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November 14, 2008

Karyl Brewster-Geisz
HMS Management Division F/SF1
National Marine Fisheries Service
1315 East West Highway
Silver Spring, MD 20910

RE: Scoping Comments on Amendment 3 to the HMS FMP

The Southern Shrimp Alliance (SSA) appreciates the opportunity to provide the following scoping comments on Amendment 3 to the Highly Migratory Species (HMS) Fishery Management Plan (FMP).

SSA has enjoyed a very constructive relationship with the National Marine Fisheries Service (NMFS) in addressing difficult conservation challenges facing the US shrimp fisheries. Working together we have achieved a number of mutually beneficial results including red snapper bycatch conservation in the Gulf of Mexico and deep sea coral habitat protection in the South Atlantic. Like those issues, we look forward to working cooperatively with the Agency in addressing the blacknose shark conservation issues raised by the Agency's determination that this stock is overfished and overfishing is occurring.

Although a product of peer review, we have a number of concerns with the data inputs, assumptions and analyses associated with the 2007 SEDAR stock assessment for blacknose sharks. These issues relate both to the estimates of bycatch attributed to the shrimp fishery and some elements of the stock assessment itself. These issues do not appear trivial and if carefully revisited by the Agency's scientific staff, may well result in significant changes to these bycatch estimates and the resulting status determination of the stock. Before addressing any management options that may be required for the shrimp fisheries, we feel strongly that a cooperative effort to reconsider these scientific issues is warranted. Therefore, we urge that Agency to enter into such a cooperative effort among government and non-government scientists with the objective of reaching consensus.

There follows an informal outline of a number of the scientific issues we have identified and which we hope will be addressed by such a scientific review. We appreciate your consideration and look forward to working with you.

Sincerely,

John Williams,
Executive Director

Southern Shrimp Alliance, Inc

ELEMENTS OF BLACKNOSE SHARK ASSESSMENT THAT WARRANT RECONSIDERATION

DATA INPUTS

- **SEAMAP Data**

  - Seasonal
    - Bycatch estimates are performed on a trimester basis but standard SEAMAP cruises are performed only in the 2nd and 3rd trimesters. There has been some sparse sampling in winter, but the winter estimate may not be very good.

  - Geographical
    - Blacknose shark abundance is highest in the eastern GOM (stat areas 1-9). However, SEAMAP cruises are not routinely conducted in stat areas 1-9, but are conducted in the western GOM areas 10-21. This raises question as to the validity of SEAMAP data to this species.
    - The author of the SEAMAP abundance indices (Nichols) indicated that his model was not "as satisfactory" for species such as blacknose sharks which occur mainly in the eastern GOM as compared to the western GOM where SEAMAP cruises are typically conducted. He also discusses the high cost of imbalanced sampling where the entire range is not sampled. This seems to cast uncertainty on the blacknose shark assessment.

  - Day/Night data
    - Blacknose sharks were taken at depths between 10 and 40 fathoms in the fall SEAMAP studies and between 5 and 50 fathoms in the summer SEAMAP studies. . In the western GOM, these depths are fished by the brown shrimp fishery which is a night fishery. In the eastern GOM, these depths are used by the pink shrimp fishery which is also a night fishery.
    - The SEAMAP data used in the assessment combines catch data for trawls conducted at both night and day. The SEAMAP day trawl blacknose shark catch rate was stated to be 15 times greater than the night trawl catch rate. Only the night trawl data is applicable to the fisheries in question. Therefore, the catch rates used in the assessment are likely much higher than what actually occur in the fisheries.

  - Bycatch reduction from TEDs
    - The Georgia Bulldog video strongly suggests that TEDs are effective in excluding a substantial number of the sharks entering the net. It appears that the video includes

portions during which the net was equipped with the older small TED and portions with the newer larger TED now required for use in our fisheries. Our preliminary review indicates that of the portion where the new larger TED was used, approximate 12 out of 17 sharks (70%) were excluded from the net. This is critical information because SEAMAP nets are not equipped with any TED design and yet SEAMAP data was a major source of data used in the assessment. All shrimp trawl nets operating in the brown and pink shrimp fisheries are equipped with TEDs. Therefore, the number of takes of blacknose sharks in the SEAMAP cruises used in the assessment are likely much higher than what actually occur in the fisheries. (See section on "shrimp trawl video" below)

- Sample size
  - The assessment uses a correlation between a very small sample size of SEAMAP takes (273) and observed takes (27)as a predictor of shrimp trawl bycatch. Validity?

- **Observer Data**
  - Relevance of data to current fishery (age of data)
    - The NMFS observer data used in the assessment is primarily from the 1970s and 1980s shrimp trawl fishery. Only 11 takes of blacknose sharks have been observed in that past 16 years (since 1992). Validity of observer data?

- **Shrimp Trawl Fishing Effort Data**
  - Most Current ?
    - It does not appear that the stock assessment used the most current shrimp trawl fishing effort data.
    - What was the benchmark period used in the assessment for the bycatch estimates?
    - Shrimp trawl fishing effort in the 10-30fm zone in the western GOM (stat areas 10-21) has been reduced by approximately 78 to 80 percent since 2001-2003. Shrimp trawl fishing effort in the eastern GOM has also been reduced by 79 percent. Therefore, the estimates of shrimp trawl bycatch used in the assessment may be significantly higher than what is actually occurring in the fisheries.

