CIE Independent Peer Review Report: SEDAR 39 Highly Migratory Species Atlantic Smoothhound and Gulf of Mexico Smoothhound Complex

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Executive Summary

This review is a result of the SEDAR 39 Assessment Review Workshop. The assessments of Highly Migratory Species Atlantic Smoothhound shark and *Mustelus* complex in the Gulf of Mexico were presented at the February (10th-12th) assessment review workshop as part of the SEDAR 39 process. Data and Assessment review report materials were made available to the review panel in January. This is one report of a 3-member peer review for the assessment, contracted through the CIE process, but independent of the consensus summary being drafted. This report should be read in conjunction with the SEDAR 39 data and assessment reports and along with the other CIE reviewers' reports.

Available data for both assessments consists of total catch estimates and CPUE series, along with length compositions for the Atlantic smoothhound assessments. In general the data is of good quality for species that are predominantly bycatch. The CPUE series selected for use in both of the assessments were from fishery independent sources. In the Atlantic the CPUE series did not trend in one general pattern or trend, in general the CPUE series from the GOM did generally trend in the same, increasing direction. Historical catches have been estimated for both the assessments. In the GOM the bycatch in the shrimp fishery is the predominant source of bycatch, while in the Atlantic the dominant sources are the recreational fishery and the gillnet fishery. Significant data gaps were mostly limited to the historical (pre-model) catch in both assessments. The GOM assessment used a state-space Bayesian surplus production model (SSSPM) first described by Meyer and Millar (1999) and the Atlantic used Stock Synthesis 3 (Methot and Wetzel 2013). Both models were suited to the available data. Estimates of biological and life history traits such as growth, natural mortality and the size at maturity are used in the Atlantic assessment to inform and the model regarding the plausible population dynamics. The GOM assessment used a model that did not allow for multiple life history inputs but did use demographic information to develop an informative prior for the intrinsic rate of growth.

In both assessment models with different combinations of the input data and parameterizations were run to assess the plausibility of alternate assumptions regarding the state of nature and their effects on the estimates of stock status. In general this is good, standard practice for bycatch species. In both assessments the stocks are not estimated to be over fished or experiencing overfishing in the 2012, the last year of the model. These conclusions appear robust within the ranges of uncertainty examined by the assessment team, and there is little evidence to the contrary.

Both assessments could benefit from integrating the projection scenarios into the model. While the methods in which each model was projected forward is adequate, integration of the projection scenarios into the modeling framework would allow for the projections to carry forward the errors as modeled in the assessment.

In principal the Atlantic assessment could benefit from grouping indices and fitting multiple models, using only non-conflicting indices within a model. Allowing a model to include conflicting indices breaks the assumption the indices represent the population dynamics, and results in poor fit as the model finds a non-optimal solution that is a compromise between the conflicting indices. In reality the 8 CPUE series selected for the assessment are all at least partially conflicting, models were fit to the individual series and the effect on stock status was minimal.

The overall findings of this review are that as presented in the assessment reports the base case and sensitivity model adequately capture the status of the stock and that are useful for management inference. With respect to the specific assessments:

Atlantic smoothhound shark (*M. canis*)

- The data used, chosen by the Data Workshop, were adequate.
- Generally increasing SSF/SSF_{MSY} since the late 1990s with current estimates indicate the stock is not overfished.
- Current (2012) estimates of fishing mortality indicate that overfishing is not occurring.
- The assessment found that the stock was not overfished an overfishing was not occurring; this conclusion is based on the balance of evidence, across the alternative structural assumptions examined in the assessment.
- Projection results for a given fixed catch indicate that current catch levels are sustainable.
- This assessment is of high scientific quality, represents the best available science and fulfills the terms of reference.

GULF OF MEXICO SMOOTHHOUND COMPLEX

- The data used, chosen by the Data Workshop were adequate
- The model selection and implementation, including the projection of future harvest scenarios was appropriate to the data
- The decline in total fishing mortality over the last decade is due to reduction of bycatch in the shrimp fishery
- The assessment found that the stock was not overfished an overfishing was not occurring; this conclusion is based on the balance of evidence, across the alternative structural assumptions and sensitivity analyses examined in the assessment.
- Projection results indicate that current catch levels are sustainable for the next decade.
- This assessment represents the best scientific information available and fulfills the terms of reference.

CIE REVIEW OF SEDAR 39 HMS SMOOTHHOUND

Background

This review is part of the CIE process associated with SEDAR 39. The SEDAR 39 process consists of a data workshop and review, an assessment process that includes online meetings (webinars) that outline the assessment process and an assessment review. This document is an independent review of the assessment, and assessment process based on the review workshop held in Panama City (Florida) on February 9th-12th. The intent of this review is to ensure that the SEDAR 39 assessments represent the best available science.

Description of the Individual Reviewers' Role

Background materials outlining the data preparation, report of the data workshop and the report of the assessment workshop along with research recommendations and reference materials were made available by FTP on January 22, 2015. These materials were downloaded and reviewed by the reviewer prior to the review workshop held in in Panama City Florida on February 9th-12th. During the review workshop the assessment team presented the assessments for the Atlantic smoothhound (*Mustelus canis*) and the Gulf of Mexico smoothhound complex, along with supplementary material (e.g. catch estimation methodology). Discussion of the assessment approach, analysis and results occurred throughout the three-day session. Additional analysis was requested and presented by the assessment team, who were very responsive to these requests.

Summary of Findings

HMS ATLANTIC SMOOTH DOGFISH

In general the SEDAR process is well structured and has adequate resources for the both the data gathering and assessment phase of the assessment process. Both the data compilation and assessment processes are well documented; additionally the data process is independent of the assessment process which helps maintain the neutrality of the data selection process. This is not to say that the processes were ideal, but that in general the assessment results and decisions preceded them are well documented and transparent. This was the first time that the assessment team used the stock synthesis modeling framework and as such a certain decisions that occurred in the early data and assessment phases could have been better informed in collaboration with a scientist more familiar with the modeling platform.

TOR 1. Evaluate the data used in the assessment, including discussion of the strengths and weaknesses of data sources and decisions, and consider the following:

In general shark assessments are difficult to conduct because the catch history is unknown and often the only CPUE series is from a fishery that is avoiding the shark species of interest. In the case

of both assessments there are a multiple of well designed fishery independent indices of abundance. The data used in the HMS Atlantic smooth dogfish assessment include catch, CPUE and length frequency data in the assessment model.

The stock unit as defined in the assessment document (one single stock, no mixing with the Gulf of Mexico) is appropriate given that the dominant fisheries in the two regions are different fleets/gears. Additionally tag-recapture and genetic analyses indicate that the GOM and northwest Atlantic stocks are different, with a single well-mixed stock in the northwest Atlantic.

The species life history is well studied with published studies available on the age and growth as well as the maturity and reproduction of the species in the Atlantic Ocean these studies are based on large sample sizes and represent the species range in the northwest Atlantic.

