21-04 **ALB**

RECOMMENDATION BY ICCAT ON CONSERVATION AND MANAGEMENT MEASURES, INCLUDING A MANAGEMENT PROCEDURE AND EXCEPTIONAL CIRCUMSTANCES PROTOCOL, FOR NORTH ATLANTIC ALBACORE

NOTING that the objective of the Convention is to maintain populations of tuna and tuna-like species at levels that will support maximum sustainable catch (usually referred to as Maximum Sustainable Yield (MSY));

RECOGNIZING the intent of the Commission to adopt Harvest Control Rules (HCRs) and Management Procedures (MPs) developed using Management Strategy Evaluation (MSE), as established in *Recommendation by ICCAT on the development of harvest control rules and of management strategy evaluation* (Rec. 15-07);

RECALLING that paragraph 18 of *the Recommendation by ICCAT on a Harvest Control Rule for North Atlantic Albacore supplementing the multiannual conservation and management programme, Rec. 16-06 (Rec. 17-04)* called for the consolidation of its relevant provisions with those of *the Recommendation by ICCAT on a Multi-annual Conservation and Management Program for North Atlantic Albacore (Rec. 16-06)* into a single Recommendation;

FURTHER RECALLING that, in 2020, the Commission adopted the *Recommendation by ICCAT amending the Recommendation 16-06 establishing a Multi-annual Conservation and Management Programme for North Atlantic Albacore* (Rec. 20-03), and the *Recommendation by ICCAT amending the Recommendation 17-04 on a Harvest Control Rule for North Atlantic Albacore Supplementing the Multi-annual Conservation and Management Programme in Rec. 16-06* (Rec. 20-04);

NOTING that paragraph 17 of Rec. 16-06 was amended by paragraph 4 of Rec. 20-03 and established an obligation for the Commission to review the Rec. 16-06, including consolidation of relevant provisions into a single recommendation in 2021;

NOTING that paragraph 17 of Rec. 17-04 was amended by paragraph 3 of Rec. 20-04 and established an obligation for the Commission to review the interim Harvest Control Rules in 2021 with a view to adopting a long-term management procedure;

RECALLING the importance that all fleets participating in the northern albacore fishery submit the required data (catch, effort and catch-at-size) on their fisheries for transmission to the Standing Committee on Research and Statistics (SCRS);

RECOGNISING that it is appropriate, as already applicable to other stocks under the purview of ICCAT, to maintain the ICCAT register of vessels authorized to fish North Atlantic albacore;

CONSIDERING that the 2020 SCRS stock assessment concluded that the relative abundance of North Atlantic albacore has continued to increase over the last years and that the probability of the stock being in the green quadrant of the Kobe plot (not overfished and not undergoing overfishing, $F<F_{MSY}$ and $B>B_{MSY}$) is 98.4%;

RECOGNIZING the positive external review of the MSE and that simulations conducted in 2017 and subsequent years allow the SCRS to provide robust advice for a wide range of uncertainties and meet the objectives for the North Atlantic albacore stock to be in the green quadrant of the Kobe plot with a probability higher than 60%;

NOTING that the Harvest Control Rule with the highest target fishing mortalities ($F_{TAR}=F_{MSY}$) was associated with lower probabilities, although higher than 60%, of being in the Kobe green quadrant and higher probabilities of the stock being between B_{LIM} and B_{THRESH} with only slightly higher long-term yields;

FURTHER NOTING the desire for stability in the fishery;

CONSIDERING that the SCRS tested a minimum fishing mortality (F_{MIN}) should the stock status fall below safe biological limits;

FURTHER CONSIDERING the work of the SCRS in 2018 and 2019 to test through MSE several HCR variants and the SCRS advice in 2019 that the Commission could adopt alternative harvest control rules to provide additional stability to the fisheries while meeting management objectives. These alternatives include, *inter alia*, applying the restriction of 20% maximum reduction in Total Allowable Catch (TAC) and 25% maximum TAC increase when B is estimated to be higher than B_{LIM};