LIFE HISTORY ASSUMPTIONS

- **Fecundity**
  - The assessment notes that blacknose sharks in the South Atlantic reproduce every 2 years and that blacknose sharks in the GOM reproduce every year. This is confirmed in the scientific literature.
  - The assessment further notes there were difficulties in running the model using the 2 year assumption for the South Atlantic. Consequently, the assessment scientists

chose to use an average of the two and thereby assumed that blacknose sharks reproduce every 1.5 years in both the GOM and South Atlantic.

- The assumption that reproduction occurs every 1.5 years instead of 1 year in the GOM is likely to have a substantial impact on the intrinsic rate of population increase (r) for the stock. This represents a 33% reduction in the spawning stock fecundity which is a principal measure used for the stock status determination. In other words, the population rate of growth and recruitment used in the assessment is likely to be much lower than what is actually occurring in the GOM population. Consequently, the assessment's conclusions about the status of the blacknose shark are likely to be overly pessimistic.

- **Distribution**
  - SEAMAP data indicates that since 1972 only 273 blacknose sharks were caught in 15,652 tows and that blacknose sharks were present in less than 1 percent of the SEAMAP stations. SEAMAP cruises are conducted in the western GOM. This low number of interactions indicates that the western GOM is not within the primary range of this species. This calls into question the validity of using SEAMAP data for this assessment.

CHOICE OF ASSESSMENT MODEL AND METHODS

The assessment indicates that different models/methods produced different results. The figure of page 16 of the SEDAR Review Panel report indicates that one method resulted in the stock status determination of overfished and overfishing is occurring and the other did not. The model chosen was that which resulted in the overfished/overfishing determination. Neither model produced good fits to the abundance indices. There is also discussion in the Review Panel Report regarding how the age-structured approach fit all of the catch data well except the shrimp bycatch data. And, there are a number of points made about how the results of this assessment may change considerably in the next assessment. This lack of consistency between models begs explanation and suggests uncertainty.

OTHER DATA & ANALYTICAL ISSUES

- **Fish Size & Mortality Assumptions**
  - The assessment appears to use an assumption that blacknose sharks taken in all commercial fisheries average 4.97 lbs dw, and that blacknose sharks taken in all recreational fisheries average 1.5 lbs dw.

    - What is the source of these average fish size assumptions for both commercial and recreational fisheries?

- The assessment presents data indicating that the recreational fisheries landed (killed) 10,408 blacknose sharks. Why would recreational anglers land (kill) sharks that only weigh 1.5 lbs instead of releasing them? Is this really happening or is a product of extrapolation? This really calls into question the validity of the average fish size assumption for recreational fisheries.

- Does the Georgia Bulldog video confirm that a reasonable estimate of the average size of sharks which pass through the TED into the cod end of the net is 4.97 lbs? Our preliminary review suggests that the sharks that pass through the TED and into the net are smaller than 4.97 lbs dw. If the average size of sharks is significantly smaller than 4.97 lb dw, this could have a major impact on the fishing mortality rate for shrimp trawl bycatch. This, in turn, could have a significant impact on the stock status determination.

- The assessment appears to assume that catch = 100% mortality in the commercial fisheries. Does catch = 100% mortality in the commercial fisheries including the shrimp trawl fishery? What is the post-release survival of discarded sharks in these fisheries? If survival is greater than 0 percent than the assessment may be overly pessimistic.

- Does the assessment assume the same fishing mortality rate (F) for 1.5 lb fish taken in the recreational fisheries and 4.97 lb fish taken in the commercial fisheries? In reality, there is likely to be a substantial difference in the F rate associated with these different average sizes (ages).

- What is the sensitivity of the model to differences in each of the assumptions discussed above?

- **SEDAR 13 Review Panel Report Issues**

  - Natural Mortality
    - On page 14 of the Report there is a discussion of the natural mortality rate assumption being the highest pup survival (ie. low M). Is this a valid or reasonable assumption? The choice of M can have a major impact on the assessment results in terms of stock status. Sensitivity analyses need to be conducted using a plausible range of M values.
  - Indices of Abundance
    - The discussion at the bottom of page 14 of the Report seems to suggest that there are serious problems with the selected indices because they cannot all account for the condition of the stock. There is a question of whether the

stock unit is properly defined and a recommendation for using subsets in the future.

- Gear Selectivity
  - The Report indicates that the method used to estimate gear selectivity was "relatively crude" and there was insufficient information for the reviewers to determine if this approach was adequate or not. (see top of p. 15)

- In General
  - How do the following statements in the SEDAR 13 Review Panel Report support the need for a timely review and revision of the current stock assessment? (bold added)

(1) **"Executive Summary:** For **blacknose sharks**, appropriate standard assessment methods based on general production models and on age-structured modeling were used to derive management benchmarks. The current assessment indicates that spawning stock fecundity (SSF) in 2005 and during 2001-2005 is smaller than SSFmsy, i.e. that blacknose shark are overfished. The estimate of fishing mortality rate in 2005 and the average for 2001-2005 is greater than Fmsy, and the ratio is substantially greater than 1 in both cases. Thus, overfishing was occurring and is likely still occurring. **However, because of uncertainties in indices, catches and life history parameters, the status of blacknose shark could change substantially in the next assessment in an unpredictable direction." (See p. 2)**

(2) ***"Schedule for the next assessment of blacknose:*** the current stock status indicates that blacknose shark is being overfished and that overfishing is occurring. Thus, **it would be wise to reassess this stock within two or three years**. **Users of the assessment results should be aware that major differences in the estimated status could be expected in the next assessment if consistent subsets of stock size indices were used. In the current assessment, the stock size indices used are conflicting, and the assessment model takes an average of all the indices. If separate assessments were done with the indices that indicated increases, those that indicated stability, and those that indicated decreases, this would show greater uncertainty in stock status and stock trends." (See p.19)**

SHRIMP TRAWL VIDEO

- NMFS HMS Division has distributed a video as part of their scoping presentations to the Councils as supporting evidence that sharks are caught as bycatch in the shrimp trawl fisheries.

