Report from the Chair

of the

Second South East Data, Assessment, and Review (SEDAR) Peer Review Panel Workshop

held at the

Holiday Inn-Brownstone Hotel,
1707 Hillsborough Street, Raleigh, NC 27605

on

February 25 to 28, 2003

Norm Hall
Murdoch University, Western Australia, Australia
March 2003

Synopsis/summary of the meeting

The SEDAR Review Panel met at the Holiday Inn-Brownstone Hotel, 1707 Hillsborough Street, Raleigh, NC 27605, from February 25 to 28, 2003. The purpose of the meeting was to review the stock assessments that had been undertaken for the vermilion snapper and black sea bass stocks that lie off the south eastern coast of the U.S. The Statement of Work to be undertaken, which describes the terms of reference for the Review Panel, is presented as Appendix 1.

The 2nd SEDAR Review Panel comprised Dr Jon Volstad (CIE, Maryland), Dr Liz Brooks (NMFS SEFSC), Gary Shepherd (NMFS NEFSC), Gregg Waugh (SAFMC), Mark Marhefka (Snapper Grouper Advisor Panel, vermilion snapper), Jodie Gay (Snapper Grouper Advisor Panel, black sea bass), Dr Michelle Duval (NGO/SSC Representative, NC Environmental Defense), and Douglas Gregory (SSC Representative, Florida Sea Grant) and was chaired by Dr Norman Hall (Murdoch Univ., Australia/CIE).

A list of the assessment reports that were reviewed and discussed by the SEDAR Review Panel is presented in Appendix 2, together with details of other background documents that were made available to the Review Panel. The reports of both the vermilion snapper and black sea bass assessments were introduced by Dr Jim Berkson, who chaired the Data and Assessment workshops, and who presented the Review Panel with an overview of the outcomes of these workshops. Details of the stock assessment of the vermilion snapper fishery were presented by Dr Erik Williams, while Drs Doug Vaughan and Kyle Shertzer reported on the assessment for black sea bass.

The overall conclusion of the Panel was that the assessments had been undertaken very competently, and the Panel acknowledged the efforts of those concerned in the Data and Assessment Workshops and in the model development and exploration.

The draft reports arising from the Second SEDAR Review Workshop are included as Appendices 3 and 4.

A summary of the issues that were discussed for each fishery is presented below.

Vermilion snapper

1. Detail in the assessment reports

   The Review Panel found that, in many cases, the descriptions presented in the assessment report did not record detail that would have assisted in the review. For example, while the assessment report provided details of the range of values of natural mortality that had been accepted at the Data Workshop for use in the assessment, no details were provided of the evidence or studies that had resulted in such estimates. The reasoning at the Data Workshop that had led to the

selection of the particular range of values was not reported in the Assessment Report. In such cases, the Review Panel was unable to determine from the Assessment Report alone whether the decision or assumption that had been made was appropriate, or whether the values that had been selected for use were adequate. Fortunately, the presenters were able to advise on many of the missing details.

2. Adequacy of data

Details of the methods that had been used to collect much of the data, and to process them after collection, were not presented in the assessment. Moreover, a detailed evaluation of the coverage, accuracy and precision of the data, with respect to the stock, was not presented in the assessment report. Thus, in determining whether the data were likely to be representative of the stock as a whole, or only of a specific spatio-temporal component of the stock, the Review Panel relied on comments from the various experts present at the Review Workshop (in particular, Dr Pat Harris and Ms Jennifer Potts).

As tables of data had not been presented in the assessment reports, it was not possible for the Review Panel to undertake any exploratory analysis of their own. It would be useful for future reviews that both figures and tables are provided. In particular, it would be valuable to list, in tabular format, all values that were used as input to the models. This would allow the Review Panel to explore these data and to determine whether the results of the models appeared consistent with results from other simple approaches.

The assessment was constrained by the lack of consistent, long-term time series of abundance indices, and in particular, by the lack of a long-term fishery independent series. The index that had been derived from the headboat data appeared likely to be very influential in the assessment, due to its long-term nature. While indices of abundance derived from commercial fisheries data would have been useful, it is likely that they would not have contained a great deal of information. The reason for this is the fact that the commercial fisheries data are unlikely to provide a time series of sufficient length, and thus may only provide information on recent trends. However, it is important that future assessments should attempt to include these data and to ensure that any information contained in the data contributes to the results of these assessments. The adequacy of the coverage of the fishery by the various data sets was an issue with which the Review Panel grappled. It was concluded that there would be value in reviewing the various sampling and data collection regimes to determine how these might be extended to provide data that were more likely to be representative of the stock.

3. Adequacy of models

The models, which had been applied by the Assessment Workshop, appeared appropriate. However, the fact that it was not possible to fit the production model signaled that there was insufficient information present in the abundance indices to determine the magnitude of the biomass with any precision. When the length composition data were added, it became possible to fit a length-based model. However, the resulting biomass estimates for this new model were very dependent on the values of natural mortality and steepness of the stock-recruitment relationship, which had been input. While biomass estimates were still uncertain, estimates of fishing mortality appeared more consistent over the different sets of natural mortality and steepness parameters.

On further consideration, following the meeting, I believe that this result arises because estimates of total mortality are being derived from the information contained in the declining right-hand limbs of the length composition data and thus are relatively well determined. However, because of the lack of information in the abundance indices, the model appears to rely strongly on the values of the parameters that had been input for natural mortality and steepness when estimating the magnitude of the current biomass. For such data, when the model is used to estimate the steepness of the stock-recruitment relationship, the tendency is usually that the steepness estimate will approach unity, or a high value, thus predicting approximately constant recruitment. For such data, it is important that attempts should be made to estimate uncertainty in parameter estimates and outcomes. For the assessments reported by the Assessment Workshop, uncertainty in input values (natural mortality and steepness) had been investigated in the various sensitivity runs, but, because of the large number of parameters in the length-structured model, no attempt had been possible to explore the uncertainty of estimation. There would be value in considering the development of a simpler length-structured model, with fewer parameters, in order that the uncertainty associated with parameter estimation can be explored.

