Presentation of 2018 SCRS Meeting Results and Advice

#6a

2018 Fall Meeting of the Advisory Committee to the U.S. Section to the International Commission for the Conservation of Atlantic Tunas

October 2018 Silver Spring, MD

NOAA FISHERIES

Southeast Fisheries Science Center

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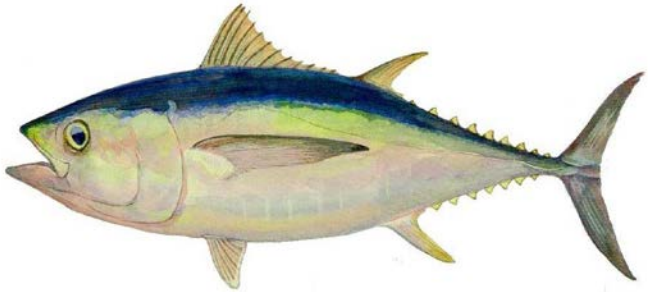
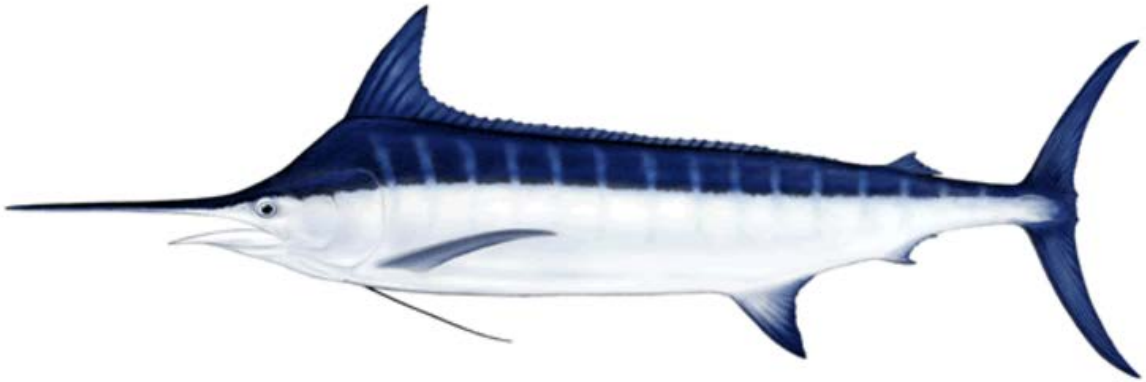
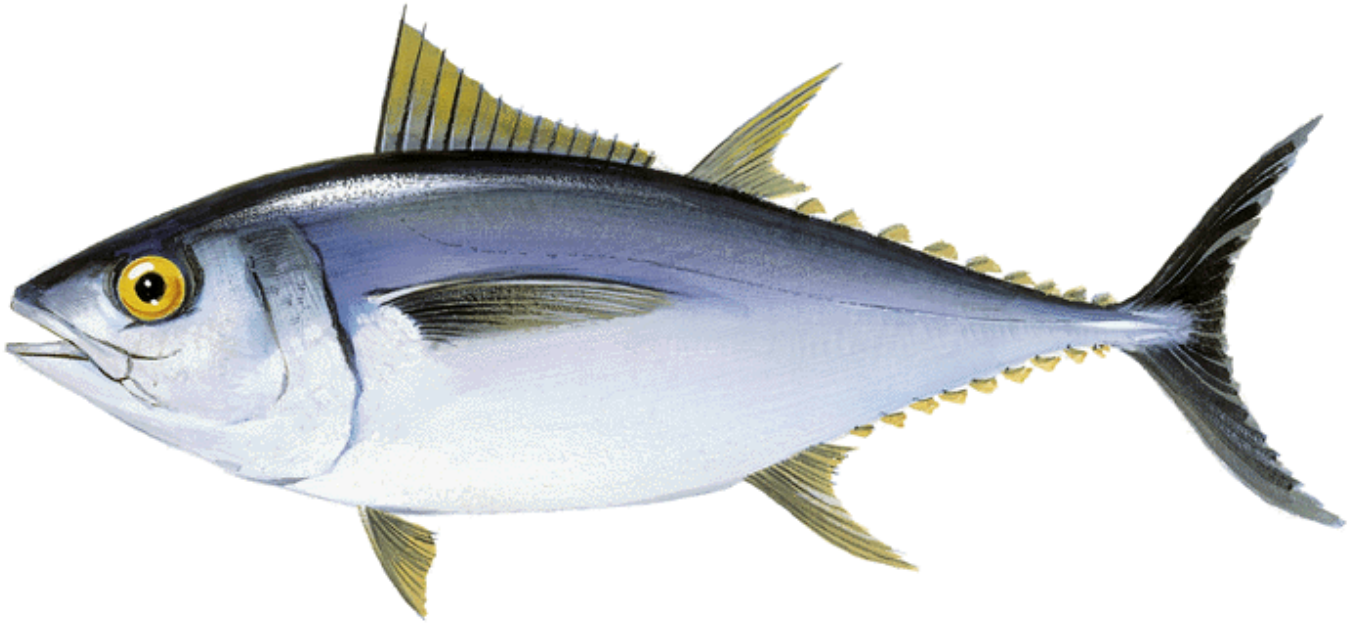
Stocks Assessed in 2018



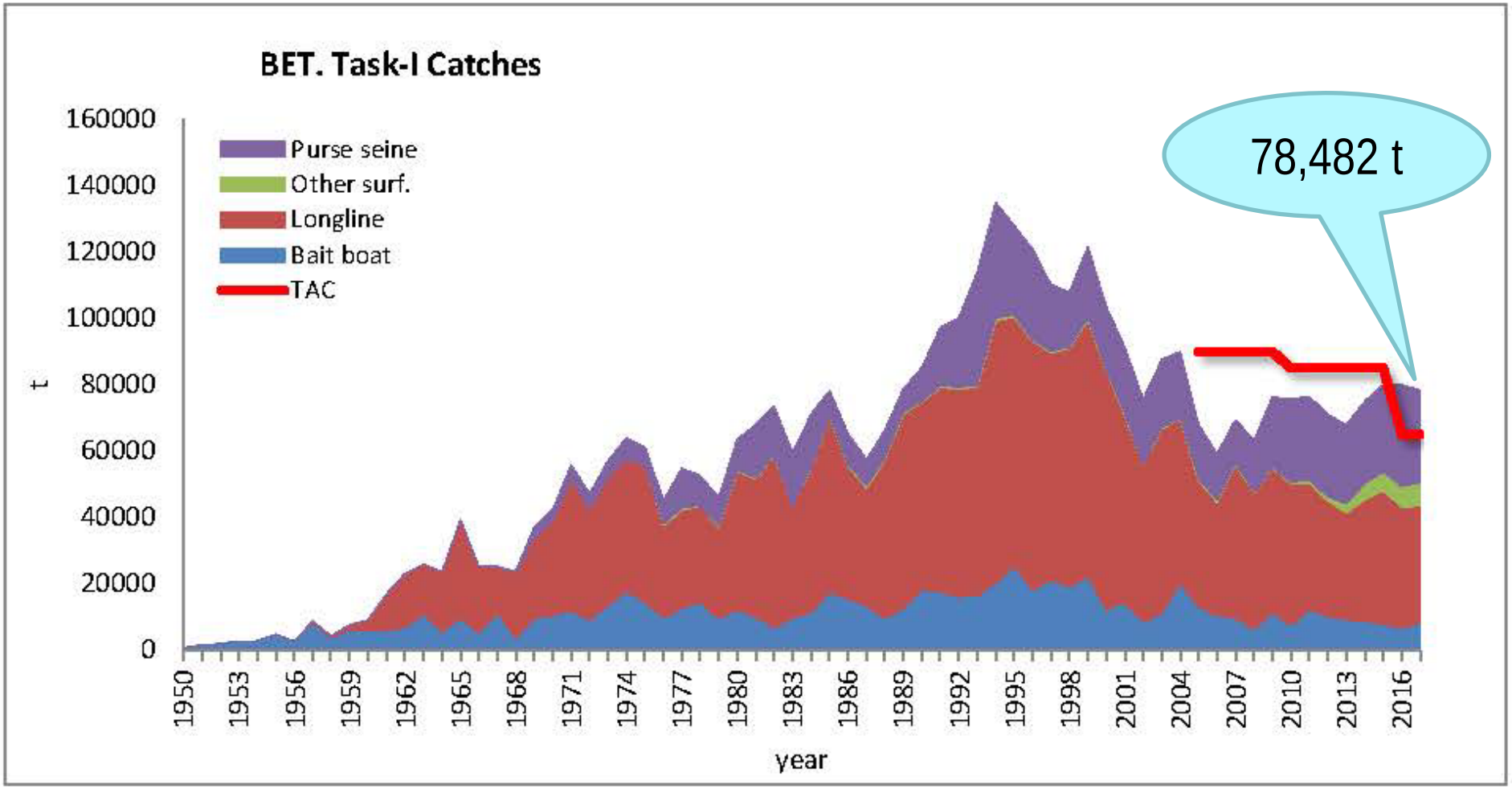




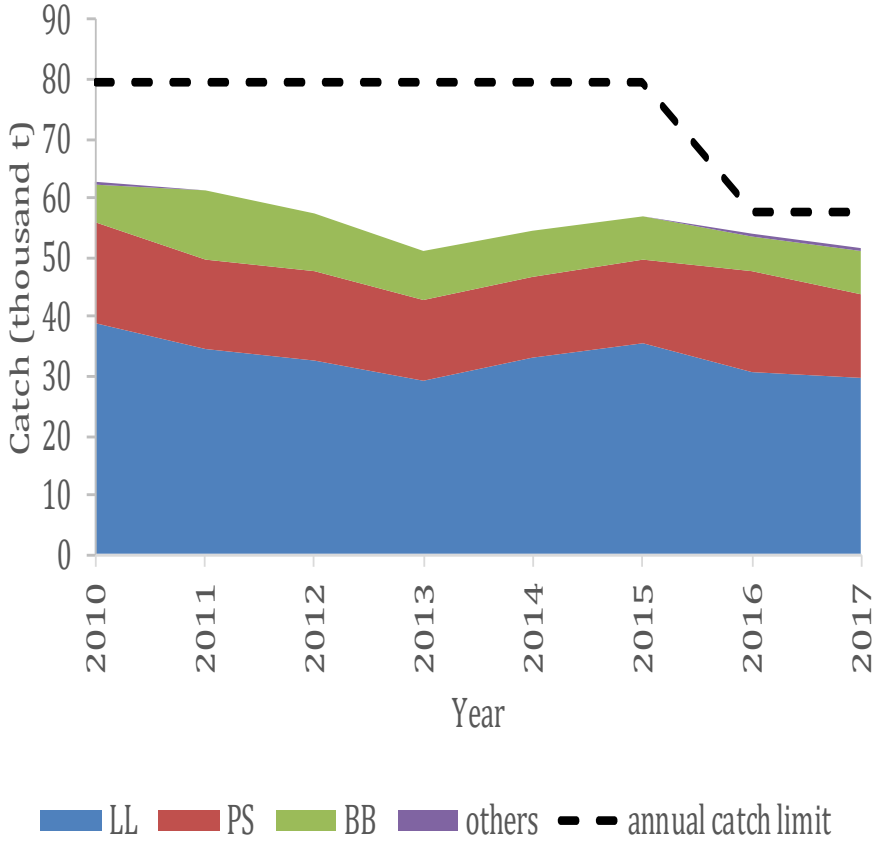
BIGEYE (*Thunnus obesus*)
Stock Assessment in 2018

- Projections during the 2015 stock assessment indicated that maintaining catch levels at the current TAC of 65,000 t was expected to recover the stock status to Convention objectives with 49% probability by 2028.
- However, catches in 2014 and 2015 were higher than assumed in the projections and have exceeded the TAC in 2016 and 2017.

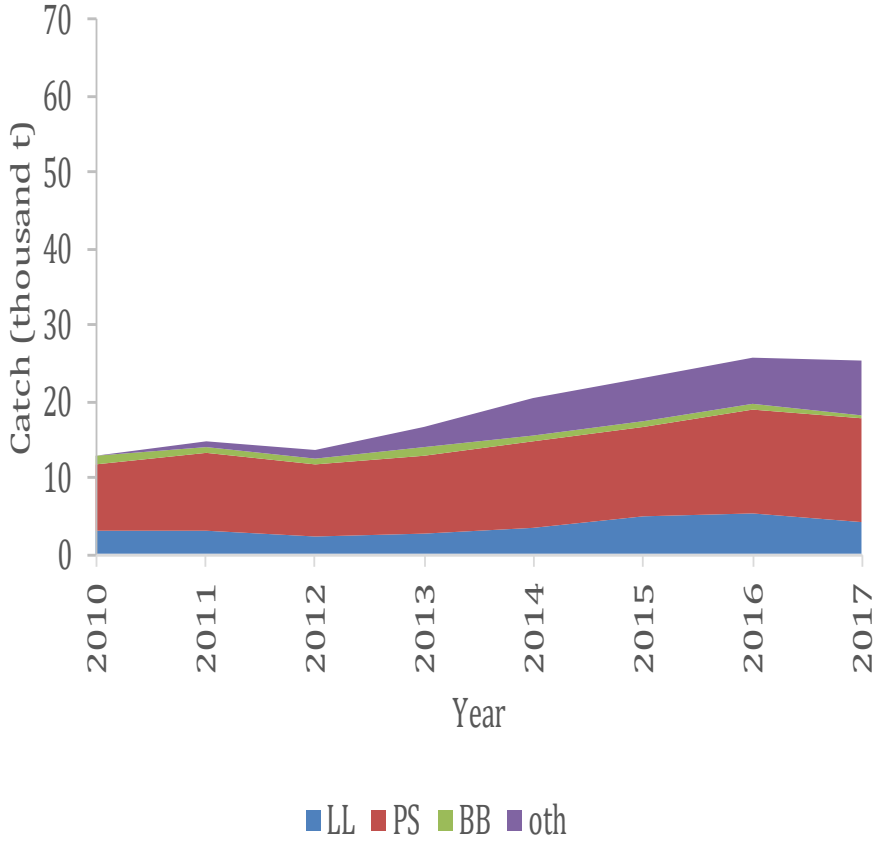
YEAR	2014	2015	2016	2017
BET Task I 2015	68,390	68,390	65,000	65,000
BET Task I 2018	75,029	**79,949**	**79,958**	**78,482**


BET. Task-I Catches
160000
140000
120000
100000
80000
60000
40000
20000
0
t
Purse seine
Other surf.
Longline
Bait boat
TAC
78,482 t
1950
1953
1956
1959
1962
1965
1968
1971
1974
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
2007
2010
2013
2016
year

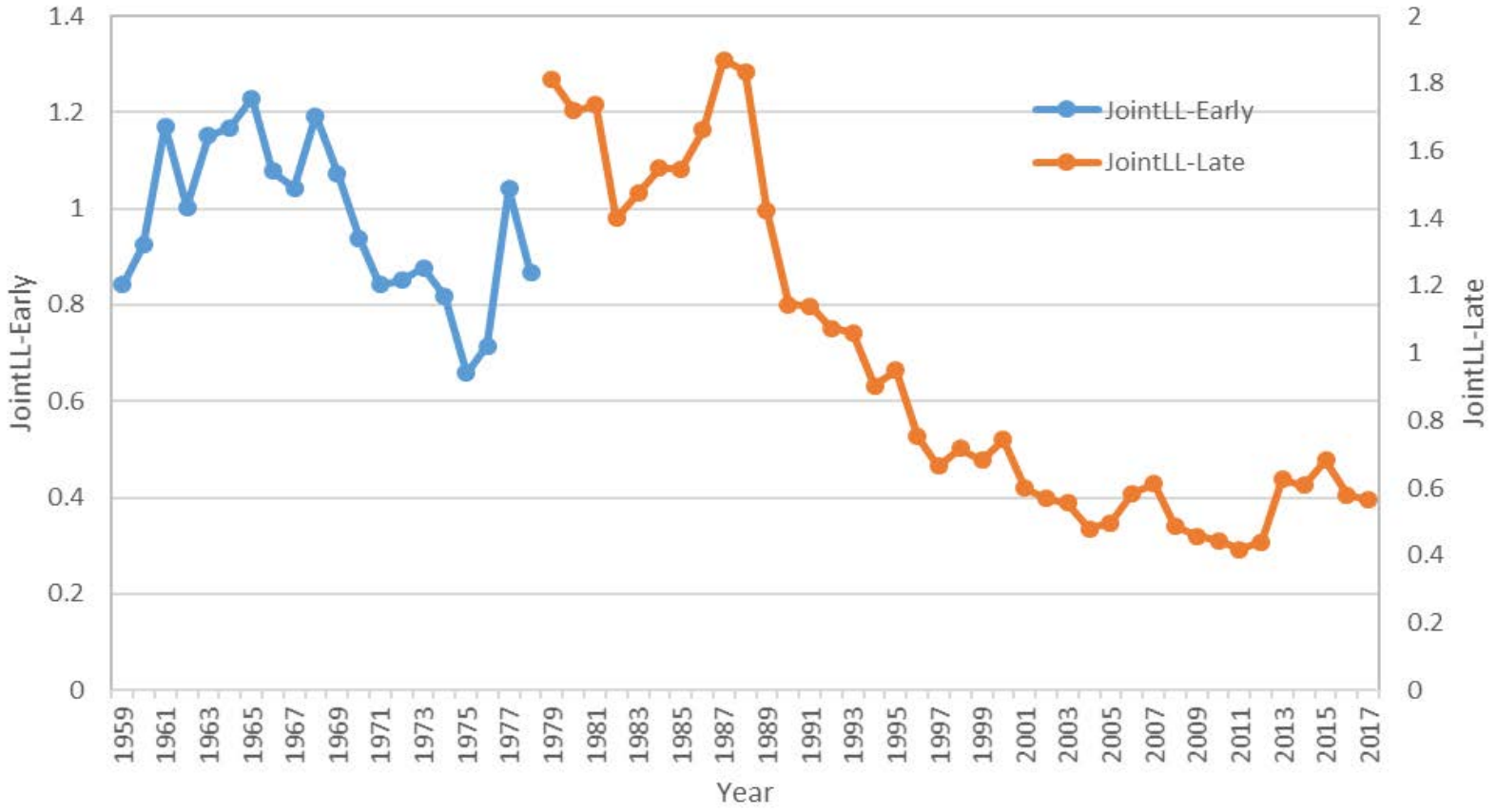
FLEETS WITH ANNUAL CATCH LIMITS



FLEETS WITH NO ANNUAL CATCH LIMIT

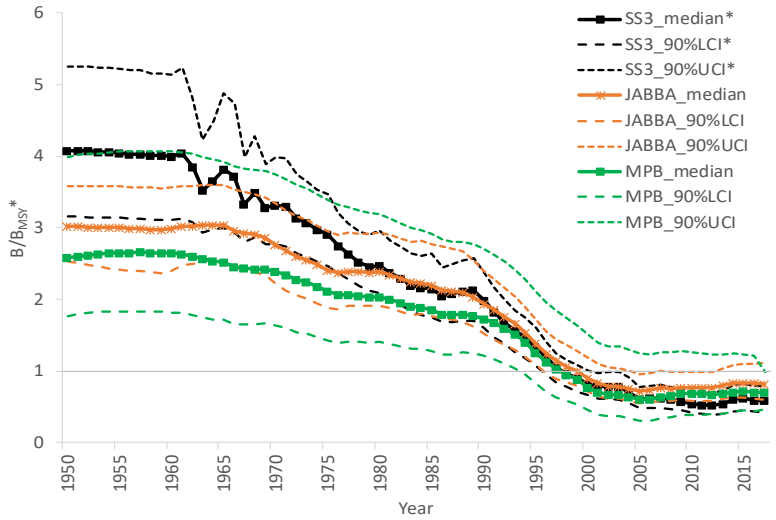


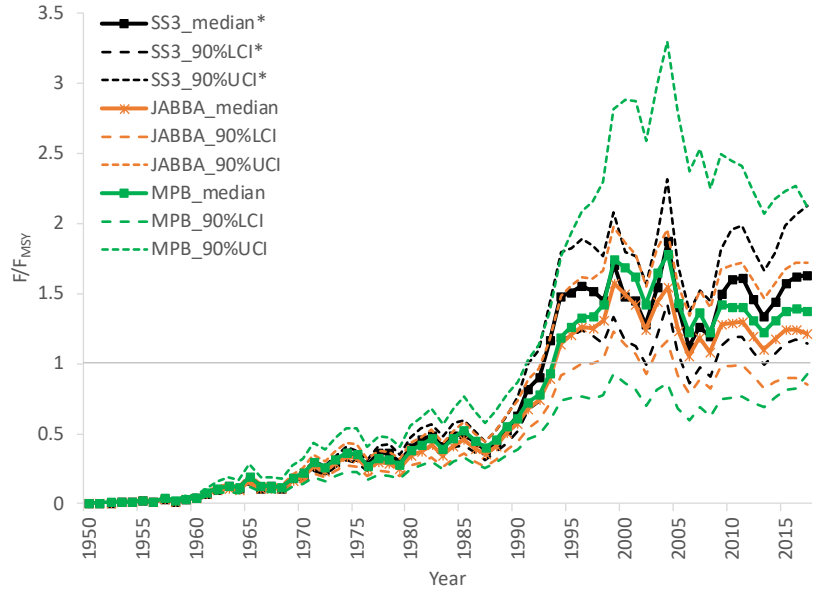
- A major improvement in 2018 was the development of a standardized joint Longline Standarized index (SCRS/2018/51).
- This work was funded by ICCAT/ISSF and used set by set data of Japan, Korea, Chinese-Taipei and USA LL.



