

S EDAR 13 Stock Assessment Review Small Coastal Sharks

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Prepared for
Center for Independent Experts (NTV)

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Executive summary

A Review Panel Workshop was held in Panama City, Florida on August 6- 10, 2007 to evaluate the results of the SEDAR-13 Small Coastal Sharks (SCS) Data Workshop held on February 5-9 2007 and the Stock Assessment Workshop held on May 7-11, 2007. The Review Panel Workshop is the third component of the SEDAR process where outside, independent experts evaluate the results of these previous workshops and the resulting advice to management. The Review Panel Workshop was given 10 terms of reference to be covered for their report and they produced a Summary Consensus Report that completes the SEDAR process.

The SCS Data Workshop presented biological life history data, and abundance indices and surveys and evaluated these data for their value as input to stock assessment models. The SCS complex is made up of four species, Atlantic sharpnose shark (*Rhizoprionodon terraenovae*), finetooth shark (*Carcharhinus isodon*), blacknose shark (*Carcharhinus acronotus*), and bonnethead shark (*Sphyrna tiburo*). Overall, these species are relatively data poor and lack sufficient data in some cases to assess population structure and population growth rates, among other parameters. Abundance indices often trended in different directions, which led to difficulty in producing clear stock assessment results. The data were drawn from academic, state, and federal sources and provided the best data currently available for these species.

The SCS Assessment Workshop evaluated the results of the Data Workshop in order to choose the appropriate modeling approach, given the quality and extent of input data. Assessments were done for the complex and for each of the individual species using three models in total, a Bayesian surplus production model (finetooth, blacknose, Atlantic sharpnose), a WinBUGS Bayesian state-space surplus production model (finetooth, blacknose, Atlantic sharpnose), and a State-space age structured production model (blacknose, Atlantic sharpnose, bonnethead). The abundance indices that were chosen as input to the models varied in their spatial and temporal coverage, but also often reflected conflicting trends, thus making the modeling more difficult. The number of indices also varied for the individual species: 4 for finetooth, 7 for blacknose, 13 for Atlantic

sharpnose, and 12 for bonnethead. The models that were chosen were appropriate and used the best available science.

The results of these assessments show that for finetooth, Atlantic sharpnose and bonnethead the stocks are not overfished and no overfishing is occurring. However, the stock assessments do show that blacknose shark is overfished. The estimate of fishing mortality rate for blacknose in 2005 and the average for 2001-2005 is greater than F_{msy} , and the ratio is substantially greater than 1 in both cases. Thus, overfishing was occurring. The Review Panel was unanimous in agreement with these conclusions.

The SEDAR process incorporates three workshops, data, stock assessment and review, and is structured to provide expert input throughout the process. I was impressed with the thoroughness of this process. There are always areas that can be improved, and we include comments in our recommendation section that address this, but overall this was well organized, and accomplished with a high degree of professionalism. The process insures that the best available science is used in the management of these species.

The Review Workshop produced a Consensus Summary Report with five recommendations for future SEDAR assessments as follows:

- 1) Sensitivity runs in the assessments should examine the robustness of stock status relative to the biological parameters that determine MSY . These include values for M , growth, fecundity, selectivity, and the form of the stock recruitment curve.
- 2) Projection software tools should be developed that can incorporate uncertainty in the initial conditions and capture process error more comprehensively for the forecast period.
- 3) The Review workshop identified process error, especially in F as a problem in determining stock status relative to MSY reference points. Further consideration needs to be given to a more robust means of interpreting stock status than the procedure of simply using the most recent data year. It is also important for managers to know the probability of exceeding reference points in the medium term, even if present stock status is judged satisfactory.
- 4) A more detailed and comprehensive analysis of the CPUE series would be desirable to evaluate the utility of many series available. A rigorous and objective scientific protocol should be developed against which CPUE series are evaluated as a basis for inclusion in assessments. This should include, *inter alia*, statistical design, spatial coverage and relevance to target species. The Review Panel envisioned a set of standards that delineated a weighted scoring depending on the attributes of the time series. For example, if the time series was based on a statistically valid sampling design targeted at the specific species, then it would achieve a high score for that standard. If the time series was properly designed for another species and largely covered the distribution in space and time, it would achieve an intermediate score against this standard, and so on. This would avoid vulnerability to personal preference and ad hoc choice of which time series to include.

5) Differences between successive assessments, particularly when different data series or different assessment models are used, should be systematically investigated to assess whether differences are due to changes in data, changes in models, or changes in assumptions.

Background

The SEDAR 13 Review Workshop Panel evaluated assessments of the Small Coastal Shark Complex, Atlantic sharpnose shark (*Rhizoprionodon terraenovae*), finetooth shark (*Carcharhinus isodon*), blacknose shark (*Carcharhinus acronotus*), and bonnethead shark (*Sphyrna tiburo*). During the evaluation the panel considered data, assessment methods, and model results. The evaluation was guided by Terms of Reference that were specified in advance. The Review Workshop panel documented its findings in a Peer Review Consensus Summary. The Consensus Summary is a SEDAR product, not a product of the CIE.

The SEDAR process uses three workshops to produce a final report on the status of the stocks that it evaluates: 1) Data Workshop, 2) Stock Assessment Workshop, and 3) Review Workshop. For the Data Workshop, scientists synthesize the elementary data on life history, age, growth, population structure, and data indices that are available for the species. For the Stock Assessment Workshop, the time series and indices are reviewed and evaluated as input to models, models are chosen that are appropriate for the data, and assessments are run. For the Review Workshop, a team of independent scientists (provided by the CIE) review the previous two workshop reports and supporting materials, and review and comment on the strengths and limitations of the stock assessments and their supporting data. They provide a Consensus Summary Report as the final step.