RECOGNISING that after 5 years of implementation of the interim harvest control rule it is advisable to promote the testing of further refinements that will allow testing tradeoff of alternative Management Procedures with finer steps both for fishing mortality and biomass also including levels above those providing MSY;

NOTING the importance of identifying exceptional circumstances that would result in suspending or modifying the application of the HCR;

FURTHER NOTING that the SCRS is in the process of developing another MSE framework that may not be available before 2026;

AWARE that the application of the HCR in 2020 resulted in a TAC increase and that, under the difficult circumstances facing the organization last year, it was agreed to apply the increase on a pro-rata basis to the catch and other limits, but that this approach did not establish a precedent;

THE INTERNATIONAL COMMISSION FOR THE CONSERVATION
OF ATLANTIC TUNAS (ICCAT) RECOMMENDS THAT:

PART I
GENERAL PROVISIONS

1. Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities (CPCs) whose vessels fish North Atlantic albacore in the Convention area shall implement the following conservation and fishery management measures for North Atlantic albacore tuna, which include the Management Procedure (MP) set out in **Annex 1** for establishing annual Total Allowable Catches.

Management objectives

2. The management objectives for the Northern Atlantic albacore stock are:

   (a) to maintain the stock in the green quadrant of the Kobe plot, with at least a 60% probability, while maximizing long-term yield from the fishery, and

   (b) where the spawning stock biomass (SSB) has been assessed by the SCRS as below the level capable of producing MSY (SSB_{MSY}), to rebuild SSB to or above SSB_{MSY}, with at least a 60% probability, and within as short a time as possible, while maximizing average catch and minimizing inter-annual fluctuations in TAC levels.

PART II
MANAGEMENT PROCEDURE AND EXCEPTIONAL CIRCUMSTANCES

3. The components of the MP are set out in **Annex 1** and related **Appendices** therein.

4. The SCRS shall assess the occurrence of exceptional circumstances (ECs) and the Commission shall act in accordance with the Exceptional Circumstances Protocol sets out in **Annex 2**.

PART III
CATCH LIMITS

Total Allowable Catch and catch limits

5. The procedure for the establishment of the 3-year constant annual TAC is set out in **Annex 3**.

6. Pursuant to the application of the procedures established in **Annex 1** and **Annex 3**, constant annual TAC of 37,801 t is established for the management period 2022-2023. This annual TAC shall be allocated as follows:

CPC	*Quota (t) for the period 2022-2023*
European Union	29,095.1
Chinese Taipei	4,416.9
United States	711.5
Venezuela	337.5

* Transfers:
- The European Union is authorized to transfer 442.25 t from its quota in 2022 and 2023 to the United Kingdom.
- Chinese Taipei is authorized to transfer 200 t of North Atlantic albacore to Belize for 2022 and 2023.

7. CPCs other than those mentioned in paragraph 6 shall limit their annual catches to 242 t.

8. By way of derogation from paragraphs 6 and 7, Japan shall endeavor to limit the total weight of its North Atlantic albacore annual catches to a maximum of 4.5% of the weight of its total bigeye tuna longline catch in the Atlantic Ocean in 2022 and 2023.

Underage or overage of catch

9. Any unused portion or excess of a CPC's annual quota/catch limit may be added to/shall be deducted from, according to the case, the respective quota/catch limit during or before the adjustment year, in the following way:

Year of Catch	*Adjustment Year*
2019	2021
2020	2022
2021	2023
2022	2024
2023	2025

However, the maximum underage that a CPC may carryover in any given year shall not exceed 25% of its initial catch quota.

If, in any year, the combined landings of CPCs exceed the TAC by more than 20%, the Commission will re-evaluate this Recommendation at its next Commission meeting, including taking into account any advice of the SCRS pursuant to its evaluation of the existence of exceptional circumstances as reflected in **Annex 2**, and may, as appropriate, recommend further measures.

PART IV
CAPACITY MANAGEMENT MEASURES

10. CPCs fishing for North Atlantic albacore shall limit the fishing capacity of their vessels, excluding recreational vessels, fishing for this stock from 1999 onwards, by limiting the number vessels to the average number of vessels in the period 1993-1995.