- According to NMFS HMS Division:

  "The footage was shot off the coast of Georgia from the R/V Georgia Bulldog. It is a confiscated shrimp trawler operated by the University of Georgia Marine Extension Service. Most of the footage was within 10 miles of shore, in water depths less than 40 feet. All the footage was using TEDs with less than 4 inch bar spacing. There has been no analysis of the shark catch. This work was primarily done to test these TEDs for wild turtle exclusion, and the SEFSC was not working up or identifying the bycatch. However, the SEFC noted that most of these sharks appear to be approximately 2 ½ feet long."

- The video appears to indicate that a very significant number (~70%) of the sharks that enter the net are expelled through the new, large TED opening.

- The SEDAR assessment of blacknose shark (and other coastal sharks) relied heavily on SEAMAP data to estimate shark bycatch in shrimp trawl fisheries. The SEAMAP trawl net is not equipped with a TED. Thus, it appears that the assessment did not account for what appears to be a very substantial shark bycatch reduction effect of TEDs used in 100% of the current brown and pink fisheries where blacknose shark bycatch can occur. If this is true, then the assessment is likely to be overly pessimistic.

- The SEDAR assessment also assumed the average weight of sharks caught in shrimp trawl fisheries was 4.97 lb dw. Is it possible to estimate size of sharks that passed through the TED bars into the cod end of the net used in the video to confirm if that is consistent with 4.97 lb dw assumption in assessment?

- Is there any data that can be retrieved from the Georgia Bulldog testing cruises to determine the mortality/survival rates of sharks found in the cod end? Any species identification possible?

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

Dr. Bonnie Ponwith
Director,
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, FL 33149

MAR 2 7 2009

Dear Dr. Ponwith,

As you are aware, the Highly Migratory Species (HMS) Management Division is in the process of writing a draft Environmental Impact Statement (EIS) and proposed rule that would implement measures to rebuild overfished stocks and end overfishing of Atlantic shark stocks per the recent small coastal shark assessments completed in 2007.

For this rulemaking, the HMS Management Division released a scoping presentation and request for comments on the EIS on July 2, 2008 (73 FR 37932). The Southern Shrimp Alliance (SSA) provided a comment on the scoping presentation dated November 14, 2008. In their comment was a section entitled "Elements of Blacknose Shark Assessment that Warrant Reconsideration" that contained several comments regarding SEDAR 13 as well as comments regarding a shrimp trawl video that was made by the Southeast Fisheries Science Center (SEFSC) in Pascagoula, Mississippi, and distributed to interested parties by the HMS Management Division. The HMS Management Division distributed this video to simply show that small sharks can go through the turtle exclusion devices (TEDs) found on commercial shrimp trawls.

On February 10, 2009, the HMS Management Division released a Predraft summarizing the comments received during scoping. Some of the SSA comments on the stock assessment were addressed in the Predraft; however, the SSA submitted another comment on March 16, 2009, regarding the Predraft. Their comment included additional analyses on the shrimp trawl video and the shrimp bycatch model used in SEDAR 13. In their March 16, 2009, comment, the SSA stated that the section of the Predraft that responded to their scoping comments regarding SEDAR 13 was not "consistent with the prevailing scientific understanding of the issues raised." In addition, the SSA submitted a powerpoint/report entitled "Potential Effects of Turtle Excluder Devices on Bycatch of Blacknose Sharks." The SSA states that the "report has been submitted by the authors to the SEFSC. It strongly suggests that the blacknose bycatch estimate for the shrimp trawl fisheries that was used in the SEDAR 13 stock assessment did not adequately account for the substantial blacknose shark bycatch reduction effect of TED's currently deployed in the shrimp trawl fisheries. Consequently, the bycatch estimate used in the stock assessment is likely substantially higher than what is actually occurring in the fisheries." The SSA also submitted a datasheet and a report entitled "A Review of Submersible Video Depicting Shark Interaction with various TED types," which analyzes the shrimp trawl video showing interactions of sea turtles, finfish, and sharks with TEDs in the South Atlantic.

Given the many concerns expressed regarding the methods and results derived from the SEDAR 13 assessments on small coastal sharks, I am writing to seek assistance from the SEFSC in

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drafting a response to the November 14, 2008, and March 16, 2009, comments submitted by the SSA. During the Amendment 2 rulemaking, I made a similar request regarding comments we received from Rusty Hudson and Dr. Frank Hester. The response we received from the SEFSC was helpful not only in responding to the comments but also for my staff in analyzing the different management measures.

I feel that a response by the SEFSC in this instance is required given your staff's familiarity with the data and methodology employed during the SEDAR 13 assessments. The SEFSC staff's expertise is needed to address the technical comments raised by the SSA regarding SEDAR 13 in their November 14, 2008, comment (and in particular, the section entitled "Elements of Blacknose Shark Assessment that Warrant Reconsideration), and the alternate analysis proposed in the reported entitled "Potential Effects of Turtle Excluder Devices on Bycatch of Blacknose Sharks." The comments and documents referenced above have already been sent to Katie Andrews, John Carlson, and Enric Cortés.

