

**SEDAR**

**Southeast Data, Assessment, and Review**

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**SEDAR 16**

**South Atlantic and Gulf of Mexico King Mackerel**

**SECTION V: Review Workshop Report**

**SEDAR**  
4055 Faber Place Drive, Suite 201  
North Charleston, SC 29405

## **1. INTRODUCTION**

### **1.1. Workshop Time and Place**

The SEDAR 16 Review Workshop was held August 4 - 8, 2008 in Jacksonville, Florida.

### **1.2. Terms of Reference**

1. Evaluate the adequacy, appropriateness, and application of data used in the assessment.
2. Evaluate the adequacy, appropriateness, and application of methods used to assess the stock.
3. Recommend appropriate estimates of stock abundance, biomass, and exploitation.
4. Evaluate the methods used to estimate population benchmarks and management parameters (*e.g.*, *MSY*, *F<sub>msy</sub>*, *B<sub>msy</sub>*, *MSST*, *MFMT*, or *their proxies*); recommend appropriate management benchmarks and provide estimated values for management benchmarks, a range of ABC, and declarations of stock status.
5. Evaluate the adequacy, appropriateness, and application of the methods used to project future population status; recommend appropriate estimates of future stock condition (*e.g.*, exploitation, abundance, biomass).
6. Evaluate the adequacy, appropriateness, and application of methods used to characterize uncertainty in estimated parameters. Provide measures of uncertainty for estimated parameters\*. Ensure that the implications of uncertainty in technical conclusions are clearly stated.
7. Ensure that stock assessment results are clearly and accurately presented in the Stock Assessment Report, including the Summary Report, and that reported results are consistent with Review Panel recommendations\*\*.
8. Evaluate the SEDAR Process. Identify any Terms of Reference which were inadequately addressed by the Data or Assessment Workshops; identify any additional information or assistance which will improve Review Workshops; suggest improvements or identify aspects requiring clarification.
9. Review the research recommendations provided by the Data and Assessment workshops and make any additional recommendations warranted. Clearly indicate the research and monitoring needs that may appreciably improve the reliability of future assessments. Recommend an appropriate interval for the next assessment.

10. Prepare a Peer Review Consensus Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference. Complete and submit this report within 3 weeks of workshop conclusion.

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

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

### 1.3. List of Participants

#### **Reviewers**

Guillermo Diaz (Chair).....NMFS S&T  
Doug Gregory .....GMFMC SSC/FL Sea Grant  
Neil Klaer..... CIE  
Paul Medley ..... CIE  
Kenneth Patterson ..... CIE

#### **Presenters**

Shannon Cass-Calay .....NMFS - Miami  
Mauricio Ortiz.....NMFS - Miami  
Victor Restrepo .....NMFS - Miami

#### **Council-Appointed Observers**

Brian Chevront.....SAFMC  
Ben Hartig.....SAFMC AP  
Albert Jones .....GMFMC SSC  
Anne Lange .....SAFMC SSC  
Robert Muller.....AW Rep/GMFMC SAP/FL FWC  
Donald Waters .....GMFMC AP  
Bob Zales, II.....GMFMC AP

#### **Council Representation**

George Geiger (SAFMC).....FL  
Michael Ray (GMFMC) .....TX

**Other Observers**

Frank Hester..... DSF  
 Russell Hudson ..... DSF  
 Tom Ihde..... Univ. of MD  
 Richard Methot ..... NMFS NWFSC  
 Mike Wilberg ..... CBL

**Staff**

Patrick Gilles..... NMFS Miami  
 Rick Leard..... GMFMC  
 Julie A. Neer ..... SEDAR  
 Tina O'Hearn ..... GMFMC  
 Andi Stephens ..... SAFMC  
 Gregg Waugh ..... SAFMC

**1.4. List of Data Workshop Working Papers**

Document #	Title	Authors
<b>Documents Prepared for the Review Workshop</b>		
SEDAR16-RW-01	Virtual Population Analyses of Gulf of Mexico and Atlantic King Mackerel Migratory Groups: Continuity Case and Updated Runs Through July 2008	Cass-Calay, S., M. Ortiz and V.R. Restrepo

## **Review Panel Consensus**

### *Executive Summary*

The assessment was well carried out and used appropriate methods. However, because of uncertainties in stock structure and incomplete data series, a substantial uncertainty in the state of the stock exists. For practical purposes, the most important of these is that it is very uncertain whether good recruitments that appear in some indices means that the available stock biomass of catchable fish in the eastern Gulf will increase in the next years. It will take two to three years for these fish to enter the fishery, at which point an update assessment should be conducted to test whether the expected increase is indeed occurring.