11. Paragraph 10 does not apply to CPCs whose average catches are less than 200 t.

PART V
CONTROL MEASURES

Specific authorization to fish for North Atlantic albacore and ICCAT record of vessels

12. CPCs shall issue specific authorizations to vessels 20 meters LOA or greater flying their flag that are authorized to fish North Atlantic albacore in the Convention area. Each CPC shall indicate which of such vessels it has so authorized on its vessel list submitted pursuant to the *Recommendation by ICCAT amending Recommendation 13-13 Concerning the Establishment of an ICCAT Record of Vessels 20 meters in Length Overall or Greater Authorized to Operate in the Convention Area* (Rec. 21-14). Such vessels not entered into this record or entered without the required indication that fishing for North Atlantic albacore is authorized are deemed not to be authorized to fish for, retain on board, transship, transport, transfer, process or land North Atlantic albacore.

13. CPCs may allow bycatch of North Atlantic albacore by vessels not authorized to fish for North Atlantic albacore pursuant to paragraph 12, if the CPC establishes a maximum onboard bycatch limit for such vessels and the bycatch in question is accounted for within the CPC's quota or catch limit. Each CPC shall provide in its Annual Report the maximum bycatch limit it allows for such vessels. That information shall be compiled by the ICCAT Secretariat and made available to CPCs.

PART VI
FINAL PROVISIONS

14. During 2022-2023, the SCRS should undertake the following analyses to:

    (a) test further HCRs supporting the management objectives expressed in paragraph 2 above and associated with a range of control parameters wider than those explored for this Management Procedure and namely:

$$F_{TAR}=(0.8; 0.9; 1.0) * F_{MSY}$$
$$B_{THRESH} = (0.8; 0.9; 1.0; 1.1; 1.2) * B_{MSY}$$

    The remaining control parameters shall remain as indicated by this Recommendation.

    (b) evaluate the number of Catch per Unit of Effort (CPUE) series that need to be available and the percentage by which catch data are underreported, that would trigger an occurrence of exceptional circumstance.

15. When advising the Commission on the results of the testing requested in paragraphs 14 (a) and (b) the SCRS shall provide performance statistics to support decision-making in accordance with the performance indicators in **Annex 4.** Where necessary, for ease of communication the SCRS may limit the presentation to the underlined metrics therein.

16. In 2023, the Commission should review the MP established by this Recommendation to consider if any revision to it is needed, including to the HCR specified in **Annex 1,** taking into account any analyses carried out by the SCRS in accordance with paragraphs 14 and 15.

17. Beginning for the 2024-2026 management period, the Commission shall adopt a 3-year constant annual TAC. This TAC shall be based on the application of the current MP or possibly an amended MP pursuant to paragraph 16, unless other action is required in accordance with the Exceptional Circumstances Protocol (**Annex 2**) as set out in paragraph 4.

18. The SCRS shall continue the development of a new MSE framework to support the possible adoption of a new MP by the Commission no later than 2026 and the setting of a TAC for the management period 2027-2030.

In this respect, the SCRS is also requested to explore the possibility of defining potential additional CPUE indices, to complement those reported in **Appendix A of Annex 1**, as well as to advise on how possible environmental changes will be taken into account in the development of this framework.

19. This Recommendation repeals and replaces:

- the *Recommendation by ICCAT on a Multi-annual Conservation and Management Programme for North Atlantic Albacore* (Rec. 16-06),
- the *Recommendation by ICCAT on a Harvest Control Rule for North Atlantic Albacore Supplementing the Multiannual Conservation and Management Programme, Rec. 16-06* (Rec. 17-04),
- the *Recommendation by ICCAT Amending the Recommendation 16-06 Establishing a Multi-Annual Conservation and Management Programme for North Atlantic Albacore* (Rec. 20-03),
- the *Recommendation by ICCAT Amending the Recommendation 17-04 on a Harvest Control Rule for North Atlantic Albacore Supplementing the Multi-annual Conservation and Management Programme in Rec. 16-06* (Rec. 20-04).

