Food and Agriculture Organization of the United Nations

Indian Ocean Tuna Commission
Commission des Thons de l'Ocean Indien
iotc ctoi

APPENDIX 13
EXECUTIVE SUMMARY: BLUE MARLIN (2025)

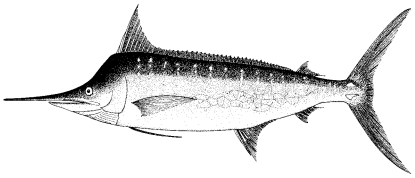

Table 1. Status of blue marlin (*Makaira nigricans*) in the Indian Ocean

Area[1]	Indicators		2025 stock status determination[3]
Indian Ocean	Catch 2024 (t)	10,420[2]	97.4%
	Average catch 2020-2024 (t)	8,673	
	Average catch 2021-2023 (t)	8,134	
	MSY (1,000 t) (80% CI)	8.35 (7.52 –9.23)	
	F_{MSY} (80% CI)	0.30 (0.21 – 0.38)	
	B_{MSY} (1,000 t) (80% CI)	27.92 (22.3 – 39.9)	
	F_{2023}/F_{MSY} (80% CI)	1.54 (1.16 – 2.06)	
	B_{2023}/B_{MSY} (80% CI)	0.62 (0.48 – 0.78)	
	B_{2023}/B_0 (80% CI)	0.23 (0.18 – 0.29)	

[1] Boundaries for the Indian Ocean are defined as the IOTC area of competence
[2] Proportion of 2024 catch estimated or partially estimated by IOTC Secretariat: 36.5 %
[3] 2023 is the final year that data were available for this assessment
* Estimated probability that the stock is in the respective quadrant of the Kobe plot (shown below), derived from the confidence intervals associated with the current stock status

Colour key	Stock overfished (B_{2023}/B_{MSY}< 1)	Stock not overfished (B_{2023}/B_{MSY}≥ 1)
Stock subject to overfishing (F_{2023}/F_{MSY}> 1)	**97.4%**	**0.2%**
Stock not subject to overfishing (F_{2023}/F_{MSY}≤ 1)	**2.1%**	**0.3%**
Not assessed/Uncertain/Unknown		

The percentages are calculated as the proportion of model terminal values that fall within each quadrant with model weights accounted for

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Stock status. A new stock assessment was carried out for blue marlin in 2025 using two different models: JABBA, a Bayesian state-space production model (age-aggregated); and SS3, an integrated model (age-structured) (using data up to 2023). Uncertainty in the biological parameters and the parameterisation of the SS3 model is still evident and as such the JABBA model (B_{2023}/B_{MSY} = 0.62, F_{2023}/F_{MSY} = 1.54) was selected as the base case. Both models were consistent with regards to stock status, although the SS3 model was less pessimistic. On the weight-of-evidence available in 2025, the stock is determined to be ***overfished*** and ***subject to overfishing*** (**Table 1** and **Fig. 3**).

Outlook. The B/B_{MSY} trajectory declined from the mid-1980s to 2007. A short-term increase in B/B_{MSY} occurred from 2007 to 2012, which is thought to be linked to the Northwestern Indian Ocean piracy period. Thereafter, the B/B_{MSY} trajectory again declines to the current estimate **of 0.62**. F/F_{MSY} increased

since the mid-1980s and despite a recent decline, F/F_{MSY} remains above 1. The majority of CPUE indices have shown a declining trend since 2015, noting a recent increasing trend in CPUE indices in 2023.