The terms of reference for the SEDAR 13 Review Workshop were:

1. Evaluate the adequacy, appropriateness, and application of data used in the assessment.
2. Evaluate the adequacy, appropriateness, and application of methods used to assess the stock.
3. Recommend appropriate estimates of stock abundance, biomass, and exploitation (if possible).
4. Evaluate the methods used to estimate population benchmarks and management parameters; recommend values for management benchmarks (MSY, Fmsy, Bmsy, MSST, MFMT) and provide declarations of stock status.
5. Evaluate the adequacy, appropriateness, and application of the methods used to project future population status; recommend appropriate estimates of future stock condition (if possible).

6. Evaluate the adequacy, appropriateness, and application of methods used to characterize uncertainty, considering input data, model fit, and model configuration. Ensure that the implications of uncertainty with regard to status determinations and management values are clearly stated.
7. Ensure that assessment results are clearly and accurately presented in the Stock Assessment Report and that reported results are consistent with Review Panel recommendations.
8. Evaluate the SEDAR Process. Identify any Terms of Reference which were inadequately addressed by the Data or Assessment Workshops; identify any additional information or assistance which will improve Review Workshops; suggest improvements or identify aspects requiring clarification.
9. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations warranted. Clearly indicate the research and monitoring needs that may appreciably improve the reliability of future assessments. Recommend an appropriate interval for the next assessment and whether a benchmark or update assessment should be considered.
10. Prepare a Peer Review Consensus Summary summarizing these evaluations and addressing each Term of Reference. Complete the Advisory Report summarizing key assessment results. (Consensus Report to be drafted by the Panel during the review workshop with a final report due two weeks after the workshop ends.)

Description of review activities

Meeting materials were forwarded electronically to review panel participants three weeks prior to the workshop and were available through the internet (<http://www.sefsc.noaa.gov/sedar/>). I downloaded and reviewed these materials, which included the Data Workshop Summary Document, the Stock Assessment Workshop Summary Document, and supporting materials from both of these workshops.

The review workshop was held at the Bay Point Marriott Resort in Panama City, Florida from 1:00 p.m. Monday, August 6, 2007 through 1:00 p.m. Friday, August 10, 2007. For the Review Workshop, NMFS scientists presented the results of each assessment as a series of PowerPoint presentations. During their presentations, the Review Panel members asked questions about the interpretations and received clarifications. Additional simulations were requested that could be done within the time available and these were largely completed and made available to the Panel. At the completion of the presentations, the Review Panel met, each member was assigned a species to summarize, and by the end of the meeting we had completed the first draft of the SEDAR Consensus Summary Report.

Subsequent to the meeting, I completed a more polished draft and emailed this to the Review Panel members. Upon further comment, I revised, and edited my assignment and reviewed the entire report on two subsequent occasions. The Review Panel reached an agreeable consensus.

Upon completion of the SEDAR Consensus Summary Report, I then wrote my CIE report in which the SEDAR Consensus Summary Report.

Summary of findings

I provide a synopsis here of the full report as in the Consensus Summary Report.

The small Coastal Shark complex is comprised of four species, finetooth, blacknose, Atlantic sharpnose and bonnethead sharks. In the TOR stock assessments were to be done for the complex and for each individual species. However, there were sufficient data to develop stock assessments on each species which obviated the need for one on the overall complex. Also because Atlantic sharpnose and bonnethead comprise 94% of the complex, then the overall assessment would largely be a mixture of just these two. Instead, we concentrated on the individual species stock assessments as a better guide to appropriate management. Hence our recommendations were made for the individual species.

For finetooth sharks, data on population dynamics was sparse, especially regarding the intrinsic rate of population growth, stock structure, and abundance. They comprise only 1% of the catch of small coastal sharks. Although there is some data indicating modest stock separation between the East Coast and Gulf of Mexico, it is sufficiently preliminary so that the species is handled as a single stock. Choice of the periodicity of reproduction was more problematic. It was assumed that there is biennial reproduction based on sparse data from the East Coast only. Natural mortality is estimated from maximum age using well known techniques. As calculated from the oldest shark, M is a conservative estimate and this builds a level of precaution into the assessment. The most difficult parameter to estimate was r , the intrinsic rate of population increase. This rate is used as input to surplus production models. The value of r obtained from life tables is -0.056 indicating a declining population. Based on calculations of the steepness of the recruitment function, this value of r was rejected as being unreasonable. Such a result could arise from misspecification of fecundity-at-age or incorrectness in the assumption of biennial recruitment. Only four indices of CPUE were available, the fishery-dependent gillnet observer series, and three fishery-independent surveys including the Panama City gillnet, Texas, and South Carolina Coastspan gillnet time series. These series occur throughout the range but are not continuous or overlapping. The choice of these indices is reasonable given that they provide the best coverage in time or space for this species.

Because data were limited two surplus production models were used for the stock assessment, a Bayesian surplus production model and a WinBUGS Bayesian state-space surplus production model. These models were the most appropriate for the data available. Because there was uncertainty in life history parameters, a range of parameters were used to evaluate the effects of this uncertainty. Results of the assessments indicated that the stock is not overfished and no overfishing is occurring. These results are in contrast to the 2002 assessment. However, because different indices were chosen for the 2007

assessment the two cannot be compared directly. Nonetheless, these contradictions indicated that management should be cautious.

