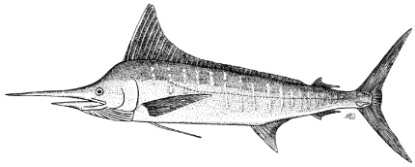
DRAFT EXECUTIVE SUMMARY: STRIPED MARLIN

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



Status of the Indian Ocean striped marlin (MLS: *Tetrapturus audax*) resource

TABLE 1. Striped marlin: Status of striped marlin (*Tetrapturus audax*) in the Indian Ocean.

Area[1]	Indicators		2015 stock status determination
Indian Ocean	Catch 2015: Average catch 2011–2015:	4,410 t 4,481 t	60%
	MSY (1,000 t) (80% CI): F_{MSY} (80% CI): B_{MSY} (1,000 t) (80% CI): F_{2014}/F_{MSY} (80% CI): B_{2014}/B_{MSY} (80% CI): B_{2014}/B_{1950} (80% CI):	5.22 t (5.18–5.59) 0.62 (0.59–1.04) 8.4 t (5.40–8.90) 1.09 (0.62–1.66) 0.65 (0.45–1.17) 0.24 (n.a.–n.a.)	

[1]Boundaries for the Indian Ocean = IOTC area of competence; n.a. = not available. Percentage of times the stock status from plausible model runs is in each respective quadrant of the Kobe plot shown below.

Colour key	Stock overfished($B_{year}/B_{MSY}< 1$)	Stock not overfished ($B_{year}/B_{MSY}\geq 1$)
Stock subject to overfishing($F_{year}/F_{MSY}> 1$)	60%	0%
Stock not subject to overfishing ($F_{year}/F_{MSY}\leq 1$)	36%	4%
Not assessed/Uncertain		

INDIAN OCEAN STOCK – MANAGEMENT ADVICE

Stock status. In 2015 an ASPIC stock assessment confirmed the assessment results from 2012 and 2013 that indicated the stock is currently subject to overfishing and that biomass is below the level which would produce MSY. Two approaches examined in 2015 came to similar conclusions, namely a Bayesian Surplus Production Model, and a Stock Reduction Analysis using only catch data. The ASPIC model indicated that the stock has been subject to overfishing for some years, and that as a result, the stock biomass is well below the B_{MSY} level and shows little signs of rebuilding despite the declining effort trend. In 2016 reported catches increased to 4,410 t. On the weight-of-evidence available in 2016, the stock is determined to be ***overfished*** and ***subject to overfishing*** (Table 1; Fig. 1).

Outlook. The decrease in longline catch and effort in the years 2009–11 lowered the pressure on the Indian Ocean stock as a whole, however, given the increased catches reported in 2012, 2013 and 2014, combined with the concerning results obtained from the stock assessments carried out in 2012, 2013 and 2015, the outlook is pessimistic for the stock as a whole and a precautionary approach to the management of striped marlin should be considered by the Commission in order to reduce catches well below MSY estimates to enable the stock to rebuild. There is a very high risk of exceeding the biomass MSY-based reference points by 2017 if catches increase further or are maintained at current levels (2014) until 2017 (>75% risk that $B_{2017}< B_{MSY}$, and $F_{2017}> F_{MSY} \approx 68\%$) (Table 2).

Management advice. A precautionary approach to the management of striped marlin should be considered by the Commission to reduce catches below 4,000 t thereby ensuring the stock may rebuild to sustainable levels.

The following key points should be noted:

- **Maximum Sustainable Yield (MSY)**: estimate for the whole Indian Ocean is 5,220 t (5,180–5,590). However, the biomass is well below the B_{MSY} reference point and fishing mortality is in excess of F_{MSY} at recent catch levels of around 4,410 t. Catches should be reduced to below 4,000 t following advice from the 18th Session of the Scientific Committee.
- **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 striped marlin.
- **Main fishing gear** (2012–15): Longline: 69%; Gillnet: 24% (of the total estimated striped marlin catch).

- **Main fleets** (2012–15): Indonesia (drifting longline and coastal longline): 36%; Taiwan,China (drifting longline): 23%; I.R. Iran (gillnet): 14%; Pakistan (gillnet): 8% (of the total estimated striped marlin catch).

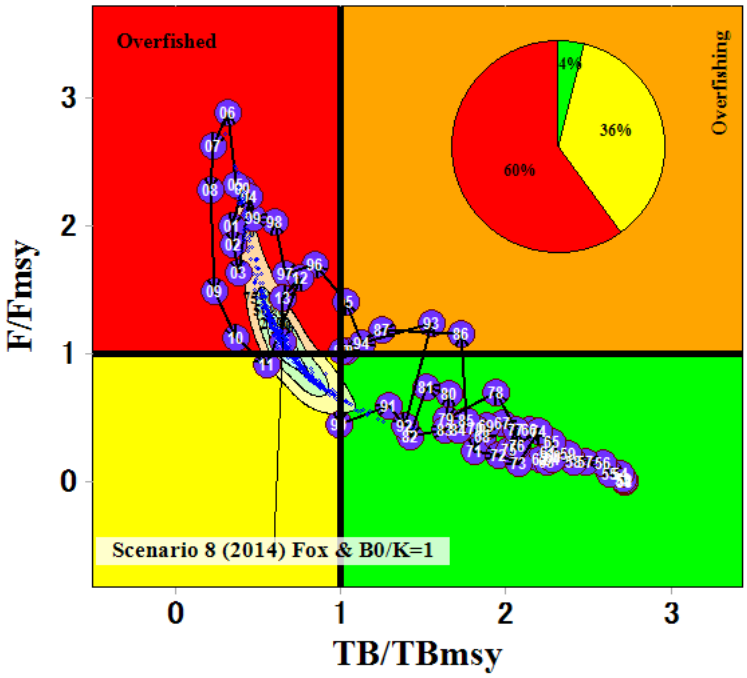


Fig. 1. Striped marlin: ASPIC aggregated Indian Ocean assessment Kobe plot with the confidence surface and compositions of its uncertainties in terms of 4 phases (pie chart).

Table 2. Striped marlin: ASPIC aggregated Indian Ocean assessment Kobe II Strategy Matrix. Probability (percentage) of violating the MSY-based reference points for nine constant catch projections (average catch level from 2012–14 (4,915 t), ± 10%, ± 20%, ± 30% and ± 40%) projected for 3 and 10 years.

Reference point and projection timeframe	**Alternative catch projections (relative to the average catch level from 2012–2014, 4,915 t) and probability (%) of violating MSY-based target reference points ($B_{targ} = B_{MSY}$; $F_{targ} = F_{MSY}$)**								
	60%	**70%**	**80%**	**90%**	**100%**	**110%**	**120%**	**130%**	**140%**
	2,949 t	3,441 t	3,932 t	4,424 t	4,915 t	5,407 t	5,898 t	6,390 t	6,881 t
$B_{2017} < B_{MSY}$	41	57	59	70	75	82	90	95	97
$F_{2017} > F_{MSY}$	10	19	23	41	68	90	98	100	100
$B_{2024} < B_{MSY}$	7	12	15	29	60	98	100	100	100
$F_{2024} > F_{MSY}$	7	12	14	26	53	99	100	100	100

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