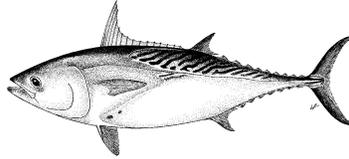


## APPENDIX 19 EXECUTIVE SUMMARY: KAWAKAWA (2020)



**Table 1.** Status of kawakawa (*Euthynnus affinis*) in the Indian Ocean

Area <sup>1</sup>	Indicators		2020 stock status determination <sup>3</sup>
Indian Ocean	Catch 2019 <sup>2</sup> (MT)	128,042	50%
	Average catch 2015-2019 (MT)	148,084	
	MSY (MT) (80% CI)	148,825 (124,114 – 222,505)	
	F <sub>MSY</sub> (80% CI)	0.44 (0.21–0.82)	
	B <sub>MSY</sub> (MT) (80% CI)	355,670 (192,080 – 764,530)	
	F <sub>current</sub> /F <sub>MSY</sub> (80% CI)	0.98 (0.85–1.11)	
B <sub>current</sub> /B <sub>MSY</sub> (80% CI)	1.13 (0.75–1.58)		

<sup>1</sup> Boundaries for the Indian Ocean stock assessment are defined as the IOTC area of competence

<sup>2</sup> Proportion of 2019 catch estimated or partially estimated by IOTC Secretariat: 41%

<sup>3</sup> The stock status refers to the most recent years' data used in the assessment conducted in 2020. i.e. 2018

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)	35%	15%
Stock not subject to overfishing (F <sub>year</sub> /F <sub>MSY</sub> ≤ 1)	0%	50%
Not assessed/Uncertain		

The percentages are calculated as the proportion of model terminal values that fall within each quadrant with model weights taken into account

### INDIAN OCEAN STOCK – MANAGEMENT ADVICE

**Stock status.** A new stock assessment was carried out in 2020 using data-limited assessment techniques. The OCOM model indicated that F was just F<sub>MSY</sub> (F/F<sub>MSY</sub>=0.98) and B above B<sub>MSY</sub> (B/B<sub>MSY</sub>=1.13). The estimated probability of the stock currently being in green quadrant of the Kobe plot is about 50%. Due to the quality of the data being used, the simple modelling approach employed in 2020, and the large increase in kawakawa catches over the last decade (Fig. 1), measures need to be taken in order to reduce the level of catches which have surpassed the estimated MSY levels for all years since 2011 – despite the decrease in catches from their peak in 2013. Based on the weight-of-evidence available, the kawakawa stock for the Indian Ocean is classified as **not overfished** and **not subject to overfishing** (Table 1, Fig. 2).

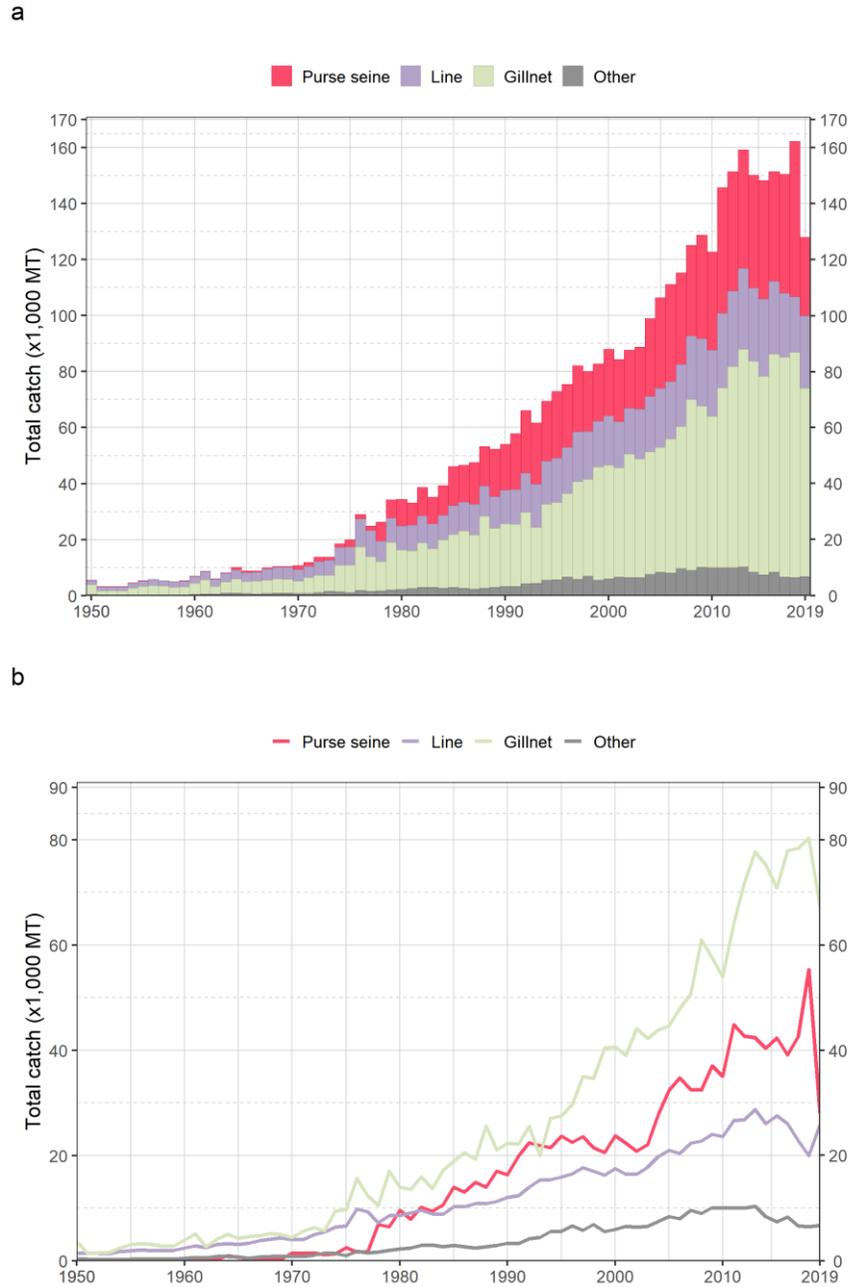
**Outlook.** There is considerable uncertainty about stock structure and the estimate of total catches. Due to the uncertainty associated with catch data (e.g., 33% of catches partially or fully estimated by the IOTC Secretariat in 2018) and the limited number of CPUE series available for fleets representing a small proportion of total catches, only data poor assessment approaches can currently be used. Aspects of the fisheries for this species, combined with the lack of data on which to base a more complex assessment

