APPENDIX 6
EXECUTIVE SUMMARY: BULLET TUNA (2023)
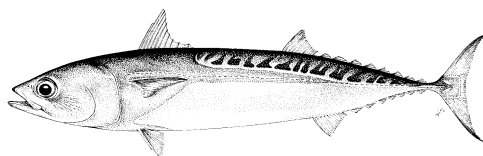
TABLE 1. Status of bullet tuna (*Auxis rochei*) in the Indian Ocean

Area[1]	Indicators		2021 stock status determination[3]
Indian Ocean	Catch 2022[2] (t) Mean annual catch (2018-2022) (t)	23,447 24,258	**Unknown**
	MSY (1,000 t) (80% CI) F_{MSY} (80% CI) B_{MSY} (1,000 t) (80% CI) $F_{current}/F_{MSY}$ (80% CI) $B_{current}/B_{MSY}$ (80% CI) $B_{current}/B_0$ (80% CI)	Unknown	

[1]Stock boundaries defined as the IOTC area of competence;
[2]Proportion of catch fully or partially estimated for 2022: 49.2%;
[3]2019 is the final year that data were available for this assessment

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

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Stock status. No new stock assessment was conducted in 2023 and so the results are based on the results of the assessment carried out in 2021 using the data-limited techniques (CMSY and LB-SPR), however the catch data for bullet tuna are very uncertain given the high percentage of the catches that had to be estimated due to a range of reporting issues. Due to a lack of fishery data for several gears, only preliminary stock status indicators can be used. Aspects of the fisheries for bullet tuna combined with the lack of data on which to base an assessment of the stock are a cause for concern. Stock status in relation to the Commission's B_{MSY} and F_{MSY} reference points remains unknown (**Table 1**).

Outlook. Annual catches of bullet tuna have steadily increased from around 2,000 t in the early 1990s to around 13,000 t in 2015-2017. In 2018, catches sharply increased to 33,000 t – mostly due to an increase in catches reported by Indonesian industrial purse seine fisheries (**Fig. 1**). In 2019, the catches of bullet tuna decreased to less than 24,000 t despite a major increase in the number of Indonesian industrial purse seiners in operation. There is considerable uncertainty around bullet tuna catches and insufficient information to evaluate the effect that these catch levels may have on the resource. Research emphasis should be focused on improving the data collection and reporting systems in place and collating catch per unit effort (CPUE) time series for the main fleets, size compositions and life trait history parameters (e.g., estimates of growth, natural mortality, maturity, etc.).

Management advice. For assessed species of neritic tunas and seerfish in the Indian Ocean (longtail tuna, kawakawa and narrow-barred Spanish mackerel), the MSY was estimated to have been reached between 2009 and 2011 and both F_{MSY} and B_{MSY} were breached thereafter. Therefore, in the absence of a stock assessment of bullet tuna a limit to the catches should be considered by the Commission, by ensuring that future catches do not exceed the average catches estimated between 2009 and 2011 (8,590 t). This catch advice should be maintained until an assessment of bullet tuna is available. Considering that MSY-based reference points for assessed species can change over time, the stock should be closely monitored. Mechanisms need to be developed by the Commission to improve current statistics by encouraging CPCs to comply with their recording and reporting requirements, so as to better inform scientific advice.

The following should be also noted:

- The Maximum Sustainable Yield estimate for the Indian Ocean stock is unknown;
- 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;
- Research emphasis should be focused on collating catch per unit effort (CPUE) time series for the main fleets, size compositions and life trait history parameters (e.g. estimates of growth, natural mortality, maturity, etc.).
- Species identification, data collection and reporting urgently need to be improved;
- 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 (reference year 2021), 50.3% of the total catches was 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.