Annex 1

MANAGEMENT PROCEDURE (MP)

1. For the purpose of the MP for North Atlantic albacore, the following reference points are established:

   a) $B_{THRESH} = B_{MSY}$
   b) $B_{LIM} = 0.4*B_{MSY}$
   c) $F_{TAR} = 0.8*F_{MSY}$
   d) $F_{MIN} = 0.1*F_{MSY}$

2. The North Atlantic albacore stock assessment shall be conducted every three (3) years according to the MP model specifications and data inputs as set out in **Appendix A** below. The next stock assessment shall occur in 2023.

3. The MP shall be applied to set a 3-year constant annual total allowable catch using the following three values estimated from each stock assessment. For each value the median values as reported in the summary table of the SCRS report shall be used:

   a) The estimate of current stock biomass (B_{CURR}).
   b) The estimate of the stock biomass at Maximum Sustainable Yield (B_{MSY}).
   c) The estimate of the fishing mortality at MSY (F_{MSY}).

4. The Harvest Control Rule within the MP shall have the form as set out in **Appendix B** below and the following control parameters set out in points (a) through (f) below:

   a) The biomass threshold level (B_{THRESH}) is equal to the biomass able to deliver the maximum sustainable yield ($B_{THRESH} = B_{MSY}$).

   b) A fishing mortality target corresponding to 80% of F_{MSY} ($F_{TAR} = 0.8*F_{MSY}$) will be applied when the stock status is at, or above, the threshold level (B_{THRESH}).

   c) If the current biomass (B_{CURR}) is estimated to be below the threshold level (B_{THRESH}) and higher than B_{LIM}, then fishing mortality will be reduced linearly for the next multiannual management period (F_{NEXT}) on the following basis:

$$F_{NEXT} = \left(a + b*\frac{BCURR}{BMSY}\right)* F_{MSY} = \left(-0.367 + 1.167\,\frac{BCURR}{BMSY}\right)* F_{MSY}$$

$$\text{where } a = \left[\frac{Ftar}{FMSY}\right] - \left[\frac{\frac{Ftar}{FMSY} - \frac{Fmin}{FMSY}}{\frac{Bthresh}{BMSY} - \frac{Blim}{BMSY}}\right] * \frac{Bthresh}{BMSY} = -0.367$$

$$b = \left[\frac{\frac{Ftar}{FMSY} - \frac{Fmin}{FMSY}}{\frac{Bthresh}{BMSY} - \frac{Blim}{BMSY}}\right] = 1.167$$

   d) If the current biomass (B_{CURR}) is estimated to be at, or below, B_{LIM}, then the fishing mortality shall be set at F_{MIN} with a view to ensure a level of catch for scientific monitoring.

   e) The maximum catch limit (C_{MAX}) recommended is 50,000 t in order to avoid adverse effects of potentially inaccurate stock assessments.

   f) The maximum change in the catch limit (D_{MAX}) shall not exceed 25% in case of increase or 20% in case of decrease of the previous recommended catch limit when $B_{CURR} \geq B_{THRESH}$.

5. The HCR described in paragraph 4. a)-d) produces a relationship between stock status and fishing mortality as shown in the graph of **Appendix B** below. The table of **Appendix C** reports the values of fishing mortality to be applied (F_{NEXT}) for specific values of relative biomass (B_{CURR}/B_{MSY}).

Appendix A of Annex 1

Data and stock assessment specifications for the North Atlantic Albacore Management Procedure

- CPUE indices and their starting years; where "t" is the year of the Management Procedure iteration for establishing the TAC for years t+1, t+2 and t+3.