(e.g. integrated models) are a cause for considerable concern. In the interim, until more traditional approaches are developed, data-poor approaches will be used to assess stock status. Continued increase in the annual catches for kawakawa is also likely to further increase the pressure on the Indian Ocean stock. 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.). However, it should be noted that catches have since declined from 168,174 MT (2013) to 159,121 MT (2017).

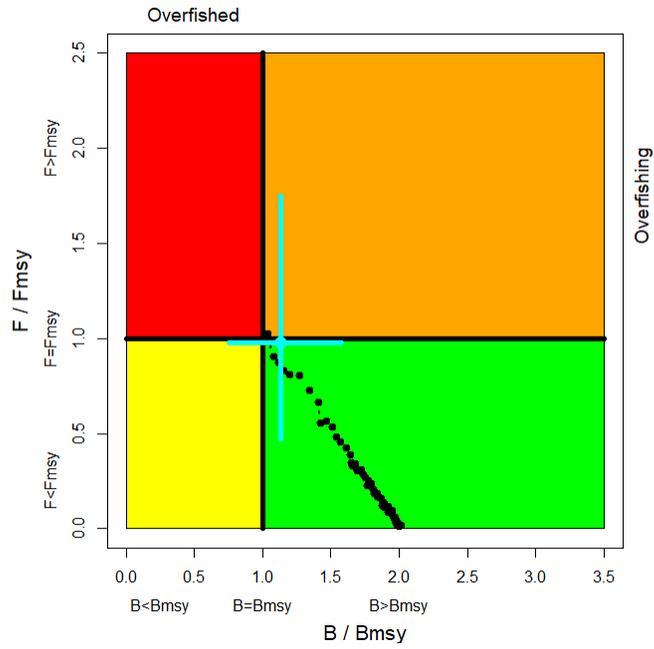
**Management Advice.** However, the assessment models rely on catch data, which is considered to be highly uncertain. The catch in 2018 was above the estimated MSY. The available gillnet CPUE of kawakawa showed a somewhat increasing trend although the reliability of the index as abundance indices remains unknown. Despite the substantial uncertainties, the stock is probably very close to being fished at MSY levels and that higher catches may not be sustained in the longer term. A precautionary approach to management is recommended.

The following should be also noted:

- The Maximum Sustainable Yield estimate for the Indian Ocean is estimated to be 148,825 MT with a range between 124,114 and 222,505 MT and so catch levels should be reduced in future to prevent the stock becoming overfished.
- 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.
- Improvement in data collection and reporting is required if the stock is to be assessed using integrated stock assessment models.
- 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.).
- Given the limited information submitted by CPCs on total catches, catch and effort and size data for neritic tunas, despite their mandatory reporting status, the IOTC Secretariat was required to estimate 33% of the catches (in 2019, with reference year 2018), 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 gear (average catches 2015–19):** kawakawa are caught mainly by gillnets (~50%), purse seiners (including coastal ones, ~28%) and handlines and trolling (~13%) (**Fig. 1**).
- **Main fleets (average catches 2015–19):** Catches are highly concentrated: Indonesia, India, and I.R. Iran account for ~75% of catches in recent years.



**Fig. 1.** Annual time series of (a) cumulative and (b) individual nominal catches (MT) by gear group for kawakawa 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.** OCOM Indian Ocean assessment Kobe plot for kawakawa. 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 blue cross represents the estimate of stock status in 2018 (median and 80% confidence interval).