APPENDIX 8
EXECUTIVE SUMMARY: KAWAKAWA (2024)

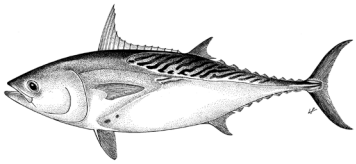

TABLE 1. Status of kawakawa (*Euthynnus affinis*) in the Indian Ocean

Area[1]	Indicators		2023 stock status determination[3]
Indian Ocean	Catch 2023[2] (t) Mean annual catch 2019-2023 (t)	152,828 156,428	**27%**
	MSY (t) (80% CI) F_{MSY} (80% CI) B_{MSY} (t) (80% CI) $F_{current}/F_{MSY}$ (80% CI) $B_{current}/B_{MSY}$ (80% CI)	154,000 (122,000 – 193,000) 0.60 (0.48 – 0.74) 258,000 (185 – 359) 0.98 (0.82–2.20) 0.99 (0.45 – 1.20)	

[1]Stock boundaries defined as the IOTC area of competence;
[2]Proportion of catch fully or partially estimated for 2023: 67.6%;
[3]2021 is the final year that data were available for this assessment.

Colour key	Stock overfished (SB_{year}/SB_{MSY}< 1)	Stock not overfished (SB_{year}/SB_{MSY}≥ 1)
Stock subject to overfishing (F_{year}/F_{MSY}> 1)	25%	23%
Stock not subject to overfishing (F_{year}/F_{MSY}≤ 1)	27%	25%
Not assessed/Uncertain / Unknown		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

Stock status. No new stock assessment was conducted in 2024 for kawakawa and so the results are based on the results of the assessment carried out in 2023 which examined a number of data-limited methods include C-MSY, OCOM, and JABBA models (based on data up to 2021). These models produced stock estimates that are not drastically divergent because they shared similar dynamics and assumptions. The C-MSY model has been explored more fully and therefore is used to obtain estimates of stock status. The C-MSY model indicated that the fishing mortality F was very close to F_{MSY} (F/F_{MSY}=0.98) and the current biomass B was also very close to B_{MSY} (B/B_{MSY}=0.99). The estimated probability of the stock currently being in yellow quadrant of the Kobe plot is about 27%. The analysis using OCOM model is more pessimistic and using JABBA incorporating gillnet CPUE indices is more optimistic. Due to the quality of the data being used, the simple modelling approach employed in 2020 and 2023, 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 most years since 2011. While the precise stock structure of kawakawa remains unclear, recent research (IOTC-2020-SC23-11_Rev1) provides strong evidence of population structure of kawakawa within the IOTC area of competence, with at least 4 genetic populations identified. This increases the uncertainty in the assessment, which currently assumes a single stock of kawakawa. Based on the weight-of-evidence available, the kawakawa stock for the Indian Ocean

is classified as **overfished** but **not subject to overfishing** (**Table 1**, **Fig. 1**). However, the assessment using catch-only method is subjected to high uncertainty and is highly influenced by several prior assumptions.

Outlook. There is considerable uncertainty about stock structure and the estimate of total catches. Due to the uncertainty associated with catch data (e.g., 67.6% of catches partially or fully estimated by the IOTC Secretariat for 2023) 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.).

Management Advice. The assessment models rely on catch data, which are considered to be highly uncertain. The catch in 2022 was just 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 for the Indian Ocean is estimated to be 154,000 t with a range between 122,000 t and 193,000 t and so catch levels should be reduced in future to bring the stock back into the green quadrant;
- 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 60.1% of the catches of kawakawa (in 2022), 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.

