2016 : STATUS SUMMARY FOR SPECIES OF TUNA AND TUNA-LIKE SPECIES UNDER THE IOTC MANDATE, AS WELL AS OTHER SPECIES IMPACTED BY IOTC FISHERIES.

Temperate and tropical tuna stocks: main stocks being targeted by industrial, and to a lesser extent, artisanal fisheries throughout the Indian Ocean, both on the high seas and in the EEZ of coastal states.

Stock	Indicators	2011	2012	2013	2014	2015	2016	Advice to the Commission
Albacore *Thunnus alalunga*	Catch 2015: 35,068 t Average catch 2011–2015: 34,902 t MSY (1000 t) (80% CI): 38.8 (33.9–43.6) F_{MSY} (80% CI): - SB_{MSY} (1000 t) (80% CI): 30.0 (26.1–34.0) F_{2014}/F_{MSY} (80% CI): 0.85 (0.57–1.12) SB_{2014}/SB_{MSY} (80% CI): 1.80 (1.38–2.23) SB_{2014}/SB_{1950} (80% CI): 0.37 (0.28–0.46)							Although considerable uncertainty remains in the SS3 assessment, particularly due to the lack of biological information on Indian Ocean albacore tuna stocks, a precautionary approach to the management of albacore tuna should be applied by capping total catch levels to MSY levels (approximately 40,000).
Bigeye tuna *Thunnus obesus*	Catch 2015: 92,736 t Average catch 2011–2015: 101,515 t MSY (1,000 t) (80%): 104 (87-121) F_{MSY} (80%): 0.17 (0.14-0.20) SB_{MSY} (1,000 t) (80%): 525 (364-718) F_{2015}/F_{MSY} (80%): 0.76 (0.49-1.03) SB_{2015}/SB_{MSY} (80%): 1.29 (1.07-1.51) SB_{2015}/SB_0 (80%): 0.38 (n.a. – n.a.)						**83.7%**	The stock status determination did not qualitatively change in 2016, but is somewhat less optimistic than in 2013. If catch remains below the estimated MSY levels estimated for the current mix of fisheries, then immediate management measures are not required. However, increased catch or increases in the mortality on immature fish will likely increase the probabilities of breaching reference levels in the future. Continued monitoring and improvement in data collection, reporting and analysis is required to reduce the uncertainty in assessments.
Skipjack tuna *Katsuwonus pelamis*	Catch 2015: 393,954 t Average catch 2011–2015: 394,320 t MSY (1,000 t) (80% CI): 684 (550–849) F_{MSY} (80% CI): 0.65 (0.51–0.79) SB_{MSY} (1,000 t) (80% CI): 875 (708–1,075) C_{2013}/C_{MSY} (80% CI): 0.62 (0.49–0.75) SB_{2013}/SB_{MSY} (80% CI): 1.59 (1.13–2.14) SB_{2013}/SB_0 (80% CI): 0.58 (0.53–0.62)							The adoption of Resolution 16/02 requires that an estimate of SB/SB0 from future skipjack assessments is used to parameterise the Harvest Control Rule (HCR). The next assessment for skipjack will be conducted in 2017, at which time the HCR will be applied and a total allowable catch for skipjack will be advised for 2018. No additional management measures are required at this time, however continued monitoring and improvement in data collection, reporting and analysis (including fishery indicators) is required to reduce the uncertainty in assessments.
Yellowfin tuna *Thunnus albacares*	Catch 2015: 407,575 t Average catch 2011–2015: 390,185 t MSY (1000 t) (80% CI): 422 (406-444) F_{MSY} (80% CI): 0.151 (0.148-0.154) SB_{MSY} (1,000 t) (80% CI): 947 (900-983) F_{2015}/F_{MSY} (80% CI): 1.11 (0.86-1.36) SB_{2015}/SB_{MSY} (80% CI): 0.89 (0.79-0.99) SB_{2015}/SB_0 (80% CI): 0.29 (n.a.-n.a.)					**94%**	**67.6%**	The stock status determination did not change in 2016, but does give a somewhat more optimistic estimate of stock status than the 2015 assessment as a direct result of the use of more reliable information on catch rates of longline fisheries and updated catch up to 2015. The stock status is driven by unsustainable catches of yellowfin tuna taken over the last four (4) years, and the relatively low recruitment levels estimated by the model in recent years. The Commission has an interim plan for the rebuilding of this stock (Resolution 16/01), which is yet to be evaluated) to achieve the recovery of yellowfin stock, with catch limitations beginning January 1 2017. The possible effect of this measure can only be assessed once estimates of abundance in 2018 would be available at the 2019 assessment. The projections produced to advise on future catches are, in the short term, driven by the below average recruitment estimated for in recent years since these year classes have yet to reach maturity and contribute to the spawning biomass.