### **Data**

No concerns were raised about US data collection, but the absence of Mexican catch data from the assessment means that the absolute size of the stock can not be estimated. Nevertheless, the assessments contain useful information about trends and relative stock sizes.

It is a problem that few fishery independent surveys cover this stock, and the existing ones are not complete in their spatial or temporal coverage. While much effort has been made to analyze the fishery data to cover for this lack, such analysis cannot be a full and proper substitute for fishery independent survey data concerning a pelagic fish stock. In such stocks, fishery catch rates are often poor estimators of stock abundance

### **Methods**

The methods used are endorsed as the best available and appropriate for the available data. However, a minor correction to the base case was requested by the Review Panel (RP) and this was accepted by the assessment team.

### **Estimates of Stock Abundance, Biomass, and Exploitation**

The uncertainties around the stock assessments due to uncertainties in stock structure and the relationship of the data to the stock are such that considering only base-case assessments would not provide an adequate picture for management purposes. The RP has reviewed a wide range of interpretations of the data and could draw some firm conclusions about the state of the stocks, but other issues remain uncertain. In the face of this uncertainty the RP advocates that estimates be presented in the form of a decision table that illustrates the levels of risk associated with various catch levels.

### **Population Benchmarks**

The RP noted that standard methods had been used to calculate population benchmarks, and did not re-evaluate these methods. Rather, the panel identified what stock status declarations could reliably be made in the light of the uncertainties which had been identified. These declarations are provided.

Both the Gulf of Mexico (GOM) and Atlantic (ATL) spawning stock biomass levels in 2006 were above the MSST, and therefore not overfished. However, it is uncertain whether the GOM stock is currently experiencing overfishing. For the ATL stock, it is uncertain whether overfishing is occurring, but if it is, then this is at a low level.

### **Methods used to project future population status and characterize uncertainty**

The uncertainties in the assessments are so important that they cannot be estimated on the basis of a single assessment with stochastic projections. The RP recommends instead that the results of a number of plausible assessments be projected forwards so that the results can be used for management purposes in the form of a decision table. The Assessment Team has been asked to prepare such tables. The panel also advises on a closer assessment of the assumptions used concerning the shape of the stock-recruitment relationship at low stock sizes.

### **Presentation of results**

Term of reference No 7, "Ensure that stock assessment results are clearly and accurately presented in the Stock Assessment Report, including the Summary Report, and that reported results are consistent with Review Panel recommendations." has not been addressed as the stock assessment report has not been drafted at the time of writing.

### **Evaluation of the SEDAR process**

The Panel strongly recommends that a serious effort be made to fill data gaps (e.g., better designed larval surveys, data to improve stock identification, etc.) and notably to ensure a full coverage of the stock in time and space using methods suited to measuring pelagic fish abundance, such as larval, egg production or acoustic surveys. At present levels of survey effort, the assessment results are unlikely to be precise enough to allow the Management Councils to implement the management procedures currently under discussion (such as setting ABCs for several years in the future on the basis of medium-term projections).

The RP recommended that the behavior of the current control rules be investigated using simulation, to explore whether (and if so, how) the management objectives can be attained using the information available.

The RP had concerns as to the appropriateness of assessing a resource that is apparently migratory and trans-boundary in nature in a national assessment and management structure. This is relevant as the absence of Mexican catch data is a critical source of uncertainty in terms of stock levels and selectivity; better information of the Mexican catch is needed.

### **Research recommendations**

The panel has provided recommendations to help address the concerns noted above and to help improve the accuracy of parameter estimation.

## SEDAR 16. South Atlantic and Gulf of Mexico King Mackerel

August, 2008

### Review Workshop Terms of Reference

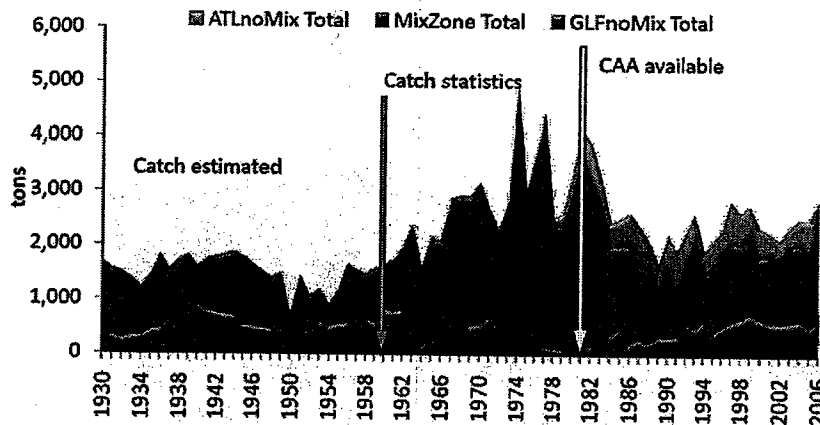
#### 1. Evaluate the adequacy, appropriateness, and application of data used in the assessment.