Considerable uncertainty existed in the estimates of biomass and of the biomass-based reference points, and results from the different sensitivity runs were scattered widely over the phase plot. For low values of natural mortality and steepness, the stock would appear to be severely overfished, while for higher values of natural mortality and steepness, and for the estimate that arose from the base run, the stock appeared not to be overfished. Weights had been assigned by the Assessment Workshop to the different sensitivity runs, but the Review Panel recognized that these were arbitrary. The Panel grappled with the issue of whether all of the sets of steepness and natural mortality were appropriate for use, both during the Workshop and afterwards, during an email discussion. Eventually, the Panel concluded that the lower values of natural mortality and steepness were unlikely, and thus they based their assessment of the state of the stock on those sensitivity runs that appeared more appropriate, concluding that the stock was not overfished. However, the wording of the Assessment report was

phrased to communicate the uncertainty associated with the estimates of biomass and biomass-based reference points.

4. Adequacy of projections

   The methods used for the projection appeared adequate. However, as a consequence of the period from which recruitment estimates were sampled, a slight upward trend was apparent in the average predicted biomass. This appears due to slightly higher than average recruitment being estimated for the period from which the future recruit levels were sampled. Furthermore, this was in spite of the fact that the fishery was assessed to be experiencing overfishing, and despite the fact that the current level of fishing mortality was being used for the projection. On considering this subsequent to the meeting, it is possible that this result also stems partly from the uncertainty that surrounds the estimate of current biomass.

5. Research recommendations

   The research recommendations were focused on studies that would improve the quality of the data and by which a longer time series of fisheries independent data might be recovered from the existing data sets. There was a need to analyze the data from the commercial fishery, as this sector believed that their data would be valuable and should be considered in future assessments. Lack of information on the quantity and size/age composition of discards, and of their mortality following release, were also seen as necessary subjects for future research.

Black sea bass

1. Detail in the assessment reports

   The assessment report for the black sea bass suffered from the same deficiencies as that for vermilion snapper, in that the descriptions in the Assessment Report lacked sufficient detail.

2. Adequacy of data

   Similar problems arose for black sea bass as for vermilion snapper. Here the problem of coverage was associated with the MARMAP study being undertaken at times and locations that might not have recorded the abundance seen by the commercial fishers. Again, commercial fishers were concerned that their logbook and other data were not included as time series in the assessment. Moreover, the commercial fisher on the Review Panel considered that, based on his and other fishers' observations, the abundance had not declined to the extent shown by the headboat index. The Panel considered this issue and acknowledged that the use of GLM to adjust the data for factors such as time and space was appropriate and should remove the impact of any change in the spatial or temporal distribution of

fishing by the headboat sector of the fishery. However, further review of these data would be useful to determine whether more subtle factors, such as targeting of different species, were influencing the trend shown by this index. The Panel noted that the effects of increasing fishing efficiency, arising from introduction of technology such as GPS or improved sounders, had not been included in the assessment. It would assist greatly if a longer-term time series could be recovered from the fishery-independent data. The magnitude and composition of the discards from the different fishing sectors, and the release mortality associated with capture and discard, were areas in which the data could be improved.

3. Adequacy of models

   The question was raised as to whether production models would be adequate if applied to a protogynous species such as the black sea bass. The Panel believed that this issue required further research, and set aside the assessment results based on the production model. However, the Panel accepted the age-structured model as an appropriate tool for assessment. They expressed concern regarding the variable that should be used as a measure of spawning potential, and whether this should be based on total or female only biomass. The Panel decided that, for the current assessment, total biomass should be used as the measure from which the status of the stock might be determined.

   The model fit was accepted and the assessment of the status of the stock appeared sound.

4. Adequacy of projections

   The Panel considered that the methods used to project the fishery forward in time were appropriate.

5. Research recommendations

   Similar research recommendations were made to those for vermilion snapper. However, as identified above, the issue of protogyny was of concern for both the production model and for the selection of the variable to be used as a measure of spawning potential in the stock assessment. The point was raised among the Panel that, although the biological process of sex change may be recognized in fishery models, there is little understanding of the behavioral dynamics of the species and of whether change in the sex/size/age composition of the stock is likely to affect the spawning potential of the stock. Although given a low priority, this was considered a useful subject for research.

The meeting process

This workshop represented only the second such cycle of the SEDAR process, and, to some extent, the form of the process is still being developed. However, it was pleasing to note that, in the Statement of Work, a very clear instruction had been given to the Review Panel concerning its responsibility not to undertake or request new assessments at the meeting. Clearly, the results from such assessment would not have received the same level of scrutiny and review as results that had been produced and reviewed in the SEDAR process and would not satisfy the requirements for an open and transparent process.

It would be extremely useful if, as in the case of the SARC reviews for the North Eastern Fisheries Science Center, at future meetings,

1. The organizing committee would supply a rapporteur to record the discussion arising from the presentation of each stock assessment;
2. The Assessment Workshop would produce a first draft of the Advisory Report on Stock Status for each fishery, based on their findings from the assessment;
3. A "SEDAR Leader" would be appointed from among the Review Panel (other than the Chair) for each fishery that is being assessed. This Leader would be responsible for using the rapporteur's notes of the Panel's discussion to produce a first draft of the section of the Consensus Assessment Report concerning the fishery, and to modify the initial draft Advisory Report on Stock Status for the fishery, thereby producing a modified draft that could be considered by the Review Panel as a group.

These modifications to the process would aid the operations of the Review Panel considerably. It is essential that such drafts of the final reports should be available for consideration by the Panel as soon as possible after the presentations regarding each assessment and its associated discussion. It would be ineffective for the Panel to produce those initial draft reports, as these are more effectively produced by an individual before being discussed by the entire Panel.

Discussions at the Review Panel Workshop were open, with participation from both the Panel and other attendees. Thus, the meeting was inclusive and allowed issues to be raised by all present and considered by the Panel. The final decisions on the statements included in the Advisory Report and Consensus Report were made by the Panel Members alone. As a consequence of the open discussion, I believe that the Review accomplished its purpose of a full and transparent review of the assessments.

The materials arrived in time for review. However, as indicated in the Reports and in the discussion above, greater detail would have been desirable.

Drs John Merriner, Mike Prager and Jim Berkson provided invaluable advice regarding the form of the outputs that they sought from the meeting but, of course, left the content to the Review Panel's determination. The intent of the final reports from the meeting was not to duplicate the Assessment Reports that had been produced by the Assessment

Workshop, but to provide an informed evaluation of the methods used and conclusions that had been reached, in order to provide an interpretation of the assessments that might assist the Council.

