Food and Agriculture
Organization of the
United Nations

Indian Ocean Tuna Commission
Commission des Thons de l'Ocean Indien
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APPENDIX 13
EXECUTIVE SUMMARY: BLACK MARLIN (2020)
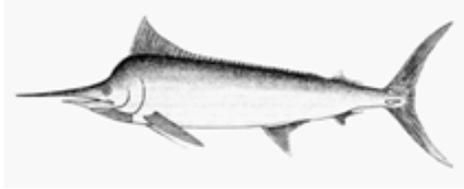
Table 1. Status of black marlin (*Makaira indica*) in the Indian Ocean

Area[1]	Indicators		2020 stock status determination
Indian Ocean	Catch 2019 (MT)[2] Average catch 2015–2019 (MT)	17,415 18,599	
	MSY (1,000 MT) (80% CI) F_{MSY} (80% CI) B_{MSY} (1,000 MT) (80% CI) F_{2017}/F_{MSY} (80% CI) B_{2017}/B_{MSY} (80% CI) B_{2017}/B_0 (80% CI)	12.93 (9.44-18.20) 0.18 (0.11-0.30) 72.66 (45.52-119.47) 0.96 (0.77-1.12) 1.68 (1.32-2.10) 0.62 (0.49-0.78)	

[1] Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence
[2] Proportion of 2019 catch fully or partially estimated by the IOTC Secretariat: 37%

Colour key	Stock overfished (B_{year}/B_{MSY}< 1)	Stock not overfished (B_{year}/B_{MSY}≥ 1)
Stock subject to overfishing (F_{year}/F_{MSY}> 1)		
Stock not subject to overfishing (F_{year}/F_{MSY}≤ 1)		
Not assessed/Uncertain		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

Stock status. No new stock assessment for black marlin was carried out in 2020, thus, the stock status is determined on the basis of the 2018 assessment based on JABBA and other indicators presented in 2019. This assessment suggests that the point estimate for the stock in 2017 is in the green zone in the Kobe plot with F/F_{MSY}=0.96 (0.77-1.12) and B/B_{MSY}=1.68 (1.32-2.10). The Kobe plot from the JABBA model indicated that the stock is not **subject to overfishing** and is currently not **overfished** (**Table 1**; **Fig. 2**), however these status estimates are subject to a high degree of uncertainty. The recent sharp increases in total catches (e.g., from 13,000 MT in 2012 to over 21,000 MT by 2016), and conflicts in information in CPUE and catch data lead to large uncertainties in the assessment outputs. This caused the point estimate of the stock status to change from the red to the green zones of the Kobe plot without any evidence of a rebuilding trend. **As such, the results of the assessment are uncertain and should be interpreted with caution.**

Outlook. While the recent high catches seem to be mainly due to developing coastal fisheries operating in the core habitat of the species, the CPUE indicators are from industrial fleets operating mostly offshore on the edges of the species distribution. However, the recent increases in catches are much higher than MSY and are a cause for concern and will likely continue to drive the population towards overfished status.

Management advice. Current catches (>17,400 MT in 2019) (**Fig. 1**) are higher than MSY estimate (12,930 MT), which is likely to associate with high uncertainty. The catch limits as stipulated in Resolution 18/05 have also been exceeded. The Commission should provide mechanisms to ensure that catch limits are not exceeded by all concerned fisheries. Projections were not carried out due to the poor predictive capabilities identified in the assessment diagnostics.

