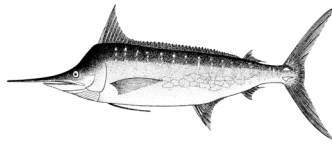# APPENDIX 13
## EXECUTIVE SUMMARY: BLUE MARLIN (2024)



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

| Area[1] | Indicators | | 2022 stock status determination[3] |
|---|---|---|---|
| Indian Ocean | Catch 2023[2] (t) | 7,888 | **72%\*** |
| | Average catch 2019-2023 (t) | 7,049 | |
| | MSY (1,000 t) (80% CI) | 8.74 (7.14 –10.72) | |
| | $F_{MSY}$ (80% CI) | 0.24 (0.14 – 0.39) | |
| | $B_{MSY}$ (1,000 t) (80% CI) | 35.8 (22.9 – 60.3) | |
| | $F_{2020}/F_{MSY}$ (80% CI) | 1.13 (0.75 – 1.69) | |
| | $B_{2020}/B_{MSY}$ (80% CI) | 0.73 (0.51 – 0.99) | |
| | $B_{2020}/B_0$ (80% CI) | 0.36 (0.26 – 0.50) | |

[1] Boundaries for the Indian Ocean are defined as the IOTC area of competence
[2] Proportion of 2023 catch estimated or partially estimated by IOTC Secretariat: 45.7%
[3] 2020 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 ($B_{year}/B_{MSY}< 1$) | Stock not overfished ($B_{year}/B_{MSY}\geq 1$) |
|---|---|---|
| Stock subject to overfishing ($F_{year}/F_{MSY}> 1$) | **72%** | **0%** |
| Stock not subject to overfishing ($F_{year}/F_{MSY}\leq 1$) | **26%** | **2%** |
| Not assessed/Uncertain/Unknown | | |

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

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*Stock status.* No new stock assessment was carried out for blue marlin in 2024, thus the stock status is determined on basis of the 2022 assessment which was based on two different models: JABBA, a Bayesian state-space production model (age-aggregated); and SS3, an integrated model (age-structured) (using data up to 2020). Uncertainty in the biological parameters is still evident and as such the JABBA model (B2020/BMSY = 0.73, F2020/FMSY =1.13) was selected as the base case. Both models were consistent with regards to stock status. On the weight-of-evidence available in 2022, 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 NW Indian Ocean Piracy period. Thereafter, the $B/B_{MSY}$ trajectory again declines to the current estimate **of 0.73**. $F/F_{MSY}$ 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.