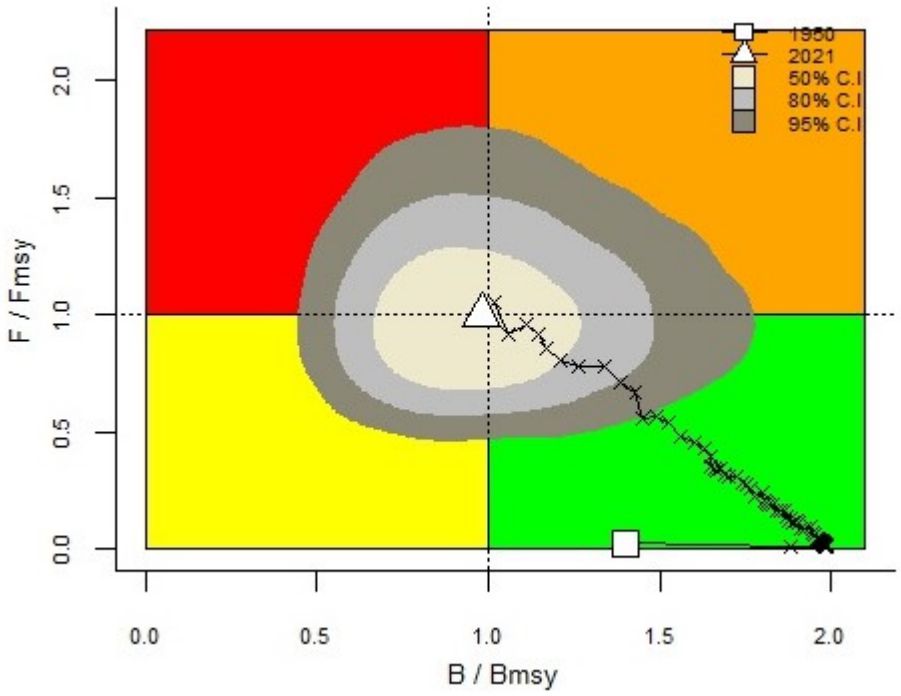

Fig. 1. C-MSY Indian Ocean assessment Kobe plot for kawakawa. The Kobe plot presents the trajectories (median) for the range of plausible model trajectories included in the formulation of the final management advice. The shaded contour lines represent 50%, 80%, and 95% confidence intervals of estimated stock status in 2021

Fisheries overview.

- **Main fisheries (mean annual catch 2019-2023)**: kawakawa are caught using gillnet (48.5%), followed by purse seine (29.3%) and line (17%). The remaining catches taken with other gears contributed to 5.1% of the total catches in recent years (**Fig. 2**).

- **Main fleets (mean annual catch 2019-2023)**: the majority of kawakawa catches are attributed to vessels flagged to Indonesia (30.6%) followed by India (23.4%) and I. R. Iran (22.2%). The 32 other fleets catching kawakawa contributed to 23.7% of the total catch in recent years (**Fig. 3**).