Total catch estimates are a combination of commercial landings, and bycatch estimates which include variable estimates of live-discard mortality depending on the gear. The catch estimates represent credible estimations for the time period. The catch at length data include data from multiple surveys as well as on board observer data and are considered credible.

a) Are data decisions made by the DW and AW sound and robust?

The data used in Atlantic smooth dogfish assessment consist of length frequency information, catch estimates and CPUE along with life history data. The data decisions made by the DW and AW are generally sound with the exception of the DW's decision to set the year for unexploited biomass to 1981. This decision was made in part because the catch prior to that time, was thought to be impossible to estimate. While the decision no not estimate the catch prior to 1981 is may be realistic given the lack of information, that doesn't translate into a virgin stock in 1981.

b) Are data uncertainties acknowledged, reported, and within normal or expected levels?

The uncertainties associated with the data are acknowledged within normal levels. The DW had considered 20 CPUE series of which 8 were selected for use. The selected indices were ranked based on their reliability as determined by the data workshop. The uncertainty with respect to the catch data was addressed through the use of high catch and low catch scenarios, based on high and low levels of post release live discard mortality. Under the assumption that the length frequency data was highly correlated within each set the effective sample size of the data was reduced to limit the influence.

c) Are data applied properly within the assessment model?

The data are applied properly within the assessment model. This assessment used Stock Synthesis (SS3) which is an integrated statistical age-structured population model that can accommodate many types of data. The abundance and catch data are complimented by the length frequency data which helps inform the model.

d) Are input data series reliable and sufficient to support the assessment approach and findings?

The input data series are sufficient to support the use of SS3. Specifically the availability many years of length composition for multiple fleets, a well-studied life history, catch estimates and survey CPUE data is more than sufficient to support the use of an integrated statistical model such as SS3. The assessment is largely constrained to the plausible population dynamics due to the species biology, this is an advantage for the assessment as SS3 is informed by the integration of the fecundity, growth rate and maturity schedule.

TOR 2. Evaluate and discuss the strengths and weaknesses of the methods used to assess the stock, taking into account the available data, and considering the following:

a) Are methods scientifically sound and robust?

The modelling framework used to assess the stock (SS3) is publically available and has been extensively tested, and is a product of many years of development and analysis. One drawback to SS3 is that it is very complex with multiple interacting options available to configure the model. This means that the assessment team must invest significant resources to be fluent in the common practices associated with the model.

b) Are assessment models configured properly and used consistent with standard practices?

In general the assessment model (base case) was configured properly and consistent with standard practices. In cases where the review panel noted that this was not the case (e.g. estimating early recruitment deviates), subsequent analysis at the review workshop did not indicate a change in stock status based on the application of the standard practices.

c) Are the methods appropriate for the available data?

The methods are appropriate for the available data. This assessment is not a truly data poor assessment (note the 20 candidate CPUE series), however much of the data is low information and collected as part of ongoing research activities that seem to provide insight to distinct parts of the stock, SS3 is an appropriate framework to integrate the available data.

TOR 3. Evaluate the assessment findings and consider the following:

a) Are abundance, exploitation, and biomass estimates reliable, consistent with input data and population biological characteristics, and useful to support status inferences?

The estimated trend in abundance of the spawning stock from the base case indicates a decline in abundance from the beginning of the assessment (1982) until 1999, with a general increase in population abundance until the end of the assessment period (2012). This population trend corresponds with an estimated decrease in the overall fishing mortality in 1996 due to a decrease in gillnet landings. Catch estimates indicate that the gillnet landings experienced a sharp decline after 1995 with a gradual increase through the 2000s until reaching approximately the previous high value in 2010,

and then dropping sharply thereafter. This trend fits with the estimated population trajectory. The gillnet fishery is the dominant source of mortality in the recent period of the model and the abundance, exploitation and biomass estimates from the base case model are consistent with the majority of the input data (note that there are some inconsistent CPUE series and some poor fits to the length frequency data). These estimates are useful to support perceptions of stock trends however the stock status should be interpreted with care because the fit to the stock recruitment relationship, which governs the overall productivity of the stock, is uncertain.

b) Is the stock overfished? What information helps you reach this conclusion?

The abundance and biomass estimates from the base case model indicate that the stock is not overfished based on the accepted base case and sensitivities presented (SEL2 and internally estimated selection parameters) the range of sensitivity models indicate that the population is above MSY. The stock is not overfished nor is it experiencing overfishing but this is conditioned on the stock recruitment relationship which may be unreliable. The range of sensitivities investigated appropriately captures the uncertainty regarding the states of nature and therefore the implications regarding the reference points

c) Is the stock undergoing overfishing? What information helps you reach this conclusion?

The exploitation estimates from the base case model indicate that the stock is not experiencing overfishing in the last year of the model (2012). The sensitivities to the selected base case indicate that the recent year's exploitation rate is near the $F_{CURRENT} / F_{MSY} = 1$ bound. The stock status is conditioned on the estimated stock recruitment relationship which was adequate but not well fit.

d) Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?

The stock recruitment relationship as implemented in this model is largely influenced by the steepness parameter which was estimated externally via demographic methods. This is an appropriate and well implemented method for this species particularly because of their well-studied fecundity. The stock recruitment model as implemented in this assessment contains estimated annual deviates which effectively drive the annual recruitment estimates from the implemented stock recruitment relationship. This relationship appears to be correctly estimated.

e) Are the quantitative estimates of the status determination criteria for this stock reliable? If not, are there other indicators that may be used to inform managers about stock trends and conditions?

With respect to the selected base case model the estimates of the stock status appear reliable and are supported by the estimated and derived quantities in the model. The model estimates a lower exploitation rate in the terminal year (2012) than the historic high (1995) and also than the two previous years suggesting a recent decrease in the exploitation rate.

TOR 4. Evaluate the stock projections, including discussing strengths and weaknesses, and consider the following:

a) Are the methods consistent with accepted practices and available data?

The stock projections were based on Monte Carlo simulations drawn from the estimated distribution of the equilibrium recruitment and terminal fishing mortality. The projections included process error in the stock recruitment relationship and projected at 21 levels of catch for 10 years. These methods are consistent with accepted practices.

b) Are the methods appropriate for the assessment model and outputs?

The methods are appropriate for the assessment model and the outputs. The projections include error in the equilibrium recruitment and the terminal exploitation rate as well as error in the stock recruitment relationship. Although not utilized, projections from within SS3 are feasible and could integrate the error estimated in the MCMC simulations in the projections.

c) Are the results informative and robust, and useful to support inferences of probable future conditions?

The results of the projections are informative with respect to the probable future conditions for 21 different levels of catch, assuming that the base case configuration of the model continues to represent the population dynamics of the stock. Note that because a large portion of the overall catch is bycatch it is unlikely that a constant catch scenario will occur.

d) Are key uncertainties acknowledged, discussed, and reflected in the projection results?

The uncertainty with respect stock status was reflected in the projection results from the base case model via the Monte Carlo simulations. Uncertainty with respect to the plausible states of nature was included via projections from the range of model sensitivities evaluated for the base model configuration (MS-9 to MS-15; ATL Assessment Report Table 4 13).

