

Atlantic States Marine Fisheries Commission

Weakfish Stock Assessment Subcommittee

April 1, 2009

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Weakfish Technical Committee

April 2, 2009

Baltimore, Maryland

Meeting Report

Participants – April 1

Russ Allen (NJ DEP, TC Chair)
Jeff Brust (NJ DEP, SAS Chair)
Vic Crecco (CT DEP)
Yan Jiao (Virginia Tech)
Des Kahn (DE DFW)

Lee Paramore (NC DMF)
Jim Uphoff (MD DNR)
Joe Cimino (VMRC)
Nichola Meserve (ASMFC, staff)
Dick Brame (CCA, guest)

Participants – April 2

Christina Grahn (NY DEC)
Russ Allen (NJ DEP, TC Chair)
Jeff Brust (NJ DEP, SAS Chair)
Des Kahn (DE DFW)
Jim Uphoff (MD DNR)
Ellen Cosby (PRFC)
Joe Cimino (VMRC)

Lee Paramore (NC DMF)
Erin Levesque (SC DNR)
Eric Robillard (GA DNR)
Joseph Munyandorero (FL FWCC)
Wilson Laney (USFWS)
Nichola Meserve (ASMFC, staff)

Overview

The Weakfish Stock Assessment Subcommittee (SAS) met to review and select final model runs for the 2009 Weakfish Stock Assessment. The Weakfish Technical Committee (TC) met to review and approve the SAS's work. Additional analytical and writing tasks were assigned to various committee members (see last page). The final stock assessment report is due May 14.

Age Structured Models

ADAPT VPA

The SAS reviewed 16 ADAPT runs. Alternative runs included various sets of the 44 available indices. Generally, all runs showed convergence in N, SSB, and F until about 2002, after which time trends diverge depending on the indices selected. Inclusion of any young-of-year indices in runs led to less reliable results with larger retrospective patterns. The SAS concluded that the YOY indices should not be included in the preferred run because they provide conflicting data.

The previous assessment's preferred run included only the fishery-dependent indices (i.e., MRFSS aged 3, 4, 5 and 6+ and age-aggregated 2+), which was criticized by the review panel. In response, the SAS decided that a run with more indices should be selected as the preferred age-structured run. Based on previous analysis of the indices coherence and consistency, the NJ, DE,

and NC indices were selected for inclusion in addition to the MRFSS. Selecting indices based on *a priori* weighting was also discussed and it was determined that the SAS's work on this should be recorded in the report and results of a corresponding run compared to the preferred.

The SAS considered another run in which the NJ, DE, and NC indices were truncated (to remove ages with many zeros). After observing the minimal difference in output between using the truncated and non-truncated indices, the SAS decided not to use the truncated indices because it excludes information and is less defensible.

Review of the MRFSS indices indicated that because the values were so small, some were incorrectly being input as zeroes when rounded to two decimal points. The SAS decided that scaling the values might weight the indices more than others, so the values would be rounded to four decimal points for input.

The SAS also considered runs with the standardized indices (GLM or GAM), but discussion indicated that the SAS had not seen all the output data to evaluate the indices and thus considered them exploratory. Several issues identified were that a standardized MRFSS index based on private boats in the mid-Atlantic was not available, that the standardized NJ index was not based on August only tows, and that standard error was not clearly indicated. The SAS agreed that it should be recorded in the report that standardization of indices was undertaken, that preliminary results showed correlation with regular indices, and that work will continue. Additionally, the SAS wanted the standardization report included as an appendix and for the review panel to provide feedback. The Term of Reference related to fishery-independent indices was modified accordingly (see below).

The SAS also discussed several new potential sources of uncertainty related to ageing: use of multiyear age-length keys to age earlier years' samples; application of scale-otolith conversion to all indices (DE index specifically mentioned); lagging of MRFSS age-specific surveys; and accuracy of historic recreational catch at age. The SAS determined that evaluating these issues would not occur for this assessment but be longer-term projects. The NJ index used in the model runs does need to be updated to include pre-1994 values now that they are available.

The SAS's preferred ADAPT run includes the MRFSS 3-6+, MRFSS 2+, NJ 1-6+, DE 1-6+, and NC 1-6+ indices, rounded to four decimal places and including 2008 values where available. The SAS also selected this as the preferred age-structured run after concluding that the ASAP runs were too preliminary.

The TC reviewed the SAS's selection for the preferred model run. Questions regarding index selection were answered. Observed versus predicted values, residuals, and the indices themselves were reviewed. Changing selectivity as a consequence of management was discussed in relation to the MRFSS index. The residuals seemed to indicate that the MRFSS indices were influencing the model as much as the three states' indices combined, possibly because of its longer timeseries. Additional surveys such as ChesMMAP and a GA trawl survey should be considered as sources of indices for future assessments. It was noted the data from ChesMMAP and NEAMAP are used in this assessment. The TC asked that the report mention the additional surveys from which data were used and the surveys which may provide indices for future use.

The TC endorsed the SAS's selection of the preferred age-structured model run and encouraged further development of the ASAP model for weakfish stock assessment.

ASAP Runs

The SAS reviewed five ASAP runs. These were considered to be exploratory runs, the methods and results of which could not yet be fully explained, thus the SAS did not select a preferred ASAP run for review. However, the SAS agreed that one or two runs should be included in the stock assessment report as a work in progress to possibly be included in the next assessment.

Retrospective Correction

The SAS reviewed one method to "correct" age-structured results for retrospective bias suggested by Jim. The SAS agreed that some sort of correction should be presented in the report because it is clear that there is a retrospective pattern that causes error in the last five or so years' estimates. Jim or Jeff will update the correction analysis with the final runs. The TC did not object to the inclusion of a retrospective correction for review.

