SCRS Report 2018

PANEL 1

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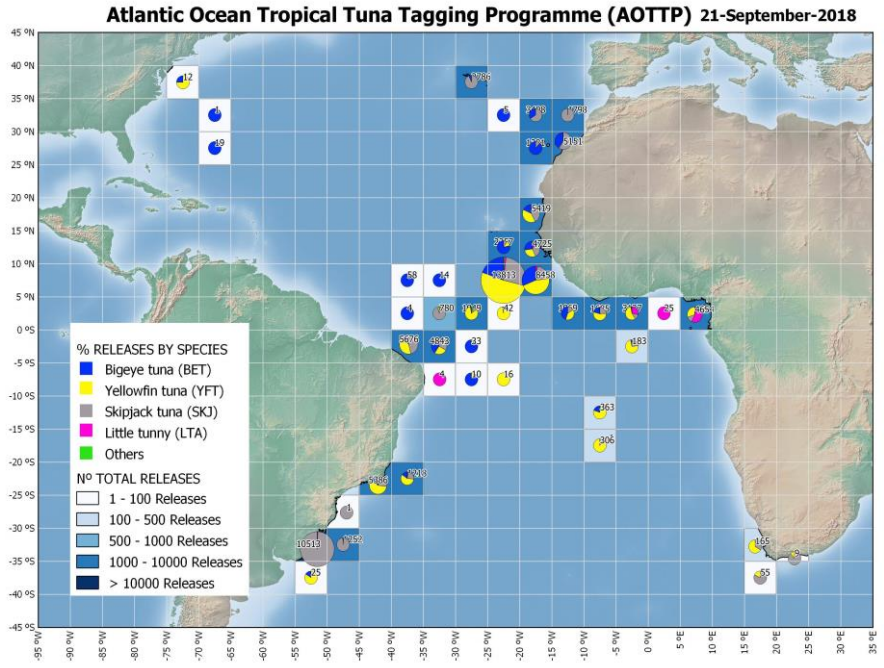
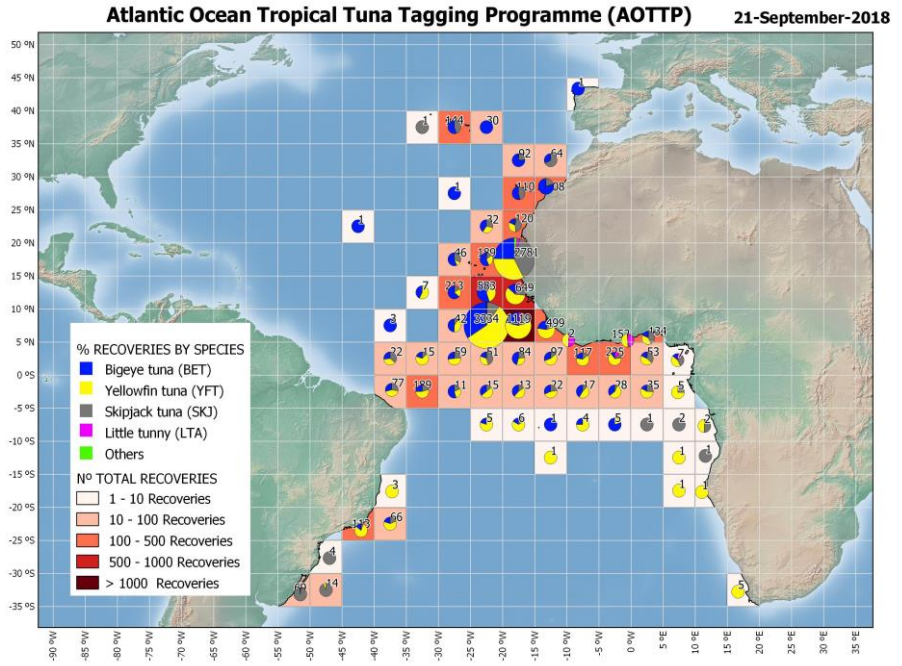
Tropical tuna summary

- AOTTP
- State of Stocks and Outlook (from Executive Summaries)
  - BET, YFT and SKJ
- Responses to the Commission
- Effects of Current regulations (from Executive Summaries)
  - BET, YFT and SKJ
- Management recommendations(from Executive Summaries)
  - BET, YFT and SKJ
- MSE

AOTTP - Evidence based approach for sustainable management of tuna resources in the Atlantic Ocean

- **THREE EXPECTED RESULTS**
  - Tag-recapture data for tropical tuna species in ICCAT database
  - Key parameters (e.g. growth, mortality and migration) for stock assessment estimated from AOTTP tag-recapture data
  - Scientists from developing Contracting Parties of ICCAT trained in tagging data collection and scientific analyses





ICCAT CICTA CICAA **Research Programs: AOTTP**

Species	Releases	Recoveries	Rate %
Bigeye	19,198	4,077	21%
Little tunny	4,556	393	9%
Skipjack	39,448	2,670	7%
Wahoo	131	1	1%
Yellowfin	28,833	5,837	21%
Total	**92,418**	**13,065**	**14%**

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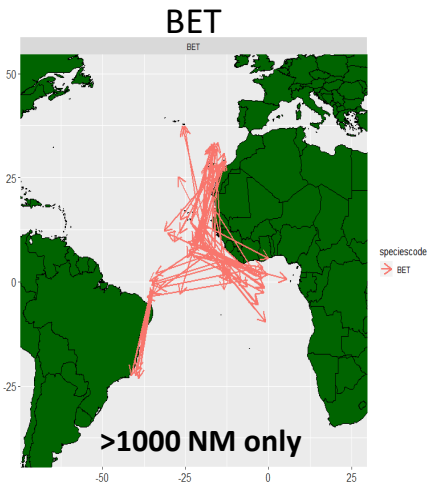
Tuna movements