Management advice. The catches of blue marlin (average of 7,262 t in the final 3 years examined in the assessment, 2021-2023) were lower than MSY (8,351 t), however the catch in 2024 was higher than MSY. The stock is currently **overfished** and **subject to overfishing**, and according to the KOBE plot (**Fig. 3**), has been in this state since 2001 (with ~ 80 % CI). According to K2SM calculated at the time of the assessment (**Table 2**), a reduction of 20% of catches (5,809 t) compared to the mean of catches from 2021-2023 (7,262 t) would recover the stock to the green quadrant by 2035 with a probability of 64 % and if the catches are reduced by 40 % (4,357 t) the probability would be 86 %. The Commission should note that the current catch limit for blue marlin in Resolution 18/05 (11,930 t, which was established as the MSY value estimated in 2016 stock assessment) is 30 % more (3,579 t) than the new MSY estimated by the latest stock assessment in 2025 (8,351 t). Thus, it is recommended that the Commission urgently revise Resolution 18/05 to incorporate limits that reflect the most recent stock assessment and projections and review and strengthen the implementation and effectiveness of the measures contained in this Resolution.

The following key points should also be noted:

- **Maximum Sustainable Yield (MSY)**: estimate for the Indian Ocean blue marlin stock in 2025 is 8,351 t (estimated range (80% C.I.) 7,516–9,232 t).
- **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 blue marlin.
- **Main fisheries (mean annual catch 2020-2024)**: blue marlin are caught using line (46%), followed by longline (30.6%) and gillnet (18.2%). The remaining catches taken with other gears contributed to 5.3% of the total catches in recent years (**Fig. 1**). The last 2 years in the data series are significantly higher than previous years which could be due to the revision of catches from Indonesia and increased catches from India, and these may be subject to examination. The recent increase in catch by lines also requires further examination.
- **Main fleets (mean annual catch 2020-2024)**: the majority of blue marlin catches are attributed to vessels flagged to Indonesia (25%) followed by India (23.5%) and Sri Lanka (15.5%). The 29 other fleets catching blue marlin contributed to 35.9% of the total catch in recent years (Fig. 2).

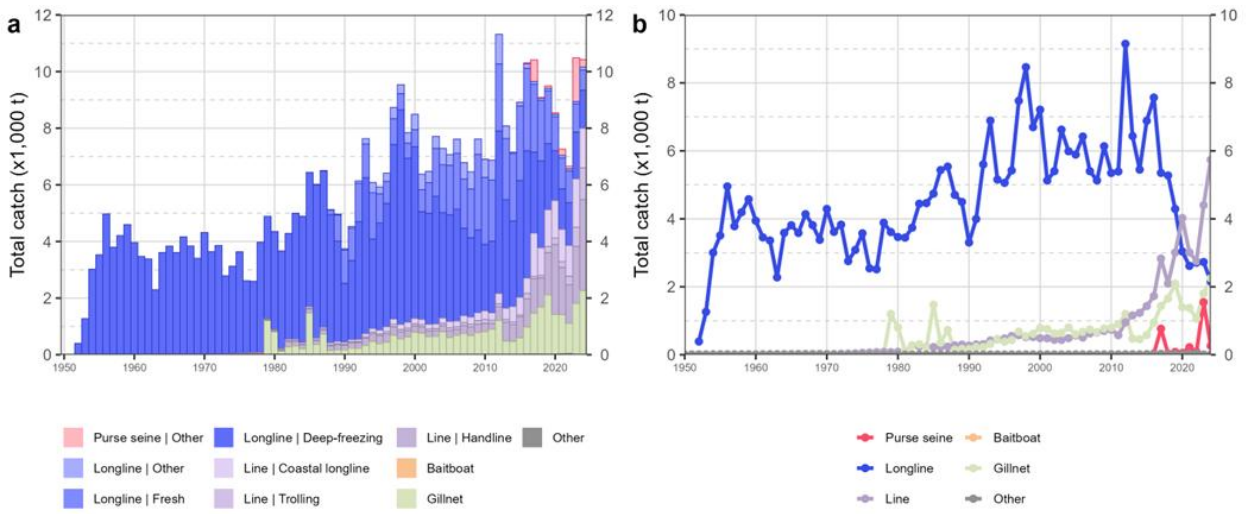

Fig. 1. Annual time series of (a) cumulative retained catches (metric tonnes; t) by fishery and (b) individual retained catches (metric tonnes; t) by fishery group for blue marlin during 1950-2024. Purse seine | Other: coastal purse seine, large-scale purse seine, and ring net; Longline | Other: swordfish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