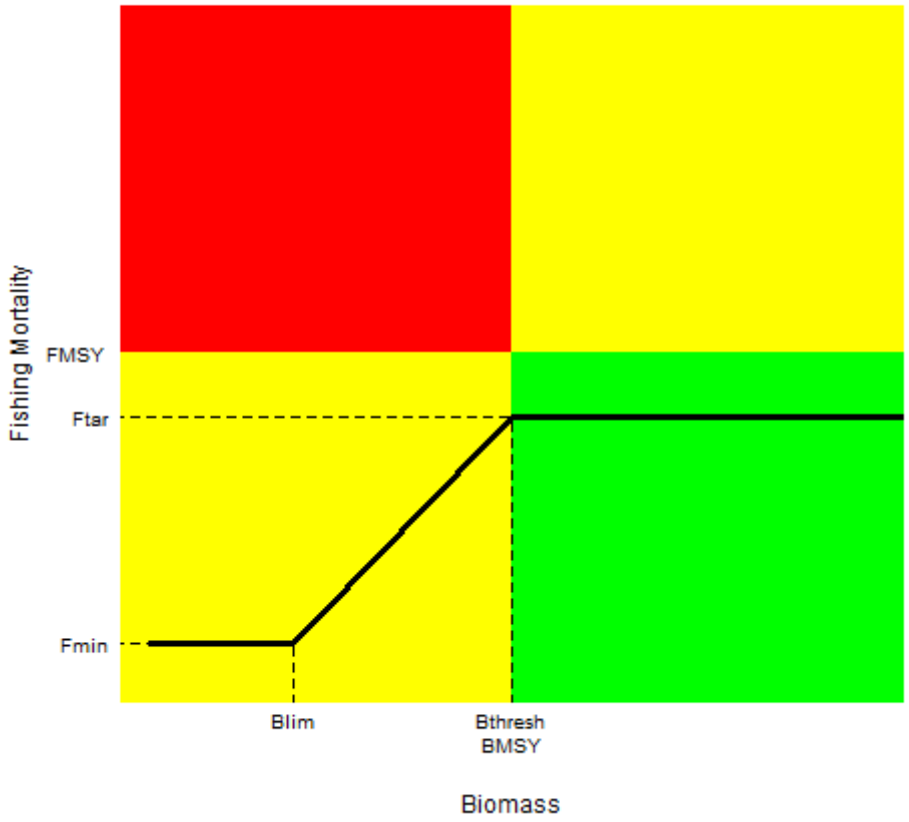
Index	First year	Final year
Chinese Taipei LL late	1999	t-1 preferably (t-2 otherwise)
Japan bycatch LL	1988	t-1 preferably (t-2 otherwise)
Spanish baitboat	1981	t-1 preferably (t-2 otherwise)
US LL	1987	t-1 preferably (t-2 otherwise)
Venezuelan LL	1991	t-1 preferably (t-2 otherwise)

- Specifications of the biomass dynamic model; where "t" is the year of the Management Procedure iteration for the establishing the TAC for the years t+1, t+2 and t+3.

Software	Model	Catch series	Starting Values
mpb	Fox (biomass dynamic)	Start 1930 Final year: t-1 preferably (t-2 otherwise)	Biomass at t=0 (fixed): 1x K Variance treatment for the CPUE indices: model weighted

Appendix B of Annex 1

Graphic form of the Harvest Control Rule



Appendix C of Annex 1

Values of relative biomass and corresponding fishing mortality based on a sliding linear relationship between B_{LIM} and B_{THRESH} as produced by the HCR

B_{CURR}/B_{MSY}	F_{NEXT}
1 or above	0.80* F_{MSY}
0.98	0.78* F_{MSY}
0.96	0.75* F_{MSY}
0.94	0.73* F_{MSY}
0.92	0.71* F_{MSY}
0.90	0.68* F_{MSY}
0.88	0.66* F_{MSY}
0.86	0.64* F_{MSY}
0.84	0.61* F_{MSY}
0.82	0.59* F_{MSY}
0.80	0.57* F_{MSY}
0.78	0.54* F_{MSY}
0.76	0.52* F_{MSY}
0.74	0.50* F_{MSY}
0.72	0.47* F_{MSY}
0.70	0.45* F_{MSY}
0.68	0.43* F_{MSY}
0.66	0.40* F_{MSY}
0.64	0.38* F_{MSY}
0.62	0.36* F_{MSY}
0.60	0.33* F_{MSY}
0.58	0.31* F_{MSY}
0.56	0.29* F_{MSY}
0.54	0.26* F_{MSY}
0.52	0.24* F_{MSY}
0.50	0.22* F_{MSY}
0.48	0.19* F_{MSY}
0.46	0.17* F_{MSY}
0.44	0.15* F_{MSY}
0.42	0.12* F_{MSY}
0.40	0.10* F_{MSY}

