

ICCAT SCRS Report

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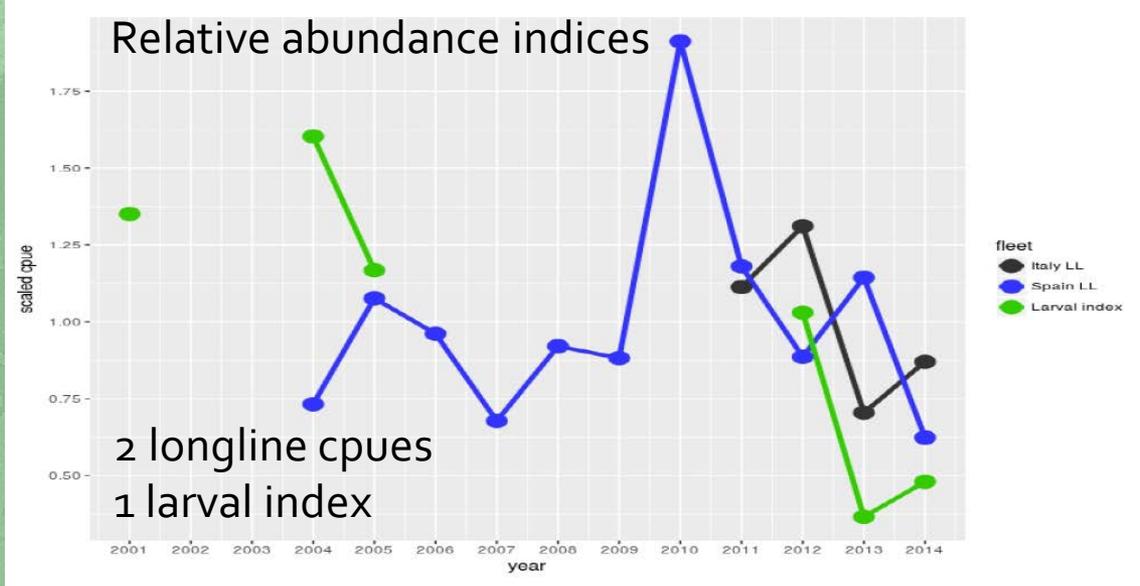
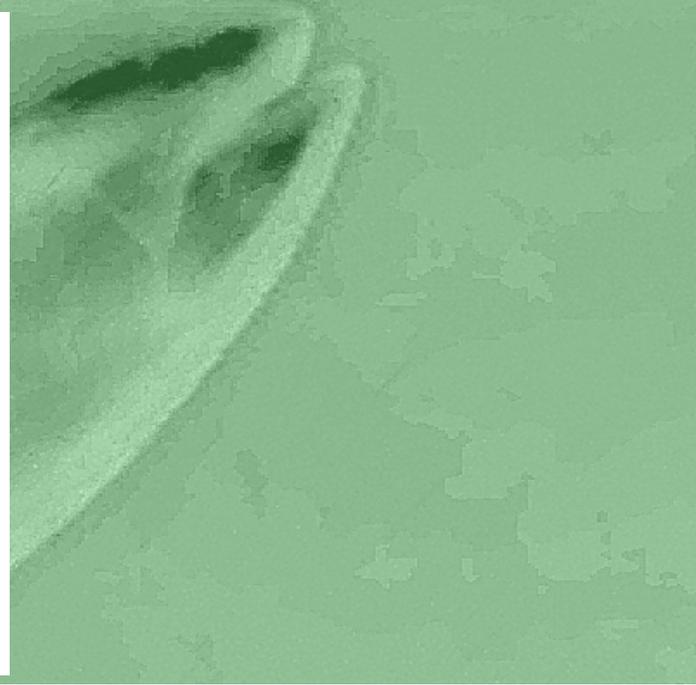
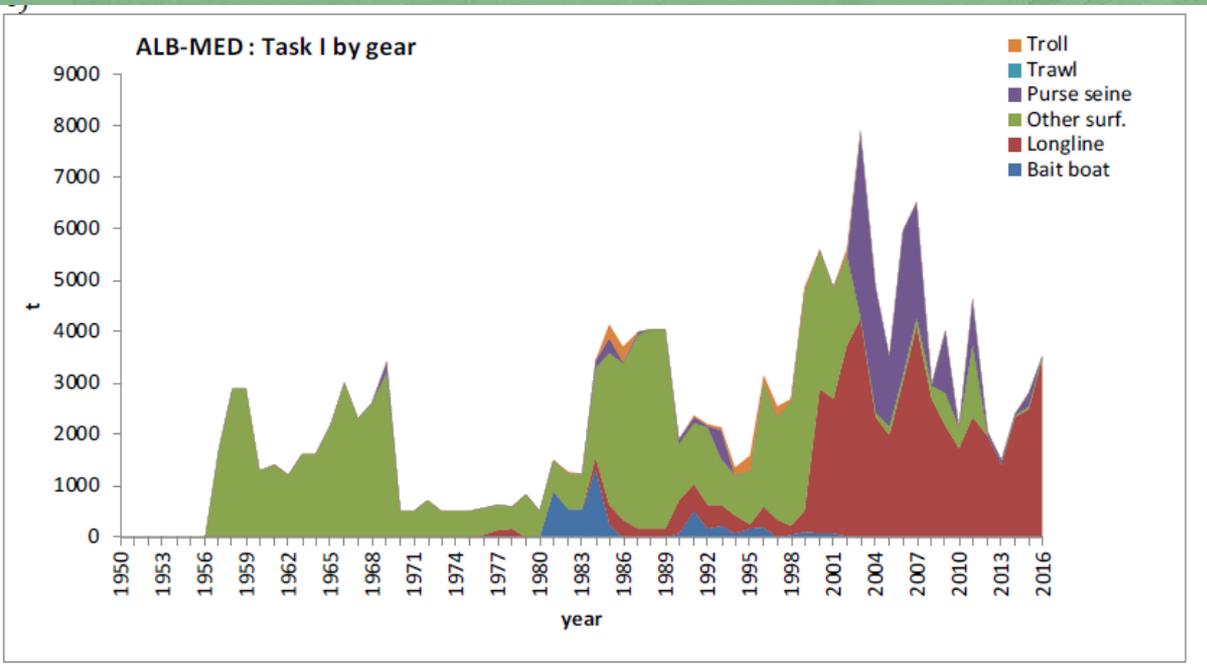
Panel 2- Temperate tunas North



