

REPORT ON THE 33rd NORTHEAST REGIONAL STOCK ASSESSMENT REVIEW COMMITTEE (SARC) MEETING

by

Patrick J. Sullivan
SARC Chair and CIE Peer Review Scientist

Executive Summary

The 33rd Northeast Regional Stock Assessment Review Committee (SARC) met the week of June 25th, 2001 at the Northeast Fisheries Science Center, Woods Hole, MA, to review assessments pertaining to Gulf of Maine cod (*Gadus morhua*), Gulf of Maine – Georges Bank white hake (*Urophycis tenuis*), and Gulf of Maine – Georges Bank redfish (*Sebastes fasciatus* Storer), and to evaluate and provide guidance on the use and limitations of production modeling methods.

To summarize the consensus stock assessment review:

- the Gulf of Maine cod stock is overfished and overfishing is occurring;
- the Gulf of Maine – Georges Bank white hake stock is overfished and overfishing is occurring; and
- the Gulf of Maine – Georges Bank redfish stock remains in an overfished condition but overfishing is not occurring.

To summarize the consensus methods review:

- production modeling is a valuable tool;
- there are many instances where a more comprehensive approach, more than just a production model analysis alone, is required;
- many of the biological reference points currently used as management proxies were initially developed using production modeling, but now may need updating with more comprehensive approaches, which may include production modeling as one component;
- age-structured modeling approaches and even graphical data analysis of survey and catch data will add to this comprehensive picture;
- alternative modeling approaches applied to assessments help illustrate the strengths and weaknesses of assumptions and data;
- analytical and data collection methods are evolving rapidly, and scientists should be encouraged to use the best information available;

- high quality data make for high quality analyses and wise decision making;
- expect to see current proxy biological reference points updated.

To summarize my review of the overall SARC process:

Stock Assessment Review:

- the Stock Assessment Workshop (SAW) and SARC processes continue to evolve, and that should be encouraged;
- the SARC meetings are apparently meant as a peer review process;
- one should not expect that there will be sufficient time to conduct or even complete assessments during the SARC meeting, that is the responsibility of the SAW;
- the SAW and individual stock assessment scientists should be given greater ownership (and therefore responsibility) for their assessments, thereby encouraging the development of more complete assessments by the time the SARC meets and creating a greater distinction between the responsibilities of the SAW and those of the SARC;
- while some additional analyses for clarification or correction should be expected, the stock assessment working group should have an assessment that is fairly close to complete at the start of the SARC meeting;
- if the SARC meetings are not held for peer review, but rather for consensus building and to provide recommendations to the Council from a broader scientific and managerial vantage point, then the process should be recognized as such and some mechanism should be developed to identify issues important to the Council so that they can be more directly addressed;
- the terms of reference provided to the SARC are sometimes too general, particularly where circumstances or issues of special concern to the Council exist as indicated above;
- separate reports from the SAW and SARC might facilitate a clearer distinction between the processes of scientific analysis and peer review (or that of consensus building and recommendation);
- the formulaic organization of the Advisory Report provides a convenient structure for SARC scientists (many of whom may be unfamiliar with the SARC, SAW, and Council processes) to work within when communicating their recommendations; it also provides the Council with a familiar format in which to view results and recommendations; however, there are nearly always circumstances that require an insight to be communicated that does not fit the formula; stock assessments that contain some information, but not enough to provide a biological reference point are one such example of this; stock assessments that contain more information than can rightfully be encapsulated in a biological reference point are another example of this; the format for the Advisory Report is fine, but this format should not overly restrict the level or quality of the information it is meant to convey.

Methods Review:

- the SARC panel had the expertise, but lacked the time to conduct a comprehensive review of the methods as specified by the SARC terms of reference, never the less it endeavored to provide a review of production modeling within this context;
- a workshop devoted to methodological review, with extensive analyses provided by NMFS scientists and other participants, might be an alternative mechanism for providing a baseline review and guidance regarding state-of-the-art approaches to fisheries science;
- one of the problems managers are encountering with current biological reference points is that the information that went into their derivation now needs updating, and often these updates provide a more comprehensive analysis than can be framed within a production model context alone;
- it is important for managers to make their concerns known and to ask for robust and self-consistent reference points, but it is also important to have at hand the best information available, and this necessarily involves change.