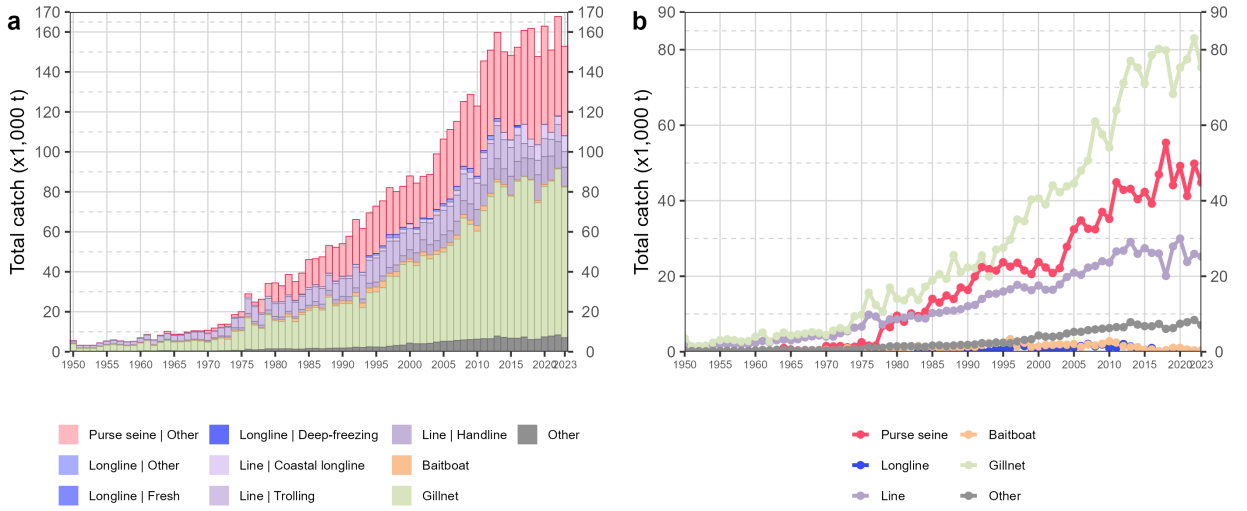

Fig. 2. Annual time series of (a) cumulative nominal catches (t) by fishery and (b) individual nominal catches (t) by fishery group for kawakawa during 1950-2023

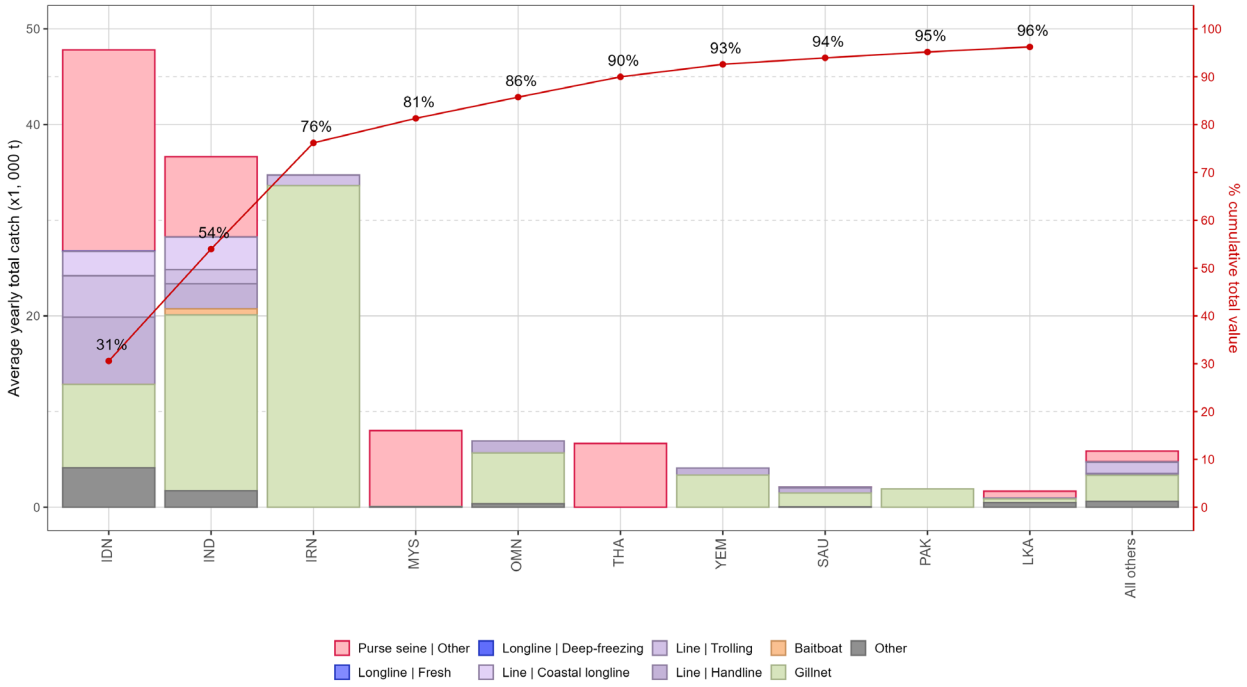

Fig 3. Mean annual catches (t) of kawakawa by fleet and fishery between 2019 and 2023, with indication of cumulative catches by fleet