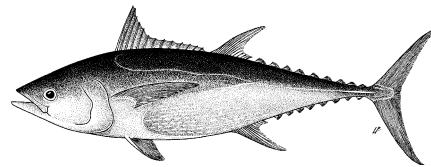




## APPENDIX 9

### EXECUTIVE SUMMARY: LONGTAIL TUNA (2023)



**TABLE 1.** Status of longtail tuna (*Thunnus tonggol*) in the Indian Ocean

Area <sup>1</sup>	Indicators		2023 stock status determination <sup>3</sup>
Indian Ocean	Catch 2022 <sup>2</sup> (t)	136,271	<b>35%</b>
	Mean annual catch (2018-2022) (t)	131,320	
	MSY (t) (80% CI)	133,000 (108 – 165)	
	$F_{\text{MSY}}$ (80% CI)	0.31 (0.22 – 0.44)	
	$B_{\text{MSY}}$ (t) (80% CI)	433,000 (272,000 – 690,000)	
	$F_{\text{current}}/F_{\text{MSY}}$ (80% CI)	1.05 (0.84 – 2.31)	
	$B_{\text{current}}/B_{\text{MSY}}$ (80% CI)	0.96 (0.44 – 1.19)	

<sup>1</sup>Stock boundaries defined as the IOTC area of competence;

<sup>2</sup>Proportion of catch fully or partially estimated for 2022: 30.4%;

<sup>3</sup>2021 is the final year that data were available for this assessment

Colour key	Stock overfished ( $SB_{\text{year}}/SB_{\text{MSY}} < 1$ )	Stock not overfished ( $SB_{\text{year}}/SB_{\text{MSY}} \geq 1$ )
Stock subject to overfishing ( $F_{\text{year}}/F_{\text{MSY}} > 1$ )	35%	25%
Stock not subject to overfishing ( $F_{\text{year}}/F_{\text{MSY}} \leq 1$ )	23%	17%
Not assessed/Uncertain/Unknown		

#### INDIAN OCEAN STOCK – MANAGEMENT ADVICE

**Stock status.** A new assessment was conducted for longtail tuna in 2023 which examined a number of data-limited methods including C-MSY, OCOM, and JABBA models (based on data up to 2021). These models produced stock estimates that are not drastically divergent because they shared similar dynamics and assumptions. The C-MSY model has been explored more fully and therefore is used to obtain estimates of stock status. The C-MSY analysis indicates that the stock is being exploited at a rate that exceeded  $F_{\text{MSY}}$  in recent years and that the stock appears to be below  $B_{\text{MSY}}$  and above  $F_{\text{MSY}}$  (35% of plausible models runs) (Fig. 2). Catches between 2017 and 2021 were slightly above MSY but steadily declined from 2012 to less than 113,000 t in 2019, (Fig. 1). The  $F_{\text{2021}}/F_{\text{MSY}}$  ratio is lower than previous estimates and the  $B_{\text{2021}}/B_{\text{MSY}}$  ratio was higher than in previous years. The analysis using the OCOM model is more pessimistic and using JABBA incorporating gillnet CPUE indices is more optimistic. The JABBA model, however, is unable to estimate carrying capacity with a fair degree of certainty without additional prior constraints, indicating the fact that the CPUE is either not informative or is conflicting with catch data. While the precise stock structure of longtail tuna remains unclear, recent research (IOTC-2020-SC23-11\_Rev1)

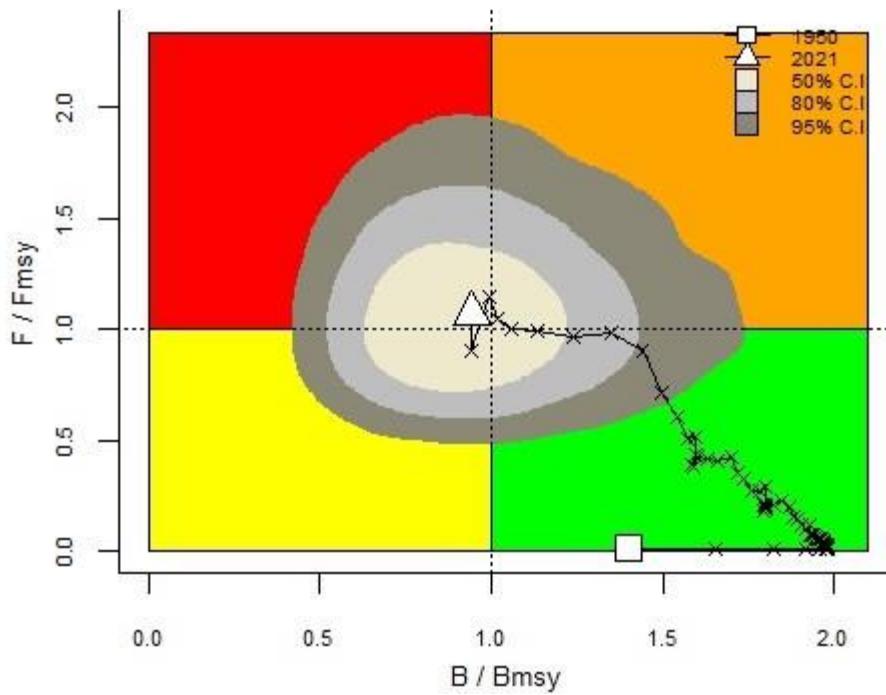
provides strong evidence of population structure of longtail tuna within the IOTC area of competence, with at least 3 genetic populations identified. This increases the uncertainty in the assessment, which currently assumes a single stock of longtail tuna. Based on the C-MSY assessment, the stock is considered to be both **overfished** and **subject to overfishing** (**Table 1; Fig. 1**). However, the assessment using catch-only method is subjected to high uncertainty and is highly influenced by several prior assumptions.

