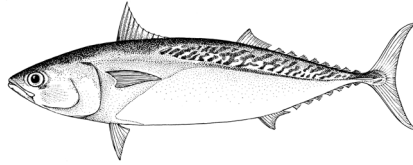


## APPENDIX 7 EXECUTIVE SUMMARY: FRIGATE TUNA (2022)



**TABLE 1.** Status of frigate tuna (*Auxis thazard*) in the Indian Ocean

| Area <sup>1</sup> | Indicators                                      |         | 2021 stock status determination <sup>3</sup> |
|-------------------|---|---------|--|
| Indian Ocean      | Catch (2020) (t) <sup>2</sup>                   | 127,516 |  |
|                   | Mean annual catch (2016-2020) (t)               | 103,740 |  |
|                   | MSY (1,000 t) (80% CI)                          | unknown |  |
|                   | F <sub>MSY</sub> (80% CI)                       | unknown |  |
|                   | B <sub>MSY</sub> (1,000 t) (80% CI)             | unknown |  |
|                   | F <sub>current</sub> /F <sub>MSY</sub> (80% CI) | unknown |  |
|                   | B <sub>current</sub> /B <sub>0</sub> (80% CI)   | unknown |  |

<sup>1</sup>Stock boundaries defined as the IOTC area of competence; <sup>2</sup>Proportion of catch fully or partially estimated for 2020: 74.3%;

<sup>3</sup>Status relates to the final year data are available for assessment

| Colour key   | Stock overfished (SB <sub>year</sub> /SB <sub>MSY</sub> < 1) | Stock not overfished (SB <sub>year</sub> /SB <sub>MSY</sub> ≥ 1) |
|--|--|--|
| Stock subject to overfishing (F <sub>year</sub> /F <sub>MSY</sub> > 1)     |  |  |
| Stock not subject to overfishing (F <sub>year</sub> /F <sub>MSY</sub> ≤ 1) |  |  |
| Not assessed/Uncertain   |  |  |

### INDIAN OCEAN STOCK – MANAGEMENT ADVICE

**Stock status.** A new assessment was carried out in 2021 using the data-limited techniques (CMSY and LB-SPR), however the catch data for frigate 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 frigate tuna combined with the lack of data on which to base an assessment of the stock are a cause for considerable concern. Stock status in relation to the Commission's B<sub>MSY</sub> and F<sub>MSY</sub> reference points remains **unknown (Table 1)**.

**Outlook.** Estimated catches have increased steadily since the late-1970s, reaching around 30,000 t in the late-1980s, to between 51,000 and 58,000 t by the mid-1990s, and steadily increasing to over 90,000 t in the following ten years. Between 2010 and 2014 catches have increased to over 105,000 t, rising to the highest levels recorded; although catches have since decline marginally to between 90,000 – 102,000 t since 2014. There is insufficient information to evaluate the effect that this level of catch or a further increase in catches may have on the resource. 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.).

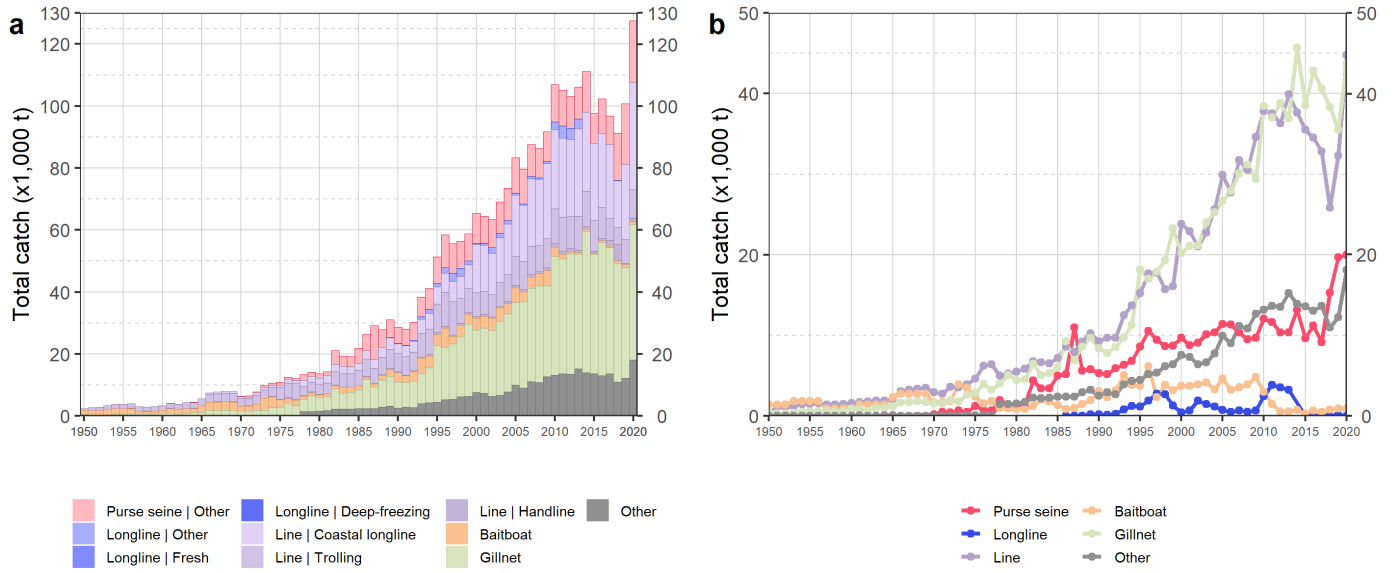
**Management advice.** For assessed species of neritic tunas in Indian Ocean (longtail tuna, kawakawa and narrow-barred Spanish mackerel), the MSY was estimated to have been reached between 2009 and 2011 and both  $F_{MSY}$  and  $B_{MSY}$  were breached thereafter. Therefore, in the absence of a stock assessment of frigate 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 (101,260 t). The reference period (2009-2011) was chosen based on the most recent assessments of those neritic species in the Indian Ocean for which an assessment is available under the assumption that also for frigate tuna MSY was reached between 2009 and 2011. This catch advice should be maintained until an assessment of frigate 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:

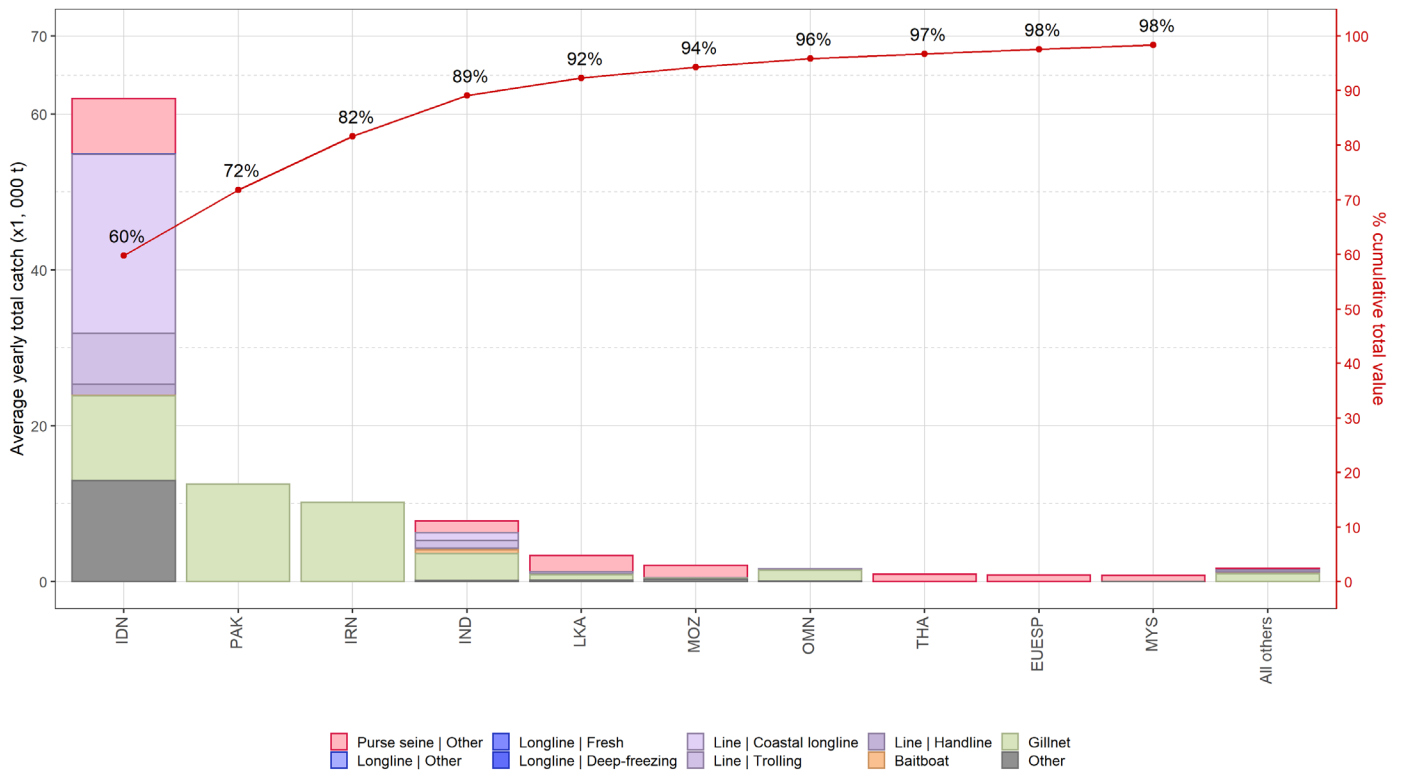
- The Maximum Sustainable Yield estimate for the Indian Ocean stock is unknown;
- Limit reference points: the Commission has not adopted limit reference points for any of the neritic tunas under its mandate;
- Further work is needed to improve the reliability of the catch series, such as verification or estimation 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 2020 catches (reference year 2019), 40% of the total catches 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](#).

#### **Fisheries overview.**

- **Main fisheries (mean annual catch 2016-2020):** frigate tuna is caught using gillnet (38.8%), followed by line (32.8%) and purse seine (14.5%). The remaining catches taken with other gears contributed to 13.8% of the total catches in recent years (**Fig. 1**);
- **Main fleets (mean annual catch 2016-2020):** most frigate tuna catches are attributed to vessels flagged to Indonesia (59.8%) followed by Pakistan (12.1%) and I. R. Iran (9.8%). The 27 other fleets catching frigate tuna contributed to 18.5% 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 frigate tuna during 1950-2020



**Fig. 2.** Mean annual catches (t) of frigate tuna by fleet and fishery between 2016 and 2020, with indication of cumulative catches by fleet