TOR 5. Consider how uncertainties in the assessment, and their potential consequences, are addressed.

a) Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty in the population, data sources, and assessment methods.

The major uncertainties in the assessment were addressed through sensitivity analyses that consisted of a single change from the reference model in either some model assumption or data input. These changes represented plausible alternative states of nature and some changes were independent of others. In such circumstances it can be useful to evaluate all possible combinations of the sensitivity analyses, e.g. make several changes at the same time. Through the automation of model running procedures such extensive sensitivity analyses can easily be implemented. The results of the sensitivity analysis indicate the same stock status, as does the base case.

b) *Ensure that the implications of uncertainty in technical conclusions are clearly stated.*

The impact of the uncertainty considered in the stock assessment on the technical conclusions does not change the status of the stock (the considered alternatives indicate that the population is above MSY and the exploitation rate is lower than F_{MSY}). The extremes of the considered uncertainty also indicate that population may be near parity with respect to the $F_{CURRENT}/ F_{MSY}$ reference point.

TOR 6. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.

a) Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments.

Aside from the research recommendations provided by the Data and Assessment workshops, the following research topics would assist any future assessment;

- Research on developing refined CPUE trends from the gillnet fishery as it is currently the major source of fishing mortality. This would likely require an increase the monitoring on the gillnet fishery.
- Research on estimation of the effective sample size (appropriate weights) of the length composition outside the model.
- Research avenues that would directly assist the stock assessment process are to consider alternative recruitment functions (e.g. the low fecundity stock recruitment function).
- Future assessments should consider the modeling of initial depletion (i.e. using estimated fishing mortalities, catches or recruitment offset), a priority given the uncertain early catch history.
- Research into integrating the stock projections from within SS3 would also be a valuable investment.

b) Provide recommendations on possible ways to improve the SEDAR process.

In general the SEDAR process is well structured, the use of data and assessment workshops along with the background documentation (working papers) is of great assistance to the reviewers. In general the decisions made are well documented, and often the rationale behind those decisions was as well (i.e. CPUE worksheets). With respect to this assessment it some of the modelling decisions could have benefited from additional early consultation from scientists with experience in integrated assessment models such as SS.

TOR 7. Consider whether the stock assessment constitutes the best scientific information available using the following criteria as appropriate: relevance, inclusiveness, objectivity, transparency, timeliness, verification, validation, and peer review of fishery management information.

All of the details of the assessment were available for review at the review workshop, and the assessment team was responsive to the requests for clarification and details regarding the assessment. The assessment included all relevant data and while there were minor differences in the input data the sensitivity runs indicated that these differences did not alter the assessment findings with respect to stock status.

TOR 8. Provide guidance on key improvements in data or modelling approaches which should be considered when scheduling the next assessment.

The key improvements with respect to this assessment would be to;

- Development an index of abundance from the gillnet fishery
- Conduct research into appropriate weighting of the data
- Research the use of alternative stock recruitment functions
- Develop alternative, independent catch histories to assess the structural uncertainty with respect to catch.

TOR 9. Ensure that stock assessment results are clearly and accurately presented in the Stock Assessment Report and that reported results are consistent with Review Panel recommendations. If there are differences between the AW and RW due to the reviewer's request for changes and/or additional model runs, etc. describe those reasons and results.

The assessment base case and sensitivity runs as presented in the assessment report were accepted by the review panel as adequately capturing the status of the stock.

[HMS GULF OF MEXICO SMOOTHHOUND COMPLEX]

TOR 1. Evaluate the data used in the assessment, including discussion of the strengths and weaknesses of data sources and decisions, and consider the following:

a) Are data decisions made by the DW and AW sound and robust?

In general shark assessments are difficult to conduct because the catch history is unknown and often the only CPUE series is from a fishery that is avoiding the shark species of interest. The GOM smoothhound complex assessment concerns three species of Mustelus (*M. canis*, *M. sinusmexicanus* and *M. norrisi*) which are largely indistinguishable without complex techniques; therefore they are being assessed as one complex within the northern GOM. The decision by the DW and AW to treat the complex as one and to ignore the potential catch outside the territorial waters of the US is sound given that tagging data did not indicate large scale movement and there was no other recourse.

The life history inputs to the stock assessment model consist of a single parameter *r* the productivity of the stock. Values for the three species were estimated from life tables and the range of productivity values for the complex was between 0.28 and 0.18, the higher value was used to represent the productivity of the *M. canis* and *M sinusmexicanus* while the lower value represents the productivity of

M. norrisi. The midpoint of these values was used in the assessment with higher and lower values in sensitivity runs.

In the case of the HMS Gulf of Mexico smoothhound complex fishery independent indices of abundance exist for the entire complex and are used in the assessment under the assumption that the composition of the complex has not changed substantially, therefore taken as a whole the indices represent the abundance of the stock. Three of the indices of abundance originate from trawl surveys and one from a bottom longline survey. The surveys span the assessment area and have been standardized according to common practice.

Catch estimates for the complex are dominated by the bycatch in the shrimp fishery. The total catch is estimated as a combination of statistical models used to estimate shrimp bycatch based on observer data, shrimp effort and nets per vessel for 2009-2012 when observer data are available. In reality there is very limited data to estimate the *Mustelus* bycatch in the shrimp fishery, mandatory observer coverage began in 2007 however highly informational information on shark bycatch is limited to 2009-2012. In general the estimation of unobserved bycatch is inherently difficult, and no less so in this case, the estimates of smoothhound catches in the Gulf of Mexico are adequate and consistent with common practice.

b) Are data uncertainties acknowledged, reported, and within normal or expected levels?

The uncertainties in the data are readily acknowledged with in the DW report. That there are uncertainties in the data is to be expected given the nature of the species complex, the *M. canis* and *M sinusmexicanus* are quite similar in their life history information while *M. norrisi* has a slightly different life history in that it is slightly shorter lived and has a higher natural mortality.

c) Are data applied properly within the assessment model?

The data used in the GOM smoothhound complex assessment consist of catch, CPUE data. Auxiliary information is used to set prior parameters for the growth rate, theoretical carrying capacity, initial depletion, error terms and the annual depletion, which are then estimated in the model. The data (catch and CPUE) are properly applied within the assessment. One item of note is that a smoothed version of the SEAMAP CPUE index was used to estimate the catch, the same index was used to fit the model. In practice this is not ideal, but there is a lack of significantly different alternatives.

d) Are input data series reliable and sufficient to support the assessment approach and findings?

The input data are reliable and sufficient to support the assessment approach. In practice the state-space Bayesian surplus production model needs relatively little data only timeseries of catch and a CPUE trend. Informative priors for *r,* K and the initial depletion can help inform the model if available, these facts made the assessment approach well suited to the available data, which was catch and CPUE.

TOR 2. Evaluate and discuss the strengths and weaknesses of the methods used to assess the stock, taking into account the available data, and considering the following:

a) Are methods scientifically sound and robust?