More data were available for the assessment of blacknose sharks, even though it too is somewhat sparse. Data available were estimates of life history parameters (such as reproductive rate, growth, maturity and natural mortality (again calculated from maximum age)). The choice of these parameters was reasonable. Based on length-frequency data, catches were converted from length to age. Because these sharks are caught as bycatch in the shrimp fishery, there is more catch data available for them. There were also more CPUE indices available for this species. However, the indices did not agree, while some went up others went down. In all, seven were chosen for input in the models. The indices cover variable time periods and locations, but generally cover the range of the species. These data were the best available for the use in stock assessment of this species.

Three models were used for stock assessment of blacknose sharks, a Bayesian Surplus Production model (BSP), a Winbugs state-space Bayesian surplus production model, and a State-space age structured production model (SPASM). These models are well known and have been used previously. SPASM was used to estimate both observation error and process error and was the principal assessment tool used to evaluate stock status. The methods chosen are appropriate for blacknose shark given the data available. The current assessment indicates that spawning stock fecundity (SSF) is smaller than SSF_{msy} , and that blacknose shark are overfished. The estimate of fishing mortality rate in 2005 and the average for 2001-2005 is greater than F_{msy} , and the ratio is substantially greater than 1 in both cases. Thus, overfishing was occurring and is likely still occurring.

Atlantic sharpnose sharks are a predominant member of the Small Coastal Shark complex and consequently have more data, although these data are still not extensive. The data used in this assessment are similar to the other sharks in this complex and consist of life history parameters including reproductive rate, growth, maturity and natural mortality (determined from maximum age), catch data and CPUE indices from both fishery independent and fishery dependent sources. The catch of Atlantic Sharpnose shark is largely taken as bycatch in the shrimp fishery with smaller amounts taken in the recreational and commercial fisheries. Thirteen CPUE indices were chosen for the assessment based on the number of years of observations, area coverage and precision. Two were fishery dependent surveys and 11 were fishery independent surveys. These data are appropriate for this species and the best available for this stock assessment.

Three methods were used to assess this stock including a Bayesian Surplus Production model (BSP), a Winbugs state-space Bayesian surplus production model, and a State-space age structured production model (SPASM). These models have been used previously for stock assessment and are appropriate for this species given the available data. The SSF index does not fall below the threshold, but is declining continuously towards it. Thus the stock is not presently overfished. However F is close to F_{msy} and if F is maintained at this level then the stock will continue to decline toward the SSF

threshold. The assessment showed that the stock is not overfished and overfishing is not occurring.

Bonnethead shark is the other predominant member of the Small Coastal Shark complex. It is also largely taken as bycatch in the shrimp fishery (80% of the catch), but also in directed recreational and commercial fisheries. Data available for input to stock assessment models includes life table parameters, size frequencies, and population growth and reproduction parameters. Twelve CPUE indices were used as input to the stock assessment models. The indices varied in spatial coverage and time span. These data were the best available and were appropriate for input to the models.

The State-space age structured production model (SPASM) was the primary model used for stock assessment for this species. This model has been used previously for stock assessment and is appropriate for this species given the available data. The results of the stock assessment show that bonnethead are not overfished and overfishing is not occurring.

Conclusions/recommendations

I thought that the SEDAR process was very comprehensive. The availability of the Data and Stock Assessment Summary Reports, along with their abundant supporting documents provided good preparation for the Review Panel meeting. The sequence of workshops provides an excellent format for thoughtful stock assessments. The presentations at the Review Panel meeting were comprehensive and the responses to our requests were completed with alacrity. Some further information on how life-history parameters were chosen for some of the models would have been helpful, but these were minor issues.

The stock assessment models were appropriate for the species and, the NMFS scientists have done an admirable job in attempting to get the most out of sparse data. In the case of finetooth sharks because the life table yielded negative r , the use of simpler models might provide additional insights and make the overall assessment conclusions more robust. This was not a problem for the other species where surplus production models were used.

Mortality was estimated in a risk-averse manner, by estimating survivorship from maximum age data using a variety of well-known techniques. Typically when applying such methods to finfish, the 95th percentile of age is chosen to eliminate spurious outliers. However in a data sparse situation, this approach would be less helpful because of the scarcity of aged samples. As done now, it provides a conservative estimate of M . As more validated aged data become available, other approaches will be more useful.

The calculation of negative r from the finetooth shark life tables is problematic and further research on estimating this parameter is justified. Such a result could arise from misspecification of fecundity-at-age or incorrectness in the assumption of biennial recruitment pointing to the sparse nature of data for this species in particular, but also for

the members of the complex. It is important to collect and evaluate new data on these species as they become available, or to conduct targeted research separately.

Of concern to me was the method of selection of CPUE and survey indices. The evaluation of these indices by the Data and Stock Assessment Workshops is a major improvement to the process. Rather than be the choice of only a few people, however knowledgeable, selection now occurs after a review by more people actively studying these species. However, the process is still more ad hoc than necessary and indices may be included because of personal persuasion by an advocate. Arguably a better approach would be to devise a set of standards against which the relative merits of an index could be evaluated more objectively. Such a set of standards might also provide a framework that would encourage the improvement of existing surveys and data sampling practices.