Assessment Models for Management Advice

- ASPIC
- **SS3**
- JABBA





SS3: Statistical age-structured model

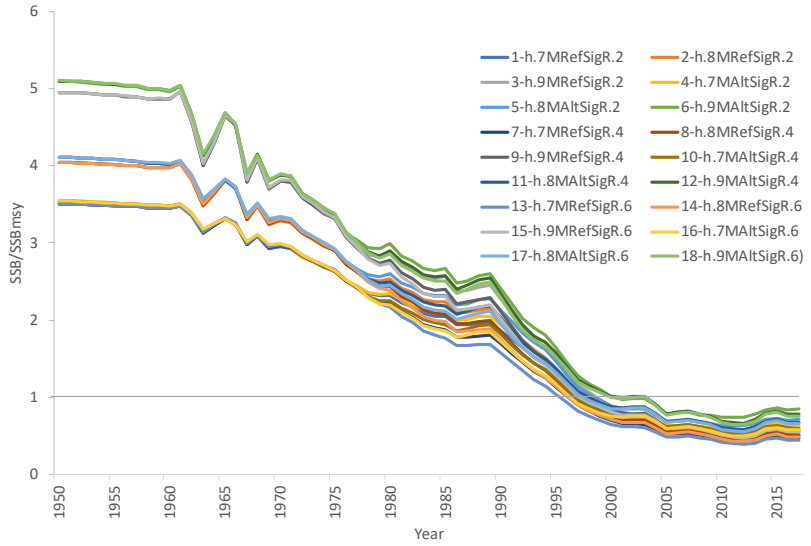
18 scenarios to investigate structural uncertainty associate to various parameters

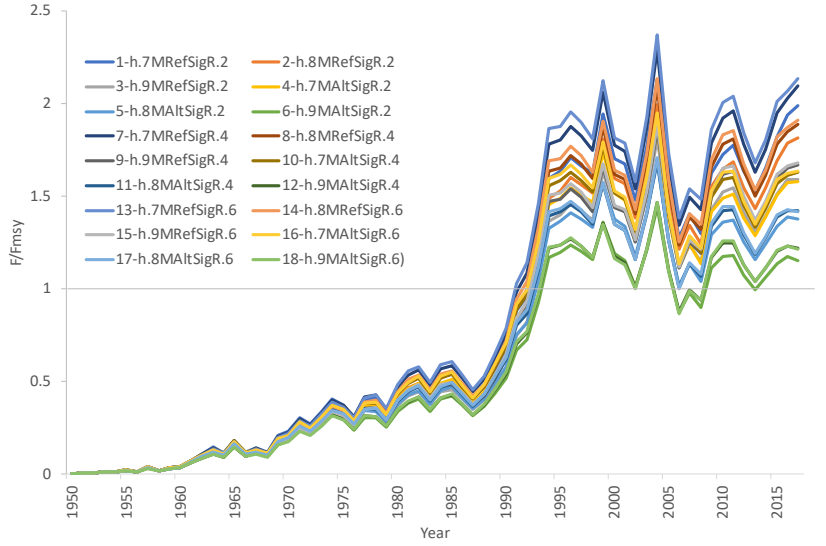
- Lambda = 0.1
- Time block 92 Japan LL R2
- Split index
- M (2 models)
- H (3)
- 3 SigmaR

Model feature	SS3
Software availability	NMFS toolbox
Population spatial structure / areas	1
Period	1950-2017
Number CPUE Series	1
Uses Catch-at-length	Yes
Uses tagging data	No
Age-structured	Yes
Sex-structured	No
Number of Fleets	15

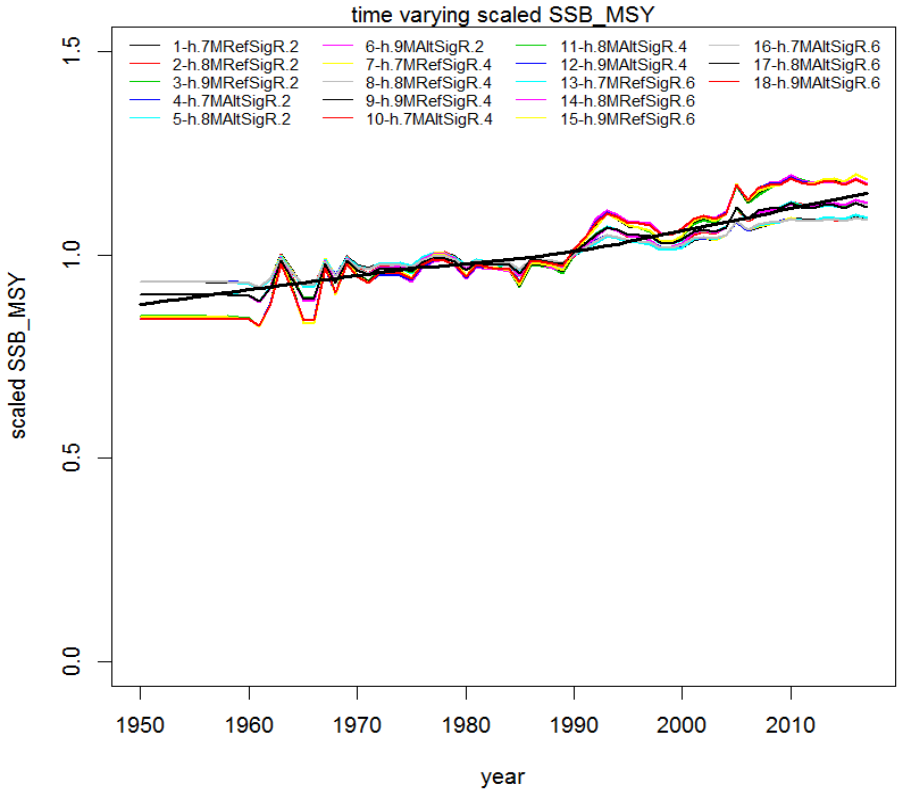
STOCK TRAJECTORIES IN RELATION TO MSY BENCHMARKS

18 Stock Synthesis Uncertainty Grid

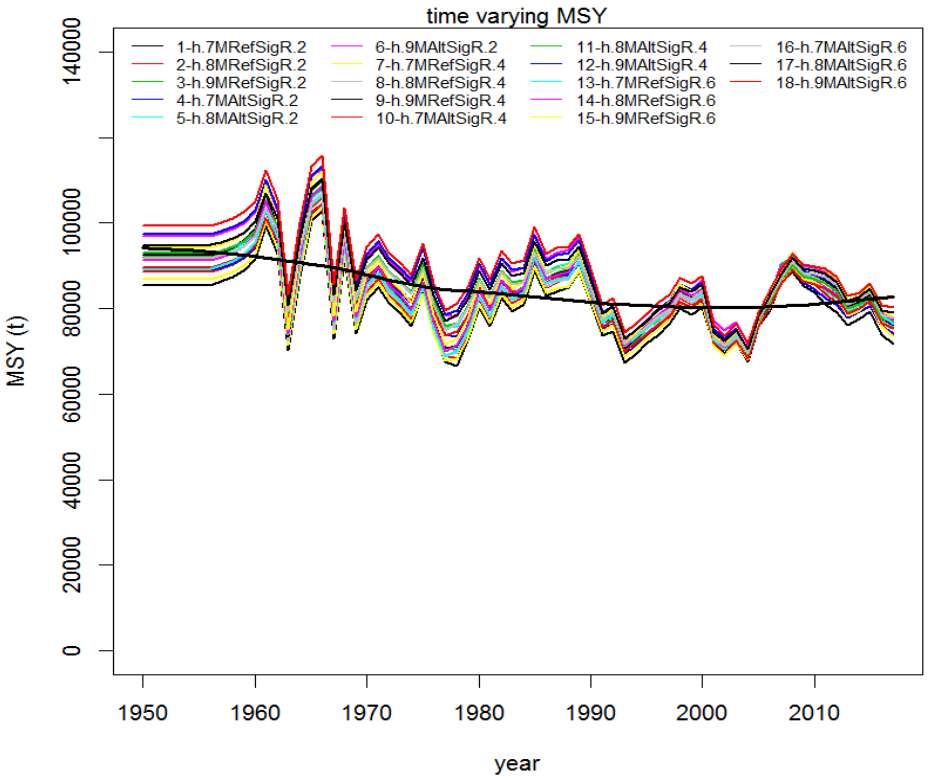




Time-varying SSB_{MSY}

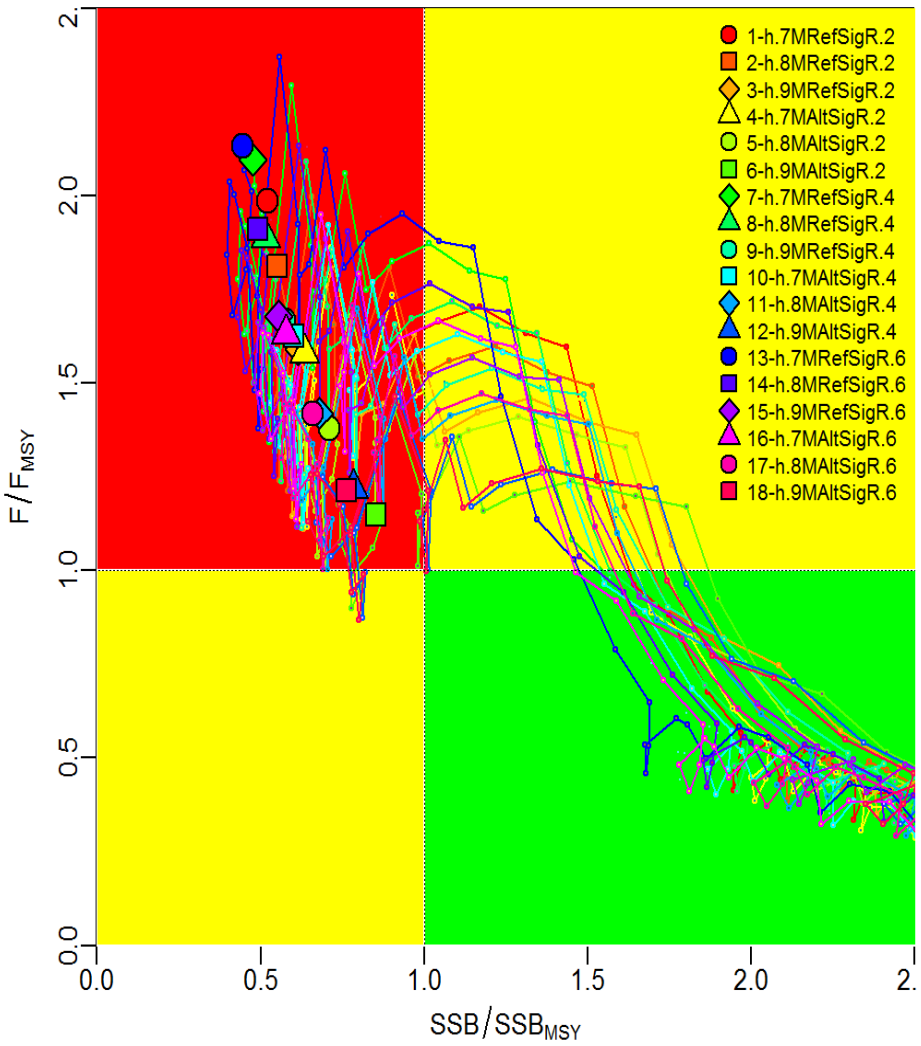


Time-varying MSY



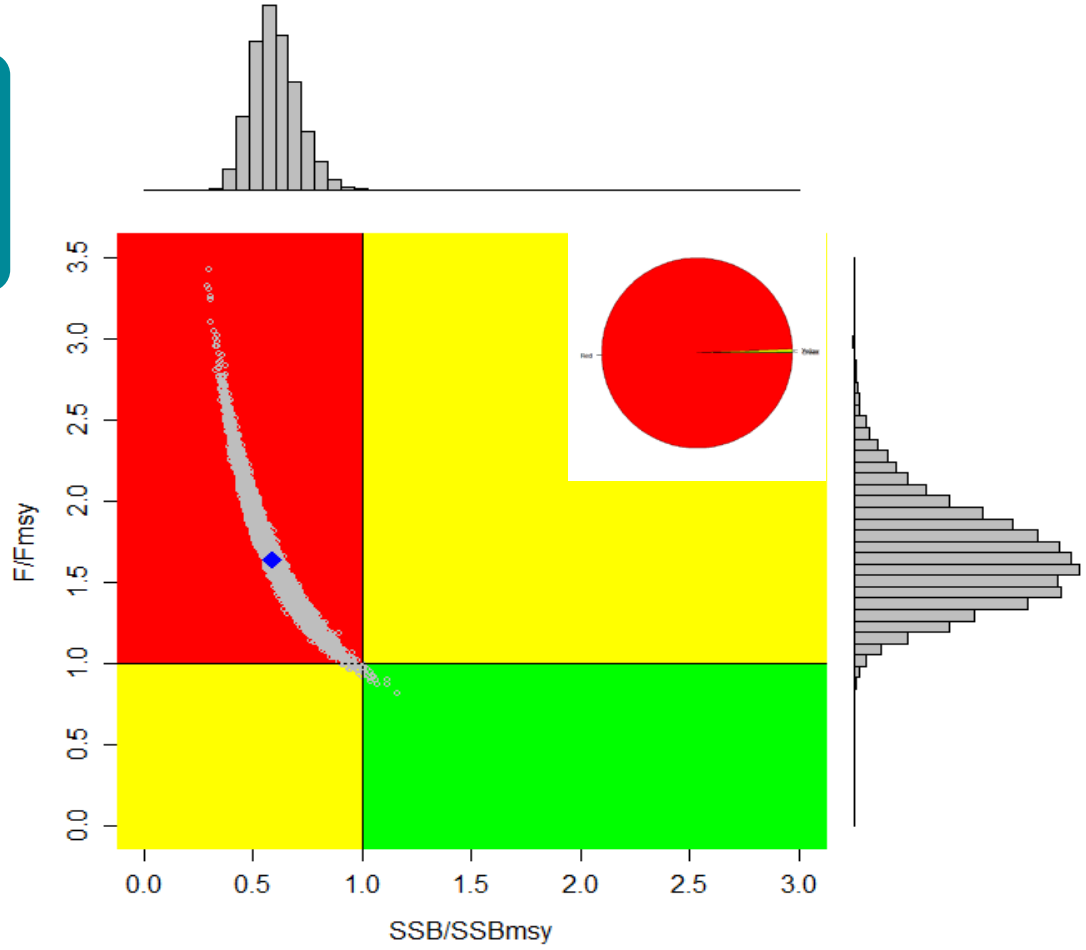
KOBE PLOT

18 Stock Synthesis Uncertainty Grid

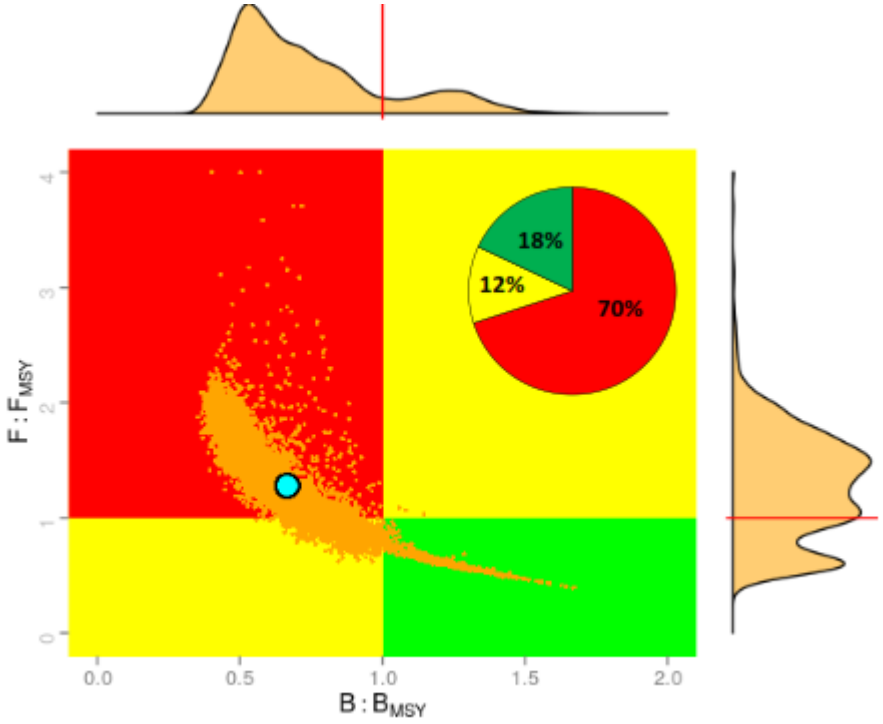


KOBE PLOT

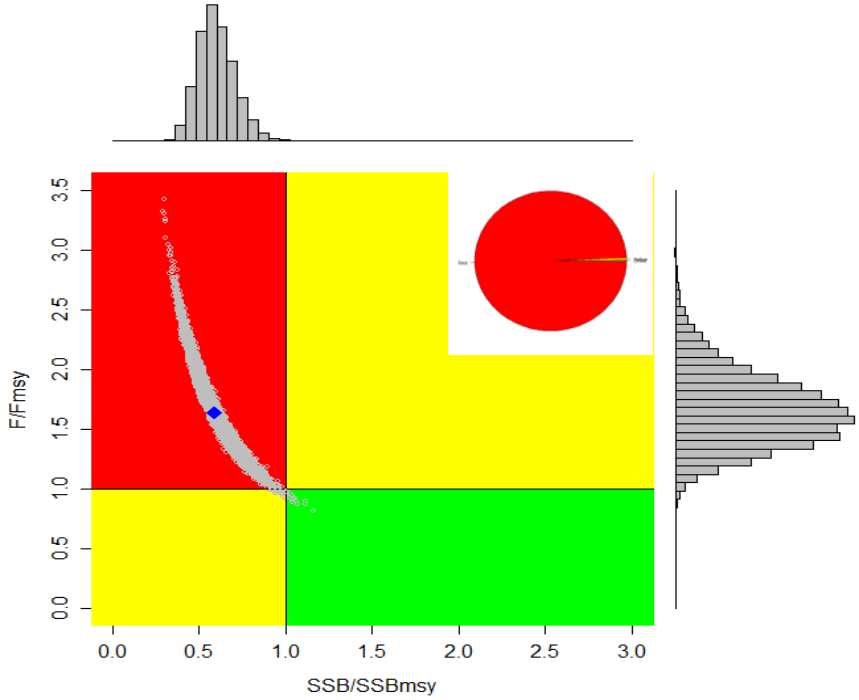
18 Stock Synthesis Uncertainty Grid



2014 Stock Status
(2015 Assessment Results)



2017 Stock Status
(2018 Assessment Results)



Probability SSB >= SSB_{MSY}

Allowing catches to continue near current levels has <1% probability of healthy stock status though 2033.

Catch (1000 t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
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

Reducing catches to ~62,500 t has a 51% chance to achieve healthy status by 2033, but has a >50% probability of overfishing until 2028.

Probability SSB >= SSB_{MSY}

Catch (1000 t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
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

Probability F <= F_{MSY}

Catch (1000 t)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
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

Probability both F <= F_{MSY} and SSB >= SSB_{MSY}

Catch (1000 t)	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	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

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

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

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]

[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

[Rec[Rec. 16-01], paragraph 49(c). Develop a table for consideration by the Commission 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 longline, FAD purse seine, free school purse seine, and baitboat fisheries to the total catch.

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%

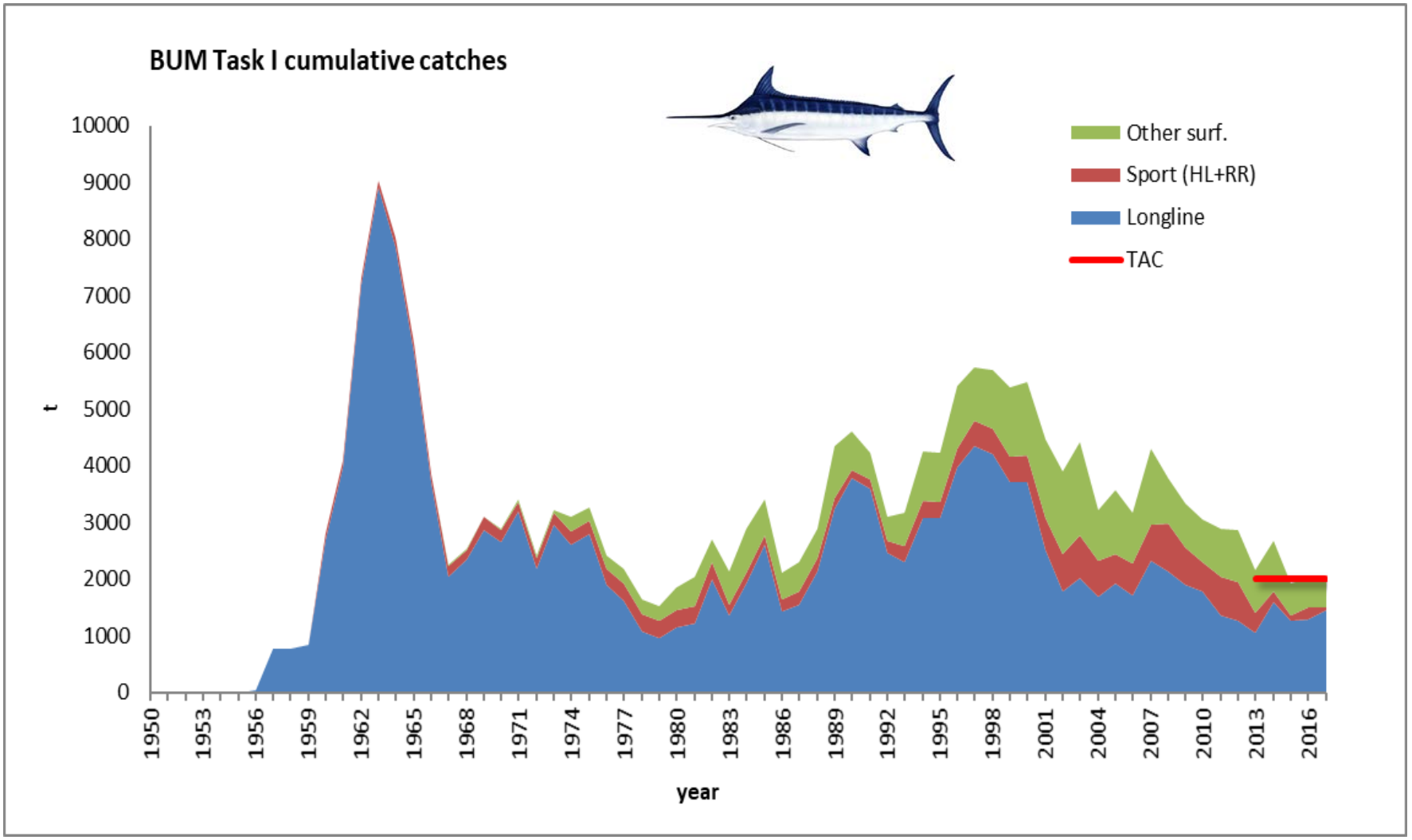
Table 19.4.2. Percent change in bigeye tuna spawning stock biomass that would produce maximum sustainable yield (SSB_{MSY}) associated with a reallocation of fishing mortality from an individual fleet to the other fleets. Scenarios examined included a 10%, 20%, 50%, and 100% reallocation of F from purse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

