APPENDIX 1
EXECUTIVE SUMMARY: ALBACORE (2025)

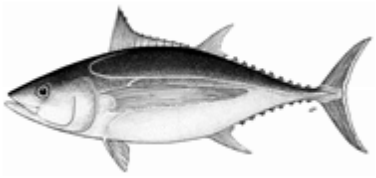

Table 1. Status of albacore (*Thunnus alalunga*) in the Indian Ocean

Area	Indicators – 2025 assessment		2025 stock status determination[3]
Indian Ocean[1]	Catch (2024) (t)	36,458[2]	54.1%
	Mean annual catch (2020-2024) (t)	40,715	
	MSY (x1,000 t) (95% CI)	44.31 (37.15-51.64)	
	F_{MSY} (95% CI)	0.16 (0.15-0.17)	
	SB_{MSY} (x1,000 t) (95% CI)	26.75 (22.34-31.29)	
	F_{2023} / F_{MSY} (95% CI)	0.97(0.52-1.42)	
	SB_{2023} / SB_{MSY} (95% CI)	1.33 (0.90-1.78)	
	SB_{2023} / SB_0 (95% CI)	0.285 (0.085-0.485)	

[1]Stock boundaries defined as the IOTC area of competence; [2]Proportion of catch fully or partially estimated for 2024: 0%
[3]2023 is the final year that data were available for this assessment

Table 2: Probability of stock status with respect to each of four quadrants of the Kobe plot. Percentages are calculated as the proportion of model terminal values that fall within each quadrant with model weights taken into account

	Stock overfished (SB_{2020} / SB_{MSY}<1)	Stock not overfished (SB_{2020} / SB_{MSY}≥ 1)
Stock subject to overfishing (F_{2020} / F_{MSY}≥ 1)	15.1 %	29.0 %
Stock not subject to overfishing (F_{2020} / F_{MSY}≤ 1)	1.76 %	54.1 %
Not assessed/Uncertain / Unknown		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

Stock status. The stock status for albacore tuna has been assessed for 2025. The stock assessment was carried out using Stock Synthesis III (SS3), a fully integrated model that is currently also used to provide scientific advice for the three tropical tunas stocks in the Indian Ocean. The models used in 2025 are based on the models developed in 2019 and 2022 with a series of revisions that were noted during the 9th WPTmT data preparatory and assessment meetings held in April and July 2025 respectively. There are some noticeable changes compared to the previous data sets used as inputs into the assessment models: the CPUE indices have been estimated using updated methods (described during the 9th WPTmT assessment meeting); the length-frequency data have been updated and include additional data not available for the 2022 assessment.

A series of new joint CPUE indices from JPN, TWN,China, and KOR were only made available at the start of the assessment meeting. These indices are used as the main abundance indices within the assessment models. The methodology for the standardisation of the CPUE is again different from that used in the 2019, and 2022 assessments. In this iteration of the CPUE standardisation, similar methods were followed (as in 2022), to identify suitable sets from which to standardise the CPUE indices. The main difference between the 2022 and 2025 CPUE indices is the omission of positive spatio-temporal interactions and use of operational data instead of aggregated data in the 2025 analyses. This was tested, but results suggested omitting this aspect was a better update for the indices.

The 2025 CPUE series follow similar trends to the indices in 2019 and 2022, noting that there is a significant increase in CPUE in the final years in all quarters in the southwest (R3), compared to the last iteration.

The two sets of indices from the northwest and southwest Indian Ocean monitor different components of the albacore stock. The CPUE in the western area (LL1+3) may best represent the abundance of albacore at this time. The western area also represents a significant proportion of the albacore biomass in the Indian Ocean. The eastern indices are affected by changes in targeting and are not used in the assessment of the stock.

Trends in the northwest CPUE (R1) series suggest that the biomass vulnerable to longline fishing has declined significantly compared to levels observed in 1980-82, whereas a much smaller decline was observed in the southwest CPUE series for the same period (R3). Prior to 1980 there were 20 years of moderate fishing, after which total catches of albacore tuna in the Indian Ocean have more than doubled (**Fig. 1**). Catches have also increased substantially since 2007 for some fleets (e.g., Taiwan,China longline fisheries), although there is substantial uncertainty regarding the reliability of the catch estimates.