Biomass Models

The SAS reviewed the predation hypothesis model developed by Vic and the forage hypothesis model developed by Jim. It was noted that Table 2 in Jim's report needs to be updated (DE trawl survey values are for age 2+ index, and should be age 1+).

The SAS had originally discussed including one of these two approaches, but determined that they were complimentary and should both be included in the report for peer review. The SAS discussed restructuring the report to first show that fishing is not responsible for the decline in weakfish abundance, and to second provide the hypothesis testing for other causes of decline. The TC agreed with this decision. The Terms of Reference were revised accordingly (see below).

Terms of Reference

To address the selection of assessment models for review and for added clarity, the ToRs were revised by the SAS and/or the TC, and later approved by the TC as follows:

1. Evaluate biases, precision, uncertainty, and sampling methodology of the commercial and recreational catch (including landings and discards) and effort.
2. Evaluate precision, geographical coverage, representation of stock structure, and relative accuracy of the fisheries independent and dependent indices of abundance. Review preliminary work on standardization of abundance indices.
3. Evaluate the ADAPT VPA catch at age modeling methods and the estimates of F, Z, spawning stock biomass, and total abundance of weakfish produced, along with the uncertainty and potential bias of those estimates. Review the severity of retrospective pattern.
4. Evaluate the index-based methods and the estimates of F, ages 1+ stock biomass, surplus production, and time-varying natural mortality of weakfish produced, along with the uncertainty of those estimates. Determine whether these techniques could complement or substitute for age-based modeling for management advice.
5. Evaluate testing of fishing and additional trophic and environmental covariates and modeling of hypotheses using biomass dynamic models featuring multiple indices blended into a single index with and without a Steele-Henderson (Type III) predator-prey extension. Evaluate biomass dynamic model estimates of F, ages 1+ stock biomass, surplus production, time-

varying natural mortality, and biological reference points along with uncertainty of those estimates. Advise on burden of proof necessary for acceptance of alternatives to constant M and whether these biomass dynamic techniques could complement or substitute for age-based modeling for management advice.

6. Evaluate AIC-based hypothesis testing of fishing and additional predation-competition effects using multi-index biomass dynamic models with and without prey-based, predator-based, or ratio dependent predator-prey extensions. Evaluate biomass dynamic model estimates of F, ages 1+ stock biomass, surplus production, time-varying natural mortality, and biological reference points along with uncertainty of those estimates. Advise on burden of proof necessary for acceptance of alternatives to constant M and whether these biomass dynamic techniques could complement or substitute for age-based modeling for management advice.
7. Review evidence for constant or recent systematic changes in natural mortality, productivity, and/or unreported removals.
8. Estimate biological reference points using equilibrium and non-equilibrium assumptions and evaluate stock status relative to these BRPs.
9. Review stock projections and impacts on the stock under different assumptions of fishing and natural mortality.
10. Make research recommendations for improving data collection and assessment.

Reference Points

The SAS decided, and the TC agreed, to include reference points for each model: Thompson-Bell reference points based on ADAPT results, and the equilibrium and non-equilibrium reference points based on the biomass dynamic models.

Stock Status

The SAS decided, and the TC agreed, that stock status would be determined once the reference points are developed. Stock status is expected to be the same regardless of which model's estimates and reference points are compared; however, it was acknowledged that the TC may need to select a set of reference points for management use, yet this selection may hinge on the review panel's advice.

Projections

The SAS decided, and the TC agreed, to include projections for each model if possible: for ADAPT results, projections under a constant M assumption; for biomass dynamic models, equilibrium and non-equilibrium projections.

Evidence for Changes in M

The SAS reviewed the additional evidence for a systematic change in M in the draft report: environmental as indicated by a mean sea-surface temperature anomaly in the North Atlantic, food diet as indicated by stomach content analyses from NMFS fall trawl survey, size at age developed from biological sampling, and estimates of natural mortality at age from the Lorenzen method. The SAS decided, and the TC agreed, to keep the analyses correlating sea-surface temperature to landings, and empty stomachs to total mortality, but to remove the size at age and natural mortality at age analyses because they were inconclusive, preliminary, or could be biased from the location of samples.

Research Recommendations

The TC reviewed draft research recommendations pulled from an ongoing update to an ASMFC publication on prioritized research needs for interjurisdictional management. Revisions were made to: add new recommendations, remove completed recommendations, identify those recommendations in progress as such, and improve unclear or poorly worded recommendations. The revised recommendations will be in the draft final report submitted to the TC for final review, and should be reviewed for completeness and accuracy again.

Comments on Draft Report

Jeff noted that he had only received comments on the distributed sections of the draft stock assessment report from several individuals and asked that others send theirs as soon as possible so he can continue editing.

Background Materials for Reviewers

Nichola asked what should be provided as background material for the review panel. Mentioned were: the complete 2006 assessment report, the 2004 SARC report, and Janaka's discard report.

Travel funding to the SARC will be made available to all members of the stock assessment subcommittee.

Assignments and Timeline for Completion

By May 1 –

Lee: life history section of stock assessment report

Des/Jeff: Thompson-Bell reference points based on ADAPT results; projections under constant M assumption

Jim & Vic: equilibrium and non-equilibrium reference points for biomass dynamic results; projections if possible

Jeff: stock status section of stock assessment report

Jeff/Jim: updated retrospective correction

Jeff: final draft of report for TOR 3

Vic and Jim: final, reformatted draft of reports for TORs 4-6

Yan: updated standardized indices report with requested information

May 4 – Draft Final SAR sent to TC for review

May 11 – Comments of Draft Final SAR due

May 14 – Final SAR submitted to SAW Chairman