Food and Agriculture Organization of the United Nations

iotc ctoi

REPORT OF THE 22ND SESSION OF IOTC SCIENTIFIC COMMITTEE KARACHI, PAKISTAN, 2-6 DECEMBER 2019

TOSHIHIDE KITAKADO

(TOKYO UNIV. MARINE SCIENCE TECHNOLOGY)

CHAIR OF THE SC

2020 IOTC COMMISSION MEETING, NOVEMBER 2-6, 2020

CONTENTS

- Introduction
- Stock status of some species for which a new stock assessment was carried out in 2019 [albacore, bigeye, blue marline and Indo-Pacific sailfish]
- Other issues and general recommendations from SC 2019
- 2020 Workplan (all but WPDCS have been held already) and draft meeting schedule in 2021 and 2022

INTRODUCTION

SCIENTIFIC COMMITTEE MEETING IN KARACHI, PAKISTAN

- The 22nd Session of the Indian Ocean Tuna Commission (IOTC) Scientific Committee (SC) was held in Karachi, Pakistan, from 2 – 6 December 2019
- A total of 43 participants of delegates and other participants attended the Session
- The meeting was chaired by vice-chair, Dr. Adam,

- The opening of the meeting was attended by the Honourable Ali Haider Zaidi, Minister for Maritime Affairs
- The SC thanked
  - the Government of Pakistan for hosting the meeting
  - the local authorities of Karachi for providing excellent meeting facilities and assistance
  - WWF-Pakistan for their assistance in organizing the meeting

- The reports of Working Parties were smoothly introduced, discussed and endorsed

EX-CHAIRS, INTERIM-CHAIRS AND NEW-CHAIRS

- **2016-2019**

  Chair: Dr. Hilario Murua (EU)

  Vice-Chair: Dr. Shiham Adam (Maldives) [interim chair in SC 2019]

- **2020-2021**

  Chair: Dr. Toshihide Kitakado (Japan)

  Vice-Chair: Dr. Denham Parker (South Africa)

STOCK STATUS

2019 SC WORK PLAN ENDORSED BY 2018 COMMISSION MEETING

Working Party on Temperate Tunas				
Species	**2017**	**2018**	**2019**	**2020**
Albacore			Data preparatory meeting **and Stock assessment**	–

The result on albacore stock assessment will be reported from now

Working Party on Neritic Tunas				
Species	**2019****	**2020***	**2021*****	**2022**
Bullet tuna	Data preparation	**Assessment**	Data preparation	Data preparation
Frigate tuna	Data preparation	**Assessment**	Data preparation	Data preparation
Indo-Pacific king mackerel	Data preparation	**Assessment**	Data preparation	Data preparation
Kawakawa	Data preparation	**Assessment**	Data preparation	Data preparation
Longtail tuna	Data preparation	**Assessment**	Data preparation	Data preparation
Narrow-barred Spanish mackerel	Data preparation	**Assessment**	Data preparation	Data preparation

Working Party on Ecosystems and By			
Species	**2019**	**2020**	**2021**
Blue shark		Indicators	Full assessment*
Oceanic whitetip shark	Indicators	Full assessment*	–
Scalloped hammerhead shark		–	–
Shortfin mako shark	Indicators	Full assessment*	–
Silky shark	Full assessment*	-	Indicators;
Bigeye thresher shark	–	–	–
Pelagic thresher shark			
Porbeagle shark			
Marine turtles		cators	
Seabirds	–	Review of mitigation measures in Res. 12/04	–
Marine Mammals	ERA; Review of mitigation measures in Res. 12/06	–	-

Stock assessment for silky shark was not able to update because of very little information available for this species.

2019 SC WORK PLAN ENDORSED BY 2018 COMMISSION MEETING

The result will be reported from now

Some scientific progress was made but no new advice could be provided in 2019

The results will be reported from now

Working Party on Tropical Tunas					
Species	**2019**	**2020**	**2021**	**2022**	**2023**
Bigeye tuna	**Full assessment**	Indicators	Indicators	**Full assessment**	Indicators
Skipjack tuna	Indicators	**Full assessment**	Indicators	Indicators	**Full assessment**
Yellowfin tuna	**Full Assessment***	Indicators	**Full assessment**	Indicators	Indicators

* According to the details provided by the workplan in Appendix 38 of the SC report

Working Party on Billfish					
Species	**2019**	**2020**	**2021**	**2022**	**2023**
Black marlin			**Full assessment**		
Blue marlin	**Full assessment**			**Full assessment**	
Striped marlin			**Full assessment**		
Swordfish	**Indicators**	**Full assessment**		**Indicators**	**Full assessment**
Indo-Pacific sailfish	**Full assessment***			**Full assessment***	

*Including data poor stock assessment methods; Note: the assessment schedule may be changed depending on the annual review of fishery indicators, or SC and Commission requests

Food and Agriculture Organization of the United Nations

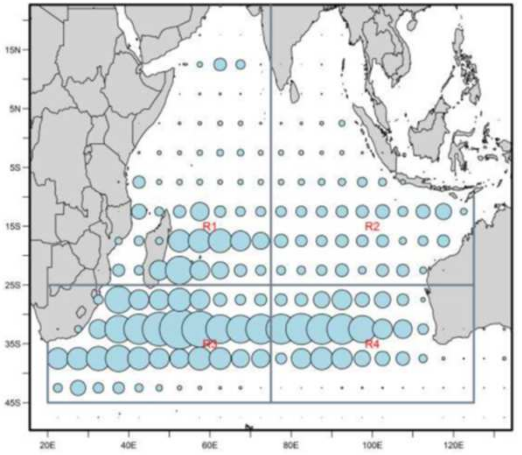
iotc ctoi

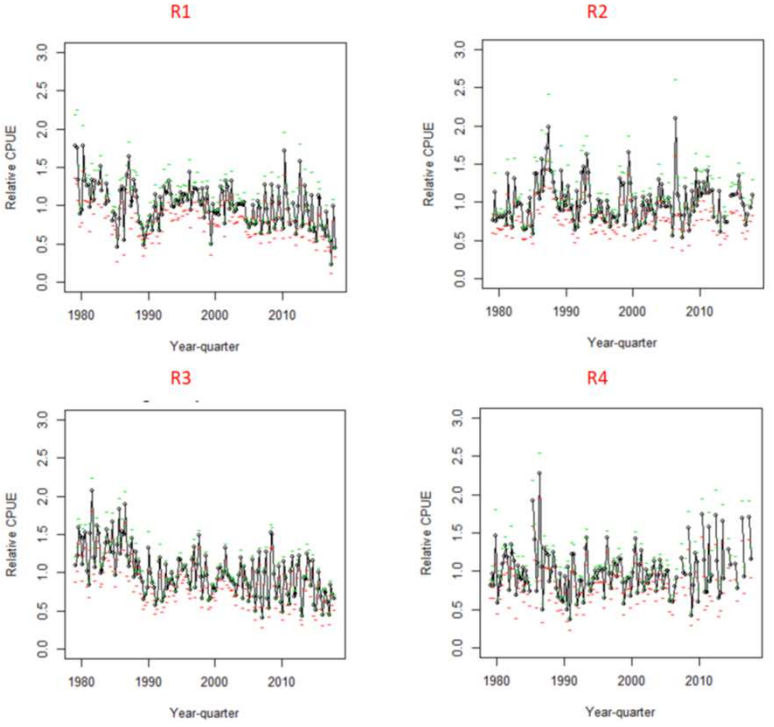
STOCK STATUS AND MANAGEMENT ADVICE (1)

ALBACORE

ALBACORE

- Data preparation meeting in January 2019, in Kuala Lumpur, Malaysia
  - Catch series, Joint CPUE, size data, biological parameters, specification

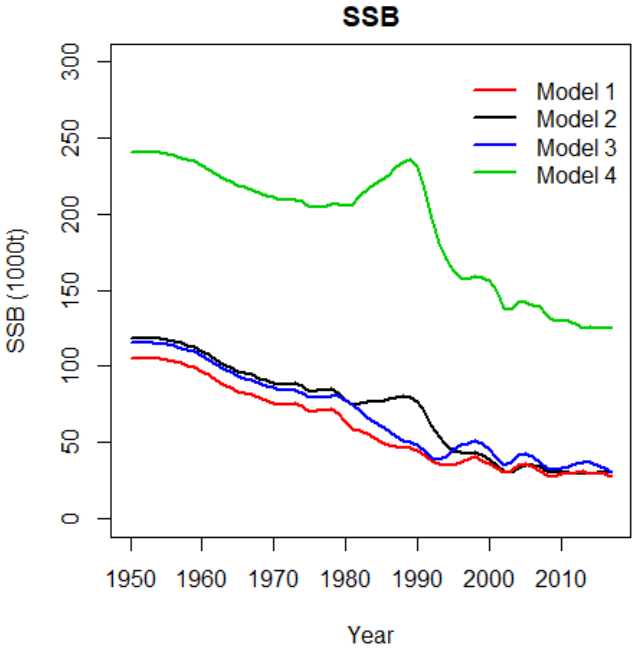


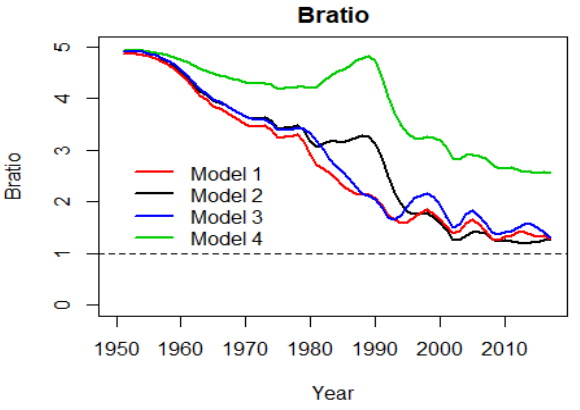


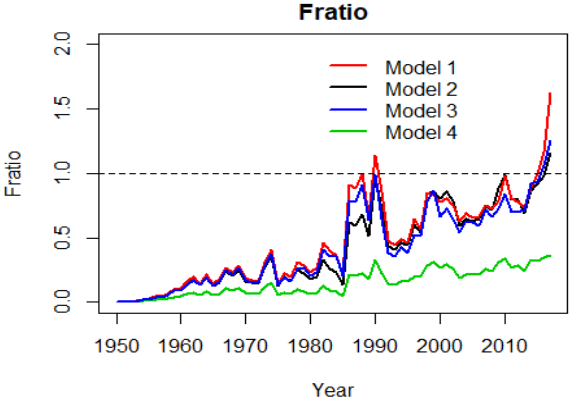
- Stock assessment meeting in July 2019 in Shimizu, Japan