Events

The meeting ran over a five day period.

Monday, June 25th: The first half of day one was used for introductions, an overview of the agenda, and an outline of how the meeting was to be conducted. A presentation of the cod assessment was given by Ralph Mayo in the afternoon. Peter Shelton took on the task of SARC leader to guide discussions on cod and Jim Weinberg acted as rapporteur.

Tuesday, June 26th: On Tuesday an introduction to issues of concern regarding methodology and production modeling was provided by Paul Rago. Robert Mohn took on the task of SARC leader on methods and Steve Murawski acted as rapporteur. The white hake assessment was presented Tuesday afternoon by Katherine Sosebee. Dan Power took on the task of SARC leader for white hake and Susan Wigley acted as rapporteur.

Wednesday, June 27th: Wednesday morning the SARC received a briefing on additional analysis done for cod by Ralph Mayo, followed by a presentation of the redfish assessment by Ralph Mayo. Norman Hall took on the task of SARC leader for redfish and Paul Nitchske acted as rapporteur. Additional methodology presentations were given Wednesday afternoon by John Brodziak and Steve Cadrin.

Thursday, June 28th: Thursday morning the SARC was briefed on updates to the cod projections, and briefed on alternatives to the white hake analysis. Late Thursday morning and afternoon the SARC began wording the advisory reports for cod, white hake, and redfish. Late Thursday afternoon the SARC discussed

issues related to the terms of reference for the methodology component of the meeting and received the last of the methods presentations by Paul Rago.

Friday, June 29th: Friday morning and early afternoon the SARC finished wording cod, white hake, and redfish advisory reports. Late Friday afternoon was spent framing what would be the advisory report and recommendations regarding the production modeling and modeling methodology report.

Results

Assessments

The SARC reviewed Gulf of Maine cod, Gulf of Maine – Georges Bank white hake, and Gulf of Maine – Georges Bank redfish.

Gulf of Maine Cod

An age-structured VPA assessment was conducted and reviewed, using standardized NEFSC and Massachusetts DMF surveys and commercial catch landings. The approach is adequate and improves upon information that was used in developing earlier proxy biological reference points. Consequently these reference points had to be updated.

Sampling of commercial landings needs to be improved, especially for the large market category. Sampling of discards and recreational catches is inadequate.

The Gulf of Maine cod stock is overfished and overfishing is occurring, relative to updated reference points.

Gulf of Maine – Georges Bank White Hake

Uncertainty in species identification, stock identification, discard rates, and quality of sampling for hake less than 60 cm suggested that analysis of this component of the fishery would be problematic. Consequently, only the component of the fishery greater than 60 cm was analyzed for trends indicative of stock status. Restricting the analysis in this way makes comparisons to previous proxy biological reference points untenable. No new biological reference points were estimated however.

A non-equilibrium surplus production model incorporating covariates (ASPIC) confirmed survey trends in exploitation rates and biomass for >60cm white hake.

The white hake stock is overfished and overfishing is occurring.

Gulf of Maine – Georges Bank redfish

An index of exploitation (catch/survey biomass index) was calculated from NEFSC autumn surveys from 1963-2000. An age structured dynamics model (ASDM) was applied to the above data sets from 1934-2000 to derive estimates of population biomass and fishing mortality and to estimate surplus production. A non age-structured biomass dynamics model (ASPIC) was employed to provide additional estimates of surplus production and to derive MSY-based reference points.

The redfish stock remains in an overfished condition but overfishing is not occurring.

Methodology

The SARC reviewed surplus production modeling and more comprehensive methodological approaches in the context of an evolving information base.

