7. SEDAR 89: SOUTH ATLANTIC TILEFISH STOCK ASSESSMENT REVIEW

7.1 Documents

Attachment 7a. SEDAR89: Tilefish Stock Assessment Report
*Attachment 7b. South Atlantic Tilefish Stock Assessment Presentation
Attachment 7c. SEDAR 89: Terms of Reference
*Attachment 7d. Additional Tilefish Sensitivity Analyses and Projections

7.2 Presentation

Matt Vincent, SEFSC

7.3 Overview

The SEDAR 89: South Atlantic Tilefish stock assessment was an operational assessment completed using the Beaufort Assessment Model (BAM) with a terminal year of 2022. Data compilation and assessment methods were guided by methods used in previous Tilefish assessments (SEDAR 4, SEDAR 25, and SEDAR 66), and other recent SEDAR assessments along with recommendations from the topical working group for this assessment. A base run of BAM was configured and a mixed Monte Carlo/Bootstrap Ensemble (MCBE) analysis was conducted to provide estimates of key management quantities, such as stock and fishery status.

Current stock status was estimated in the base run to be SSB2022/MSST = 1.261, indicating that the stock is not overfished. Throughout its history, SSB did not drop below MSST. Results from the MCBE suggested that the estimate of SSB relative to SSBMSY and the status relative to MSST is highly uncertain. A small majority (54%) of MCBE runs agreed with the stock status result from the base assessment model. The base model, median and majority of the MCBE suggests that the stock is not overfished but is below SSBMSY.

The estimated time series of F /F_{MSY} from the assessment model suggests that although F has exceeded F_{MSY} sporadically for individual years during the assessment period, it has not been consistently above the limit since the period of overfishing during 1990-1995. However, fishing mortality has been increasing considerably since 2010 and is estimated to be above F_{MSY} in the terminal year of the model. There is considerable uncertainty in F /F_{MSY} as demonstrated by the MCBE, especially toward the end of the assessment period. Current fishery status in the terminal year, with current F represented by the geometric mean from 2020 − 2022 ($F_{current} = F_{2020–2022}$ = 0.216), was estimated by the base run to be $F_{2020–2022}/F_{MSY} = 1$. Thus, at the end of the assessment Tilefish was fully exploited. However, results from the MCBE show that there is a lot of uncertainty in the fishing status of the species. Only 35% of MCBE runs agreed with the

fishing status result from the base model, and the median value of $F_{2020–2022}/F_{MSY}$ from the MCBE runs (1.16).

The SSC is asked to review, discuss, and provide feedback on the SEDAR 89: South Atlantic Tilefish Operational Assessment model configurations, projections, and uncertainties. If the assessment is determined to be suitable for providing management advice, the SSC will apply the new ABC Control Rule and make catch-level recommendations to the Council.

7.4 Public Comment

No public comment was provided.

7.5 Action

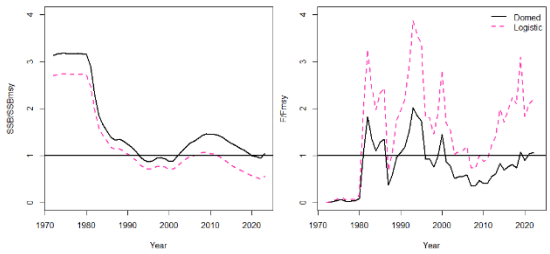
- **Review assessment**

  The SSC thanked Dr. Vincent for a thorough assessment overview and commented that the stock status indicators (SSB and F) are close to what can be expected with managing using MSY; both $SSB_{2022}/MSST$ and $F_{2020-2022}/F_{MSY}$ are near 1.