Other observations

While much of the email discussion concerning the Reports from the Review was focused on editorial comment, the issue of whether or not the vermilion snapper stock was overfished received a reasonable amount of consideration. Such discussion is hidden from the public view as it occurs in a non-transparent forum. The question rises as to whether a mechanism needs to be developed that would provide an open forum for this portion of the process?

Acknowledgements

The success of the meeting was due, in no small part, to the members of the Data and Assessment Workshops, who produced the reports which provided the background for the assessment, to the presenters, Drs Erik Williams, Doug Vaughan and Kyle Shertzer, to the attendees, in particular Dr Pat Harris and Ms Jennifer Potts, and to the members of the Review Panel. Participation in both the meeting and email discussions was strong, and all participants are thanked for their contribution.

Appendix 1. Statement of work

STATEMENT OF TASK

Consulting Agreement between the University of Miami and Dr. Norman Hall

February 12, 2003

General

The **S**outh **E**ast **D**ata, **A**ssessment, and **R**eview (**SEDAR)** process for stock assessment and review is used in the NMFS- Southeast Fisheries Science Center's area of responsibility. This new program provides the framework for independent peer review of stock assessments undertaken jointly by NMFS-SEFSC, three Regional Fishery Management Councils, and two Interstate Fishery Commissions, and state fishery agencies. The SEDAR process uses a three phase approach: a data workshop, an assessment workshop, and a peer review panel workshop. The peer review panel is composed of stock assessment experts, other scientists, and representatives of the Council, the fishing industries, and non-governmental conservation organizations. The communication elements of SEDAR include a stock assessment report from the Assessment Workshop, a review panel report evaluating the assessment(s) (drafted during the Review Panel Workshop), presentation of the peer reviewed assessment results to the Council(s) and public, and publication of collected documents for stock assessments considered in that cycle of the SEDAR process.

The assessments to be reviewed by this SEDAR Peer Review Panel are of black seabass and vermilion snapper from the South Atlantic Fishery Management Council area of jurisdiction. A data workshop was held October 6–10, 2002 in Charleston, SC. The assessment workshop was held January 6–10, 2003 in Beaufort, NC. The SEDAR Review Panel for the black seabass and vermilion snapper assessments will include up to 12 members: 1 senior assessment scientist each from NMFS- NEFSC and -SEFSC, 1 Council Staff scientist and 2 assessment scientist members of the Scientific and Statistical Committee from the South Atlantic Fishery Management Council, 1 commercial fisherman from the Snapper-Grouper Advisor Panel (shared by two individuals, each with special experience in one of the species), 1 scientist representative from a non-governmental organization, and 2 members (chair and reviewer) from the Center for Independent Experts (CIE). Assessment scientists from NMFS-SEFSC will present the assessments and be available to provide supplemental information as requested by the review panel.

SEDAR Assessment Review Panel Tasks-

The Panel will evaluate the black seabass and vermilion snapper assessments, the input data, assessment methods, and model results as put forward in the stock assessment workshop report.

Specifically, the review panel will:

1. Evaluate the adequacy and appropriateness of fishery-dependent and independent data used in the assessment (i.e. was the best available data used in the assessment)
2. Evaluate the adequacy, appropriateness and application of models used to assess these species and to estimate population benchmarks (MSY, Fmsy, Bmsy and MSST, i.e. Sustainable Fisheries Act items);
3. Evaluate the adequacy, appropriateness, and application of models used for rebuilding analyses;
4. Develop recommendations for future research for improving data collection and the assessment;
5. Prepare a report summarizing the peer review panel's evaluation of the black seabass and vermilion snapper stock assessments. (Drafted during the Review Workshop, with the Final report due two weeks after the workshop- March 14, 2003);
6. Prepare a summary stock status report including management recommendations. (Drafted during the Review Workshop, with the Final report due two weeks later - March 14, 2003.)

It is emphasized that the panel's primary duty is to review the existing assessment. In the course of this review, the Chair may request a reasonable number of sensitivity runs, additional details of the existing assessment, or similar items from technical staff. However, the review panel is not authorized to conduct an alternative assessment, or to request an alternative assessment from the technical staff present. To do so would invalidate the transparency of the SEDAR process. If the review panel finds that the assessment does not meet the standards outlined in points 1 through 3, above, the panel shall outline in its report the remedial measures that the panel proposes to rectify those shortcomings.

The Review Panel Report is a product of the overall Review Panel, and is NOT a CIE product. The CIE will not review or comment on the Panel's report, but shall be provided a courtesy copy, as described below under "Specific Tasks." The CIE products to be generated are the Chair's report, also discussed under Specific Tasks.

Specific Tasks

Designee will serve as Chair of a SEDAR Stock Assessment Review Panel which is to convene in Raleigh, NC at the Holiday Inn Brownstone Hotel during the week of 24 February 2003. The Panel meeting will begin mid-day on February 25 and conclude early afternoon on February 28, 2003. The Panel will review stock assessments provided for black seabass (stock South of Hatteras, NC) and vermilion snapper in the area of jurisdiction of the South Atlantic Fishery Management Council.

The SEFSC shall provide the CIE with copies of the following two documents for distribution to the Chair.

> Report of Black Seabass Stock Assessment Workshop, Second SEDAR Process, Beaufort, North Carolina, January 6-10, 2003. Prepared for South Atlantic Fishery Management Council, Charleston, South Carolina, 14 February 2003.
>
> Report of Vermilion Snapper Stock Assessment Workshop, Second SEDAR Process, Beaufort, North Carolina, January 6-10, 2003. Prepared for South Atlantic Fishery Management Council, Charleston, South Carolina, Issued February 13, 2003.

It is estimated that the Chair's duties will occupy a total of two weeks, or 14 days - several days prior to the Review Panel meeting for document review; four days at the SEDAR meeting; several days following the meeting to ensure that the final documents are completed, and several days to complete a Chair's report for the CIE. .