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%


2018 BLUE MARLIN
STOCK ASSESSMENT


BUM Task I cumulative catches
Other surf.
Sport (HL+RR)
Longline
TAC
t
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1950
1953
1956
1959
1962
1965
1968
1971
1974
1977
1980
1983
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2004
2007
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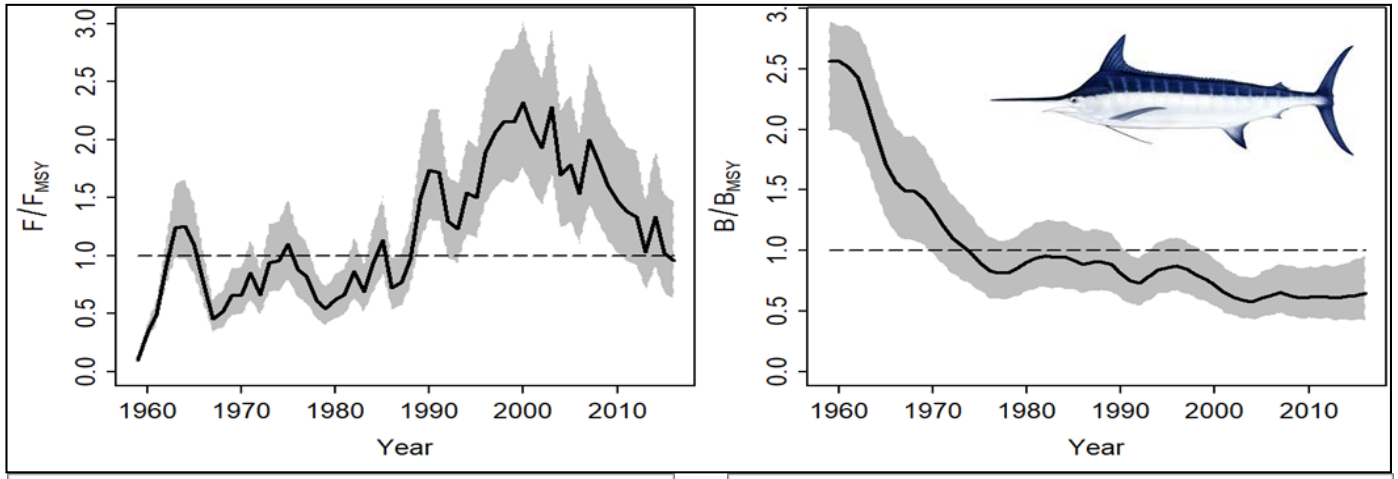
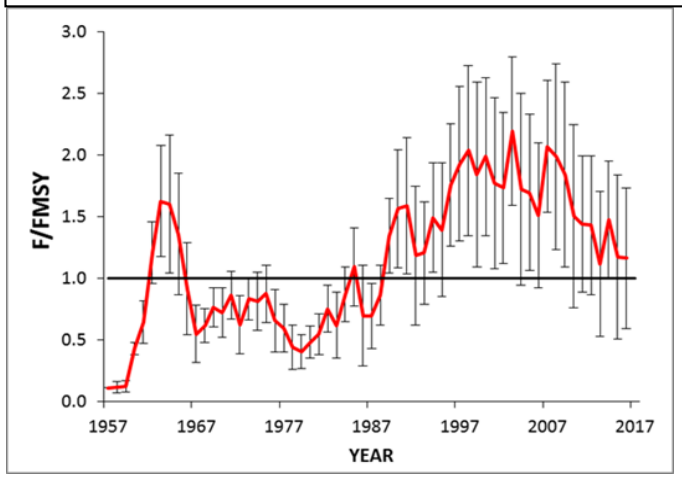
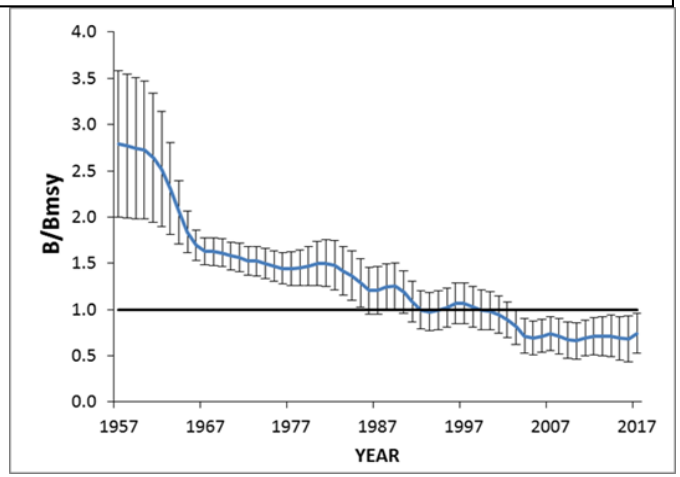
2016
year

Blue Marlin Assessed in 2018 (data through 2016)

Both Models Resulted in Very Similar Results



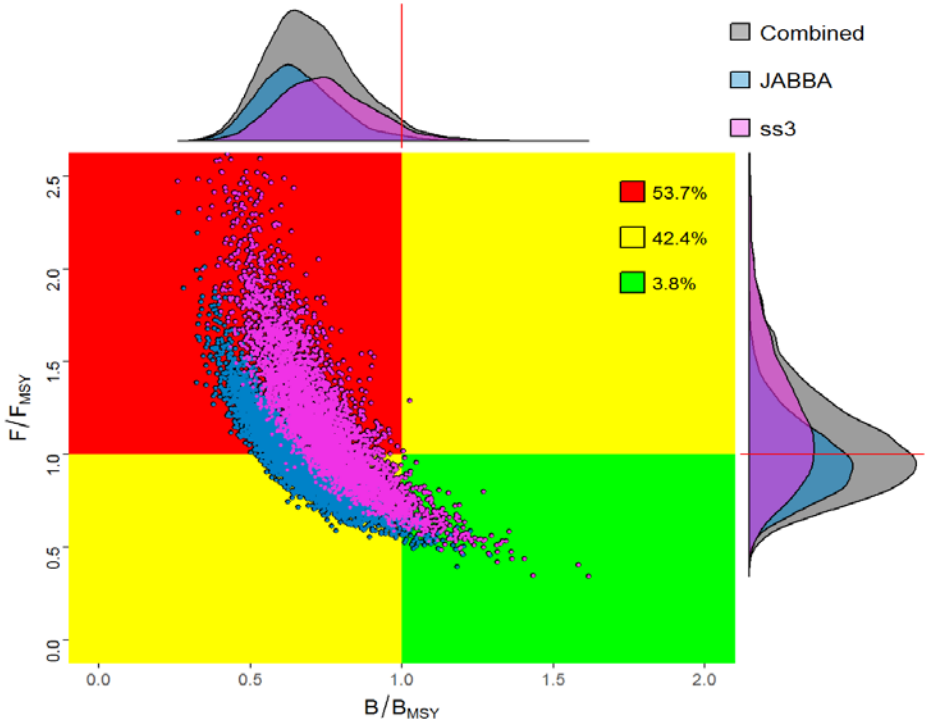




Blue Marlin Status

Discards (live and dead) continue to be a large source of uncertainty in the assessment. Only the US and Mexico have consistently reporting discards from 2006-2017. Other CPC report sporadically.

in 2016 the stock of Atlantic blue marlin was overfished and experiencing overfishing



Combined Kobe plots for the final base cases of JABBA (blue) and SS (pink) models for the Atlantic blue marlin.

ATLANTIC BLUE MARLIN SUMMARY	
Maximum Sustainable Yield	3,056 t (2,384 – 3,536 t)[1]
Current (2017) Yield	1,987 t[2]
Relative Biomass (SSB_{2016}/SSB_{MSY})	0.69 (0.52 – 0.91)[1]
Relative Fishing Mortality (F_{2016}/F_{MSY})	1.03 (0.74 -1.50)[1]
Stock Status (2016)	Overfished: Yes Overfishing: Yes
Conservation and Management Measures in Effect:	Recommendation [Rec. 15-05]. Reduce the total harvest to 2,000 t in 2016, 2017, and 2018.

[1] Combined Bayesian surplus production model and age structured assessment model results. Values correspond to median estimates, 80% confidence interval values are provided in parenthesis.
[2] 2017 yield should be considered provisional.

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

TAC | Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
0	11	21	35	49	61	70	77	82	86	88
1000	11	18	27	36	45	53	59	65	70	73
1250	11	17	24	32	40	47	53	58	63	67
1500	11	16	23	29	35	42	48	53	57	61
1750	11	15	20	26	31	37	42	47	50	54
2000	11	15	19	24	28	32	36	40	44	47
2250	11	14	17	21	24	27	31	34	37	40
2500	11	13	15	18	20	23	26	28	30	33
2750	11	12	14	16	17	18	20	22	24	25
3000	11	10	11	12	14	15	16	17	18	18
3250	9	8	8	9	10	10	11	11	12	12
3500	6	6	6	6	7	7	7	7	8	8

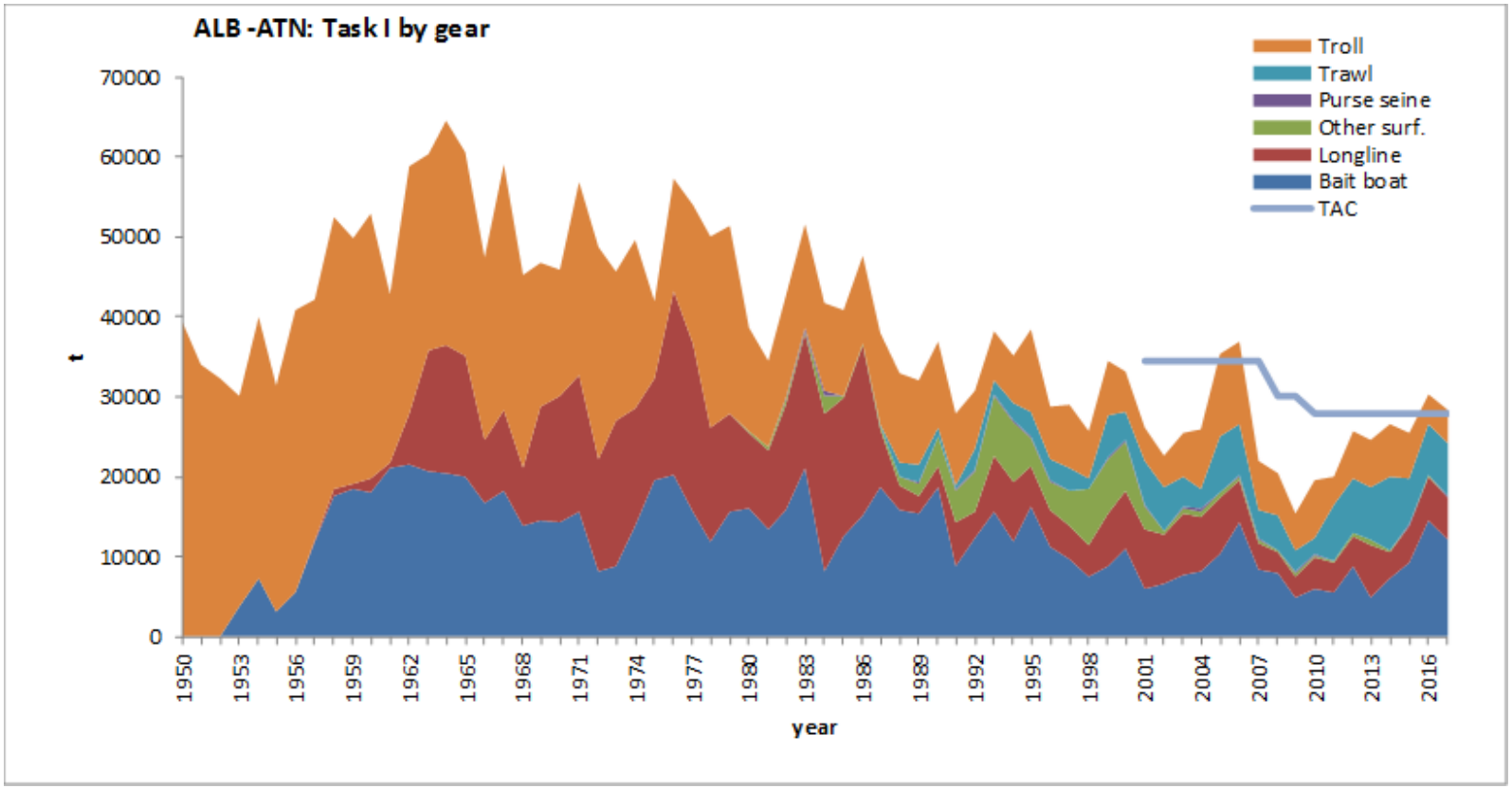
According to these projections the current TAC of 2,000 will only provide a 47% probability of being in the green quadrant by 2028. In contrast, a TAC of 1,750 t will allow the stock to rebuild with more than 50% probability by the year 2028

Bigeye, Albacore, Yellowfin and Skipjack (BAYS) Tunas


ALBACORE!

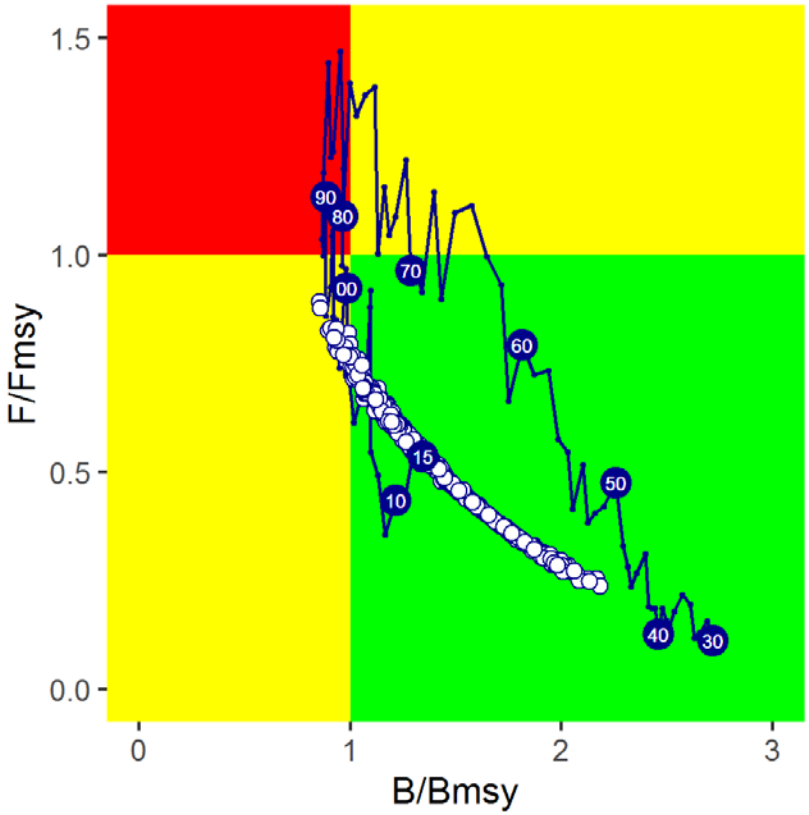
North Atlantic Albacore

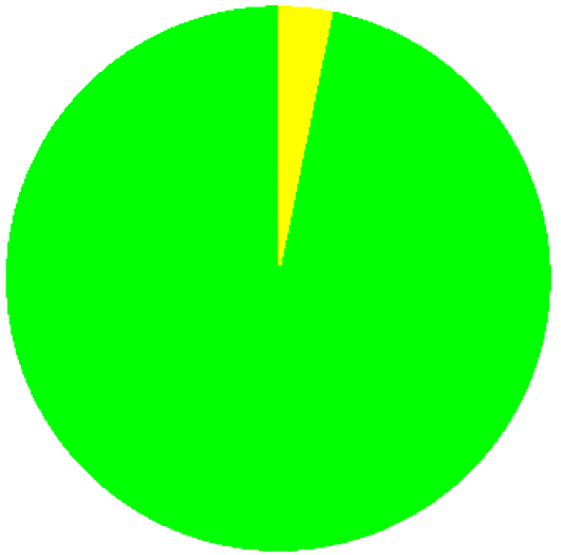
Catch (mt) by Gear Type



2017 Total Yield: 28,310 t (above the TAC of 28,000 t)

North Atlantic Albacore 2016 Assessment
Stock Status (and historical trend)





Pr(Green) > 95%

NOT overfished: SSB_{2014}/SSB_{MSY}=1.36 (1.05-1.78)

Nor overfishing: F_{2014}/F_{MSY}=0.54 (0.35-0.72)

Peer Review of the Code and Algorithms used Within the MSE Framework Management for NALB Stock

In general, the MSE framework appears to be of high quality and robust to uncertainty.

The documentation and annotations could be improved to increase transparency and additional sources of uncertainty may be considered, especially with regard to catchability.

The biomass dynamics model does appear to underestimate the "true" reference points in the most recent years (2013-2016), therefore additional investigations of the model is recommended to understand the different model behaviors

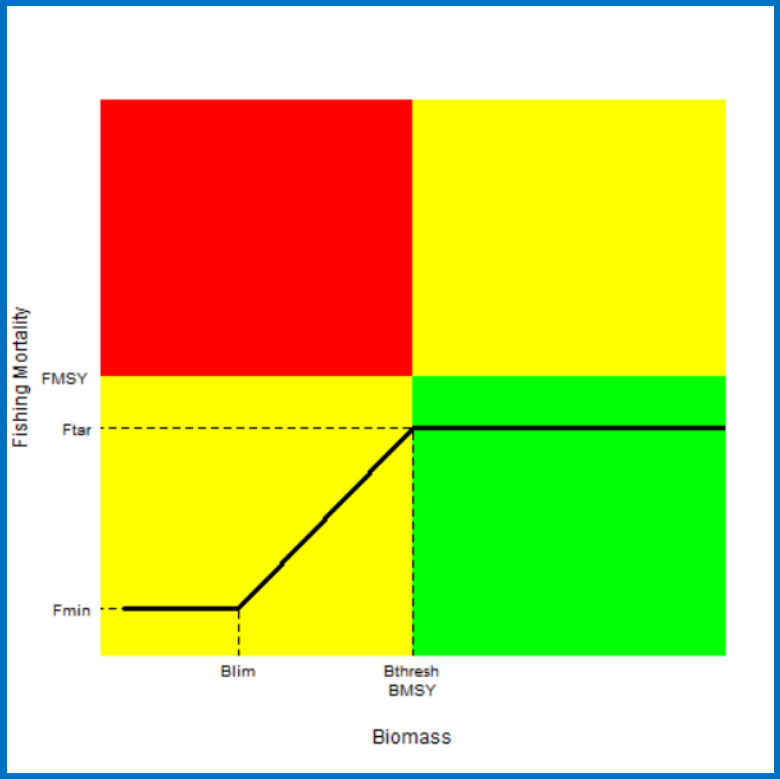
Management Strategy Evaluation of N. Albacore

Rec. 17-04:

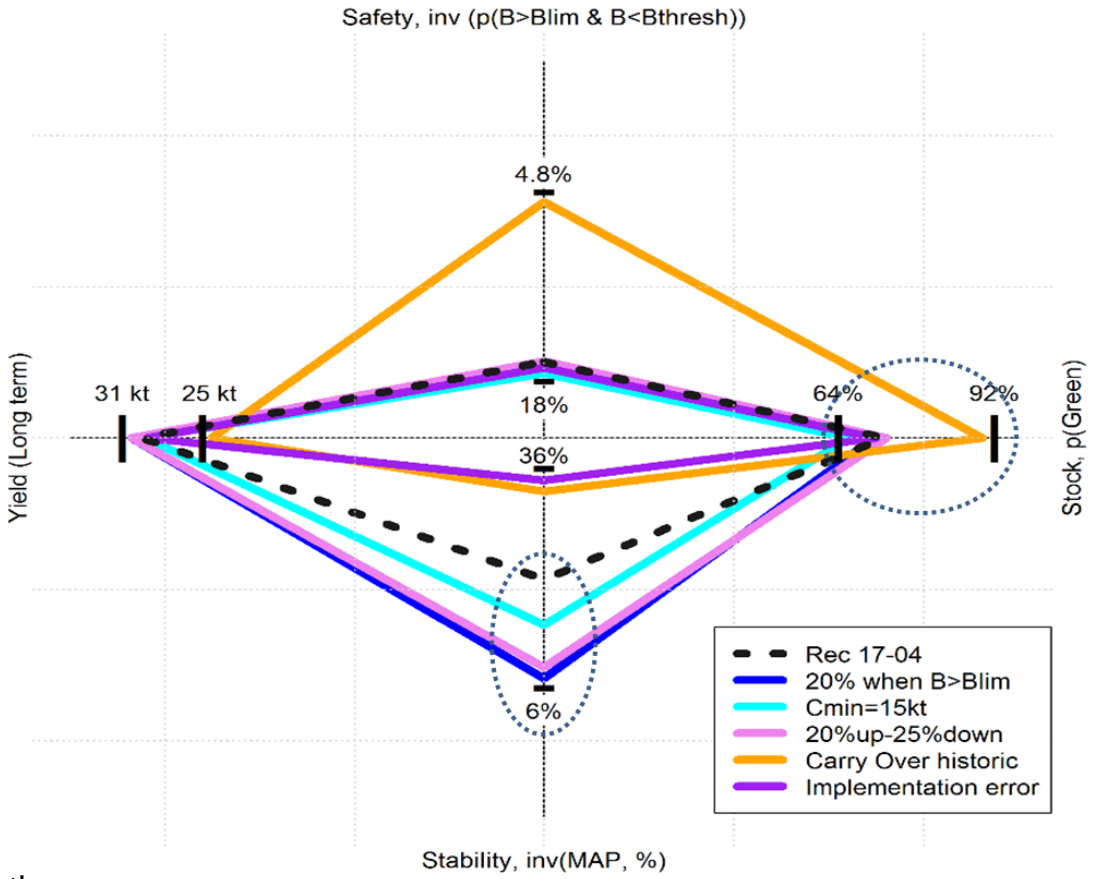
Interim HCR

Maximum TAC = 50000 €

20% máximum TAC change if B>Bthr



Relative performance of the adopted HCR adopted as well as different variants: (A) setting a lower TAC limit of 15000t (light blue), (B) applying the 20% stability clause also when Bcur>Blim and Bcur<Bthr (dark blue), (C) 25% maximum TAC reduction and 20% maximum TAC increase when Bcur>Blim and Bcur<Bthr (pink), and allowing for carry over (orange). The purple scenario represents an extreme scenario of imperfect implementation of the TAC.

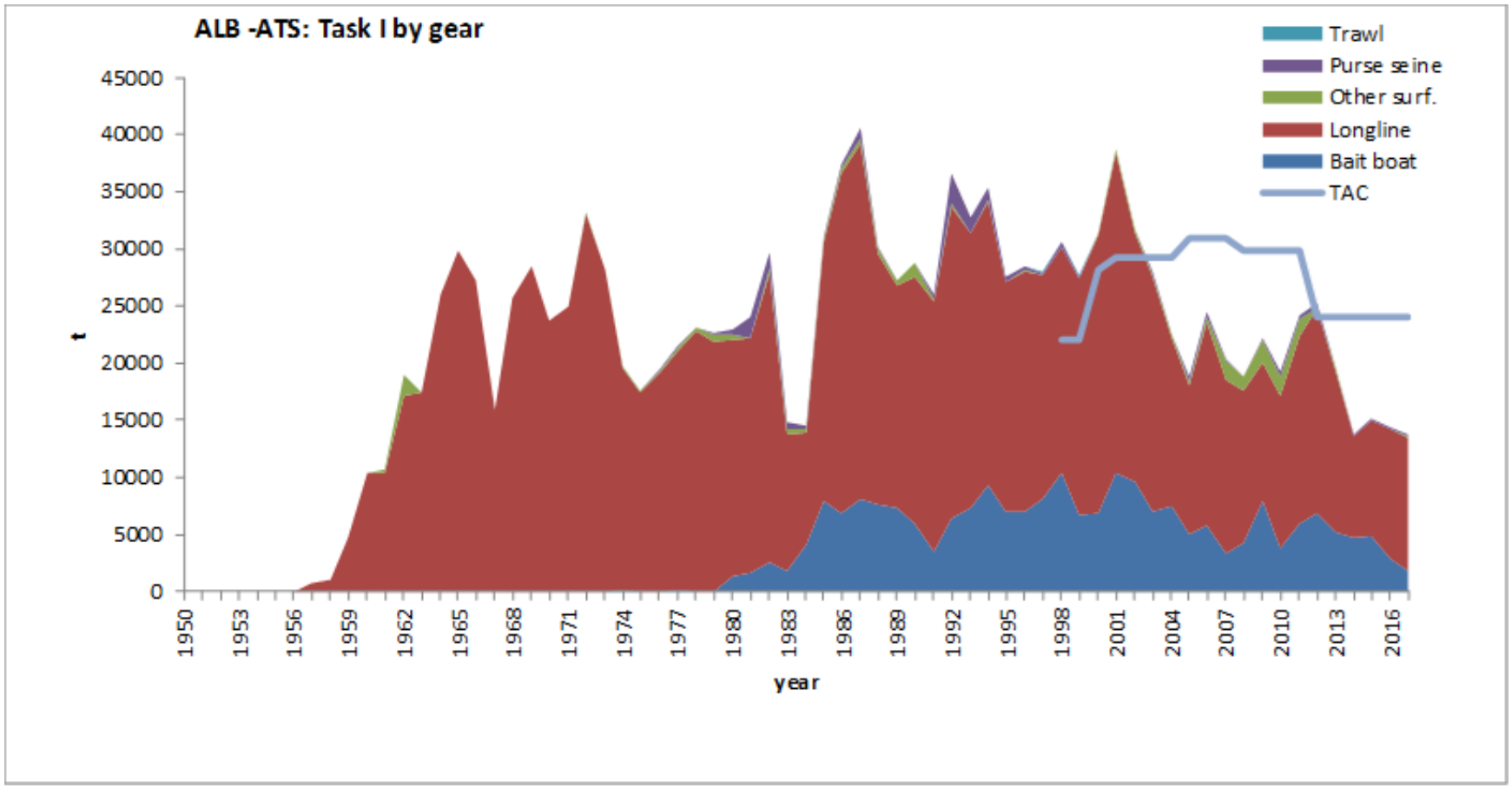


- All variants meet management objectives
- Carry over scenario: less stability and catch, better stock condition and safety
- (A), (B), (C): more stable than the interim HCR.
- Min TAC (15000 t) overrides application of Fmin.