Species	Mean	Max
Bigeye	229 NM	4421 NM
Little tunny	144 NM	630 NM
Skipjack	226 NM	3445 NM
Yellowfin	210 NM	4312 NM



http://aottp.iccat.int/maps/migration/

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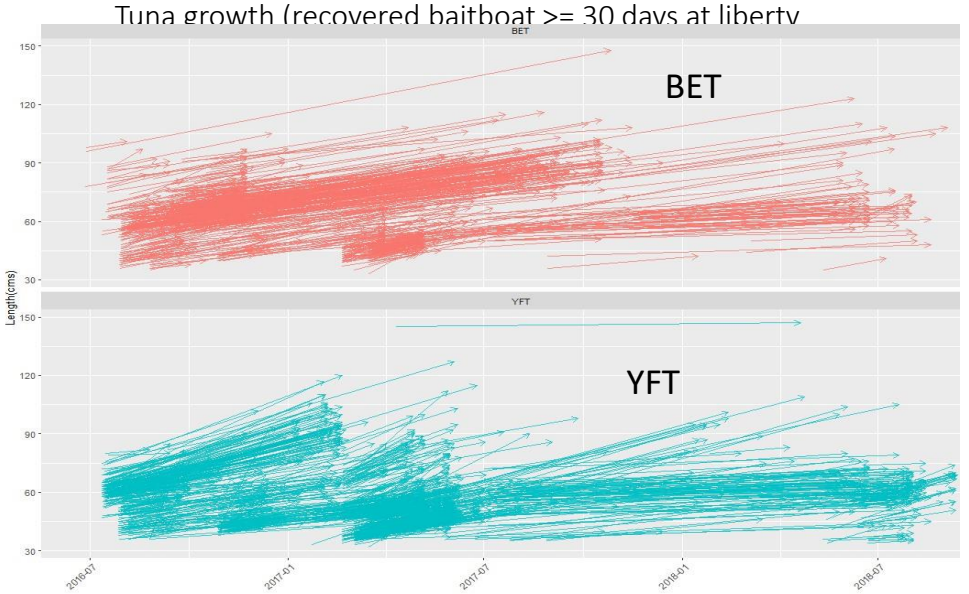
Tuna growth (recovered baitboat >= 30 days at liberty



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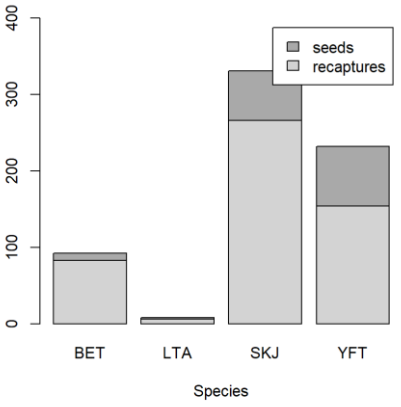
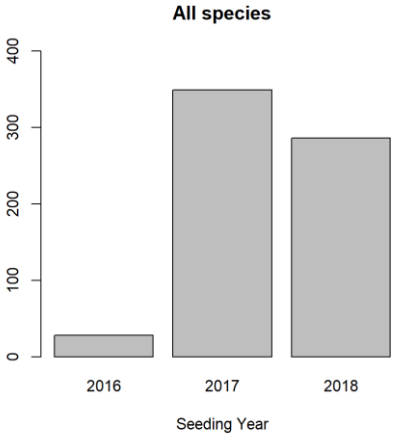
Tag seeding





ICCAT CICTA CICAA *Research Programs: AOTTP*

Capacity building activities

awareness-raising activities

Tagging and recovery

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AOTTP - Budget

- EU contributing with **90%** of the overall **15 M€** for a 5 year period (ends June 2020)
- **10%** from ICCAT Contracting Parties and Contributors (USA, China, Canada, Uruguay, Chinese-Taipei)

	Year 1	Year 2	Year 3
Human resources	179,405 €	317,300 €	413,784 €
Other costs	135,699 €	356,065 €	315,951 €
Travel	8,984 €	37,043 €	67,448 €
Equipment/supplies	846,148 €	121,176 €	141,710 €
Tagging	920,254 €	3,508,274 €	2,270,085 €
TOTAL	**2,090,490 €**	**4,339,858 €**	**3,208,978 €**

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AOTTP – future plans

Tagging:

- USA & Caribbean
- Gulf of Guinea
- St Helena
- Canary Islands
- Cabo Verde and Mauritania
- Northern Brazil

Research:

- Hard part/ageing
- Targeted research will be commissioned
- Final AOTTP Symposium will be organised for May 2020.

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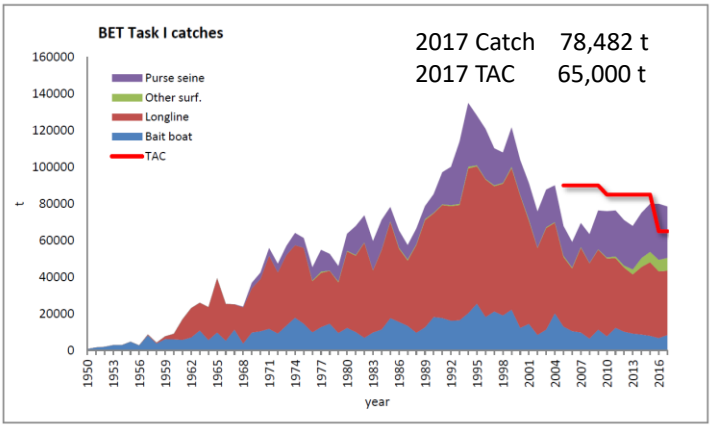
BET Fishery indicators

Nominal catches in the last two years have exceed the agreed TAC (65,000 t) by around 20%.



Extensive review and re-estimation of annual catches. Large difference between preliminary catch of 2016 (72,375 t.) reported in SCRS 2017 compared to the 2016 catch level used in the 2018 stock assessment (79,958 t).