The RP addressed issues of data quality and usage extensively during the meeting, as thoroughly as was possible in the time available and without hands-on experience.

##### 1.1 Landing Data

###### 1.1.1 Commercial

The RP expressed concern that the exclusion of the high reported landings from Mexico may result in an incorrect interpretation of stock status if the GOM and Mexican king mackerel are actually one unit stock. The RP recognized that information on size composition, catch rates, and gears selectivity from that area were lacking and that there were concerns about the quality of the available Mexican landings data (accuracy of landings reports, species identification, etc.).



Except for the available Mexican data, no other concerns were expressed relative to the landings data. The US commercial landings had been accounted for spatially and temporally to include a GOM zone, a mixing zone, and an ATL zone. The mixing zone historically has been the source of about 60% of the total commercial landings.

The RP accepted the AW and DW recommendation that the number of dead discards in the commercial finfish fisheries is considered sufficiently low (about 10-15 thousand fish per year) to be negligible and to not include them in the assessment.

**Shrimp Bycatch:** The RP agreed with the AW and DW recommendation to exclude shrimp bycatch from the mixing zone in the model since there were few observed occurrences of king mackerel bycatch by shrimp trawlers in this area, and extrapolation

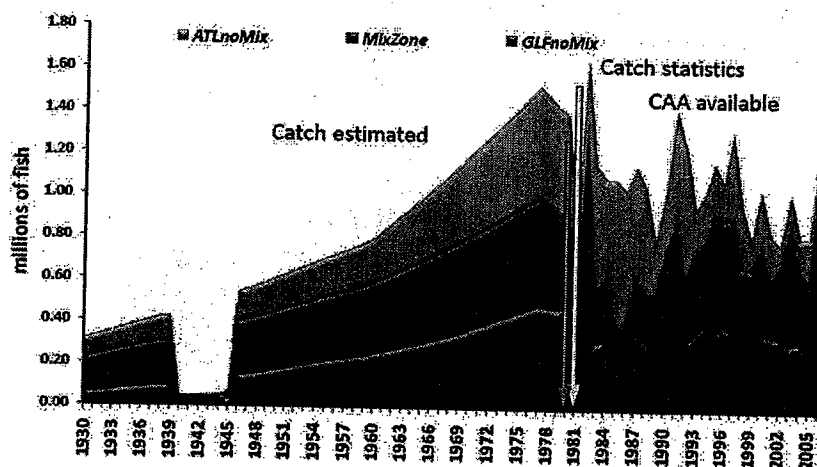
of these using estimated shrimp trawl effort would be highly uncertain. Shrimp bycatch estimates in the GOM were derived from a combination of SEAMAP data and shrimp observer data. The RP also concurred with the AW recommendation to use the delta-lognormal estimation of bycatch in this assessment as an improvement over the standard GLM estimation procedures. However, it should be noted that given the unbalanced nature of the data, the results are sensitive to the estimation procedure used.

### **1.1.2 Recreational**

The RP had no concerns about how the recreational landings were used in the assessment models.

The RP accepted the AW and DW recommendation to apply a 20% release mortality to the MRFSS fishery where fish are released alive and a 33% mortality to the headboat fishery where fish were released both dead and alive with the note that continuity runs do not include discards (B2 portions).

## **Total recreational catch**



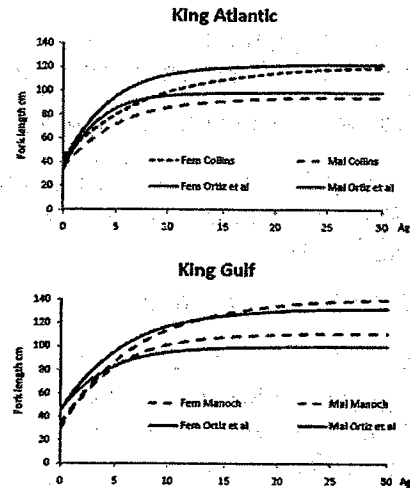
### **1.1.3 Age Composition**

The RP accepted the AW recommendation to use ages 0-11+ for both the GOM and the SA region.

