

APPENDIX 10

EXECUTIVE SUMMARY: INDO-PACIFIC KING MACKEREL (2021)

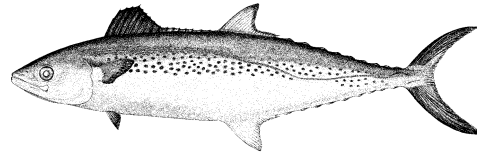


TABLE 1. Indo-Pacific king mackerel: Status of Indo-Pacific king mackerel (*Scomberomorus guttatus*) in the Indian Ocean.

Area ¹	Indicators		2021 stock status determination
Indian Ocean	Catch 2019 ² (t)	45,79645,513	35%
	Average catch 2015-2019 (t)		
	MSY (1,000 t)	46.9 (37.7–58.4)	
	F _{MSY}	0.74 (0.56–0.99)	
	B _{MSY} (1,000 t)	63.2 (42–94)	
	F _{current} /F _{MSY}	0.90 (0.78–2.01)	
B _{current} /B _{MSY}	1.03 (0.46–1.19)		
	B _{current} /B ₀	0.51 (0.23–0.60)	

¹ Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence.

² Proportion of catch estimated or partially estimated by IOTC Secretariat in 2019: 39%

Colour key	Stock overfished ($B_{year}/SB_{MSY} < 1$)	Stock not overfished ($B_{year}/SB_{MSY} \geq 1$)
Stock subject to overfishing ($F_{year}/F_{MSY} > 1$)	16%	19%
Stock not subject to overfishing ($F_{year}/F_{MSY} \leq 1$)	30%	35%
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). Analysis using the catch only method CMSY indicates the stock is being exploited at a rate that is below F_{MSY} in recent years and that the stock appears to be above B_{MSY} , although the estimates would be more pessimistic if the stock productivity is assumed to be less resilient. The analysis using the length-based approach (LB-SPR) was also undertaken in 2021 and the results are not conflicting with CMSY in terms of status. The catch-only model has provided a more defensible approach in addressing the uncertainty of key parameters and the currently available catch data for the Indo-Pacific king mackerel appear to be of sufficient quality. Based on the weight-of-evidence currently available, the stock is considered to be not overfished and not subject to overfishing (Table 1; Fig. 2).

Outlook. Total annual catches for Indo-Pacific king mackerel have increased steadily over time, reaching a peak of 51,600 t in 2009 and have since fluctuated between around 40,000 t and 48,000 t. There is considerable uncertainty about stock structure and total catches. Aspects of the fisheries for this species, combined with the limited data on which to base a more complex assessment (e.g., integrated models), are a cause for concern. Although data-poor methods are used to provide stock status advice, further refinements to the catch-only methods and application of additional data-poor approaches may improve confidence in the results. 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. Reported catches of Indo-Pacific king mackerel in the Indian Ocean has increased considerably since the late 2000s with recent catches fluctuating around estimated MSY, although the catch in 2019 was below the estimated MSY. This suggests that the stock is very close to being fished at MSY levels and that higher catches may not be sustained despite the substantial uncertainty associated with the assessment, a precautionary approach to management is recommended.

The following should be also noted:

- Limit reference points: The Commission has not adopted limit reference points for any of the neritic tunas under its mandate.
- 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.).
- 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.
- Data collection and reporting urgently needed to be improved, given the 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) 75% 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.
- **Main fishing gears (average catches 2015-2019):** Indo-Pacific King mackerel are caught mainly by gillnets (~66%), however significant numbers are also caught by trawling (~18%) and trolling (7%) (**Fig. 1**).
- **Main fleets (average catches 2015-2019):** Almost two-thirds of catches are accounted for by fisheries in India and Indonesia; with important catches also reported by I.R. Iran (~19%).