The state-space Bayesian surplus production model has been used within fisheries assessments for multiple assessments including the small coastal shark complex (Cortés 2002), hammerhead sharks (Jiao et al 2009) and swordfish (Brodziak and Ishimura 2011) among others. The methods are scientifically sound. One advantage of this assessment method is that the data requirements are relatively minor. Additionally as implemented this model estimates process error and observation error, an estimation technique allows for flexibility in the model because the scientist is not forced to assume that either that the observations are perfect or that the process is purely deterministic.

b) Are assessment models configured properly and used consistent with standard practices?

The assessment model was configured properly and used consistent with standard practice for fitting a SSSPM.

c) Are the methods appropriate for the available data?

The data consists of CPUE trends that reflect the abundance of the species complex and the estimated historical catch. The methods used are appropriate for the available data, especially given the fact that there is no possibility of determining the historical species composition and the gaps in the overall life history data for these species in the GOM.

TOR 3. Evaluate the assessment findings and consider the following:

a) Are abundance, exploitation, and biomass estimates reliable, consistent with input data and population biological characteristics, and useful to support status inferences?

The estimates of abundance, exploitation and biomass through time are consistent with the trends in the input data for the base case model. To a certain extent this is expected given that the SEMAP survey data was used to fit the model and to estimate the catches. The sensitivity analyses based on alternative data (using the hierarchical index, inverse cv weighting and high and low catch) were largely consistent with the base case.

b) Is the stock overfished? What information helps you reach this conclusion?

The stock is not overfished based on the estimation of $N_{CURRENT}/N_{MSY}$ for the base case and all the sensitivity runs. This finding is in concert with the fact that the major source of exploitation bycatch in the shrimp fishery which has been declining throughout the last decade.

c) Is the stock undergoing overfishing? What information helps you reach this conclusion?

The stock is not undergoing overfishing based on the estimation of the exploitation rate ($H_{CURRENT}/H_{MSY}$) in the base and all of the sensitivity runs. This is due to a reduction in the overall exploitation rate over

the decade. The reduction in exploitation rate is coincident with the decline in the shrimp fishery and the estimated catches in 2012 are just over half the maximum annual catch in the time series, which occurred approximately a decade prior to the end of the model (2012).

d) Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?

The SSSPM does not include a stock recruitment relationship. Information on the rate of population increase is input into the model through the parameter *r* which was obtained externally through demographic methods. This value was input to the model and given an informative prior so that the estimation procedure would not cause large deviations in this parameter to fit the CPUE. The methods used to determine *r* are reliable insofar as the estimated value is plausible to inform the model and perform projections

e) Are the quantitative estimates of the status determination criteria for this stock reliable? If not, are there other indicators that may be used to inform managers about stock trends and conditions?

The quantitative estimates of the stock status are reliable, the model fits the abundance data reasonably well, the model diagnostics indicate that the parameters are well estimated. Retrospective plots show no departure in the overall trends, though there is a scale change indicated by an influential last point, showing an uptick in the population. However the population status (not over fished, not overfishing) does not change over any of the retrospective runs.

TOR 4. Evaluate the stock projections, including discussing strengths and weaknesses, and consider the following:

a) Are the methods consistent with accepted practices and available data?

The projections are based on MCMC output from the model, which is then projected forward using the surplus production model without process error at varying levels of catch. Although not the most technical projection methodology, this is an appropriate method that provides for some variability from the model to propagate through into the projections. The methods are consistent with accepted practices and available data.

b) Are the methods appropriate for the assessment model and outputs?

The projection methods are appropriate for the model. The projections span the plausible states of nature and variability in the estimation model is propagated through to the projections. The projection methods do not include process error from the model.

c) Are the results informative and robust, and useful to support inferences of probable future conditions?

The results of the projections are based on six constant catch scenarios ranging from 0 to 4 times the catch in 2012 and a MSY scenario. The projections are useful to support hypothetical situations associated with constant catch. In reality the majority of the catch is bycatch due to the shrimp fishery

and will fluctuate with the amount of effort in that fishery. In general this type of constant catch projection is useful to identify, in the near term what catch levels may trigger a change in stock status.

d) Are key uncertainties acknowledged, discussed, and reflected in the projection results?

The different states of nature considered in the assessment were reflected in the projection results, as was some of the variability in the model. The projection results were presented in terms of the catch that would result in 30% probability of being overfished or experiencing overfishing.

TOR 5. Consider how uncertainties in the assessment, and their potential consequences, are addressed.

a) Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty in the population, data sources, and assessment methods.

The sensitivity analyses were a single change from the reference model in either some model assumption or data input. Some of these changes represented plausible alternative states of nature and some changes were independent of others. In such circumstances it can be useful to evaluate all possible combinations of the sensitivity analyses, e.g. make several changes at the same time. Through the automation of model running procedures such extensive sensitivity analyses can easily be implemented. One significant source of uncertainty in the population structure and data is the definition of the stock. The assessment interprets the stock as being confined to the US EEZ, while this is likely not the case it is a plausible simplification given the total lack of data from the Mexican waters.

b) Ensure that the implications of uncertainty in technical conclusions are clearly stated.

The implications of the uncertainty considered in the assessment are clearly shown in Figure 3.21 of the assessment report. This figure shows the stock status for the base case, the sensitivity and the retrospective runs, none of which differ greatly from the chosen base case run.

TOR 6. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.

a) Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments.

The research recommendations provided by the DW and AW are acceptable, in general the catch estimates from the shrimp fishery could benefit from an increase in the spatiotemporal observer coverage of the shrimp fleet. Additional research into the possibility of estimating catches in the Mexican EEZ and work to estimate the total catches in the model based on known effort would be worthwhile.

Molecular techniques to assess the species composition of the overall complex should be made a regular part of the monitoring and evaluation process. Although the species have similar life histories monitoring the catch composition is important to check for serial depletion of a single species.

The sensitivity analyses run on the high and low catch scenarios are practically uninformative, they will scale the biomass up and down but not change the stock status, a better method of including plausible states of nature with respect to the catch estimates is to include alternative catch estimates that are independent, or at least have a different trend.

b) Provide recommendations on possible ways to improve the SEDAR process.

In general the SEDAR process is fairly well structured with the development of data workshops and assessment workshops. The extensive documentation of working papers and workshop reports is very helpful. The rational for including or excluding the abundance indices was often documented in the index worksheets, this type of explanation of rational for other decisions would be helpful.

TOR 7. Consider whether the stock assessment constitutes the best scientific information available using the following criteria as appropriate: relevance, inclusiveness, objectivity, transparency, timeliness, verification, validation, and peer review of fishery management information.

The stock assessment constitutes the best available science. The input data was subject to significant review, and is reliable for use in the stock assessment. The catch estimates benefit from the mandatory reporting of sharks since 2009, and in time will get better. The indices of abundance are based on fishery independent sources that are reliable.

TOR 8. Provide guidance on key improvements in data or modelling approaches which should be considered when scheduling the next assessment.

Modelling approaches that would allow for the estimation of catch within the model for the years prior to 2009 would be beneficial. Research into approaches that allow for the process error from within the assessment model to be carried for into the projections would also be beneficial.