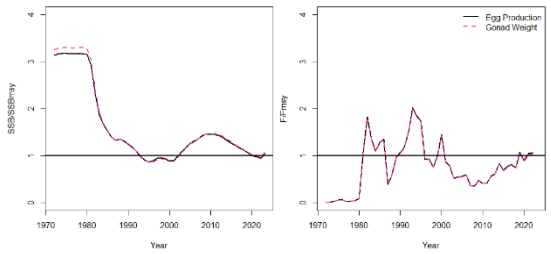
  - Does the assessment address the ToRs to the SSCs satisfaction?
    - *Yes, addressed all TORs including sub-bullets.*
  - Is the assessment consistent with BSIA guidance and practices?
    - *Yes, meets all BSIA guidance and practices, many model parameters were updated with more recent information.*
  - Does the assessment reliably capture past trends in the fishery and population?
    - *Yes. The appropriate changes in selectivity were made, and there were good fits to landings, indices, and age-comps, and reasonable good fits to length-comps.*
  - Does the assessment provide a reliable, quantitative estimate of current stock status?
    - *Yes. The stock status indicators are reliable and show that both SSB and F indicators are close to what is expected when managed to MSY. However, there is a noticeable difference between base model values and median MCBE values that have an influence on stock status determination.*
  - Does the assessment provide reliable predictions of future conditions to support fishing level recommendations?
    - *Yes. The requested projections provide guidance to support fishing level recommendations, but with the usual caveat that the further the projections in the future, the more uncertain the results.*

- **Identify, summarize, and discuss assessment uncertainties.**

- Review, summarize, and discuss the factors of this assessment that affect the reliability of estimates of stock status and fishing level recommendations.
  - *Although the stock-recruit relationship was used to derive MSY, there are additional parameters with high uncertainty:*
    - *The F_init parameter (the value of fishing mortality rate to initialize the model, see slide 33 of attachment 7b) has high uncertainty.*
    - *Significant uncertainty in distribution of the steepness; steepness was fixed in past assessment and is estimated in the current assessment.*
  - *There is substantial retrospective bias in stock biomass in terminal year run (Fig. 34 in the Assessment Report). However, this may be explained by the introduction of the new selectivity time block towards the terminal year.*
- Describe the risks and consequences of the assessment uncertainties with regard to status and fishing level recommendations.
  - *Stock status determination is different between base run and median MCBE runs (see phase plots, Fig. 28 in Assessment Report). All variables using the MCBE indicate more conservative stock dynamics.*
  - *Lack of indices of abundance for recent years.*
- Are methods of addressing uncertainty consistent with SSC expectations and the available information?
  - *Yes, the methods of addressing uncertainty are consistent with expectations using the MCBE approach.*
- List (in order of the greatest contribution to risk and overall assessment uncertainty) and comment on the effects of those assessment factors that most contribute to risk and impact status determinations and future yield predictions.
  - *Steepness (impacts both F and SSB as stock status determination criteria).*
  - *F_init (impacts only F as stock determination criteria).*
  - *Selectivity: The shape of the selectivity curves affects stock size and SSB. The selectivity at age was estimated using a two-parameter, flat-topped, logistic model for years prior to 2020. The selectivity functions for both the commercial handline and commercial longline fleets were estimated for two time blocks (1972-2019, 2020-2022), where the most recent assumed a domed selectivity (See page 22 of the Assessment Report).* A *sensitivity run with dome shaped selectivity for the earlier time block presented during the meeting showed significant changes in stock size and SSB and did not seem appropriate.*



- *Change in spawning input (gonad weight to fecundity) in the latest assessment may affect SSB, but note that a comparison of the two methods presented during the meeting showed very little difference in stock status between the methods.*



- *The uncertainty in stock status determination in the tilefish assessment (differences observed between MCBE and Base model) has an impact on the confidence in stock status determination.*

➢ **Provide fishing level recommendations.**
- Apply the South Atlantic ABC control rule.
  - *Stock risk rating: High (see Agenda item 3)*
  - *Current biomass status: Moderate*
  - *Using the new ABC-CR, the SSC recommends P* = 30%*
- Comment on any difficulties encountered in applying the Control Rule, including any required information that is not available.
  - *See comments under agenda item 3 on stock risk rating.*
  - *In the future, the Council is expected to select risk rating prior to assessment. Because the ABC control rule is new, they have not officially selected one yet, but the assessment is completed.*

➢ **Provide advice on monitoring the stock until the next assessment.**
- What indicators or metrics should be included in the SAFE Report to monitor and evaluate the stock until the next assessment? Current data will be included:

