
Report on the assessments for the Large Coastal Shark complex, blacktip shark, and sandbar shark (LCS SEDAR 11 Review, 5–9 June 2006 Panama City, FL)

John Casey

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University of Miami

Independent System for Peer Review

The Centre for Fisheries and Aquaculture Science
Lowestoft Laboratory
Pakefield Road
Lowestoft
Suffolk NR33 0HT
England, United Kingdom
Phone +44 1502 524251
www.cefas.co.uk



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Executive Summary

The SEDAR 11 review workshop was held at the Bay Point Marriott, in Panama City, Florida, from 1:00 p.m. on Monday, June 5, 2006 through 12:00 p.m. on Friday, June 9, 2006. The meeting was conducted in comfortable surroundings with excellent facilities and with a spirit of co-operation from all participants.

Overall the reports from the SEDAR 11 Data and Assessment workshops were well presented and comprehensive. Analysts should be congratulated for their considerable effort in trying to arrive at acceptable assessments for sandbar, blacktip and the large coastal shark complex. The presenters at the review meeting gave clear and informative presentations and took care to point out the details of concerns they had with either the data or the methods. From my perspective, the whole three stage SEDAR review process has worked extremely effectively and each of the stock assessments has been thoroughly evaluated.

My findings and conclusions on each of the assessments as follows:

Large Coastal Shark Complex

While the data utilized in the 2006 assessment of the Large Coastal Shark complex were the best available to the analysts at the time, and were treated appropriately, the assessment model used was probably not appropriate and it is unclear what the assessment results represent. This is not a criticism of the methods *per se* or of the diligence of the analysts but is a reflection of the information that is available for assessment purposes. In short, the assessment workshop was being asked to draw too much from the data.

I conclude that future assessments of the Large Coastal Shark complex using the current approach and data are unlikely to produce improved or effective management advice, and continuing the current approach is not recommended. Improvements in collection of species-specific catch and catch rate data, together with robust estimates of life history parameters, with the aim of conducting single species assessments to provide mixed species advice should be a priority. I also suggest close examination of basic population indicators such as mean age/size in the catches may be informative.

The status of the large coastal shark complex remains unknown.

Sandbar (*Carcharhinus plumbeus*)

It appears that the population model and resulting population estimates were the best possible given the data available. There is a fundamental shift in the perception of stock status in the 2006 assessment compared to the 2002 assessment. The 2006 assessment indicates that the stock is overfished and that overfishing is taking place. The change in perception seems to be mainly attributable to revisions to the life history parameters. However, the adoption of the three stage SEDAR review process for the 2006 assessment has resulted in

a more thorough review, and I conclude that the 2006 assessment results are a better and more reliable indication of stock status than the 2002 assessment.

All appropriate sensitivity runs indicate that the stock is overfished and that overfishing is taking place. I am sufficiently confident that these results are representative of the true status of sandbar. The target year to rebuild the stock is estimated to be 2070.

Blacktip (*Carcharhinus limbatus*) Gulf of Mexico

The results of the assessment are sufficiently reliable that it can be concluded that the stock of blacktip in the Gulf of Mexico is not overfished and that overfishing is not taking place. However, the absolute estimates of stock status remain unknown. The basic information from the three abundance indices believed to be most representative of the stock were consistent with each other and suggest that during the past 10 years, stock abundance has been increasing coincidental with declining catches. This is in keeping with the observation, based on life-history characteristics, that blacktip are a relatively productive species.

The assessment indicates that the blacktip stock in the Gulf of Mexico is relatively healthy. However, there is considerable imprecision in the stock estimates and the absolute level of the stock is unknown. Hence, there is no scientific basis for advising on a specific catch level for blacktip in the Gulf of Mexico.

Blacktip (*Carcharhinus limbatus*) Atlantic

The data used for the analyses were treated appropriately, but it was unclear whether catch estimates prior to 1991 adequately represent historical removals of blacktip shark from the Atlantic stock component. In addition it was impossible to judge the extent to which each of the standardized catch-rate series reflected real trends in the abundance of the stock.

Given the widely differing results arising from the different models, the status of the stock of Atlantic blacktip shark is uncertain, so no reliable estimates of abundance, biomass or exploitation rate can be advanced at the current time. Further, in the absence of any reliable estimates of abundance, biomass and exploitation rates, no reliable estimates of stock status for Atlantic blacktip can be suggested.

Given that the current status of Atlantic blacktip is unknown, no reliable population projections were possible, so no probable values for future population condition and status of Atlantic blacktip can be provided. Furthermore, there is no scientific basis for advising on a specific catch level for blacktip in the Atlantic at this time.

1. BACKGROUND

The Large Coastal Shark Complex (LCS), blacktip shark, and sandbar shark are currently managed by the Highly Migratory Species Division of the National Marine Fisheries Service. In the past, Shark Evaluation Workshops were conducted to analyze the available data and assess the status of the complex. For the 2006 assessments, 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 LCS 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 a data report produced by the data workshop, a stock assessment report and summary produced by the assessment workshop, a review panel report evaluating the assessment (drafted during the review panel workshop), and collected stock assessment documents considered in the SEDAR process.

I was contracted by CIE to participate as a review panellist for the 11th SEDAR (Large Coastal Sharks) Review Workshop to provide an independent report to the CIE on the validity, results, recommendations, and conclusions of the assessments, and to contribute to the Panel's consensus summary report. This report is my independent report to the CIE on the following assessments:

- Large Coastal Shark complex
- Sandbar shark
- Blacktip shark, Gulf of Mexico
- Blacktip shark, Atlantic

2. REVIEW ACTIVITIES

The SEDAR 11 review workshop was held at the Bay Point Marriott, in Panama City, Florida, from 1:00 p.m. on Monday, June 5, 2006 through 12:00 p.m. on Friday, June 9, 2006. Participants in the review workshop are listed in Appendix 1. The terms of reference are given in Appendix 2 and my statement of work is given in Appendix 3.

Prior to the Review Workshop, I was provided with draft stock assessment reports and web access to all relevant supporting documents and papers arising from the Data and Assessment Workshops (Appendix 4). This gave me ample opportunity to gain a thorough understanding of the data and methods used for the assessments and to develop a preliminary list of points for discussion at the workshop.

The meeting was open, and was attended by observers including members of the fishing industry. For each stock, the results of the assessments were presented to the review Panel and other attendees, and the input data, assessment approach, results and utility of the findings for management were evaluated through open discussion, and the Terms of Reference for each stock assessment (Appendix 2) were reviewed to ensure they had been fully addressed.