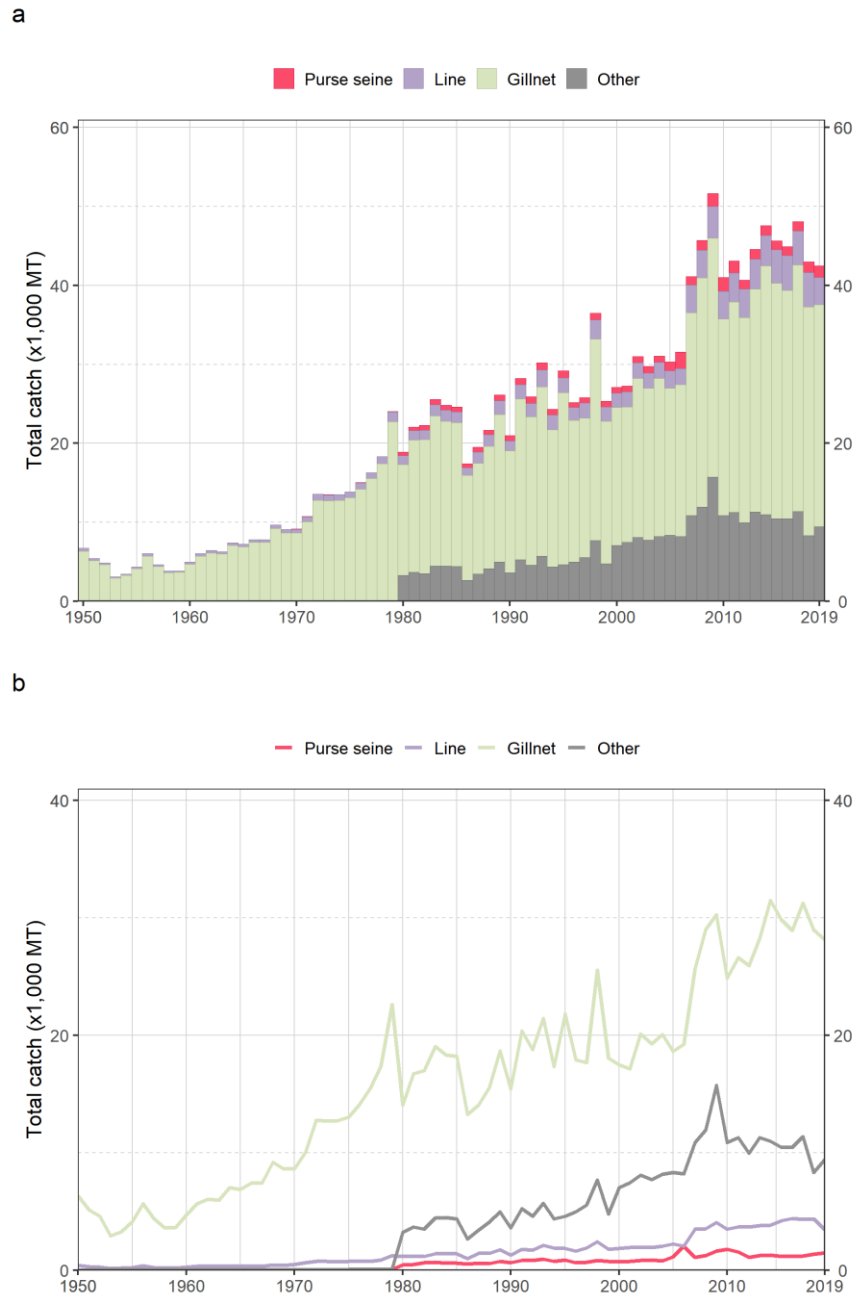


Fig. 1. Annual time series of (a) cumulative and (b) individual nominal catches (t) by gear group for Indo-Pacific king mackerel during 1950–2019. Purse seine: coastal purse seine, purse seine, ring net; Line: coastal longline, hand line, troll line; Gillnet: coastal and offshore gillnets, driftnet; Other: all remaining fishing gears

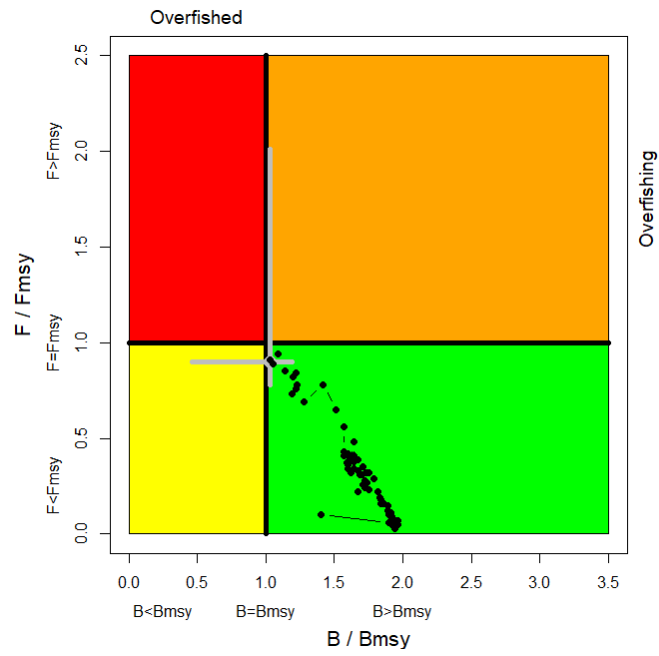


Fig. 2. Indo-Pacific king mackerel CMSY Indian Ocean assessment Kobe plot. The Kobe plot presents the trajectories (geometric mean) for the range of plausible model options included in the formulation of the final management advice. The gray cross represents the estimate of stock status in 2021 (median and 80% confidence interval).