The final set of assessment model options included alternative models using the northwest and southwest CPUE indices. Both northwestern (NW) and southwestern (SW) models show similar trends in biomass estimates as the 2022 assessment models, however there are some outstanding issues with the updated NW and SW models in 2025.

In particular, the SW model produced very high biomass estimates with large uncertainty when the selectivity for LL3 and LL4 was unconstrained (allowed to be domed-shaped), while the NW model showed bias in the predicted length composition for the LL1 fishery. Despite several investigative model runs during the meeting, the exact causes of these issues and potential solutions remains unclear.

Although there were changes to the input data and the CPUE indices were available later than expected, the updated assessment models in their current configuration are considered sufficient to estimate stock status. However, further scrutiny is needed to improve their reliability and ensure robust management advice into the future. As such, continued refinement of the assessment is required.

Based on outputs from the combined stock assessment models, catches in 2024 (36, 458 t) were marginally below the MSY level estimated by the SS3 model in 2025 (44,310 t). Fishing mortality represented as F_{2023}/F_{MSY} is 0.97 (0.52-1.42). Biomass is estimated to be above the SB_{MSY} level (1.33 (0.90-1.78), **Table 1**, **Fig. 3**). The stock status in relation to the Commission's interim B_{MSY} and F_{MSY} target reference points indicates that the stock is **not overfished** and is **not subject to overfishing** (**Table 1**).

Outlook. The impacts of piracy in the western Indian Ocean resulted in the displacement of a substantial portion of longline fishing effort into the traditional albacore fishing areas in the southern and eastern Indian Ocean. However, in recent years the effort distribution in the Indian Ocean has been dynamic. Based on the previous advice current catch appears to be sustainable in the short term although the advice is based on model assumptions that may be associated with high levels of uncertainty (see management advice below for more detail).

Management advice. Considerable uncertainty remains in the SS3 assessment conducted in 2025, however the trends in key model outputs align relatively well with the 2022 assessment. For this year, due to the uncertainty in the model outputs, the management advice from 2022 would be carried over for one year (1 year) to allow time to update the SS3 assessment to provide updated management advice in 2026. It is anticipated that, once the assessment is improved and accepted at the proposed WPTmT meeting next year, management advice can be updated using the new assessment.

Therefore, based on the 2022 management advice, the K2SM indicates that there is low risk of violating the target and limit reference points with current and moderate increases in catch in the short term. Current catches (36,458 t for the statistical year 2024; **Table 1**) are below the estimated level of MSY.

It should be noted that as in 2022, neither CPUE series or other model assumptions account for any change in catchability/effort creep over the time series.

The following should be noted:

- The primary sources of data that drive the assessment, total catches, CPUE and length data, are uncertain and should be developed further as a priority;
- The catch estimates for 2024 (36,458 t) are below the current estimated MSY levels (**Table 1**);