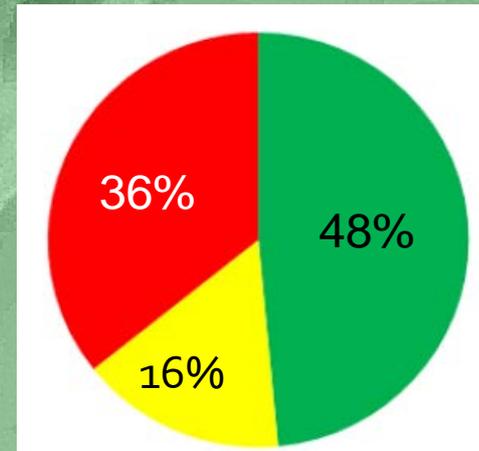
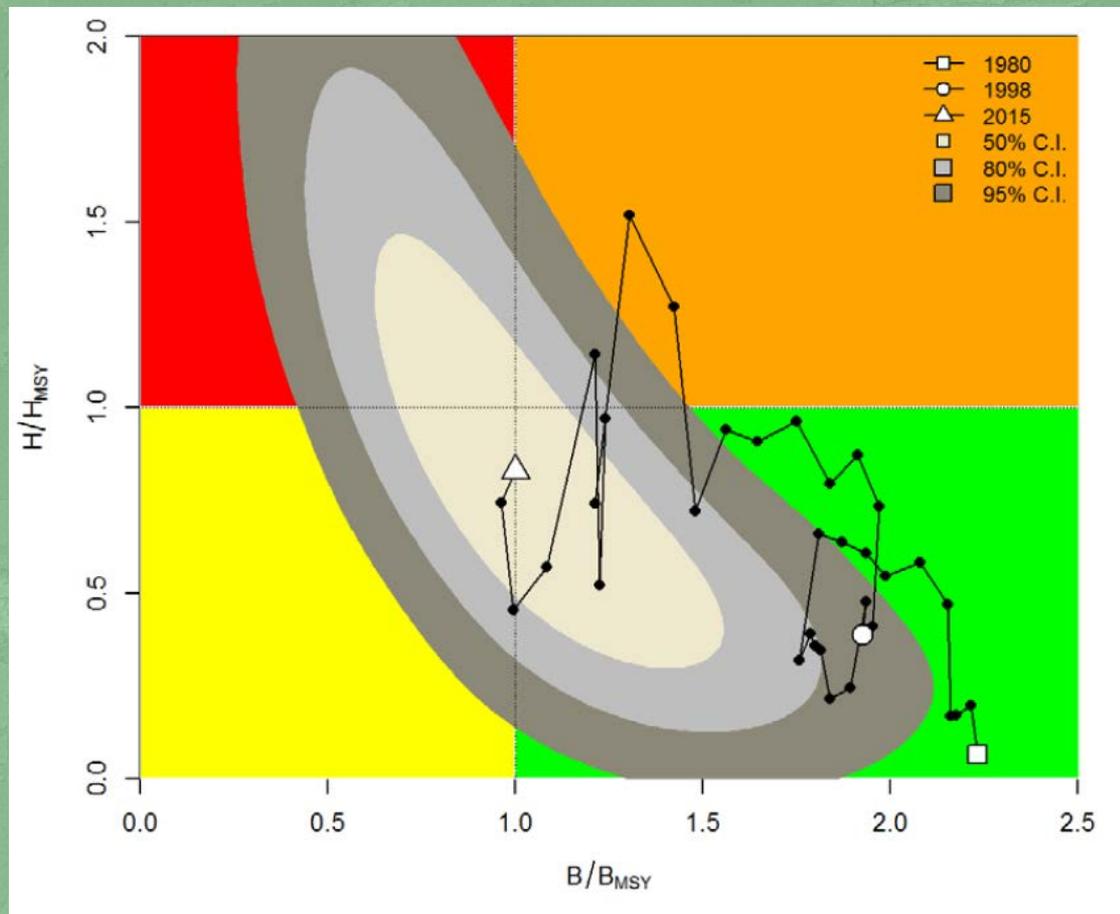
2017 Report of the SCRS Temperate tunas

- Summary of 2017 assessment of Albacore Mediterranean
- GBYP research highlights (including progress on MSE)
- Summary of 2017 Bluefin tuna stock assessment
- Responses to the Commission (including MSE ALB N)

ALB Mediterranean fishery indicators: Catches



ALBACORE Mediterranean stock status 2015



Production model – high uncertainty in results
very sensitive to trends in last few years of data

Summary of stock status ALB Mediterranean

- There is limited quantitative information is available to the SCRS for use in conducting a robust quantitative characterization on biomass status relative to Convention objectives.
- Recent fishing mortality levels appear to be below FMSY, and current biomass is approximately at BMSY level. However, there is considerable uncertainty about current stock status.
- Catch levels as high as those in the years 2006-2007 (beyond 5,900 t) proved to be unsustainable.
- Recent catches for this stock are close to the estimated MSY.

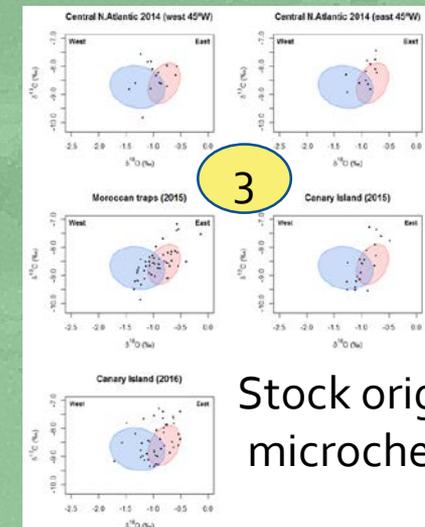
Management recommendations ALB Mediterranean

- Institute management measures designed to avoid increases in catch and effort directed at Mediterranean albacore.
- Maintain catches below MSY at least until relative abundance trends are updated. The precise level of catch would depend on the level of risk the Commission is willing to take.

