APPENDIX 12
EXECUTIVE SUMMARY: BLACK MARLIN (2023)

TABLE 1. Status of black marlin (*Istiompax indica*) in the Indian Ocean.

Area[1]	Indicators		2022 stock status determination
Indian Ocean	Catch 2022 (t)[2]	25,521	
	Average catch 2018–2022 (t)	17,962	
	MSY (1,000 t) (95% CI)	17.30 (11.00 – 35.02)	
	F_{MSY} (95% CI)	0.20 (0.12 - 0.34)	
	B_{MSY} (1,000 t) (95% CI)	87.39 (53.82-167.70)	
	F_{2019}/F_{MSY} (95% CI)	0.53 (0.22 – 1.05)	
	B_{2019}/B_{MSY} (95% CI)	1.98 (1.42 – 2.57)	
	B_{2019}/B_0 (95% CI)	0.73 (0.53 – 0.95)	

[1] Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence
[2] Proportion of 2021 catch fully or partially estimated by the IOTC Secretariat: 23.3%

| Colour key	Stock overfished ($B_{year}/B_{MSY} < 1$)	Stock not overfished ($B_{year}/B_{MSY} \geq 1$)
Stock subject to overfishing ($F_{year}/F_{MSY} > 1$)	🟥	🟧
Stock not subject to overfishing ($F_{year}/F_{MSY} \leq 1$)	🟨	🟩
Not assessed/Uncertain		

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Stock status. No new stock assessment was carried out for black marlin in 2023, thus the stock status is determined on the basis of the 2021 assessment based on JABBA, a Bayesian state-space production model (using data up to 2019). (). The relative point estimates for this assessment are F/FMSY=0.53 (0.22-1.05) and B/BMSY=1.98 (1.42-2.57). The Kobe plot (Fig. 3) indicated that the stock is not subject to overfishing and is currently not overfished (Table 1; Fig. 3), however these status estimates are subject to a high degree of uncertainty. The recent sharp increases in total catches (e.g., from 13,000 t in 2012 to over 22,000 t by 2016), and conflicts in information between CPUE and catch data lead to large uncertainties in the assessment outputs. Similar uncertainties were observed in the 2018 assessment of black marlin, which caused the point estimate of the stock status to change from the red (2016) to the green (2018) zone of the Kobe plot without any evidence of a rebuilding trend. Since 2018, there has been no discernable improvement in the data available for black marlin and the subsequent assessment outputs remain uncertain and should be interpreted with caution. As such, there is no reasonable justification to change the stock status from "Not assessed/Uncertain".

Outlook. While the recent high catches seem to be mainly due to developing coastal fisheries operating in the core habitat of the species (mainly IR.Iran, India and Sri Lanka), the CPUE indicators are from industrial fleets operating mostly offshore on the edges of the species' distribution. The outlook is likely to remain uncertain in the absence of CPUE indices from gillnet and coastal longline fleets to inform stock assessment models. Moreover, catches remain substantially higher than the limits stipulated in Res 18/05 and are a cause for concern as this will likely continue to drive the population towards overfished status.

Management advice. The catch limits as stipulated in Resolution 18/05 have been exceeded for two consecutive years since 2020. Thus, it is recommended that the Commission review the implementation and effectiveness of the measures contained in this Resolution and consider the adoption of additional conservation and management measures. The Commission should provide mechanisms to ensure that catch limits are not exceeded by all concerned fisheries.