- Provisional reference points: noting that the Commission in 2015 adopted Resolution 15/10 *On interim target and limit reference points and a decision framework*, the following should be noted:
  - **Fishing mortality**: the fishing mortality at the time of the assessment was considered to be below the interim target reference point of F_{MSY}, and therefore below the interim limit reference point of $1.4*F_{MSY}$ (**Fig. 3**)
  - **Biomass**: the spawning biomass at the time of the assessment was considered to be above the target reference point of SB_{MSY}, and therefore above the limit reference point of $0.4*SB_{MSY}$ (**Fig. 3**)
- **Main fisheries (mean annual retained catch 2020-2024)**: albacore are caught using longline (82.3%), followed by line (15%) and gillnet (1.1%). The remaining catches taken with other gears contributed to 1.6% of the total catches in recent years (**Fig. 1**).
- **Main fleets (mean annual retained catch 2020-2024)**: the majority of albacore catches are attributed to vessels flagged to Taiwan,China (50.9%) followed by Indonesia (24.1%) and China (11%). The 24 other fleets catching albacore contributed to 13.8% of the total catch in recent years (**Fig. 2**).
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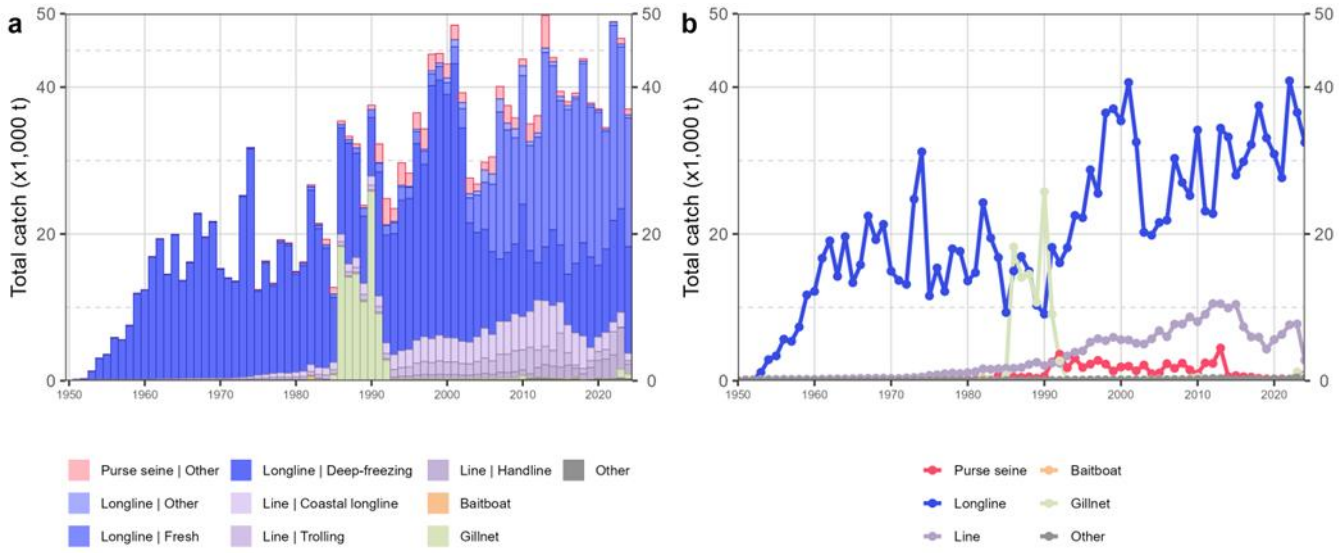

Fig. 1. Annual time series of (a) cumulative retained catches (metric tonnes; t) by fishery and (b) individual retained catches (metric tonnes; t) by fishery group for albacore during 1950-2024. Purse seine | Other: coastal purse seine, purse seine of unknown association type, ring net; Longline | Other: swordfish and sharks-targeted longlines; Other: all remaining fishing gears