Appendices

Appendix 1. CIE Statement of Work

Consulting Agreement between Dr. Cynthia Jones and NTVI

Statement of Work

SEDAR 13 Stock Assessment Review

Small Coastal Sharks

August 6 - 10, 2007

Panama City, Florida

SEDAR Overview:

The Small Coastal Shark Complex (SCS), Atlantic sharpnose, finetooth, blacknose, and bonnethead sharks are currently managed by the Highly Migratory Species (HMS) Division of the National Marine Fisheries Service. For the current assessment, it was recommended that the assessment follow the guidelines set forth by the South East Data, Assessment, and Review (SEDAR) process. Although SEDAR is a joint process for stock assessment and review of the South Atlantic, Gulf of Mexico, and Caribbean Fishery Management Councils; NOAA Fisheries, SEFSC and SERO; and the Atlantic and Gulf States Marine Fisheries Commissions, it was felt that this process would work for the SCS as well. SEDAR is organized around three workshops: data, assessment, and review. Input data are compiled during the data workshop, population models are developed during the assessment workshop, and an independent peer review of the data and assessment models is provided by the review workshop. SEDAR documents include working papers prepared for each workshop, supporting reference documents, and a SEDAR Stock Assessment Report. The SEDAR Stock Assessment Report consists of a data report produced by the data workshop, a stock assessment report produced by the assessment workshop, and a peer review consensus report and advisory report prepared by the review workshop.

SEDAR is a public process. All workshops, including the review, are open to the public and noticed in the Federal Register. All documents prepared for SEDAR are freely distributed to the public upon request and posted to the publicly accessible SEDAR website. Public comment during SEDAR workshops is taken on an 'as needed' basis; the workshop chair is allowed discretion to recognize the public and solicit comment as appropriate during panel deliberations. The names of all participants, including those on the Review Panel, are revealed.

The review workshop provides an independent peer review of SEDAR stock assessments. The term review is applied broadly, as the review panel may request additional analyses, correction of errors, and sensitivity runs of the assessment model provided by the assessment workshop. The review panel is ultimately responsible for

ensuring that the best possible assessment is provided through the SEDAR process. The review panel task is specified in Terms of Reference.

The SEDAR 13 review panel will be composed of three Center for Independent Experts (CIE)-appointed reviewers, and a chair appointed by the SEFSC director. Council staff, HMS staff, and Commission staff, may attend as observers. Members of the public may attend SEDAR review workshops.

CIE Request:

NMFS-SEFSC requests the assistance of three fisheries assessment scientists from the CIE to serve as technical reviewers for the SEDAR 13 review panel that will consider assessments of the Small Coastal Shark Complex (SCS), Atlantic sharpnose shark, finetooth shark, blacknose shark, and bonnethead shark. Reviewer tasks are listed below.

The stocks assessed through SEDAR 13 are within the jurisdiction of NOAA Fisheries Service, Highly Migratory Species Division.

The review workshop will take place at the Bay Point Marriott Resort in Panama City, Florida from 1:00 p.m. Monday, August 6, 2007 through 1:00 p.m. Friday, August 10, 2007.

Meeting materials will be forwarded electronically to review panel participants and made available through the internet (<http://www.sefsc.noaa.gov/sedar/>); printed copies of any documents are available by request. The names of reviewers will be included in workshop briefing materials.

Please contact Julie A Neer (Shark SEDAR Coordinator; 850-234-6541 ext. 240 or Julie.neer@noaa.gov) for additional details.

Hotel arrangements:

Marriott's Bay Point Resort Village
4200 Marriott Drive
Panama City, Florida 32408
Reservations: 1-800-644-2650

Group "NOAA Fisheries" Rate: \$99 + tax; guaranteed through July 6, 2007.

(NOTE: Hotel requires first night room deposit or credit card guarantee)

SEDAR Review Workshop Panel Tasks:

The SEDAR 13 Review Workshop Panel will evaluate assessments of the Small Coastal Shark Complex, Atlantic sharpnose shark, finetooth shark, blacknose shark, and bonnethead shark. During the evaluation the panel will consider data, assessment methods, and model results. The evaluation will be guided by Terms of Reference that are specified in advance. The Review Workshop panel will document its findings in a Peer Review Consensus Summary (Annex I). The Consensus Summary is a SEDAR product, not a product of the CIE. Separate CIE reviewer reports will also be produced, as described in Annex II, to provide distinct, independent analyses of the technical issues and of the SEDAR process.

SEDAR 13 Review Workshop Terms of Reference:

11. Evaluate the adequacy, appropriateness, and application of data used in the assessment.
12. Evaluate the adequacy, appropriateness, and application of methods used to assess the stock.
13. Recommend appropriate estimates of stock abundance, biomass, and exploitation (if possible).
14. Evaluate the methods used to estimate population benchmarks and management parameters; recommend values for management benchmarks (MSY, Fmsy, Bmsy, MSST, MFMT) and provide declarations of stock status.
15. Evaluate the adequacy, appropriateness, and application of the methods used to project future population status; recommend appropriate estimates of future stock condition (if possible).
16. Evaluate the adequacy, appropriateness, and application of methods used to characterize uncertainty, considering input data, model fit, and model configuration. Ensure that the implications of uncertainty with regard to status determinations and management values are clearly stated.
17. Ensure that assessment results are clearly and accurately presented in the Stock Assessment Report and that reported results are consistent with Review Panel recommendations.
18. Evaluate the SEDAR Process. Identify any Terms of Reference which were inadequately addressed by the Data or Assessment Workshops; identify any additional information or assistance which will improve Review Workshops; suggest improvements or identify aspects requiring clarification.
19. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations warranted. Clearly indicate the research and monitoring needs that may appreciably improve the reliability of future assessments. Recommend an appropriate interval for the next assessment and whether a benchmark or update assessment should be considered.