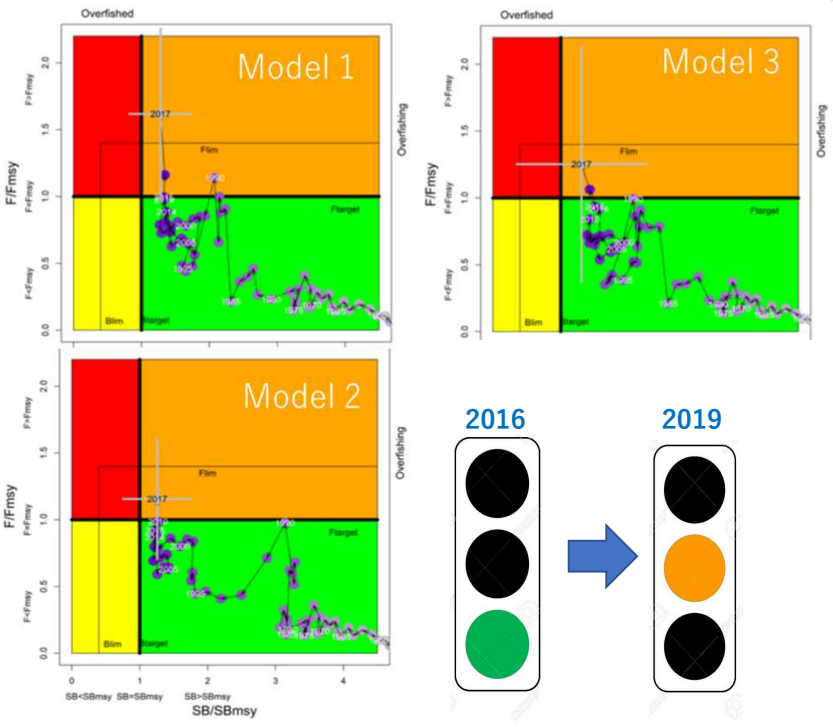
ALBACORE

- Two types of assessment models were used
  - Bayesian state-space production models
  - Stock Synthesis 3 (SS3, used for advice this time)









Change from 2016 assessment to 2019 one

- The similar model was used, but catch and CPUE data were updated (CPUE were significantly different from 2016)
- CPUE in R1&R2, used in fitting, showed decreasing trends since 1979
- Different growth function was used
- Lower MSY and BMSY estimates were provided.

=> These can attribute to changes in the stock status

Indicators – 2019 assessment		2019 stock status[3] determination
	SS3	
Catch 2018[2]:	41,603 t	
Average catch 2014–2018:	38,030 t	
MSY (1000 t) (95% CI):	35.7 (27.3–44.4)	
F_{MSY} (95% CI):	0.21 (0.195-0.237)	
SB_{MSY} (1000 t) (95% CI):	23.2 (17.6–29.2)	
F_{2017}/F_{MSY} (95% CI):	1.346 (0.588–2.171)	
SB_{2017}/SB_{MSY} (95% CI):	1.281 (0.574–2.071)	
SB_{2017}/SB_{1950} (95% CI):	0.262 (-)	

K2SM with respect to the target reference points (SB_{MSY} and F_{MSY})

Table 11. Albacore: SS3 aggregated Indian Ocean assessment Kobe II Strategy Matrix based on the model options (i) Model 1 (ii) Model 2 (iii) Model 3 . Probability (percentage) of violating the MSY-based target (top) and limit (bottom) reference points for constant catch projections (2017 catch level, ± 10%, ± 20%, ± 30% ± 40%) projected for 3 and 10 years.

Reference point and projection timeframe	Alternative catch projections (relative to the catch level for 2017) and probability (%) of violating MSY-based target reference points ($SB_{targ} = SB_{MSY}$; $F_{targ} = F_{MSY}$)								
	60% (22,901)	70% (26,718)	80% (30,534)	90% (34,351)	100% (38,168)	110% (41,985)	120% (45,802)	130% (49,618)	140% (53,435)
$SB_{2020} < SB_{MSY}$	0.614	0.678	0.715	0.769	0.818	0.828	0.87	0.883	0.898
$F_{2020} > F_{MSY}$	0.074	0.224	0.4	0.556	0.654	0.731	0.766	0.788	0.782
$SB_{2027} < SB_{MSY}$	0.176	0.307	0.456	0.572	0.713	0.823	0.898	1	1
$F_{2027} > F_{MSY}$	0.002	0.085	0.287	0.473	0.718	0.878	1	1	1

K2SM with respect to the limit reference points (SB_{MSY} and F_{MSY})

Reference point and projection timeframe	Alternative catch projections (relative to the catch level for 2017) and probability (%) of violating MSY-based target reference points ($SB_{targ} = SB_{MSY}$; $F_{targ} = F_{MSY}$)								
	60% (22,901)	70% (26,718)	80% (30,534)	90% (34,351)	100% (38,168)	110% (41,985)	120% (45,802)	130% (49,618)	140% (53,435)
$SB_{2020} < SB_{Lim}$	0.039	0.065	0.084	0.124	0.161	0.19	0.253	0.314	0.373
$F_{2020} > F_{Lim}$	0.003	0.037	0.129	0.277	0.414	0.537	0.629	0.696	0.712
$SB_{2027} < SB_{Lim}$	0.059	0.12	0.22	0.325	0.462	0.648	0.749	1	1
$F_{2027} > F_{Lim}$	0	0.006	0.127	0.309	0.622	0.843	1	1	1

Food and Agriculture Organization of the United Nations

ALBACORE

iotc ctoi

Stock status

- A new stock assessment was carried out for albacore in 2019 using Stock Synthesis III (SS3)
- The current assessment has utilized joint CPUE series that are significantly different from the last assessment. Catches have also increased substantially since 2007 for some fleets
- Fishing mortality represented as F2017/FMSY is 1.346 (95%CI=0.588–2.171). Biomass is estimated to be above the SBMSY level as B2017/BMSY =1.281 (95%CI=0.574–2.071). **The stock status in relation to the Commission's BMSY and FMSY target reference points indicates that the stock is not overfished but is subject to overfishing**

Outlook and Management Advice

- Maintaining or increasing effort in the core albacore fishing grounds is likely to result in further decline in the albacore tuna biomass, productivity and CPUE. Although considerable uncertainty remains in the assessment conducted in 2019, **current catches (38,168 t in 2017) are exceeding the estimated MSY level (35,700 t) and therefore a precautionary approach should be applied**
- **The K2SM indicates that catch reductions are required in order to prevent the biomass from declining to below MSY levels in the short term**

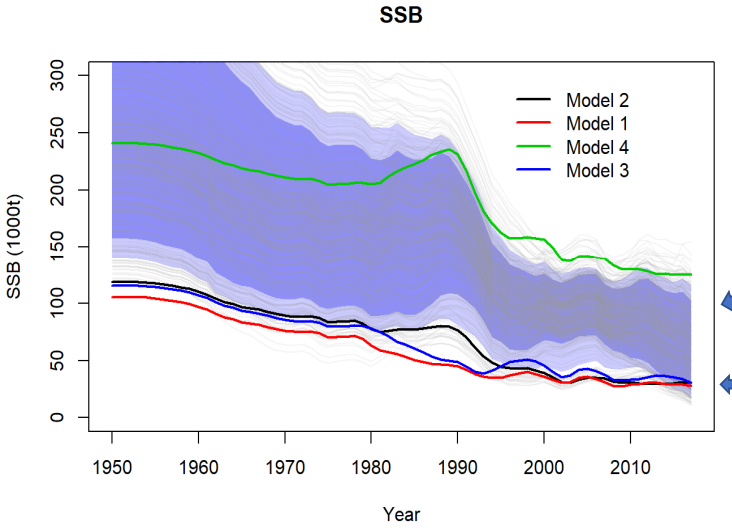
Recommendation from the SC to the Commission

SC22.16 (para 80)

- Next stock assessment is planned in 2022 in the WPTmT
- But the 2019 SC **AGREED** that it would be beneficial to hold an assessment preparatory meetings in 2020 or 2021, and to this end, the SC **RECOMMENDED** that the Commission consider approving an assessment preparatory meeting for the WPTmT in either of these years

(Chair's note: the meeting was not held in 2020, so this will be held in 2021 if approved)

- The SC **NOTED** that the 2019 albacore stock assessment results fall outside the range of uncertainty captured by the current operating model (OM) based on 2016, and therefore reconditioning of the OM is required based on the 2019 assessment.