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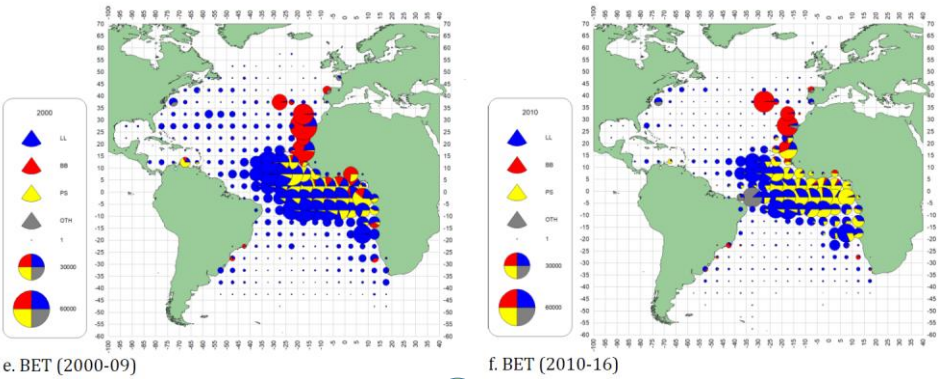
BET Fishery indicators

Geographic distribution of catches



e. BET (2000-09) f. BET (2010-16)

LONGLINE PURSE SEINE

BAITBOAT OTHER GEAR

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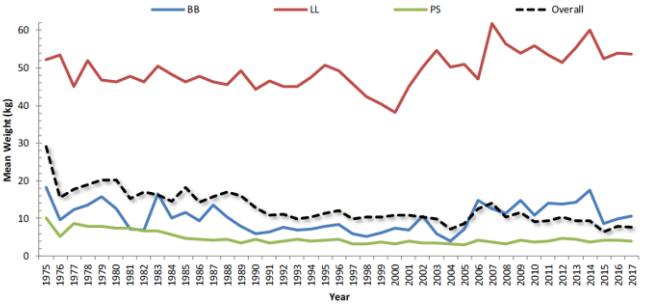
BET Fishery indicators

Since 2000, several longline fleets have shown increases in the mean weight of bigeye tuna caught, with the average longline-caught fish increasing from 40 kg to 60 kg between 2000 and 2008.

Average weight of bigeye tuna caught in free schools is more than double the average weight of those caught around FADs.



Trend of mean weight for bigeye based on the catch-at-size data for 1975-2017 by major fisheries (BB=Baitboats, LL=Longlines, PS=Purse seine). The mean weight of the baitboat fishery (BB) reflects various baitboat fleets operating in different areas of the Atlantic Ocean.

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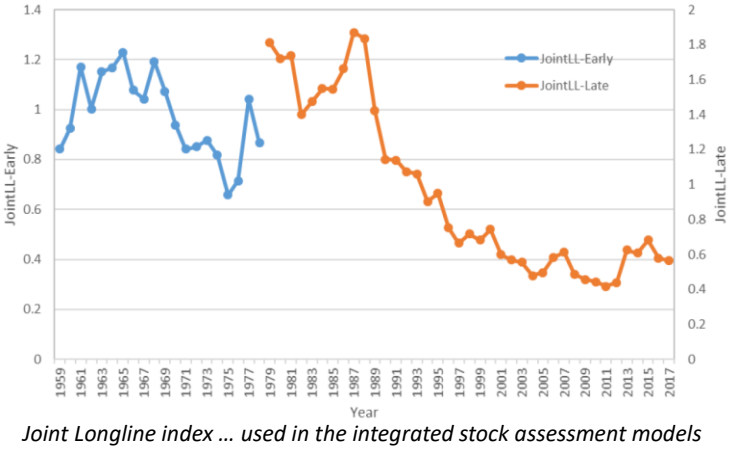
BET Fishery indicators

Joint Longline standardized abundance index using operational detailed data of longline major fleets (Japan, Korea, United States and Chinese Taipei) from 1959-2017

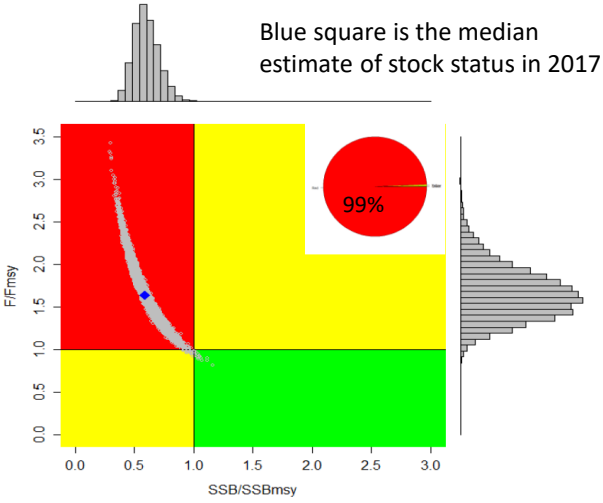


Joint Longline index … used in the integrated stock assessment models and the production assessment models. Note that the second time period of the split index is on the second y-axis.

BET Stock Status

Uncertainty of the stock assessment results has decreased from previous stock assessments. This is likely the result of the use of the improved joint LL index, the confirmation that catches continue to exceed TACs, and the use of a single model platform (integrated analysis SS) for the provision of the management advice.

Blue square is the median estimate of stock status in 2017



BET Executive Summary Table

The current MSY may be below what was achieved in past decades because overall selectivity has shifted to smaller fish. Calculations of the time-varying benchmarks from SS3 uncertainty grid show a long-term increase in SSB_{MSY} and a general long term decrease in MSY

ATLANTIC BIGEYE TUNA SUMMARY

Maximum Sustainable Yield	76,232 t (72,664-79,700 t)[1]
Current (2017) Yield	78,482 t[2]
Relative Spawning Biomass (SSB_{2017}/SSB_{MSY})	0.59 (0.42-0.80)[1]
Relative Fishing Mortality (F_{2017}/F_{MSY})	1.63 (1.14-2.12)[1]
Stock Status (2017)	Overfished: Yes Overfishing: Yes
Conservation & management measures in effect:	[Rec. 16-01] – Total allowable catch for 2016-2018 is set at 65,000 t for Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities. – Be restricted to the number of their vessels notified to ICCAT in 2005 as fishing for bigeye tuna. – Specific limits of number of longline boats; China (65), Chinese Taipei (75), Philippines (5), Korea (14), EU (269) and Japan (231). – Specific limits of number of purse seine boats; EU (34) and Ghana (17). – No fishing with natural or artificial floating objects during January and February in the area encompassed by the African coast, 20° W, 5°N and 4°S. – No more than 500 FADs active at any time by vessel. – Use of non-entangling FADs.