Roles and responsibilities:

1. Prior to the Review Panel meeting the Chair will be provided with the stock assessment workshop report and other associated documents on the black seabass and vermilion snapper. The Chair shall read and review these documents to gain an in-depth understanding of the stock assessment itself and the resources and information considered in the assessment;
2. During the Review Panel meeting, the Chair shall control and guide the meeting, including the coordination of presentations and discussions, and document flow;
3. The Chair shall facilitate the preparation and writing of the Peer Review Panel Report (item 5 above) and a Draft Summary Stock Status Report (item 6 above). Review panel members, SEFSC staff, and stock assessment scientists present will assist the Chair as needed. The Chair shall be responsible for the editorial content of the two review workshop reports. These reports shall be drafted during the Review Workshop, with the final reports due to the recipients listed below in item #4 two weeks after the workshop- March 14, 2003. These reports are products of the Review Panel meeting, and are not CIE products.;
4. The Review Panel Report and the Draft Summary Stock Status Report, which are not CIE products, shall be provided to Dr. Nancy Thompson, NMFS-SEFSC, 75 Virginia Beach Drive, Miami, FL 33149 (e-mail, Nancy.Thompson@NOAA.GOV); Dr. John Merriner, NOAA Beaufort

Laboratory, 101 Pivers Island Road, Beaufort, NC 28516 (e-mail, John.Merriner@NOAA.GOV ; and Mr. Robert Mahood, South Atlantic Fishery Management Council, One Southpark Circle, Suite 306, Charleston, SC 29407 (e-mail, Robert.Mahood@safmc.net). Dr. David Die of the CIE shall also be provided a courtesy copy of these documents via e-mail at ddie@rsmas.miami.edu.

5. The Assessment Workshop Chair and SEDAR Coordinator will assist the Chair prior to, during and after the meeting to ensure that final documents/results are distributed in a timely fashion;
6. No later than March 14, 2003, the Chair shall submit a written chair report[1] addressed to the "University of Miami Independent System for Peer Review," and sent to Dr. David Sampson, via email to David.Sampson@oregonstate.edu, and to Mr. Manoj Shivlani, via email to mshivlani@rsmas.miami.edu.

Contact persons:
NMFS contact: Dr. John Merriner, Beaufort Laboratory, 101 Pivers Island Road, Beaufort, NC 28516. Phone 252-728-8708. FAX 252-728-8784. E-mail john.merriner@noaa.gov
SAFMC contact: Mr Gregg Waugh, One Southpark Circle, Suite 306, Charleston, SC 29407, phone 843-571-4366, FAX 843-769-4520, E-mail gregg.waugh@safmc.net.

[1] The written report will undergo an internal CIE review before it is considered final. After completion, the CIE will create a PDF version of the written report that will be submitted to NMFS and the consultant.

ANNEX I: Contents of Chair Report

1. Synopsis/summary of the meeting – to provide context for the comments rather than to rewrite the summary report, which is a product of the meeting, and is not a CIE product.

2. Views on the meeting process, including recommendations for improvements on:
   - The meeting process itself;
   - The outcome(s) of the meeting;
   - Materials provided for the meeting, including their timeliness, relevance, content, and quality;
   - The guidance provided to run the meeting.

3. Other observations on the meeting process.

4. Appendices, including:
   - Statement of Work;
   - Bibliography of the materials provided for the meeting;
   - Summary report (if available at the time of report submission).

Appendix 2. Bibliography of the materials provided for the meeting

2nd SEDAR Review Panel Working Papers
February 25 to 28, 2003
Holiday Inn-Brownstone Hotel, 1707 Hillsborough Street, Raleigh, NC 27605

Vermilion snapper

Report of Vermilion Snapper Assessment Workshop, Second SEDAR Process, Beaufort, North Carolina, January 6-10, 2003.

Black sea bass

Report of Black Seabass Stock Assessment Workshop, Second SEDAR Process, Beaufort, North Carolina, January 6-10, 2003.

Other documents, which were provided as background information

Stock Assessment and Fishery Evaluation Report for the Snapper Grouper Fishery of the South Atlantic, Volume 1, November 1999:

- **Executive summary**.
- Appendix L. **Manooch III, C.S., (1997).** Population Assessment of the Vermilion Snapper, *Rhomboplites aurorubens*, from the Southeastern United States.
- Appendix O. **Vaughan, D.S., Collins, M.R., Zhao, B. and Meister, H.S. (1996).** Population Characteristics of the Black Sea Bass *Centropristis striata* from the U.S. Southern Atlantic Coast.
- Appendix Y. **Potts, J.C., Manooch III, C.S. and Vaughan, D.S. (1998).** Age and growth of vermilion snapper from the southeastern United States. *Trans. Am. Fish. Soc.,* 127:787-795.
- Appendix Z. **Vaughan, D.S., Zhao, B., Collins, M.R., McGovern, J.C. and Meister, H.S. (1998).** Evaluation of multiple survey indices in assessment of black sea bass from the U.S. South Atlantic Coast. Fishery Stock Assessment Models, Alaska Sea Grant College Program, AK-SG–98-01. 121-136.

Chapman, R.W., Sedberry, G.R. and McGovern, J.C. (1999). Identification of stock structure in black sea bass, *Centropristis striata*, and white grunt, *Haemulon plumeiri*, in the South Atlantic Coast and Gulf of Mexico. South Carolina Department of Natural Resources, Marine Resource Research Institute, NA57FF0291, manuscript. 32 pp.

Cuellar, N., Sedberry, G.R. and Wyanski, D.M. (1996). Reproductive seasonality, maturation, fecundity, and spawning frequency of the vermilion snapper, *Rhomboplites aurorubens*, off the southeastern United States. *Fishery Bulletin*, **94**: 635-653.

McGovern, J.C., Collins, M.R., Pashuk, O. and Meister, H.S. (2002). Temporal and spatial differences in life history parameters of black sea bass in the southeastern United States. *North American Journal of Fisheries Management*, **22**: 1151-1163.

Parker, Jr., R.O. and Dixon, R.L. (1998). Changes in a North Carolina reef fish community after 15 years of intense fishing – global warming implications. *Trans. Am. Fish. Soc.,* **127**: 908-920.

Poffenberger, J. (2002). A report on the supplemental discard data for the Southeast Fisheries Science Center's coastal fisheries logbook program. Sustainable Fisheries Division Contribution No. SFD-02/03-183, 16 pp.

Steimle, F.W., Zetlin, C.A., Berrien, P.L. and Chang, S. (1999). Essential Fish Habitat Source Document: Black sea bass, *Centropristis striata*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-143.