The following key points should be noted:
- **Maximum Sustainable Yield (MSY)**: Estimate for the whole Indian Ocean is 12,930 MT.
- **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 fishing gears (average catches 2015-19)**: Black marlin are largely considered to be a non-target species of industrial and artisanal fisheries. Gillnets account for more than 50% of total catches in the Indian Ocean, followed by coastal longline, troll and handlines (32%), with remaining catches recorded under longlines (11%) (**Fig. 1**).
- **Main fleets (average catches 2015-19):** More than 75% of the total catches of black marlin are accounted for by three fleets: I.R. Iran (gillnet): 32%; India (gillnet and trolling): 24%; Sri Lanka (gillnet and fresh longline): 20%.
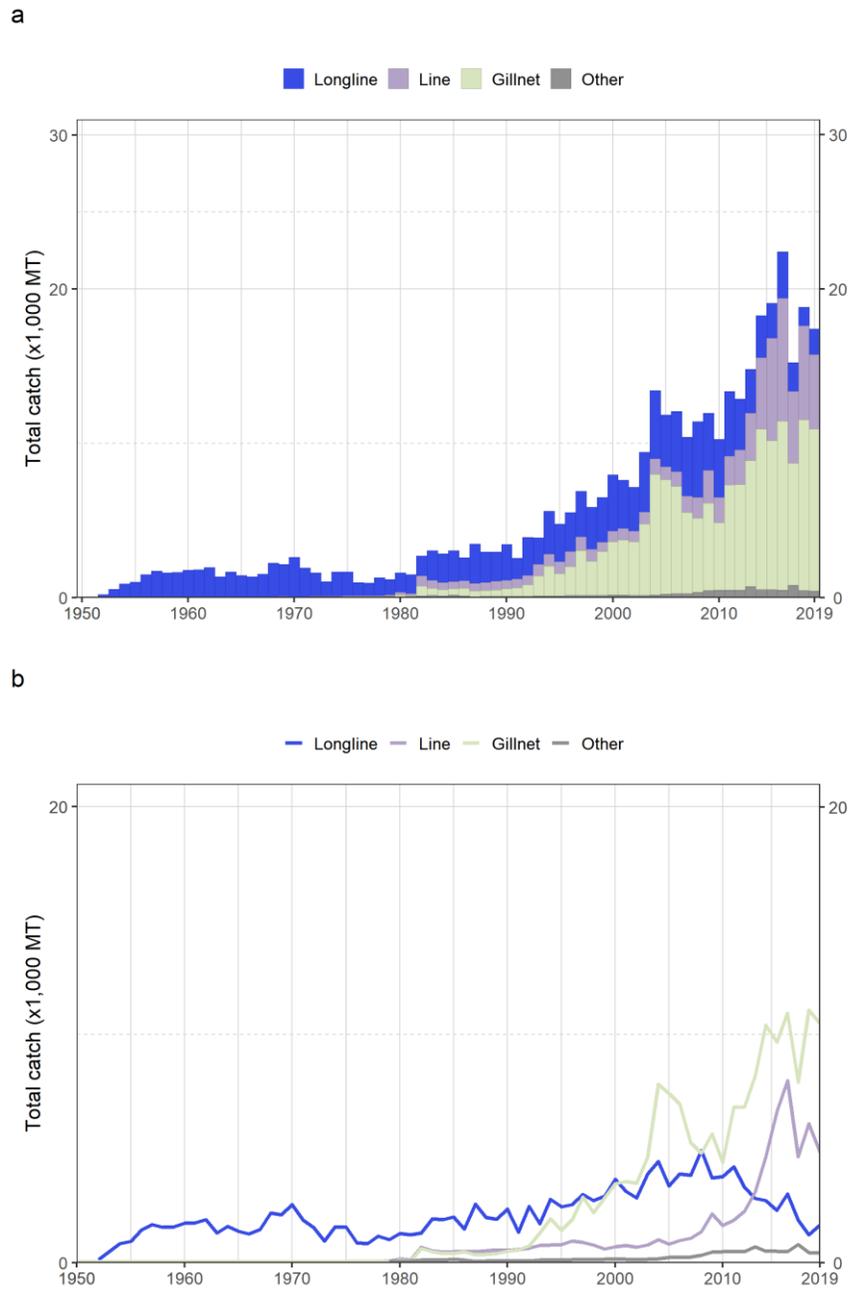
Fig. 1. Annual time series of (a) cumulative and (b) individual nominal catches (MT) by gear group for black marlin during 1950–2019. <u>Longline</u>: deep-freezing and fresh longlines, swordfish and sharks-targeted longlines; <u>Line</u>: coastal longline, hand line, troll line; <u>Gillnet</u>: coastal and offshore gillnets, driftnet; <u>Other</u>: all remaining gears
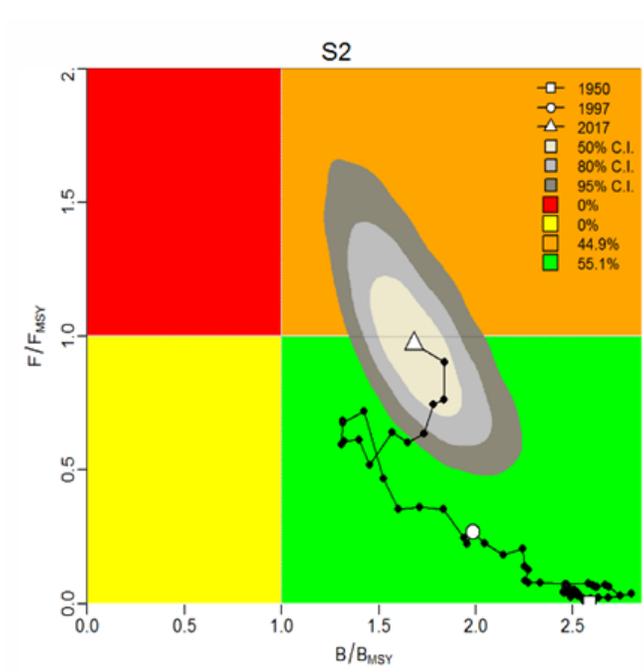
Fig. 2. Black marlin: JABBA Indian Ocean assessment Kobe plots for black marlin (contours are the 50, 80 and 95 percentiles of the 2017 estimate). Black line indicates the trajectory of the point estimates for the total biomass (B) ratio and fishing mortality (F) ratio for each year 1950–2017