TOR 9. Ensure that stock assessment results are clearly and accurately presented in the Stock Assessment Report and that reported results are consistent with Review Panel recommendations. If there are differences between the AW and RW due to the reviewer's request for changes and/or additional model runs, etc. describe those reasons and results.

The RW accepted the AW presented base case, although additional runs were requested during the RW the panel accepted the presented base case and sensitivity runs as adequately representing the status of the stock.

Appendix 1: Bibliography of materials provided for review

SEDAR 39
HMS Smoothhound Sharks
Document List

Document #	Title	Authors	Date Submitted
Documents Prepared for the Data Workshop			
SEDAR39-DW-01	Tag and recapture data for smoothhound sharks, *Mustelus* spp., in the Gulf of Mexico and US South Atlantic: 1998-2012	Dana M. Bethea and William B. Driggers III	14 March 2014
SEDAR39-DW-02	Standardized catch rates of smooth dogfish from the SEAMAP-South Atlantic Shallow Water Trawl Survey	E. Cortés and J. Boylan	9 May 2014
SEDAR39-DW-03	Preliminary catches of smoothhound sharks	E. Cortés and H. Balchowsky	9 May 2014
SEDAR39-DW-04	Relative abundance of *Mustelus spp*. in the Gulf of Mexico based on observer data collected in the reeffish bottom longline fishery	John Carlson and Elizabeth Scott-Denton	30 April 2014
SEDAR39-DW-05	Shrimp Fishery Bycatch Estimates for Smoothhound Sharks in the Gulf of Mexico, 1972-2012	Xinsheng Zhang, Enric Cortés, Dean Courtney and Elizabeth Scott-Denton	12 May 2014
SEDAR39-DW-06	Smoothhound Abundance Indices from NMFS Bottom Longline Surveys in the Western North Atlantic and Northern Gulf of Mexico	Adam G. Pollack and G. Walter Ingram, Jr.	7 May 2014 Updated 22 May 2014
SEDAR39-DW-07	Smoothhound Abundance Indices from SEAMAP Groundfish Surveys in the Northern Gulf of Mexico	Adam G. Pollack and G. Walter Ingram, Jr.	20 May 2014 Updated 22 May 2014
SEDAR39-DW-08	Smoothhound Abundance Indices from NFMS Small Pelagics Surveys in the Northern Gulf of Mexico	Adam G. Pollack and G. Walter Ingram, Jr.	9 May 2014 Updated 16 May 2014
SEDAR39-DW-09	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the Northeast Fisheries Observer Program	C.T. McCandless and J.J. Mello	30 June 2014
SEDAR39-DW-10	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the Rhode Island Department of Environmental Management trawl surveys	C.T. McCandless and S.D. Olszewski	30 June 2014
SEDAR39-DW-11	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the University of Rhode Island trawl survey conducted by the Graduate School of Oceanography.	C.T. McCandless	17 June 2014
SEDAR39-DW-12	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the	C.T. McCandless and K. Gottschall	17 June 2014

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	Long Island Sound Trawl Survey conducted by the Connecticut Department of Energy and Environmental Protection		
SEDAR39-DW-13	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the Peconic Bay Small Mesh Trawl Survey conducted by the New York State Department of Environmental Conservation	C.T. McCandless and C. Grahn	17 June 2014
SEDAR39-DW-14	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the New Jersey Division of Fish and Wildlife ocean trawl surveys	C.T. McCandless, J. Pyle, G. Hinks and L. Barry	17 June 2014
SEDAR39-DW-15	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the Delaware Division of Fish and Wildlife 30-foot otter trawl survey	C.T. McCandless and M. Greco	17 June 2014
SEDAR39-DW-16	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) longline surveys in Delaware Bay	C.T. McCandless	30 June 2014
SEDAR39-DW-17	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the Ocean Gillnet Program conducted by the North Carolina Division of Marine Fisheries	C.T. McCandless, C. Stewart, and H. White	30 June 2014
SEDAR39-DW-18	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the University of North Carolina shark longline survey south of Shakleford Banks	C.T. McCandless, F.J. Schwartz, and John J. Hoey	17 June 2014
SEDAR39-DW-19	Standardized indices of abundance for Smooth Dogfish, *Mustelus canis*, from the South Carolina Department of Natural Resources red drum longline survey	C.T. McCandless and B. Frazier	30 June 2014
SEDAR39-DW-20	Mark/Recapture Data for the Smooth Dogfish, *Mustelus Canis*, in the western North Atlantic from the NEFSC Cooperative Shark Tagging Program	N. E. Kohler, P. A. Turner, M. Pezzullo, and C. T. McCandless	19 May 2014 Updated 17 June 2014
SEDAR39-DW-21	A Preliminary Review of Post-release Live-discard Mortality Rate Estimates in Sharks for use in SEDAR 39	Dean Courtney	18 May 2014 Updated: 20 June 2014
SEDAR39-DW-22	Identification, Life History and Distribution of *Mustelus canis*, *M. norrisi* and *M. sinusmexicanus* in the northern Gulf of Mexico	Lisa M. Jones, William B. Driggers III, Kristin M. Hannan, Eric R.	16 May 2014 Updated: 22 May 2014

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		Hoffmayer, and Christian M. Jones	
SEDAR39-DW-23	Discards of *Mustelus canis* in the coastal gillnet fishery off the Southeast United States	John Carlson, Alyssa Mathers, and David Gloeckner	9 May 2014 Addendum: 22 May 2014
SEDAR39-DW-24	Biomass. Abundance and distribution of smooth dogfish (Mustelus canis) from the Northeast Fisheries Science Center and Massachusetts Department of Marine Fisheries trawl surveys	Katherine A, Sosebee, Jeremy King, Michele Traver, and Larry Alade	19 May 2014 Updated: 24 June 2014
SEDAR39-DW-25	Estimation of smooth dogfish discards in the Northeast United States fisheries using data collected by the Northeast Fisheries Observer Program	Katherine A, Sosebee	16 May 2014 Updated: 18 June 2014
SEDAR39-DW-26	Discards of *Mustelus spp*. in the Gulf of Mexico reeffish bottom longline fishery	John Carlson, Elizabeth Scott-Denton, and Kevin McCarthy	14 May 2014 Addendum: 21 May 2014
SEDAR39-DW-27	SEDAR 39 Indices Report Cards	S39 Indices WG	18 June 2014
SEDAR39-DW-28	Seasonal Distribution of *Mustelus canis* off the Atlantic coast of the U.S.	Melissa M. Giresi, William B. Driggers, R. Dean Grubbs, Jim Gelsleichter, Eric R. Hoffmayer	21 May 2014
SEDAR39-DW-29	Initial Comparison of Genetic Population Structure of *Mustelus canis* using the mitochondrial gene, NADH-2	Melissa M. Giresi and David S. Portnoy	21 March 2014
SEDAR39-DW-30	Size composition and indices of relative abundance of the smooth dogfish (*Mustelus canis*) in the near shore Atlantic Ocean	Robert J. Latour, Christopher F. Bonzek, and J. Gartland	16 June 2014
SEDAR39-DW-31	Length/weight relationships and life history data for *Mustelus canis* off of the Atlantic coast of the U.S.	Eric R. Hoffmayer, William B. Driggers, R. Dean Grubbs, Melissa M. Giresi, Jim Gelsleichter, Robert Latour	22 May 2014
Documents Prepared for the Assessment Process			
SEDAR39-AW-01	Review of Available Length Composition Data Submitted for use in the SEDAR 39 *Mustelus canis* Atlantic Stock Assessment	Dean Courtney	10 Sept 2014
SEDAR39-AW-02	Hierarchical analysis of U.S Atlantic Smooth dogfish and Gulf of Mexico smoothhound species indices of	Cami McCandless	15 Oct 2014