Appendix 3. Draft Advisory Report

Second SEDAR

(South East Data, Assessment and Review)

Draft

Advisory Report

on the status of the stocks of

Vermilion Snapper and Black Sea Bass from the south east of the U.S.

Second SEDAR Review Panel Workshop
RALEIGH, NC 27605
February 25 – 28, 2003

Second SEDAR Advisory Report on Stock Status
Vermilion Snapper and Black Sea Bass
RALEIGH, NC 27605

February 25 - 28, 2003

I. Vermilion Snapper

1. Status of Stock

The assessment indicates that overfishing is occurring but that the stock is not currently overfished. However, SFA benchmarks are estimated from the stock-recruitment relationship, in which the SEDAR Review Panel did not have confidence.

The estimate of the current fishing mortality, F, is taken as the average F over the last 3 years (F_{proj}=0.44/yr). F_{proj} is considered to be a robust prediction of current F because it reduces the influence of uncertainty about recent recruitment. F_{proj} was consistently above the F_{MSY} and F_{max} values under the full range of sensitivity runs.

There is a high level of uncertainty in determining whether or not the stock is overfished. The SEDAR Review Panel concluded that the stock was not overfished by restricting its attention to points E, D, H, and G in the phase plot of status indicators (Figure 19[2]). These four points reflect the uncertainty in the stock-recruitment relationship by spanning a wide range for steepness[3] (0.7-0.95) and the most likely range for natural mortality (0.25-0.3/yr).

2. Biological Reference Points

Previous Assessment
According to the existing pre-SFA overfishing definition, vermilion snapper are overfished if the SPR is less than 30%. The most recent estimate of SPR (prior to the current assessment) was 21-27%, which means that, using this definition, vermilion snapper should be considered overfished.

[2] References to tables and figures refer to the tables and figures presented in the corresponding report from the Assessment Workshop.
[3] The "steepness" of the stock-recruitment relationship, which was used in the model, is a value that can range from 0.2 to 1.0 and is the fraction of the virgin recruitment that will recruit to the fishery when the spawning stock is reduced to 20% of its virgin level. If steepness is 0.2, recruitment is directly proportional to the size of the spawning stock, whereas if steepness is 1.0, recruitment is constant and independent of the size of the spawning stock.

Current assessment
The Review Panel advises the following –

1. Use F_{max} (currently estimated as 0.35/yr) as a proxy for F_{msy} (MFMT);
2. Therefore, the proxy for MSY may be taken as the yield associated with F_{max};
3. Estimates of MSST are poorly determined and range from 185 billion to 378 billion eggs, for values of steepness ranging from 0.7 to 0.95 and of the natural mortality rate ranging from 0.25 to 0.3 per year.

3. Forecast

If recruitment occurs at or above the estimated average levels for the 1983-98 time period (as used in projections), and the fishing mortality rate is maintained at the current level (F_{proj}), then the stock biomass is likely to increase over the next few years. Although F_{proj} was consistently above F_{max}, above average annual recruitment was experienced between 1983-98, thus producing the projected increase in biomass.

4. Special Comments

The estimated abundance indices used in the assessment of this stock are based on a limited spatial coverage that does not fully reflect the entire stock. In the short-term, information from the commercial fishery on the abundance of larger vermilion snapper should be examined. Over the long-term, fishery independent sampling should be expanded. Attention should also be given to developing a recruitment index.

Effective monitoring of stock status will require more and improved data on discards. It is recommended that the bycatch logbook be continued and expanded estimates provided.

5. Source of Information

Report of Vermilion Snapper Assessment Workshop, January 6-10, 2003.

In addition, a Data Workshop was held during October 7-10, 2002. All data, reports, and results are included on a CD available from the NMFS Beaufort Lab.

II. Black Sea bass

1. Status of Stock

Overfishing is occurring and the stock is overfished, based upon the best available data used in the assessment.

The best estimate of fully-selected F_{2001} was 1.04/yr (range 0.89 – 2.00/yr). The best estimate of the January 1, 2002 spawning biomass was 1755 mt (range 766 – 2715 mt).

2. Biological Reference Points

Previous Assessment
Existing BRP previously approved by the Council - The timetable for rebuilding black sea bass effectively was reset on December 2, 1999, when the SFA Comprehensive Amendment was implemented in regulations. The regulations require that the black sea bass stock be rebuilt above the B_{msy} level (*i.e.*, the biomass must be above the biomass capable of producing the MSY), which was specified as 5.31 million pounds by December 2, 2009 (based on a 10 year rebuilding timeframe). Based on data through 1995, the spawning stock biomass/MSST ratio was estimated at 0.54, which suggested that the stock was below the MSST and therefore overfished. The fishing mortality through 1995 was 0.97/yr, which was above the MFMT (0.72/yr), and therefore black sea bass were experiencing overfishing.

Current assessment
The panel advises the following –
The base-run estimates and their extreme range obtained from the alternative sensitivity runs are reported below. Note that choosing within the range should be done on a run-by-run basis; see Tables 6.2 and 8.1 in the Report of the Black Sea bass Stock Assessment Workshop. Each of the runs is associated with the assigned probability specified in the assessment document (Table 6.1). In general, the range results from the minimum and maximum bounds of the sensitivity runs, some of which may be unlikely to represent the current stock status. The base run represents the central case, and is considered to provide the most likely set of results.

The BRPs varied considerably in the various sensitivity runs:

1. MSY = 1730 mt (range 987 – 3580 mt)
2. MFMT = 0.04/yr (range 0.002 – 0.99), based on the default control rule. If the council were to choose another control rule, the MFMT would need to be re-specified. The Council instead might choose to use $F_{rebuild}$.
3. MSST = 9460 mt (1830 – 30700 mt)
4. Bmsy = 13500 mt (range of 3050 – 38300 mt)
5. F_{2001}/F_{MSY} = 5.22 (0.94 – 22.23)
6. SSB_{2002}/SSB_{MSY} = 0.13 (0.02 – 0.89)
7. Rebuilding timeframe = 18 years based on the base run with $F_{rebuild}$ = 0.16/yr (range 0.10 – 0.49)

3. Forecast

Using values from the central run as a starting point, the stock could not recover in 10 years with F=0. The rebuilding time calculated from the generation time is 18 years (see Table 8.1)

4. Special Comments

The fisherman on the panel with extensive experience over the past 20 years fishing for black sea bass has not observed similar declines in his catches. Consequently, he does not believe the model results. There may be some mixing of the northern and southern stocks, which should be considered in future assessments.