[1] Combined result of SS3 18 uncertainty grid. Median and 10 and 90% percentile in brackets.
[2] Reports for 2017 reflect most recent data but should be considered provisional.

ICCAT CICTA CICAA **BET Outlook**

(a) Probability of Overfishing Not Occurring (F <= F_{MSY})

Current TAC →

Catch	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
35	93	98	99	100	100	100	100	100	100	100	100	100	100	100	100
37.5	88	95	98	99	100	100	100	100	100	100	100	100	100	100	100
40	80	91	96	98	99	100	100	100	100	100	100	100	100	100	100
42.5	72	85	92	96	98	99	100	100	100	100	100	100	100	100	100
45	63	75	86	91	95	97	99	99	100	100	100	100	100	100	100
47.5	53	67	77	85	91	94	97	98	99	100	100	100	100	100	100
50	44	56	68	76	83	88	92	95	97	98	99	100	100	100	100
52.5	35	46	58	66	75	80	85	89	92	95	96	98	99	99	100
55	28	37	48	55	63	70	75	79	84	87	90	93	94	96	97
57.5	22	29	37	44	52	58	63	69	73	77	79	82	85	88	89
60	17	22	29	35	42	47	51	57	60	64	67	70	72	74	76
62.5	12	17	21	26	32	36	40	45	48	51	53	57	59	60	62
65	9	12	16	19	23	27	32	34	38	40	43	46	47	50	50
67.5	7	8	11	13	16	19	23	27	30	34	36	39	41	42	42
70	4	6	7	9	12	14	16	20	25	28	31	32	33	34	34
72.5	3	5	6	6	8	10	13	17	22	23	23	24	25	24	23
75	2	3	3	5	6	8	11	15	16	16	16	14	12	8	6
77.5	1	2	3	3	4	7	10	11	12	10	7	4	1	1	1
80	1	1	1	2	3	5	8	9	6	3	1	0	0	0	0
82.5	1	1	1	2	3	5	6	5	2	1	0	0	0	0	0
85	1	1	1	1	2	4	4	1	0	0	0	0	0	0	0
87.5	0	0	1	1	2	3	1	0	0	0	0	0	0	0	0
90	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0

ICCAT CICTA CICAA **BET Outlook**

(b) Probability of Not Overfished (SSB >= SSB_{MSY})

Current TAC →

Catch	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
35	0	3	11	26	46	62	77	88	94	97	99	100	100	100	100
37.5	0	3	10	24	41	58	73	82	90	95	98	99	100	100	100
40	0	2	9	21	37	53	67	78	87	93	96	98	99	100	100
42.5	0	2	9	19	33	49	62	73	81	89	94	96	98	99	100
45	0	2	8	17	30	43	56	67	76	84	90	94	96	98	99
47.5	0	2	7	15	26	37	50	60	70	78	84	90	93	96	98
50	0	2	6	13	22	33	44	55	63	70	77	84	88	92	94
52.5	0	2	5	11	20	28	37	47	55	62	70	76	80	85	89
55	0	2	5	10	17	25	32	40	48	55	61	67	72	76	80
57.5	0	2	4	9	14	20	26	35	40	47	52	56	62	67	70
60	0	2	4	7	12	17	23	29	35	39	44	49	52	55	59
62.5	0	1	3	6	10	14	19	24	29	33	37	41	44	48	51
65	0	1	3	5	8	12	16	19	24	28	31	35	38	42	44
67.5	0	1	2	4	7	9	12	16	19	24	28	32	34	36	37
70	0	1	2	3	5	8	10	12	17	20	26	27	27	28	29
72.5	0	1	2	3	4	6	8	11	15	19	18	19	20	19	19
75	0	1	2	3	4	5	7	10	14	13	13	12	9	6	4
77.5	0	1	2	2	3	4	7	9	10	10	7	4	2	1	1
80	0	1	1	2	3	3	5	8	7	4	2	0	0	0	0
82.5	0	1	1	1	2	3	6	6	3	1	0	0	0	0	0
85	0	1	1	1	1	3	4	2	1	0	0	0	0	0	0
87.5	0	0	1	1	1	3	2	1	0	0	0	0	0	0	0
90	0	0	1	1	1	3	1	0	0	0	0	0	0	0	0

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(c) Probability of Not Overfished (SSB >= SSBmsy) and Overfishing not occurring (F <= F_{MSY})

Catch	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
35	0	3	11	26	46	62	77	88	94	97	99	100	100	100	100
37.5	0	3	10	24	41	58	73	82	90	95	98	99	100	100	100
40	0	2	9	21	37	53	67	78	87	93	96	98	99	100	100
42.5	0	2	9	19	33	49	62	73	81	89	94	96	98	99	100
45	0	2	8	17	30	43	56	67	76	84	90	94	96	98	99
47.5	0	2	7	15	26	37	50	60	70	78	84	90	93	96	98
50	0	2	6	13	22	33	44	55	63	70	77	84	88	92	94
52.5	0	2	5	11	20	28	37	47	55	62	70	76	80	85	89
55	0	2	5	10	17	25	32	40	48	55	61	67	72	76	80
57.5	0	2	4	9	14	20	26	35	40	47	52	56	62	67	70
60	0	2	4	7	12	17	23	29	35	39	44	49	52	55	59
62.5	0	1	3	6	10	14	19	24	29	34	37	41	44	48	51
65	0	1	3	5	8	12	16	19	24	28	31	35	38	42	44
67.5	0	1	2	4	7	9	12	16	19	23	28	32	34	36	39
70	0	1	2	3	5	8	10	12	17	20	26	27	27	28	29
72.5	0	1	2	3	4	6	8	11	15	19	18	19	20	19	19
75	0	1	2	3	4	5	7	10	14	13	13	12	9	6	4
77.5	0	1	2	2	3	4	6	9	10	10	6	4	1	1	1
80	0	1	1	2	3	3	5	8	6	3	1	0	0	0	0
82.5	0	1	1	1	2	3	5	5	2	1	0	0	0	0	0
85	0	0	1	1	1	3	4	1	0	0	0	0	0	0	0
87.5	0	0	1	1	1	2	1	0	0	0	0	0	0	0	0
90	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0

2018 TAC

Projections with current TAC level is not expected to end overfishing (F<FMSY) with 50% probability until 2032. Higher probabilities of rebuilding require longer timeframes and/or larger reduction of current catches.