## 1.2 Life History

### 1.2.1 Growth

Only age and length data from the non-mixing areas were used for estimating growth curves for the Atlantic and Gulf stocks. Consequently, about a third of the data used in SEDAR 5 was excluded because it was collected in the mixing zone and thus could not be assigned to a particular stock. In addition, new aging data was available and the newly estimated growth functions also took into account minimum size restrictions. As a result, the new models of growth predict faster growth rates for the Atlantic stock and slower growth rates for the Gulf stock than those estimated in SEDAR 5. The RP found the new estimated growth curves to be more appropriate to use in the assessment considering, among other factors, the need to exclude data from the mixing zone.



### 1.2.2 Stock Composition

The RP accepted the AW recommendation to adopt a 50:50 mixing ratio as the default for the base case. The VPA 2-Box cannot model mixing rates like the SS3 model, so assumptions on mixing ratios had to be made a priori.

It was discussed that there was insufficient data to separate the east and west GOM into two stocks. The DW suggested that a sensitivity analysis could be run excluding all fish west of the Mississippi River. The RP concluded that it would not be instructive to evaluate an eastern Gulf only scenario at this stage. Sensitivity scenarios were run to conduct similar evaluations.

The appropriateness of the level of data aggregation is questionable. While at least two migratory units have been described, over 50% of the fishery is prosecuted on the stocks when they are mixed during the winter. Therefore, separate management of these stock components may not provide the best management advice for king mackerel in the southeastern US unless some mechanism can be developed to identify Gulf and Atlantic biological samples collected in the mixing zone.

It is also possible that a third management unit may also exist in the western GOM. As catches in this area are relatively small, the issue may have relatively little impact, although it should be noted that two of the abundance indices used apply to this region.

### 1.2.3 Fecundity

The RP accepted the AW and DW recommendations to use the new length-based batch fecundity, a single function for batch fecundity at length for both migratory groups, and the updated fecundity vector based on hydrated oocyte data as reported in SEDAR16-DW-06. However, the RP noticed that the fecundity information was derived from small

samples sizes (32 fish) in the GOM and an effort should be made to estimate new length-based relationship increasing the sample sizes prior to the next assessment.

### 1.2.4 Maturity

The RP accepted the size/age at maturity information from Finucane *et al.* (1986), but recommends these functions be updated with more recent data.

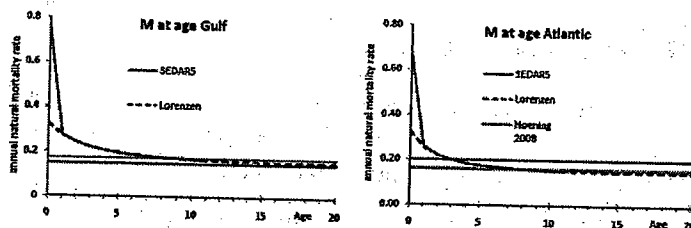
### 1.2.5 Length-Weight Relationship

The length-weight relationship used in SEDAR 16 differed from SEDAR 5 in that SEDAR 5 used the growth curve to determine the relationship, whereas SEDAR 16 used observed data.

### 1.2.6 Natural Mortality

The RP accepted the Lorenzen (1996) age-specific estimates of natural mortality (M) scaled to the Hoenig (1983) estimate based on maximum age for king mackerel as presented in the DW report. The RP did not investigate the sensitivity of the assessment results to the assumptions of higher natural mortality at younger ages. The differences seen in the estimates between the Atlantic and Gulf stocks

- Natural mortality at age
  - Estimates base on Hoening's max age formulation
    - GOM 24 yrs M = 0.174 / ATL 26 yrs M = 0.160
  - M at age: Lorenzen's formulation [Age 2+ full selected]
  - Adjusted for age 0 .....



reflect the current observed differences in maximum ages for king mackerel between the ATL (26 years) and the GOM (24 years), which provide Hoenig (1983) estimates of 0.16 and 0.17 year<sup>-1</sup>, respectively. This procedure resulted in an increase in the Atlantic estimate from the 0.15 used in SEDAR 5 and in a decrease in the 0.20 Gulf estimate used in previous assessments.

### 1.2.7 Weight at Age

The RP accepted the new weight-at-age estimates recommended by the DW and used by the AW. It was noted that the female weights-at-age used in the VPA2 Box model shows heavier fish at a given age in the GOM than in the ATL resulting in a higher estimated fecundity at age.