The SARC consensus was that production modeling is a valuable tool, however there are many instances where a more comprehensive approach, more than just production model analysis alone, is required. This, unfortunately for managers, means that many of the biological reference points currently used as management proxies, which were initially developed using production modeling, may now need updating and this updating may require the use of more comprehensive approaches. These more comprehensive approaches may include production modeling as one component, but will likely also include analyses from age-structured and/or size-structured models. Even graphical data analysis of trends in survey and catch data will add to this comprehensive picture.

Although it is convenient, and sometime necessary to reduce all analyses to a single model, or even a single output, one should recognize that viewing alternative modeling approaches applied to assessments will help illustrate the strengths and weaknesses of model assumptions and data inputs.

Analytical and data collection methods are evolving rapidly, and scientists should be encouraged to use the best information available. And while scientists and advisors should strive for summarizations that are self-consistent and robust over

a range of conditions, as the data and methods evolve so should the advice that comes as a result.

It may go without saying that high quality data make for high quality analyses and wise decision making, but scientists are being forced to do more with less, and one cannot expect to make good forecasts without good data.

The bottom line is that managers should expect to see current proxy biological reference points updated or even replaced as information and methodologies improve.

SARC Process

Examination of the SARC process is here broken down into that part of the process relating to the stock assessment review and that part of the process relating to the methods review.

Stock Assessment Review

The SAW and SARC make up an important part of the process through which the Council gets its information. The process has steadily improved over the years and continues to evolve. This evolution of the process should be encouraged as it reflects a greater awareness of the complexities involved in fisheries science and fisheries management.

The SARC meetings have apparently been constructed as a peer review process. However, their role is often seen to provide an independent mechanism that includes not just quality control, but consensus building and recommendations in the face of uncertainty. A clearer identification and demarcation of this role may help the process.

One consequence of the lack of clarity in the expected role of the SARC is that the assessments are now not really viewed as complete until the SARC has viewed them. This has led to an overly cautious approach to developing the assessments that necessitates the SARC having to help complete the assessment during the week it meets. The SARC should not be expected to have sufficient time to conduct or even complete assessments during its meeting. That should be viewed as the responsibility of the SAW. The SAW and individual stock assessment scientists should be given greater ownership (and therefore responsibility) for their assessments, thereby encouraging the development of more complete assessments by the time the SARC meets and creating a greater distinction between the responsibilities of the SAW and those of the SARC. While some additional analyses for clarification, correction, or amendment might be

necessary, the stock assessment working group should be able to present an assessment that is fairly close to complete at the start of the SARC meeting.

If the SARC meetings are not principally held for peer review, but are rather intended for consensus building and to provide recommendations to the Council from a broader scientific and managerial vantage point, then the process should be recognized as such and some mechanism should be developed to identify issues important to the Council so that they can be more directly addressed and explored in the context of completed assessment results. The terms of reference provided to the SARC for this purpose are sometimes too general, particularly where circumstances or issues of special concern to the Council exist as indicated above.

Reports separately provided from the SAW and the SARC might facilitate a clearer distinction between the processes of scientific analysis and peer review, in addition to consensus building and recommendation if that is desired. In addition, it would give both the SAW and the SARC greater ownership of their work.

The formulaic organization of the Advisory Report provides a convenient structure for SARC scientists (many of whom are unfamiliar with the SARC, SAW, and Council processes) to work within when communicating their recommendations to the Council and supporting scientists. It also provides the Council with a familiar format in which to view results and recommendations. However, there are nearly always circumstances that require an insight to be communicated or an alternative view to be presented that does not fit directly into the formula. Stock assessments that contain some information, but not enough to provide a biological reference point are one such example of this. Stock assessments that contain more information than can rightfully be compared to a narrowly defined biological reference point are another example of this. The format for the Advisory Report is fine, but this format should not overly restrict the level or quality of the information it is meant to convey.