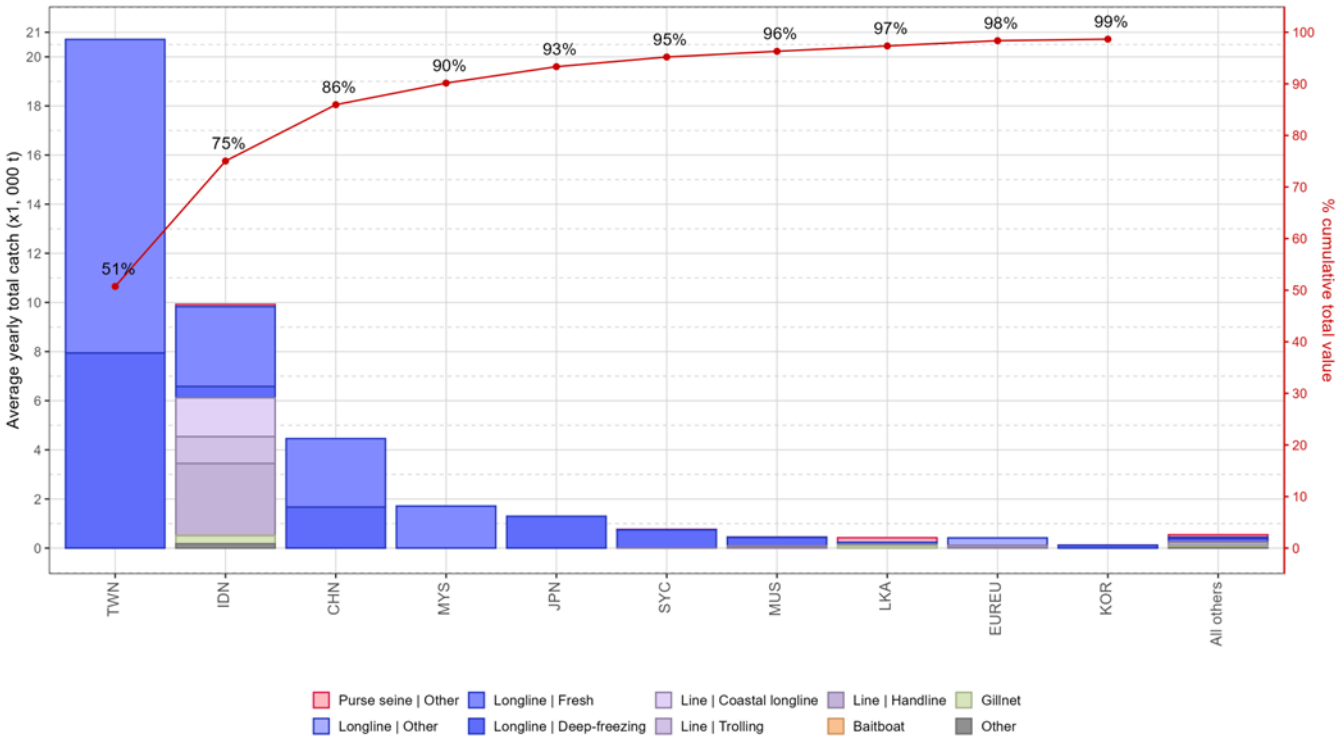

Fig. 2. Mean annual catches (metric tonnes; t) of albacore by fleet and fishery between 2020 and 2024, with indication of cumulative catches by fleet. Purse seine | Other: coastal purse seine, purse seine of unknown association type, ring net; Longline | Other: swordfish and sharks-targeted longlines; Other: all remaining fishing gears

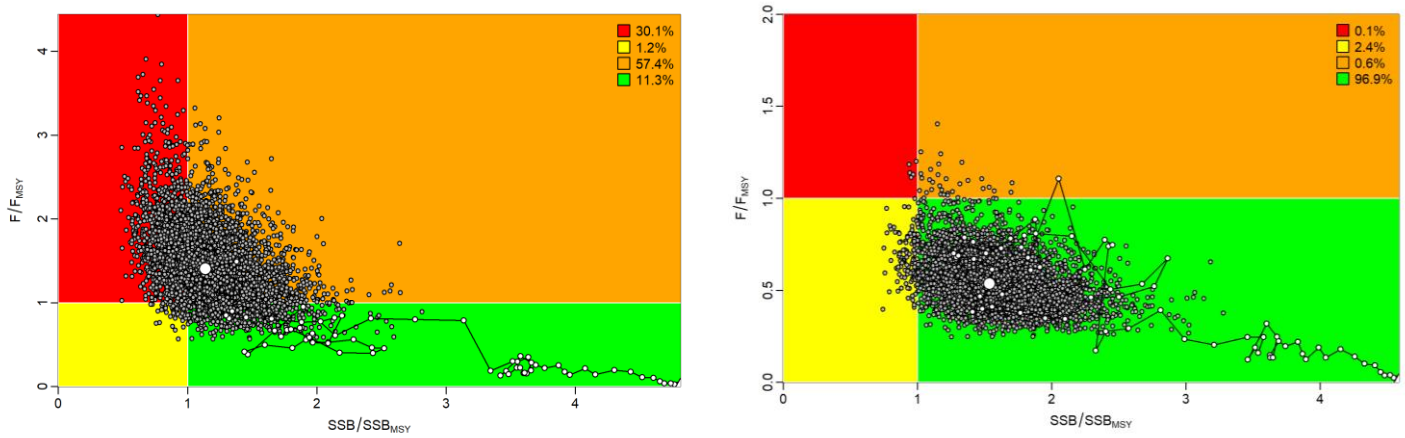

Fig. 3. Albacore: SS3 Indian Ocean assessment Kobe plot for the two model options considered: (i) Model fitted to the North-western CPUE; (ii) Model fitted to the South-western CPUE. White circles indicate the trajectory of the point estimates for the spawning biomass (SB) ratio and fishing mortality (F) ratio for each year 1950–2023 (the grey lines represent the 95 percentiles of the 2023 estimate). Target (F_{target} and SB_{target}) and limit (F_{lim} and SB_{lim}) reference points are shown