***Management advice.*** The current catches of blue marlin (average of 7,045 t in the last 5 years, 2018-2022) are lower than MSY (8,740 t). The stock is currently overfished and subject to overfishing. According to K2SM calculated (Table 2), a reduction of 20% of catches (5,700 t.) compared to 2020 catches (7,126t.) would recover the stock to the green quadrant by 2030 with a probability of 79% and if the catches are reduced by 10% (6,413 t.) the probability would be 67%. 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 36% higher than the new MSY estimated by the latest stock assessment in 2022 (8,740 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 where necessary revise 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 is 8,740 t (estimated range 7,140–10,720 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 2019-2023)**: blue marlin are caught using longline (43.8%), followed by line (27.4%) and gillnet (23%). The remaining catches taken with other gears contributed to 5.8% of the total catches in recent years (**Fig. 1**).
- **Main fleets (mean annual catch 2019-2023)**: the majority of blue marlin catches are attributed to vessels flagged to Sri Lanka (22.3) followed by Taiwan,China (22%) and India (21%). The 26 other fleets catching blue marlin contributed to 34.8% of the total catch in recent years (Fig. 2).
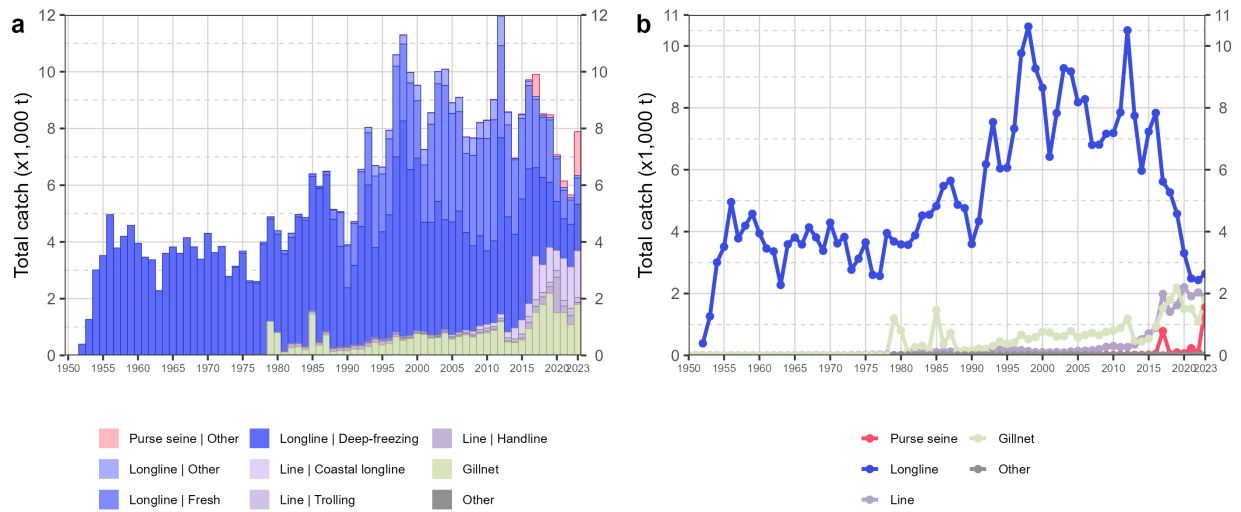
**Fig. 1**. Annual time series of (a) cumulative nominal catches (metric tons; t) by fishery and (b) individual nominal catches (metric tons; t) by fishery group for blue marlin during 1950-2023. Longline | Other: swordfish and sharks-targeted longlines; Other: all remaining fishing gears
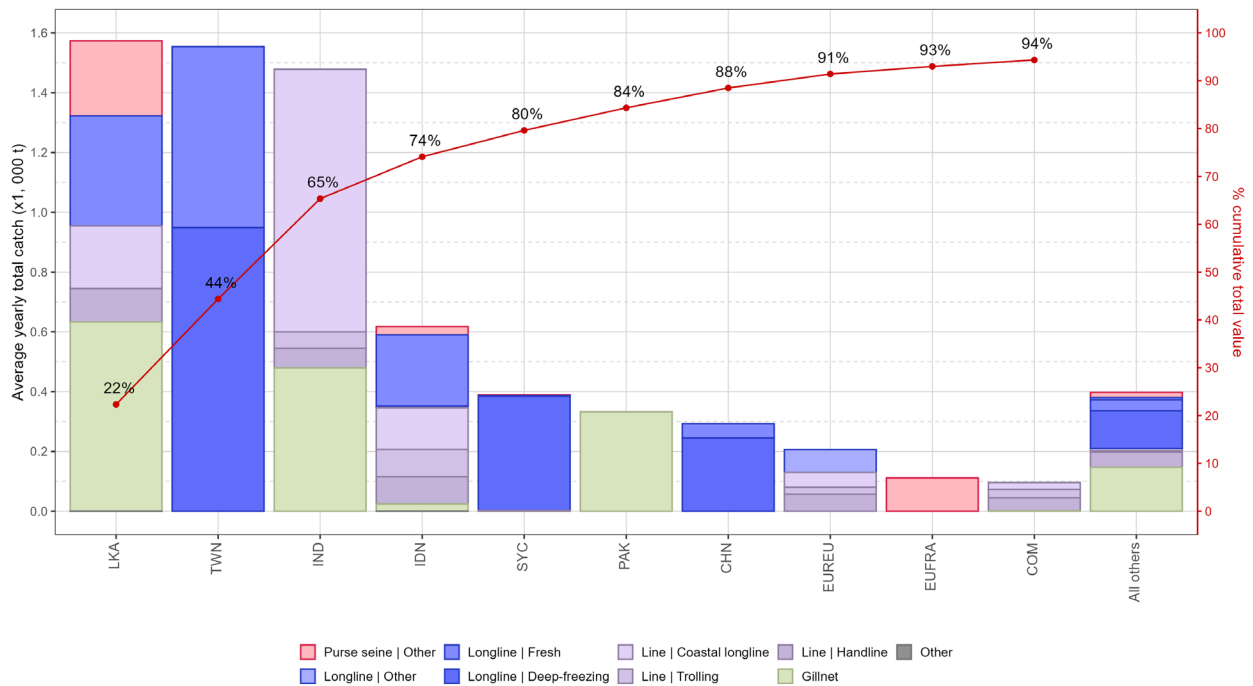