Fisheries overview.
- **Main fisheries (mean annual catch 2018-2022)**: bullet tuna is caught using purse seine (63.1%), followed by line (16.9%) and gillnet (12.8%). The remaining catches taken with other gears contributed to 7.1% of the total catches in recent years (**Fig. 1**);
- **Main fleets (mean annual catch 2018-2022)**: the majority of bullet tuna catches are attributed to vessels flagged to Indonesia (37.3%) followed by India (29.6%) and Thailand (26.1%). The 13 other fleets catching bullet tuna contributed to 6.9% of the total catch in recent years (**Fig. 2**).
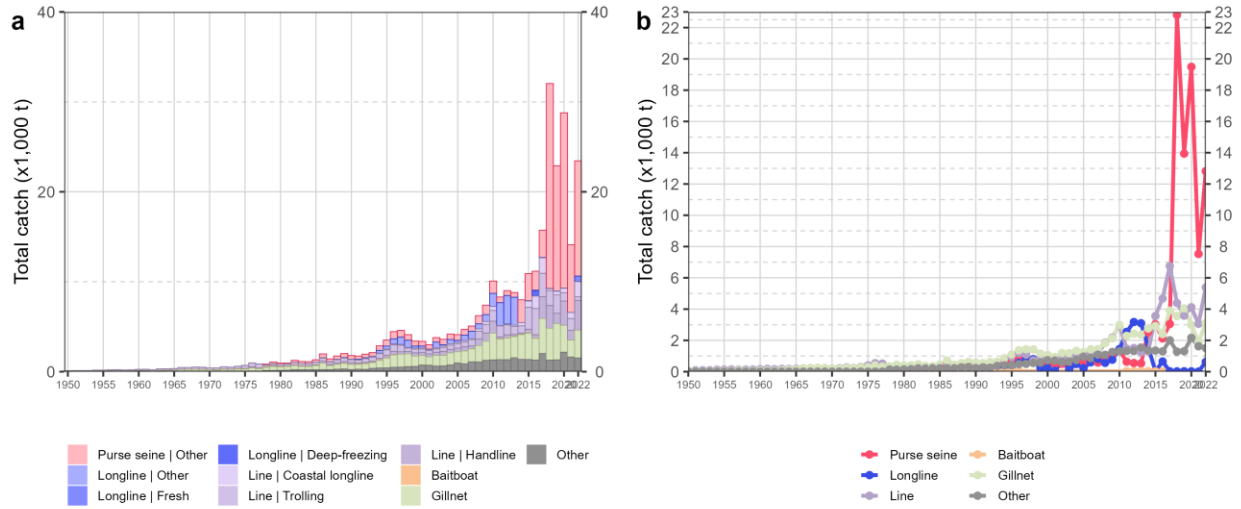
Fig. 1. Annual time series of (a) cumulative nominal catches (t) by fishery and (b) individual nominal catches (t) by fishery group for bullet tuna during 1950-2022
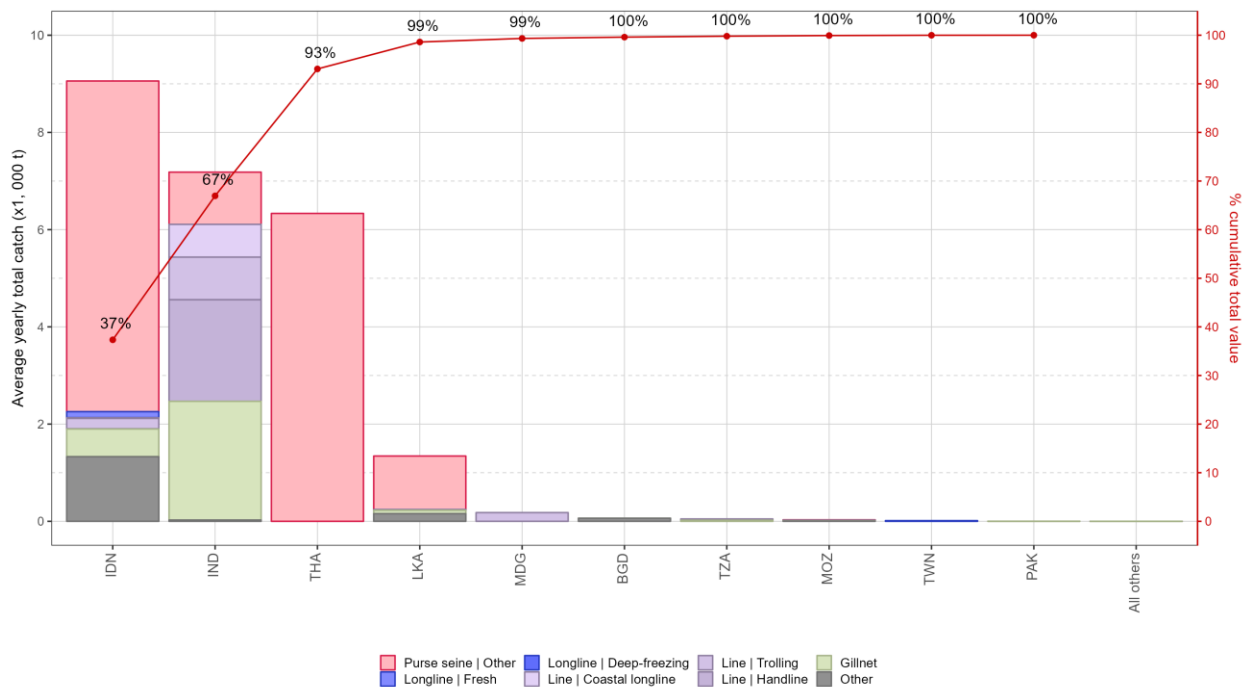

Fig. 2. Mean annual catches (t) of bullet tuna by fleet and fishery between 2018 and 2022, with indication of cumulative catches by fleet.