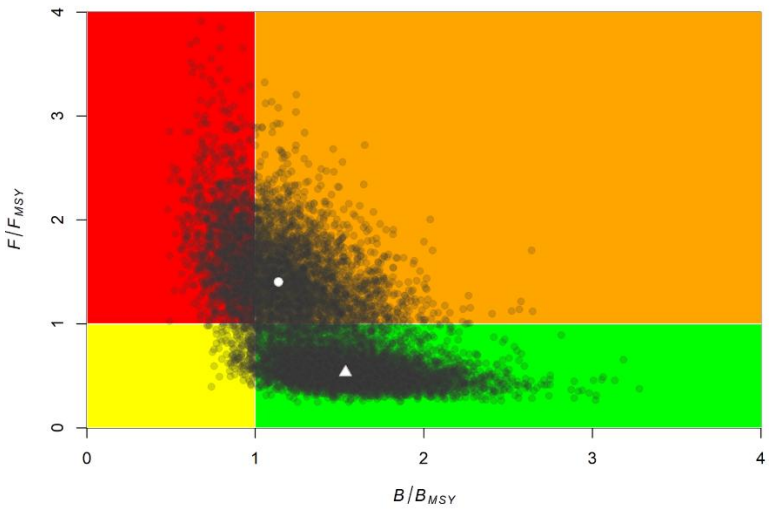

Fig. 4. Albacore: SS3 Indian Ocean assessment Kobe plot for the two model options considered plotted on the same figure. Black circles indicate the trajectory of the point estimates for the spawning biomass (SB) ratio and fishing mortality (F) ratio for each year 1950–2023. Target (F_{target} and SB_{target}) and limit (F_{lim} and SB_{lim}) reference points are shown (white triangle is southwest; white circle is northwest).

Table A2. Albacore: SS3 aggregated Indian Ocean assessment Kobe II Strategy Matrix based on the 2022 Assessment model options (i) Model 1 and (ii) Model 2. Probability (percentage) of violating the MSY-based target (top) and limit (bottom) reference points for constant catch projections (2020 catch level, ± 10%, ± 20%, ± 30% ± 40%) projected for 3 and 10 years

Reference point and projection timeframe	**Alternative catch projections (relative to the catch level for 2020) and probability (%) of violating MSY-based target reference points (SB_{targ} = SB_{MSY}; F_{targ} = F_{MSY})**								
	60% (24,644)	70% (28,751)	80% (32,858)	90% (36,966)	100% (41,073)	110% (45,180)	120% (49,288)	130% (53,395)	140% (57,502)
$SB_{2023} < SB_{MSY}$	0.006	0.016	0.022	0.036	0.045	0.069	0.097	0.123	0.154
$F_{2023} > F_{MSY}$	0	0	0.003	0.029	0.1	0.204	0.326	0.434	0.529
$SB_{2030} < SB_{MSY}$	0.03	0.047	0.087	0.135	0.19	0.28	0.395	0.505	0.603
$F_{2030} > F_{MSY}$	0	0	0.001	0.037	0.141	0.3	0.453	0.565	0.618
Reference point and projection timeframe	**Alternative catch projections (relative to the catch level for 2020) and probability (%) of violating MSY-based target reference points (SB_{Lim} = 0.4*SB_{MSY}; F_{Lim} = 1.4*F_{MSY})**								
	60% (24,644)	70% (28,751)	80% (32,858)	90% (36,966)	100% (41,073)	110% (45,180)	120% (49,288)	130% (53,395)	140% (57,502)
$SB_{2023} < SB_{Lim}$	0	0	0	0	0.001	0.002	0.005	0.006	0.012
$F_{2023} > F_{Lim}$	0	0	0	0	0.001	0.011	0.056	0.117	0.213
$SB_{2030} < SB_{Lim}$	0.004	0.009	0.022	0.042	0.074	0.118	0.169	0.243	0.344
$F_{2030} > F_{Lim}$	0	0	0	0	0.008	0.073	0.21	0.374	0.496