3. FINDINGS

This section deals with each assessment separately and as requested, I comment specifically on items 1, 2, 4, 6 and 10 of the Terms of Reference for the SEDAR review Workshop (Appendix 2).

3.1 Large Coastal Shark Complex

While the data utilized in the 2006 assessment of the Large Coastal Shark complex were the best available to the analysts at the time, and were treated appropriately, the assessment model used was probably not appropriate and it is unclear what the assessment results represent. This is not a criticism of the methods *per se* or of the diligence of the analysts, but is a reflection of the information that is available for assessment purposes. In short, the assessment workshop was being asked to draw too much from the data.

I conclude that using the current approach and data in future assessments of the Large Coastal Shark complex is unlikely to produce improved or effective management advice and is not recommended. Improvements in collection of species-specific catch and catch rate data, together with robust estimates of life history parameters, with the aim of conducting single species assessments to provide mixed species advice, should be a priority. I also suggest close examination of basic population indicators; for example, using mean age/size in the catches may be informative.

The status of the large coastal shark complex remains unknown.

3.1.1 Findings in relation to specific Terms of Reference

Evaluate whether data used in the analyses are treated appropriately and are adequate for assessing the stocks; state whether or not the input data are scientifically sound.

The input data are problematic since the complex comprises up to 22 different species each of which has different life history characteristics and behaviour. The basic catch data are too sparse to permit collection and assessment of data on individual species and historically (pre 1995) landed specimens are not recorded at the species level. As a result any signals or trends in the data are unlikely to be representative of the trends in any single species. Furthermore, the results of the assessment may not reflect the true status of the overall complex. Opposing trends in different species may be hidden. Nevertheless

overall trends in basic catch data for a species complex may be indicative of the gross trends in population biomass of the complex, provided appropriate and reliable estimates of accompanying effort are available. Effort is not documented in the assessment document, although it can be found in various documents prepared for the data workshop.

Commercial and fishery independent catch-rate series were used in the assessment model. I note that each of these series was treated independently and that the method of standardisation varied between series. While there may be sound reasoning to adopt a non-standard approach, this could have affected the precision of the estimates and lead to bias in the results of the assessment.

Given the quality of the data available and the nature of the species complex, I consider that the compilation of data was undertaken to the best possible standards. However, I would like to have seen more importance given to the basic indicators in the catch and cpue data, especially more effort on trends in mean size and age (if available) in the catch over time in relation to catches by different vessels from different areas at different times of the year. It would also be useful to see charts showing areas where the catches and catch rates series are obtained on a seasonal basis. Such information also helps in the interpretation of catch data, or at least to formulate hypotheses that may be testable.

In conclusion, the available data were appropriately handled, but there is some reservation on whether they are appropriate for describing the trends or for assessing the status of the large coastal shark complex as a whole.

Evaluate the adequacy, appropriateness, and application of the methods used to assess the populations; state whether or not the methods are scientifically sound.

The assessment used a Bayesian surplus production model to assess the population. This method is appropriate given appropriate input data and parameter estimates.

I also note that in the assessment each of the catch rate index series was given equal weighting. The pros and cons of whether to weight or not to weight are outlined in the assessment document, but I would have liked to have seen a stronger justification for equal weighting. The series are from different areas at different times of the year, and logically some *a priori* knowledge ought to permit the assignment of relative importance to each of the series in relation to the temporal and spatial distribution of the stock and fishery. Nevertheless, sensitivity tests using a weighting scheme related to the inverse of the CV of the series gave similar results to assuming equal weighting if the complex comprised 9 or 11 species. In both of these cases, the outcome is the same. However, if 22 species (a less reasonable approach in my opinion) are considered as the complex, the results would be radically affected.

In addition to the issue of weighting, the relatively flat (but variable) signal in the more recent period appears to have a strong influence on the assessment

results, and the longer time series seem not to have such a strong influence on the outcome of the assessment. The relatively flat signal may account for the apparent consistency between the weighted and un-weighted assessment results. I suggest that participants at future assessment and data workshops revisit the issue of abundance indices and again scrutinise the information on temporal extent and temporal and spatial coverage of the index area.

While the assessment method is an acceptable method, it assumes a single intrinsic rate of population growth r . However, the aggregation of data for up to 22 species into the Large Coastal Shark complex is unlikely to give a single population growth rate especially if the species composition has varied with trend over time. In addition, the assessments are for the Gulf of Mexico and Atlantic combined, and there are indications that the abundance indices from the two areas have differing catch composition. There may be a case for treating the two areas separately for assessment purposes.

In conclusion, while I agree that the methods used are all scientifically sound, I question their use as assessment tools given the available data. There may be policy reasons why an analytical approach is required, but I suspect there is much to be learned by simple indicators, such as mean size in the catches and closer scrutiny of cpue series.

Evaluate the adequacy, appropriateness, and application of the methods used to estimate stock status criteria (population benchmarks such as MSY, Fmsy, Bmsy, MSST, MFMT). State whether or not the methods are scientifically sound.

I have serious concerns that the methods used to determine reference points for a stock complex are not appropriate. It was assumed that MSY occurs at 50% of virgin biomass (or numbers). However even if this assumption is correct, and there is evidence that MSY for some shark species occurs at lower exploitation levels, the estimate of virgin biomass for the stock complex may be erroneous because of the assumption of *inter alia*, a single intrinsic rate of population growth. The methods, as such, are wholly appropriate given appropriate input data and parameters, but I do not think their application in this case is likely to give meaningful population benchmark estimates. I conclude that the status of the large coastal shark complex remains unknown.

Evaluate the adequacy, appropriateness, and application of the methods used to project future population status and, if appropriate, evaluate stock rebuilding; state whether or not the methods are scientifically sound.

Given appropriate model inputs, the methods used in the assessment would be adequate, appropriate, and scientifically sound for a single species. However, it is not possible to evaluate whether projections made for the large coastal shark complex(s) using this model would give meaningful results that would provide a useful basis for management decisions.

Develop recommendations for future research for improving data collection and stock assessment.

Issue: Improvement of species-specific data.

- Increase dockside monitoring of landed catch.
- Increase observer coverage of the commercial fleet.
- Use biochemical and/or genetic testing of products (carcasses/logs/fins) to produce reliable species identifications.

Issue: Lack or absence of species-specific life history data.