GBYP highlights

USE OF ICCAT GBYP DATA UP TO THE FIRST PART OF PHASE 7

Activity	use in the BFT Stock Assessment	use in the BFT MSE and OM
Data mining and data recovery	size data, LL CPUE, historical trap data, BB data, non-GBYP electronic tagging data	size data, LL CPUE, historical trap data, BB data, non-GBYP electronic tagging data, historical genetic data
Aerial survey on BFT spawning aggregation	data available, but not used not so far (too short series)	yes
Tagging	conventional tag data, growth data, electronic tag data	conventional tag data, electronic tag data, mixing determination by area
Biological studies	genetic and microchemical data (mixing) ALK, reproductive characteristics, L/W correlation	genetic and microchemical data (mixing by area), ALK, reproductive characteristics, L/W correlation
Modelling approaches	SAM application, VPA training course	MSE and OM development, Modelling Multi-Year Plan

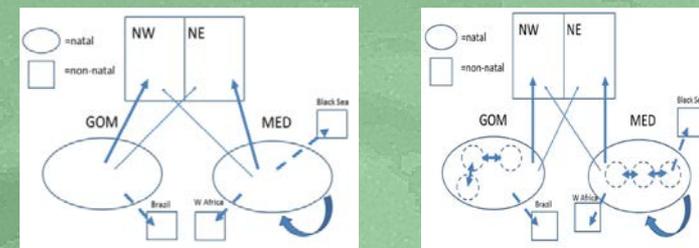
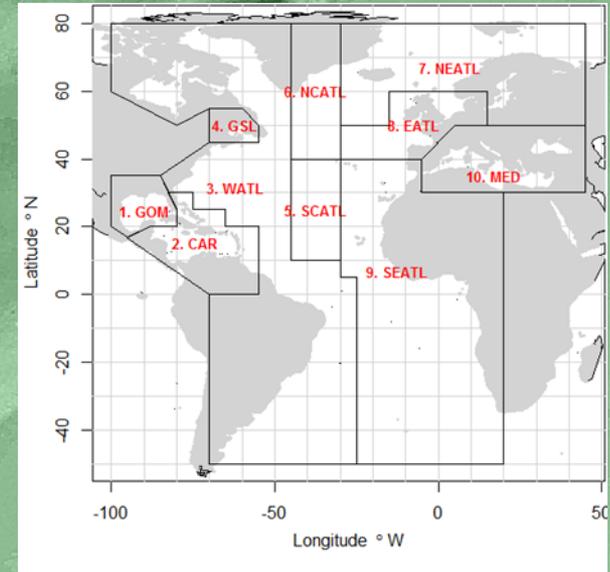


Stock origin from microchemistry

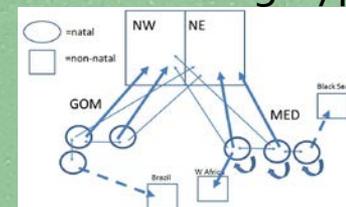
BFT GBYP Modelling for MSE - Progress

- A spatial stock-mixing operating model has been completed
- This model is fit to all the usual abundance indices, plus tag data (which inform on movement) and microconstituent data
- A core set of such operating models has been agreed which span the major uncertainties evident in the current assessments
- An initial selection of abundance indices (3 west, 4 east) to be used in the management procedures (MPs) for setting future TACs
- A computer package which will allow different scientists to easily test how their ideas for MPs will perform is virtually completed

Spatial configuration



Alternative mixing hypotheses



BFT GBYP MSE Modelling 2018-2019

- Different scientists, interacting with each other, will develop their suggested MPs over the course of 2018
- Most of these MPs will have their TACs based directly on abundance index data, e.g. TAC increases if index trends up, and vice versa
- Experience suggests that such simple formulae are more readily understood and accepted by stakeholders
- After refinement and culling, a small set of possible mps will be reported to the 2018 commission meeting
- Feedback from the Commission will assist in the refinement of MPs through a proposed panel 2 meeting early in 2019
- The evaluation of a final set of very few MPs will be presented to the 2019 commission meeting for one to be selected for possible implementation

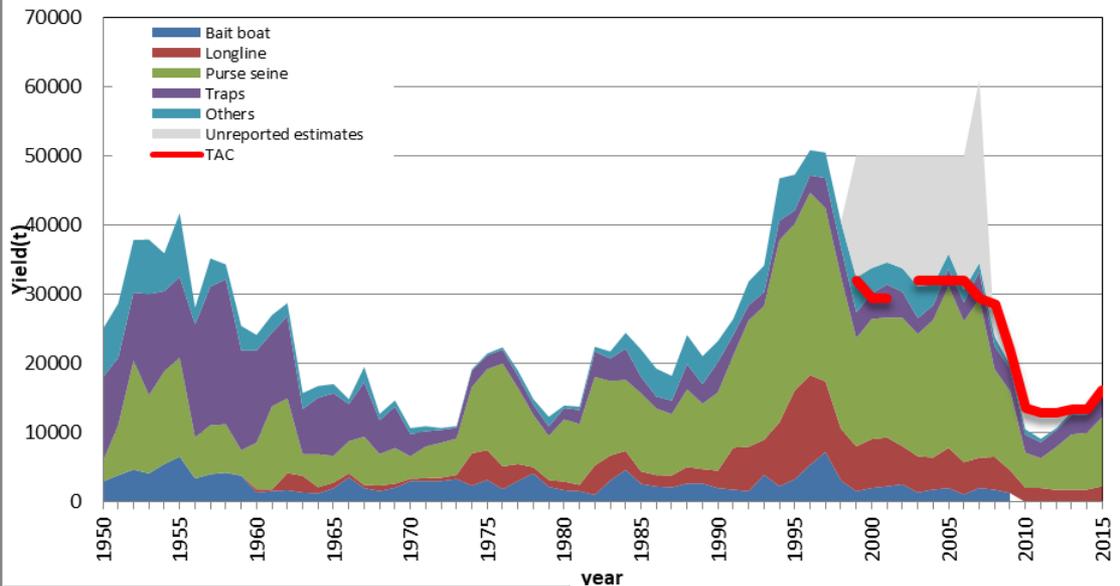
Assessment of stock status of Eastern and Mediterranean Bluefin tuna

Stock assessment based on VPA using the distribution of catches by age

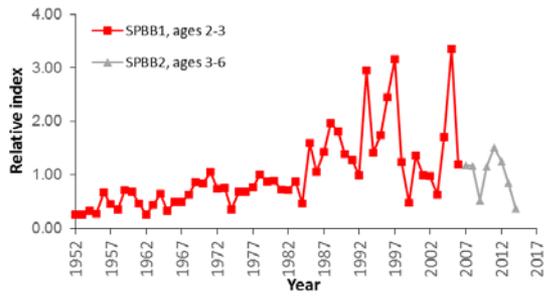
and relative abundance indices
Most from fishery dependent CPUE data

But also two fishery independent indices

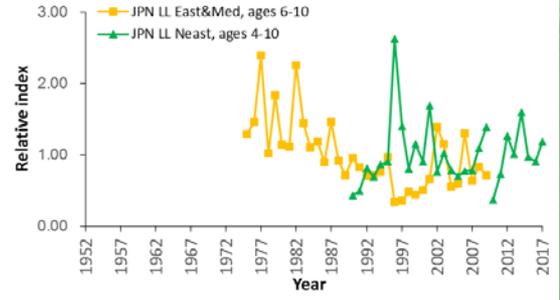
BFT -EAST Atlantic stock (Task-I) by major gear