The range of uncertainty in the current OM based on 2016 assessment

Stock assessment results in 2019

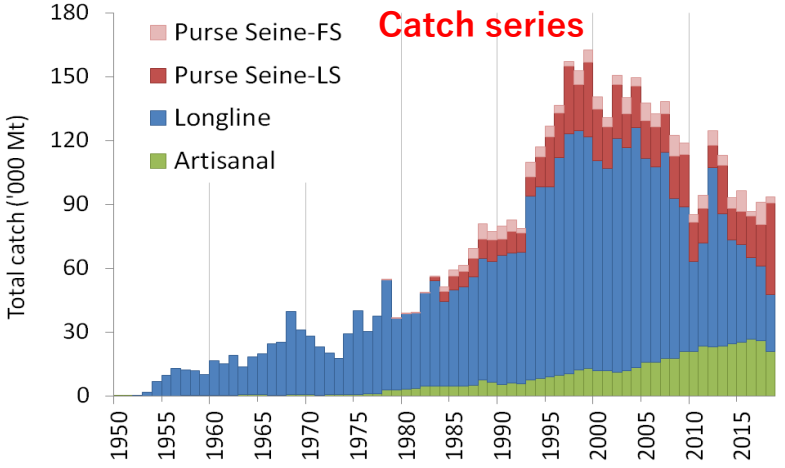
Food and Agriculture Organization of the United Nations

iotc ctoi

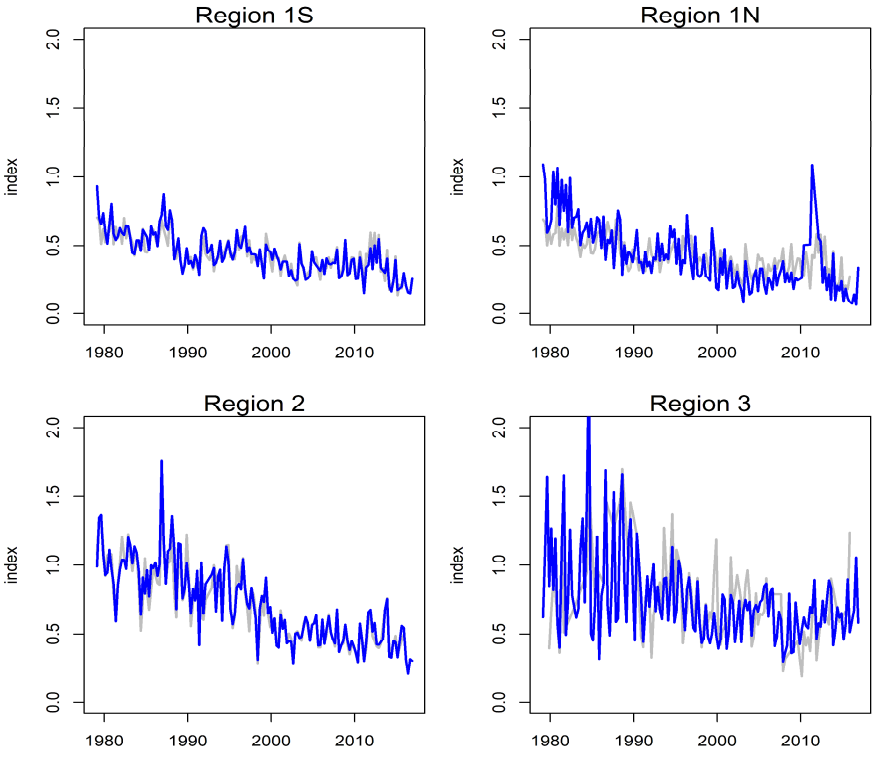
STOCK STATUS AND MANAGEMENT ADVICE (2)

BIGEYE

- Catch series
- Abundance index: Joint Longline CPUE
- Size frequency data
- Tagging data

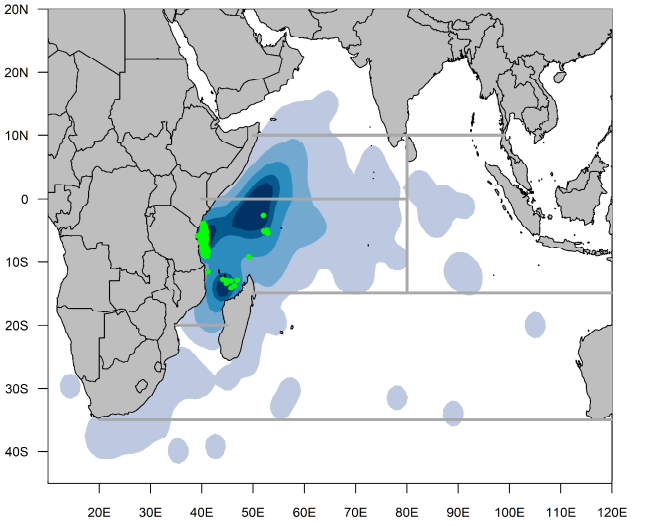


Standardized CPUE series [continued decline]



BIGEYE

- Catch series
- Abundance index: Joint Longline CPUE
- Size frequency data
- Tagging data: release/recovery from Indian Ocean RTTP used with a tag-release mortality parameter that assumes a higher mortality (≠ 2016)



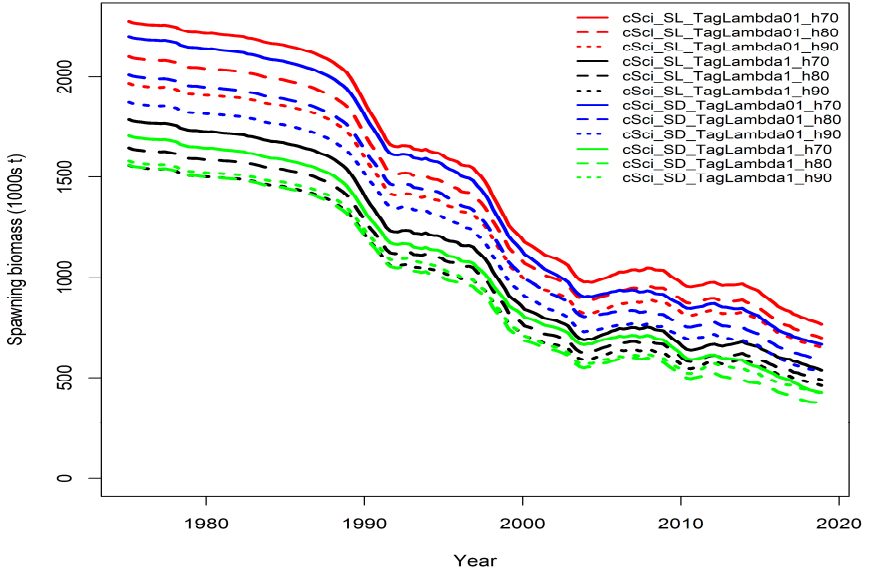
Two types of assessment models

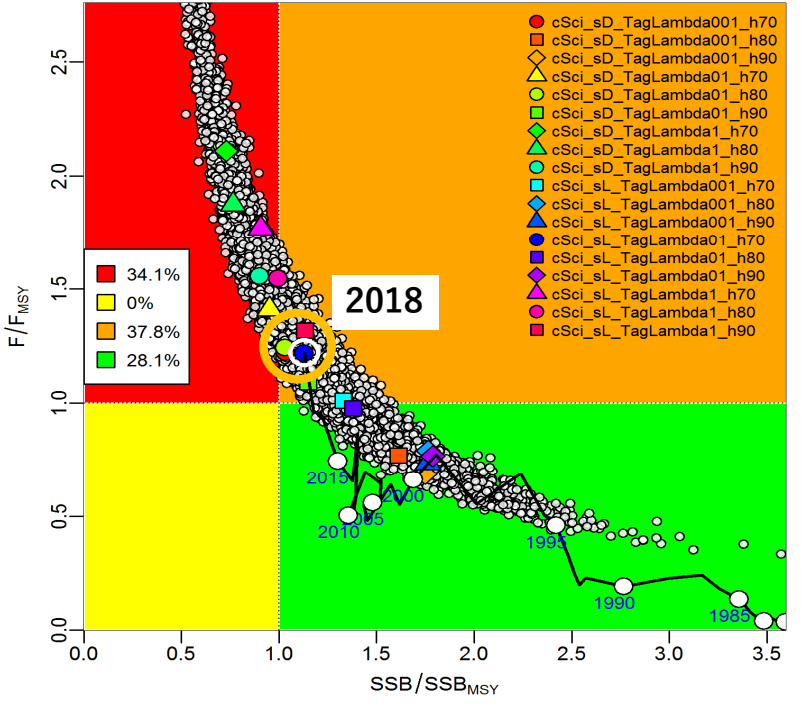
- Bayesian state-space production models (JABBA)
- Stock Synthesis 3 (SS3, used for advice this time)

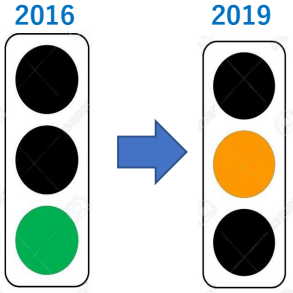
Structural uncertainty: SS3, grid of 18 model configurations that capture uncertainty on:

- Stock recruitment relationship (3 levels = 2016)
- Influence of tagging information (tag weight in the likelihood, 3 levels ≈ 2016)
- Selectivity of longline fleets (2 levels ≠ 2016)