20. Prepare a Peer Review Consensus Summary summarizing these evaluations and addressing each Term of Reference. Complete the Advisory Report summarizing key assessment results. (Consensus Report to be drafted by the Panel during the review workshop with a final report due two weeks after the workshop ends.)

NOTES: The review panel may request additional sensitivity analyses, evaluation of alternative assumptions, and correction of errors identified in the assessments provided by the assessment workshop panel; the review panel may not request a new assessment. Additional details regarding the latitude given the review panel to deviate from assessments provided by the assessment workshop panel are provided in the *SEDAR Guidelines* and the *SEDAR Review Panel Overview and Instructions*.

The panel shall ensure that corrected estimates are provided by addenda to the assessment report in the event corrections are made in the assessment, alternative model configurations are recommended, or additional analyses are prepared as a result of review panel findings regarding the TORs above.

These Terms of Reference may be modified prior to the Review Workshop. Final Terms of Reference will be provided to the Reviewers with the workshop briefing materials.

SEDAR Review Workshop Panel Supplementary Instructions

The review panel Chair is responsible for reviewing documents prior to the workshop, conducting the meeting during the workshop in an orderly fashion, compiling and editing the Peer Review Consensus Summary for each species assessed and submitting it to the Shark SEDAR Coordinator by a deadline specified. The review panel chair may participate in panel deliberations and contribute to report preparation.

Review panel reviewers are responsible for reviewing documents prior to the workshop, participating in workshop discussions addressing the terms of reference, preparing assessment summaries and consensus reports during the workshop, and finalizing SEDAR documents within two weeks of the conclusion of the workshop. Each reviewer appointed by the CIE is responsible for preparing an additional CIE Reviewer Report as described in Annex II.

The Chair and SEDAR Coordinator will work with the appointed reviewers to assign tasks during the workshop. For example, the Chair may appoint one panelist to serve as assessment leader for each assessment covered by the review, with the leader responsible for providing an initial draft consensus report text for consideration by the panel. Reviewers may alternatively be assigned particular terms of reference to initially address. However, regardless of how initial drafting is accomplished, all panelists are expected to participate in discussion of all terms of reference and all aspects of the review.

The Review Panel's primary responsibility is to ensure that assessment results are based on sound science, appropriate methods, and appropriate data. During the course of the review, the panel is allowed limited flexibility to deviate from the assessment provided by the Assessment Workshop. This flexibility may include modifying the assessment configuration and assumptions, requesting a reasonable number of sensitivity runs, requesting additional details and results of the existing assessments, or requesting correction of any errors identified. However, the allowance for flexibility is limited, and

the review panel is not authorized to conduct an alternative assessment or to request an alternative assessment from the technical staff present. The Review Panel is responsible for applying its collective judgment in determining whether proposed changes and corrections to the presented assessment are sufficient to constitute an alternative assessment. The Review Panel Chair will coordinate with the technical staff present to determine which requests can be accomplished and prioritize desired analyses.

Any changes in assessment results stemming from modifications or corrections solicited by the review panel will be documented in an addendum to the assessment report. If updated estimates are not available for review by the conclusion of the workshop, the review panel shall agree to a process for reviewing the final results.

The review panel should not provide specific management advice. Such advice will be provided by existing HMS management committees, such as its Advisory Panel, following completion of the assessment.

If the Review Panel finds an assessment deficient to the extent that technical staff present cannot correct the deficiencies during the course of the workshop, or the Panel deems that desired modifications would result in a new assessment, then the Review Panel shall provide in writing the required remedial measures, including an appropriate approach for correcting and subsequently reviewing the assessment.

Statement of Tasks for Technical Reviewers:

Roles and responsibilities:

1. Approximately 3 weeks prior to the meeting, the CIE reviewers shall be provided with the stock assessment reports, associated supporting documents, and review workshop instructions including the Terms of Reference. Reviewers shall read these documents to gain an in-depth understanding of the stock assessment, the resources and information considered in the assessment, and their responsibilities as reviewers.
2. During the Review Panel meeting, reviewers shall participate in panel discussions on assessment methods, data, validity, results, recommendations, and conclusions as guided by the Terms of Reference. The reviewers also shall participate in the development of a Peer Review Consensus Summary report, as described in Annex I. Reviewers may be asked to serve as an assessment leader during the review to facilitate preparing first drafts of review reports.
3. Following the Review Panel meeting, the reviewers shall work with the chair to complete and review the Peer Review Panel Reports. Reports shall be completed, reviewed by all 3 panelists, and comments submitted to the Chair by August 24, 2007. The Chair shall then finalize the Reports and provide them to the Shark SEDAR Coordinator by August 31, 2007¹.

¹ The Chair role is outside of the CIE peer review process. The Chair was responsible for only compiling the Consensus Report, which is separate from the independent CIE reports.

4. Following the Review Panel meeting, each reviewer shall prepare an individual CIE Reviewer Report. These reports shall be submitted to the CIE no later than August 31, 2007, 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. See Annex II for complete details on the report outline.

The duties of each Review Panelist shall occupy a maximum of 12 workdays; several days prior to the meeting for document review; five days at the SEDAR meeting, and several days following the meeting to ensure that final review comments on documents are provided to the Chair and to complete a CIE review report.