Billfish: These are the billfish stocks being exploited by industrial and artisanal fisheries throughout the Indian Ocean, both on the high seas and in the EEZ of coastal states. The marlins and sailfish are not usually targeted by most fleets, but are caught and retained as byproduct by the main industrial fisheries. They are important for localised small-scale and artisanal fisheries or as targets in recreational fisheries.

Stock	Indicators	2011	2012	2013	2014	2015	2016	Advice to the Commission
Swordfish *Xiphias gladius*	Catch 2015: 41,760 t Average catch 2011–2015: 31,900 t MSY (1,000 t) (80% CI): 39.40 (33.20–45.60) F_{MSY} (80% CI): 0.138 (0.137–0.138) SB_{MSY} (1,000 t) (80% CI): 61.4 (51.5–71.4) F_{2013}/F_{MSY} (80% CI): 0.34 (0.28–0.40) SB_{2013}/SB_{MSY} (80% CI): 3.10 (2.44–3.75) SB_{2013}/SB_{1950} (80% CI): 0.74 (0.58–0.89)							The most recent catches (41,760 t in 2015) are 2,360 t above the MSY level (39,400 t). Hence catches in 2017 should be reduced to less than MSY (39,400 t). As the updated stock assessment is scheduled in 2017, more concrete advice after 2018 should be developed next year.
Black marlin *Makaira indica*	Catch 2015: 18,490 t Average catch 2011–2015: 15,276 t MSY (1,000 t) (80% CI): 9.932 (6.963-12.153) F_{MSY} (80% CI): 0.211 (0.089-0.430) B_{MSY} (1,000 t) (80% CI): 47.430 (27.435-100.109) F_{2015}/F_{MSY} (80% CI): 2.42 (1.52-4.06) B_{2015}/B_{MSY} (80% CI): 0.81 (0.55-1.10) B_{2015}/B_{1950} (80% CI): 0.30 (0.20-0.41)						80%	Current catches are considerably higher than MSY and the stock is overfished and currently subject to overfishing. Even with a 40% reduction in current catches, it is very unlikely to achieve the Commission objectives of being in the green zone of the Kobe Plot by 2025. Current catch levels are not sustainable and there is a need for urgent actions to decrease these catch levels. The SC recommends that the maximum catch limit should be lower than MSY (9,932t).
Blue marlin *Makaira nigricans*	Catch 2015: 15,706 t Average catch 2011–2015: 14,847 t MSY (1,000 t) (80% CI): 11.926 (9.232–16.149) F_{MSY} (80% CI): 0.109 (0.076 –0.160) B_{MSY} (1,000 t) (80% CI): 113.012 (71.721 – 161.946) F_{2015}/F_{MSY} (80% CI): 1.18 (0.80–1.71) B_{2015}/B_{MSY} (80% CI): 1.11 (0.90–1.35) B_{2015}/B_{1950} (80% CI): 0.56 (0.44 – 0.71)						46,8%	Current catches are higher than MSY and the stock is currently subject to overfishing. In order to achieve the Commission objectives of being in the green zone of the Kobe Plot by 2025 with at least a 50% probability, the catches of blue marlin would have to be reduced by 24% compared to the average catch of 2013-2015, to a maximum value of 11,704 t.
Striped marlin *Tetrapturus audax*	Catch 2015: 4,410 t Average catch 2011–2015: 4,481 t MSY (1,000 t) (80% CI): 5.22 (5.18–5.59) F_{MSY} (80% CI): 0.62 (0.59–1.04) B_{MSY} (1,000 t) (80% CI): 8.4 (5.40–8.90) F_{2014}/F_{MSY} (80% CI): 1.09 (0.62–1.66) B_{2014}/B_{MSY} (80% CI): 0.65 (0.45–1.17) B_{2014}/B_{1950} (80% CI): 0.24 (n.a.–n.a.)					60%	60%	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.
Indo-Pacific Sailfish *Istiophorus platypterus*	Catch 2015: 28,455 t Average catch 2011–2015: 28,543 t MSY (1,000 t) (80% CI): 25.00 (16.18–35.17) F_{MSY} (80% CI): 0.26 (0.15–0.39) B_{MSY} (1,000 t) (80% CI): 87.52 (56.30–121.02) F_{2014}/F_{MSY} (80% CI): 1.05 (0.63–1.63) B_{2014}/B_{MSY} (80% CI): 1.13 (0.87–1.37) B_{2014}/B_{1950} (80% CI): 0.56 (0.44–0.67)							The same management advice for 2016 (catches below a MSY of 25,000 t) is kept for the next year (2017).