BIGEYE


Spawning biomass (1000s t)
0
500
1000
1500
2000
1980
1990
2000
2010
2020
Year
cSci_SL_TagLambda01_h70
cSci_SL_TagLambda01_h80
cSci_SL_TagLambda01_h90
cSci_SL_TagLambda1_h70
cSci_SL_TagLambda1_h80
cSci_SL_TagLambda1_h90
cSci_SD_TagLambda01_h70
cSci_SD_TagLambda01_h80
cSci_SD_TagLambda01_h90
cSci_SD_TagLambda1_h70
cSci_SD_TagLambda1_h80
cSci_SD_TagLambda1_h90

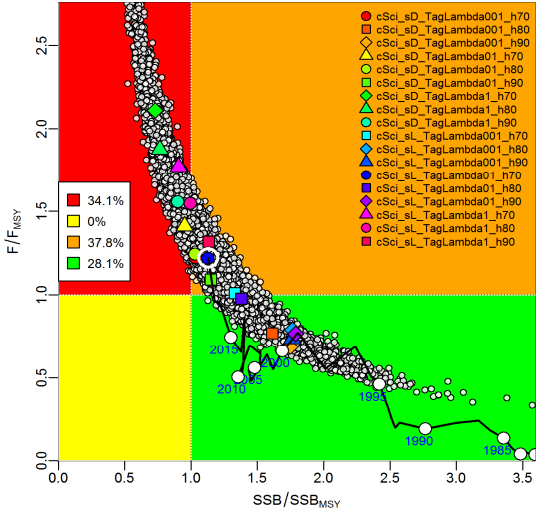

F/F_MSY
SSB/SSB_MSY
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
34.1%
0%
37.8%
28.1%
2018
2015
2010
2005
2000
1995
1990
1985
cSci_sD_TagLambda001_h70
cSci_sD_TagLambda001_h80
cSci_sD_TagLambda001_h90
cSci_sD_TagLambda01_h70
cSci_sD_TagLambda01_h80
cSci_sD_TagLambda01_h90
cSci_sD_TagLambda1_h70
cSci_sD_TagLambda1_h80
cSci_sD_TagLambda1_h90
cSci_sL_TagLambda001_h70
cSci_sL_TagLambda001_h80
cSci_sL_TagLambda001_h90
cSci_sL_TagLambda01_h70
cSci_sL_TagLambda01_h80
cSci_sL_TagLambda01_h90
cSci_sL_TagLambda1_h70
cSci_sL_TagLambda1_h80
cSci_sL_TagLambda1_h90



Main change from 2016 assessment to 2019 one

- Updated abundance index developed in 2019
- Recent increased fishing pressure on juvenile by PS
- Changes in model assumptions about LL selectivity
- Changes in tag release mortality

etc.



Area[1]	Indicators		2019 stock status[3] determination
Indian Ocean[5]	Catch in 2018[2]: Average catch 2014–2018:	93,515 t (81,413 t)[4] 92,140 t (89,720 t)[4]	38.2%*
	MSY (1,000 t) (80% CI): F_{MSY} (80% CI): SB_{MSY} (1,000 t) (80% CI): F_{2018}/F_{MSY} (80% CI): SB_{2018}/SB_{MSY} (80% CI): SB_{2018}/SB_0 (80% CI):	87 (75-108) 0.24 (0.18-0.36) 503 (370-748) 1.20 (0.70-2.05) 1.22 (0.82-1.81) 0.31 (0.21. – 0.34)	

Reference point and projection timeframe	Alternative catch projections (relative to the catch level from 2018) and weighted probability (%) scenarios that violate reference point				
	60% (48,848t)	**70%** (56,990t)	**80%** (65,130t)	**90%** (73,272t)	**100%** (81,413t)
$B_{2021} < B_{MSY}$	51.1	53.3	54.2	57.1	58.9
$F_{2021} > F_{MSY}$	7.3	17.8	32	47.9	62.8
$B_{2028} < B_{MSY}$	8	19.5	35.1	49.1	60.8
$F_{2028} > F_{MSY}$	1.1	6.9	19.8	37.7	55.6

Reference point and projection timeframe	Alternative catch projections (relative to the catch level from 2018) and probability (%) of violating MSY-based limit reference points ($B_{lim} = 0.5\ B_{MSY}$; $F_{Lim} = 1.3\ F_{MSY}$)				
	60% (48,848t)	**70%** (56,990t)	**80%** (65,130t)	**90%** (73,272t)	**100%** (81,413t)
$B_{2021} < B_{LIM}$	0	0	0	0	0
$F_{2021} > F_{LIM}$	6.0	11.0	17.0	28.0	39.0
$B_{2028} < B_{LIM}$	0.0	0.0	6.0	11.0	22.0
$F_{2028} > F_{LIM}$	0.0	6.0	17.0	22.0	39.0

BIGEYE

Stock status

- A new stock assessment was carried out for bigeye tuna in 2019 using Stock Synthesis III (SS3) with a grid of 18 model configurations designed to capture the model uncertainty
- Due to concerns on the reported catch data for 2018, the stock status is based on the best catch estimate by the Scientific Committee
- **The assessment outcome is qualitatively different to the stock assessment conducted in 2016.** Fishing mortality represented as F2018/FMSY is 1.20 (0.70–2.05). Biomass is estimated to be above the SBMSY level (B2018/BMSY =1.22 (0.82–1.81)) from the SS3 model
- The average catches over 2014-2018 (≈89,717 t) just above the estimated median MSY (87,000 t)
- **Thus, on the weight-of-evidence available in 2019, the bigeye tuna stock is determined to be not overfished but subject to overfishing**

Outlook and Management Advice

- If catches remain at current levels, there is a risk of breaching MSY reference points with 58.9% and 60.8% probability in 2021 and 2028. Reduced catches of at least 10% from current levels will likely reduce the probabilities of breaching reference levels to 49.1% in 2028
- Continued monitoring and improvement in data collection, reporting and analyses is required

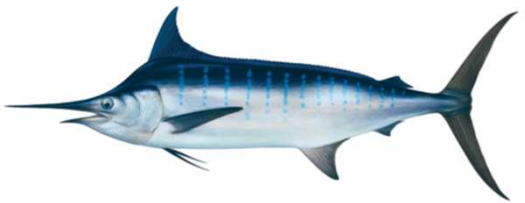
The SC also NOTED that the 2019 bigeye assessment results are more pessimistic than in previous assessments and that there were changes in the fishery characteristics, which are likely to have an impact on the evaluation of the management procedures performance. The SC AGREED that the bigeye OMs may need reconditioning on the new assessment.

Food and Agriculture Organization of the United Nations

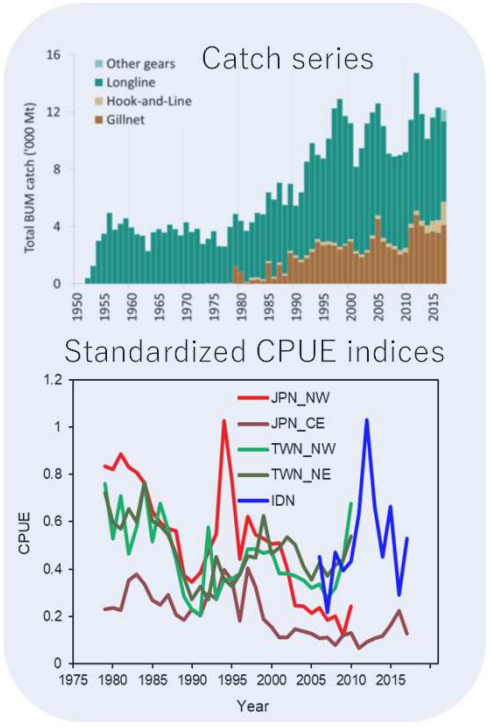
iotc ctoi

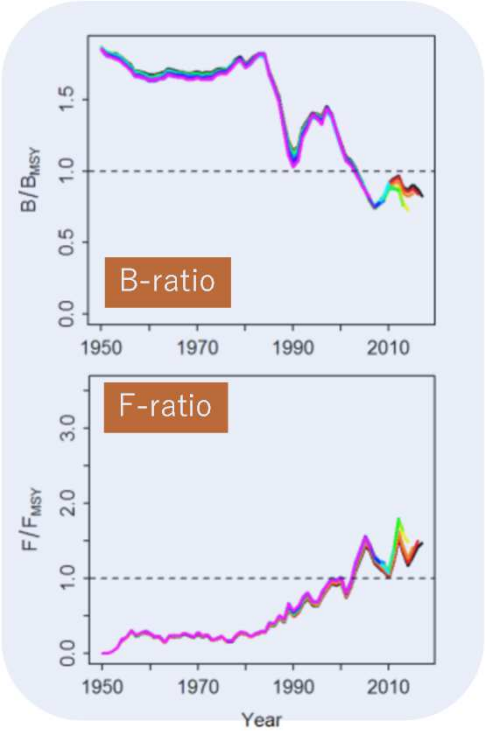
STOCK STATUS AND MANAGEMENT ADVICE (3)

