ST4, Silver Spring, MD 20910
William.Michaels@noaa.gov Phone: 301-713-2363 ext 136

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

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

Key Personnel:

NMFS Project Contact:

Dr. James Weinberg, NEFSC SAW Chairman
Northeast Fisheries Science Center
166 Water Street, Woods Hole, MA 02543
James.Weinberg@noaa.gov (Phone: 508-495-2352) (FAX: 508-495-2230)

Dr. William Karp, Acting NEFSC Science Director
National Marine Fisheries Service, NOAA
Northeast Fisheries Science Center
166 Water St., Woods Hole, MA 02543
Bill.Karp@noaa.gov Phone: 508-495-2233

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

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

2. The main body of the reviewer report shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Findings of whether they accept or reject the work that they reviewed, and an explanation of their decisions (strengths, weaknesses of the analyses, etc.) for each ToR, and Conclusions and Recommendations in accordance with the ToRs. For each assessment reviewed, the report should address whether each Term of Reference of the SAW was completed successfully. For each Term of Reference, the Independent Review Report should state why that Term of Reference was or was not completed successfully. To make this determination, the SARC chair and CIE reviewers should consider whether the work provides a scientifically credible basis for developing fishery management advice.

   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, and especially where there were divergent views.

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

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

   e. The CIE independent report shall be a stand-alone document for others to understand the proceedings and findings of the meeting, regardless of whether or not others read the SARC Summary Report. The CIE independent report shall be an independent peer review of each ToRs, and shall not simply repeat the contents of the summary report.

3. The reviewer report shall include the following appendices:

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

Annex 2: Stock Assessment Terms of Reference for SAW/SARC54 (June 5-9, 2012) (to be carried out by SAW Working Groups) (file vers.: 10/21/11)

A. Atlantic herring

1. Estimate catch from all sources including landings and discards. Describe the spatial distribution of fishing effort. Characterize uncertainty in these sources of data.

2. Present the survey data being used in the assessment (e.g., regional indices of abundance, recruitment, state surveys, larval surveys, age-length data, predator consumption rates, etc.). Investigate the utility of commercial LPUE as a measure of relative abundance, and characterize the uncertainty and any bias in these sources of data.

3. Evaluate the utility of the NEFSC fall acoustic survey to the stock assessment of herring. Consider degree of spatial and temporal overlap between the survey and the stock. Compare acoustic survey results with measures derived from bottom trawl surveys.

4. Evaluate the validity of the current stock definition, and determine whether it should be changed. Take into account what is known about migration among stock areas.

5. Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series (integrating results from TOR-6), and estimate their uncertainty. Include a historical retrospective analysis to allow a comparison with previous assessment results and previous projections.

6. Consider the implications of consumption of herring, at various life stages, for use in estimating herring natural mortality rate (M) and to inform the herring stock-recruitment relationship. Characterize the uncertainty of the consumption estimates. If possible integrate the results into the stock assessment.

7. State the existing stock status definitions for "overfished" and "overfishing". Then update or redefine biological reference points (BRPs; point estimates or proxies for B_{MSY}, $B_{THRESHOLD}$, F_{MSY} and MSY) and provide estimates of their uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for BRPs. Comment on the scientific adequacy of existing BRPs and the "new" (i.e., updated, redefined, or alternative) BRPs.

8. Evaluate stock status with respect to the existing model (from previous peer reviewed accepted assessment) and with respect to a new model, should one be developed for this peer review. In both cases, evaluate whether the stock is rebuilt (if in a rebuilding plan).
    a. When working with the existing model, update it with new data and evaluate stock status (overfished and overfishing) with respect to the existing BRP estimates.
    b. Then use the newly proposed model and evaluate stock status with respect to "new" BRPs and their estimates (from TOR-7).

9. Using simulation/estimation methods, evaluate consequences of alternative harvest policies in light of uncertainties in model formulation, presence of retrospective patterns, and incomplete information on magnitude and variability in M.

10. Develop approaches and apply them to conduct stock projections and to compute the pdf (probability density function) of the OFL (overfishing level) and candidate ABCs (Acceptable Biological Catch; see Appendix to the SAW TORs).
    a. Provide numerical annual projections (3 years). Each projection should estimate and report annual probabilities of exceeding threshold BRPs for F, and probabilities of falling below threshold BRPs for biomass. Use a sensitivity analysis approach in which a range of assumptions about the most important uncertainties in the assessment are considered (e.g., terminal year abundance, variability in recruitment).
    b. Comment on which projections seem most realistic. Consider the major uncertainties in the assessment as well as sensitivity of the projections to various assumptions.
    c. Describe this stock's vulnerability (see "Appendix to the SAW TORs") to becoming overfished, and how this could affect the choice of ABC.

11. For any research recommendations listed in recent peer reviewed assessment and review panel reports, review, evaluate and report on the status of those research recommendations. Identify new research recommendations.

B. SNE/Mid-Atlantic Yellowtail Flounder

1. Estimate landings and discards by gear type and where possible by fleet, from all sources. Describe the spatial distribution of fishing effort. Characterize uncertainty in these sources of data.

2. Present the survey data being used in the assessment (e.g., regional indices of abundance, recruitment, state surveys, age-length data, etc.). Investigate the utility of commercial or recreational LPUE as a measure of relative abundance, and characterize the uncertainty and any bias in these sources of data.

3. Evaluate the validity of the current stock definition, and determine whether it should be changed. Take into account what is known about migration among stock areas.

4. Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) for the time series (integrating results from TOR-5), and estimate their uncertainty. Include a historical retrospective analysis to allow a comparison with previous assessment results and previous projections.