Methods Review

The SARC panel had the expertise, but lacked the time to conduct a comprehensive review of the methods as specified by the SARC terms of reference. Never the less it endeavored to provide a review of production modeling within this context. A workshop devoted to methodological review, with extensive analyses provided by NMFS scientists and other participants, might be an alternative mechanism to consider for providing a baseline review and guidance regarding state-of-the-art approaches to fisheries science.

One of the problems managers are encountering with current biological reference points, which might illicit such a methodological review, is that the information that went into their derivation now needs updating, and often these updates

provide a more comprehensive analysis than can be framed within a production model context alone. It is important, therefore, for managers to make their concerns known and to ask for robust and self-consistent reference points, but it is also important for managers to recognize that they need to have the best information available at hand, and this necessarily involves change.

Conclusions

The SARC meeting went well. Northeast Fisheries Science Center scientists did a good job of amassing the information available and applying the most appropriate methods to the task at hand.

It is difficult seeing the three stocks reviewed in such poor shape, but it is clear that the mechanisms are there to encourage stock recovery. Better data are needed in order to improve the assessments, and these data should include more information on discard losses and recreational landings.

Northeast Fisheries Science Center scientists have made, and will continue to make, significant contributions to scientific methodological development. Continued research, development, and implementation of methods in data analysis, modeling, and stock assessment by this group should be encouraged. Production modeling will be an important component of this, but it should not be the only component. Effort should also be directed at providing information derived from more comprehensive approaches, which include elementary data analysis (e.g. trends in catch to survey ratios), age and size-structured modeling, production modeling, and multispecies analysis. Their expertise could also be utilized in exploring the consequences of alternate management scenarios through simulation exercises that make use of the methods presently employed for assessment.

As always seems to be the case, the SARC tried to accomplish too much in too little time. Some clarification is needed on the role of the SARC. Is it simply to provide peer review, or should it continue to provide a means for consensus building and recommendation? The insight it provides might improve if its obligations, expected products, and methods of reporting were kept distinct from the SAW.

The terms of reference provided to the SARC were fairly general. However, some mechanism for communicating specific questions or concerns regarding the stocks, the assessments, or methods to the SARC should exist. This would facilitate a communication bridge between scientists and managers. And bridges are needed.

This and other CIE review documents should be made available to NMFS at the close of the review cycle.

References

Stock Assessments

A1 – The 2001 Assessment of the Gulf of Main Cod
R. K. Mayo, e. Thunberg, and S. E. Wigley

B1 – Stock Assessment for White Hake in the Gulf of Maine – Georges Bank
Region 2001
K. A. Sosebee

C1 – Biological Characteristics, Population Dynamics and Current Status of
Sebastes fasciatus Storer, in the Gulf of Main – Georges Bank Region
R. Mayo, J. Brodziak, M. Thompson, J. Burnett, and S. Cadrin

Production Modeling

D1 – Methods Subcommittee Overview with Graphical and Diagnostic Measures
for the Evaluation of Surplus Production Models
Methods Subcommittee

D2 – External Surplus Production Models for Striped Bass, Summer Flounder,
Redfish, White Hake, and Gulf of Maine Cod
Methods Subcommittee

D3 – Tools for Estimating Surplus Production and Fmsy in Any Stock
Assessment Model
L. Jacobson and S. Cadrin

D4 – Bayesian Surplus Production Models for Gulf of Maine – Georges Bank
Redfish
J. Brodziak and H-L Lai

D5 – Sensitivity of MSY Reference Points to Recruitment Decisions for Georges
Bank Yellowtail Flounder
S. Cadrin

Appendices

Stock Assessment Review Committee:

Patrick J. Sullivan SARC Chair (CIE, Cornell Univerisity)
Terry Smith SAW Chair (NMFS)

Andy Applegate (NEFMC Staff)
Jim Armstrong (North Carolina DMF)
Carl Bouchard (New Hampshire Fisherman)
Steven Cadrin (NMFS)
Mike Fogarty (NMFS)
Norman Hall (CIE, Murdoch University, Aus)
Joe Idoine (NMFS)
Kevin Kelly (Maine DMR)
Robert Mohn (DFO)
Steve.Murawski (NMFS)
William Overholtz (NMFS)
Dan Power (DFO)
Michael Prager (NMFS)
Fred Serchuk (NMFS)
Peter Shelton (DFO)
John Witzig (NMFS)