- Conduct research on the life history of all species in the complex, including regular sampling and analysis of the main species caught.
- Use life tables (or other similar approaches) to estimate population parameters such as r .

Issue: Limited numbers of longer term abundance (catch rate) data.

- Seek out and evaluate the utility of additional abundance series available, e.g. the Schwartz data from North Carolina. Undertake further scrutiny of existing series.

Issue: Variable Geographic range of abundance surveys

- Evaluate alternative weighting schemes or modelling approaches for abundance data that take account of the geographic range of the surveys.

Issue: Lack of or absence of size composition and effort data for abundance surveys.

- Obtain and provide information on species and size composition.
- Obtain trends in deployed fishing effort at least for the catch-rate index series in Data Workshops and present them in the Assessment Workshop report, together with corresponding trends in catches and catch rate.

Issue: Assessment of the Large Coastal Shark (LCS) complex does not represent the status of the stocks, or any particular component of the stocks.

- Wherever possible, the aim should be to develop species-specific assessments for the main components of the LCS complex.
- As an interim step, split the complex into smaller groups based on species with similar life history characteristics.
- Similarly, investigate assessments for separate areas and species complexes.

Issue. Use of sophisticated modelling software because it's there.

- Consider further the appropriateness of the models used i.e. closely scrutinise input data and parameters first to produce hypotheses. Then use models to test hypotheses.
- At present I get the impression we are attempting to twist data to fit a model, when the data may not be suited to the model approach in the 1st place.

3.2 Sandbar (*Carcharhinus plumbeus*)

It appears that the population model and resulting population estimates were the best possible given the data available. There is a fundamental shift in the perception of stock status in the 2006 assessment compared to the 2002 assessment. The 2006 assessment indicates that the stock is overfished and that overfishing is taking place. The change in perception seems to be mainly attributable to revisions to the life history parameters. However, the adoption of the three stage SEDAR review process for the 2006 assessment has resulted in a more thorough review and I conclude that the 2006 assessment results are a better and more reliable indication of stock status than the 2002 assessment.

All appropriate sensitivity runs indicate that the stock is overfished and that overfishing is taking place. I am sufficiently confident that these results are representative of the true status of sandbar. The target year to rebuild the stock is estimated to be 2070.

3.2.1 Findings in relation to specific Terms of Reference

Evaluate whether data used in the analyses are treated appropriately and are adequate for assessing the stocks; state whether or not the input data are scientifically sound.

Landings data were incomplete, although the extent of missing information is unknown. In particular a potentially serious omission is the absence of by-catch estimates of sandbar from the Atlantic fishery for menhaden. Catch data were also incomplete prior to 1981, and were estimated based on extrapolation from more recent catches. There is some concern regarding the assumption of an unfished stock prior to 1975, since there was a smaller scale fishery as long ago as the 1930s to the 1950s and also concern whether catches by Cuba and Mexico during the mid-1980s had been fully accounted for. Despite these concerns, it appears that the majority of sandbar removals, at least after the mid 1980s, were accounted for.

The fishery-dependent and -independent catch-rate series used for the stock were standardized using generalized linear models, assuming a form of the Delta distribution. The Virginia Institute of Marine Science (VIMS) longline series was the longest time series and the only one that had observations prior to 1985. This series apparently contains information on size and age structure of sandbar, but such data were not available to the SEDAR review workshop. This is a potentially useful source of information and it should be examined for population trends in size and age.

Overall the data set for sandbar appear to be of good quality and the best available at this time for evaluating the status of sandbar.

Evaluate the adequacy, appropriateness, and application of the methods used to assess the populations; state whether or not the methods are scientifically sound.

The age-structured population model used for sandbar utilised state-space dynamics for some of the components and prior distributions assigned to some of the parameters. No specific age data were used in the model, but age structure was used to incorporate different natural mortalities- and selectivities-at-age for the different fisheries exploiting sandbar. Catch-rate indices were assumed to be proportional to population size but assumed series-specific catchabilities and selection curves.

The model used seemed to be appropriate, was the best available for the data provided, and adequately incorporated the information from the available catch-rate indices. However, pup survival was the only life history parameter estimated in the model, and other parameters such as natural mortality-at-age and the prior mode for pup survival had to be adjusted so that the steepness parameter remained within a reasonable range for the species. There ought to be scope to re-examine the estimates of life history parameters from observations so that such estimates do not have to be modified to force the steepness parameter to within reasonable bounds. If appropriate estimates cannot be found, either the model formulation should be investigated, or a dedicated study of the life history should be undertaken.

Evaluate the adequacy, appropriateness, and application of the methods used to estimate stock status criteria (population benchmarks such as MSY , F_{msy} , B_{msy} , $MSST$, $MFMT$). State whether or not the methods are scientifically sound.

It appears that the methods used to estimate stock status were appropriate for the population model used in the assessment. Sensitivity runs indicate that the overall status of the population is rather robust to model assumptions and that the stock is overfished with overfishing occurring. I note that the methods used for estimating stock status were much more sensitive to assumptions about life history parameters than to the catch and catch-rate data input to the model. It is therefore crucial that such estimates are re-examined for future assessments.

Evaluate the adequacy, appropriateness, and application of the methods used to project future population status and, if appropriate, evaluate stock rebuilding; state whether or not the methods are scientifically sound.

In general, because the data and the assessment model are the best currently available, it follows that the same can be said for the projections. This is true if the productivity of the stock continues to be as estimated in the assessment. Despite the uncertainty associated with the life history parameters, all model projections gave similar results and the differing assumptions about generation times had little overall effect on the outcome of the projections.

Develop recommendations for future research for improving data collection and stock assessment.

The following research recommendations are intended to add emphasis to those given in the SEDAR data workshop report.

Issue: life history parameters.

- There is a need to focus on research to provide information on life history parameters under density-dependent or density independent or -dependent conditions. For example, does natural mortality change with population size?

Issue: relationship between catch-rate indices and population size.

- Many of the indices are based on longline gear, and the assumption of proportionality needs to be assessed for that type of gear through literature review and directed research.

Issue: Appropriateness of catch-rate indices and their relationship to the population abundance.

- Examination of the size composition of catches from the different index series may be informative. Investigate basic population indicators such as mean size/age in the catch over time.
- Charts of where (and when) the catch-rate series are located together with spatial and temporal distribution of the fisheries for sandbar is desirable and potentially useful in interpreting the indices.

Issue: lack of age composition data or evaluation of trends.