Neritic tunas and mackerel: These six species have become as important or more important as the three tropical tuna species (bigeye tuna, skipjack tuna and yellowfin tuna) to most IOTC coastal states. They are caught primarily by coastal fisheries, including small-scale industrial and artisanal fisheries. They are almost always caught within the EEZs of coastal states. Historically, catches were often reported as aggregates of various species, making it difficult to obtain appropriate data for stock assessment analyses.

Stock	Indicators		2011	2012	2013	2014	2015	2016	Advice to the Commission
Bullet tuna *Auxis rochei*	Catch 2015: Average catch 2011–2015: MSY (1,000 t) (80% CI): F_{MSY} (80% CI): B_{MSY} (1,000 t) (80% CI): F_{2015}/F_{MSY} (80% CI): B_{2015}/B_{MSY} (80% CI): B_{2015}/B_0 (80% CI):	10,481 t 8,987 t unknown unknown unknown unknown unknown unknown							A precautionary approach to the management of bullet tuna should be considered by the Commission, by ensuring that future catches do not exceed current catches (average 2011-2015). The stock should be closely monitored. Mechanisms need to be developed by the Commission to improve current statistics by encouraging CPCs to comply with their recording and reporting requirements, so as to better inform scientific advice.
Frigate tuna *Auxis thazard*	Catch 2015: Average catch 2011–2015: MSY (1,000 t) (80% CI): F_{MSY} (80% CI): B_{MSY} (1,000 t) (80% CI): F_{2015}/F_{MSY} (80% CI): B_{2015}/B_{MSY} (80% CI): B_{2015}/B_0 (80% CI):	81,441 t 94,657 t unknown unknown unknown unknown unknown unknown							A precautionary approach to the management of frigate tuna should be considered by the Commission, by ensuring that future catches do not exceed current catches (average 2011-2015: 94,657 t). The stock should be closely monitored. Mechanisms need to be developed by the Commission to improve current statistics by encouraging CPCs to comply with their recording and reporting requirements, so as to better inform scientific advice.
Kawakawa *Euthynnus affinis*	Catch 2015: Average catch 2011–2015: MSY (1,000 t) (80% CI): F_{MSY} (80% CI): B_{MSY} (1,000 t) (80% CI): F_{2013}/F_{MSY} (80% CI): B_{2013}/B_{MSY} (80% CI): B_{2013}/B_{1950} (80% CI):	152,772 t 158,817 t 152 [125 –188] 0.56 [0.42–0.69] 202 [151–315] 0.98 [0.85–1.11] 1.15 [0.97–1.38] 0.58 [0.33–0.86]							Although the stock status is classified as not overfished and not subject to overfishing, the K2MSM developed in 2015 showed that there is a 96% probability that biomass is below MSY levels and 100% probability that F>FMSY by 2016 and 2023 if catches are maintained at the 2013 levels. The modelled probabilities of the stock achieving levels consistent with the MSY reference points (e.g. SB > SBMSY and F<FMSY) in 2023 are 100% for a future constant catch at 80% of current 2013 catch levels in 2014, thus if the Commission wishes to recover the stock to levels above the MSY reference points, the Scientific Committee recommends that catches should be reduced by 20% of current 2013 levels.