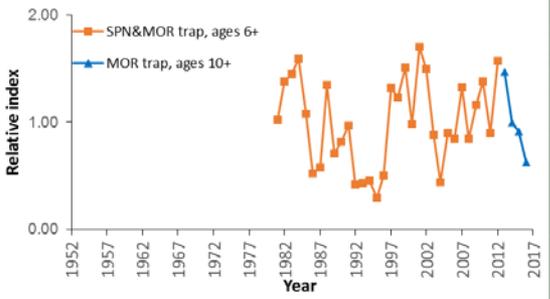
Spanish Bait boat in the Bay of Biscay



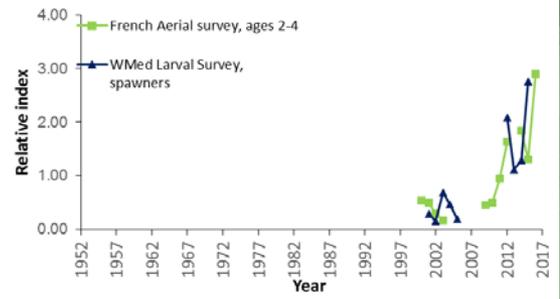
Japanese Longline



Spanish and Moroccan Traps

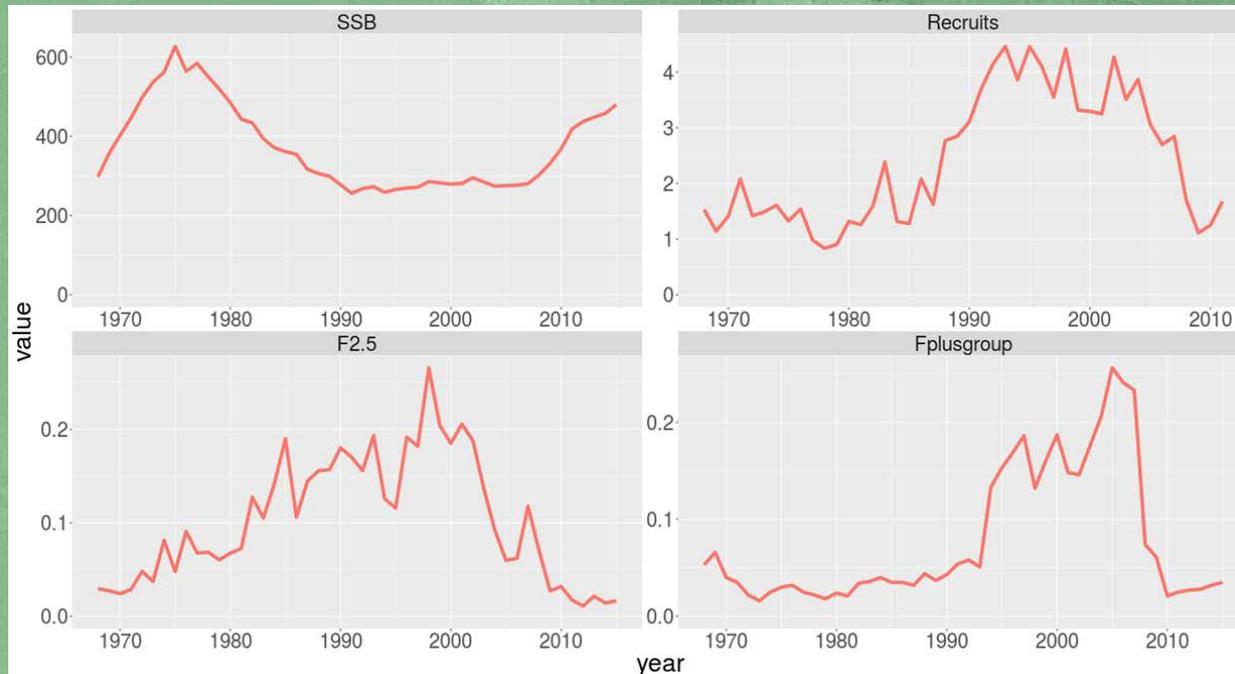


Survey



Assessment of stock status of Eastern Bluefin tuna

- There have been considerable improvements in the data quality and quantity over the past few years, often because of GBYP, nevertheless there remain important gaps
- Only the VPA results were considered sufficiently advanced at the conclusion of the meeting to be considered as the primary basis for management advice for the eastern stock.



- SSB increasing since the mid 2000s
- Fishing mortality of Young fish decreased since the mid 2000s in response to the minimum size regulation
- Fishing mortality of old fish decreased as well in response to TAC reductions

- Recent recruitment estimates are very uncertain and future recruitment cannot be predicted because of the lack of a relationship between recruitment and spawning stock

- $F_{0.1}$ was considered a reasonable proxy for FMSY
- However given the uncertainties about future recruitment, estimates of biomass base reference points were unreliable. For medium and low recruitment levels, the stock is already above $B_{0.1}$, whereas for the high level it is below.
- Compared to 2014 the extra data now available better confirm recent stock increase though the level of increase remains difficult to quantify.

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY

Current reported yield (2016)	20,098 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	Overfishing: No
Projected Yield ³ at $F_{0.1}$ in 2018	41,205 (31,190 – 57,770) t
Projected Yield ³ at $F_{0.1}$ in 2019	40,455 (31,330 – 56,600) t
Projected Yield ³ at $F_{0.1}$ in 2020	39,655 (30,420 – 55,280) t
[Rec. 12-03] TAC in 2013-2014	13,400 t – 13,400 t
[Rec. 14-04] TAC in 2015-2017	16,142 t – 19,296 t – 23,155 t
[Rec. 16-09] TAC in 2017	+500 t

1 Median and approximate 80% confidence interval from bootstrapping from the assessment.

2 $F_{2012-2014}$ refers to the geometric mean of the estimates for 2012-2014 (a proxy for recent F levels).

3 Projected yield at $F_{0.1}$ was calculated with the recent 6 years (2006-2011) recruitment level.

* As of 29 September 2017.