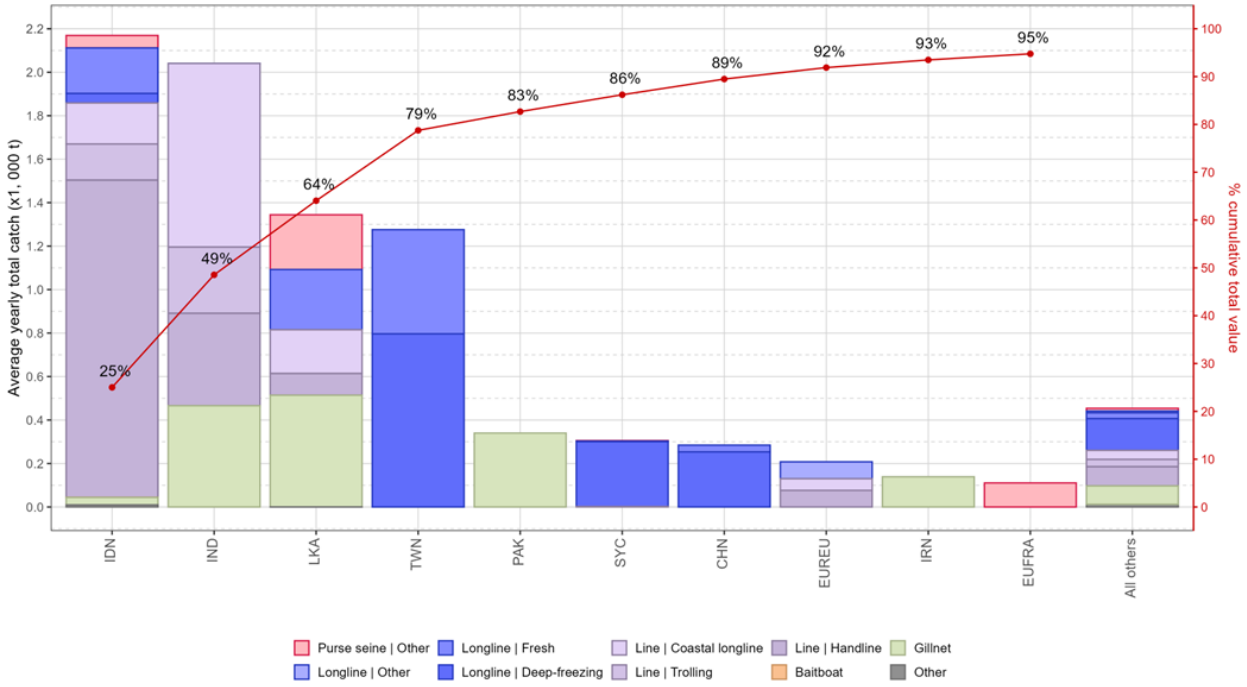

Fig. 2. Mean annual retained catches (metric tonnes; t) of blue marlin by fleet and fishery between 2020 and 2024, with indication of cumulative catches by fleet. Purse seine | Other: coastal purse seine, large-scale purse seine, and ring net; Longline | Other: swordfish and sharks-targeted longlines;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