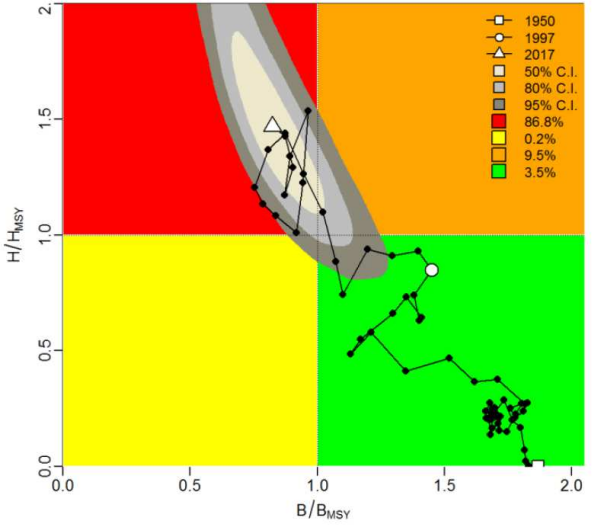
BLUE MARLIN

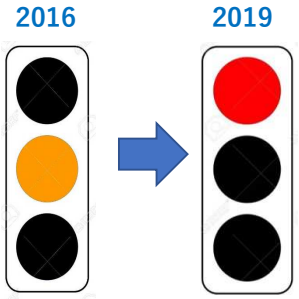


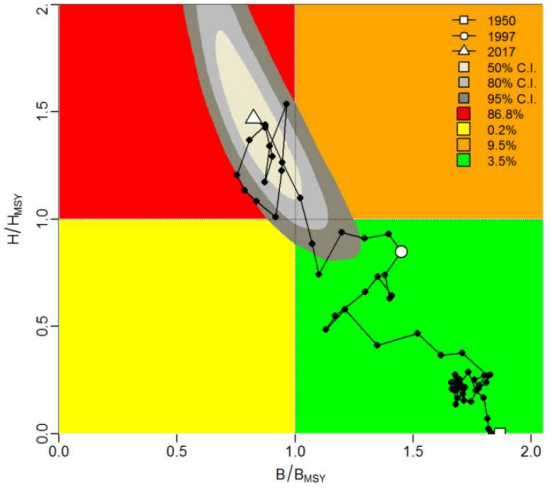
- A new stock assessment was conducted by the two methods:
  - JABBA – A Bayesian production model (continuity from 2016 and used for advice this time)
  - SS3 – An integrated model (needs inputs parameter from the Pacific)











Change from 2016 assessment to 2019 one

- The same model was used with new and improved CPUE data, but a different prior distribution was assumed
- Lower MSY and BMSY estimates were provided.
- Catch has been above the MSY level

=> These can attribute to changes in the stock status

Area[1]	Indicators		2019 stock status determination
Indian Ocean	Catch 2018[2]:	9,969 t	87%*
	Average catch 2014-2018:	11,382 t	
	MSY (1,000 t) (80% CI):	9.98 (8.18 –11.86)	
	F_{MSY} (80% CI):	0.21 (0.13 – 0.35)	
	B_{MSY} (1,000 t) (80% CI):	47 (29.9 – 75.3)	
	H_{2017}/H_{MSY} (80% CI):	1.47 (0.96 – 2.35)	
	B_{2017}/B_{MSY} (80% CI):	0.82 (0.56 – 1.15)	
	B_{2017}/B_0 (80% CI):	0.41 (0.28 – 0.57)	

[1] Boundaries for the Indian Ocean = IOTC area of competence.
[2] Proportion of catch estimated or partially estimated by IOTC Secretariat in 2019: 24%.
* 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}≥ 1)
Stock subject to overfishing (F_{year}/F_{MSY}> 1)	87%	10%
Stock not subject to overfishing (F_{year}/F_{MSY}≤ 1)	0%	3%
Not assessed/Uncertain		

From current executive summary

Stock status

- Stock status suggests that there is an 87% probability that the Indian Ocean blue marlin stock in 2017 is in the red zone of the Kobe plot, indicating **the stock is overfished and subject to overfishing** (B2017/BMSY=0.82 and F2017/FMSY=1.47)

Management advice

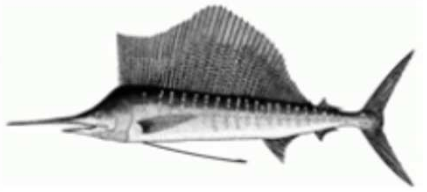
- The current catches of blue marlin (average of 11,761 t in the last 5 years, 2013-2017) are higher than MSY (9,984 t) and the stock is currently overfished and subject to overfishing
- In order to achieve the Commission objectives of being in the green zone of the Kobe Plot by 2027 (F2027 < FMSY and B2027 > BMSY) with at least a 60% chance, **the catches of blue marlin would have to be reduced by 35% compared to the average of the last 3 years, to a maximum value of approximately 7,800 t**

Food and Agriculture Organization of the United Nations

iotc ctoi

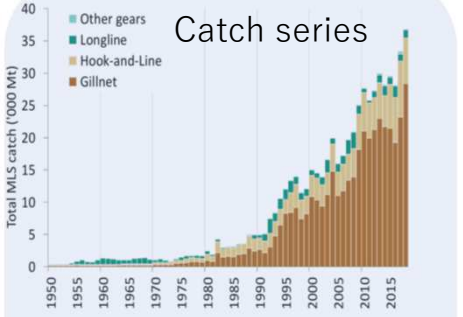
STOCK STATUS AND MANAGEMENT ADVICE (4)

INDO-PACIFIC SAILFISH



INDO-PACIFIC SAILFISH

- A new stock assessment was conducted by two data-poor assessment methods
  - Catch-only method (C-MSY; used for advice this time)
  - Stock Reduction Analysis (SRA; provided a similar result)

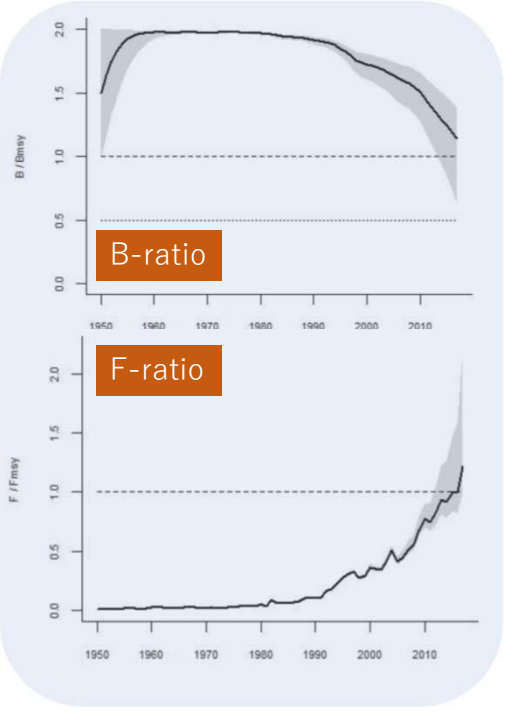


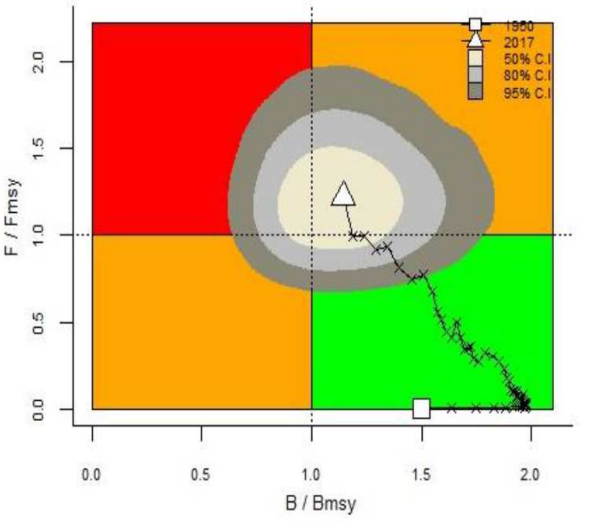
+

Prior range information on

- Initial B/K
- Final B/K
- Intrinsic rate of increase
- Carrying capacity

Initial B/K	Final B/K	r	K (1000 t)
0.5–0.9	0.3–0.7	0.16–0.5	62 – 759





INDO-PACIFIC SAILFISH

Change from 2015 assessment to 2019 one

- Stock Reduction Analysis (SRA), used in 2015, was again used this time where the result was similar with C-MSY method
- B-ratio remained the same level (slightly above 1)
- But F-ratio was increased

Note: The methods rely on the catch data, but that catch series itself is highly uncertain, and up to 29% of the catches had to be estimated by the secretariat

Indicators		2018 stock status determination
Catch 2017[2]:	33,280[3] t	
Average catch 2013-2017:	29,873[3] 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_0 (80% CI):	0.56 (0.44–0.67)	

Indicators		2019 stock status determination
Catch 2018[2]:	36,911 t	
Average catch 2014-2018:	31,267 t	
MSY (1,000 t) (80% CI):	23.9 (16.1 – 35.4)	
F_{MSY} (80% CI):	0.19 (0.14 - 0.24)	
B_{MSY} (1,000 t) (80% CI):	129 (81–206)	
F_{2017}/F_{MSY} (80% CI):	1.22 (1 – 2.22)	
B_{2017}/B_{MSY} (80% CI):	1.14 (0.63 – 1.39)	
B_{2017}/B_0 (80% CI):	0.57 (0.31 – 0.70)	

Food and Agriculture Organization of the United Nations

INDO-PACIFIC SAILFISH

iotc ctoi

Stock status

- A new stock assessment was carried out using the C-MSY model. The SRA produced similar results.
- The data poor stock assessment techniques indicated that F was above FMSY (F/FMSY=1.22) and B is above BMSY (B/BMSY=1.14).
- However **both assessment models relies on catch data, but the catch series is highly uncertain**. In addition aspects of the biology, productivity and fisheries for this species combined with the data poor status on which to base a more formal assessment are also a cause for concern.
- On the weight-of-evidence available in 2019, **the stock status cannot be assessed and is determined to be uncertain.**

Management advice

- **It is noted that 2017 catches (≈33,000 t) exceed the catch limit prescribed in Resolution 18/05 (25,000 t).**
- **The Commission should provide mechanisms to ensure that catch limits are not exceeded by all concerned fisheries.**
- Research emphasis on further developing possible CPUE indicators are warranted.