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	abundance		
SEDAR39-AW-03			
SEDAR39-AW-04			
Documents Prepared for the Review Workshop			
SEDAR39-RW-01			
SEDAR39-RW-02			
Final Stock Assessment Reports			
SEDAR39-SAR1	Atlantic Smoothhound Shark	SEDAR 39 Panels	
SEDAR39-SAR2	Gulf of Mexico Smoothhound shark complex	SEDAR 39 Panels	
Reference Documents			
SEDAR39-RD01	Reproductive biology of the smooth dogfish, *Mustelus canis*, in the northwest Atlantic Ocean	Christina L. Conrath & John A. Musick	
SEDAR39-RD02	Age and growth of the smooth dogfish (*Mustelus canis*) in the northwest Atlantic Ocean	Christina L. Conrath, James Gelsleichter, & John A. Musick	
SEDAR39-RD03	A review of the smooth-hound sharks (GENUS *Mustelus*, FAMILY TRIAKIDAE) of the western Atlantic Ocean, with descriptions of two new species and a new subspecies	Phillip C. Heemstra	
SEDAR39-RD04	Smooth Dogfish (*Mustelus canis*) Fin-to-Carcass Ratio Project	Marin Hawk, Russ Babb, and Holly White	
SEDAR39-RD05	Occurrence, catch rates, and length frequencies for smooth dogfish (*Mustelus canis*) caught in the VIMS Longline Survey: 1974-2006	R. Dean Grubbs and John A. Musick	
SEDAR39-RD06	A review of integrated analysis in fisheries stock assessment	Mark N. Maunder and Andre A. Punt	
SEDAR39-RD07	Stock synthesis: A biological and statistical framework for fish stock assessment and fishery management	Richard D. Methot Jr, and Chantell R. Wetzel	
SEDAR39-RD08	Appendix A: Technical Description of the Stock Synthesis assessment program	Richard D. Methot Jr, and Chantell R. Wetzel	
SEDAR39-RD09	Model selection for selectivity in fisheries stock assessments	Andre E. Punt, F. Hurtado-Ferro, F. and A.R. Whitten	
SEDAR39-RD10	Bayesian surplus production model with the Sampling Importance Resampling algorithm (BSP): a User's Guide	Murdoch K. McAllister and Elizabeth A. Babcock	
SEDAR39-RD11	Adjusting for bias due to variability of estimated recruitments in fishery assessment models	Richard D. Methot, Jr. and Ian G. Taylor	
SEDAR39-RD12	Package 'r4ss': r code for Stock Synthesis	Ian Taylor, Ian Stewart, Allan Hicks,	

Document List

		Tommy Garrison,Andre Punt, John Wallace, Chantel Wetzel, James Thorson,Yukio Takeuchi, Cole Monnahan, and other contributors
SEDAR39-RD13	User Manual for Stock Synthesis - Model Version 3.24s	Richard D. Methot Jr.
SEDAR39-RD14	FINAL REPORT FOR THE ASSESSMENT METHODS WORKING GROUP SUMMARIZING THE DOMESTIC SHARK P* STANDARDIZATION WORKSHOP	DEAN L. COURTNEY ENRIC CORTÉS XINSHENG ZHANG
SEDAR39-RD15		

Appendix 2: A copy of the CIE Statement of Work

Statement of Work

External Independent Peer Review by the Center for Independent Experts

SEDAR 39 HMS Smoothhound Sharks Assessment Review Workshop

Scope of Work and CIE Process: The National Marine Fisheries Service's (NMFS) Office of Science and Technology coordinates and manages a contract providing external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of NMFS scientific projects. The Statement of Work (SoW) described herein was established by the NMFS Project Contact and Contracting Officer's Technical Representative (COTR), and reviewed by CIE for compliance with their policy for providing independent expertise that can provide impartial and independent peer review without conflicts of interest. CIE reviewers are selected by the CIE Steering Committee and CIE Coordination Team to conduct the independent peer review of NMFS science in compliance the predetermined Terms of Reference (ToRs) of the peer review. Each CIE reviewer is contracted to deliver an independent peer review report to be approved by the CIE Steering Committee and the report is to be formatted with content requirements as specified in **Annex 1**. This SoW describes the work tasks and deliverables of the CIE reviewer for conducting an independent peer review of the following NMFS project. Further information on the CIE process can be obtained from *www.ciereviews.org*.

Project Description:

SEDAR 39 will be a compilation of data, an assessment of the stocks, and CIE assessment review conducted SEDAR 39 HMS Smoothhound sharks. 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, error corrections and sensitivity runs of the assessment models provided by the assessment panel. The review panel is ultimately responsible for ensuring that the best possible assessment is provided through the SEDAR process. The stocks assessed through SEDAR 39 are within the jurisdiction of the Highly Migratory Species Division of NOAA Fisheries and the states of Texas,

Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, and North Carolina, Virginia, Maryland, Delaware, Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire, and Maine. The Terms of Reference (ToRs) of the peer review are attached in **Annex 2**. The tentative agenda of the panel review meeting is attached in **Annex 3**.

Requirements for CIE Reviewers: Three CIE reviewers shall conduct an impartial and independent peer review in accordance with the SoW and ToRs herein. CIE reviewers should have expertise in stock assessment, statistics, fisheries science, and marine biology sufficient to complete the primary task of providing peer-review advice in compliance with the workshop Terms of Reference. Each CIE reviewer's duties shall not exceed a maximum of 14 days to complete all work tasks of the peer review described herein.

Location of Peer Review: Each CIE reviewer shall conduct an independent peer review during the panel review meeting scheduled in **Panama City, Florida** during **February 10-12, 2015.**

Statement of Tasks: Each CIE reviewers shall complete the following tasks in accordance with the SoW and Schedule of Milestones and Deliverables herein.

Prior to the Peer Review: Upon completion of the CIE reviewer selection by the CIE Steering Committee, the CIE shall provide the CIE reviewer information (full name, title, affiliation, country, address, email) to the COTR, who forwards this information to the NMFS Project Contact no later the date specified in the Schedule of Milestones and Deliverables. The CIE is responsible for providing the SoW and ToRs to the CIE reviewers. The NMFS Project Contact is responsible for providing the CIE reviewers with the background documents, reports, foreign national security clearance, and other information concerning pertinent meeting arrangements. The NMFS Project Contact is also responsible for providing the Chair a copy of the SoW in advance of the panel review meeting. Any changes to the SoW or ToRs must be made through the COTR prior to the commencement of the peer review.