- Total Landings relative to ABC from the previous assessment until values from SEDAR 89 are adopted.
- Recreational (FES values) and Commercial Landings
- *Fish sizes from Recreational and Commercial fisheries.*
- *Trends in abundance included in South Atlantic Deep Water Longline Survey (SADLS)*
- Economic trends
- Recreational – MRIP Directed Trips
- Commercial – Ex-Vessel Value
- Social trends
- Observations of Closures
- Comments from Fishery Performance Report
- Recent management actions
- Other?
  - *SADLS survey data:*
    - *Monitoring size distribution to assess if larger fish are present or not, which could inform the use of dome-shaped vs. flat topped selectivity.*
    - *Catch rates: sudden decline in catch rates would be a concern.*

➢ **Provide research recommendations and guidance for the next assessment.**

- Review the included research recommendations and indicate those most likely to reduce risk and uncertainty in the next assessment.
  - *Investigate effect of changing selectivity pattern to dome-shaped selectivity.*
  - *Investigate potential differences between size distributions of the survey and fishery that may explain dome-shaped selectivity, such as a change in fisher behavior or fleet distribution (e.g., more nearshore).*
  - *SADLS data availability:*
    - *Fishery-Independent abundance index.*
    - *Age-comps from survey.*
  - *New age validation studies.*
  - *Investigate stock structure along the Atlantic coast.*

- Provide any additional research recommendations the SSC believes will improve future stock assessments.
  - *See above.*
- Provide guidance on the next assessment, addressing its timing and type.
  - *Assessment Components:*
    - *Inclusion of SADLS (need for forming a topical working group?)*
    - *Stock ID workshop.*
    - *SSC review (no CIE review necessary).*

- *New assessment within 5 years.*
- *Monitor SADLS to confirm dome shaped selectivity from assessment.*

Table 1. SEDAR 89: South Atlantic Tilefish Stock Assessment Output

Table 18. Estimated status indicators, benchmarks, and related quantities from the base run of the BAM, conditional on estimated current selectivities averaged across fleets. Also presented are median values and measures of precision (standard errors, SE) from the Monte Carlo/Bootstrap ensemble analysis. Rate estimates (F) are in units of y^{-1}; status indicators are dimensionless; biomass estimates are in units of thousands of pounds, as indicated; and recruits are in millions of age-1 fish. Spawning stock biomass (SSB) is measured as fecundity of mature females (trillion eggs). $L_{current}$ are the average landings from 2020–2022.

Quantity	Units	Estimate	Median	SE
F_{MSY}	y^{-1}	0.22	0.18	0.06
$75\%F_{MSY}$	y^{-1}	0.16	0.14	0.04
B_{MSY}	1000 lb whole	6191.07	7263.71	2446.69
SSB_{MSY}	Trillions of Eggs	0.514	0.651	1.738
MSST	Trillions of Eggs	0.385	0.488	1.304
MSY	1000 lb gutted	545.08	564.30	70.90
$L_{75\%MSY}$	1000 lb gutted	524.22	540.50	68.97
$L_{current}$	1000 lb gutted	531.56	530.24	19.54
R_{MSY}	millions fish	0.05	0.05	0.01
$F_{2020-2022}/F_{MSY}$	—	1.00	1.16	0.52
$SSB_{2022}/MSST$	—	1.26	1.04	0.42
SSB_{2022}/SSB_{MSY}	—	0.95	0.78	0.32

Table 2. South Atlantic SSC Tilefish Catch Level Recommendations

Criteria	**Value**
Stock Risk Rating	*High*
Relative Stock Biomass Level	*Moderate*
P-Star	*30%*
SSC recommended $P_{Rebuild}$	N/A

OFL RECOMMENDATIONS		
Year	Landed (lbs gutted weight)	Landed (number)
2025	*495,000*	*75,000*
2026	*508,000*	*77,000*
2027	*517,000*	*78,000*
ABC RECOMMENDATIONS		
Year	Landed (lbs gutted weight)	Landed (number)
2025	*407,000*	*61,000*
2026	*429,000*	*64,000*
2027	*447,000*	*67,000*