



## Status of the Indian Ocean black marlin (BLM: *Makaira indica*) resource

TABLE 1. Black marlin: Status of black marlin (*Makaira indica*) in the Indian Ocean.

| Area <sup>1</sup> | Indicators                                    |                      | 2018 stock status determination |
|-------------------|---|----------------------|---------------------------------|
| Indian Ocean      | Catch 2017 <sup>2</sup> :                     | 21,250 t             |                                 |
|                   | Average catch 2013–2017:                      | 18,673 t             |                                 |
|                   | MSY (1,000 t) (80% CI):                       | 12.93 (9.44-18.20)   |                                 |
|                   | F <sub>MSY</sub> (80% CI):                    | 0.18 (0.11-0.30)     |                                 |
|                   | B <sub>MSY</sub> (1,000 t) (80% CI):          | 72.66 (45.52-119.47) |                                 |
|                   | F <sub>2017</sub> /F <sub>MSY</sub> (80% CI): | 0.96 (0.77-1.12)     |                                 |
|                   | B <sub>2017</sub> /B <sub>MSY</sub> (80% CI): | 1.68 (1.32-2.10)     |                                 |
|                   | B <sub>2017</sub> /B <sub>0</sub> (80% CI):   | 0.62 (0.49-0.78)     |                                 |

<sup>1</sup> Boundaries for the Indian Ocean = IOTC area of competence;

<sup>2</sup> Proportion of catch fully or partially estimated by IOTC Secretariat in 2018: 54%

| Colour key   | Stock overfished ( $B_{\text{year}}/B_{\text{MSY}} < 1$ ) | Stock not overfished ( $B_{\text{year}}/B_{\text{MSY}} \geq 1$ ) |
|--|---|--|
| Stock subject to overfishing ( $F_{\text{year}}/F_{\text{MSY}} > 1$ )        |   |  |
| Stock not subject to overfishing ( $F_{\text{year}}/F_{\text{MSY}} \leq 1$ ) |   |  |
| Not assessed/Uncertain   |   |  |

### INDIAN OCEAN STOCK – MANAGEMENT ADVICE

**Stock status.** A stock assessment based on JABBA was conducted in 2018 for black marlin. This assessment suggests that the point estimate for the stock in 2017 is in the green zone in the Kobe plot with  $F/F_{\text{MSY}}=0.96$  (0.77-1.12) and  $B/B_{\text{MSY}}=1.68$  (1.32-2.10). The Kobe plot (Fig. 2) from the JABBA model indicated that the stock is not **subject to overfishing** and is currently not **overfished** (Table 1; Fig. 2), however these status estimates are subject to a high degree of uncertainty. The recent sharp increases in total catches (e.g., from 15,000 t in 2014 to over 20,000 t since 2016, mostly due to increases by I.R. Iran and India), and conflicts in information in CPUE and catch data lead to large uncertainties in the assessment outputs. This caused the point estimate of the stock status to change from the red to the green zones of the Kobe plot without any evidence of a rebuilding trend. **As such, the results of the assessment are uncertain and should be interpreted with caution.**

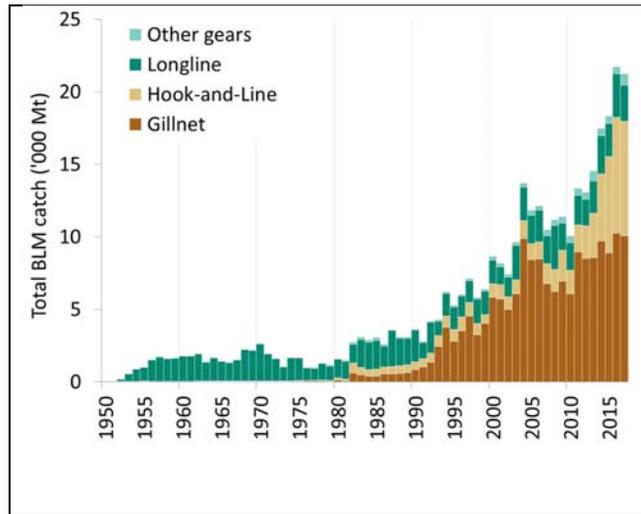
**Outlook.** While the recent high catches seem to be mainly due to developing coastal fisheries operating in the core habitat of the species, the CPUE indicators are from industrial fleets operating mostly offshore on the edges of the species distribution. However, the recent increases in catches are much higher than MSY and are a cause for concern and will likely continue to drive the population towards overfished status.

**Management advice.** Current catches (>20,000 t in 2017) (Fig. 1) are considerably higher than MSY (12,930 t) estimate, which is likely to associate with high uncertainty. The catch limits as stipulated in Resolution 18/05 have been exceeded. The Commission should provide mechanisms to ensure that catch limits are not exceeded by all concerned fisheries. Projections were not carried out due to the poor predictive capabilities identified in the assessment diagnostics.

The following key points should be noted:

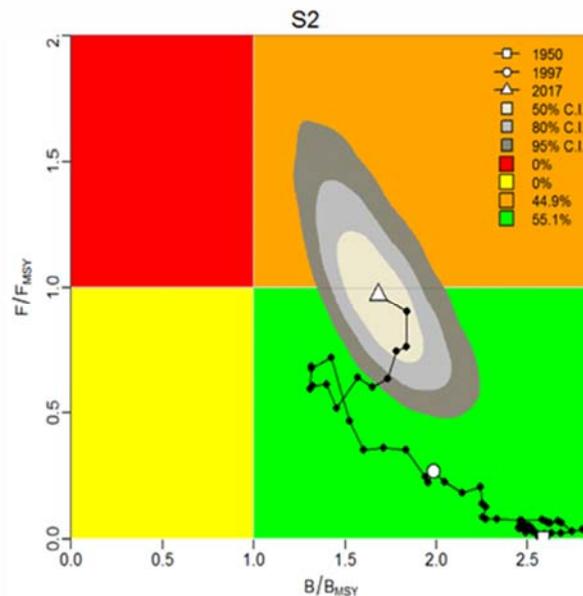
- **Maximum Sustainable Yield (MSY):** estimate for the whole Indian Ocean is 12,930 t.

- **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 black marlin.
- **Main fishing gear (average catches 2013-17):** Black marlin are largely considered to be a non-target species of industrial and artisanal fisheries. Gillnets account for around 49% of total catches in the Indian Ocean, followed by longlines (19%), with remaining catches recorded under troll and handlines (Fig. 1).
- **Main fleets (average catches 2013-17):** India (gillnet and trolling): 28%; I.R. Iran (gillnet): 27%; Sri Lanka (gillnet and fresh longline): 19%; Indonesia (fresh longline and hand lines): 10%.



**Fig. 1a-b.** Black marlin catches by gear and year recorded in the IOTC database (1950–2017):

*Notes: Other gears (OT) includes: longline-gillnet, handline, gillnet, coastal longline, troll line, sport fishing, and all other gears.*



**Fig. 2.** Black marlin: JABBA Indian Ocean assessment Kobe plots for black marlin (contours are the 50, 80 and 95 percentiles of the 2017 estimate). Black line indicates the trajectory of the point estimates for the total biomass (B) ratio and F ratio for each year 1950–2017.