The commercial data should be examined to determine whether an abundance index based on them would add to the accuracy or precision of future assessments.

The BRPs and projections are based on total mature biomass. There is uncertainty whether mature female biomass, or some other measure of reproductive potential, should be used as an alternative. Further examination of this issue is recommended. The computation of female spawning biomass in the present assessment may be misleading, and methodology for computing female biomass should be reevaluated.

Effective monitoring of stock recovery will require adequate data on discards from all fishery segments.

The Council should note that estimated abundance trends over time appear highly dependent on the headboat index, which is a fishery-dependent dataset and is the only long-term index. The fisheries literature contains substantial evidence that fishery-dependent indices can at times underestimate the degree of decline in a stock because they do not follow a simple linear relationship with stock size. By targeting local concentrations (patches) of fish that they find based on their expert knowledge, fishers can often maintain a relatively high catch per unit effort even when the overall abundance is in decline. This is especially the case for species that aggregate in structured habitats (*e.g.,* reef fish), or schooling fish that can be located by sophisticated acoustic fish finding equipment. Well-designed fisheries-independent surveys tend to provide more representative estimates of fish abundance because they cover a wider range of habitats and density levels. For such reasons, the fisheries-independent data should receive higher weighting as the time series increases.

5. Source of Information

Report of Black Seabass Assessment Workshop, January 6-10, 2003.

In addition, a Data Workshop was held during October 7-10, 2002. All data, reports, and results are included on a CD available from the NMFS Beaufort Lab.

Appendix 4. Consensus Assessment Report

Second SEDAR

(South East Data, Assessment and Review)

Consensus Assessment Report

on the assessments of the Status of the Stocks

of

Vermilion Snapper and Black Sea Bass from the south east of the U.S.

Second SEDAR Review Panel Workshop
RALEIGH, NC 27605
February 25 – 28, 2003

Second SEDAR Consensus Assessment Report
Vermilion Snapper and Black Sea Bass
RALEIGH, NC 27605
February 25 – 28, 2003

Conclusion

The SEDAR Review Panel accepted the appropriateness of the data used in the stock assessments for the vermilion snapper and black sea bass stocks and of the models used for stock assessment and projection. However, the Panel noted a number of issues that, if resolved, might improve the quality of future assessments.

1. **SEDAR Assessment Review Panel Workshop**

The SEDAR Review Panel met at the Holiday Inn-Brownstone Hotel, 1707 Hillsborough Street, Raleigh, NC 27605, from February 25 to 28, 2003, to review the assessments of the stocks of vermilion snapper and black sea bass, which occupy waters off the south eastern coast of the U.S. Members of the Review Panel and attendees of the workshop are listed in Appendix 1.

The initial Terms of Reference, which were considered by the Review Panel and which reflected the terms of reference for the data and assessment workshops, were:

1. Evaluate the adequacy and appropriateness of fishery-dependent and independent data used in the assessment (i.e. was the best available data used in the assessment)
2. Evaluate the adequacy, appropriateness and application of models used to assess these species and to estimate population benchmarks (MSY, Fmsy, Bmsy and MSST, i.e. Sustainable Fisheries Act items);
3. Evaluate the adequacy, appropriateness, and application of models used for rebuilding analyses;
4. Develop recommendations for future research for improving data collection and the assessment;
5. Prepare a report summarizing the peer review panel's evaluation of the black sea bass and vermilion snapper stock assessments. (Drafted during the Review Workshop, with the Final report due two weeks after the workshop- March 14, 2003);
6. Prepare a summary stock status report including management recommendations. (Drafted during the Review Workshop, with the Final report due two weeks later - March 14, 2003.)

A revised version of the terms of reference was received just prior to the SEDAR meeting. This document specified the terms of reference as:

1. Evaluate adequacy and appropriateness of fishery-dependent and fishery-independent data used in the assessment to accurately characterize stock status.

2. Evaluate adequacy, appropriateness, and application of models used to assess black sea bass and vermilion snapper and to estimate population benchmarks (i.e., SFA-required benchmarks of MSY, Fmsy, Bmsy and MSST and MFMT).
3. Evaluate adequacy, appropriateness, and application of models used for rebuilding analyses. Probability of rebuilding (to MSST and MSY) over time under the following fishing mortality scenarios are to be included: (a) F under current management regulations, (b) F=150% Fcurrent, (c) F=125% Fcurrent, (d) F=75% Fcurrent, (e) F=50% Fcurrent, (f) F=25% Fcurrent, (g) F=0, and (h) F=99% Fmsy.
4. Develop recommendations for future research for improving data collection and the assessment;
5. Prepare a Consensus Assessment Report summarizing the peer review panel's evaluation of the black sea bass and vermilion snapper stock assessments. (Drafted during the Review Workshop, Draft available by February 28th; Final report due two weeks after the workshop- March 14);
6. Prepare an Advisory Report to include a summary of stock-status report and forecast for the upcoming year. (Drafted during the Review Workshop; Draft available by February 28th; Final report due two weeks later -March 14)

As the Data and Assessment Workshops had not had the opportunity to run and review the projections for the various rebuilding strategies listed in Item 3, it was inappropriate for the Review Panel to request that these projections be calculated. The stock assessment team from NMFS indicated that it would be appropriate for the SAMFC to submit a request for these additional runs to NMFS and, as with other such requests from the Council, they would endeavor to produce the necessary outputs for the Council's consideration.

2. General

1. The descriptions in the assessment reports of the methods, which were used to collect and to analyze the data used in the assessments, were not sufficiently complete for a thorough and comprehensive review. Similarly, technical descriptions of the model structure, which were provided in the assessment reports, were sketchy and insufficiently complete. Accordingly, members of the Review Panel were obliged to base much of their evaluation on the information provided in the verbal presentations. It is possible that the detailed descriptions that were sought by members of the Review Panel may be presented in the reports of the Data or Assessment workshops. However, if not, it is recommended that the assessment reports for future stock assessments should include more detailed descriptions of the methods of data collection, analysis, and the use of these data for stock assessment. Generic descriptions of these methods should be developed, that are broadly applicable to this and future assessments.
2. For future stock assessments, sufficient details of the methods of data collection should be provided to allow the Review Panel to assess the extent to which catches from different spatial or temporal zones or from different fishing sectors have been representatively sampled, how the various samples are combined, and

the sampling intensity that has been applied to the different sectors. Standard errors of estimates of landings and of the various abundance indices should be calculated whenever possible, and potential sources of bias should be identified and adjusted for when feasible. It is acknowledged that the data will be adjusted in the model for gear selectivity. In the current assessment, the Review Panel was not able to assess whether samples were representative and, if not, the likely magnitude of bias that would result.