Food and Agriculture Organization of the United Nations

RECOMMENDATIONS TO COMMISSION: REVISION OF CATCH LEVEL OF MARLINS

iotc ctoi

RESOLUTION 18/05
ON MANAGEMENT MEASURES FOR THE CONSERVATION OF THE BILLFISHES: STRIPED MARLIN, BLACK MARLIN, BLUE MARLIN AND INDO-PACIFIC SAILFISH
Management Measures: Catch limits

2. CPCs shall endeavour to ensure that the overall catches, of the Indian Ocean Striped Marlin, Black Marlin, Blue Marlin and Indo Pacific Sailfish in any given year do not exceed either the MSY level or, in its absence, the lower limit of the MSY range of central values as estimated by the Scientific Committee.

a. Striped Marlin: 3,260 t
b. Black Marlin: 9,932 t
c. Blue Marlin: 11,930 t
d. Indo Pacific Sailfish: 25,000 t

Management advice. The current catches of blue marlin (average of 11,761 t in the last 5 years, 2013-2017) are higher than MSY (9,984 t) and the stock is currently overfished and subject to overfishing. In order to achieve the Commission objectives of being in the green zone of the Kobe Plot by 2027 ($F_{2027} < F_{MSY}$ and $B_{2027} > B_{MSY}$) with at least a 60% chance, the catches of blue marlin would have to be reduced by 35% compared to the average of the last 3 years, to a maximum value of approximately 7,800 t.

SC22.12 (para. 47) The SC **NOTED** that catches in recent years for Black Marlin, Blue Marlin, Striped Marlin and Indo-Pacific Sailfish have all exceeded the catch limits set by Resolution 18/05, and that current catch trends for all four species show no signs of decline in line with meeting the catch limits by 2020. As such, the SC urgently reiterates its **RECOMMENDATION** that measures are agreed to reduce current catches to the limits set for all four species covered by Resolution 18/05 as per the management advice given in the Executive Summaries

Food and Agriculture Organization of the United Nations

RECOMMENDATIONS TO COMMISSION: REVISION OF CATCH LEVEL OF MARLINS

iotc ctoi

	Striped marlin	Black marlin	Blue marlin	IP sailfish
2014	3,348	18,270	6,973	27,113
2015	3,716	19,099	8,470	28,481
2016	4,516	22,419	9,661	27,034
2017	3,412	15,221	9,853	32,338
2018	2,769	18,841	8,492	33,807
5 years average	**3,552**	**18,770**	8,690	**29,755**
3 years average	**3,566**	**18,827**	9,335	**31,060**
Catch limit set by Resolution 18/05	**3,260** Catches in 2018 **not exceeding** the limit although **the recent average exceeding**	**9,932** Current catches **exceeding** the limit	**11,930** Current atches **not exceeding** the limit	**25,000** Current catches **exceeding** the limit
Rationale of CL in Resolution 18/05	Lower limit of MSY range of central values (3,260-5,400) in 2017 assessment	MSY estimate in 2016 assessment	MSY estimate in 2016 assessment	MSY estimate in 2015 assessment
Updated MSY or its range of central values obtaind after 2018 COM	4,730 (4,270-5,180) in 2018 assessment	12,930 in 2018 assessment	9,980 in 2019 assessment	23,900 in 2019 assessment

RECOMMENDATIONS TO COMMISSION: REVISION OF CATCH LEVEL OF MARLINS

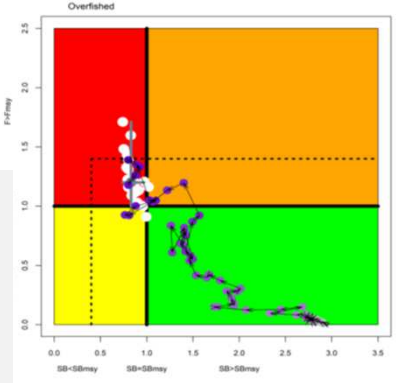
SC22.12	(para. 47) The SC **NOTED** that catches in recent years for Black Marlin, Blue Marlin, Striped Marlin and Indo-Pacific Sailfish have all exceeded the catch limits set by Resolution 18/05, and that current catch trends for all four species show no signs of decline in line with meeting the catch limits by 2020. As such, the SC urgently reiterates its **RECOMMENDATION** that measures are agreed to reduce current catches to the limits set for all four species covered by Resolution 18/05 as per the management advice given in the Executive Summaries

The SC NOTED that caches in recent years for Black Marlin and Indo-Pacific Sailfish have all exceeded the catch limits set by Resolution 18/05, and that current catch trends for the two species show no signs of decline in line with the catch limits by 2020. As such, the SC urgently reiterates its RECOMMENDATION that measures are agreed to reduce current catches to the limits set for the two species covered by Resolution 18/05 as per the management advice in the Executive Summaries.

YELLOWFIN STOCK ASSESSMENT

- **In 2018,** a full stock assessment was conducted based on a grid of 24 runs in SS3, which estimated 2018 stock status as
  Overfished and subject to overfishing (94%)
- However, the SC considered that the assessment was insufficient to cover the full range of uncertainty inherent in the data as well as the model assumptions
- As a precautionary measure, the SC advised that Commission should ensure that the catches are reduced to end overfishing and allow the SSB to recover to SSBmsy levels.

Indicators		2018 stock status[3] determination
Catch 2018[2]: Average catch 2014–2018:	423,815 t (437,422 t)[4] 404,655 t (407,377 t)[4]	94%
MSY (1000 t) (80% CI)[3]: F_{MSY} (80% CI): SB_{MSY} (1,000 t) (80% CI): F_{2017}/F_{MSY} (80% CI): SB_{2017}/SB_{MSY} (80% CI): SB_{2017}/SB_0 (80% CI):	403 (339–436) 0.15 (0.13–0.17) 1069 (789–1387) 1.20 (1.00–1.71) 0.83 (0.74–0.97) 0.30 (0.27 – 0.33)	



Between 2018 SC and 2019 SC

- The SC established a workplan to reduce uncertainties and increase the SC ability to provide concrete and robust advice by the 2019 meeting
- Although a considerable amount effort has been made in 2019 to reduce structural and data uncertainty, the SC 2019 **NOTED** that there was no strong evidence indicating a qualitative difference on the advice provided in 2018

Toward the next regular stock assessment in 2021:

- **Further progress between 2019 SC and 2020 SC**
  - review of all data sources
  - improvement of indices (longline, Maldivian Pole & Line, EU purse seine and fishery-independent)
  - consideration of impact of potential problems with catch reporting
  - development of model configuration and objective model evaluation methods
  - improvement of projection methods
- **From 2020 SC and 2021 SC**
  - data preparatory and stock assessment meetings to improve stock assessment and management advice

Management advice: As a precautionary measure, the SC advised that Commission should ensure that the catches are reduced to end overfishing and allow the SSB to recover to SSB_{MSY} levels.

Food and Agriculture Organization of the United Nations

SUMMARY OF STOCK STATUS

iotc ctoi

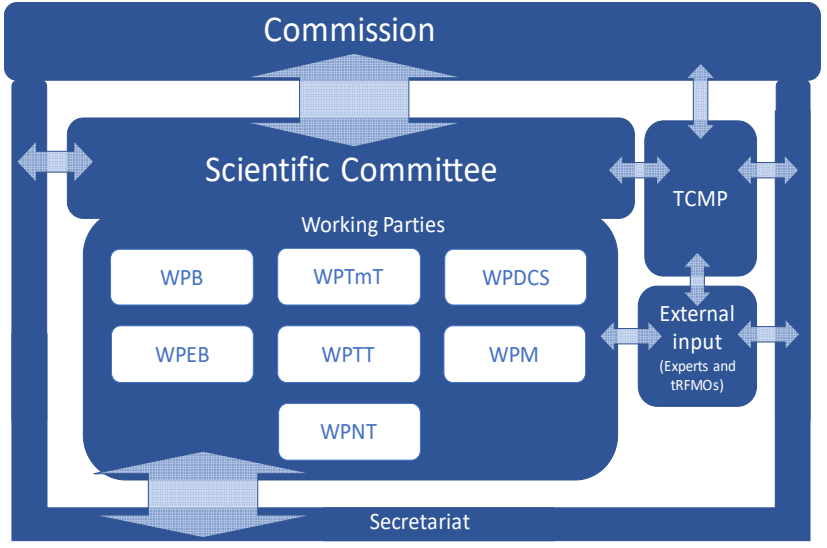
Stock	WP	2015	2016	2017	2018	2019	2020
Albacore	Temperate		SA			SA	
Bigeye tuna			SA			SA	
Skipjack tuna	Tropical			SA			SA
Yellowfin tuna		SA	SA		SA	SA	
Swordfish							SA
Black marlin			SA		SA		
Blue marlin	Billfishs		SA			SA	
Striped marlin		SA			SA		
Indo-Pacific Sailfish		SA				SA	
Bullet tuna							
Frigate tuna							
Kawakawa	Neritics	SA		SA			SA
Longtail tuna		SA	SA	SA			SA
Indo-Pacific king mackerel		SA	SA				SA
Narrow-barred Spanish mackerel		SA	SA	SA			
Blue shark				SA			
Oceanic whitetip shark							
Scalloped hammerhead shark							
Shortfin mako	Bycatch (shark)						SA
Silky shark							
Bigeye thresher shark							
Pelagic threshere shark							
Seabirds	Bycatch						
Marine mammals							
Seaturtles							