Workshop Final Reports:

The Shark SEDAR Coordinator will send copies of the final Review Panel Consensus Report to Mr. Manoj Shivlani at the CIE.

Submission and Acceptance of CIE Reports

The CIE shall provide via e-mail the individual CIE Reviewer Reports to the COTR, Dr. Stephen Brown (stephen.k.brown@noaa.gov) for review and approval, based on compliance with this Statement of Work, by September 14, 2007. The COTR shall notify the CIE via e-mail regarding acceptance of the reports within two working days of receipt. Within two working days of the COTR’s approval, the CIE shall provide the final individual CIE Reviewer Reports to the COTR in pdf format.

The COTR shall provide the final CIE Reviewer Reports to:

Acting SEFSC Director: Alex Chester, NMFS Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL 33149 (email, Alex.Chester@NOAA.gov)

Julie A. Neer, NMFS Southeast Fisheries Science Center, Panama City Laboratory, 3500 Delwood Beach Road, Panama City, Florida 32408 (email, Julie.neer@noaa.gov)

Margo Schulze-Haugen, NMFS, Highly Migratory Species Division, 1315 East-West Highway, Silver Spring, Maryland 20910 (email, margo.schulze-haugen@noaa.gov)

For Additional Information or Emergency:

Julie A. Neer, NMFS Southeast Fisheries Science Center, Panama City Laboratory, 3500 Delwood Beach Road, Panama City, Florida 32408 (email, Julie.neer@noaa.gov)

Draft Agenda

SEDAR 13: Small Coastal Sharks

Monday, August 6, 2007

- 1:00 p.m.** Convene
- 1:00 p.m. – 1:30 p.m.** **Introductions and Opening Remarks** Neer
- Agenda Review, Task Assignments
- 1:30 p.m. – 3:00 p.m.** **Small Coastal Sharks Assessment Presentation** Cortés
Data, Methods, Results Evaluation
- 3:00 p.m. – 3:30 p.m.** Break
- 3:30 p.m. – 4:30 p.m.** **Small Coastal Sharks Discussion** Chair
- Data, Methods, Results Evaluation
- identify additional analyses, sensitivities, corrections
- 4:30 p.m. – 6:00 p.m.** **Finetooth Shark Assessment Presentation** Cortés
Data, Methods, Results Evaluation
- identify additional analyses, sensitivities, corrections
- 6:00 p.m. – 8:00 p.m.** Dinner Break
- 8:00 p.m. – 10:00 p.m.** **Evening session if necessary** Chair
- Continue deliberations or work session

Tuesday, August 7, 2007

- 8:00 a.m. – 10:00 a.m.** **Small Coastal Sharks Discussion** Chair
- Review additional analyses, sensitivities
- Initial recommendations and comments
- 10:00 a.m. – 11:30 a.m.** **Finetooth Shark Discussion** Chair
- Review additional analyses, sensitivities
- Initial recommendations and comments
- 11:30 a.m. – 1:00 p.m.** Lunch Break
- 1:00 p.m. – 3:00 p.m.** **Atlantic Sharpnose Shark Assessment Presentation** TBD
- Data, Methods, Results Evaluation
- identify additional analyses, sensitivities, corrections
- 3:00 p.m. – 3:30 p.m.** Break
- 3:30 p.m. – 6:00 p.m.** **Atlantic Sharpnose Shark Discussion** Chair
- Data, Methods, Results Evaluation
- identify additional analyses, sensitivities, corrections
- 6:00 p.m. – 8:00 p.m.** Dinner Break

8:00 p.m. – 10:00 p.m. Evening session if necessary **Chair**
- Continue deliberations or work session

Wednesday, August 8, 2007

8:00 a.m. – 10:00 a.m. Atlantic Sharpnose Shark Discussion **Chair**
- Review additional analyses, sensitivities
- Initial recommendations and comments

10:00 a.m. – 11:30 a.m. Blacknose Shark Assessment Presentation
Siegfried
- Data, Methods, Results Evaluation
- identify additional analyses, sensitivities, corrections

11:30 a.m. – 1:00 p.m. Lunch Break

1:00 p.m. – 3:00 p.m. Blacknose Shark Discussion **Chair**
- Data, Methods, Results Evaluation
- identify additional analyses, sensitivities, corrections

3:00 p.m. – 3:30 p.m. Break

3:30 p.m. – 4:30 p.m. Bonnethead Shark Assessment Presentation
Siegfried
- Data, Methods, Results Evaluation
- identify additional analyses, sensitivities, corrections

4:30 p.m. – 6:00 p.m. Bonnethead Shark Discussion
Siegfried
- Data, Methods, Results Evaluation
- identify additional analyses, sensitivities, corrections

6:00 p.m. – 8:00 p.m. Dinner Break

8:00 p.m. – 10:00 p.m. Evening session if necessary **Chair**
- Continue deliberations or work session

Thursday, August 9, 2007

8:00 a.m. – 10:00 a.m. Blacknose Shark Discussion **Chair**
- Review additional analyses, sensitivities
- Initial recommendations and comments

10:00 a.m. – 11:30 a.m. Bonnethead Shark Discussion **Chair**
- Review additional analyses, sensitivities
- Initial recommendations and comments

11:30 a.m. – 1:00 p.m. Lunch Break

1:00 p.m. – 3:00 p.m. Review Workshop Terms of Reference **Chair**
- Review TORs and draft consensus statements

3:00 p.m. – 3:30 p.m. Break

3:30 p.m. – 6:00 p.m. Continue TOR review **Chair**

6:00 p.m. – 8:00 p.m. Dinner Break

8:00 p.m. – 10:00 p.m. Evening session if necessary

Chair

- Continue deliberations or work session

Friday, August 10, 2007

8:00 a.m. – 1:00 p.m. Final Review of Panel Documents

Chair

- Small Coastal Sharks Consensus Summary

- Atlantic Sharpnose Shark Consensus Summary

- Blacknose Shark Consensus Summary

- Finetooth Shark Consensus Summary

- Bonnethead Shark Consensus Summary

1:00 p.m.