3. The Review Panel considered that minimum levels of sampling intensity and spatio-temporal coverage to achieve acceptable precision for key population parameters should be specified by the assessment team and that sample sizes should be increased if the sampling intensity should fall below this minimum level. The sampling designs of the various data collection methods should be reviewed for statistical adequacy (sampling intensity and spatio-temporal coverage).
4. Data should be reported in tabular as well of graphical format, to allow the Review Panel to explore miscellaneous aspects of the data.
5. For future SEDAR reviews, the biological evidence and scientific motivation that led to the selection of the base parameter case as well as alternate parameter choices that are considered for sensitivity runs should be documented in the Assessment Report. Such selection will most likely take place at the Data Workshop, but any modifications that are made at the Assessment Workshop should also be recorded.

3. Vermilion Snapper

3.1. Adequacy and appropriateness of the data

3.1.1. The Panel accepted that the data used were the most appropriate data that were available and were adequate for conducting an assessment.

3.1.2. The Panel noted that the limited time series of the indices of abundance appeared to reflect a lack of contrast in the levels of exploitation to which the stock had been subjected in the period covered by the time series. This greatly reduced the information content of the data and led to imprecise estimates of MSY based benchmarks, as stated in the assessment workshop report.

3.1.3. The Panel noted that the headboat index appeared to be strongly influential, but recognized that this index might not adequately represent the entire stock as this fishery does not extend to the deepest waters where vermilion snapper are taken. The Panel expressed the view that an index or indices of abundance should be developed using data from the commercial fishery and that this index should be considered for inclusion in the next stock assessment for this fishery. For commercial logbook data, costs might be reduced by analyzing a representative subset of the full data set or by analyzing the logbooks derived from a selected subset of representative vessels.

3.1.4. The Panel was concerned that the fishery-independent indices of abundance (*i.e.* MARMAP) did not cover the full extent of the offshore range of the stock and were constrained to a period from May to September.

The Panel recommended that consideration should be given to developing robust fishery-independent indices of abundance that are likely to be more representative of the spatial distribution of the stock, and representative of all months of the year.

3.1.5. The Review Panel voiced its concern that the MARMAP sampling is being downgraded due to budget constraints.

3.2. Adequacy and appropriateness of the models

3.2.1. The Panel acknowledged that, based on the available information, the implementation of the models was sound and endorsed the decision to use both a production model and a length-structured forward projection model for the assessment of the vermilion snapper stock.

3.2.2. The Panel acknowledged that, because there was only limited information on historical abundance, the Assessment Workshop was unable to fit the production model.

3.2.3. The Review Panel noted that the value estimated for the steepness[4] of the stock-recruitment relationship in the base run of the model was 0.9, a result which would imply that recruitment shows little dependence on egg production.

3.2.4. The Review Panel concurred with the Assessment Workshop's conclusion that the estimate of MSY was uncertain and endorsed the decision that F_{max} should be proposed as an appropriate proxy for F_{msy}. The Review Panel agreed that the estimate of the current level of egg production (a measure of spawning stock size) was poorly estimated, as the sensitivity analyses produced widely disparate estimates of egg production, but noted that the estimates of F and of F_{max} were relatively consistent among the alternative sensitivity runs.

3.2.5. The Panel suggested that, in future assessments, consideration should be given to calculating and presenting estimates of the abundance-at-age weighted fishing mortality to supplement the information that is presented on the fishing mortality for fully-recruited fish.

3.3. Adequacy and appropriateness of the models used to evaluate short-term projections

3.3.1. The Review Panel endorsed the adequacy and appropriateness of the model that the Assessment Workshop had applied to evaluate projections.

3.3.2. There is a high level of uncertainty in determining whether or not the stock is overfished. The SEDAR Review Panel concluded that the stock was not overfished by restricting its attention to points E, D, H, and G in the phase plot of status indicators (Figure 19[5]). These four points reflect the uncertainty in the stock-recruitment relationship by spanning a wide range

[4] The "steepness" of the stock-recruitment relationship, which was used in the model, is a value that can range from 0.2 to 1.0 and is the fraction of the virgin recruitment that will recruit to the fishery when the spawning stock is reduced to 20% of its virgin level. If steepness is 0.2, recruitment is directly proportional to the size of the spawning stock, whereas if steepness is 1.0, recruitment is constant and independent of the size of the spawning stock.

[5] References to tables and figures refer to the tables and figures presented in the corresponding report from the Assessment Workshop.

for steepness (0.7-0.95) and the most likely range for natural mortality (0.25-0.3/yr).

3.4. Research recommendations

The following recommendations have been listed in order of their priority, as perceived by the Review Panel.

3.4.1. The panel proposed that MARMAP conduct a synoptic study of their gear to provide a basis for comparing relative gear efficiencies. This would allow a more comprehensive fishery-independent index to be developed.

3.4.2. Age samples from the various fishery sectors need to be increased and collected appropriately for use in stock assessment.

3.4.3. Commercial fisheries data (including logbooks) should be analyzed to determine whether it is possible to develop a reliable fishery-dependent index of abundance from these data.

3.4.4. MARMAP should be expanded into deeper water to assure greater representation of the spatial range of the stock.

3.4.5. A monitoring program should be developed to collect data on the magnitude and the size/age composition of the vermilion snapper that are discarded by each fishing sector and from each fishing gear.

3.4.6. An index of recruitment representative of the entire stock should be developed for vermilion snapper.

3.4.7. The Panel recommended that, as an alternative model that could be applied in parallel with the existing model, consideration might be given to combining the indices of abundance externally and using the resultant combined index in the length-structured model rather than including the separate indices within the model. This suggestion was also made with respect to the black sea bass assessment. The external analysis might provide better understanding of the input data and make the weighting more transparent.

4. Black sea bass

4.1. Adequacy and appropriateness of the data

4.1.1. The Panel accepted that the data used were the most appropriate data that were available and were adequate for the assessment.