5. Investigate causes of annual recruitment variability, particularly the effect of temperature. If possible, integrate the results into the stock assessment (TOR-4).

6. State the existing stock status definitions for "overfished" and "overfishing". Then update or redefine biological reference points (BRPs; point estimates or proxies for B_{MSY}, $B_{THRESHOLD}$, F_{MSY} and MSY) and provide estimates of their uncertainty. If analytic model-based estimates are unavailable, consider recommending alternative measurable proxies for BRPs. Comment on the scientific adequacy of existing BRPs and the "new" (i.e., updated, redefined, or alternative) BRPs.

7. Evaluate stock status with respect to the existing model (from previous peer reviewed accepted assessment) and with respect to a new model, should one be developed for this peer review. In both cases, evaluate whether the stock is rebuilt (if in a rebuilding plan).
    a. When working with the existing model, update it with new data and evaluate stock status (overfished and overfishing) with respect to the existing BRP estimates.
    b. Then use the newly proposed model and evaluate stock status with respect to "new" BRPs and their estimates (from TOR-6).

8. Develop approaches and apply them to conduct stock projections and to compute the pdf (probability density function) of the OFL (overfishing level) and candidate ABCs (Acceptable Biological Catch; see Appendix to the SAW TORs).
    a. Provide numerical annual projections (3 years). Each projection should estimate and report annual probabilities of exceeding threshold BRPs for F, and probabilities of falling below threshold BRPs for biomass. Use a sensitivity analysis approach in which a range of assumptions about the most important uncertainties in the assessment are considered (e.g., terminal year abundance, variability in recruitment, and recruitment as a function of stock size).
    b. Comment on which projections seem most realistic. Consider the major uncertainties in the assessment as well as sensitivity of the projections to various assumptions.
    c. Describe this stock's vulnerability (see "Appendix to the SAW TORs") to becoming overfished, and how this could affect the choice of ABC.

9. Review, evaluate and report on the status of research recommendations listed in most recent peer reviewed assessment and review panel reports. Identify new research recommendations.

Appendix to the SAW Assessment TORs:

Clarification of Terms
used in the SAW/SARC Terms of Reference

On "Acceptable Biological Catch" (DOC Nat. Stand. Guidel. 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 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)

Rules of Engagement among members of a SAW Assessment Working Group:

> Anyone participating in SAW assessment working group 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.

(END OF ANNEX 2)

Annex 3: Draft Agenda

54th Northeast Regional Stock Assessment Workshop (SAW 54)
Stock Assessment Review Committee (SARC) Meeting

June 5-9, 2012

Stephen H. Clark Conference Room – Northeast Fisheries Science Center
Woods Hole, Massachusetts

Draft AGENDA* (version: 14 March 2012)

TOPIC	PRESENTER(S)	SARC LEADER	RAPPORTEUR
Tuesday, June 5			
1 – 1:30 PM Welcome, Introduction, Agenda, Conduct of Meeting	**James Weinberg**, SAW Chair; **Robert O'Boyle**, SARC Chair		
1:30 – 3:30	Assessment Presentation (A. Herring) **Jon Deroba, others**	**TBD**	**TBD**
3:30 – 3:45	Break		
3:45 – 6	Assessment Presentation (A. Herring) **Jon Deroba, others**	**TBD**	**TBD**
Wednesday, June 6			
9 – 11:45	SARC Discussion w/ presenters (A. Herring) **Robert O'Boyle**, SARC Chair		**TBD**
11:45 – 1	Lunch		
1:00 – 3:15	Assessment Presentation (B. SNE YT) **Larry Alade**	**TBD**	**TBD**
3:15 – 3:30	Break		
3:30 – 5:30	SARC Discussion w/ presenters (B. SNE YT) **Robert O'Boyle**, SARC Chair		**TBD**

Thursday, June 7

9 - 11	Revisit w/ presenters (A. herring) **Robert O'Boyle**, SARC Chair	**TBD**
11 – 11:15	Break	
11:15 – 12:30	Revisit w/ presenters (B. SNE YT) **Robert O'Boyle**, SARC Chair	**TBD**
12:30 – 1:45	Lunch	
1:45 – 2:15	(cont.) Revisit w/ presenters (B. SNE YT) **Robert O'Boyle**, SARC Chair	**TBD**
2:15 -2:30	Break	
2:30 – 5:30	Review/edit Assessment Summary Report (A. herring) **Robert O'Boyle**, SARC Chair	**TBD**

Friday, June 8

9 - 12	Review/edit Assessment Summary Report (B. SNE YT) **Robert O'Boyle**, SARC Chair	**TBD**
12 – 1:15	**Lunch**	
1:15 – 5	SARC Report writing. (closed meeting)	

Saturday, June 9

9:00 - 3 PM (cont.) SARC Report writing. (closed meeting)

*All times are approximate, and may be changed at the discretion of the SARC chair. The meeting is open to the public, except where noted.

Annex 4: Contents of SARC Summary Report

1.

The main body of the report shall consist of an introduction prepared by the SARC chair that will include the background, a review of activities and comments on the appropriateness of the process in reaching the goals of the SARC. Following the introduction, for each assessment reviewed, the report should address whether each Term of Reference of the SAW Working Group was completed successfully. For each Term of Reference, the SARC Summary Report should state why that Term of Reference was or was not completed successfully.

To make this determination, the SARC chair and CIE reviewers should consider whether the work provides a scientifically credible basis for developing fishery management advice. Scientific 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 the CIE reviewers and SARC 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 (BRP) 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 SAW, and any papers cited in the SARC Summary Report, along with a copy of the CIE Statement of Work.

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