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Annex I. SEDAR Review Workshop Document Contents

Consensus Summary Outline

I. Terms of Reference

List each Term of Reference, and include a summary of the Panel discussion regarding the particular item. Include a clear statement indicating whether or not the criteria in the Term of Reference are satisfied.

II. Further Analyses and Evaluations

Summary and findings of review panel analytical requests not previously addressed in TOR discussion above.

III. Additional Comments

Provide a summary of any additional discussions not captured in the Terms of Reference statements.

IV. Recommendations for Future Workshops

Panelists are encouraged to provide general suggestions to improve the SEDAR process.

V. Reviewer Statements

Each individual reviewer should provide a statement attesting whether or not the contents of the Consensus Report provide an accurate and complete summary of their views on the issues covered in the review. Reviewers may also make any additional individual comments or suggestions desired.

ANNEX II: Contents of CIE Reviewer Report

1. The reviewer report shall be prefaced with an executive summary of findings and/or recommendations.
2. The main body of the reviewer report shall consist of a background, description of review activities, summary of findings, and conclusions/recommendations. Reviewers are encouraged to elaborate on any points raised in the Consensus Summary Report that they feel might require further clarification. Reviewers are also encouraged to provide any criticisms and suggestions for improvement of the SEDAR process.
3. The reviewer report shall include as separate appendices a copy of the CIE Statement of Work and a bibliography that includes all materials provided for review.

Please refer to the following website for additional information on report generation: <http://www.rsmas.miami.edu/groups/cie>.

Appendix 2. Bibliography that includes all materials provided for review.

Major documents:

SEDAR 13 SMALL COASTAL SHARKS DATA WORKSHOP REPORT
SEDAR 13 SMALL COASTAL SHARKS ASSESSMENT WORKSHOP REPORT

Additional written materials included:

SEDAR 13-DW-01: Anonymous: SEAMAP-SA shallow water trawl survey – Materials and methods

SEDAR 13-DW-02: Balchowsky and Poffenberger: Description of the databases that contain landings of shark species from the Atlantic Ocean and Gulf of Mexico

SEDAR 13-DW-03: Bethea et al.: Preliminary tag and recapture data of small coastal sharks (Atlantic sharpnose shark, *Rhizoprionodon terraenovae*, blacknose shark, *Carcharhinus acronotus*, bonnethead shark, *Sphyrna tiburo*, and finetooth shark, *C. isodon*) in the northeastern Gulf of Mexico

SEDAR 13-DW-04: Brewster-Geisz: A summary of the management of Atlantic small coastal sharks

SEDAR 13-DW-05: Carlson: Standardized catch rates of small coastal sharks from a fishery-independent longline survey in northwest Florida

SEDAR 13-DW-06: Carlson and Bethea: Standardized catch rates of small coastal sharks from a fishery-independent gillnet survey in northwest Florida

SEDAR 13-DW-07: Carlson and Cortés: Gillnet selectivity of small coastal sharks off the southeastern United States

SEDAR 13-DW-08: Carlson and Loefer: Life history parameters for Atlantic sharpnose sharks, *Rhizoprionodon terraenovae*, from the United States South Atlantic Ocean and northern Gulf of Mexico

SEDAR 13-DW-09: Carlson et al.: The Directed Shark Drift Gillnet Fishery: Characterization of the Small Coastal Shark Catch, Average Size and Standardization of Catch Rates from Observer Data

SEDAR 13-DW-10: Carlson et al: Standardized catch rates of bonnetheads from the Everglades National Park creel survey, 1978-2004

SEDAR 13–DW-11: Carlson et al.: Life history parameters for finetooth sharks, *Carcharhinus isodon*, from the United States South Atlantic Ocean and northern Gulf of Mexico

SEDAR 13-DW-12: Carlson et al.: Standardized catch rates of small coastal sharks from the Commercial Shark Fishery Longline Observer Program, 1994-2005

SEDAR 13-DW-13: Cortés: 2002 Stock assessment of small coastal sharks in the U.S. Atlantic and Gulf of Mexico

SEDAR 13-DW-14: Cortés and Boylan: Standardized catch rates of Small Coastal Sharks from the SEAMAP-South Atlantic Shallow Water Trawl Survey

SEDAR 13-DW-15: Cortés and Neer: Updated catches for Atlantic small coastal sharks

SEDAR 13-DW-16: Cortés: Standardized catch rates of bonnethead, Atlantic sharpnose shark, and the small coastal shark complex from the Marine Recreational Fishery Statistics Survey (MRFSS)

SEDAR 13-DW-17: Driggers et al.: Life history and population genetics of blacknose sharks, *Carcharhinus acronotus*, in the western North Atlantic Ocean and the northern Gulf of Mexico

SEDAR 13-DW-18: Fisher: Fishery-Independent Catch of Small Coastal Sharks in Texas Bays, 1975-2006

SEDAR 13-DW-19: Grubbs et al.: Occurrence of small coastal sharks and standardized catch rates of Atlantic sharpnose sharks in the VIMS Longline Survey: 1974-2005