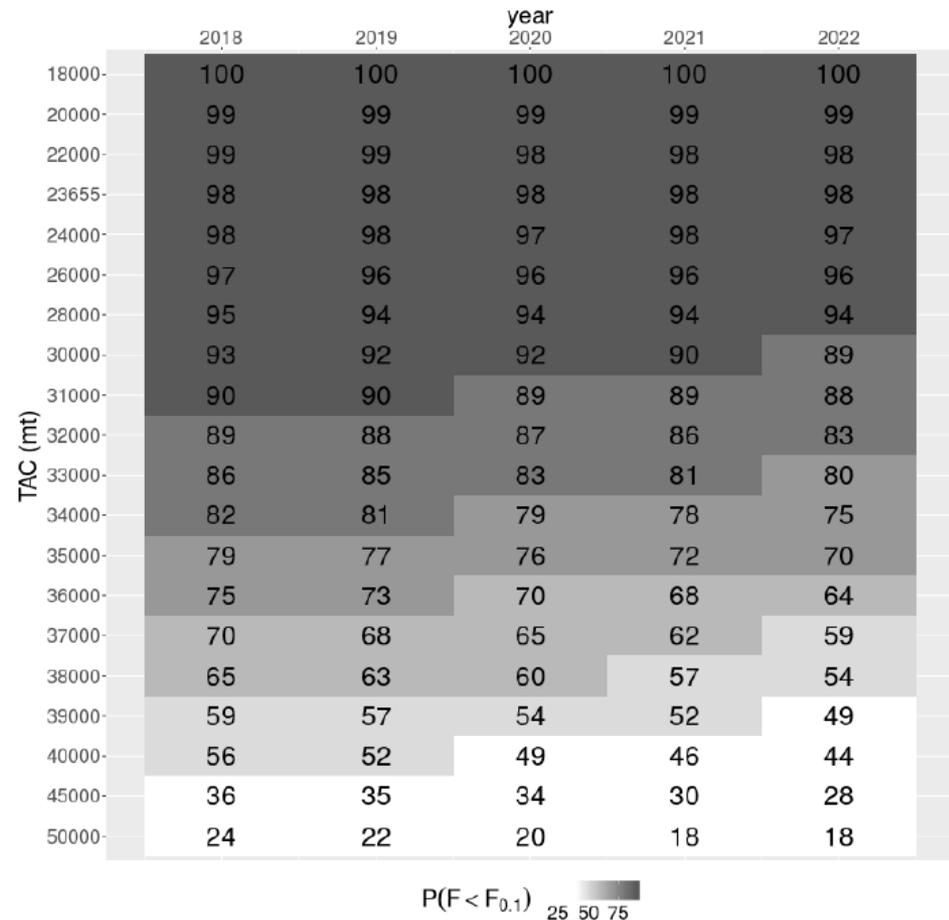
Outlook for BFT East and Mediterranean

Probability of future fishing mortality < $F_{0.1}$

Short-term projections (2017-2022, using the average recruitment over a six year period (2006-2011))

According to the base model annual constant catches up to 36,000 t have higher than 60% probability of maintaining F below $F_{0.1}$ throughout 2022

It should be noted that biomass is expected to decline for catches greater than 30,000 t.



It should be kept in mind, however, that the Kobe matrix cannot integrate some important sources of uncertainties that currently remain unquantified

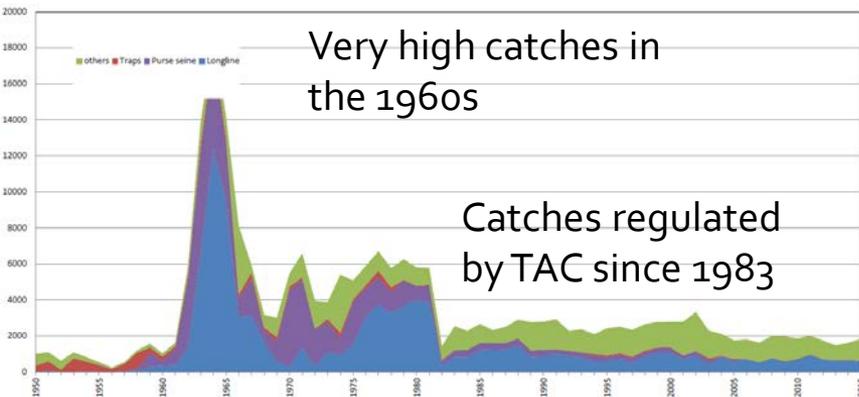
Management recommendations BFT East and Mediterranean

- Catches be increased using a gradual stepwise approach to 36,000 t in 2020.
- The continuation of the stepped increases should be reviewed annually by the Commission on the advice of the SCRS (which would be based on updates of the fishery indicators as has been done in the past three years, i.e., the SCRS could, on any of those occasions, recommend that the next increase not occur given sufficiently negative indicator signals).
- The Committee recommends a full assessment in 2020.
- Given the abundance increase evident for the stock, the Committee advises that the Commission should consider moving from the current rebuilding plan to a management plan.

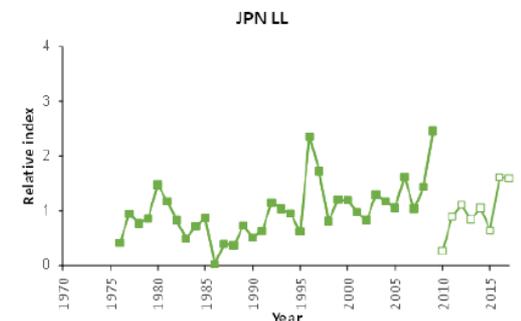
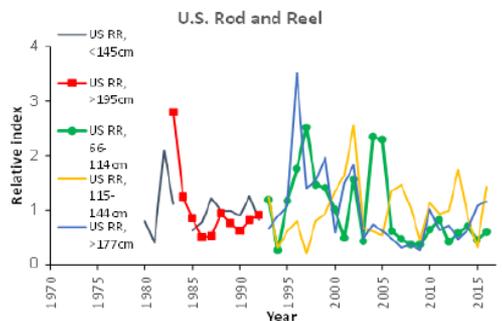
Assessment of stock status of western Bluefin tuna

- Significant improvements in basic data on fish size for some fleets
- Two indices of abundance excluded from base model because they showed opposing trends to all others and may be affected by shifts in the spatial distribution of the stock in northern latitudes