**Outlook.** There remains considerable uncertainty about the total catches of longtail tuna in the Indian Ocean. The increase in annual catches to a peak in 2012 increased the pressure on the longtail tuna Indian Ocean stock, although the catch trend has reversed since then. As noted in 2015, the apparent fidelity of longtail tuna to particular areas/regions is a matter for concern as overfishing in these areas can lead to localised depletion. Research emphasis should be focused on collating catch per unit effort (CPUE) time series for the main fleets, size compositions, exploring alternative approaches for estimating abundance (e.g., close-kin mark-recapture), and gaining a better understanding of stock structure and life trait history parameters (e.g. estimates of growth, natural mortality, maturity, etc.).

**Management advice.** The catch in 2022 was above the estimated MSY and the exploitation rate has been increasing over the last few years, as a result of the declining abundance. Despite the substantial uncertainties, this suggests that the stock is being fished above MSY levels and that higher catches may not be sustained. A precautionary approach to management is recommended.

The following should be also noted:

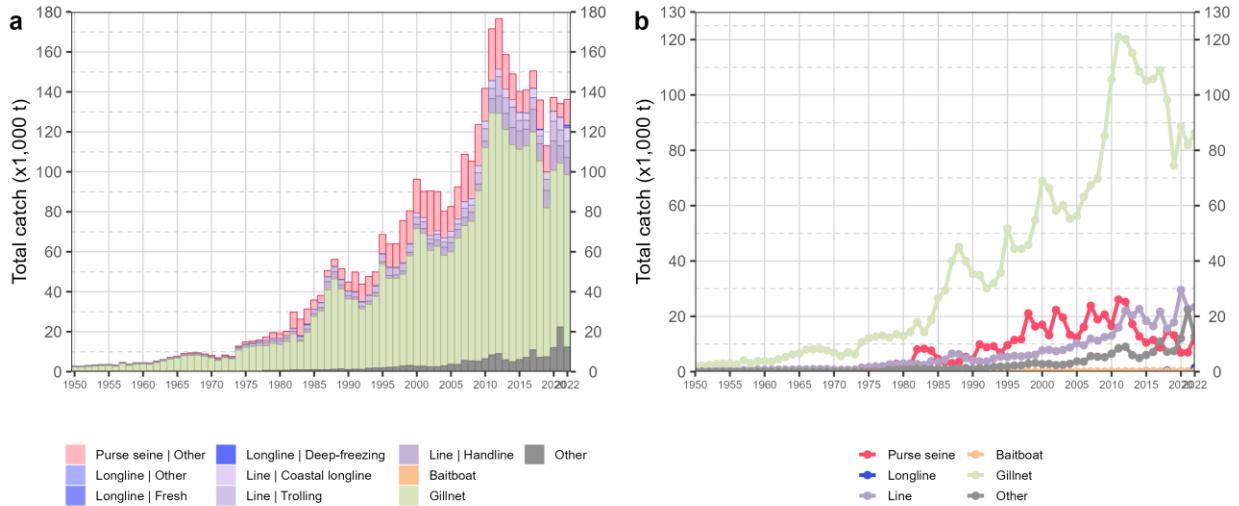
- The Maximum Sustainable Yield for the Indian Ocean is estimated to be 133,000t with a range of 108,000 –165,000t and so catch levels should be reduced in future to bring the stock back into the green quadrant;
- Limit reference points: the Commission has not adopted limit reference points for any of the neritic tunas under its mandate;
- Further work is needed to improve the reliability of the catch series. Reported catches should be verified or estimated, based on expert knowledge of the history of the various fisheries or through statistical extrapolation methods;
- Improvements in data collection and reporting are required if the stock is to be assessed using integrated stock assessment models;
- Research emphasis should be focused on collating catch per unit effort (CPUE) time series for the main fleets (I.R. Iran, Indonesia, Pakistan, Sultanate of Oman and India), size compositions and life trait history parameters (e.g., estimates of growth, natural mortality, maturity, etc.);
- There is limited information submitted by CPCs on total catches, catch and effort and size data for neritic tunas, despite their mandatory reporting status. In the case of 2022 catches 30.4% of the total catches of longtail were either fully or partially estimated by the IOTC Secretariat, which increases the uncertainty of the stock assessments using these data. Therefore, the management advice to the Commission includes the need for CPCs to comply with IOTC data requirements per Resolution [15/01](#) and [15/02](#).