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Percent of the model runs that resulted in SSB levels <= 10% of SSB_{MSY} during the projection period in a given year for a given catch level (in 1000 t) for Atlantic bigeye tuna.

when projecting at current catch level, 56% of the model runs resulted in SSB levels below 10% of SSBMSY by 2032

Catch	Perc0.1 2024	Perc0.1 2025	Perc0.1 2026	Perc0.1 2027	Perc0.1 2028	Perc0.1 2029	Perc0.1 2030	Perc0.1 2031	Perc0.1 2032	Perc0.1 2033
35	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
37.5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
40	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
42.5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
45	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
47.5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
52.5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
55	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
57.5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
60	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
62.5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
65	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%
67.5	0%	0%	0%	0%	0%	0%	6%	17%	17%	17%
70	0%	0%	0%	0%	0%	11%	17%	17%	17%	22%
72.5	0%	0%	0%	0%	11%	17%	17%	28%	33%	33%
75	0%	0%	0%	11%	17%	28%	33%	33%	33%	33%
77.5	0%	0%	6%	17%	28%	33%	33%	33%	56%	56%
80	0%	0%	17%	33%	33%	33%	44%	61%	67%	67%
82.5	0%	6%	22%	33%	39%	61%	61%	67%	67%	78%
85	0%	17%	33%	39%	61%	67%	67%	78%	78%	83%
87.5	0%	28%	39%	50%	61%	67%	78%	83%	83%	94%
90	11%	33%	50%	61%	67%	78%	83%	94%	94%	100%

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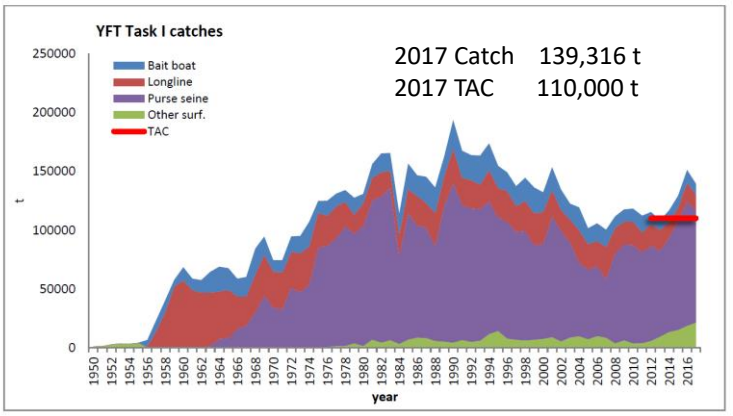
YFT Fishery Indicators



During 2012 and 2014, overall catches exceeded TAC by 5-6%. Since then, overages have increased substantially, to 17% (129,000 t) in 2015, 37% (151,200 t) in 2016 and 27% (139,300 t) in 2017.

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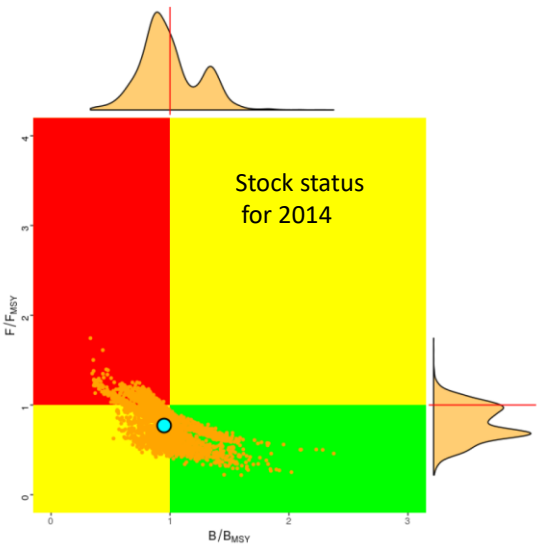
YFT Stock Status

The results of the 2016 assessment indicated that …the current stock status is overfished but not undergoing Overfishing in 2014.

The estimated MSY (median = 126,304 t) may be below what was achieved in past decades because overall selectivity has shifted to smaller fish.



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YFT Outlook

Probability of being in the green quadrant of the Kobe plot

c) Probability that $F<F_{MSY}$ and $B>B_{MSY}$

Catch	2017	2018	2019	2020	2021	2022	2023	2024
60,000	75%	91%	99%	99%	99%	99%	100%	100%
70,000	74%	87%	97%	99%	99%	99%	99%	99%
80,000	73%	86%	96%	99%	99%	99%	99%	99%
90,000	71%	82%	91%	97%	99%	99%	99%	99%
100,000	70%	80%	89%	92%	96%	97%	99%	99%
110,000	68%	78%	85%	90%	92%	95%	96%	97%
120,000	65%	73%	79%	78%	79%	80%	82%	82%
130,000	57%	59%	61%	61%	57%	54%	50%	48%
140,000	45%	44%	38%	33%	31%	31%	31%	30%
150,000	31%	24%	21%	20%	19%	20%	20%	20%

Projections conducted in 2016 concluded that … catches less than 120,000 t led to, or maintained a healthy stock status through 2024. As the actual 2016 and 2017 catches exceeded the values assumed for projections and the TAC, the percentages above (and in YFT Table 2), are likely to be optimistic.