4.2. Adequacy and appropriateness of the models

4.2.1. The Panel endorsed the decision to use an age-structured forward projection model for the assessment of the black sea bass stock.

4.2.2. The Panel was of the opinion that the application of a production model for a protogynous species such as the black sea bass might be inappropriate, and recommended that its validity be further researched.

4.2.3. The Panel considered that the assumed abrupt changes in the proportion of females that are mature at each age and the transition from female to male between the three time periods should be linked and replaced by a smoother transition (*e.g.* moving average) in future assessments of the black sea bass stock.

4.2.4. The Panel noted that the index of abundance derived from the headboat data appeared highly influential on the assessment results. The Panel suggested that it would be useful to confirm this perception by eliminating

the time series from the objective function and refitting to determine whether the remaining data are sufficient to produce a similar result to that obtained when the headboat data are included. If the headboat data are strongly influential, the Panel noted that this index was fishery-dependent but recognized that the GLM analysis had attempted to adjust for some of the factors that could affect the trends exhibited by this index.

4.2.5. The Panel noted that the Assessment Workshop had not attempted to correct for the likely increase in the effectiveness of fishing effort, and thus the current stock biomass may be lower than has been estimated.

4.2.6. The Panel noted that no commercial discards are calculated by the black sea bass model because larger fish were landed prior to the implementation of the minimum size limit in 1983 (Figure 6.5). The Panel concluded this would result in a slight underestimation of the current fishing mortality.

4.2.7. The Panel recommended that, noting the total biomass included the male portion of the stock, when considering the results from the current assessment, total mature biomass should be used when assessing stock status. The methods used in the current stock assessment to calculate the mature female biomass are possibly inappropriate. The Panel recommended further research on the issue.

4.2.8. The Panel suggested that, in future assessments, the historical landings (landings before 1972) be included in the age-structured model. This would require development of a slightly different model structure.

4.3. Adequacy and appropriateness of the models used to evaluate rebuilding

4.3.1. The Review Panel endorsed the adequacy and appropriateness of the model that the Assessment Workshop had applied to evaluate rebuilding.

4.3.2. The Panel concluded the benchmarks had been adequately calculated and the sensitivity runs adequately bracketed the likely range of variation.

4.4. Research recommendations

The following recommendations have been listed in order of their priority, as perceived by the Review Panel.

4.4.1. The Panel requested that SC DNR expand their MARMAP efforts to conduct a synoptic study of their gear to provide a basis for comparing relative gear efficiencies and thus connecting the several short MARMAP indices available for this assessment.

4.4.2. Commercial fisheries data, including logbooks, should be analyzed to determine whether it is possible to develop a reliable fishery-dependent index of abundance from these data.

4.4.3. The monitoring program should be expanded to collect data on the magnitude, release mortality, and the size/age composition of the black sea bass that are discarded by each fishing sector and from each fishing gear and depth.

4.4.4. Age samples need to be increased and collected appropriately for use in aging the catches of the various fishery sectors. Furthermore, the possibility of determining reliable age compositions from the historical MARMAP age samples needs to be evaluated.

4.4.5. The Panel suggested that a comprehensive study and documentation of the abundance index derived from the headboat data would be useful. For example, consideration might be given to whether changes in fishing operations, including species composition of landings, might reflect changes in catchability of black sea bass that have not been taken into account by the GLM.

4.4.6. The Panel considered that, through more detailed examination, it might be possible to develop an acceptable abundance index from the MRFSS data and suggested that this should be investigated.

4.4.7. An index of recruitment for the stock should be developed.

4.4.8. Research should be initiated to estimate fecundity by female size and age.

4.4.9. The Panel considered the possibility that fish from the assemblages of black sea bass located north and south of Cape Hatteras, NC, might mix and suggested that a research study should be initiated to investigate its magnitude, geographic extent, direction, timing and management implications.

4.4.10. The Panel recommended that the issue of whether it is more appropriate to use total mature biomass, mature female biomass or some other measure of spawning potential for a protogynous hermaphrodite should be investigated.

4.4.11. The Panel concluded that the application of a production model should be investigated as to its appropriateness for a protogynous species.

4.4.12. The behavioral dynamics associated with reproduction in this protogynous species should be investigated with respect to the effects of size selective harvesting.

Appendix 1. Members of the SEDAR Review Panel, Raleigh, February 25-28, 2003.

The following list of names was circulated at the SEDAR Review.

Panel Chair	Dr Norman Hall	Centre for Independent Experts, Western Australia
Review Panelist	Dr Jon Volstad	Centre for Independent Experts, Maryland
Review Panelist	Dr Liz Brooks	NMFS SEFSC
Review Panelist	Gary Shepherd	NMFS NEFSC
Review Panelist	Gregg Waugh	SAFMC
Review Panelists	Mark Marhefka (vermilion snapper) Jodie Gay (black sea bass)	Snapper Grouper Advisor Panel
Review Panelist	Dr Michelle Duval	NGO/SSC Representative, NC Environmental Defense
Review Panelist	Douglas Gregory	SSC Representative, Florida Sea Grant

Apologies: Dr Robert Muller was unable to attend the Review Workshop
Mark Marhefka was unable to attend much of the Review Workshop.

Presenters:

Data/Assessment Workshops Chair - Dr Jim Berkson, VPI
(Technical Support – Michelle Davis, Mary Tilton, VPI students)
Assessment Workshop Coordinator – Dr Michael Prager, NMFS Beaufort Lab

Assessment Workshop/Review Panel Support Staff:

Dr John Merriner, NMFS SEFSC Beaufort Lab
Dr Erik Williams, NMFS SEFSC Beaufort Lab
Dr Kyle Shertzer, NMFS SEFSC
Dr Doug Vaughan, NMFS SEFSC Beaufort Lab
Joe Geist, NC DMF and SSC
Dr Pat Harris, MARMAP and SSC
Ms Jennifer Potts, NMFS SEFSC

Meeting Support Staff & Other Attendees

Rick DeVictor, SAFMC Staff
Wayne Lee, Chair SAFMC Snapper Grouper Committee
Dr Louis Daniel, SAFMC Snapper Grouper Committee & NC DMF
George Geiger, SAFMC Member
Dr Pete Eldridge, NMFS SERO