South Atlantic Albacore

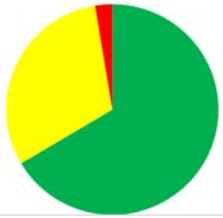
Catch (mt) by Gear

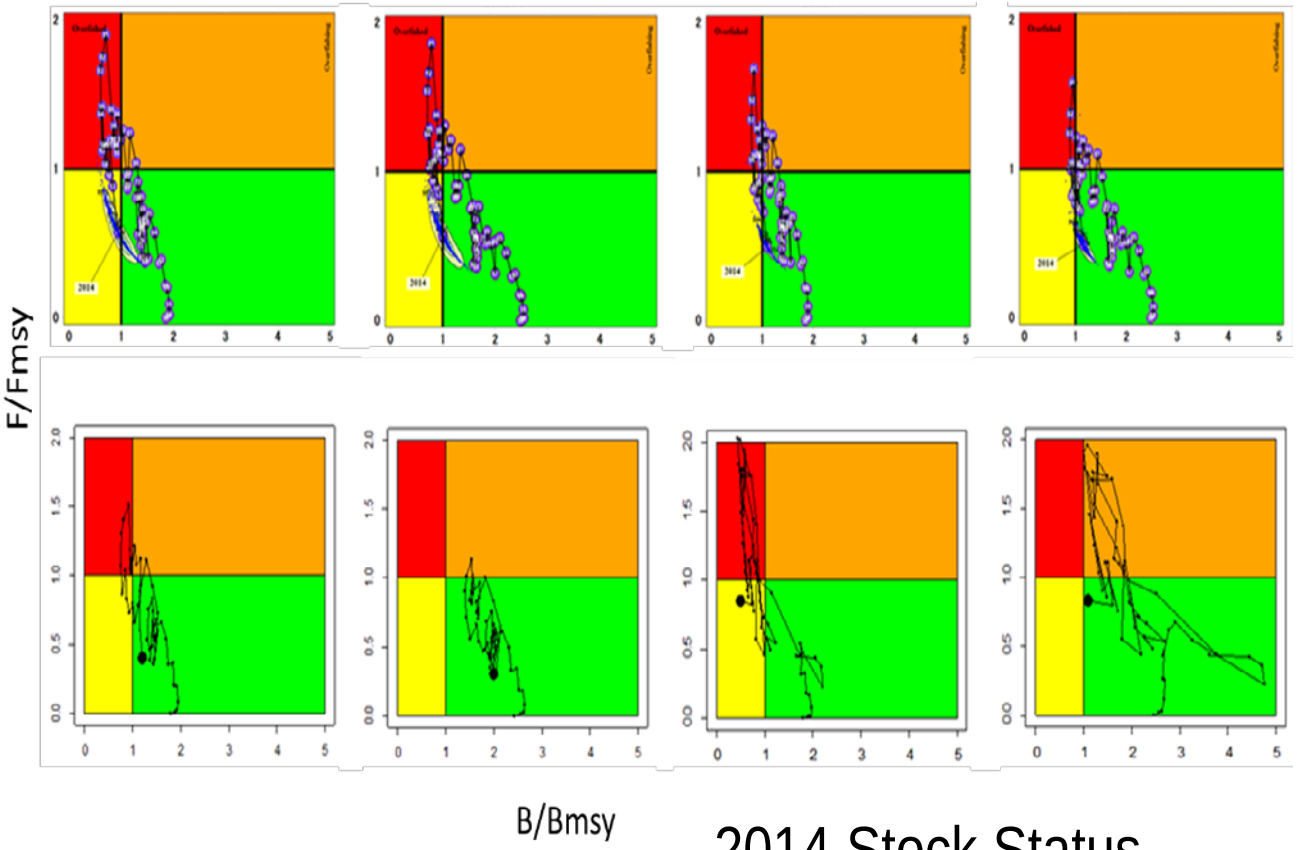
Total Yield in 2017: 13,806 t (below TAC)



South Atlantic Albacore

Pr(Green) = 66%





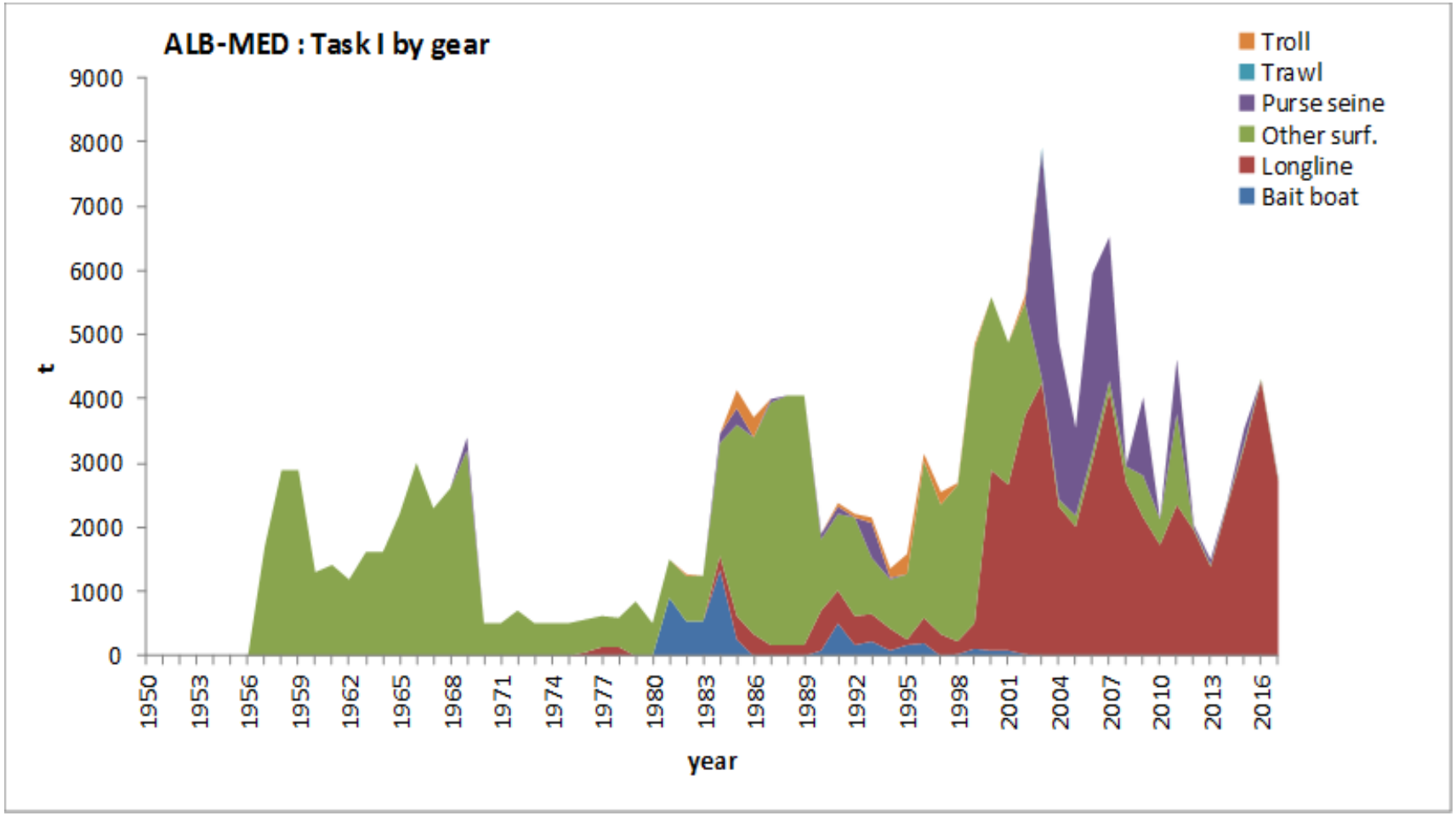
Max catch at which Pr(green)>60% by 2020

Model	Run	Catch
ASPIC	Run2	26,000
	Run6	24,000
	Run7	26,000
	Run8	26,000
BSPM	EQ SH	30,000
	EQ FOX	34,000
	CW SH	22,000
	CW FOX	18,000
Average		25,750
Median		26,000

2014 Stock Status

(2016 Assessment Results)

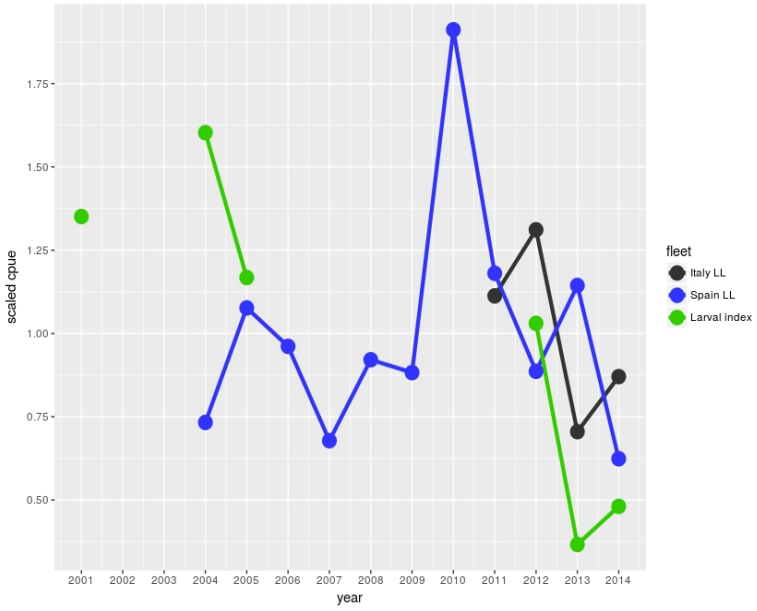
Mediterranean Albacore
Catches (mt) by Gear

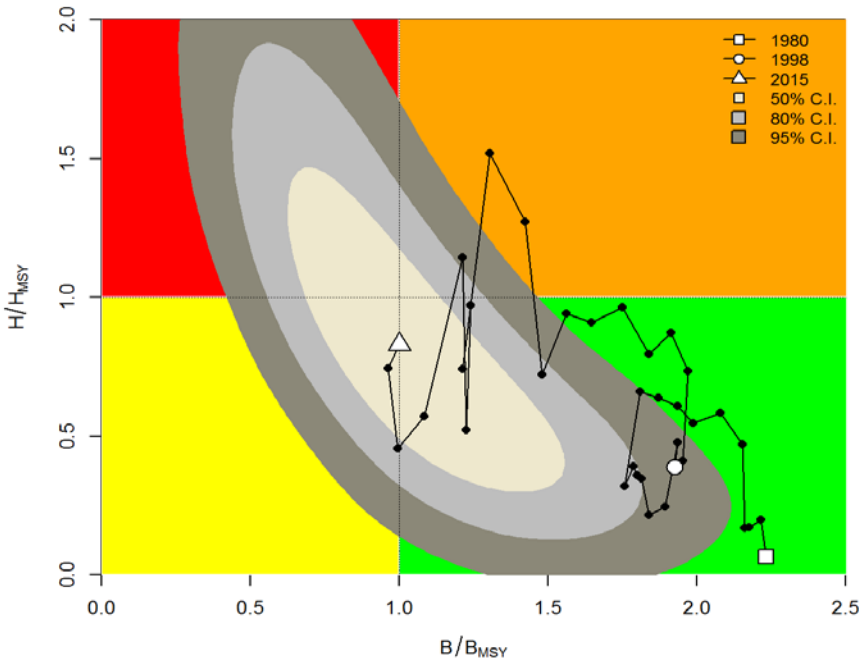


Mediterranean Albacore Assessment Summary

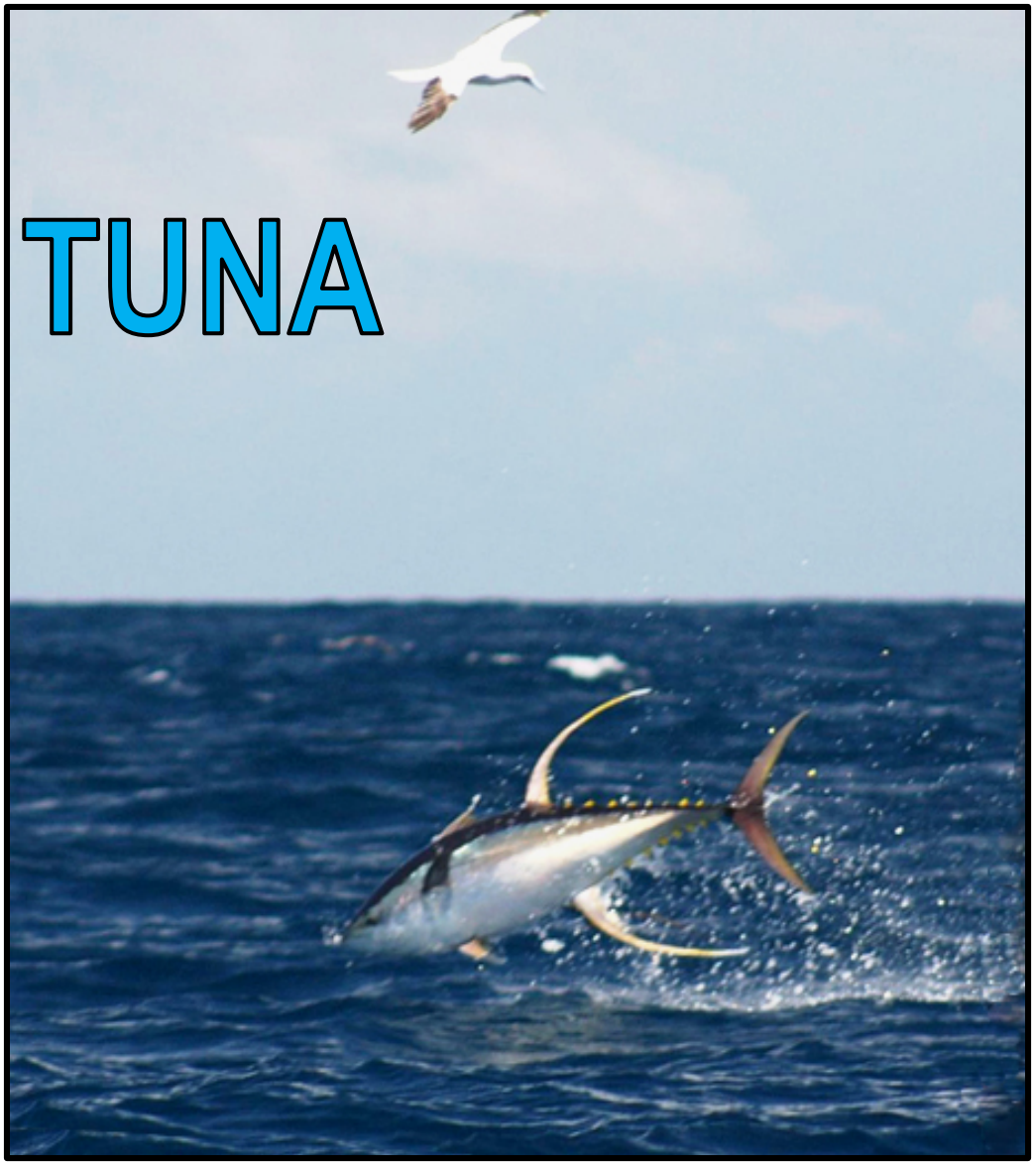
2015 Stock Status
(2017 Assessment Results)

- very little quantitative information was available to SCRS for use in conducting an assessment
- Result is high uncertainty





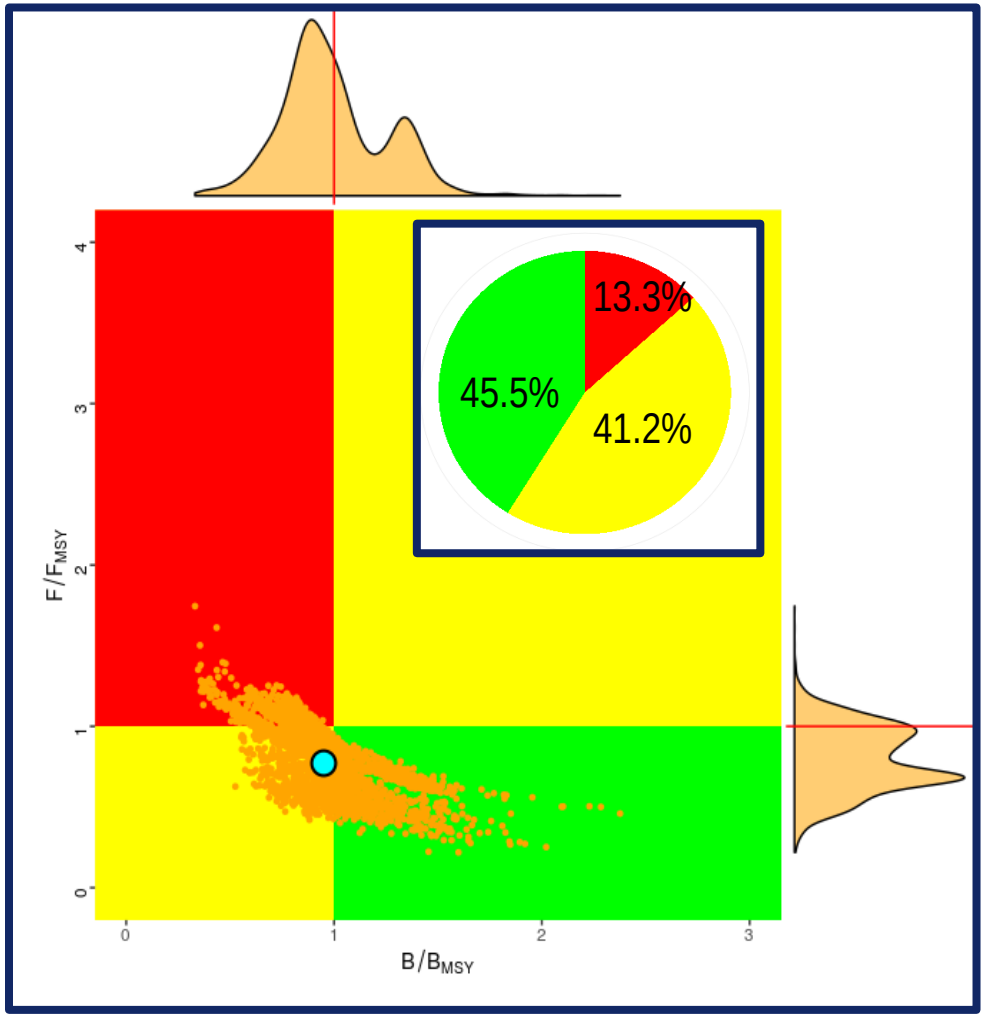
YELLOWFIN TUNA



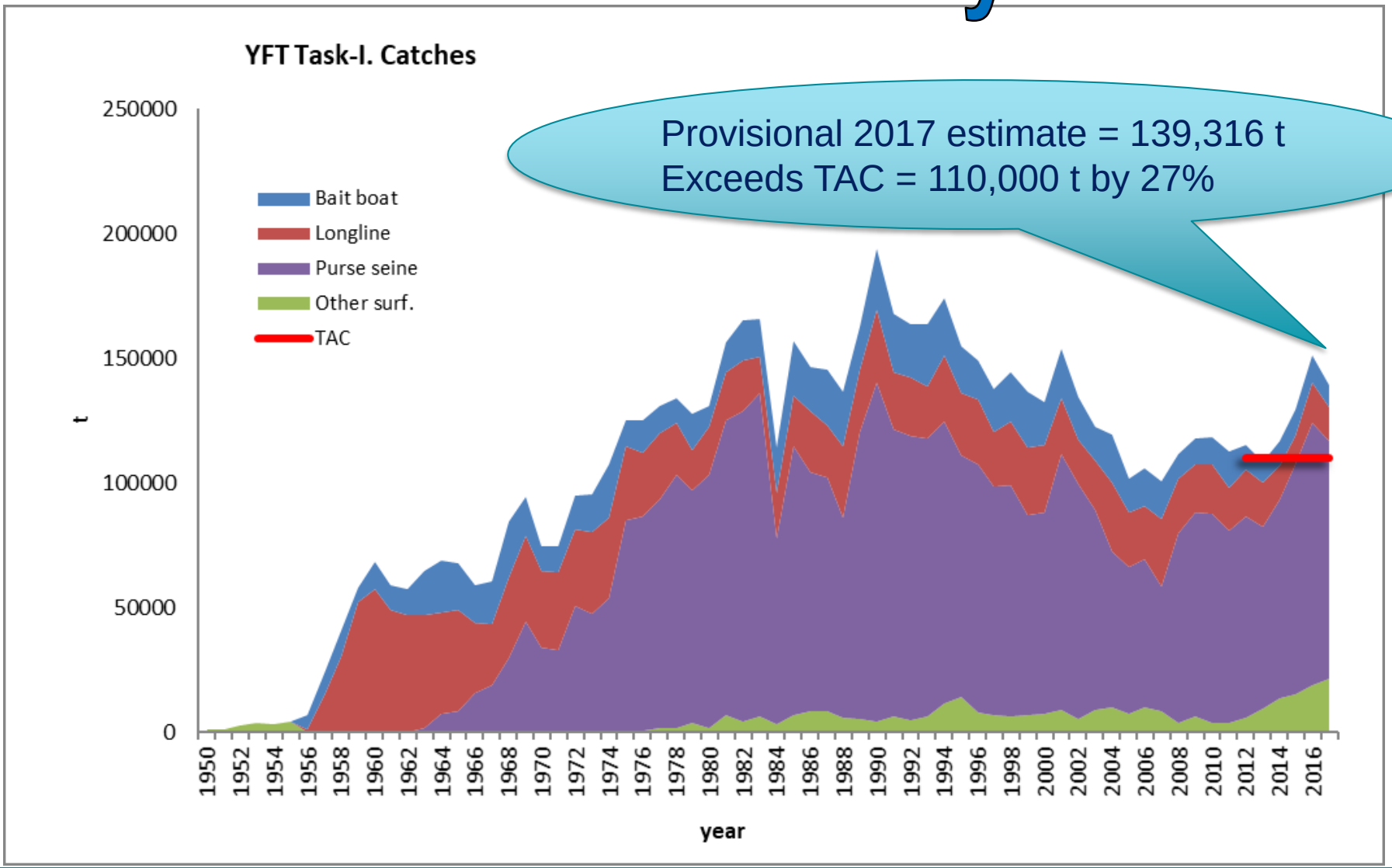
- Last Assessment in July 2016 using data through 2014

Stock Status (2014)