OTHER ISSUES AND GENERAL RECOMMENDATIONS FROM THE SC TO THE COMMISSION

OTHER ISSUES: MANAGEMENT STRATEGY EVALUATION (MSE)

Management Strategy Evaluation (MSE): a simulation framework
- for assessing the performance of management procedures (MPs)
- for identifying MPs that robustly meet management objectives

MSE works for 5 stocks: Albacore, Bigeye, Yellowfin, Skipjack, Swordfish



2019	ALB/YFT/BET	SKJ	SWO
TCMP	Provide advice to Commission on elements of candidate MPs that require a decision by the Commission, including the performance of candidate MPs against Commission objectives.	Provide advice to the Commission on any outstanding issues resulting from the application of the HCR if required	Provide advice to Commission on elements of candidate MPs that require a decision by the Commission, including the performance of candidate MPs against Commission objectives
COM	Consider work and advice from subsidiary bodies. Decision and adoption of an MP or provide direction to the WPs/SC on the need to undertake further MSE of candidate or alternative MPs	Consider work and advice from subsidiary bodies and review Resolution 16/02.	Consider work and advice from subsidiary bodies and provide direction to the WPs/SC on the need to undertake further MSE of candidate or alternative MPs
WPs/ SC	Undertake MSE to provide advice on the performance of candidate MPs		Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs

OTHER ISSUES: MANAGEMENT STRATEGY EVALUATION (MSE)

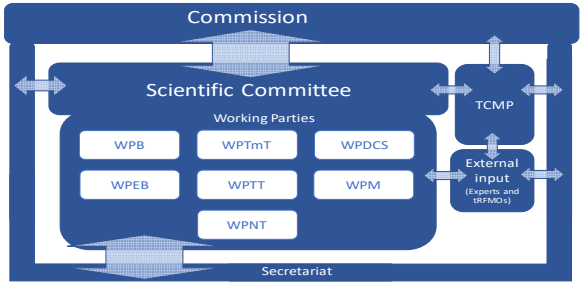
With respect to paper IOTC-2019-SC22-14 "Proposal on a management procedure for yellowfin tuna in the IOTC area of competence"

- The SC **ENCOURAGED** the proponents of the management procedure to resubmit the proposal to the TCMP and the Commission in 2020 for their consideration, with a view to adoption of a management procedure for yellowfin tuna by 2021 as per the proposed updated schedule of work in.
  (now available as IOTC-2020-S24-PropA in this meeting)

With respect to paper IOTC-2019-SC22-15 "Schedule of work for the development of management procedures for key species in the IOTC Area -Update" (submitted by Australia)

- The SC **AGREED** to a new schedule of work, noting it is a living document, and the SC encouraged the schedule should be submitted to the Commission for final endorsement.

(see Appendix 6 of SC report, and the following slides)



Year 2020

Year	Albacore	Skipjack	Yellowfin	Bigeye	Swordfish
2020	**WPs/SC**: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.	**WPs/SC**: Apply harvest control rule (HCR) using results from 2020 stock assessment to calculate total annual catch limit. (Secretariat to advise CPCs of catch limit.) Extend the HCR to develop full candidate MPs and undertake MSE to provide advice on the performance of candidate MPs.	**WPs/SC**: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.	**WPs/SC**: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.	**WPs/SC**: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.

SC chair's note on SKJ:

- A new stock assessment was conducted for Skipjack tuna in 2020 WPTT meeting and its result will be reported in 2020 SC (next month) for endorsement. Once it is endorsed, the SC can calculate an updated annual catch limit in 2020 SC meeting so that the secretariat to advise CPSs of catch limit.
- Also, we must extend the current HCR to a full MP through MSE

Year 2021

Year	Albacore	Skipjack	Yellowfin	Bigeye	Swordfish
2021	**TCMP**: Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of candidate MPs against Commission objectives.	**TCMP**: Provide advice to the Commission on outcomes from the application of the HCR. Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of candidate MPs against Commission objectives.	**TCMP**: Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of candidate MPs against Commission objectives.	**TCMP**: Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of candidate MPs against Commission objectives.	**TCMP**: Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of candidate MPs against Commission objectives.
	Commission: Consider work and advice from subsidiary bodies. Decision and adoption of an MP or provide direction to the WPs/SC on the need for further MSE of candidate or alternative MPs.	**Commission**: Consider work and advice from subsidiary bodies. Decision and adoption of an MP or provide direction to the WPs/SC on the need for further MSE of candidate or alternative MPs.	**Commission**: Consider work and advice from subsidiary bodies. Decision and adoption of an MP.	**Commission**: Consider work and advice from subsidiary bodies. Decision and adoption of an MP or provide direction to the WPs/SC on the need to undertake further MSE of candidate or alternative MPs.	**Commission**: Consider work and advice from subsidiary bodies and provide direction to the WPs/SC on the need to undertake further MSE of candidate or alternative MPs.
	WPs/SC: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.	**WPs/SC**: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.		**WPs/SC**: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.	**WPs/SC**: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.

Year 2022

Year	Albacore	Skipjack	Yellowfin	Bigeye	Swordfish
2022	**TCMP**: Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of candidate MPs against Commission objectives.	**TCMP**: Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of candidate MPs against Commission objectives.		**TCMP**: Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of candidate MPs against Commission objectives.	**TCMP**: Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of candidate MPs against Commission objectives.
	Commission: Consider work and advice from subsidiary bodies. Decision and adoption of an MP or provide direction to the WPs/SC on the need for further MSE of candidate or alternative MPs.	**Commission**: Consider work and advice from subsidiary bodies. Decision and adoption of an MP or provide direction to the WPs/SC on the need for further MSE of candidate or alternative MPs.		**Commission**: Consider work and advice from subsidiary bodies. Decision and adoption of an MP.	**Commission**: Consider work and advice from subsidiary bodies. Decision and adoption of an MP or provide direction to the WPs/SC on the need to undertake further MSE of candidate or alternative MPs.
	WPs/SC: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.	**WPs/SC**: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.			**WPs/SC**: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs.

Year 2023

Year	Albacore	Skipjack	Yellowfin	Bigeye	Swordfish
2023	**TCMP**: Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of	**TCMP**: Provide advice to Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of			**TCMP**: Provide advice to the Commission on elements of candidate MPs, and any proposed Resolutions for an MP, that require a decision by the Commission, including the performance of
	candidate MPs against Commission objectives.	candidate MPs against Commission objectives.			candidate MPs against Commission objectives.
	Commission: Consider work and advice from subsidiary bodies. Decision and adoption of an MP.	**Commission**: Consider work and advice from subsidiary bodies. Decision and adoption of an MP.			**Commission**: Consider work and advice from subsidiary bodies. Decision and adoption of an MP or provide direction to the WPs/SC on the need for further MSE of candidate or alternative MPs.
					WPs/SC: Consider recommendations from the Commission and undertake MSE to provide advice on the performance of candidate MPs,

SC chair's further notes:

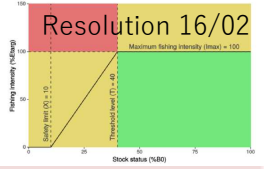
- Due to the COVID-19 pandemic, the MSE task force meeting (March 2020) and TCMP meeting (June 2020) were cancelled, and the WPM has limited hours for discussion. Therefore, TCMP in 2021 is an appropriate place to discuss the schedule in 2021 and onward by looking at progress to be made until then.
- Priorities among species should be re-discussed at the next TCMP and COM

OTHER GENERAL RECOMMENDATIONS TO THE COMMISSION (1)

REPORT OF THE 17TH SESSION OF THE WORKING PARTY ON BILLFISH (WPB17)

SC22.11 (para. 42) The SC reiterated its previous **RECOMMENDATION** that on the next revision of the IOTC Agreement, that short bill spearfish (*Tetrapturus angustirostris*) be included as an IOTC species

REPORT OF THE 21ST SESSION OF THE WORKING PARTY ON TROPICAL TUNAS (WPTT21)



Review of the statistical data available for skipjack tuna

SC22.15 (para. 76) The SC **NOTED** that total catches in 2018 (607,701 t) were 30% higher than the catch limit generated by the Harvest Control Rule (470,029 t) which applies to the years 2018–2020, and that catches have increased over the past 3 years. The SC reiterated its **RECOMMENDATION** that the Commission urgently consider the need to monitor catches of skipjack in the 2019–2020 period to ensure catches do not exceed the limit.

REPORT OF THE 15TH SESSION OF THE WORKING PARTY ON DATA COLLECTION AND STATISTICS (WPDCS15)

SC22.17 (para. 97) **NOTING** that the WPDCS highlighted several issues still affecting the quality of the information available for stock assessment purposes of tropical tunas, the SC **RECOMMENDED** that a data preparatory meeting be held prior to the Working Party on Tropical Tunas.

OTHER GENERAL RECOMMENDATIONS TO THE COMMISSION (2)

REPORT OF THE 15TH SESSION OF THE WORKING PARTY ON ECOSYSTEMS AND BYCATCH (WPEB15)

Status of development and implementation of national plans of action for seabirds and sharks, and implementation of the FAO guidelines to reduce marine turtle mortality in fishing operations

SC22.13 (para. 54) The SC **RECOMMENDED** that the Commission note the current status of development and implementation of National Plans of Action (NPOAs) for sharks and seabirds, and the implementation of the FAO guidelines to reduce marine turtle mortality in fishing operations, by each CPC as provided in Appendix 5, recalling that the IPOA-Seabirds and IPOA-Sharks were adopted by the FAO in 1999 and 2000, respectively, and recommended the development of NPOAs.