Foreign National Security Clearance: When CIE reviewers participate during a panel review meeting at a government facility, the NMFS Project Contact is responsible for obtaining the Foreign National Security Clearance approval for CIE reviewers who are non-US citizens. For this reason, the CIE reviewers shall provide requested information (e.g., first and last name, contact information, gender, birth date, passport number, country of passport, travel dates, country of citizenship, country of current residence,

and home country) to the NMFS Project Contact for the purpose of their security clearance, and this information shall be submitted at least 30 days before the peer review in accordance with the NOAA Deemed Export Technology Control Program NAO 207-12 regulations available at the Deemed Exports NAO website:

http://deemedexports.noaa.gov/

http://deemedexports.noaa.gov/compliance_access_control_procedures/noaa-foreign-national-registration-system.html

Pre-review Background Documents: Two weeks before the peer review, the NMFS Project Contact will send (by electronic mail or make available at an FTP site) to the CIE reviewers the necessary background information and reports for the peer review. In the case where the documents need to be mailed, the NMFS Project Contact will consult with the CIE Lead Coordinator on where to send documents. CIE reviewers are responsible only for the pre-review documents that are delivered to the reviewer in accordance to the SoW scheduled deadlines specified herein. The CIE reviewers shall read all documents in preparation for the peer review.

Panel Review Meeting: Each CIE reviewer shall conduct the independent peer review in accordance with the SoW and ToRs, and shall not serve in any other role unless specified herein. **Modifications to the SoW and ToRs can not be made during the peer review, and any SoW or ToRs modifications prior to the peer review shall be approved by the COTR and CIE Lead Coordinator.** Each CIE reviewer shall actively participate in a professional and respectful manner as a member of the meeting review panel, and their peer review tasks shall be focused on the ToRs as specified herein. The NMFS Project Contact is responsible for any facility arrangements (e.g., conference room for panel review meetings or teleconference arrangements). The NMFS Project Contact is responsible for ensuring that the Chair understands the contractual role of the CIE reviewers as specified herein. The CIE Lead Coordinator can contact the Project Contact to confirm any peer review arrangements, including the meeting facility arrangements.

Contract Deliverables - Independent CIE Peer Review Reports: Each CIE reviewer shall complete an independent peer review report in accordance with the SoW. Each CIE reviewer shall complete the independent peer review according to required format and content as described in Annex 1. Each CIE reviewer shall complete the independent peer review addressing each ToR as described in Annex 2.

Other Tasks – Contribution to Summary Report: Each CIE reviewer may assist the Chair of the panel review meeting with contributions to the Summary Report, based on the terms of reference of the review. Each CIE reviewer is not required to reach a consensus, and should provide a brief summary of the reviewer's views on the summary of findings and conclusions reached by the review panel in accordance with the ToRs.

Specific Tasks for CIE Reviewers: The following chronological list of tasks shall be completed by each CIE reviewer in a timely manner as specified in the **Schedule of Milestones and Deliverables**.

1) Conduct necessary pre-review preparations, including the review of background material and reports provided by the NMFS Project Contact in advance of the peer review.
2) Participate during the panel review meeting at the **Panama City, Florida during February 10-12, 2015**.
3) **In Panama City, Florida during February 10-12, 2015** as specified herein, conduct an independent peer review in accordance with the ToRs (**Annex 2**).
4) No later than **February 26, 2015**, each CIE reviewer shall submit an independent peer review report addressed to the "Center for Independent Experts," and sent to Mr. Manoj Shivlani, CIE Lead Coordinator, via email to shivlanim@bellsouth.net, and CIE Regional Coordinator, via email to Dr. David Sampson d*avid.sampson@oregonstate.edu*. Each CIE report shall be written using the format and content requirements specified in Annex 1, and address each ToR in **Annex 2**.

Tentative Schedule of Milestones and Deliverables: CIE shall complete the tasks and deliverables described in this SoW in accordance with the following schedule.

January 6, 2015	CIE sends reviewer contact information to the COTR, who then sends this to the NMFS Project Contact
January 27, 2015	NMFS Project Contact sends the CIE Reviewers the pre-review documents
February 10-12, 2015	Each reviewer participates and conducts an independent peer review during the panel review meeting
February 26, 2015	CIE reviewers submit draft CIE independent peer review reports to the CIE Lead Coordinator and CIE Regional Coordinator
March 12, 2015	CIE submits CIE independent peer review reports to the COTR
March 19, 2015	The COTR distributes the final CIE reports to the NMFS Project Contact and regional Center Director

Modifications to the Statement of Work: This 'Time and Materials' task order may require an update or modification due to possible changes to the terms of reference or schedule of milestones resulting from the fishery management decision process of the NOAA Leadership, Fishery Management Council, and Council's SSC advisory committee. A request to modify this SoW must be approved by the Contracting Officer at least 15 working days prior to making any permanent changes. The Contracting Officer will notify the COTR within 10 working days after receipt of all required information of the decision on changes. The COTR can approve changes to the milestone dates, list of pre-review documents, and ToRs within the SoW as long as the role and ability of the CIE reviewers to complete the deliverable in accordance with the SoW is not adversely impacted. The SoW and ToRs shall not be changed once the peer review has begun.

Acceptance of Deliverables: Upon review and acceptance of the CIE independent peer review reports by the CIE Lead Coordinator, Regional Coordinator, and Steering Committee, these reports shall be sent to the COTR for final approval as contract deliverables based on compliance with the SoW and ToRs. As specified in the Schedule of Milestones and Deliverables, the CIE shall send via e-mail the contract deliverables (CIE independent peer review reports) to the COTR (William Michaels, via William.Michaels@noaa.gov).

Applicable Performance Standards: The contract is successfully completed when the COTR provides final approval of the contract deliverables. The acceptance of the contract deliverables shall be based on three performance standards:

(1) The CIE report shall completed with the format and content in accordance with **Annex 1**,

(2) The CIE report shall address each ToR as specified in **Annex 2**,

(3) The CIE reports shall be delivered in a timely manner as specified in the schedule of milestones and deliverables.

Distribution of Approved Deliverables: Upon acceptance by the COTR, the CIE Lead Coordinator shall send via e-mail the final CIE reports in *.PDF format to the COTR. The COTR will distribute the CIE reports to the NMFS Project Contact and Center Director.