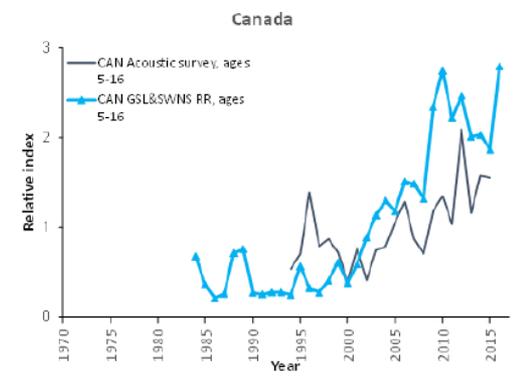
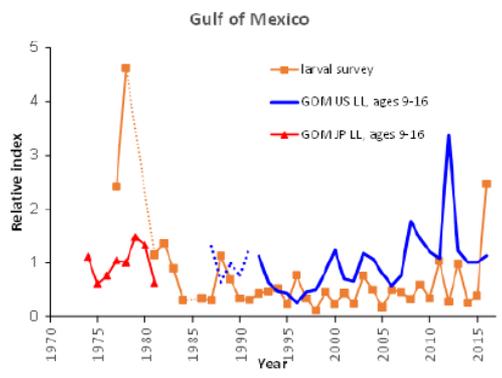
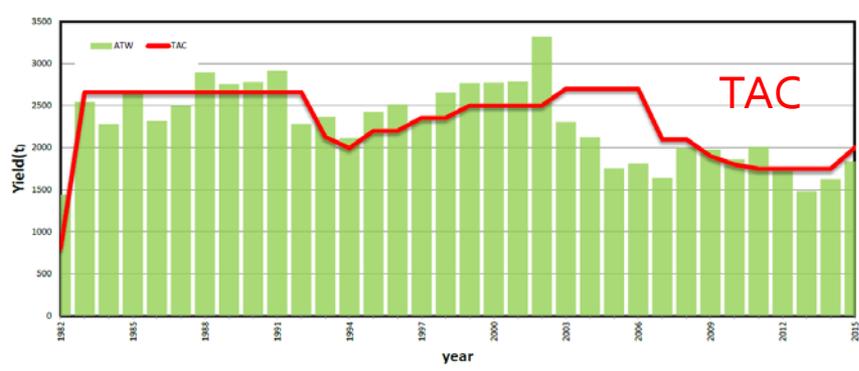
BFT-WEST Atlantic stock (Task-I) by major gear



Relative abundance indices

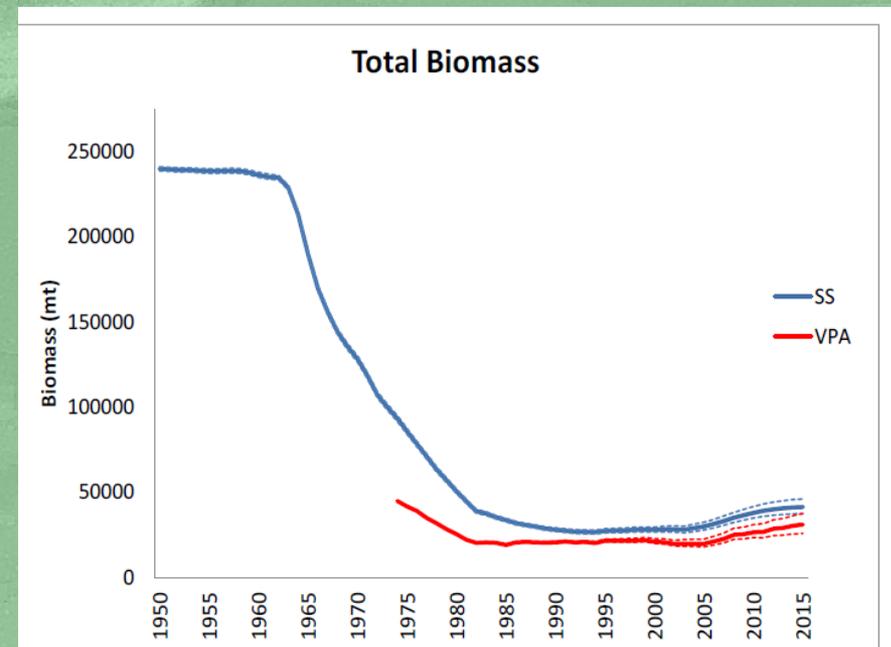
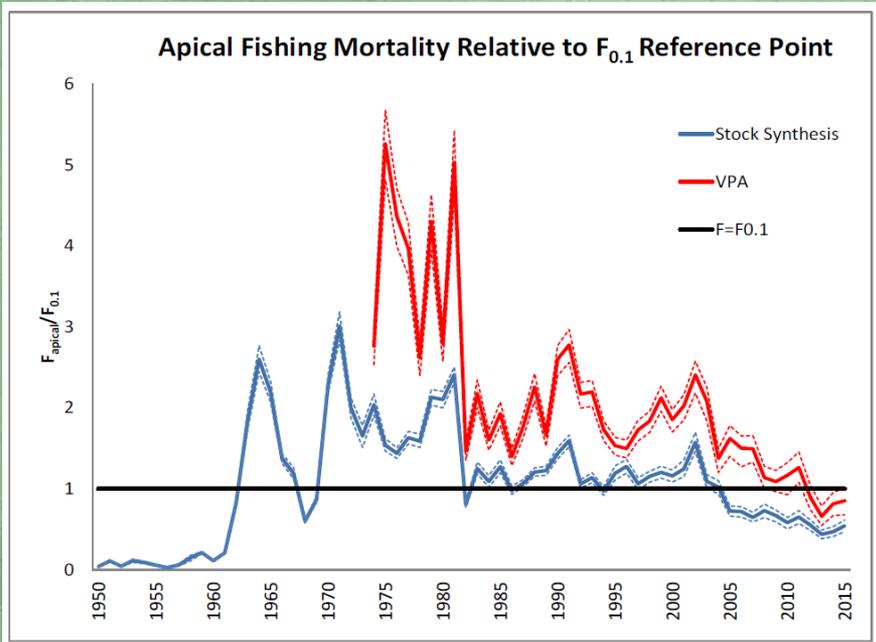
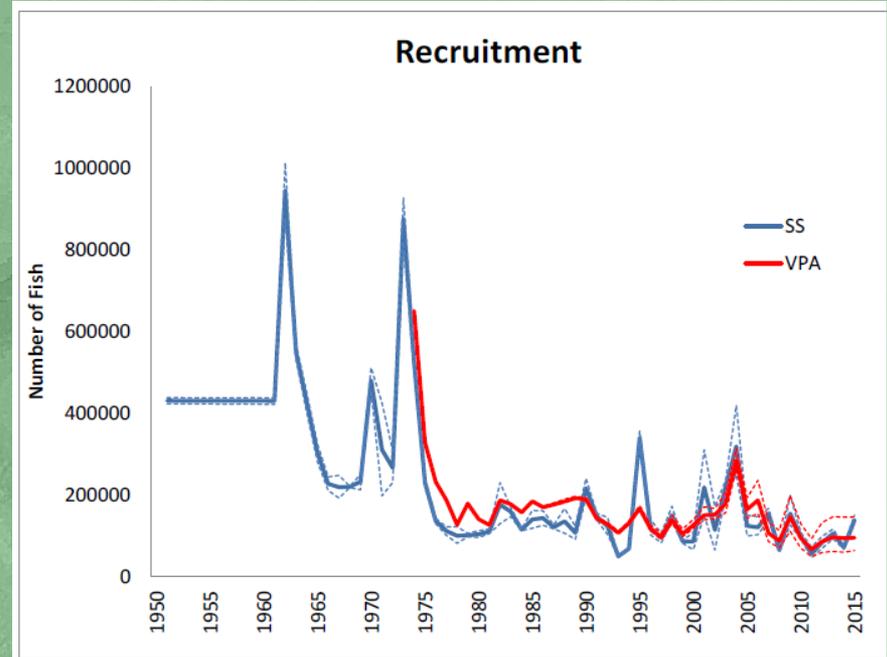