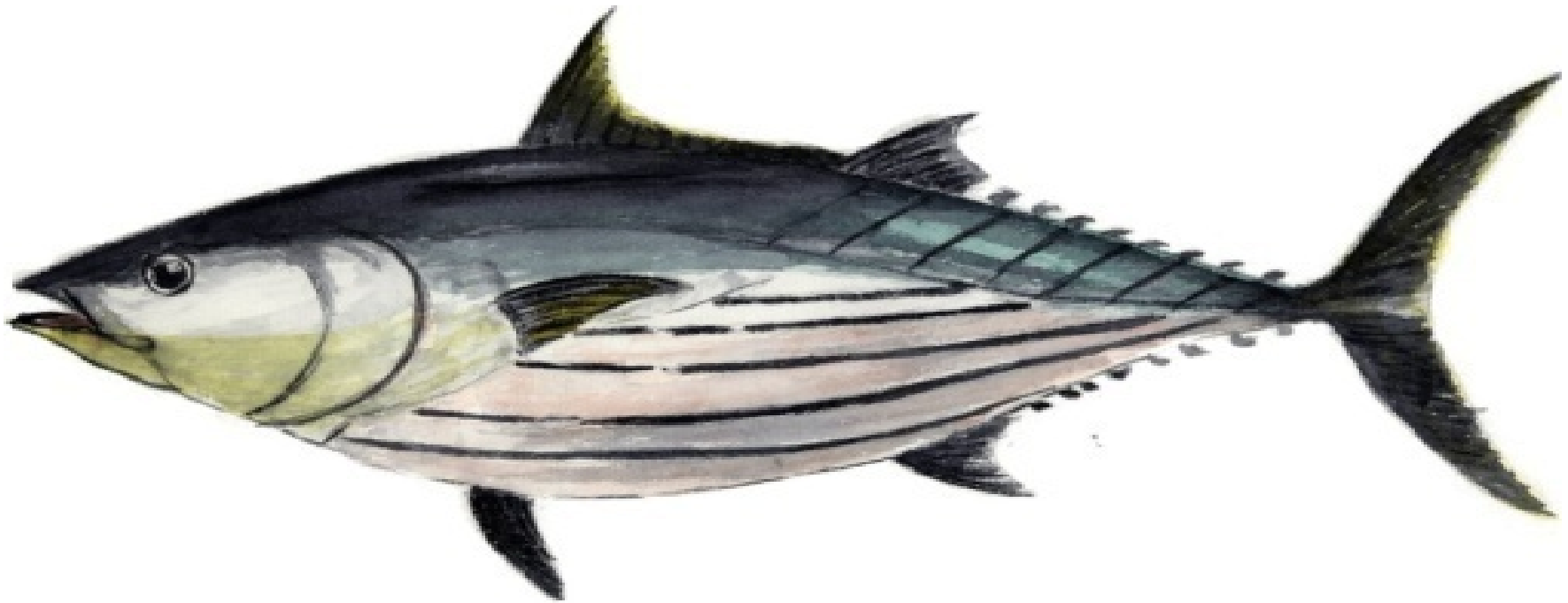
- Combined 7 models, equally weighted.
- B_{2014}/B_{MSY} = 0.95;
  - Overfished
- F_{2014}/F_{MSY} = 0.77
  - Not Overfishing
- MSY = 126,000 t
- Next Assessment in 2019



Catch History

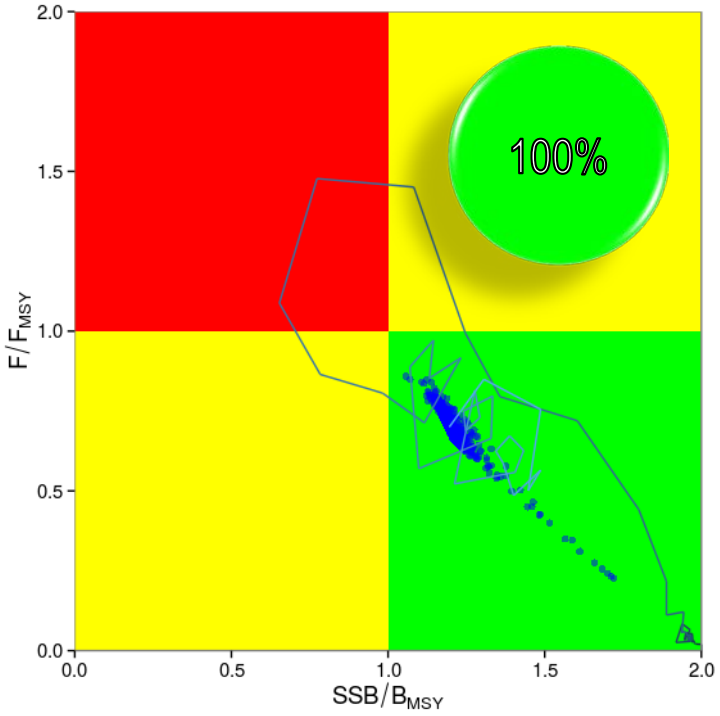


SKIPJACK



STATE OF THE STOCKS (2013)

West Atlantic



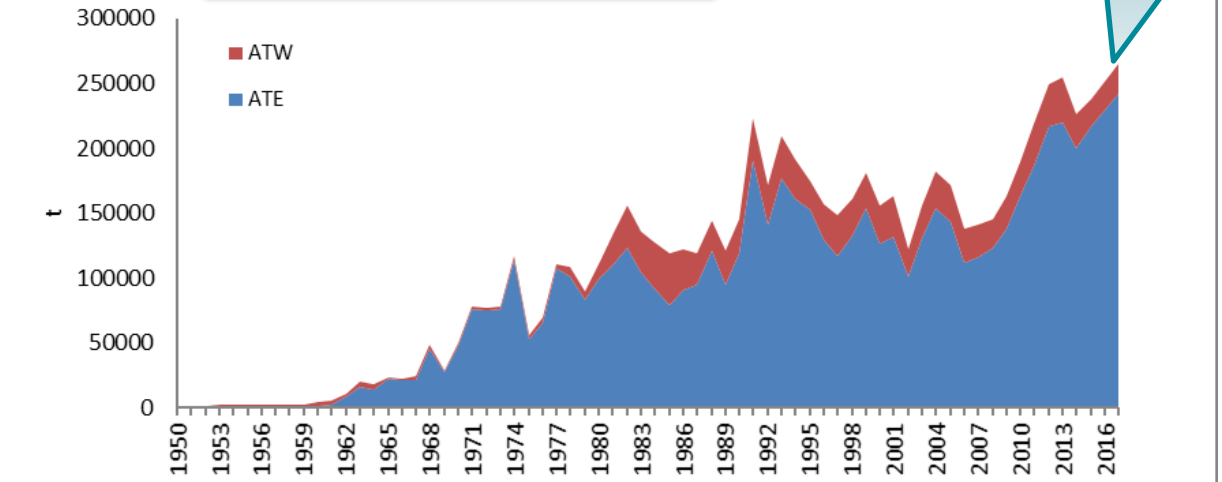
Next Assessment in 2020

	East Atlantic	West Atlantic
Maximum Sustainable Yield (MSY)	Probably higher than previous estimates (143,000-170,000)	Around 30,000-32,000 t
Current yield (2017)	242,289 t	23,276 t
Current Replacement Yield	Unknown	Somewhat below 32,000 t
Relative Biomass (B_{2013}/B_{MSY})	Likely >1	Probably close to 1.3
Mortality due to fishing (F_{2013}/F_{MSY})	Likely <1	Probably close to 0.7
Management measures in force	Rec. 16-01	None

CATCH HISTORY

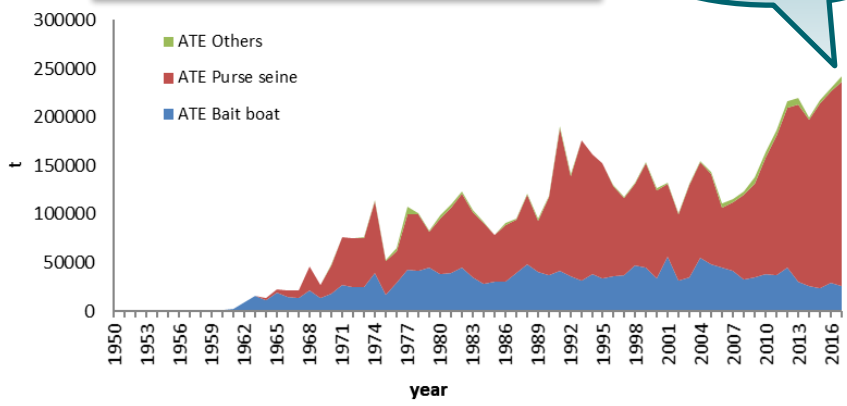
SKJ-ATL

265,565 t



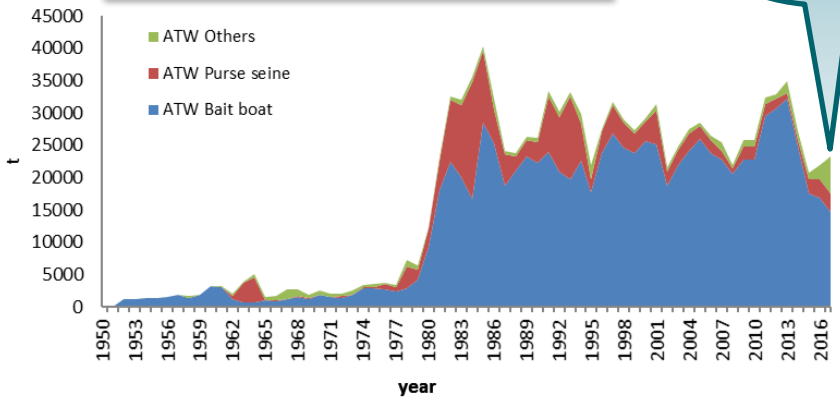
SKJ-ATL East

242,289 t



SKJ-ATL West

23,276 t



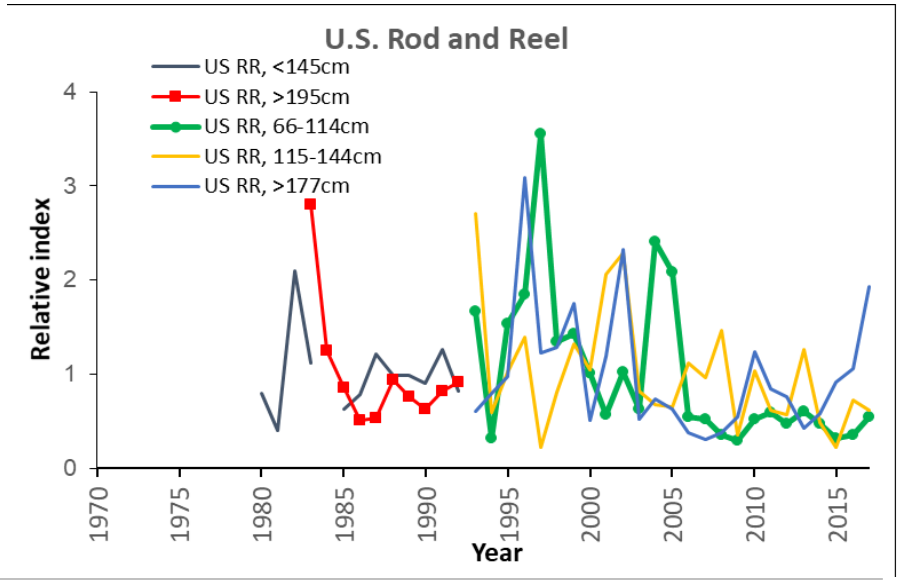
Western Atlantic Bluefin Tuna

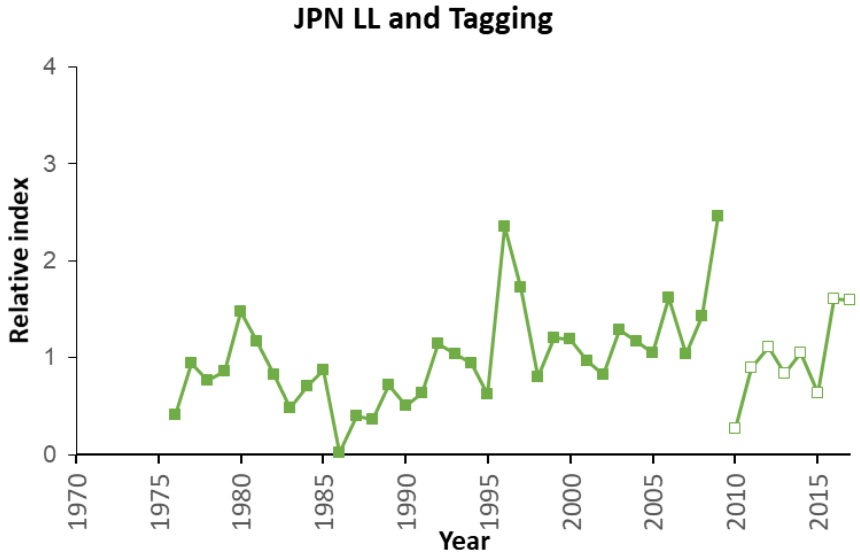
A ‘quiet’ year

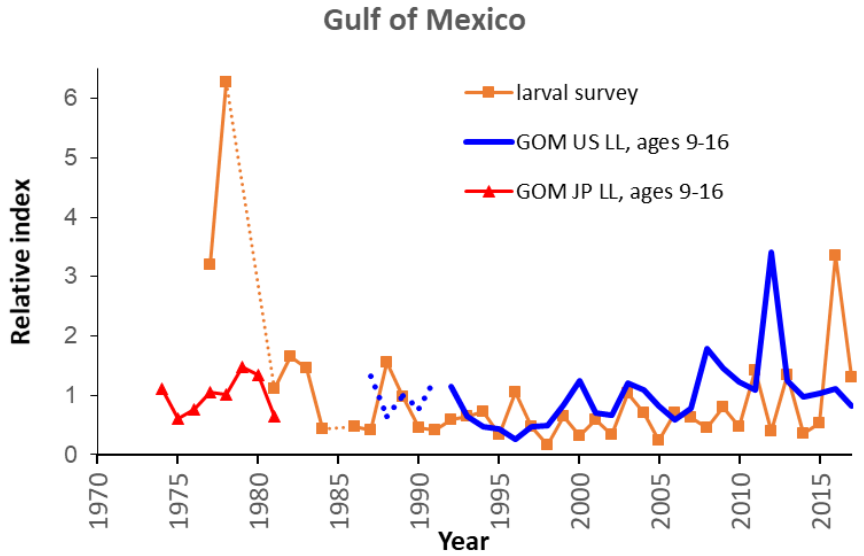
WBFT OVERVIEW

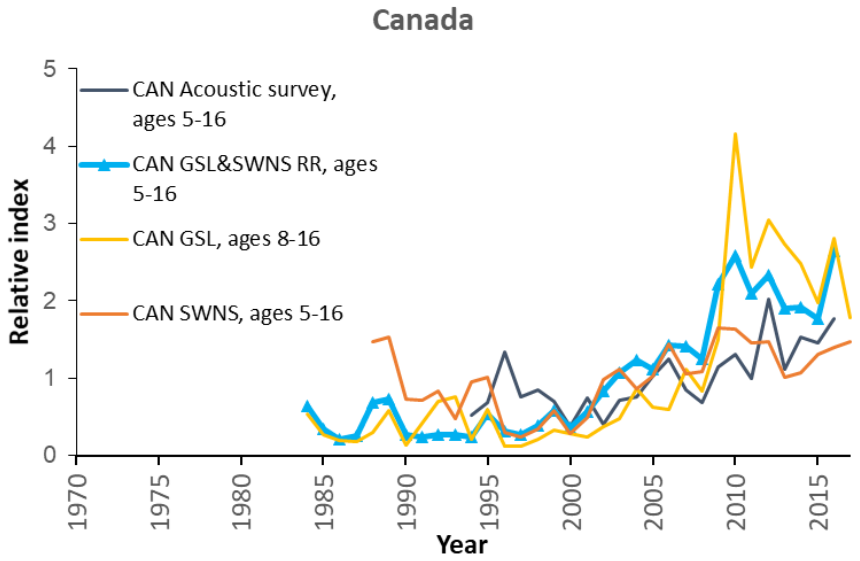
- TAC established at 2,350 t in 2018-2020 [Rec. 17-06]
- WBFT catch in 2017 was 1,851 t (including discards)
- 2017 Stock assessment indicated stock increase, no overfishing
- Given trends in indicators Group *RECOMMENDS* no change to 2017 advice
- Primary focus of BFT in 2018 and 2019 has/will be on MSE
- New WBFT Chair: Dr. John Walter

WBFT Indicators



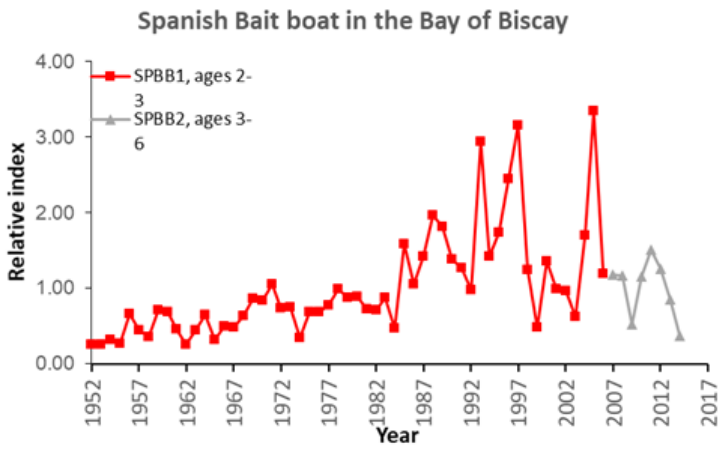


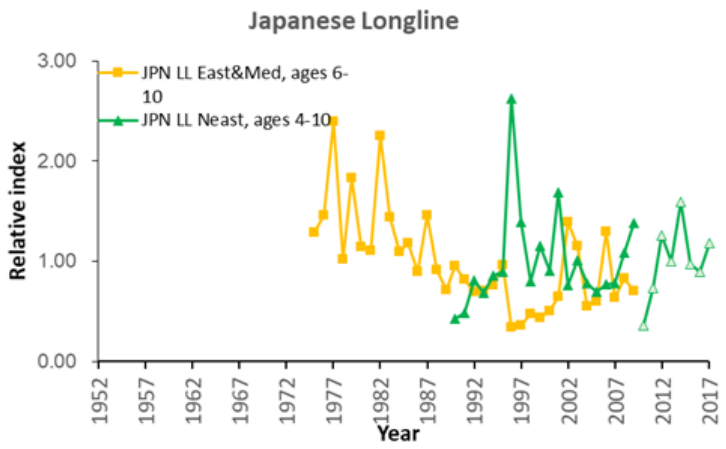


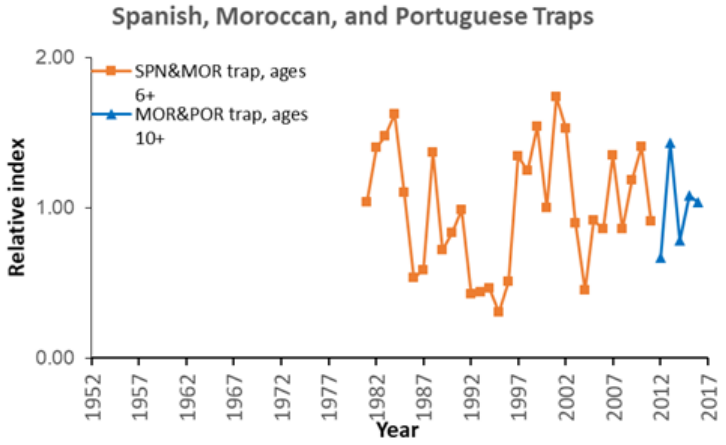


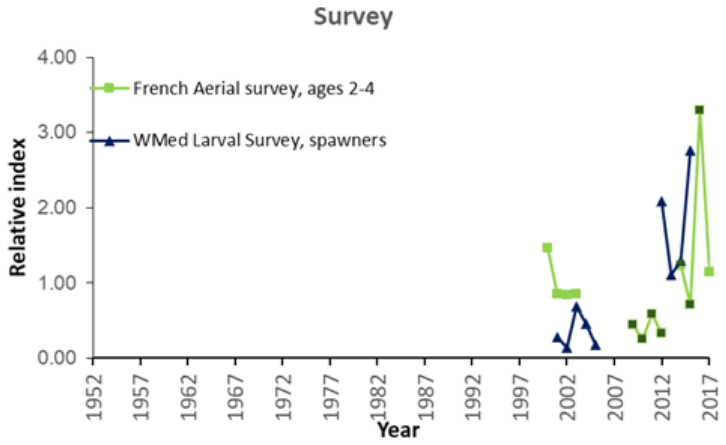

Eastern Atlantic Bluefin Tuna

EBFT Indicators









Fisheries dependent and independent Indicators

BFTE-6. Management recommendations

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY	
Current reported yield (2017)	**23,616 t***
$F_{0.1}$	**0.107(0.103-0.120)[1]**
$F_{2012-2014}/F_{0.1}$[2]	**0.339 (0.254-0.438)[1]**
Stock Status [3]	**Overfishing: No**
Rec. 17-07 TAC 2018-2020	**28, 200 - 32,240 - 36,000**

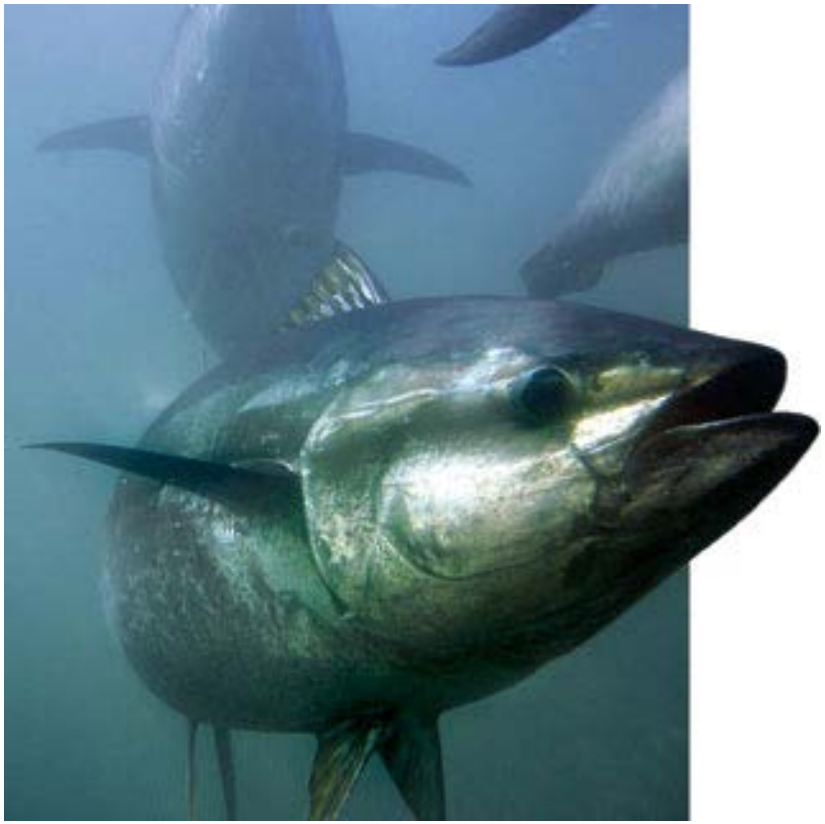
- The Indicators in 2018 did not indicate any change of the state of the stock.
- The Committee is of the view that the stepped increase for 2019 from Rec 17-07 can be maintained.