SEDAR 13-DW-20: Hale et al.: Bottom Longline Observer Program: small coastal shark catch and bycatch 1994 to 2005

SEDAR 13-DW-21: Hoffmayer and Ingram: Catch Rates and Size Composition of Small Coastal Sharks Collected During a Gillnet Survey of Mississippi Coastal Waters During 2001–2006

SEDAR 13-DW-22: Ingram et al.: Catch rates, distribution and size composition of small coastal sharks collected during NOAA Fisheries Bottom Longline Surveys from the U.S. Gulf of Mexico and U.S. Atlantic Ocean

SEDAR 13-DW-23: Kohler & Turner: Preliminary mark/recapture data for four species of small coastal sharks in the western North Atlantic

SEDAR 13-DW-24: Lombardi-Carlson: Life history traits of bonnethead sharks, *Sphyrna tiburo*, from the eastern Gulf of Mexico

SEDAR 13-DW-25: Mello et al.: Standardized catch rates of Atlantic sharpnose, *Rhizoprionodon terraenovae*, observed by the Northeast Fisheries Observer Program in the gillnet fishery from 1995-2005

SEDAR 13-DW-26: McCarthy: Standardized catch rates for small coastal sharks from the United States Gulf of Mexico and south Atlantic gillnet fishery, 1998-2005

SEDAR 13-DW-27: McCandless and Belcher: Standardized catch rates of small coastal sharks from the Georgia COASTSPAN and GADNR penaeid shrimp and blue crab assessment surveys

SEDAR 13-DW-28: McCandless and Hoey: Standardized catch rates for Atlantic sharpnose sharks from exploratory longline surveys conducted by the Sandy Hook, NJ and Narragansett, RI labs: 1961-1991

SEDAR 13-DW-29: McCandless and Natanson: Standardized catch rates for Atlantic sharpnose sharks from the NMFS Northeast Longline Survey

SEDAR 13-DW-30: McCandless et al.: Standardized catch rates of small coastal sharks from the South Carolina COASTSPAN and SCDNR red drum surveys

SEDAR 13-DW-31: Nichols: Indexes of abundance for small coastal sharks from the SEAMAP trawl surveys

SEDAR 13-DW-32: Nichols: Bycatch of small coastal sharks in the offshore shrimp fishery

SEDAR 13-DW-33: Risenhoover: Memo regarding Management Needs for Upcoming Small Coastal Shark (SCS) Stock Assessment

SEDAR 13-DW-34: Schwartz et al.: Trends in relative abundance of shark species caught during a University of North Carolina longline survey between 1972 and 2005 in Onslow Bay, NC

SEDAR 13-DW-35: Siegfried: The estimation of small coastal shark bycatch in the shrimp trawl fishery of the south Atlantic

SEDAR 13-DW-36: Tyminski et al.: Tag-recapture results of small coastal sharks (*Carcharhinus acronotus*, *C. isodon*, *Rhizoprionodon terraenovae*, and *Sphyrna tiburo*) in the Gulf of Mexico

SEDAR 13-DW-37: Tyminski et al.: Relative abundance of blacknose sharks, *Carcharhinus acronotus*, from coastal shark surveys in the eastern Gulf of Mexico, 2001–2006

SEDAR 13-DW-38: Ubeda et al.: Relative abundance of bonnethead, *Sphyrna tiburo*, and Atlantic sharpnose sharks, *Rhizoprionodon terraenovae*, in two Florida Gulf estuaries, 1995-2004

SEDAR 13-DW-39: Wiley and Simpfendorfer: Range extension: occurrence of the finetooth shark (*Carcharhinus isodon*) in Florida Bay

SEDAR 13-DW-40: Wilson and Clark: Small coastal sharks collected under the exempted fishing program managed by the Highly Migratory Species Management Division

SEDAR 13-DW-41: McCarthy: Standardized catch rates for small coastal sharks from the United States Gulf of Mexico and south Atlantic bottom longline fishery, 1996-2005

SEDAR13-AW-01 SMALL COASTAL SHARK SEDAR ASSESSMENT WORKSHOP WORKING DOCUMENT Assessment of Small Coastal Sharks, Atlantic sharpnose, Bonnethead, Blacknose and Finetooth Sharks using Surplus Production Methods

SEDAR 13-AW-02 Determining Selectivities for Small Coastal Shark Species for Assessment Purposes, Kate I Siegfried, Enric Cortés, and Elizabeth Brooks

SEDAR 13-AW-03 Assessment of Blacknose, Bonnethead, and Atlantic Sharpnose Sharks with a State-Space, Age-Structured Production Model, Kate I. Siegfried and Elizabeth N. Brooks

Materials available at the meeting included Powerpoint presentations:

Assessment of the Small Coastal Shark Complex, Atlantic sharpnose, Bonnethead, Blacknose and Finetooth sharks using surplus production methods, E. Cortés

Atlantic Sharpnose Shark Assessment Age-structured structured Production Model (SPASM) Production Model (SPASM), Liz Brooks

Assessment of the Small Coastal Shark Complex and Finetooth sharks using surplus production methods, E. Cortés

Bonnethead Shark Assessment State-space, Age-structured Production Model, Kate Siegfried and Elizabeth Brooks

Blacknose Shark Assessment State-space, Age-structured Production Model, Kate Siegfried and Elizabeth Brooks

Determining Selectivities, Kate Siegfried, Enric Cortés, and Elizabeth Brooks