Presenters:

John Brodziak (NMFS)
Ralph Mayo (NMFS)
Paul Rago (NMFS)
Katherine Sosebee (NMFS)

Rapporteurs:

Paul Nitschke (NMFS)
Jim Weinberg (NMFS)
Susan Wigley (NMFS)

STATEMENT OF TASK

Consulting Agreement between the University of Miami and Dr. Patrick Sullivan

June 18, 2001

General

The Stock Assessment Review Committee meeting (SARC) is a formal, one-week long meeting of a group of stock assessment experts who serve as a peer-review panel for several tabled stock assessments. It is part of the overall Northeast Stock Assessment Workshop (SAW) process that also includes peer assessment development (SAW Working Groups), public presentations, and document publication within a cycle that lasts six months. The panel is made up of some 12-15 assessment scientists: 4 scientists from the NEFSC; a scientist from the Northeast Regional office, scientists from the staff of the New England and Mid-Atlantic Fishery Management Councils, and Atlantic States Marine Fisheries Commission and additional panelists from state fisheries agencies, academia (US and Canada), and other federal research institutions (US and Canada).

Designee will serve as chairman of the 33rd Stock Assessment Review Committee panel. The panel will convene at the NEFSC in Woods Hole the week of 25 June (25-29 June, 2001) and review assessments for Gulf of Maine cod, white hake and redfish. The panel will also review a report from the SAW Methods Working group on the role of stock production modeling in determining and evaluating biological reference points.

Specific

- (1) Prior to the meeting: become familiar with the working papers produced by the SAW Working Groups (total number not final; there will be at least one per stock);
- (2) During the meeting: Act as chairperson where duties include control of the meeting, coordination of presentations and discussion, control of document flow;
- (3) After the meeting: Facilitate the preparation and writing of a Draft Advisory Report and Consensus Summary Report by NMFS personnel. Panelists, NEFSC staff and the SAW Chairman will ensure that documents are made available to the SARC chair, revised according to the SARC Chair's directions, compiled, copied and distributed;
- (4) Review the final Draft Advisory Report and Consensus Summary Report.
- (5) No later than July 13, 2001, submit a chair report detailing the major events, results, and conclusions of the meeting. The report should be addressed to the "UM Independent System for Peer Reviews," and sent to David Die, UM/RSMAS, 4600 Rickenbacker Causeway, Miami, FL 33149 (or via email to ddie@rsmas.miami.edu).

The SAW Chairman and SAW Coordinator will assist the Chair prior to, during and after the meeting in ensuring that documents are distributed in a timely fashion. The SARC Chair will be solely responsible for the editorial content of the reports.

The Chair's duties will occupy a total of two weeks - several days prior to the meeting for document review; the week long meeting; and several days following the meeting to ensure that the final documents are consistent with the SARC's recommendations and advice.

Contact persons: Dr. Terrence P. Smith, NEFSC, Woods Hole, SAW Chairman, 508-495-2230
Mary Jane Smith, NEFSC, Woods Hole, SAW Coordinator, 508-495-2370

Signed _____

Date _____

ANNEX I: REPORT GENERATION AND PROCEDURAL ITEMS

1. The report should be prefaced with an executive summary of findings and/or recommendations.
2. The main body of the report should consist of a background, description of review activities, summary of findings, and conclusions/recommendations.
3. The report should also include as separate appendices the bibliography of materials provided by the Center for Independent Experts and the center and a copy of the statement of work.
4. Individuals shall be provided with an electronic version of a bibliography of background materials sent to all reviewers. Other material provided directly by the center must be added to the bibliography that can be returned as an appendix to the final report.

Please refer to the following website for additional information on report generation:

http://www.rsmas.miami.edu/groups/cimas/Report_Standard_Format.html