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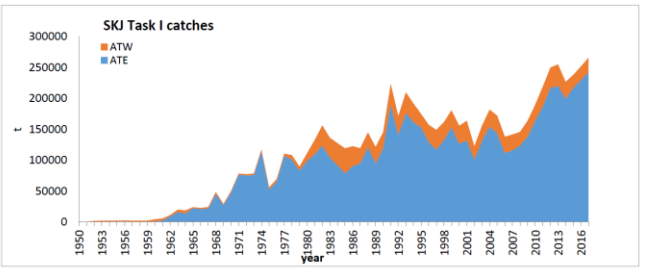
SKJ Fishery Indicators

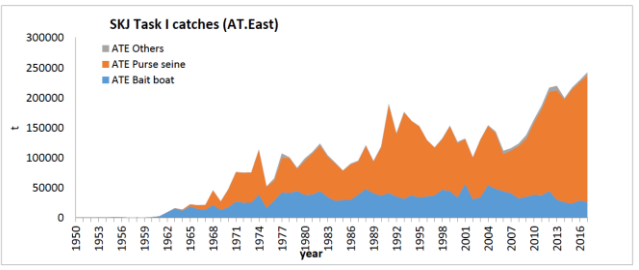
2017 Total Catch 265,565 t

2017 West Catch 23,276 t



2017 Total Catch 242,289 t

Highest ever!



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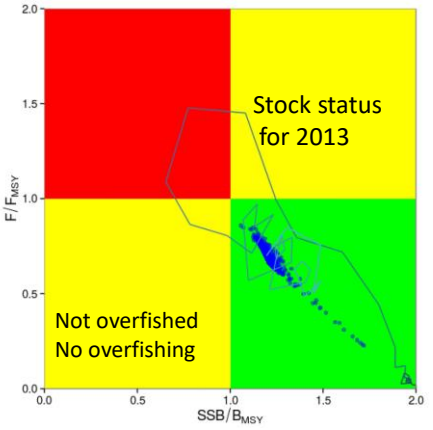
SKJ Status of stocks

SKJ East

- It is difficult to estimate the MSY in conditions of continuous growth of catches without having reliable indicators on the response of the stock to these increases.
- No reliable estimate of the maximum sustainable yield :
  - Not likely to be overfished
  - Not likely to have overfishing

SKJ West



No projections conducted for either stock, no TAC

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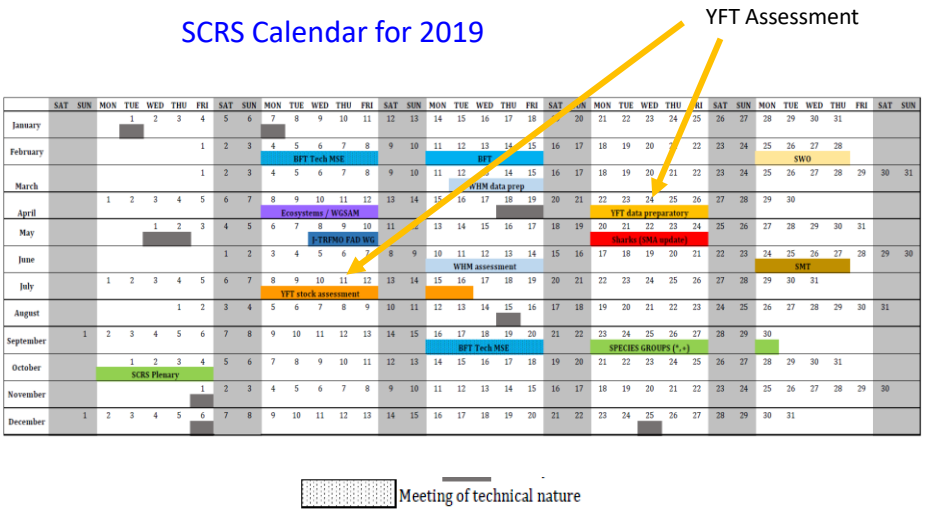
Inter-sessional SCRS meetings

SCRS Calendar for 2019



Recommendations with financial implications

- Committee recommends to hire a contractor to coordinate data aggregation and produce an aggregated index for longline fleets targeting yellowfin tuna. This approach will greatly facilitate the work of the SCRS by coordinating the data from various CPCs while assuring data confidentially. Funds requested for this activity in 2019 amount to €35,000.

- - The Committee recommends the procurement of additional funds to support the continued development of the MSE for Tropical tunas. Specifically, the Committee supports extending the current contract to support "Phase 2 and 3" activities. Funds requested for this activity in 2019 amount to €140,000.

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Responses to the Commission

19.1 Ghana's comprehensive and detailed capacity management plan on the level of catches. Rec. 16- 01, paragraph 12c

No new information was submitted this year to allow further evaluation of the Ghana's capacity management plan.

ICCAT CICTA CICAA **Responses to the Commission**

19.2 Evaluate the efficacy of the area/time closure referred to in paragraph 13 for the reduction of catches of tropical tuna juveniles. Rec. 16-01, paragraph 15

- The new time-area closure adopted was applied in January 2017 for the first time.
  - the effects could be a major reduction of the Ghanaian catches
  - it is not possible to discriminate the impact of the moratorium from the impact of the previous moratoria or other management measures (e.g. TAC and FAD limits)
  - No difference in the length distributions of bigeye tuna inside and outside the closure area.
  - … while more time is needed to be able to answer the request from the Commission …, preliminary results show that FAD effort relocation to areas outside the moratorium and current and possibly future increases of the effort (number of purse seiners, number of FADs sets, etc.) may render this measure ineffective unless additional measures are adopted to address these impacts.
  - The Committee considered that a larger area, possibly combined with a longer closure, may address the issue of redistribution of effort.
  - A thorough analysis of the AOTTP data and of the interplay between fishing capacity, fishing effort and fishing mortality, these considerations will allow the further exploration of the effectiveness of any time/area closures within a much broader management context.