Longtail tuna *Thunnus tonggol*	Catch 2015: Average catch 2011–2015: 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):	135,920 t 157,313 t 143 (106–194) 0.39 (0.29–0.54) 298 (197–545) 1.03 (0.88–1.26) 0.99 (0.78–1.19) 0.50 (0.39-0.60)					**25%**		There is a continued high risk of exceeding MSY-based reference points by 2017 if catches are maintained at current (2014) levels. (69% risk that B2017<BMSY, and 81% risk that F 2017>FMSY). If catches are reduced by 10% this risk is lowered to 27% probability B2017<BMSY and 39% probability F2017>FMSY). If the Commission wishes to recover the stock to levels above the MSY reference points, the Scientific Committee recommends catches should be reduced by approximately 10% of current 2014 levels which corresponds to catches somewhat below MSY in order to recover the status of the stock in line with the decision framework described in Resolution 15/10.
Indo-Pacific king mackerel *Scomberomorus guttatus*	Catch 2015: Average catch 2011–2015: MSY (1,000 t) (80% CI): F_{MSY} (80% CI): B_{MSY} (1,000 t) (80% CI):	45,956 t 45,485 t 46 [38.9–54.4] 0.52 [0.40–0.69]							A precautionary approach to the management of IP king mackerel should be considered by the Commission, by ensuring that catches are reduced to levels below the current estimated range of MSY. The stock should be closely monitored. Mechanisms need to be developed by the Commission to improve current statistics by

	F_{2014}/F_{MSY} (80% CI): B_{2014}/B_{MSY} (80% CI): B_{2014}/B_{1950} (80% CI):	66.0 [45.9–107.9] 0.98 [0.85–1.14] 1.10 [0.84–1.29] 0.55 [0.42–0.64]							encouraging CPCs to comply with their recording and reporting requirement, so as to better inform scientific advice.
Narrow-barred Spanish mackerel *Scomberomorus commerson*	Catch 2015: Average catch 2011–2015: 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):	152,798 t 151,227 t 131.1 [98.7–178.8] 0.34 [0.21–0.56] 326 [178–702] 1.21 [0.95–1.48] 0.95 [0.74–1.27] 0.47 [0.37–0.63]							There is a continued high risk of exceeding MSY-based reference points by 2024, even if catches are reduced to 80% of the 2014 levels (53% risk that B2024<BMSY, and 97% risk that F 2024>FMSY). The modelled probabilities of the stock achieving levels consistent with the MSY reference levels (e.g. B > BMSY and F<FMSY) in 2024 are 1 and 10%, respectively, for a future constant catch at 70% of current catch level. If the Commission wishes to recover the stock to levels above the MSY reference points, the Scientific Committee recommends that catches should be reduced by at least 30% of current levels which corresponds to catches below MSY in order to recover the status of the stock.