- The predicted age compositions for the population and the catch in the model may provide useful diagnostics for the performance of the model. Research should be directed into developing these diagnostics, including verification with any available data on age composition.

Issue: Absence of by-catch information on sandbar from the Atlantic menhaden fishery.

- Determine if such data are available and, if so, include them in the next assessment. If no such data exist, design and implement an appropriate monitoring programme preferably through a logbook scheme or using onboard observers.

3.3 Blacktip (*Carcharhinus limbatus*) Gulf of Mexico

The results of the assessment are sufficiently reliable that it can be concluded that the stock of blacktip in the Gulf of Mexico is not overfished and that overfishing is not taking place. However, the absolute estimates of stock status remain unknown. The basic information from the three abundance indices believed to be most representative of the stock were consistent with each other and suggest that during the past 10 years, stock abundance has been increasing coincidental with declining catches. This is in keeping with the

observation that based on life-history characteristics; blacktip are a relatively productive species.

The assessment indicates that the blacktip stock in the Gulf of Mexico is relatively healthy. However, there is considerable imprecision in the stock estimates and the absolute level of the stock is unknown. Hence, there is no scientific basis for advising on a specific catch level for blacktip in the Gulf of Mexico.

3.3.1 Findings in relation to specific Terms of Reference.

Evaluate whether data used in the analyses are treated appropriately and are adequate for assessing the stocks; state whether or not the input data are scientifically sound.

Given the data available, they were treated appropriately, and were adequate for the models used to assess the stocks. However, some deficiencies in the catch data exist and there is particular concern that catches before 1986 are grossly underestimated. There was an eightfold increase in commercial catches between 1985 and 1986, which seems implausible. Closer examination of potential sources of missing catch data prior to 1986 seems desirable.

The various cpue abundance indices showed conflicting trends, and it would be desirable to examine how representative of population trends each is likely to be. In discussion, the analysts felt that three series were most representative of population trends (bottom longline observer, NMFS longline southeast survey, and the Panama City gillnet survey (for juveniles)), but others deemed less representative were included in the assessment model. A pragmatic approach would be to decide *a priori* which cpue series is most likely to be representative of population trends and only use those. Charts showing the extent of spatial overlap between catch rate series, and the fishery would help address this.

No information on size or age composition of the indices or catch was presented. An analysis of such data would ensure that the indices are representative of the catch, and can be used as a diagnostic of the adequacy of the age-structured model.

The life history parameters used in the stock assessment model were changed in order to increase steepness above the minimum level required for a self-sustaining population. This meant that estimates of M at age were set at levels below that recommended by the Data Workshop ($M = 0.1$ for adults), and first-year survival was set at values higher than those shown in a field study. There is clearly a conflict between realistic assumptions for model inputs and the estimates of some life history parameters made from field observations. Either expected life history parameters are incorrect and may need to be re-evaluated or there may be an unknown source contributing pups to the population. It is unlikely that pups from the Atlantic contribute to the Gulf stock.

Evaluate the adequacy, appropriateness, and application of the methods used to assess the populations; state whether or not the methods are scientifically sound.

Given the data available, the use of the state-space age-structured surplus production assessment model was both scientifically sound and appropriate for assessing the population. However, such an approach has its limitations, and if a time-series of age/size structure catch data were available, there would be a number of potentially more robust and informative assessment techniques that could be used. I suggest that the availability of such time series data be investigated.

Evaluate the adequacy, appropriateness, and application of the methods used to estimate stock status criteria (population benchmarks such as MSY , F_{msy} , B_{msy} , $MSST$, $MFMT$). State whether or not the methods are scientifically sound.

The methods used in the assessment for estimating stock status criteria were adequate, appropriate, and scientifically sound.

Evaluate the adequacy, appropriateness, and application of the methods used to project future population status and, if appropriate, evaluate stock rebuilding; state whether or not the methods are scientifically sound.

Despite the concerns with regard to the catch data and life history parameter estimates, the methods used for population projections were appropriate and scientifically sound. I have no further comments.

Develop recommendations for future research for improving data collection and stock assessment.

The following recommendations reinforce and expand on those recommended in the LCS SEDAR 11 data and assessment workshop reports.

Issue: Potential missing catch prior to the mid 1980s and the assumption of virgin biomass in 1981.

- Explore alternative methods for estimating historical catches, such as examination of fish processor records.
- Simulate the existence of a depleted population at the start of the assessment time-series to investigate whether perception of stock status radically alters.

Issue: Estimates of life history parameters.

- Re-examine the life history characteristics using filed data, particularly reproductive rate (pup production).
- Investigate potential possible alternative recruitment sources to the population from outside the Gulf of Mexico.

Issue: inconsistency in abundance indices and poor model fit.

- Restrict selection of abundance indices to those that are most likely to provide reasonable coverage of the population. The following indices should be examined to see if they are the most representative: bottom longline observer, NMFS longline southeast survey, and Panama City gillnet survey (for juveniles).
- Examine temporal spatial overlap of abundance indices with the fishery for sandbar to gain insight as to which indices are most likely to be representative of population trends.
- Undertake an analysis of age/size composition of catch and catch rate series to determine whether indices are representative of the catch. Such an analysis could also be used as an additional diagnostic of the adequacy of the age-structured model.

Issue: precision of stock status estimates.

- Presentation of posterior distributions for F/F_{msy} and B/B_{msy} in relation to reference points would aid interpretation of stock status.

Issue: Improvement of data sampling protocols.

- Collect length frequency data from commercial landings and increase data collection from the recreational fishery as additional measures of model fit.
- Examine trends in mean size in the catch as an indication of overexploitation.

3.4 Blacktip (*Carcharhinus limbatus*) Atlantic

The data used for the analyses were treated appropriately, but it was unclear whether catch estimates prior to 1991 adequately represent historical removals of blacktip shark from the Atlantic stock component. In addition it was impossible to judge the extent to which each of the standardized catch-rate series reflected real trends in the abundance of the stock.

Given the widely differing results arising from the different models, the status of the stock of Atlantic blacktip shark is uncertain, so no reliable estimates of abundance, biomass, or exploitation rate can be advanced at the current time. Further, in the absence of any reliable estimates of abundance, biomass and exploitation rates, no reliable estimates of stock status for Atlantic blacktip can be suggested.

Given that the current status of Atlantic blacktip is unknown, no reliable population projections were possible, so no probable values for future population condition and status of Atlantic blacktip can be provided. Furthermore, there is no scientific basis for advising on a specific catch level for blacktip in the Atlantic at this time.