Furthermore, as we begin conducting analyses of the ecological impacts of the measures considered in the amendment, collaboration with Enric and Katie may be necessary to ensure that data and methods are consistent with past analyses conducted by the SEFSC.

If you have any questions or concerns regarding these requests, please contact Margo Schulze-Haugen, Chief of the HMS Management Division, at (301) 713-2347. I look forward to collaborating with you on this and future endeavors.

Sincerely,

Alan Risenhoover
Director, Office of Sustainable Fisheries

Cc: Roy Crabtree, Assistant Administrator, Southeast Regional Office
Cc: Guy Davenport, Director, Southeast Fisheries Science Center, Panama City Laboratory
Cc: Katie Andrews, Panama City Laboratory
Cc: Enric Cortés, Panama City Laboratory
Cc: John Carlson, Panama City Laboratory

UNITED STATE DEPARTMENT OFCOMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149 U.S.A.

June 2, 2009

MEMORANDUM TO: Alan Risenhoover, Sustainable Fisheries Director

FROM: Bonnie Ponwith, Southeast Fisheries Director

SUBJECT: HMS letter dated 3/27/2009 and conference call on 5/1/2009 requesting additional analyses for blacknose sharks

Attached are two documents in response to 1) the letter you sent on 3/27/2009 seeking SEFSC assistance in responding to SSA comments and 2) the request made during the conference call held on 5/1/2009.

Regarding (1), in document "SEFSC response to comments from SSA for HMS.doc", we have specifically addressed all scientific and technical issues raised in the SSA document "Comments on HMS A3 scoping blacknose sharks 11-14-08.doc". Additional relevant technical comments made by the SSA in document "Comments on HMS Pre-draft A3 blacknose sharks 3-16-09.docx" and other attachments distributed by Jackie Wilson from HMS are essentially addressed in our response or are being addressed through a collaborative effort with LGL Ecological Associates.

Regarding (2), the request to carry out additional analyses to assess the influence that different assumptions on the level of bycatch reduction may have on blacknose shark stock status, we ran three scenarios in which the shrimp bycatch series from the baseline stock assessment conducted in 2007 was reduced by 25%, 50% and 75%, respectively, to account for the introduction of TEDs in the shrimp trawl fishery starting in 1990. The attached spreadsheet ("Blacknose shark assessment scenarios with bycatch reduction.xls" summarizes the results of the new model runs. Essentially, there is no change in stock status (see cells highlighted in blue, F_{2005}/F_{MSY} and N_{2005}/N_{MSY}). Although stock status improves, despite reductions of 25% to 75% in shrimp bycatch, the stock continues to be overfished (N_{2005}/N_{MSY}=0.66 to 0.74 vs. 0.48 in the baseline assessment run from the 2007 blacknose shark stock assessment) and overfishing is still occurring (F_{2005}/F_{MSY}=2.67 to 2.21 vs. 3.77 in the baseline assessment run from the 2007 blacknose shark stock assessment). For reference, the anticipated post-TED (1990 on) reduction in bycatch from the model currently in development is approximately 50%.

Let us know if you need clarification on any of our answers to the comments posed by the SSA or on the results of the additional assessment runs.

Attachments

Cc: Roy Crabtree

SEFSC response to comments from Southern Shrimp Alliance on blacknose shark bycatch and assessment

by Drs. Katie Andrews and Enric Cortés

Below are our responses to technical comments submitted by the Southern Shrimp Alliance (SSA) to the NMFS HMS Division in document "Comments on HMS A3 Scoping blacknose sharks 11-14-08.docx". Comments follow the question text as copied from the SSA document.

ELEMENTS OF BLACKNOSE SHARK ASSESSMENT THAT WARRANT RECONSIDERATION

DATA INPUTS

- **SEAMAP Data**

  - Seasonal
    - Q: Bycatch estimates are performed on a trimester basis but standard SEAMAP cruises are performed only in the 2nd and 3rd trimesters. There has been some sparse sampling in winter, but the winter estimate may not be very good.

      A: Bycatch estimates are provided on an annual scale, but trimester estimates are available if needed. The comment was that the winter estimates may not be very good because there is sparse sampling in winter (i.e. no SEAMAP data). The data are sparse for the bycatch estimates in general. This may lead to an over or underestimation of bycatch depending on the encounter rate. When there are no SEAMAP data, the observer data are used alone to provide the estimate, therefore it is the best science available given the data.
  - Geographical
    - Q: Blacknose shark abundance is highest in the eastern GOM (stat areas 1-9). However, SEAMAP cruises are not routinely conducted in stat areas 1-9, but are conducted in the western GOM areas 10-21. This raises question as to the validity of SEAMAP data to this species.

      A: We do not know of any sources that verify that blacknose abundance is greater in the eastern GOM than the western GOM. The SEAMAP data supplement the sparse observer data in the GOM. Since the SEAMAP data cover half the GOM spatially, they are valid data for such a calculation.
    - Q: The author of the SEAMAP abundance indices (Nichols) indicated that his model was not "as satisfactory" for species such as blacknose sharks which occur mainly in the eastern GOM as compared to the western GOM where SEAMAP cruises are typically conducted. He also discusses the high cost of imbalanced sampling where the entire range is not sampled. This seems to cast uncertainty on the blacknose shark assessment.

A: The question raised is whether SEAMAP data are valid for blacknose shark assessment. The SEAMAP data presented by Nichols were not used to provide an estimate of relative abundance for the assessment (i.e. CPUE) because they were not accepted by the WG; they were used to provide bycatch estimates only.