BFT-WEST Atlantic stock (Task-I) total catch & TAC's



Assessment of stock status of western Bluefin tuna

- Substantial improvements in stock assessment and many models considered.
- VPA and SS used as the basis for management advice for the western stock.
- Both models estimated with a high probability that overfishing is not occurring.
- Biomass has increased from 2004 to 2015



Assessment of stock status of western Bluefin tuna

SUMMARY TABLE

Current Catch including discards (2016)	1,899*
F_{current} (2012-2014)	0.05 (0.04-0.10)
$F_{0.1}$	0.09 (0.08-0.12)
Ratio of recent F to $F_{0.1}$	0.59 (0.44-0.79)
Estimated probability of overfishing	0.002
Stock status	Overfishing : No Overfished : 1
Projected Catch in 2018 at $F_{0.1}$	2,691 t (2,098-3,183)
Projected Catch in 2019 at $F_{0.1}$	2,568 t (2,010-3,020)
Projected Catch in 2020 at $F_{0.1}$	2,446 t (1,922-2,872)

- The 2017 assessment does not provide management advice based on MSY reference points due to the uncertainty associated with future recruitment.
- Short-term advice based on a $F_{0.1}$ reference point, a proxy for F_{msy} , using recent recruitment (median of the last 6 years).
- This assuming that near term recruitment will be similar to the recent past.

Outlook for western Bluefin tuna

Probability of future fishing mortality < $F_{0.1}$

- Short-term advice based on a $F_{0.1}$ reference point, a proxy for F_{msy} , using recent recruitment (median of the last 6 years).
- This assuming that near term recruitment will be similar to the recent past.
- It should be noted that biomass is expected to decline for catches greater than 1,000 t.

Catch	2018	2019	2020
1000	100%	100%	100%
1250	100%	100%	100%
1500	100%	100%	100%
1750	99%	98%	96%
2000	94%	90%	87%
2250	83%	80%	76%
2500	72%	69%	65%
2750	62%	54%	46%
3000	46%	33%	21%
3250	26%	15%	7%

Management recommendations

BFT West

- In 1998, the Commission initiated a 20-year rebuilding plan designed to achieve SSBMSY with at least 50% probability.
- The Committee is not using biomass based reference points in formulating 2017 advice. Instead, $F_{0.1}$ is used as a proxy for FMSY to provide the TAC recommendations.
- The Committee is not evaluating if the stock is rebuilt because it has been unable to resolve the long term recruitment potential.
- The Committee advises that constant catches over 2018-2020 should not be greater than 2500 t as that would exceed the median yield associated with $F_{0.1}$.

Responses to Commission's requests

20.9	Provide information and guidance on enhancing efforts to address any deficiencies identified regarding fisheries for which biological sampling ... SCRS to report efforts made to enhance biological sampling activities. Rec. 16-08, paragraph 20	BFT
20.10	Review new available information related to the identification of specific spawning times and areas of bluefin tuna ..., Rec. 16-08, paragraph 23	BFT
20.11	Provide guidance on a range of fish size management measures for western Atlantic bluefin tuna and their impact on yield per recruit and spawner per recruit considerations. To comment on the effect of fish size management measures on their ability to monitor stock status. Rec. 16-08, paragraph 27	BFT
20.12	Mauritania will conduct research activities in cooperation with an ICCAT CPC of its choice, and will be subject to the presentation of a specific programme to the SCRS. ...Rec. 14-04, paragraph 5	BFT
20.16	Refine the testing of candidate reference points ...and associated harvest control rules (HCRs) that would support the management objective expressed in paragraph 2 of Rec. 16-06. ... provide statistics to support decision-making in accordance with the performance indicators in Annex 2. Rec. 16-06, paragraph 11	ALBN
20.17	The HCRs referred to in paragraph 13 of Rec. 16-06 should be evaluated by the SCRS through the management strategy evaluation process, including in light of new assessments of the stock. Rec. 16-06, paragraph 14	ALBN
20.22	Conversion algorithm for the caging operations. Rec. [14-04] Annex 9, item iii	BFT

Responses to Commission's requests BFT

20.9 Provide information and guidance on enhancing efforts to address any deficiencies identified regarding fisheries for which biological sampling ... SCRS to report efforts made to enhance biological sampling activities. Rec. 16-08, paragraph 20

- The Committee recommends a sampling plan be developed that includes minimum of 200 bluefin tuna tissue samples per year from each major fleet, to be collected in a representative fashion with respect to season and area fished.
- The Committee also recommends the formation of an oversight body (perhaps an ad hoc working group) that will coordinate the sampling and processing to ensure that targets are being met and that the resulting data is maintained.
- The Committee notes these recommendations are applicable to other species like Albacore and Swordfish

Responses to Commission's requests BFT

20.10 Review new available information related to the identification of specific spawning times and areas of bluefin tuna ..., Rec. 16-08, paragraph 23 BFT

The committee reviewed this information and provides a summary in regards to:

- Evidence of new spawning areas in the West outside the Gulf of Mexico associated with spawners smaller than those in the GOM. These areas had not been identified as suitable habitat by other analyses.
- Genetic and micro-chemical analyses revealed some percentage of bluefin tunas in the western area has characteristics different from the WBFT and the EBFT and this might be possibly correlated also to spawning areas outside the GOM and the Med.