3.4.1 Findings in relation to specific Terms of Reference.

Evaluate whether data used in the analyses are treated appropriately and are adequate for assessing the stocks; state whether or not the input data are scientifically sound.

The data used for the analysis had been treated appropriately and represented the best estimates of assessment input information currently available to the data and assessment workshops. However, I note a number of concerns as follows:

There was a large increase in the catches after 1990. Commercial catch estimates for the period prior to 1995 were derived using information from more recent years, to apportion catch between the Gulf of Mexico and the Atlantic. Hence I conclude that the commercial catch data may be unreliable prior to 1991 at least.

The standardized catch-rate indices showed conflicting trends, and it is impossible to judge the extent to which each of the series reflected real trends in the abundance of the stock. Additionally, the time-series of catch-rate indices was relatively short compared with the time-series of catch estimates.

A single selectivity vector was applied to commercial catch-rate indices and since the catch-rate series are derived from different fleets operating in different areas and at different times, this may be inappropriate. Moreover, while the separate indices themselves may be good indicators of abundance for the fraction of the population that they sample, the application of an inappropriate selectivity vector may introduce differential bias into the indices. Careful examination of size and age composition of the catch-rate index data should be undertaken to establish whether appropriate fleet-specific size/age selectivity vectors can be derived.

The life history parameters used in the stock assessment model were changed in order to increase steepness above the minimum level required for a self-sustaining population. This meant that estimates of M at age were set at levels below that recommended by the Data Workshop ($M = 0.1$ for adults), and first-year survival was set at values higher than those shown in a field study. There is clearly a conflict between realistic assumptions for model inputs and the estimates of some life history parameters made from field observations. Either expected life history parameters are incorrect and may need to be re-evaluated or there may be an unknown source contributing pups to the population. It is unlikely that pups from the Gulf contribute to the Atlantic stock.

Evaluate the adequacy, appropriateness, and application of the methods used to assess the populations; state whether or not the methods are scientifically sound.

Given the information available, the methods used to assess the Atlantic blacktip are scientifically sound and appropriate. However, the varying results of

the assessment largely highlighted the lack of consistency in signals in the catch-rate index series.

Evaluate the adequacy, appropriateness, and application of the methods used to estimate stock status criteria (population benchmarks such as MSY , F_{msy} , B_{msy} , $MSST$, $MFMT$). State whether or not the methods are scientifically sound.

Given appropriate and reliable input data, the methods available to the assessment workshop to derive estimates of stock status criteria are scientifically sound. However, largely because of inconsistent signals from the catch rate indices, the assessment model did not provide reliable estimates of abundance, biomass, or exploitation rate for Atlantic blacktip. Hence, the results from the methods do not provide reliable estimates of stock status.

Evaluate the adequacy, appropriateness, and application of the methods used to project future population status and, if appropriate, evaluate stock rebuilding; state whether or not the methods are scientifically sound.

Given that the current status of Atlantic blacktip is unknown, no reliable population projections were possible.

Develop recommendations for future research for improving data collection and stock assessment.

The following recommendations are intended to supplement and expand on those given in the SEDAR 11 Data and Assessment Workshop reports:

Issue: Reliability of catch data.

- Any additional sources of information on catches should be sought and examined. The catch data especially for the period prior to 1995 should be re-examined to establish whether all removals have been accounted for and whether they are realistic estimates of actual removals.
- Estimates of blacktip bycatch in the fishery for Atlantic menhaden should be derived if possible, and catch information from logbooks and trip weigh-out records from the Florida east coast gillnet fleet for the period 1985–1991 may also be available.

Issue: Consistency of catch-rate indices.

- Careful examination of size and age composition of the catch-rate index data should be undertaken to establish whether appropriate fleet-specific size/age selectivity vectors can be derived.

Issue: Trends in fishing effort.

- Trends in deployed fishing effort, at least for the catch-rate index series, should be developed in future Data Workshops and presented in the Assessment Workshop report, together with corresponding trends in catches and catch rate. It would also be informative to document time-series trends in deployed fishing effort for all fleets that exploit Atlantic blacktip if such data are available.

Issue: Information on size and age compositions.

- It would be informative to examine simple metrics such as mean age and mean size in the catches as a whole, and by fleet and geographic area. These may give a crude indication of trends in exploitation rate.

Issue: Life history parameters for Atlantic blacktip.

The life history parameters entered into the stock assessment model appear to be unrealistic, because they had to be changed in order to increase steepness above the minimum level required for a self-sustaining population. Data pertaining to life history characteristics should be re-examined, and that information that may identify alternative sources of recruitment to the population should be explored.

4. Bibliography of materials provided by CIE

SEDAR 11 DATA WORKSHOP _ WORKING PAPERS

- LCS05/06-DW-01 Anonymous: Documentation for the North Carolina Division of Marine Fisheries catch rate series (NC#)
- LCS05/06-DW-02 Anonymous: Description of estimates of unreported catches
- LCS05/06-DW-03 Anonymous: Final Meeting Report of the 2002 Shark Evaluation Workshop. NOAA NMFS Panama City Laboratory, Panama City Beach, FL. June 24-28, 2002. Final Meeting Report, 20 August 2002.
- LCS05/06-DW-04 Balchowsky & Poffenberger: Description of the Databases that Contain Landings of Shark Species from the Atlantic Ocean and Gulf of Mexico
- LCS05/06-DW-05 Beerkircher et al.: SEFSC Pelagic Observer Program data summary for 1992-2000
- LCS05/06-DW-06 Bonfil & Babcock: Estimation of catches of sandbar (*Carcharhinus plumbeus*) and blacktip (*C. limbatus*) sharks in the Mexican fisheries of Gulf of Mexico
- LCS05/06-DW-07 Brewster-Geisz & Eytcheson: Illegal Fishing off the coast of Texas by Mexican Lanchas
- LCS05/06-DW-08 Brewster-Geisz: A summary of the management of Atlantic Large Coastal Sharks
- LCS05/06-DW-09 Brown: Standardized catch rates of sandbar (*Carcharhinus plumbeus*) sharks in the Virginia - Massachusetts (U.S.) rod and reel fishery 1986 - 2004
- LCS05/06-DW-10 Carlson et al.: Life history parameters for blacktip sharks, *Carcharhinus limbatus*, from the United States South Atlantic Bight and Eastern Gulf of Mexico
- LCS05/06-DW-11 Carlson: The Directed Shark Gillnet Fishery: Large Coastal Catch Composition and a Standardized Catch Rate Series.
- LCS05/06-DW-12 Carlson & Bethea: Standardized catch rates of large coastal sharks from a fishery-independent survey in northeast Florida
- LCS05/06-DW-13 Carlson et al.: Standardized catch rates of large coastal sharks from the Everglades National Park creel survey, 1972 – 2002