**Fig. 2**. Mean annual catches (metric tons; t) of blue marlin by fleet and fishery between 2019 and 2023, with indication of cumulative catches by fleet. Longline | Other: swordfish and sharks-targeted longlines; Other: all remaining fishing gears
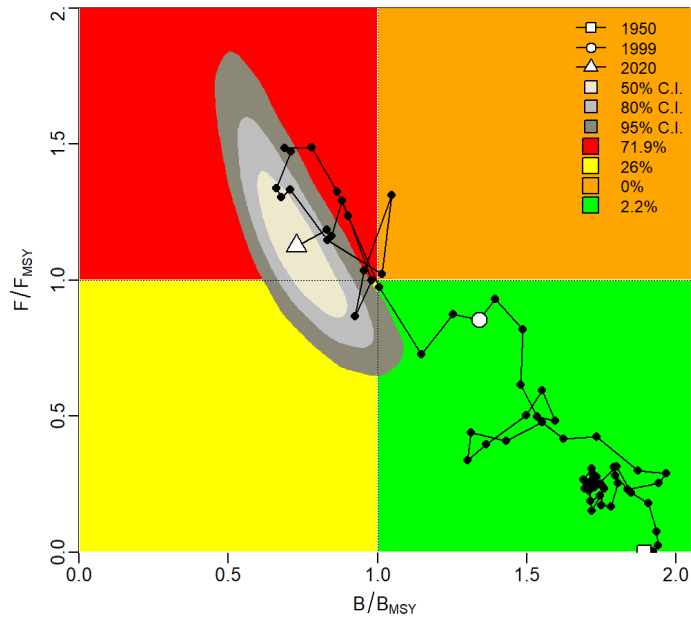
**Fig. 3.** Kobe stock status plot for the Indian Ocean stock of blue marlin, from the final JABBA base case (the black line traces the trajectory of the stock over time). Contours represent the smoothed probability distribution for 2020 (isopleths are probability relative to the maximum).

**Table 2.** Blue Marlin: Indian Ocean JABBA Kobe II Strategy Matrix. Probability (percentage) of achieving the green quadrant of the KOBE plot nine constant catch projections, with future catch assuming to be 30–110% (in increments of 10%) of the 2020 catch level (7,126 t)

| TAC (t) | Year | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|
| 2137 | 65 | 81 | 90 | 94 | 96 | 98 | 99 | 99 |
| 2850 | 59 | 76 | 85 | 91 | 94 | 96 | 97 | 98 |
| 3563 | 54 | 70 | 80 | 87 | 90 | 93 | 95 | 96 |
| 4275 | 48 | 63 | 73 | 80 | 86 | 89 | 91 | 93 |
| 4998 | 42 | 55 | 65 | 72 | 78 | 82 | 85 | 88 |
| 5700 | 36 | 47 | 56 | 63 | 69 | 73 | 77 | 79 |
| 6413 | 30 | 40 | 46 | 53 | 57 | 61 | 65 | 67 |
| 7126 | 25 | 32 | 37 | 41 | 45 | 48 | 51 | 53 |
| 7838 | 21 | 24 | 28 | 31 | 33 | 35 | 37 | 38 |