E/W BFT meetings and workplan

- Focus on MSE, resolving aging issues and improving indices

- GBYP Reproduction workshop (November 28-30, 2018) **https://www.iccat.int/Documents/Other/G-0814-18_ENG.pdf**
- 3 intersessional meetings in 2019; see revised MSE roadmap (15.2)
  - BFT MSE Technical Team (Feb)*
  - BFT intersessional/MSE meeting (Feb)
  - BFT MSE technical team (TBD)*
- BTRP-funded MSE Stakeholder meetings (time/date TBD PI: Dr. Steve Cadrin)

*open to full WG



Progress related to BFT MSE

Joint t_RFMO MSE workshop – Seattle June- Key terms

Operating model (OM): mathematical–statistical model(s) used to describe the fishery dynamics in simulation trials, intended to reflect uncertainties about the dynamics of the resource, the fishery and future resource monitoring data .

Management Strategy Evaluation (MSE): A process where performances of alternative harvest strategies are tested and compared using stochastic simulations of stock and fishery dynamics against a set of performance statistics developed to quantify the attainment of management objectives (MO).

Management Objectives (MO): Social, economic, biological, ecosystem, and political (or other) goals for a given management unit. For example, maximize catch, maintain stock in Green, and industry stability through low inter-annual variability in catches.

Harvest Control Rule (HCR): A pre-agreed and well-defined rule or action(s) that describes how management should adjust in response to the state of specified indicator(s).

Management Procedure (MP): *formally specified*, simulation tested combination of monitoring, assessment, HCR and management action designed to meet the stated objectives of a fishery. Can be empirical (index) or model based (e.g. Albacore)

Key developments

1. **Revised BFT MSE Technical Team** (BTT, open to all WG)
   - BFT chairs (2), chair, rapporteur, developer, CMP developers

2. **Revised roadmap** (Goal: MP to Commission in 2020)
   - Clarifies roles, responsibilities and "guillotines"
   - Clear "chain of command"
     - MSETT→ BFT WG → SCRS→ Panel 2 → Commission

3. **Substantial progress in**:
   - Operating Model development and refinement
   - Candidate management Procedure evaluation
   - Evaluation of mixing

Indices being considered for Empirical Management Procedures

These indices have been chosen to be reasonably reliable as related to abundance, reflect a range of different sizes of fish, cover both commercial catch rates and fishery independent surveys, and have high expectation for continued annual availability in the future.

West

- Gulf of Mexico larval index
- US RR 66-114 cm index
- Japan Longline West CPUE
- Canadian acoustic survey

East+Med

- Japan longline Northeast
- Western Mediterranean larval index
- GBYP aerial survey
- Juvenile aerial survey Gulf of Lyon

Mostly Empirical (index-based) Management procedures are being considered

- Models have not provided SSB benchmarks for BFT

- Indices have the benefit of being intuitive and straight forward, index goes up TAC goes up, vice versa

Movement (constant), mixing (time varying) and recruitment

Movement and mixing

- The Operating Models take account of information (tagging, microchemistry, genetics) that inform on movement of both western and eastern origin bluefin throughout the Atlantic .

Recruitment, regime shifts and dynamic B_{msy}

- OMs include a range of scenarios for past and future recruitment

- OM computations take regime shifts into account by allowing B_{msy} to vary over time; hence stock status is evaluate according to the shifting benchmark that would occur with a regime shift

Operating models are still a work in progress, still to come:

- Data deadline
- Final decisions and weighting of Operating models
- Initial evaluation of Management Procedure performance
- Meetings with Panel 2 to specify management objectives (maximize catch, minimize variance in catch, maintain stock in the Green, etc)
- See detailed workplan for more info…

ICCAT CICTA CICAA

BFT MSE roadmap

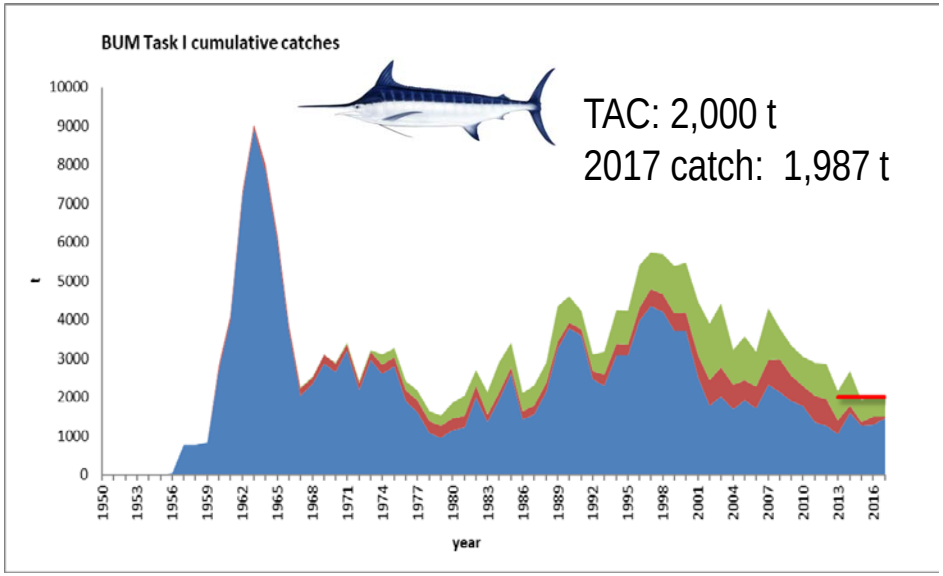
2018	2019	2020
SCRS: progress review and recs	BMSE TT: final ref OMs; CMP progress; key performance stats	BMSE TT: CMPs
Comm: update from SCRS Chair; input on conceptual mgmt objectives	BFTWG: approve ref set of OMs; advise on CMPs	BFTWG: CMPs; ECs; peer review?
	P2: feedback on MSE/CMPs; operational MOs	P2: feedback on CMPs/ECs
	BMSE TT * 2: refine CMPs	BMSE TT: CMPs
	BFTWG: recommend CMPs; feedback on MOs; exceptional circumstances	BFTWG: final CMPs, w/ TACs; ECs
	SCRS: endorse final OMs/CMPs	SCRS: endorse final CMPs/ECs
	P2➔Comm: final operational MOs; performance of CMPs	P2➔Comm: adopt final MP w/ ECs, TAC

NOAA FISHERIES

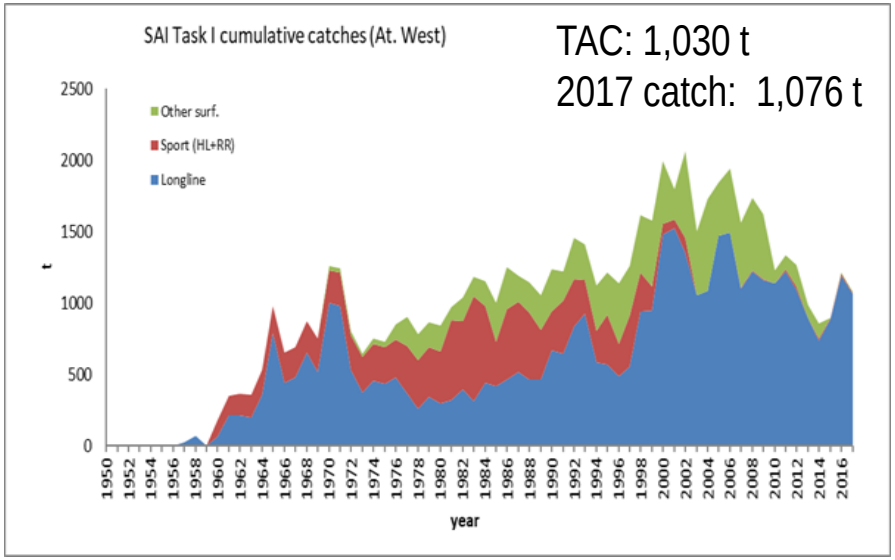
Billfish

BILLFISH ESTIMATED CATCHES

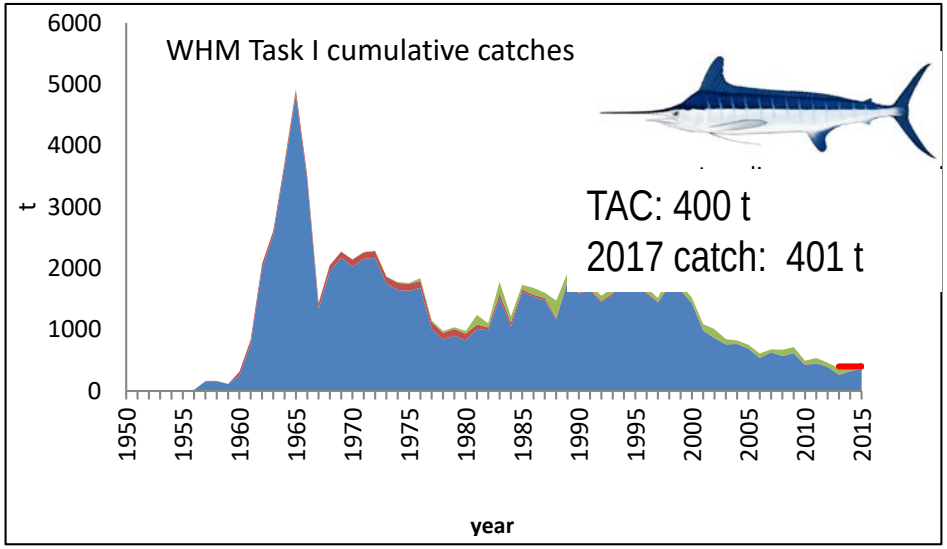
TAC: 1,271 t
2017 catch: 1,591 t



TAC: 2,000 t
2017 catch: 1,987 t



TAC: 1,030 t
2017 catch: 1,076 t



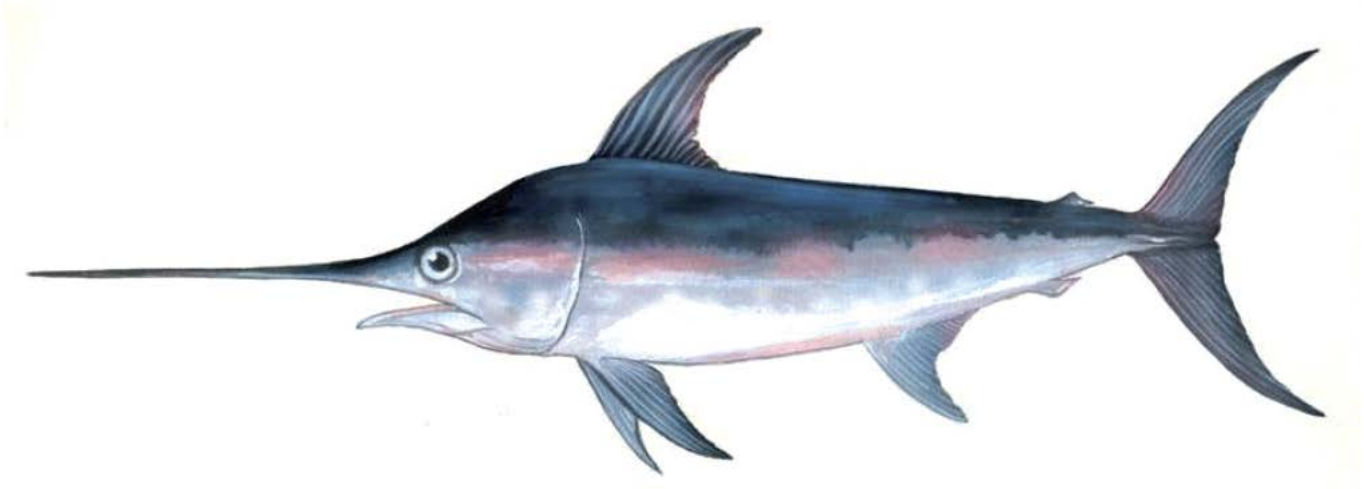
TAC: 400 t
2017 catch: 401 t

BILLFISH STOCK STATUS

	Atlantic Sailfish		Blue Marlin	White Marlin
	West	East		
MSY	1,438-1,636 t	1,635-2,157 t	3,056 t (2,384 – 3,536 t)	874 t - 1604 t
catch (2017)[1]	1,076 t	1,591 t	1,987 t	401 t
status year	2014	2014	2016	2010
B/B_{MSY} or SSB/SSB_{MSY}	1.16-1.81	0.22-0.70	0.69 (0.52 – 0.91)	0.32 -0.5
F/F_{MSY}	0.33 -0.63	0.33-2.85	1.03 (0.74 – 1.50)	0.99 (0.75-1.27)
Overfished	Not likely	Yes	Yes	Yes
Overfishing	Not likely	Possibly	Yes	Not likely
Management Measures in Effect	[Rec. 16-11]. Limit Atlantic sailfish catches of either stock to the level of 67% of MSY.		[Rec. 15-05]. Reduce the total harvest to 2,000 t in 2016, 2017, and 2018	[Rec. 15-05] Reduce the total harvest to 400 t in 2016, 2017, and 2018

[1]provisional as of 9.27.18

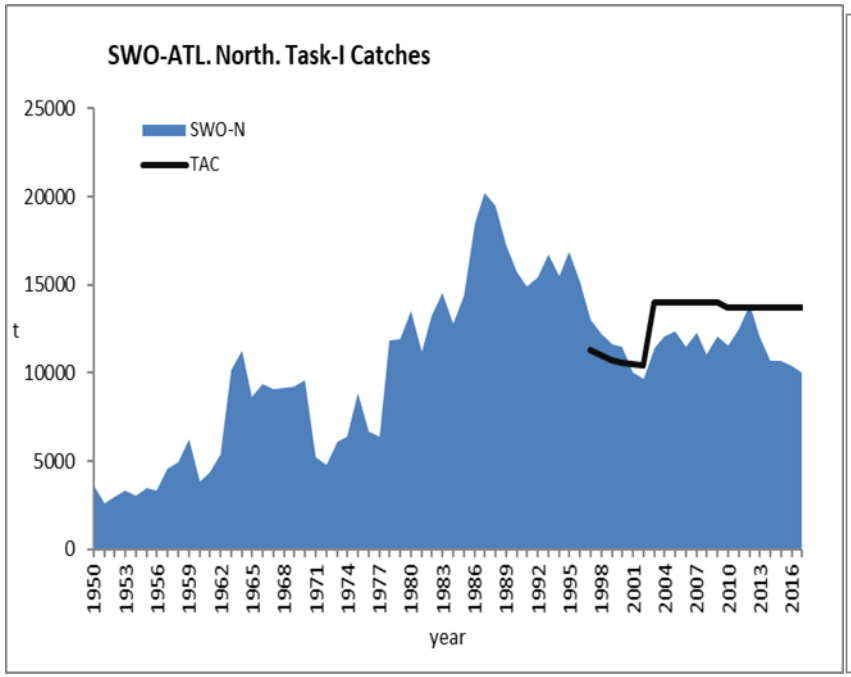
North and South Atlantic Swordfish – last stock assessment in 2017

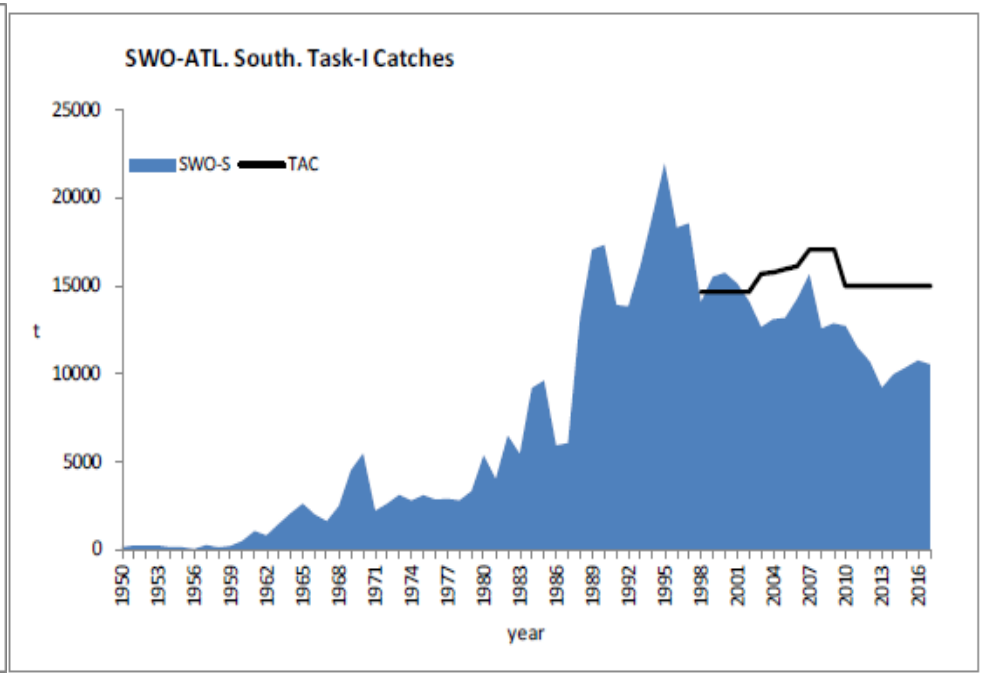


swordfish drawing by Wendy Williams

Catches – North and South Atlantic

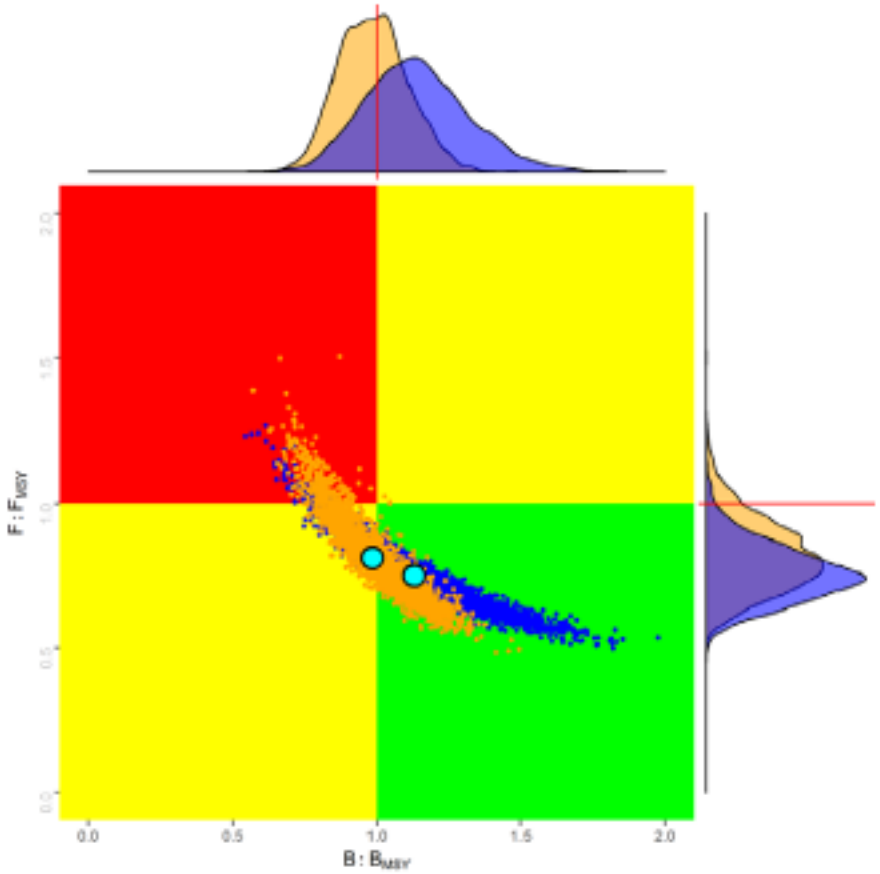
- North – Decrease: 10,046 t in 2017, down from 10,376 t in 2016; 2017 TAC: 13,700
- South – Decrease: 10,512 t in 2017, down from 10,735 t in 2016; 2017 TAC: 14,000

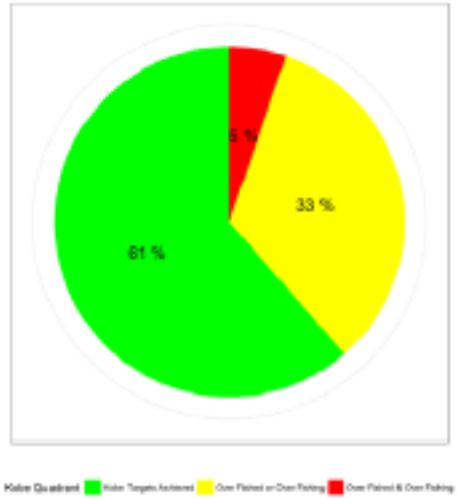




Total reported catch (Task I) and TACs for the North (left) and South (right) Atlantic swordfish stocks (1950-2017)

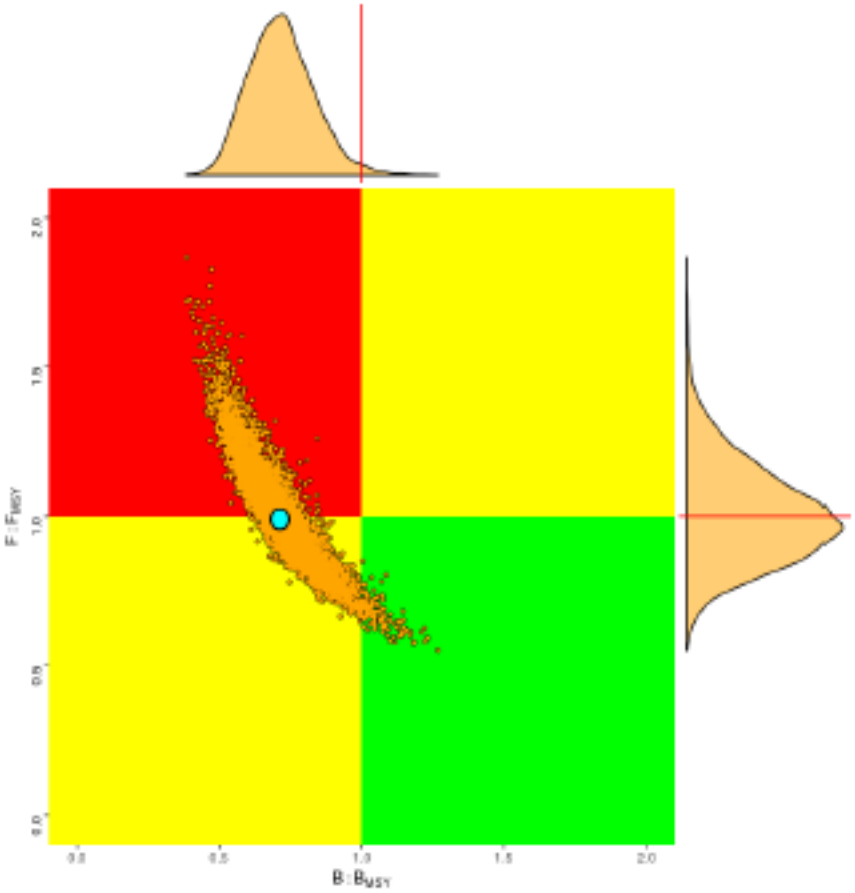
North - Stock status (SS and BSP2)

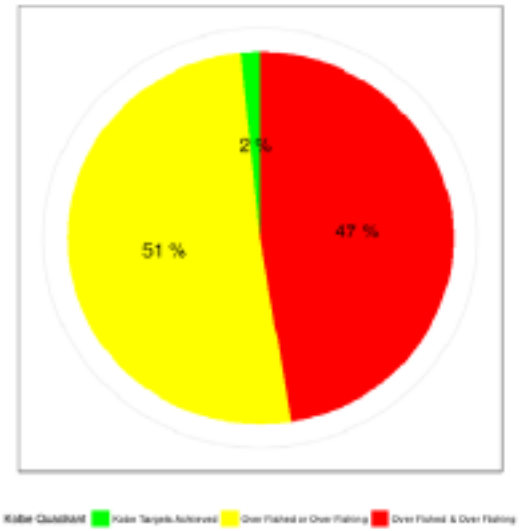




- Estimate of status is slightly more pessimistic than previous 2009/2013 assessments.
- **61% probability** that stock is at or above MSY reference levels (terminal year = 2015).
- Results not comparable with previous assessments due to incorporation of more data sources, different model platforms and updated catch and CPUE information.