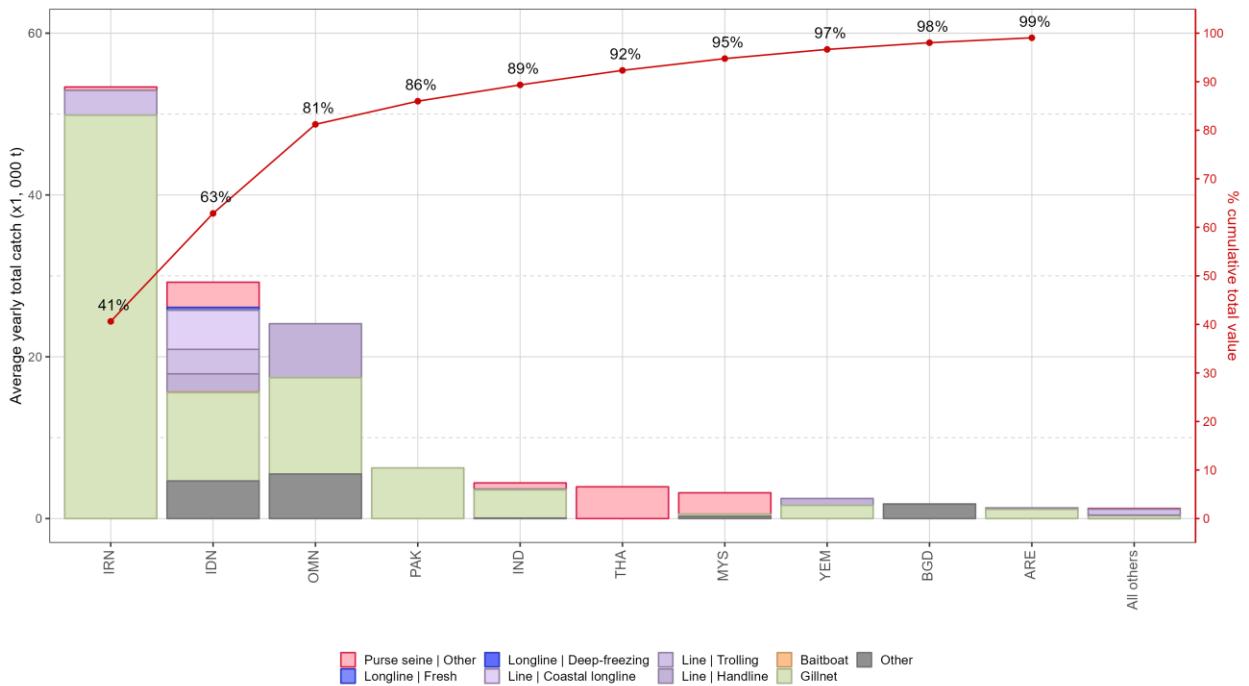
**Fig. 1.** Longtail tuna C-MSY Indian Ocean assessment Kobe plot. The Kobe plot presents the trajectories (median) for the range of plausible model trajectories included in the formulation of the final management advice. The shaded contour lines represent 50%, 80%, and 95% confidence intervals of estimated stock status in 2021 (

#### *Fisheries overview.*

- **Main fisheries (mean annual catch 2018-2022):** longtail tuna are caught using gillnet (65.4%), followed by line (16.6%) and 'other' gears (9.3%). The remaining catches taken with purse seine, longline and pole-and-line contributed to 8.7% of the total catches in recent years (**Fig. 2**).
- **Main fleets (mean annual catch 2018-2022):** the majority of longtail tuna catches are attributed to vessels flagged to I. R. Iran (40.6%) followed by Indonesia (22.2%) and Sultanate of Oman (18.3%). The 21 other fleets catching longtail tuna contributed to 18.8% of the total catch in recent years (**Fig. 3**).



**Fig. 2.** Annual time series of (a) cumulative nominal catches (t) by fishery and (b) individual nominal catches (t) by fishery group for longtail tuna during 1950-2022



**Fig. 3.** Mean annual catches (t) of longtail tuna by fleet and fishery between 2018 and 2022, with indication of cumulative catches by fleet.