Resolution 17/05 and the conservation of sharks in IOTC fisheries

SC22.14 (para. 55) The SC **ENDORSED** the advice of the WPEB regarding the need to improve data collection and reporting for shark species. To this end, the SC **RECOMMENDED** that several initiatives be implemented, including: (i) holding regional workshops to improve shark species identification, shark data sampling and collection (fisheries and biological) and IOTC data reporting requirements; (ii) data mining to fill historical data gaps; (iii) developing alternative tools to improve species identification (e.g. genetic analyses, machine learning, and artificial intelligence).

OTHER GENERAL RECOMMENDATIONS TO THE COMMISSION (3)

SUMMARY DISCUSSION OF MATTERS COMMON TO WORKING PARTIES (CAPACITY BUILDING ACTIVITIES – STOCK ASSESSMENT COURSE; CONNECTING SCIENCE AND MANAGEMENT, ETC.)

Invited Expert(s) at the WP meetings

SC22.18 (para. 104) Given the importance of external independent review for working party meetings, the SC **RECOMMENDED** the Commission continues to allocate sufficient budget for invited scientific experts to be regularly invited to scientific working party meetings.

Meeting participation fund

SC22.19 (para. 105) The SC reiterated its **RECOMMENDATION** that the IOTC Rules of Procedure (2014), for the administration of the Meeting Participation Fund be modified so that applications are due not later than 60 days, and that the full Draft paper be submitted no later than 45 days before the start of the relevant meeting. The aim is to allow the Selection Panel to review the full paper rather than just the abstract, and provide guidance on areas for improvement, as well as the suitability of the application to receive funding using the IOTC MPF. The earlier submission dates would also assist with visa application procedures for candidates.

IOTC species identification guides: Tuna and tuna-like species

SC22.20 (para. 106) The SC reiterated its **RECOMMENDATION** that the Commission allocates budget towards continuing the translation and printing of the IOTC species ID guides so that hard copies of the identification cards can continue to be printed as many CPCs scientific observers, both on board and port, still do not have smart phone technology/hardware access and need to have hard copies on board.

OTHER GENERAL RECOMMENDATIONS TO THE COMMISSION (4)

SCIENCE RELATED ACTIVITIES OF THE IOTC SECRETARIAT IN 2019

SC22.08 (para. 17) The SC **NOTED** the recent departure of two scientific staff at the Secretariat and **ACKNOWLEDGED** that the Secretariat is in the process of recruiting two replacement staff members. Notwithstanding this replacement of staff, the SC **RECALLED** that in 2018 the Commission deferred the recruitment of a P4 officer for the IOTC Data and Science Section until 2020. Given the increased workload of the Secretariat, the SC **RECOMMENDED** that the Commission confirm the reinstatement of this position at its next meeting, so it can be advertised and filled as soon as possible.

NATIONAL REPORTS FROM CPCS

SC22.09 (para. 23) Noting that the Commission, at its 15th Session (in 2011), expressed concern regarding the limited submission of National Reports to the SC, and stressed the importance of providing the reports by all CPCs, the SC **RECOMMENDED** that the Commission note that in 2019, 23 reports were provided by CPCs (26 in 2018, 23 in 2017, 23 in 2016, 26 in 2015) (Table 2).

SC22.10 (para. 24) The SC **RECOMMENDED** that the Compliance Committee and Commission note the lack of compliance by 9 Contracting Parties (Members) and 2 Cooperating Non-Contracting Party (CNCPs) that did not submit a National Report to the Scientific Committee in 2019, noting that the Commission agreed that the submission of the annual reports to the Scientific Committee is mandatory

CPC	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Contracting Parties (Members)														
Australia														
Bangladesh	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.					
China														
Comoros														
Eritrea														
European Union														
France (OT)														
Guinea														
India														
Indonesia	n.a.													
Iran, Islamic Rep. of														
Japan														
Kenya														
Korea, Republic of														
Madagascar														
Malaysia														
Maldives, Rep. of	n.a.	n.a.	n.a.											
Mauritius														
Mozambique	n.a.	n.a.	n.a.	n.a.	n.a.									
Oman, Sultanate of														
Pakistan														
Philippines														
Seychelles, Rep. of														
Sierra Leone	n.a.	n.a.												
Somalia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.						
Sri Lanka														
South Africa, Rep. of														
Sudan														
Tanzania, United Republic of	n.a.													
Thailand														
United Kingdom (OT)														
Yemen	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.								
Liberia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.					
Senegal														

Green = submitted. Red = not submitted. n.a. = not applicable (not a CPC in that year). Green hash = submitted as part of EU report.

OTHER GENERAL RECOMMENDATIONS TO THE COMMISSION (5)

IMPLEMENTATION OF THE REGIONAL OBSERVER SCHEME

SC22.22 (para. 127) The SC **ACKNOWLEDGED** that estimation of ROS coverage for the purse seine fleets is adversely impacted by the lack of uniformity in reporting effort data to the IOTC Secretariat, and AGREED that this information, which is particularly useful to assess the performance of Resolution 11/04, should be further standardized. As such, the SC **RECOMMENDED** that all purse seine fleets reporting effort as fishing hours or fishing days begin to submit this information as 'number of sets' instead, in particular when fulfilling the reporting requirements of Resolution 15/02.

PROGRESS ON THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE PERFORMANCE REVIEW PANEL

SC22.23 (para. 133) The SC **RECOMMENDED** that the Commission note the updates on progress regarding Resolution 16/03, as provided at Appendix 33.

Consultants

SC22.24 (para. 150) Noting the highly beneficial and relevant work done by IOTC stock assessment consultants in previous years, the SC **RECOMMENDED** that the engagement of consultants be continued for each coming year based on the Program of Work. Consultants will be hired to supplement the skill set available within the IOTC Secretariat and CPCs.

OTHER GENERAL RECOMMENDATIONS TO THE COMMISSION (6)

REVIEW OF THE DRAFT, AND ADOPTION OF THE REPORT OF THE 22ND SESSION OF THE SCIENTIFIC COMMITTEE

SC22.25 (para. 160) The SC **RECOMMENDED** that the Commission consider the consolidated set of recommendations arising from SC22, provided at Appendix 38.

Food and Agriculture Organization of the United Nations

SCHEDULE OF 2020 MEETINGS

iotc ctoi

	2020		
Meeting	**No.**	**Date**	**Location**
Working Party on Neritic Tunas (WPNT)	10th	6 – 10 July	Kenya (TBC)
Working Party on Temperate Tunas (WPTmT)	8th	Requested for 2020	NA
Working Party on Billfish (WPB)	18th	2-5 September (4d)	China (TBC)
Working Party on Ecosystems and Bycatch (WPEB)	16th	7-11 September (5d)	China (TBC)
Working Party on Methods (WPM)	11th	17 – 19 October (3d) (with WPTT)	Maldives (TBC)
Working Party on Tropical Tunas (WPTT)	22nd (DP)	17 – 21 February (TBC)	Seychelles
	22nd (AS)	21 – 26 October (6d) (with WPM)	Maldives (TBC)
Working Party on Data Collection and Statistics (WPDCS)	16th	30 November – 3 December (4d)	Seychelles
Scientific Committee (SC)	23rd	5 - 9 December (5d)	Seychelles

Food and Agriculture Organization of the United Nations

DRAFT SCHEDULE OF 2021 AND 2022 MEETINGS

iotc ctoi

	2021			2022		
Meeting	**No.**	**Date**	***Location**	**No.**	**Date**	***Location**
Working Party on **Temperate Tunas**	08th	April	TBC	9th	TBC	TBC
Working Party on **Tropical Tunas (Data Preparatory meeting)**	23rd	TBC	TBC	24th	TBC	TBC
Working Party on **Ecosystems and Bycatch** (WPEB) BSH Data Preparatory Meeting	17th	TBC	TBC	-	NA	NA
Working Party on **Neritic Tunas**	11th	July	TBC	12th	TBC	TBC
Working Party on **Billfish** (WPB)	19th	September (4d)	TBC	20th	TBC	TBC
Working Party on **Ecosystems and Bycatch** (WPEB)	17th	September (5d)	TBC	18th	TBC	TBC
Working Party on **Methods**	12th	October (3d) (with WPTT)	TBC	13th	October (3d) (with WPTT)	TBC
Working Party on **Tropical Tunas** (Assessment meeting)	23rd	October (6d) (with WPM)	TBC	24th	October (6d) (with WPM)	TBC
Working Party on **Data Collection and Statistics**	17th	November (3d)	TBC	18th	November (3d)	TBC
Scientific Committee	24th	November/December (5d)	TBC	25th	December (5d)	TBC

- Data preparatory meetings are important therefore have been included for WPTT as recommended.
- Due to the Covid-19 crisis and the cancellation of physical meetings for the foreseeable future, offers to host meetings in 2021 were not requested or accepted.
- Should the situation change, the Secretariat will work with Member countries to determine hosting of these meetings.

2020 Scientific Committee

- December 7-11: virtual session
- Deadlines
  - ✓November 7th : for the submission of **papers titles**
  - ✓November 22nd : for the submission of **National reports**
  - ✓November 22nd: for the submission of **full papers**

THANK YOU SO MUCH FOR KIND ATTENTION