- LCS05/06-DW-14 Cortés: Documentation of the South Carolina Department of Natural Resources longline survey catch rate series (SC LL Recent)
- LCS05/06-DW-15 Cortés & Brooks: Estimates of natural mortality for sandbar and blacktip sharks for use in assessments
- LCS05/06-DW-16 Cortés & Neer: Updated catches of Atlantic sharks
- LCS05/06-DW-17 Cortés et al.: Standardized catch rates of large coastal sharks from the Commercial Shark Fishery Observer Program, 1994-2004
- LCS05/06-DW-18 Diaz: Estimation of large coastal sharks dead discards for the US pelagic longline fishing fleet
- LCS05/06-DW-19 Dunnigan: Memo regarding Management Needs for Upcoming Large Coastal Shark (LCS) Stock Assessment
- LCS05/06-DW-20 Ha & Musick: A preliminary analysis of Virginia shark longline data 1974 - 2004
- LCS05/06-DW-21 Hester: Documentation for the Brannon catch rate series
- LCS05/06-DW-22 Hester & Hudson: An evaluation of the content and quality of two Commercial Atlantic Shark Fishery logbook data sets for consideration for stock assessment use
- LCS05/06-DW-23 Hoey et al: A review of exploratory longline surveys and biological sampling of sharks from the Sandy Hook and Narragansett labs: 1961-1991
- LCS05/06-DW-24 Hoffmayer et al: Catch Rates for Blacktip and Other Large Coastal Shark Species from Mississippi Coastal Waters During 1998–2005
- LCS05/06-DW-25 Hueter: Documentation for the Hudson, Jax, Pt. Salerno, and Tampa Bay Recreational Fishing Tournaments catch series, along with the Crooke longline catch rate series
- LCS05/06-DW-26 Hueter et al: Relative abundance of juvenile blacktip sharks in three Florida Gulf coast nursery areas, 1995-2004
- LCS05/06-DW-27 Ingram et al: Catch rates, distribution and size composition of large coastal sharks collected during NOAA Fisheries Bottom Longline Surveys from the U.S. Gulf of Mexico and U.S. Atlantic Ocean

- LCS05/06-DW-28 Keeney et al.: Genetic heterogeneity among blacktip shark, *Carcharhinus limbatus*, continental nurseries along the U.S. Atlantic and Gulf of Mexico
- LCS05/06-DW-29 Kohler et al: Preliminary Tag and Recapture Data for the Sandbar Shark, *Carcharhinus plumbeus*, and the Blacktip Shark, *Carcharhinus limbatus*, in the Western North Atlantic
- LCS05/06-DW-30 McCandless: Relative abundance trends for juvenile sandbar sharks in Delaware Bay
- LCS05/06-DW-31 McCarthy & Abercrombie: Standardized catch rates of large coastal sharks from the United States bottom longline fishery during 1996-2004
- LCS05/06-DW-32 Morgan and Burgess: The Commercial Shark Fishery Observer Program: History, collection methodology and summary statistics 1994-2005(1)
- LCS05/06-DW-33 Natanson and McCandless: Catch Rate Information Obtained from the NMFS Northeast Longline Survey
- LCS05/06-DW-34 Neer and Cortés: Estimation of large coastal shark complex, blacktip, and sandbar shark bycatch in the Gulf of Mexico menhaden fishery
- LCS05/06-DW-35 Ortiz: Standardized catch rates for blacktip shark (*Carcharhinus limbatus*), sandbar shark (*C. plumbeus*), and large coastal complex sharks from the U.S. longline fleet 1981-2004
- LCS05/06-DW-36 Ortiz: Standardized catch rates for blacktip shark (*Carcharhinus limbatus*), sandbar shark (*C. plumbeus*), and large coastal complex sharks from the Marine Recreational Fisheries Statistical Survey (MRFSS)
- LCS05/06-DW-37 Phares: Recreational Marine Fishing Surveys in the Gulf of Mexico and Atlantic States, 1981-2004
- LCS05/06-DW-38 Poffenberger: Description of the Southeast Fisheries Science Center's Logbook Program for Coastal Fisheries
- LCS05/06-DW-39 Romine & Musick: Life history of the sandbar shark, *C. plumbeus*, in the Northwestern Atlantic
- LCS05/06-DW-40 Grubbs et al.: Long-term movements, migration, and temporal delineation of a summer nursery for juvenile sandbar sharks in the Chesapeake Bay region

- LCS05/06-DW-41 Scott & Lacey: Documentation for the Charterboat catch rate series
- LCS05/06-DW-42 SEFSC: Review of Headboat Survey – Questions and Answers
- LCS05/06-DW-43 Simpfendorfer et al.: Large coastal shark surveys in the eastern Gulf of Mexico 2001-2004
- LCS05/06-DW-44 Tyminski et al: Results of Mote Marine Laboratory Shark Tagging Program for blacktip (*Carcharhinus limbatus*) and sandbar (*C. plumbeus*) sharks
- LCS05/06-DW-45 Ulrich: Documentation for the South Carolina Longline Survey – Early (SCLL Early)
- LCS05/06-DW-46 Conrath & Musick: Investigations into the winter habitat of juvenile sandbar sharks, *Carcharhinus plumbeus*, using pop-up archival satellite transmitters (PSATs).
- LCS05/06-DW-47 Merson: Maturation of the sandbar shark in the western North Atlantic

SEDAR 11 DATA WORKSHOP: SUPPLEMENTARY INFORMATION

- Heist E.J. and Gould J.R, 1999. Micro-satellite DNA variation in sandbar sharks (*Carcharhinus plumbeus*) from the Gulf of Mexico and Mid-Atlantic Bight. *Copeia*, 1999 (1) , 182-186
- Heist E.J., Graves J.E. and Musick, J.A. 1995. Population genetics of the sandbar shark (*Carcharhinus plumbeus*) from the Gulf of Mexico and Mid-Atlantic Bight. *Copeia*, 1995 (3) , 555-562
- KEENEY, D. B., HEUPEL, M. R., HUETER R. E. and HEIST E . J., 2005. Microsatellite and mitochondrial DNA analyses of the genetic structure of blacktip shark (*Carcharhinus limbatus*) nurseries in the northwestern Atlantic, Gulf of Mexico, and Caribbean Sea. *Molecular Ecology*, 2005(14), 1911–1923

SEDAR 11 DATA WORKSHOP REPORT

- LCS05/06: LARGE COASTAL SHARK COMPLEX, BLACKTIP AND SANDBAR SHARKS LARGE COASTAL SHARK COMPLEX DATA WORKSHOP REPORT 12 JANUARY 2006

SEDAR 11 ASSESSMENT WORKSHOP

- SEDAR 11: LARGE COASTAL SHARK COMPLEX ASSESSMENT WORKSHOP REPORT, 8 May 2006.