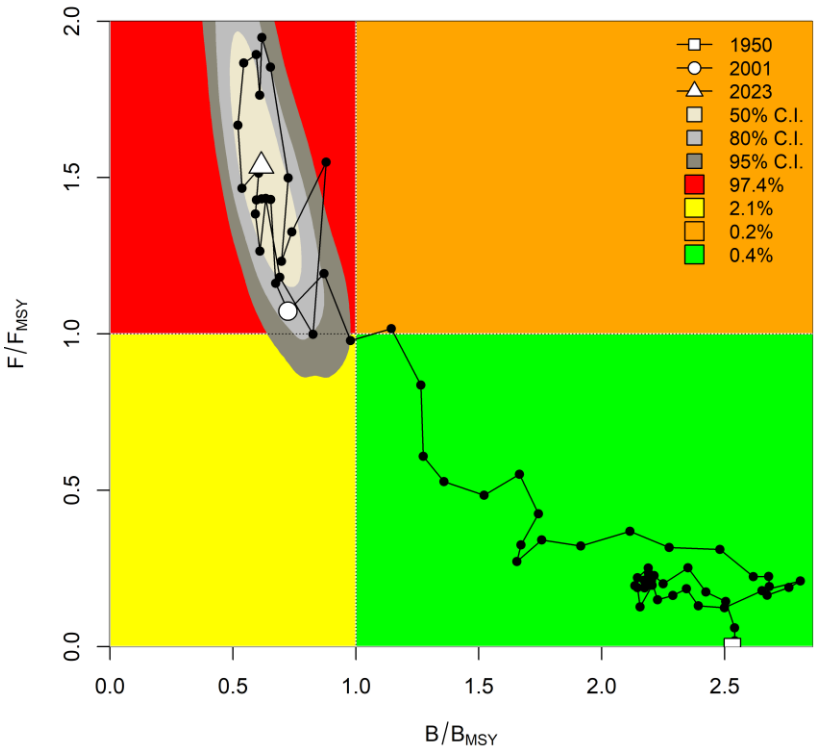

Fig. 3. JABBA Indian Ocean assessment Kobe plots for blue marlin (contours are the 50, 80 and 95 percentiles of the 2023 estimate). Black line indicates the trajectory of the point estimates for the total biomass ratio (B/B_{MSY}) and fishing mortality ratio (F/FMSY) for each year 1950–2023

Table 2. Blue Marlin: Indian Ocean JABBA Kobe II Strategy Matrix. Probability (percentage) of achieving the green quadrant of the KOBE plot, for a range of constant catch projections (JABBA). Catch in 2024 and 2025 are fixed at 7,262 t

Catch (t)\Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
4,357 (60%)	10	22	35	48	59	67	74	80	83	86
5,083 (70%)	10	20	31	41	50	58	64	69	73	77
5,809 (80%)	10	18	26	34	41	47	53	57	61	64
6,536 (90%)	10	16	22	27	33	37	41	44	47	50
7,262 (100%)	10	14	18	22	25	27	30	32	34	35
7,988 (110%)	10	12	15	16	18	19	20	21	22	22
8,714 (120%)	8	9	11	11	12	12	12	13	12	12
9,440 (130%)	6	6	6	7	6	6	6	6	6	6
10,167 (140%)	4	4	4	4	3	3	3	3	3	2

Table 3. Blue marlin: JABBA Indian Ocean assessment Kobe II Strategy Matrix. Probability (percentage) of violating the MSY-based target reference points for nine constant catch projections relative to the average catch level from 2021 to 2023 (7,262 t)*, ± 10%, ± 20%, ± 30% ± 40%) projected for 3 and 10 years

Reference point and projection timeframe	**Alternative catch projections (relative to the average catch level from 2021 to 2023 of 7,262 t) and probability (%) of violating MSY-based target reference points (Btarg = B_{MSY}; Ftarg = F_{MSY})**								
	60% (4,357)	70% (5,083)	80% (5,809)	90% (6,536)	100% (7,262)	110% (7,988)	120% (8,714)	130% (9,440)	140% (10,167)
$B_{2028} < B_{MSY}$	65	69	74	78	82	85	88	90	92
$F_{2028} > F_{MSY}$	19	31	45	60	72	81	88	93	96
$B_{2035} < B_{MSY}$	14	23	36	50	64	77	87	93	97
$F_{2035} > F_{MSY}$	5	12	23	40	58	75	87	94	98