- Day/Night data
  - Q: Blacknose sharks were taken at depths between 10 and 40 fathoms in the fall SEAMAP studies and between 5 and 50 fathoms in the summer SEAMAP studies. In the western GOM, these depths are fished by the brown shrimp fishery which is a night fishery. In the eastern GOM, these depths are used by the pink shrimp fishery which is also a night fishery. The SEAMAP data used in the assessment combines catch data for trawls conducted at both night and day. The SEAMAP day trawl blacknose shark catch rate was stated to be 15 times greater than the night trawl catch rate. Only the night trawl data is applicable to the fisheries in question. Therefore, the catch rates used in the assessment are likely much higher than what actually occur in the fisheries.
  A: The factor, *depth*, is included in the model to estimate bycatch in the shrimp fishery rather than a *day/night* factor. There are data we plan to use to determine the proportion of shrimping that occurs during the day versus night. We also plan to re-examine *depth* simultaneously to determine if *day/night* would better describe the distribution of shrimping effort in the GOM.

- Bycatch reduction from TEDs
  - Q: The Georgia Bulldog video strongly suggests that TEDs are effective in excluding a substantial number of the sharks entering the net. It appears that the video includes portions during which the net was equipped with the older small TED and portions with the newer larger TED now required for use in our fisheries. Our preliminary review indicates that of the portion where the new larger TED was used, approximate 12 out of 17 sharks (70%) were excluded from the net. This is critical information because SEAMAP nets are not equipped with any TED design and yet SEAMAP data was a major source of data used in the assessment. All shrimp trawl nets operating in the brown and pink shrimp fisheries are equipped with TEDs. Therefore, the number of takes of than what actually occur in the fisheries. (See section on "shrimp trawl video" below)
  A: It is apparent that TEDs reduce, but do not eliminate, the number of sharks that are caught as bycatch in the shrimp fishery. We are currently working with consultants from LGL Ecological Associates to explicitly incorporate a TED effect into the bycatch estimation model. Also, we repeat that SEAMAP data were only used in shrimp trawl bycatch estimation, not as a CPUE time series or any other data inputs used in the stock assessment.

- Sample size
  - Q: The assessment uses a correlation between a very small sample size of SEAMAP takes (273) and observed takes (27)as a predictor of shrimp trawl bycatch. Validity?

A: Using the SEAMAP data and observer data to estimate the number of blacknose sharks captured as bycatch is not only valid, but also warranted. It is widely accepted that a considerable amount of bycatch of a number of species are taken by the shrimp trawl nets. That bycatch must be quantified. It is more difficult to provide robust estimates with limited data, but we are using the best available science to analyze the data that are available.

- **Observer Data**
  - Relevance of data to current fishery (age of data)
    - Q: The NMFS observer data used in the assessment is primarily from the 1970s and 1980s shrimp trawl fishery. Only 11 takes of blacknose sharks have been observed in that past 16 years (since 1992). Validity of observer data?

      A: The observer data are a valid source of information about the bycatch in the shrimp fishery and cover the entire modern time series of the assessment model (1972-2005). The low number of observed blacknose are much more likely due to observers not being required to record sharks to species for the majority of the time there has been an observer program. Also, there is approximately 1% coverage in the fishery, and that number should be greatly increased in order to provide a better picture of what is caught as bycatch.

- **Shrimp Trawl Fishing Effort Data**

  Most Current ?
  - Q: It does not appear that the stock assessment used the most current shrimp trawl fishing effort data.
  - Q: What was the benchmark period used in the assessment for the bycatch estimates?
  - Q: Shrimp trawl fishing effort in the 10-30fm zone in the western GOM (stat areas 10-21) has been reduced by approximately 78 to 80 percent since 2001-2003. Shrimp trawl fishing effort in the eastern GOM has also been reduced by 79 percent. Therefore, the estimates of shrimp trawl bycatch used in the assessment may be significantly higher than what is actually occurring in the fisheries.

    A: The shrimp trawl effort data used were current at the time of the assessment. The years of effort data available were 1981-2006, but we only used the data through 2005 to match all the other inputs of the assessment. Keep in mind that the assessment began in 2006 and concluded in 2007.

LIFE HISTORY ASSUMPTIONS

- **Fecundity**
  - Q: The assessment notes that blacknose sharks in the South Atlantic reproduce every 2 years and that blacknose sharks in the GOM reproduce every year. This is confirmed in the scientific literature.

- Q: The assessment further notes there were difficulties in running the model using the 2 year assumption for the South Atlantic. Consequently, the assessment scientists chose to use an average of the two and thereby assumed that blacknose sharks reproduce every 1.5 years in both the GOM and South Atlantic.
- Q: The assumption that reproduction occurs every 1.5 years instead of 1 year in the GOM is likely to have a substantial impact on the intrinsic rate of population increase (r) for the stock. This represents a 33% reduction in the spawning stock fecundity which is a principal measure used for the stock status determination. In other words, the population rate of growth and recruitment used in the assessment is likely to be much lower than what is actually occurring in the GOM population. Consequently, the assessment's conclusions about the status of the blacknose shark are likely to be overly pessimistic.