SEDAR 11 ASSESSMENT WORKSHOP: WORKING PAPERS

- SEDAR 11-AW-01-V2. APOSTOLAKI: FIRST ESTIMATES OF THE STATUS OF SANDBAR SHARK STOCK OFF THE EASTERN COAST OF THE US
- SEDAR 11-AW-02_V2. APOSTOLAKI: FIRST ESTIMATES OF THE STATUS OF BLACKTIP STOCK OFF THE EASTERN COAST OF THE US
- SEDAR11-AW-03. Brooks: A State-Space, Age-Structured Production Model for Sandbar Shark
- SEDAR11-AW-04. Brooks: Preliminary Runs of a State-Space, Age-Structured Production Model for Blacktip Shark
- SEDAR11-AW-05. Cortés and Babcock. Assessment of Large Coastal, Blacktip, and Sandbar Sharks using Surplus Production Methods
- SEDAR11-AW-06. Cortés and Neer. Catch history for blacktip shark – combined regions
- SEDAR11-AW-07. Freitas. Assessing Shark Landings and Conservation Measures in Rhode Island
- SEDAR11-AW-08. Hester and Hudson. Some Cautions on the Use of Pelagic Longline Logbook (PLL) Data to Assess the Abundance of Large Coastal Sharks (LCS)
- SEDAR11-AW-09. Merson. Length and age at maturity of the sandbar shark, *Carcharhinus plumbeus*
- SEDAR11-AW-10. Brooks and Cortés Issues related to Biological Inputs to Blacktip and Sandbar assessments

Appendix 1: Participants in the SEDAR 11 Review workshop

1.1.1 Participants

Affiliation E-mail

Review Panel:

Andrew Payne	CIE, Chair	andy.payne@cefas.co.uk
John Casey	CIE, Reviewer	john.casey@cefas.co.uk
Steve Smith	CIE, Reviewer	SmithSJ@mar.dfo-mpo.gc.ca
Steve Campana	Bedford Institute of Oceanography	CampanaS@mar.dfo-mpo.gc.ca
Colin Simpfendorfer	Mote Marine Laboratory	colins@mote.org

Presenters:

Liz Brooks	NOAA Fisheries/SEFSC, Miami	liz.brooks@noaa.gov
Enric Cortes	NOAA Fisheries/SEFSC, Panama City	enric.cortes@noaa.gov

Observers:

Karyl Brewster-Geisz	NOAA Fisheries/HMS, Silver Spring	karyl.brewster-geisz@noaa.gov
John Carlson	NOAA Fisheries/SEFSC, Panama City	john.carlson@noaa.gov
Joe Grist	Atlantic States MF Commission	jgrist@asmfc.org
Mark Harrison	Harrison International LLC	mhfinman@aol.com
Russell Hudson	Directed Shark Fisheries, Inc.	DirectedShark@aol.com

Staff support:

Julie Neer	NOAA Fisheries/SEFSC, Panama City	Julie.Neer@noaa.gov
Loyd Darby	NOAA Fisheries/SEFSC, Miami	loyd.darby@noaa.gov
Lori Hale Williams	NOAA Fisheries/SEFSC, Panama City	loraine.hale@noaa.gov
Chris Hayes	Virginia Tech	chayes1@vt.edu

Appendix 2: Terms of Reference

The LCS SEDAR 11 Review Panel will evaluate the large coastal shark complex, blacktip shark, and sandbar shark stock assessments, including input data, assessment methods, and model results as put forward in stock assessment reports. The Assessment Review Panel will:

1. Evaluate whether data used in the analyses are treated appropriately and are adequate for assessing the stocks; state whether or not the input data are scientifically sound.
2. Evaluate the adequacy, appropriateness, and application of the methods used to assess the populations; state whether or not the methods are scientifically sound.
3. Recommend appropriate or best estimated values of population parameters such as abundance, biomass, and exploitation (if possible).
4. Evaluate the adequacy, appropriateness, and application of the methods used to estimate stock status criteria (population benchmarks such as MSY , F_{msy} , B_{msy} , $MSST$, $MFMT$). State whether or not the methods are scientifically sound.
5. Recommend appropriate values for stock status criteria (if possible).
6. Evaluate the adequacy, appropriateness, and application of the methods used to project future population status and, if appropriate, evaluate stock rebuilding; state whether or not the methods are scientifically sound.
7. Recommend probable values for future population condition and status (if possible).
8. Ensure that all desired and necessary assessment results (as listed in the SEDAR Stock Assessment Report Outline) are clearly and accurately presented in the Stock Assessment Report and that such results are consistent with the Review Panel's consensus regarding adequacy, appropriateness, and application of the data and methods.
9. Evaluate the Data and Assessment Workshops with regard to fulfilling their respective Terms of Reference and state whether or not the Terms of Reference for previous workshops are adequately addressed in the Data Workshop and Stock Assessment Report sections;
10. Develop recommendations for future research for improving data collection and stock assessment.
11. Prepare a Consensus Report summarizing the peer review panel's evaluation of the reviewed stock assessments and addressing these Terms of Reference. (Drafted during the Review Workshop with a final report due two weeks after the workshop ends.)

Appendix 3: Statement of Work

Subcontract between the University of Miami and CEFAS (Dr. John Casey)

Statement of Work

May 2, 2006

General

The Large Coastal Shark Complex (LCS), blacktip shark, and sandbar shark are currently managed by the Highly Migratory Species Division of the National Marine Fisheries Service. In the past, Shark Evaluation Workshops were conducted to analyze the available data and assess the status of the complex. 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 LCS 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 a data report produced by the data workshop, a stock assessment report and summary produced by the assessment workshop, a review panel report evaluating the assessment (drafted during the review panel workshop), and collected stock assessment documents considered in the SEDAR process.