Sharks: Although sharks are not part of the 16 species directly under the IOTC mandate, sharks are frequently caught in association with fisheries targeting IOTC species. Some fleets are known to actively target both sharks and IOTC species simultaneously. As such, IOTC Contracting Parties and Cooperating Non-Contracting Parties are required to report information at the same level of detail as for the 16 IOTC species. The following are the main species caught in IOTC fisheries, although the list is not exhaustive.

Stock	Indicators		2011	2012	2013	2014	2015	2016	Advice to the Commission
Blue shark *Prionace glauca*	Reported Catch 2015 : Not elsewhere included (nei) sharks 2015: Average reported catch 2011–2015: Not elsewhere included (nei) sharks 2011–15: MSY (1,000 t) (80% CI): F_{MSY} (80% CI): SB_{MSY} (1,000 t) (80% CI): F_{2014}/F_{MSY} (range): SB_{2014}/SB_{MSY} (range): SB_{2014}/SB_0 (range):	30,054 t 57,125 t 29,535 t 49,785 t Unknown Unknown Unknown (0.44–4.84) (0.83–1.75) Unknown							A precautionary approach to the management of blue shark should be considered by the Commission, by ensuring that future catches do not exceed current catches. The stock should be closely monitored. Mechanisms need to be developed by the Commission to improve current statistics by encouraging CPCs to comply with their recording and reporting requirement on sharks, so as to better inform scientific advice.
Oceanic whitetip shark *Carcharhinus longimanus*	Reported Catch 2015 : Not elsewhere included (nei) sharks 2015: Average reported catch 2011–2015: Not elsewhere included (nei) sharks 2011–15: MSY (range):	211 t 57,125 t 248 t 49,785 Unknown							(OCS) A precautionary approach to the management of oceanic whitetip shark should be considered by the Commission, noting that recent studies suggest that longline mortality at haulback is high (50%) in the Indian Ocean, while mortality rates for interactions with other gear types such as purse seines and gillnets may be higher. Mechanisms need to be developed by the Commission to encourage CPCs to comply with their recording and reporting requirement on sharks, so as to better inform scientific advice.
Scalloped hammerhead shark *Sphyrna lewini*	Reported catch 2013: Not elsewhere included (nei) sharks 2015:	52 t 57,125 t							A precautionary approach to the management of these sharks should be considered by the Commission. Mechanisms need to be developed by the Commission to encourage CPCs to comply with

	Average reported catch 2011–2015: Not elsewhere included (nei) sharks 2011–15: MSY (range):	75 t 49,785 t unknown							their recording and reporting requirement on sharks, so as to better inform scientific advice.
Shortfin mako *Isurus oxyrinchus*	Reported Catch 2015 : Not elsewhere included (nei) sharks 2015: Average reported catch 2011–2015: Not elsewhere included (nei) sharks 2011–15: MSY (range):	1,268 t 57,125 t 1,447 t 49,785 t unknown							
Silky shark *Carcharhinus falciformis*	Reported Catch 2015 : Not elsewhere included (nei) sharks 2015: Average reported catch 2011–2015: Not elsewhere included (nei) sharks 2011–15: MSY (range):	3,232 t 57,125 t 3,707 t 49,785 unknown							
Bigeye thresher shark *Alopias superciliosus*	Reported Catch 2015 : Not elsewhere included (nei) sharks 2015: Average reported catch 2011–2015: Not elsewhere included (nei) sharks 2011–15: MSY (range):	0 t 57,125 t 94 t 49,785 unknown							
Pelagic thresher shark *Alopias pelagicus*	Reported Catch 2015 : Not elsewhere included (nei) sharks 2015: Average reported catch 2011–2015: Not elsewhere included (nei) sharks 2011–15: MSY (range):	0 t 57,125 t 69 t 49,785 unknown							

*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(SByear/SBMSY< 1)	Stock not overfished (SByear/SBMSY≥ 1)
Stock subject to overfishing(Fyear/FMSY> 1)		
Stock not subject to overfishing (Fyear/FMSY≤ 1)		
Not assessed/Uncertain		