  A: Assuming a combined reproductive cycle of 1.5 years for the GOM and South Atlantic (SA) was decided at the Data Workshop (DW). The rationale for this decision, as explained in the DW report, was that genetic data were not conclusive despite reproductive cycles appearing to be different in the two areas. The growth model used was also a composite for the two areas (GOM and SA) because of the lack of younger individuals in the growth model from the SA and the lack of larger animals from the GOM. As a result, combined maturity ogives for the two areas were also used. Average litter size for the areas combined was 3.3 pups per litter. Assuming a 2-year reproductive cycle for blacknose sharks in the SA with the other life history inputs resulted in a negative population growth rate in a demographic model, which the WG deemed as unlikely. Hence, the WG decided to use the 1.5-year reproductive cycle for the two areas combined. Assuming a 1-yr, as opposed to a 1.5-yr, reproductive cycle obviously increases the reproductive output. However, a sensitivity analysis incorporating a 1-yr reproductive cycle had little effect on stock status criteria (scenario S3 in Table 4.4. of stock assessment).

- **Distribution**
  - Q: SEAMAP data indicates that since 1972 only 273 blacknose sharks were caught in 15,652 tows and that blacknose sharks were present in less than 1 percent of the SEAMAP stations. SEAMAP cruises are conducted in the western GOM. This low number of interactions indicates that the western GOM is not within the primary range of this species. This calls into question the validity of using SEAMAP data for this assessment.

    A: The SEAMAP data were not used as an estimate of relative abundance in the stock assessment, so this concern does not apply.

CHOICE OF ASSESSMENT MODEL AND METHODS

Q: The assessment indicates that different models/methods produced different results. The figure of page 16 of the SEDAR Review Panel report indicates that one method resulted in the

stock status determination of overfished and overfishing is occurring and the other did not. The model chosen was that which resulted in the overfished/overfishing determination. Neither model produced good fits to the abundance indices. There is also discussion in the Review Panel Report regarding how the age-structured approach fit all of the catch data well except the shrimp bycatch data. And, there are a number of points made about how the results of this assessment may change considerably in the next assessment. This lack of consistency between models begs explanation and suggests uncertainty.

A: Uncertainty is pervasive in all stock assessments. The WG opted for the age-structured production model as the "best" model to assess the status of blacknose sharks because it allows more direct incorporation of biological and fishery data than biomass dynamic models. The choice was done prior to running the assessment models. However, as was noted in the Assessment and Review Panel reports (e.g., see phase plot on page 18 of Review Panel report), some of the surplus production models also resulted in an overfished stock status (Bayesian Surplus Model using inverse CV weighting and the WinBUGS state-space model) and overfishing (Bayesian Surplus Model using inverse CV weighting). As noted by the reviewers, results may change if different subsets of relative abundance indices are chosen, but that is true for most stock assessments. Part of the reason for having SEDAR meetings is to convene a group of experts that choose the indices more likely to reflect stock status based on a set of criteria. The assessment actually considered sensitivity analyses in which all CPUE indices were included or using an alternative weighting method, none of which resulted in any substantial change in stock status.

OTHER DATA & ANALYTICAL ISSUES

- **Fish Size & Mortality Assumptions**
    - Q: The assessment appears to use an assumption that blacknose sharks taken in all commercial fisheries average 4.97 lbs dw, and that blacknose sharks taken in all recreational fisheries average 1.5 lbs dw.

        - What is the source of these average fish size assumptions for both commercial and recreational fisheries?

        - The assessment presents data indicating that the recreational fisheries landed (killed) 10,408 blacknose sharks. Why would recreational anglers land (kill) sharks that only weigh 1.5 lbs instead of releasing them? Is this really happening or is a product of extrapolation? This really calls into question the validity of the average fish size assumption for recreational fisheries.

        - Does the Georgia Bulldog video confirm that a reasonable estimate of the average size of sharks which pass through the TED into the cod end of the net is 4.97 lbs? Our preliminary review suggests that the sharks that pass through the

TED and into the net are smaller than 4.97 lbs dw. If the average size of sharks is significantly smaller than 4.97 lb dw, this could have a major impact on the fishing mortality rate for shrimp trawl bycatch. This, in turn, could have a significant impact on the stock status determination.

- The assessment appears to assume that catch = 100% mortality in the commercial fisheries. Does catch = 100% mortality in the commercial fisheries including the shrimp trawl fishery? What is the post-release survival of discarded sharks in these fisheries? If survival is greater than 0 percent than the assessment may be overly pessimistic.

- Does the assessment assume the same fishing mortality rate (F) for 1.5 lb fish taken in the recreational fisheries and 4.97 lb fish taken in the commercial fisheries? In reality, there is likely to be a substantial difference in the F rate associated with these different average sizes (ages).

- What is the sensitivity of the model to differences in each of the assumptions discussed above?

A: There appear to be several misunderstandings or confusions in this section:

We are unsure of the source for the cited 4.97 lb dw average weight for blacknose sharks in the commercial fisheries. As explained in the DW report, the assessment unit is numbers. Table 4 in document SEDAR-13-DW15 shows the average weights used to transform commercial landings (not catches) from weight to numbers for 1995-2005. Average weights come from the shark bottom longline and drift gillnet observer programs. Recreational catches are reported in numbers so no average weights are used. Recreational catch estimates, as explained at length in the DW and other reports, come from the Marine Recreational Fishery Statistics Survey (MRFSS), the NMFS Headboat Survey, and the Texas Parks and Wildlife Department Recreational Survey and include fish retained and discarded dead. Very few animals are measured, but some length and weight information is available (e.g., see Table 9 in document SEDAR-13-DW15).