The peer review panel is composed of stock assessment experts, other scientists, and representatives of councils, fishing industries, and non-governmental conservation organizations. For each assessment considered during the review workshop, a panel member will be chosen to serve as review leader whose responsibilities include ensuring that panel comments regarding the assessment are accurately documented in the consensus report and assisting the chair in drafting the report during the workshop.

NMFS-SEFSC requests the assistance of three assessment scientists from the Center for Independent Experts (CIE): one to serve as Chair and two to serve as a technical reviewer for the LCS SEDAR 11 Review Panel that will consider assessments for the Large Coastal Shark complex, blacktip shark, and sandbar shark. No consensus opinion among the three CIE panelists is sought.

The review workshop for LCS SEDAR 11 will take place at the Bay Point Marriott, in Panama City, Florida, from 1:00 p.m. on Monday, June 5, 2006 through 12:00 p.m. on Friday, June 9, 2006.

Meeting materials will be forwarded electronically and in hard copy if requested. Please contact Julie A. Neer (Shark SEDAR Coordinator; 850-234-6541 ext. 240 or Julie.neer@noaa.gov) for additional details.

SEDAR Assessment Review Panel Tasks

The LCS SEDAR 11 Review Panel will evaluate the large coastal shark complex, blacktip shark, and sandbar shark stock assessments, including input data, assessment methods, and model results as put forward in stock assessment reports. The Assessment Review Panel will:

1. Evaluate whether data used in the analyses are treated appropriately and are adequate for assessing the stocks; state whether or not the input data are scientifically sound.
2. Evaluate the adequacy, appropriateness, and application of the methods used to assess the populations; state whether or not the methods are scientifically sound.
3. Recommend appropriate or best estimated values of population parameters such as abundance, biomass, and exploitation (if possible).
4. Evaluate the adequacy, appropriateness, and application of the methods used to estimate stock status criteria (population benchmarks such as MSY, Fmsy, Bmsy, MSST, MFMT). State whether or not the methods are scientifically sound.
5. Recommend appropriate values for stock status criteria (if possible).
6. Evaluate the adequacy, appropriateness, and application of the methods used to project future population status and, if appropriate, evaluate stock rebuilding; state whether or not the methods are scientifically sound.
7. Recommend probable values for future population condition and status (if possible).
8. Ensure that all desired and necessary assessment results (as listed in the SEDAR Stock Assessment Report Outline) are clearly and accurately presented in the Stock Assessment Report and that such results are consistent with the Review Panel's consensus regarding adequacy, appropriateness, and application of the data and methods.
9. Evaluate the Data and Assessment Workshops with regard to fulfilling their respective Terms of Reference and state whether or not the Terms of Reference for previous workshops are adequately addressed in the Data Workshop and Stock Assessment Report sections;
10. Develop recommendations for future research for improving data collection and stock assessment.
11. Prepare a Consensus Report summarizing the peer review panel's evaluation of the reviewed stock assessments and addressing these Terms of Reference. (Drafted during the Review Workshop with a final report due two weeks after the workshop ends.)

The Assessment Review Panel's primary duty is to review the assessments as presented. In the course of this review, the Chair may request a reasonable number of sensitivity runs, additional details regarding 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. If the review panel finds that either the input data or the stock assessment are not adequate and reliable, the panel shall outline in its report the remedial measures necessary to correct the 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 and Reviewer's reports, also discussed under Specific Tasks.

The review workshop for SEDAR 11, Large Coastal Sharks, will take place at the Bay Point Marriott, in Panama City, Florida, 5 June 2006 (beginning at 1:00 pm) through 9 June 2006 (ending at 1:00 pm). Meeting materials will be forwarded electronically and in hard copy if requested. Please contact Julie A. Neer (Shark SEDAR Coordinator; 850-234-6541 ext. 240 or Julie.neer@noaa.gov) for additional details.

Specific Tasks

The Review Panelist's duties will occupy up to a maximum of 14 workdays each; 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 their individual CIE review reports.

Roles and responsibilities:

The CIE designees shall serve as technical reviewers for an LCS SEDAR 11 Stock Assessment Review Panel workshop to be held June 5 – 9, 2006 in Panama City, Florida (See attached agenda.). The workshop panel shall review stock assessments for the large coastal shark complex, blacktip sharks, and sandbar sharks under the jurisdiction of the National Marine Fisheries Service Highly Migratory Species Division. Roles and responsibilities of the technical reviewers include:

1. Prior to the meeting the CIE reviewers shall be provided with the stock assessment reports and associated documents. The reviewers shall read these documents to gain an in-depth understanding of the stock assessments and the resources and information considered in the assessments.
2. During the Review Panel meeting, the reviewers shall participate, as peers, in panel discussions on assessment validity, results, recommendations, and conclusions. The reviewers also shall participate

in the development of the Consensus Report.

3. Following the Review Panel meeting, the reviewers shall review and provide comments to the Panel Chair on the Consensus Report.
4. No later than June 23, 2006, each reviewer shall submit a written CIE Reviewer Report¹ consisting of the findings, analysis, and conclusions (see annex 1 for details) to Dr. David Sampson, via email to David.Sampson@oregonstate.edu, and to Mr. Manoj Shivilani, via email to mshivilani@rsmas.miami.edu.

Annex I. Contents of SEDAR and CIE Reports.

SEDAR Consensus Summary Contents

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. Additional Comments

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

III. Stakeholder Comments

Stakeholder representatives on the Panel are encouraged to submit brief statements summarizing their opinions regarding stock status, analytical methods, and input data.

IV. Recommendations for Future Workshops

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

Contents of CIE Chair Report

1. Synopsis/summary of the meeting – to provide context for the comments rather than to rewrite the summary report. (The latter 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.

¹ All CIE reports will undergo an internal CIE review before they are considered final.

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

Contents of CIE Reviewer Reports

1. Each report shall be prefaced with an executive summary of findings and/or recommendations.
2. The main body of each reviewer report shall consist of a background, description of review activities, summary of findings, and conclusions/recommendations. The report shall address points 1, 2, 4, 6, and 10 under the above heading: SEDAR Assessment Review Panel Tasks.
3. Each reviewer report shall also include as separate appendices the bibliography of materials provided by the Center of Independent Experts and a copy of the Statement of Work.

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