South - Stock status (JABBA)

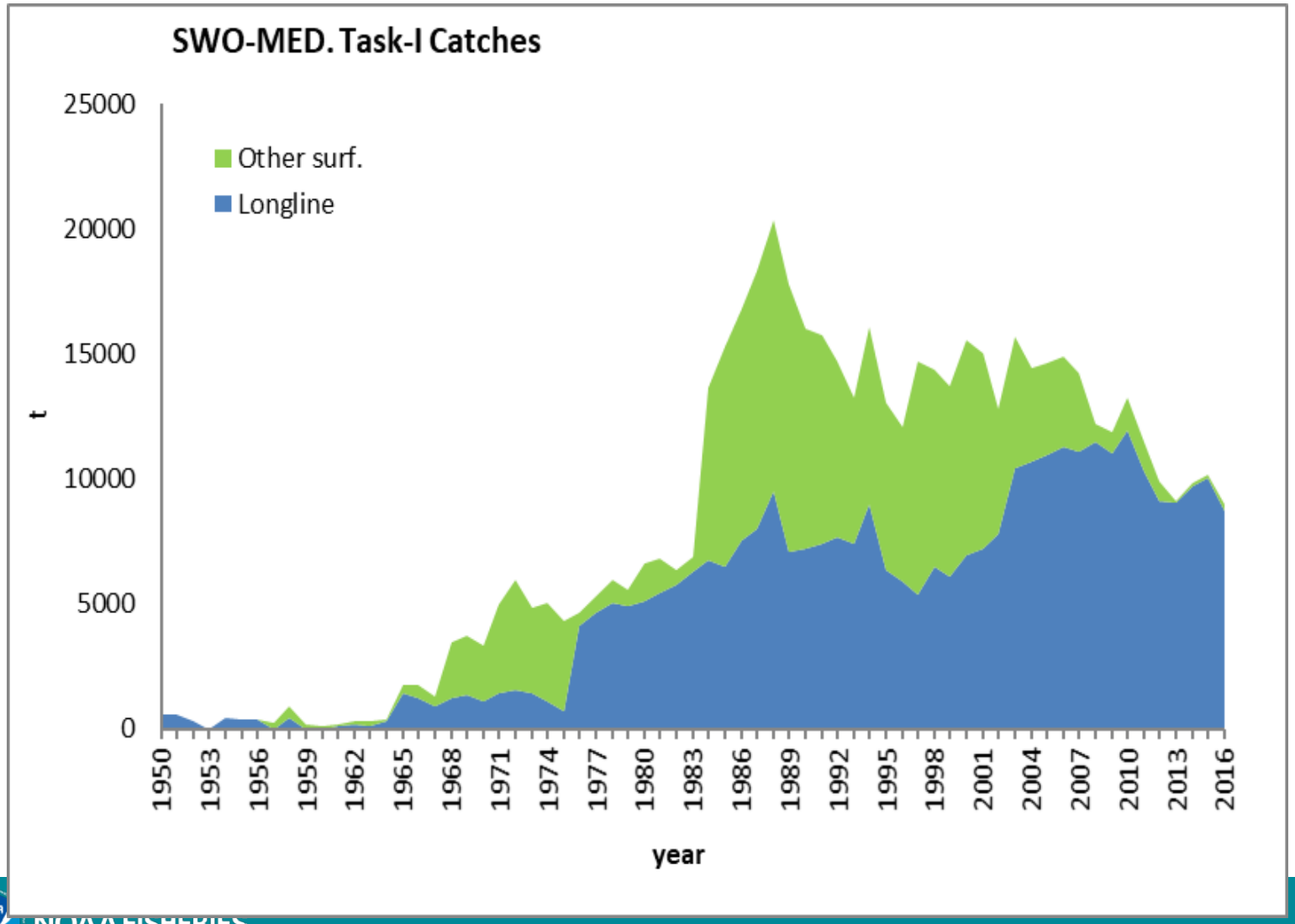




- JABBA and BSP2 are **similar in structure and use of information**. JABBA is written in **open-source** and has extended capabilities for future evolution, so was used for status and advice.
- Results are not comparable with last assessment (2013). Previously there was a need to **combine CPUEs (form GLM outputs)** and assume strong **priors for K based on the North** stock.
- With this improved model it was possible to **provide quantitative advice** for the first time in the South.

Med Swordfish catch

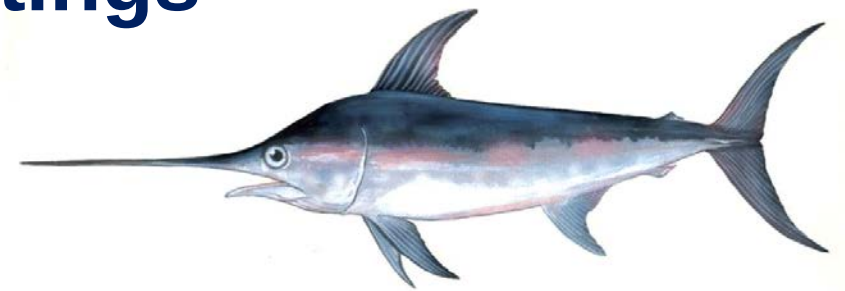
No TAC, 2017 catch= 8,402 MSY 19,700



Swordfish summary

	North Atlantic	South Atlantic	Mediterranean
Maximum Sustainable Yield	13,059 (11,840-14,970)	14,570 (12,962-16,123)	19,683 t
Current (2017) Yield	10,046 t	10,512 t	8,402 t
status year	2015	2015	2015
SSB/SSB_{MSY})	1.04 (0.82 - 1.39)	0.72 (0.53 - 1.01)	0.12
F/F_{MSY}	0.78 (0.62-1.01)	0.98 (0.70 - 1.36)	1.85
Overfished	No	Yes	Yes
Overfishing	No	No	Yes

2018 – Main goals - Meetings



- **2018 Meetings:**

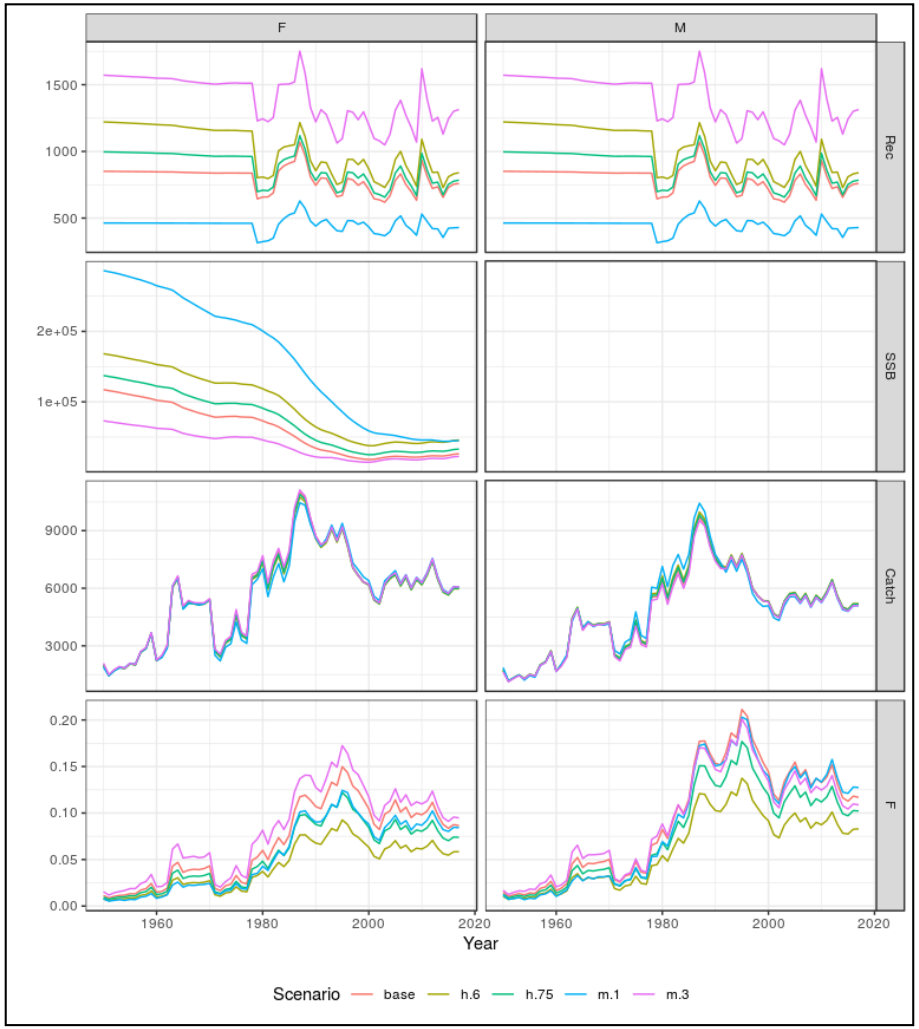
  - **Inter-sessional meeting** (16-20 April, Madrid, 2 days with BFT)
    - Start MSE process; discuss main uncertainties for OM
    - Main research lines for SWO; start a biology and stock structure project (Atlantic + Mediterranean)

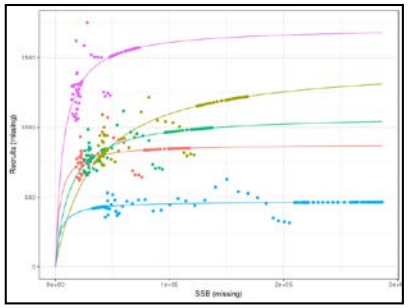
  - **Species groups** (26-27 Sept, Madrid)
    - Progress on MSE and biology project
    - Statistics and executive summary
    - Workplan and Recommendations

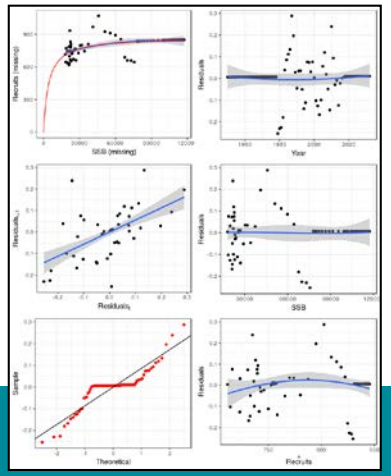
Progress on N-SWO MSE: Contract

- Contract awarded to Sea++ (Dr. Laurence Kell) for OM development and initial test of MPs.
- 2 SCRS documents provided (SCRS/2018/166; SCRS/2018/167): Show the framework (FLR) and an example to condition the operating model and test alternative management procedures.
- Code in Github (private site): need to ask secretariat for access.

Example provided in SCRS/2018/166 with an OM conditioned based on 2 alternatives for M and steepness and with some diagnostics







Progress on N-SWO MSE: Contract awarded

- **Workplan: agreed with Contractor until December 2018**

- Set up a factorial design (grid) of main uncertainties based on SS3: Natural Mortality; Steepness, Selection patterns and Effective sample size.

- Run and test main effects: 9 models

- Run validation procedure: convergence, plausible values for time series (e.g., catch and biomass), residual analysis, parameters within plausible ranges (e.g., B0), check parameter distribution (e.g., truncated), cross-validation, retrospective analysis, R0 likelihood profiles.

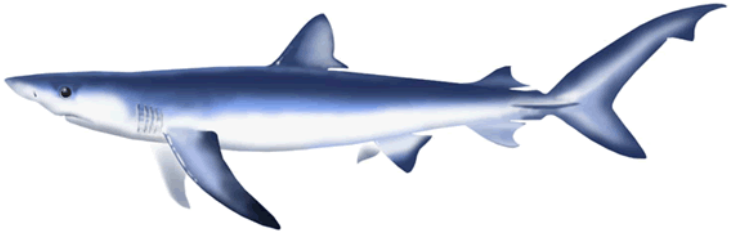
- Automated procedure proposed and tested on full set of interactions: 72 models.

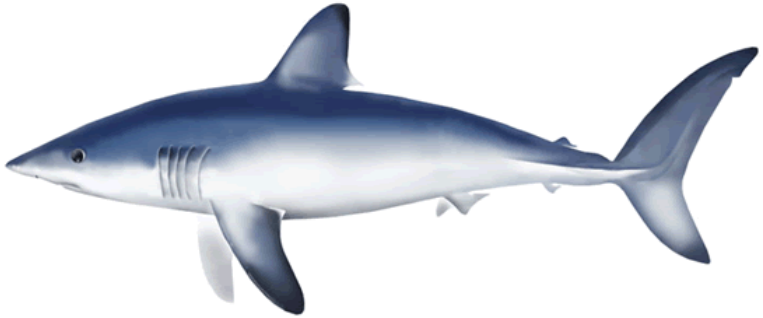
- Several MPs will be run with a selection of OMs

- Visualization app will be constructed to help interpret the results in terms of acceptability and robustness of the MP under different definitions for management objectives

The SWO SG needs the management objectives for NSWO to be defined by the ICCAT Commission.

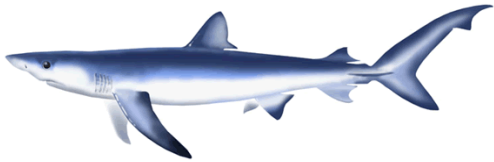
Sharks



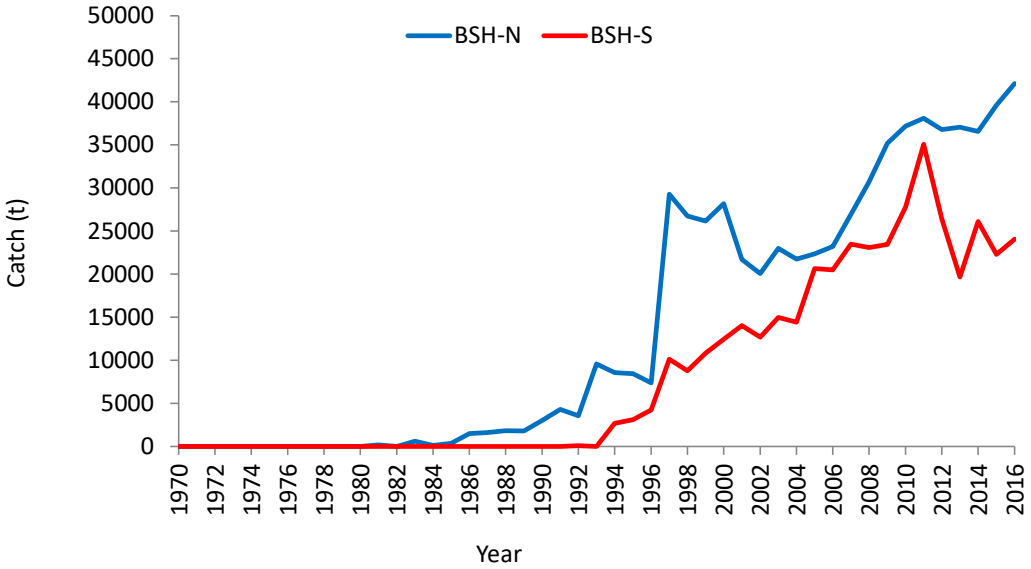


Shortfin Mako
(North and South Atlantic stocks)
assessed in 2017

Blue shark: catches and CPUE



2015 assessment

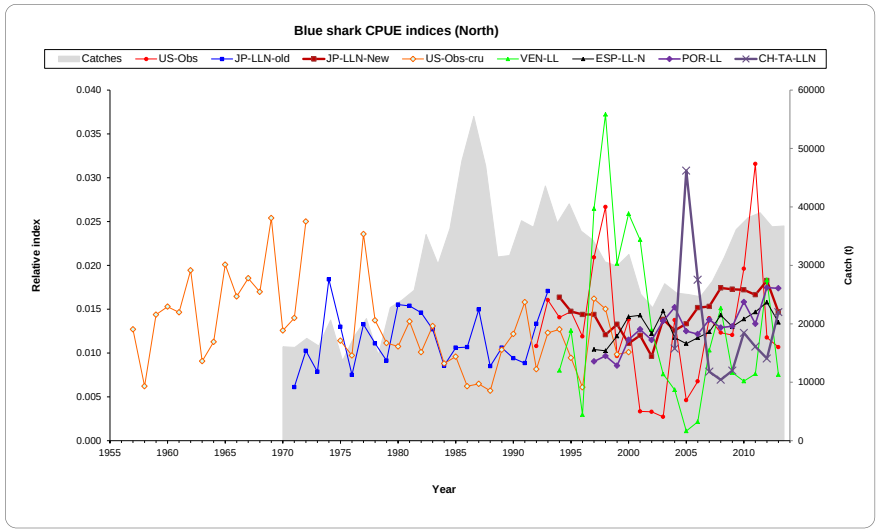


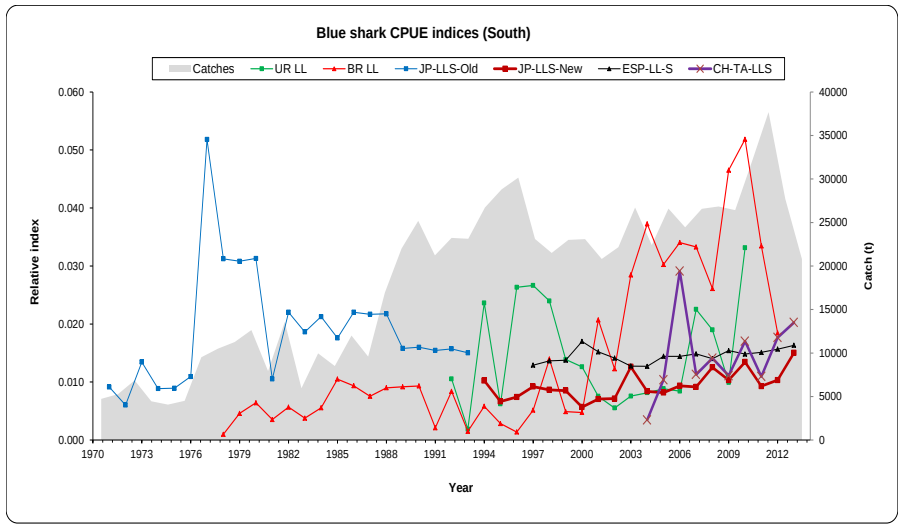
+4440 t, -4392 t

Change in catches from 2015 to 2016 and from 2016 to 2017

+2960 t, +2815 t

Catches



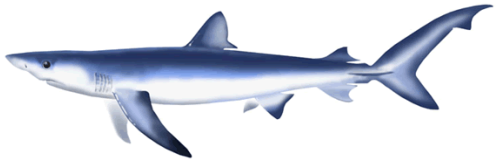


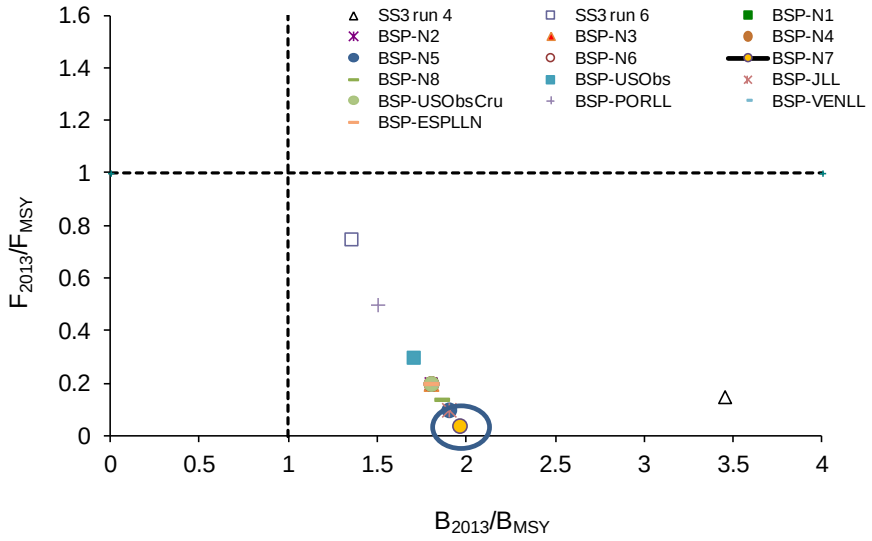
North Atlantic

South Atlantic

NOAA FISHERIES

Blue shark: stock status





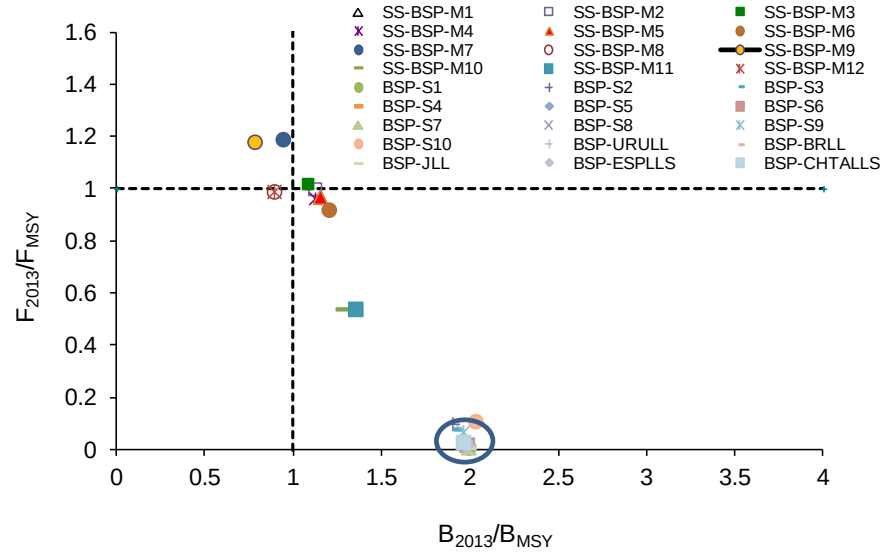
North Atlantic

Overfished: Not likely

(B_{2013}/B_{MSY}=1.35-3.45)

Overfishing: Not likely

(F_{2013}/F_{MSY}=0.04-0.75)