Support Personnel:

Allen Shimada
NMFS Office of Science and Technology
1315 East West Hwy, SSMC3, F/ST4, Silver Spring, MD 20910
Allen.Shimada@noaa.gov Phone: 301-427-8174

William Michaels
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1315 East West Hwy, SSMC3, F/ST4, Silver Spring, MD 20910
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Manoj Shivlani, CIE Lead Coordinator
Northern Taiga Ventures, Inc.
10600 SW 131st Court, Miami, FL 33186
shivlanim@bellsouth.net Phone: 305-383-4229

Key Personnel:

NMFS Project Contact:

Julie A. Neer
SEDAR Coordinator
4055 Faber Place Drive, Suite 201
North Charleston, SC 29405
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julie.neer@safmc.net

Annex 1: Format and Contents of CIE Independent Peer Review Report

1. The CIE independent report shall be prefaced with an Executive Summary providing a concise summary of the findings and recommendations, and specify whether the science reviewed is the best scientific information available.

2. The main body of the reviewer report shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Summary of Findings for each ToR in which the weaknesses and strengths are described, and Conclusions and Recommendations in accordance with the ToRs.

   a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including providing a brief summary of findings, of the science, conclusions, and recommendations.

   b. Reviewers should discuss their independent views on each ToR even if these were consistent with those of other panelists, and especially where there were divergent views.

   c. Reviewers should elaborate on any points raised in the Summary Report that they feel might require further clarification.

   d. Reviewers shall provide a critique of the NMFS review process, including suggestions for improvements of both process and products.

   e. The CIE independent report shall be a stand-alone document for others to understand the weaknesses and strengths of the science reviewed, regardless of whether or not they read the summary report. The CIE independent report shall be an independent peer review of each ToRs, and shall not simply repeat the contents of the summary report.

3. The reviewer report shall include the following appendices:

   Appendix 1: Bibliography of materials provided for review

   Appendix 2: A copy of the CIE Statement of Work

   Appendix 3: Panel Membership or other pertinent information from the panel review meeting.

Annex 2: Tentative Terms of Reference for the Peer Review

SEDAR 39 HMS Smoothhound Sharks Assessment Review Workshop

1. Evaluate the data used in the assessment, including discussion of the strengths and weaknesses of data sources and decisions, and consider the following:
   a) Are data decisions made by the DW and AW sound and robust?
   b) Are data uncertainties acknowledged, reported, and within normal or expected levels?
   c) Are data applied properly within the assessment model?
   d) Are input data series reliable and sufficient to support the assessment approach and findings?
2. Evaluate and discuss the strengths and weaknesses of the methods used to assess the stock, taking into account the available data, and considering the following:
   a) Are methods scientifically sound and robust?
   b) Are assessment models configured properly and used consistent with standard practices?
   c) Are the methods appropriate for the available data?
3. Evaluate the assessment findings and consider the following:
   a) Are abundance, exploitation, and biomass estimates reliable, consistent with input data and population biological characteristics, and useful to support status inferences?
   b) Is the stock overfished? What information helps you reach this conclusion?
   c) Is the stock undergoing overfishing? What information helps you reach this conclusion?
   d) Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?
   e) Are the quantitative estimates of the status determination criteria for this stock reliable? If not, are there other indicators that may be used to inform managers about stock trends and conditions?
4. Evaluate the stock projections, including discussing strengths and weaknesses, and consider the following:
   a) Are the methods consistent with accepted practices and available data?
   b) Are the methods appropriate for the assessment model and outputs?
   c) Are the results informative and robust, and useful to support inferences of probable future conditions?
   d) Are key uncertainties acknowledged, discussed, and reflected in the projection results?

5. Consider how uncertainties in the assessment, and their potential consequences, are addressed.
    - Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty in the population, data sources, and assessment methods.
    - Ensure that the implications of uncertainty in technical conclusions are clearly stated.
6. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.
    - Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments.
    - Provide recommendations on possible ways to improve the SEDAR process.
7. Consider whether the stock assessment constitutes the best scientific information available using the following criteria as appropriate: relevance, inclusiveness, objectivity, transparency, timeliness, verification, validation, and peer review of fishery management information.
8. Provide guidance on key improvements in data or modeling approaches which should be considered when scheduling the next assessment.
9. Ensure that stock assessment results are clearly and accurately presented in the Stock Assessment Report and that reported results are consistent with Review Panel recommendations. If there are differences between the AW and RW due to the reviewer's request for changes and/or additional model runs, etc. describe those reasons and results.
10. CIE Reviewer may contribute to a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference.

Annex 3: Tentative Agenda

SEDAR 39 HMS Smoothhound Sharks Review Workshop

Panama City, Florida

10-12 February 2015

Tuesday

9:00 a.m.	**Introductions and Opening Remarks**	**Coordinator**
	- Agenda Review, TOR, Task Assignments	
9:30 a.m. – 11:30 a.m.	**Assessment Presentations – Gulf of Mexico**	**Enric Cortés**
	- *Assessment Data & Methods*	
	- Identify additional analyses, sensitivities, corrections	
11:30 a.m. – 1:00 p.m.	**Lunch Break**	
1:00 p.m. – 6:00 p.m.	**Assessment Presentations – Atlantic**	**Dean Courtney**
	- *Assessment Data & Methods*	
	- Identify additional analyses, sensitivities, corrections	

***Tuesday Goals*:** Initial presentations completed, sensitivity and base model discussion begun

Wednesday

8:00 a.m. – 11:30 a.m.	**Panel Discussion**	**Chair**
	- *Assessment Data & Methods*	
	- Identify additional analyses, sensitivities, corrections	
11:30 a.m. – 1:00 p.m.	**Lunch Break**	
1:00 p.m. – 6:00 p.m.	**Panel Discussion/Panel Work Session**	**Chair**
	- Continue deliberations	
	- Review additional analyses	
	- Recommendations and comments	
6:00 p.m. – 6:30 p.m.	**Public comment**	**Chair**

***Wednesday Goals*:** sensitivities and modifications identified, preferred models selected, projection approaches approved, Report drafts begun

Thursday

8:00 a.m. – 11:30 a.m.	**Panel Discussion**	**Chair**
	- Final sensitivities reviewed.	
	- Projections reviewed.	**Chair**
11:30 a.m. – 1:00 p.m.	**Lunch Break**	
1:00 p.m. – 5:00 p.m.	**Panel Discussion or Work Session**	**Chair**
	- *Review Reports*	
5:00 p.m. – 5:30 p.m.	**Public comment**	**Chair**
5:30 p.m.	**ADJOURN**	

Thursday Goals: Complete assessment work and discussions, final results available. Draft Reports reviewed.

Appendix 3: **LIST OF PARTICIPANTS**

Workshop Panel

Carolyn Belcher, Chair ..... HMS AP
Robin Cook ..... CIE Reviewer
Neil Klaer ..... CIE Reviewer
Joel Rice ..... CIE Reviewer

Analytic Representation

Enric Cortés ..... SEFSC, Panama City
Dean Courtney ..... SEFSC, Panama City
Xinsheng Zhang ..... SEFSC, Panama City

Council Representation

Anna Beckwith ..... SAFMC
Ben Hartig ..... SAFMC

Appointed Observers

Peter Barile ..... SFA
Kathy Sosebee ..... NEFSC

Staff

Julie Neer ..... SEDAR
Julie O'Dell ..... SAFMC Staff
Karyl Brewster-Geisz ..... HMS