The following key points should be noted:
- **Maximum Sustainable Yield (MSY)**: estimate for the whole Indian Ocean is 17,300 t.
- **Provisional reference points**: Although the Commission adopted reference points for swordfish in [Resolution 15/10](#) *on target and limit reference points and a decision framework*, no such interim reference points nor harvest control rules have been established for black marlin.
- **Main fisheries** (mean annual catch 2018-2022): black marlin are caught using gillnet (63.1%), followed by line (24.9%) and longline (7.1%). The remaining catches taken with other gears contributed to 4.9% of the total catches in recent years (**Fig. 1**).
- **Main fleets** (mean annual catch 2018-2022): the majority of black marlin catches are attributed to flagged to I. R. Iran (43.4%) followed by India (19.5%) and Sri Lanka (12.4%). The 25 other fleets catching black marlin contributed to 24.6% of the total catch in recent years (**Fig. 2**).
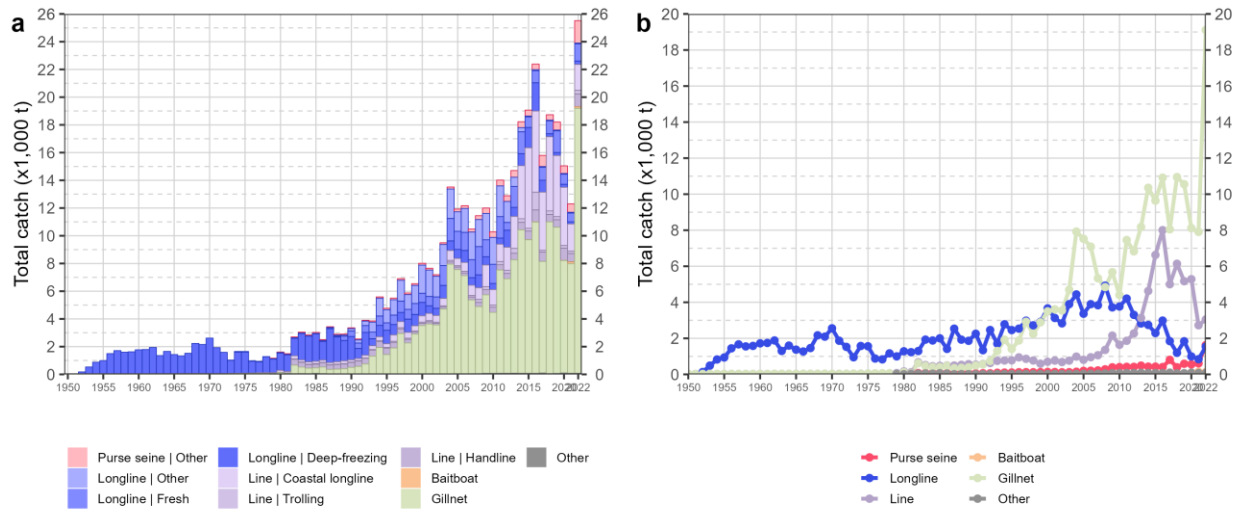
Fig. 1. Annual time series of (a) cumulative nominal catches (metric tons; t) by fishery and (b) individual nominal catches (metric tons; t) by fishery group for black marlin during 1950-2022. Longline | Other: swordfish and sharks-targeted longlines; Other: all remaining fishing gears
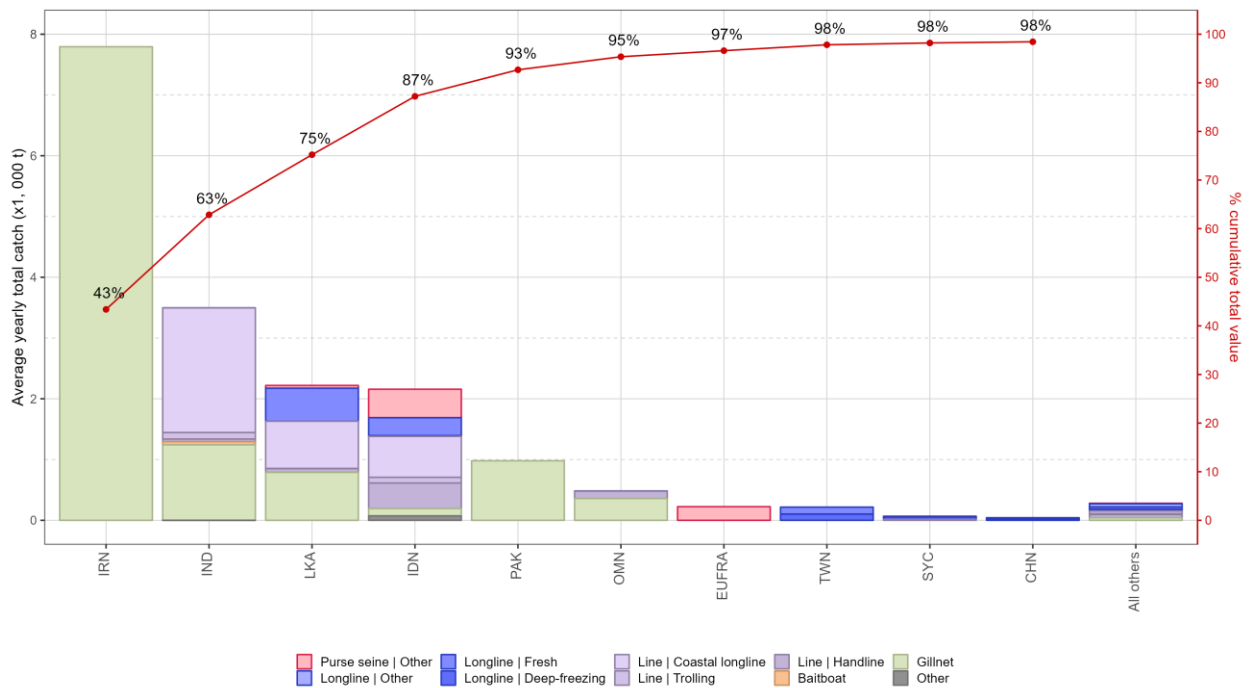
Fig. 2. Mean annual catches (metric tons; t) of black marlin by fleet and fishery between 2018 and 2022, with indication of cumulative catches by fleet. Longline | Other: swordfish and sharks-targeted longlines; Other: all remaining fishing gears
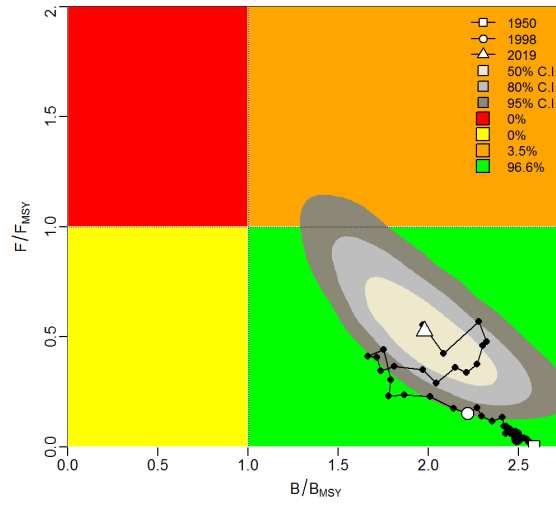
Fig. 2. JABBA Indian Ocean assessment Kobe plots for black marlin (contours are the 50, 80 and 95 percentiles of the 2019 estimate). Black line indicates the trajectory of the point estimates for the total biomass ratio (B/B$_{MSY}$) and fishing mortality ratio (F/F$_{MSY}$) for each year 1950–2019.