ICCAT CICTA CICAA **Responses to the Commission**

19.3 Recommendations made by the FAD Working Group (Annex 8) and develop a work plan. Rec. 16-01, paragraph 49 (a)

- FAD and buoys have a complicated dynamics (Figure 19.3.2).
- Proposed list of definitions of FAD-related terms should be considered as interim, subject to further improvements, especially in the context of the work of the joint t-RFMO FAD Technical Working Group
- Committee proposes minimum standards for Data collection and Reporting Requirement on FADs (SCRS/2018/159)
- New ST08a and ST08b forms for data reporting on FADs and buoys are proposed

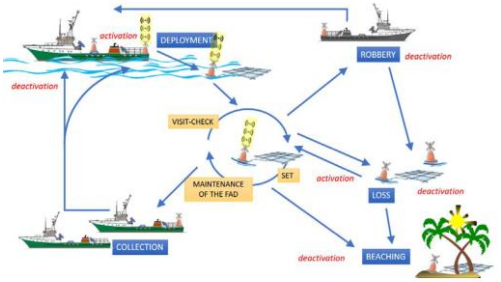

Figure 19.3.2. Life cycle of a buoy in connection with FAD activities (SCRS/2018/158).

ICCAT CICTA CICAA **Responses to the Commission**

19.4 Develop a table that quantifies the expected impact on MSY, BMSY, and relative stock status for both bigeye and yellowfin resulting from reductions of the individual proportional contributions of major fisheries to the total catch. Rec. 16-01, paragraph 49 (c)

Committee examined the approximate relative changes to yield at MSY, SSB required to produce MSY, and the SSB/SSB_{MSY} ratio that can be expected from a series of changes to fleet allocation in the projection:

1) Using a decision support tool
- tested reductions in fishing mortality (F) of 10, 20, 50, and 100 percent for each of the main gear types (longline, purse seine – free school, purse seine – FAD, and baitboat), with the reduced F reallocated, proportionally, to the remaining fleets. (Table 19.4.1 and 19.4.4)
- examined how reverting to selectivity patterns characteristic of the 1980s would affect the metrics listed above.

2) Examined historical "fishery impacts" of each main gear type

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19.4 reductions in fishing mortality for each of the main gear types

Reallocation of part of a gear's catch to other gears

Table 19.4.1. Percent change in bigeye tuna maximum sustainable yield (MSY) associated with a reallocation of fishing mortality from an individual fleet to the other fleets. Scenarios examined included a 10%, 20%, 50%, and 100% reallocation of F from purse seines on free schools, fishing on FADs+Ghana, baitboats, and longlines. Under the current fleet allocation (i.e. status quo) the MSYs estimated for bigeye using the DST were 76,087 t, 77,536 t and 77,401 t for Run 3 which is the closest to the median run.

Bigeye Run 3 Maximum Sustainable Yield				
Treatment	*PS Free School*	*FADs+Ghana*	*Baitboat*	*Longline*
10% reduction	-0.2%	10%	0.2%	-2%
20% reduction	-0.5%	17%	0.3%	-5%
50% reduction	-1%	32%	1%	-13%
100% reduction	-2%	46%	2%	-30%

Table 19.4.4. Percent change in yellowfin tuna maximum sustainable yield associated with a reallocation of fishing mortality from an individual fleet to the other fleets. Scenarios examined included a 10%, 20%, 50%, and 100% reallocation of F from purse seines on free schools, fishing on FADs+Ghana, baitboats, and longlines. Under the current fleet allocation (i.e. status quo) the MSYs estimated for yellowfin using the DST were 123,765 t and 126,314 t for Run 5 and 7, averaged.

Yellowfin averaged Maximum Sustainable Yield				
Treatment	*PS Free School*	*FADs+Ghana*	*Baitboat*	*Longline*
10% reduction	-2%	6%	0.0%	-0.6%
20% reduction	-4%	12%	0.0%	-1.3%
50% reduction	-9%	27%	-0.1%	-3%
100% reduction	-19%	49%	-0.2%	-7%

19.4 reductions in fishing mortality for each of the main gear types

Table 19.4.2. Percent change in bigeye tuna spawning stock biomass that would produce maximum sustainable yield (SSB_{MSY}) associated with a reallocation of fishing mortality from an individual fleet to the other fleets. Scenarios examined included a 10%, 20%, 50%, and 100% reallocation of F from purse seines on free schools, fishing on FADs+Ghana, baitboats, and longlines.

Bigeye Run 3 Spawning Stock Biomass to produce MSY				
Treatment	*PS Free School*	*FADs+Ghana*	*Baitboat*	*Longline*
10% reduction	-0.1%	-2%	0.2%	0.1%
20% reduction	-0.2%	-3%	1%	0.1%
50% reduction	-1%	-8%	2%	-0.1%
100% reduction	-1%	-13%	4%	-3%

Much less impact on Spawning stock biomass

Table 19.4.5. Percent change in yellowfin tuna spawning stock biomass that would produce maximum sustainable yield (SSB_{MSY}) associated with a reallocation of fishing mortality from an individual fleet to the other fleets. Scenarios examined included a 10%, 20%, 50%, and 100% reallocation of F from purse seines on free schools, fishing on FADs+Ghana, baitboats, and longlines.

Yellowfin averaged Spawning Stock Biomass to produce MSY				
Treatment	*PS Free School*	*FADs+Ghana*	*Baitboat*	*Longline*
10% reduction	-0.6%	-1%	0.1%	0.1%
20% reduction	-1.2%	-2%	0.2%	0. 3%
50% reduction	-3%	-6%	0.5%	0.5%
100% reduction	-9%	-17%	1%	1%

ICCAT CICTA CICAA Responses to the Commission

19.4 reductions in fishing mortality for each of the main gear types

Table 19.4.3. Percent change in hypothetical stock status of bigeye tuna in 2017 (SSB/SSB_{MSY}) associated with a change in the spawning biomass benchmarks that would have occurred with a reallocation of fishing mortality from an individual fleet to the other fleets. Scenarios examined included a 10%, 20%, 50%, and 100% reallocation of F from purse seines on free schools, fishing on FADs+Ghana, bait boats, and longlines.