The sources of mortality from commercial fisheries in Table 4 of the assessment, also found in more detail in the DW report, correspond to *landings*, not catches. Hence, the inclusion separately of bottom longline discards (which come from observed proportions of sharks discarded dead). The bycatch estimates from the shrimp fishery are assumed to be 100% dead. It is very unlikely that any animals would survive capture in the codend. Also, according to observer reports, there is little effort to quickly return live bycatch to the sea.

The difference in fishing mortalities across fisheries comes from the use of fleet-specific selectivities. A different selectivity function was used for longlines, gillnets, etc. Those selectivity curves model the different sizes/ages that each fleet preferentially takes. The surplus production age-structured model estimates a separate F for each fleet (see equations 7 and 8 in stock assessment report).

- **SEDAR 13 Review Panel Report Issues**

  - Q: Natural Mortality
    - On page 14 of the Report there is a discussion of the natural mortality rate assumption being the highest pup survival (ie. low M). Is this a valid or reasonable assumption? The choice of M can have a major impact on the assessment results in terms of stock status. Sensitivity analyses need to be conducted using a plausible range of M values.

      A: The low estimates of M (high survival) used in the baseline demographic and stock assessment analyses are intended to simulate a more realistic, density-dependent response and result in higher production (higher r, higher spawning stock fecundity, etc.). Thus, any sensitivity analyses would necessarily include higher values of M (lower survivorship) resulting in a less productive stock and likely worsened stock status. M values were also age-specific (decreasing with increasing age), which is more realistic than using a fixed value of M for all ages.

  - Q: Indices of Abundance
    - The discussion at the bottom of page 14 of the Report seems to suggest that there are serious problems with the selected indices because they cannot all account for the condition of the stock. There is a question of whether the stock unit is properly defined and a recommendation for using subsets in the future.

      A: The reviewers' advice was that consistent subsets of indices be used to counteract the mixed signals given by multiple, contradicting indices. As of the SEDAR 13 Data Workshop, there was no formal protocol for accepting or rejecting indices of abundance. The WG did so as objectively as possible, and the indices that were used in the assessment were the best available information about the stock at the time based on several selection criteria mentioned earlier. The WG selected those indices to be included in the assessment by considering both positive and negative aspects of each index as well as its perceived utility for the assessment (see Table 3.1 in Data Workshop Report). All selected indices were statistically standardized with GLM techniques. Note also that a sensitivity analysis incorporating all available indices resulted in no change in stock status (scenario S1 in Table 4.4. of stock assessment).

We do not think that using only the increasing or only the decreasing indices is appropriate. The decision to use an index should be made regardless of whether it shows a positive or negative trend over time. The assessment then, in turn, quantifies the stock based on the collection of accepted indices.

- Q: Gear Selectivity
  - The Report indicates that the method used to estimate gear selectivity was "relatively crude" and there was insufficient information for the reviewers to determine if this approach was adequate or not. (see top of p. 15)

  A: The procedure for estimating gear-specific selectivity was briefly described on page 27 of the DW report. After examination of the length frequency data presented at the DW, age-length keys were used to transform length frequencies into age frequencies, from which gear-specific selectivity was estimated prior to the AW using the methodology mentioned. The method for estimating selectivity is explained in detail in document SEDAR-13-AW-02, which was also distributed to the peer reviewers. As to the quality and quantity of the data, the reviewers were presented the attached Powerpoint presentation to explain in detail what was written in the report. The method was accepted by the reviewers as the best method available given the data.

- Q: In General
  - How do the following statements in the SEDAR 13 Review Panel Report support the need for a timely review and revision of the current stock assessment? (bold added)

(1) **"Executive Summary:** For **blacknose sharks**, appropriate standard assessment methods based on general production models and on age-structured modeling were used to derive management benchmarks. The current assessment indicates that spawning stock fecundity (SSF) in 2005 and during 2001-2005 is smaller than SSFmsy, i.e. that blacknose shark are overfished. The estimate of fishing mortality rate in 2005 and the average for 2001-2005 is greater than Fmsy, and the ratio is substantially greater than 1 in both cases. Thus, overfishing was occurring and is likely still occurring. **However, because of uncertainties in indices, catches and life history parameters, the status of blacknose shark could change substantially in the next assessment in an unpredictable direction." (See p. 2)**

(2) ***"Schedule for the next assessment of blacknose:*** the current stock status indicates that blacknose shark is being overfished and that overfishing is occurring. Thus, **it would be wise to reassess this stock within two or three years**. **Users of the assessment results should be aware that major differences in the estimated status could be expected in the next assessment if consistent subsets of stock size indices were used. In the current assessment, the stock size indices used**

are conflicting, and the assessment model takes an average of all the indices. If separate assessments were done with the indices that indicated increases, those that indicated stability, and those that indicated decreases, this would show greater uncertainty in stock status and stock trends." (See p.19)

A: The blacknose assessment and that for the other small coastal sharks was completed in 2007; thus an updated or benchmark assessment scheduled for 2010 would fall within the three-year timeframe mentioned.

Q: SHRIMP TRAWL VIDEO

- NMFS HMS Division has distributed a video as part of their scoping presentations to the Councils as supporting evidence that sharks are caught as bycatch in the shrimp trawl fisheries.

- According to NMFS HMS Division:

  "The footage was shot off the coast of Georgia from the R/V Georgia Bulldog. It is a confiscated shrimp trawler operated by the University of Georgia Marine Extension Service. Most of the footage was within 10 miles of shore, in water depths less than 40 feet. All the footage was using TEDs with less than 4 inch bar spacing. There has been no analysis of the shark catch. This work was primarily done to test these TEDs for wild turtle exclusion, and the SEFSC was not working up or identifying the bycatch. However, the SEFC noted that most of these sharks appear to be approximately 2 ½ feet long."