South Atlantic

Overfished: Undetermined

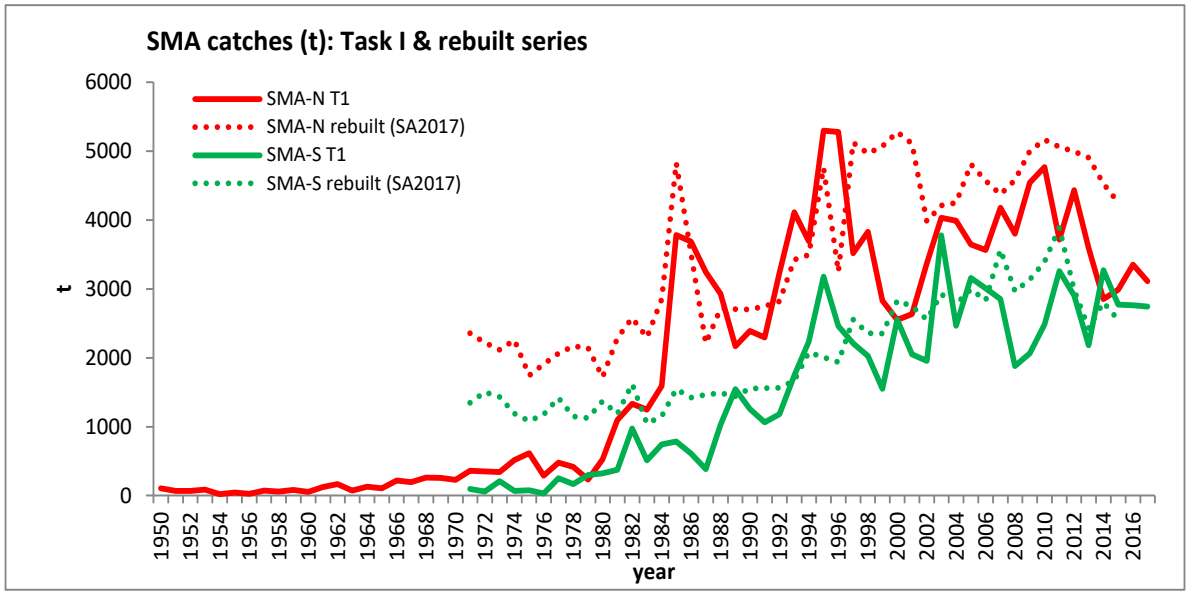
(B_{2013}/B_{MSY}=0.78-2.03)

Overfishing: Undetermined

(F_{2013}/F_{MSY}=0.01-1.19)

Shortfin mako: catches and CPUE

2017 assessment

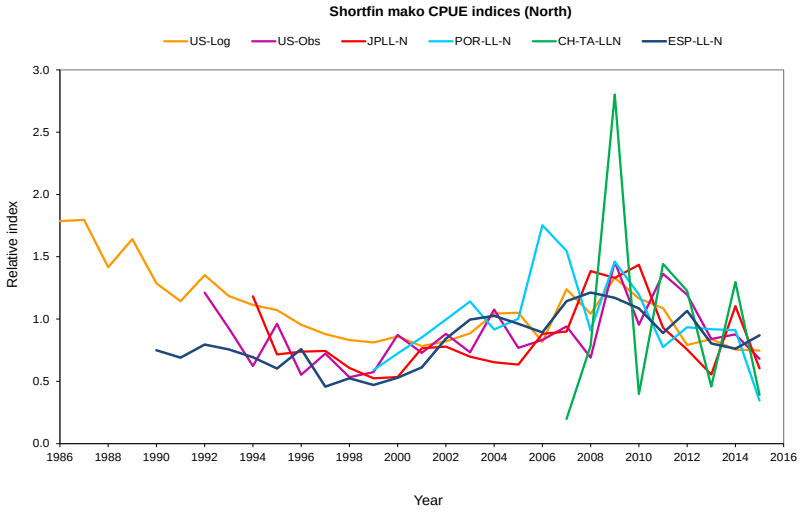


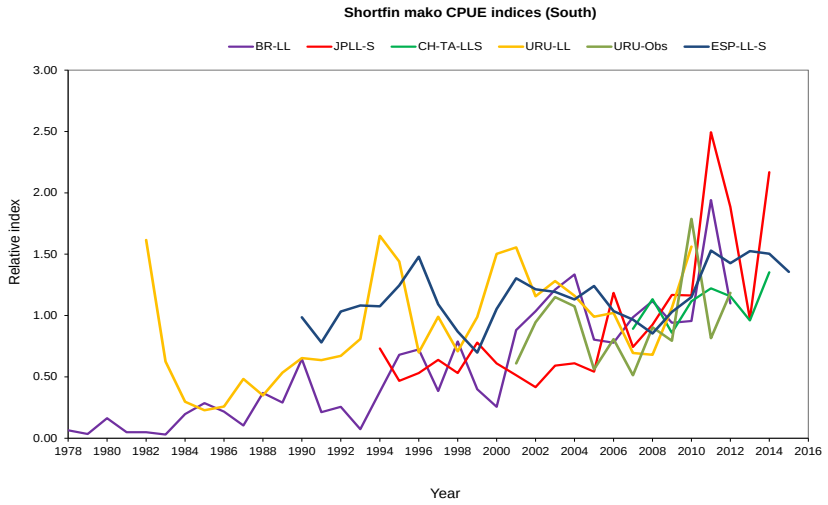
Change in catches from 2015 to 2016 and from 2016 to 2017

+361 t, -239 t

-23 t, -31 t

Catches



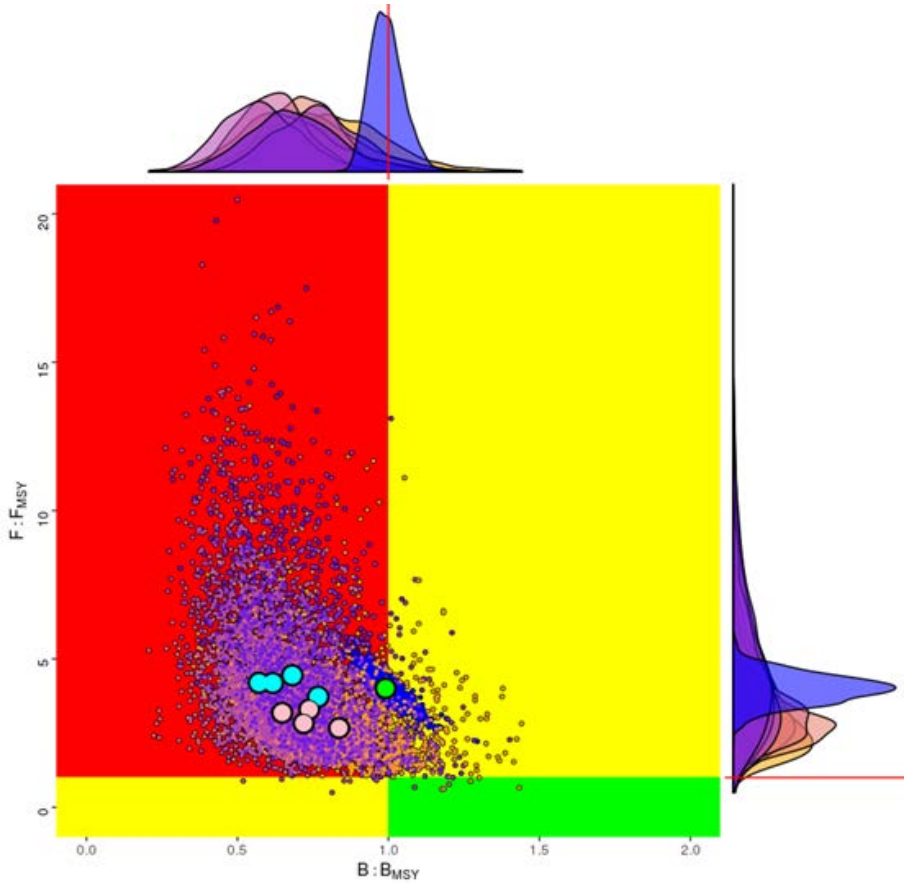


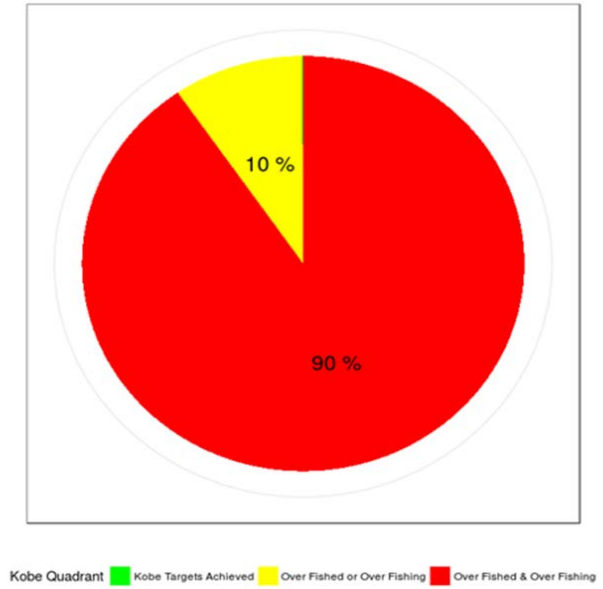
North Atlantic

South Atlantic

Shortfin mako: stock status

North Atlantic





Overfished: Yes (B_{2015}/B_{MSY}=0.57-0.95)

Overfishing: Yes (F_{2015}/F_{MSY}=1.93-4.38)

Shortfin mako: outlook

North Atlantic

Probability ($F<F_{MSY}$)

Catch (t)	2018	2020	2022	2024	2026	2028	2030	2032	2034	2036	2038	2040
0	100	100	100	100	100	100	100	100	100	100	100	100
500	75	74	75	75	74	75	75	76	76	75	75	75
1000	30	32	32	32	34	35	36	35	38	38	38	38
1500	11	10	11	13	14	14	14	15	15	16	16	16
2000	2	3	4	4	4	5	4	5	5	5	6	6
2500	1	1	1	1	2	2	2	2	2	2	2	2
3000	0	0	0	0	0	0	0	0	0	0	0	0
3500	0	0	0	0	0	0	0	0	0	0	0	0
4000	0	0	0	0	0	0	0	0	0	0	0	0

Probability ($B>B_{MSY}$)

Catch (t)	2018	2020	2022	2024	2026	2028	2030	2032	2034	2036	2038	2040
0	6	10	16	21	27	31	36	41	43	46	50	54
500	4	9	12	15	19	21	24	27	29	30	33	35
1000	6	9	10	13	16	18	21	22	23	25	25	27
1500	6	8	10	11	12	12	13	15	16	17	16	16
2000	5	7	7	8	9	9	8	9	8	9	9	9
2500	6	7	7	6	7	6	7	7	6	6	6	6
3000	5	6	5	5	5	5	4	4	3	3	3	3
3500	6	6	5	5	5	3	3	2	2	2	2	2
4000	6	4	3	2	2	2	1	1	1	1	0	0

Probability ($F<F_{MSY}$ and $B>B_{MSY}$) (Kobe plot green zone)

Catch (t)	2018	2020	2022	2024	2026	2028	2030	2032	2034	2036	2038	2040
0	6	11	16	21	27	31	36	41	43	46	50	54
500	4	9	12	15	19	21	24	27	29	30	33	35
1000	5	8	9	11	15	15	19	20	21	23	23	25
1500	3	4	5	7	7	8	9	10	11	12	12	12
2000	0	2	2	3	3	3	3	4	4	4	5	5
2500	0	1	1	1	1	2	2	2	2	2	2	2
3000	0	0	0	0	0	0	0	0	0	0	0	0
3500	0	0	0	0	0	0	0	0	0	0	0	0
4000	0	0	0	0	0	0	0	0	0	0	0	0

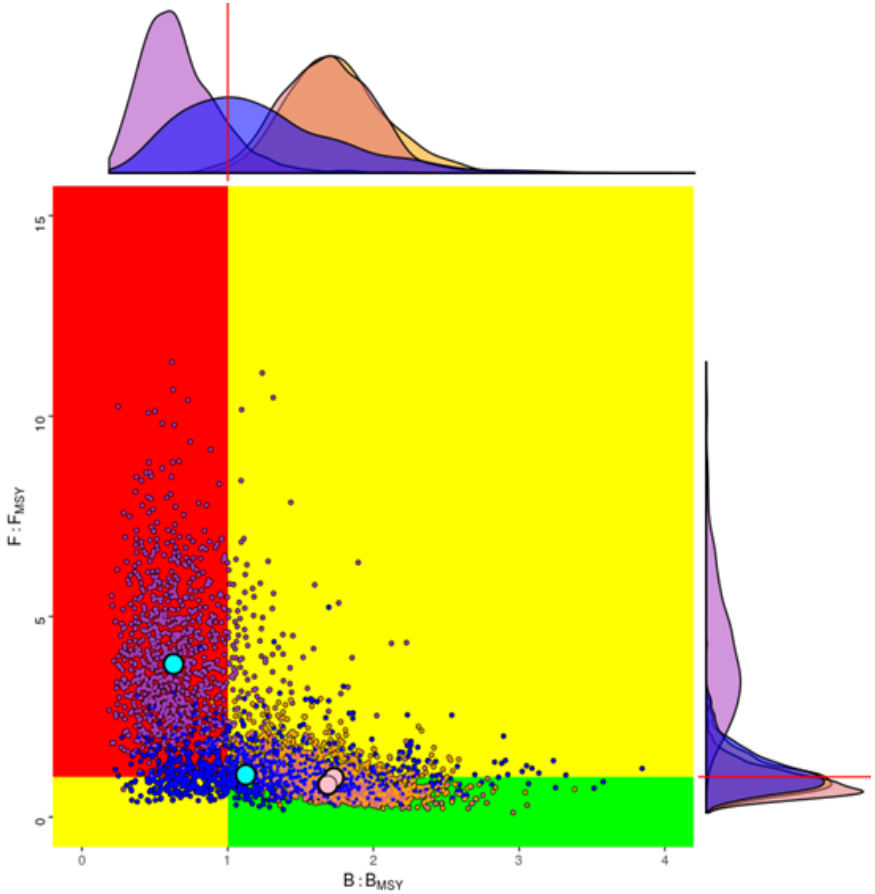
Management recommendations (North Atlantic shortfin mako)

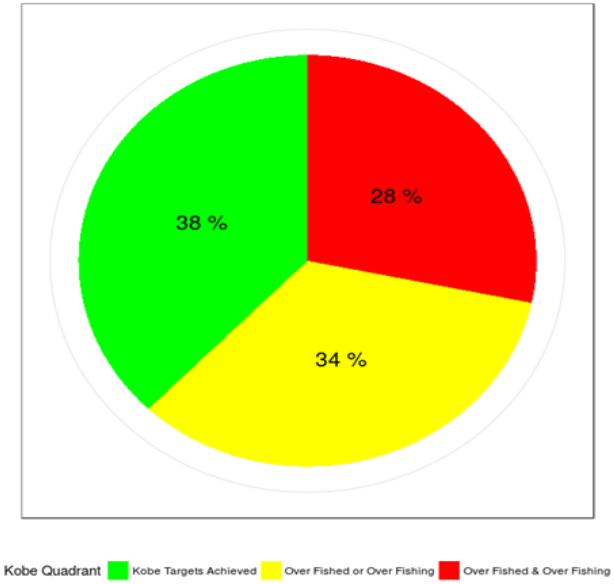
- For the North Atlantic stock of shortfin makos, the probabilities in the Kobe matrices indicate that to stop overfishing and start rebuilding, the constant annual catch should be reduced to 500 t or less. This will achieve the goal of stopping overfishing in 2018 with a 75% probability, but it only has a 35% probability of rebuilding the stock by 2040. Only a 0 t annual catch will rebuild the stock by 2040 with a 54% probability.

- The Kobe II strategy matrix shows the range of possible options for the Commission to consider. If the Commission wishes to stop overfishing immediately and achieve rebuilding by 2040 with over a 50% probability, the most effective immediate measure is a complete prohibition of retention. Additional recommended measures that can potentially further reduce incidental mortality include time/area closures, gear restrictions, and safe handling and best practices for the release of live specimens (since post release survival can reach 70%).

Shortfin mako: stock status

South Atlantic



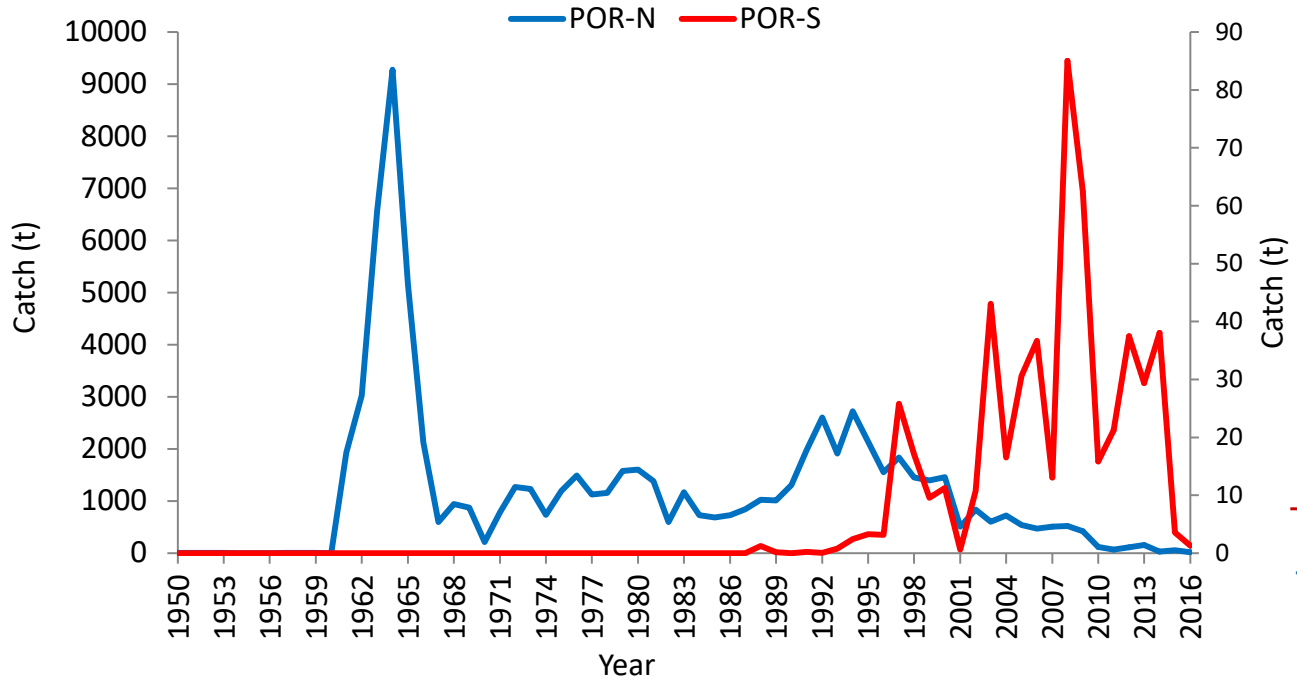


Overfished: Possibly (B_{2015}/B_{MSY}=0.65-1.75)

Overfishing: Possibly (F_{2015}/F_{MSY}=0.86-3.67)

Porbeagle: catches

2009
assessment

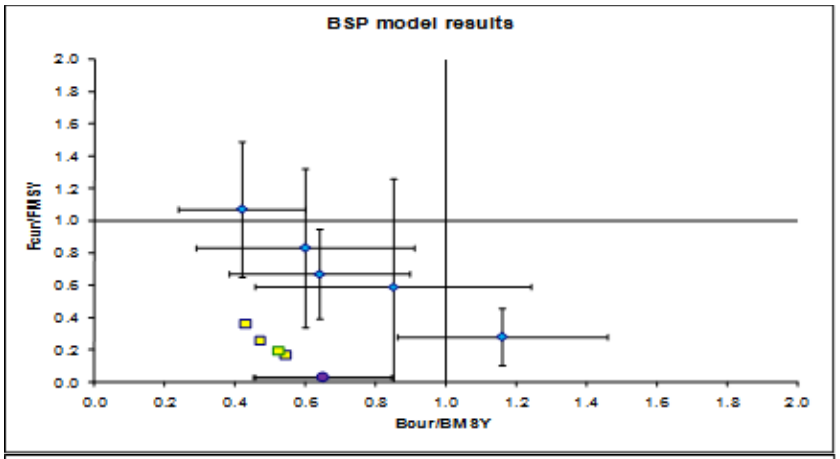


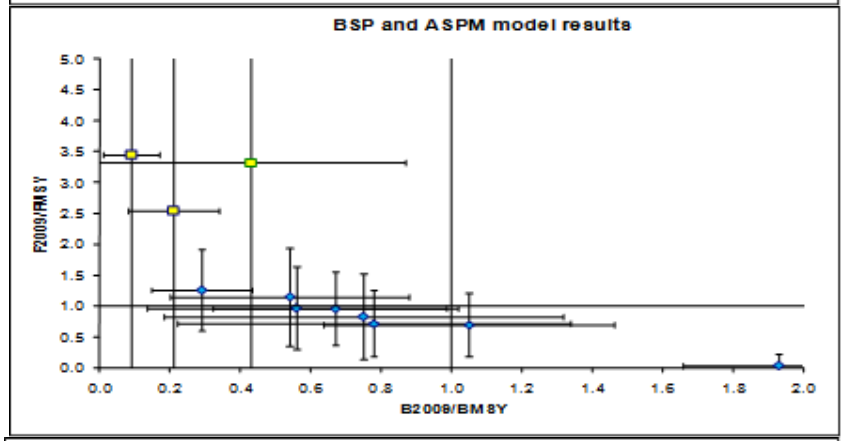
Change in catches from 2015 to 2016 and 2016-2017

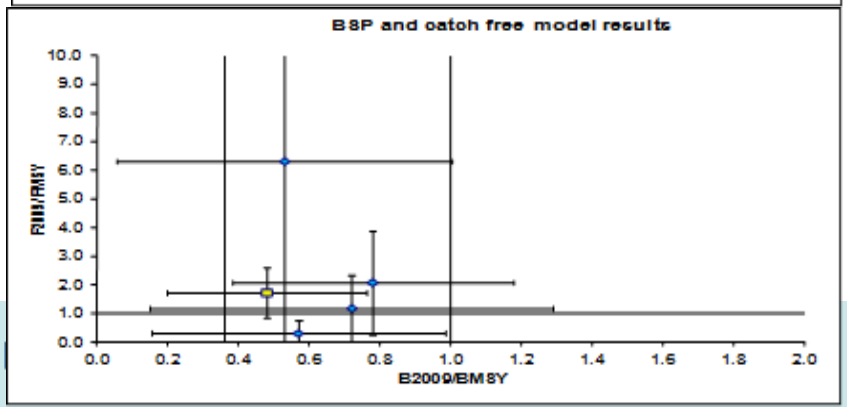
-36 t, + 6 t

-2 t, -1 t

Porbeagle: stock status







Northwest Atlantic

Overfished: Yes (B_{2008}/B_{MSY}=0.43-0.65)

Overfishing: No (F_{2008}/B_{MSY}=0.03-0.36)

Northeast Atlantic

Overfished: Yes (B_{2008}/B_{MSY}=0.09-1.93)

Overfishing: No (F_{2008}/B_{MSY}=0.04-3.45)

Southwest Atlantic

Overfished: Yes (B_{2008}/B_{MSY}=0.36-0.78)

Overfishing: Undetermined

(F_{2008}/B_{MSY}=0.31-10.78)

2019 Work Plan

Hold a single intersessional meeting to:

- Conduct **projections** for SMA based on the 2017 stock assessment, but incorporating projections with Stock Synthesis. Projections can include several of the provisions contemplated in Rec 17-08 (100 t intervals, 2 generation times; effectiveness of circle hooks, effect of minimum sizes with SS3)

- *Initiate* the review of data available for a stock assessment of POR in the future, including:
  - Catch data available at the Secretariat
  - National scientists to identify data available (catch, indices of abundance, length compositions, life history)
  - Life history
  - Review of SDRDCP activities (e.g., reproductive biology, satellite tagging) that can be of use to provide future advice
  - The ABNJ POR assessment for the Southern Hemisphere

- Review of the SRDCP activities and progress

Proposed 2019 SCRS Calendar

2019 Commission and SCRS/Commission joint meetings are yet to be determined and are not shown

	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
January				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
February							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
March							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
April			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
May					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
June								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
July			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
August						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
September		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
October				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
November							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
December		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				

SCRS Plenary

Ecosystems / WGSAM

J-TRFMO FAD WG

WHM data prep

BFT

WHM assessment

YFT Assessment

YFT

Sharks

SMT

SPECIES GROUPS (*)

SWO