Bigeye Run 3 Stock Status in 2017 (SSB/SSB_{MSY})				
Treatment	*PS Free School*	*FADs+Ghana*	*Baitboat*	*Longline*
10% reduction	0.1%	1.7%	-0.2%	-0.1%
20% reduction	0.2%	3.4%	-0.7%	-0.1%
50% reduction	0.6%	8.1%	-1.7%	0.1%
100% reduction	1.3%	14.6%	-3.7%	3.1%

Much less impact on relative stock status

Table 19.4.6. Percent change in hypothetical stock status of yellowfin tuna (SSB/SSB_{MSY}) in in 2016 associated with a change in the spawning biomass benchmarks that would have occurred with a reallocation of fishing mortality from an individual gear fleet to the other fleets. Scenarios examined included a 10%, 20%, 50%, and 100% reallocation of F from purse seines on free school, fishing on FADs+Ghana, bait boats, and longlines.

Yellowfin Stock Status in 2014 (SSB/SSB_{MSY})				
Treatment	*PS Free School*	*PS FAD/Ghana*	*Baitboat*	*Longline*
10% reduction	0.6%	0.6%	-0.1%	0.1%
20% reduction	1.2%	1.6%	-0.2%	-0.3%
50% reduction	3.6%	6.5%	-0.5%	-0.4%
100% reduction	9.8%	19.8%	-1.0%	-1.0%

ICCAT CICTA CICAA **Responses to the Commission**

19.4 reductions in fishing mortality for each of the main gear types

Changing catch allocation to the pattern seen in the 1980s

Table 19.4.7. Percent change in bigeye and yellowfin tuna estimated benchmarks and stock status projected under historical fleet F allocations compared to the current allocations. Scenarios examined included the fleet allocations during 1980-1989, and 2000-2015.

Historical Allocations (using 1980-1989 selectivity pattern and allocation)		
Benchmark	*Bigeye Run 3*	*Yellowfin*
PME	41%	-6%
SSB_{PME}	-15%	-11%
SSB/SSB_{PME}	17,5%	12,4%
Historical Allocations (using 2000-2015 selectivity pattern and allocation)		
Benchmark	*Bigeye Run 3*	*Yellowfin*
PME	8%	-6%
SSB_{PME}	1%	-2%
SSB/SSB_{PME}	-0,8%	2,2%

ICCAT CICTA CICAA **Responses to the Commission**

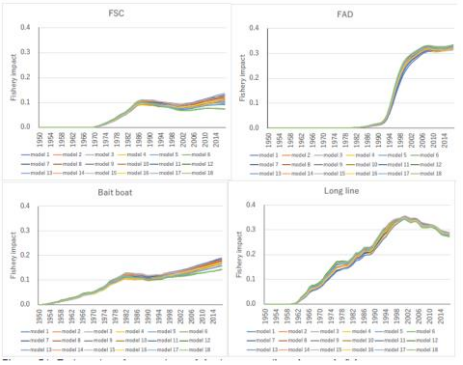
19.4 reductions in fishing mortality for each of the main gear types

Historical impacts of each gear type

One can determine the relative impact of an individual fleet by removing the historical mortality generated by that fleet. As that mortality is removed, the stock responds by growing in size. This growth is a measure of the foregone growth potential resulting from the past harvests of each fleet through time, thus it is an indicator of the impact of each fleet on the overall spawning stock biomass.

Fishery Impact

FSC	FAD	BB	LL
0.10	0.32	0.16	0.28



BET Management recommendations

- The Commission should urgently ensure that catches are appropriately reduced to end overfishing and allow the stock to recover following the Decision Framework adopted in paragraph 3 of Rec. 11-13.

- Furthermore, the Committee notes that the necessary reduction of fishing mortality could be not achieved with current and previous FAD time area closures and/or changes to fleet allocation alone.

- The Commission should be aware that increased harvests on small fishes by FADs and other fisheries as well as the development of new fisheries could have had negative consequences for the productivity of bigeye tuna fisheries … and, therefore, should the Commission wish to increase long-term sustainable yield, the Committee continues to recommend that effective measures be found to reduce fishing mortality of small bigeye tunas.

YFT Management recommendations

- The Committee … noting that for 2015- 2017 catches have exceeded TAC, it is possible that overfishing is now occurring. To address this concern, the Committee recommends a stock assessment of yellowfin tuna be conducted in 2019.
- Furthermore, given that significant overages continue to occur, existing conservation and management measures appear to be insufficient, and the Committee recommends that the Commission strengthen such measures.
- The Commission should also be aware that increased harvests on small yellowfin and bigeye tuna could have negative consequences. Should the Commission wish to increase long term sustainable yield, the Committee continues to recommend that effective measures be found to reduce fishing mortality on small yellowfin and bigeye tuna (e.g. FAD-related and other fishing mortality of small yellowfin tuna).

SKJ Management recommendations

Eastern Stock

- Committee recommended (in the past) that the catch and effort levels do not exceed the level of 2012-2013 catch or effort. The provisional catch in 2017 exceeds this level by 11%.
- The Commission should be aware that increasing harvests and fishing effort for skipjack could lead to involuntary consequences for other species that are caught in combination with skipjack in certain fisheries particularly juveniles of yellowfin and bigeye (Anon., 2017b).
- The Committee recommends improvements in the estimation of faux poissons that is mainly composed of skipjack so that the uncertainty of the total skipjack catches are reduced.

Western Stock

- Catches should not be allowed to exceed the MSY.

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MSE Tropicals

- The implementation of the MSE roadmap has been very challenging, for both the SCRS and the Commission. The SCRS recommends that the delivery of MSE outputs for tropical tunas are delayed as proposed in the new roadmap.

- Highlights for 2018:
  - Panel 1 discussed tropical tuna MSE
  - Start of development of the MSE simulation framework for tropical tunas by the starting to develop operating models for bigeye, yellowfin and skipjack, and investigating communication tools for MSE results
  - Panel 1 discussed the identification of multi-specific Management Procedures that could potentially be applied for tropical tunas

- Main challenges going forward:
  - Integrating MSE work on the agenda of the tropical tuna working group and panel 1 (because of the pressure of continuing to do assessments and develop conservation measures for overfished stocks)