- The video appears to indicate that a very significant number (~70%) of the sharks that enter the net are expelled through the new, large TED opening.

- The SEDAR assessment of blacknose shark (and other coastal sharks) relied heavily on SEAMAP data to estimate shark bycatch in shrimp trawl fisheries. The SEAMAP trawl net is not equipped with a TED. Thus, it appears that the assessment did not account for what appears to be a very substantial shark bycatch reduction effect of TEDs used in 100% of the current brown and pink fisheries where blacknose shark bycatch can occur. If this is true, then the assessment is likely to be overly pessimistic.

- The SEDAR assessment also assumed the average weight of sharks caught in shrimp trawl fisheries was 4.97 lb dw. Is it possible to estimate size of sharks that passed through the TED bars into the cod end of the net used in the video to confirm if that is consistent with 4.97 lb dw assumption in assessment?

- Is there any data that can be retrieved from the Georgia Bulldog testing cruises to determine the mortality/survival rates of sharks found in the cod end? Any species identification possible?

A: The Georgia Bulldog footage was provided simply to determine whether *any* sharks still get through the TED bars and are retained in the codend. It has been previously stated that there was an expectation that TEDs would exclude a large proportion of sharks and that NMFS is working with consultants hired by the shrimping industry to explicitly model the TED effect in shrimp fishery bycatch. We do not recommend that the Georgia Bulldog footage be used to show percent escapement or retention as it was a small sample taken in the SA during the off-shrimping season. If a study were to be carried out, it should be done on a shrimping vessel during true operational conditions. The species assemblage, fish behavior and environmental conditions will all be different than during the Georgia Bulldog sample trawls.

Each of the reductions is taken after 1990 to reflect a potential magnitude for the TED effect

Summarized stock status	Base assessment results	% Reduction in bycatch		
		25%	50%	75%
SSF_{2005}/SSF_{MSY}	0.48	0.62	0.65	0.70
F_{2005}/F_{MSY}	3.77	2.67	2.46	2.21
N_{2005}/N_{MSY}	0.48	0.66	0.70	0.74
MSY	89415	77768	73835	69458
B_{2005}/B_0	0.17	0.24	0.25	0.27
Pup-survival	0.78	0.77	0.77	0.76
steepness	0.34	0.33	0.33	0.33

75% reduction in bycatch

New catch series Year	bycatch
1950	11509
1951	14783
1952	14964
1953	17204
1954	17772
1955	16105
1956	14640
1957	13157
1958	13073
1959	14664
1960	15706
1961	7878
1962	10328
1963	15560
1964	13915
1965	14953
1966	14114
1967	17335
1968	15807
1969	16546
1970	18233
1971	18674
1972	16797
1973	17085
1974	8716
1975	22969
1976	14957
1977	12863
1978	24171
1979	14823
1980	9759
1981	11475
1982	8964
1983	10731
1984	8201
1985	11025
1986	22764
1987	13656
1988	12270
1989	29999
1990	5651
1991	10495
1992	10750

50% reduction in bycatch

New catch series Year	bycatch
1950	11509
1951	14783
1952	14964
1953	17204
1954	17772
1955	16105
1956	14640
1957	13157
1958	13073
1959	14664
1960	15706
1961	7878
1962	10328
1963	15560
1964	13915
1965	14953
1966	14114
1967	17335
1968	15807
1969	16546
1970	18233
1971	18674
1972	16797
1973	17085
1974	8716
1975	22969
1976	14957
1977	12863
1978	24171
1979	14823
1980	9759
1981	11475
1982	8964
1983	10731
1984	8201
1985	11025
1986	22764
1987	13656
1988	12270
1989	29999
1990	11302.5
1991	20989.5
1992	21499.5

25% reduction in bycatch

New catch series Year	bycatch
1950	11509
1951	14783
1952	14964
1953	17204
1954	17772
1955	16105
1956	14640
1957	13157
1958	13073
1959	14664
1960	15706
1961	7878
1962	10328
1963	15560
1964	13915
1965	14953
1966	14114
1967	17335
1968	15807
1969	16546
1970	18233
1971	18674
1972	16797
1973	17085
1974	8716
1975	22969
1976	14957
1977	12863
1978	24171
1979	14823
1980	9759
1981	11475
1982	8964
1983	10731
1984	8201
1985	11025
1986	22764
1987	13656
1988	12270
1989	29999
1990	16953.75
1991	31484.25
1992	32249.25

75% reduction in bycatch (continued)
New catch series

Year	bycatch
1993	4366
1994	7697
1995	11346
1996	9933
1997	16410
1998	9592
1999	7728
2000	8881
2001	12831
2002	7148
2003	15270
2004	18447
2005	5789

50% reduction in bycatch (continued)
New catch series

Year	bycatch
1993	8732
1994	15394.5
1995	22692
1996	19866
1997	32819.5
1998	19183.5
1999	15456.5
2000	17761.5
2001	25662.5
2002	14296.5
2003	30539.5
2004	36893
2005	11577

25% reduction in bycatch (continued)
New catch series

Year	bycatch
1993	13098
1994	23091.75
1995	34038
1996	29799
1997	49229.25
1998	28775.25
1999	23184.75
2000	26642.25
2001	38493.75
2002	21444.75
2003	45809.25
2004	55339.5
2005	17365.5