Responses to Commission's requests BFT

20.11 Provide guidance on a range of fish size management measures for western Atlantic bluefin tuna and their impact on yield per recruit and spawner per recruit considerations. To comment on the effect of fish size management measures on their ability to monitor stock status. Rec. 16-08, paragraph 27

- The Committee **recognized that Y/R and SSB/R could be improved by changing the selectivity pattern** (decreasing the selectivity of ages 1-6 by 40% resulted in only modest improvements), but this would imply allocation changes with implications beyond strict Y/R and SSB/R considerations.
- Committee was concerned that such **changes in selectivity would affect the availability and utility of indices** of stock sizes currently used in the assessment.... And may have unintended negative consequences such as **increased discard mortality**, which may be difficult to monitor, and changes due to reallocation of effort which may be difficult to predict.
- **The Committee reiterates last year's request for the Commission to clarify whether it requires further analyses.**

Responses to Commission's requests BFT

20.12 Mauritania will conduct research activities in cooperation with an ICCAT CPC of its choice, and will be subject to the presentation of a specific programme to the SCRS. ...Rec. 14-04, paragraph 5

The Committee did not receive any report related to research activities conducted by Mauritania, either alone or in collaborations with an ICCAT CPC of its choice, related to bluefin tuna caught under this quota.

Responses to Commission's requests BFT

20.22 Conversion algorithm for the caging operations. Rec. [14-04] Annex 9, item iii

The Committee recommends the following equation:

$$RWT = 3.508 \times 10^{-5} \times SFL^{2.883091788}$$

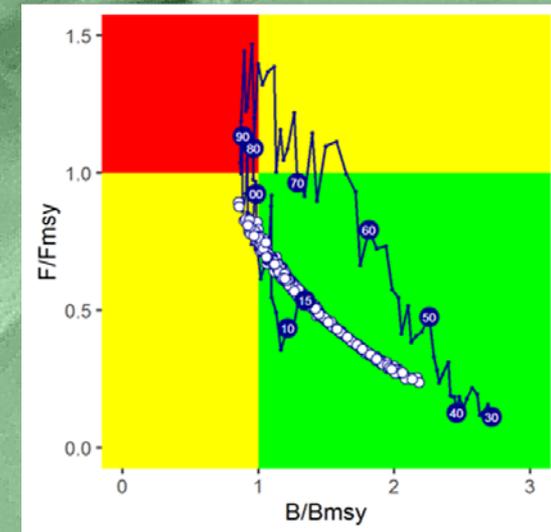
to be used to convert SFL in to RWT during caging operations in the Adriatic Sea.

Responses to Commission's requests ALB N

20.16 Refine the testing of candidate reference points ...and associated harvest control rules (HCRs) that would support the management objective expressed in paragraph 2 of Rec. 16-06. ... provide statistics to support decision-making in accordance with the performance indicators in Annex 2. Rec. 16-06, paragraph 11

20.17 The HCRs referred to in paragraph 13 of Rec. 16-06 should be evaluated by the SCRS through the management strategy evaluation process, including in light of new assessments of the stock. Rec. 16-06, paragraph 14

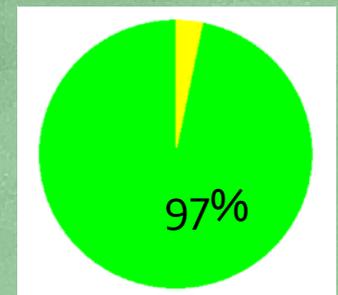
Stock Status (Madeira 2016)



$B/BMSY=1.4$

$F/FMSY=0.5$

$MSY= 37,082 \text{ t}$



Response to Commission 20.16 and 20.17

Evaluations of HCRs within MPs

HCRs are defined by the combination of the target fishing mortality (FTAR), Biomass threshold (BTHRESH) and the type of stability clause for TAC:

(SC1) maximum change in TAC of 20% always applied from one 3-year management period to the next while also always imposing a 15,000-50,000 t min-max TAC;

(SC2) same as SC1 but not restricting TAC reductions and not imposing a minimum TAC when $B < BTHR$.

Number	HCR			Stock Status	Safety	Catch	Stability
	Ftar	Bthresh	Stability clause	pGr%	pBint%	LongY (kt)	MAP (%)
1	0,80	0,80	SC2	85,5	9,0	26,5	8,3
2	1,00	0,80	SC2	78,9	13,0	29,0	8,8
3	0,80	1,00	SC2	88,6	8,3	26,9	8,3
4	1,00	1,00	SC2	84,5	9,2	26,9	8,9
1	0,80	0,80	SC1	85,8	9,3	32,1	5,6
2	1,00	0,80	SC1	74,7	15,8	34,1	6,2
3	0,80	1,00	SC1	86,0	10,4	32,2	6,0
4	1,00	1,00	SC1	77,9	14,3	35,0	6,3

All eight HCRs meet the objective to be in the green quadrant of the Kobe Plot with > 60% probability, and the results are presented in a simple manner to allow the Commission to consider the main tradeoffs between HCRs.

Response to Commission 20.16 and 20.17

Adoption of interim HCR

- The MSE used is specifically tailored to evaluate a series of HCRs as a component of a Management Procedures that mimics the 2016 stock assessment of North Atlantic albacore.
- The Committee agrees that the Commission could select a HCR based on the current MSE results presented here and, according to Rec. 16-06, set an annual constant TAC for the following 3 years. However, the Committee cautions that any such adoption of an HCR should be done on an interim basis, contingent on future advice of the SCRS based on its ongoing review of these HCRs.
- Whichever HCR is selected among the 8 tested, its application will result in a **short-term 3 years TAC of 33,600 t** which results from the maximum 20% increase from the current level; this conforms to the positive stock status estimated in the 2016 assessment.

Response to Commission 20.16 and 20.17

Future application, review and modification of interim HCR

- If the interim HCR was directly apply to the result of future stock assessments, future TACs can change widely if the assessment results change with the incorporation of the most recent information.
- MSE for NALB should be independently reviewed in the next few years, before the HCR can be considered to be permanently adopted
- There is an extensive workplan to validate and improve the MSE framework used in the evaluation of HCRs.
- In the future the Commission may decide to change how stock status should be assessed thus changing the MP. In order to use these alternative assessment methods as components of MPs the new MPs would need to be tested within the ALBN MSE framework.

Response to Commission 20.16 and 20.17

Dealing with exceptional circumstances

- ICCAT would need to define what it considers “exceptional circumstances” that would result in suspending the application of the HCR, and also establish guidance on the alternative management response in those circumstances.
- SCRS could provide some advice on the technical aspects of this issue for the Commission’s consideration.
- The SCRS could try to incorporate these circumstances in future developments of the MSE framework in order to provide further advice to the Commission about MP performance.