Annex 2

Exceptional circumstances protocol for North Atlantic albacore

1. Principles of exceptional circumstances

The following three general principles should be considered as a signal indicating the possibility that exceptional circumstances (ECs) exist:

a. When there is evidence that the stock is in a state not previously considered to be plausible in the context of the management strategy evaluation (MSE);

b. When there is evidence that the data required to apply the management procedure (MP) are not available or are no longer appropriate; and/or,

c. When there is evidence that total catch is above the TAC set using the MP.

2. Indicators for ECs

In light of the principles specified in Section 1, the SCRS should use the following table to judge whether ECs exist. Triggering an EC does not immediately result in TAC advice from the MP being rescinded; rather, it means that the SCRS needs to examine the indicators and determine if a change in advice is warranted.

Principle	*Indicator*	*Criterion*	*Frequency of evaluation of Exceptional Circumstances*
a. Stock dynamics	Relative stock biomass (B/B_{MSY})[1]	Falls outside the 2.5% and 97.5% percentile range of values in any year from the OMs used in the MSE when the accepted MP was tested	Each benchmark stock assessment (every 6-7 years)
	Relative fishing mortality (F/F_{MSY})[1]		
	Growth[2]	Are substantially different from the values from the OMs used in the MSE when the accepted MP was tested	After completion, presentation, and acceptance by the SCRS of a study as the new reference
	Maturity[2]		
	Natural mortality[2]		
	CPUE[3]	Falls outside the 2.5% and 97.5% percentile range of values in any year from the OMs used in the MSE when the accepted MP was tested	Annually
b. Application of the MP	CPUE	If two or more series have not been updated for two or more years. If two or more series are determined to no longer reflect abundance	Each MP iteration (every 3 years)
	Catch	Catch data are unavailable or substantially unreported	Each MP iteration (every 3 years)
	Relative stock biomass (B/B_{MSY})[4]	Values from the production model in an iteration of the MP fall outside the 2.5% and 97.5% percentile range of values in any year produced by the accepted MP's production model during MSE testing	Each MP iteration (every 3 years)
	Relative fishing mortality (F/F_{MSY})[4]		
c. Implementation of the TAC	Catch	Total catch is above by more than 20% the TAC set using the MP	Annually

[1] B/B_{MSY} and F/F_{MSY}: In every benchmark assessment, the estimated B/B_{MSY} and F/F_{MSY} trajectories are plotted (overlaid) on top of those used in the OMs (Figures 19 and 20 of the MSE Consolidated document (Merino *et al*. 2020)). The SCRS would compare the new estimated stock trajectory with the potential realities of the stock contemplated in the OMs. If the new trend falls within the trends considered in the OMs, there is no EC. The criteria, as written, implies that if in a single year, relative biomass or fishing mortality falls outside of the values considered in the OMs, then EC would be identified by the SCRS.

[2] Growth, Maturity and Natural Mortality values as in Consolidated document (Merino *et al*. 2020).

[3] CPUE (for the principle of stock dynamics only): Every year the SCRS would update the standardized CPUEs and plot the new time series on top of those used in the MSE (Figure 23 of the MSE Consolidated document (Merino *et al*. 2020)). The trend should be within the values considered in the OMs for every single year.

[4] B/B_{MSY} and F/F_{MSY}: Every 3 years (MP iteration), the relative B and F series estimated by the MP is plotted (overlaid), on top of those estimated by the MP in the iterations of the MSE (Figures 21-22 of the MSE Consolidated document (Merino *et al*. 2020)). The comparison is the "estimated trajectories" to the "estimated trajectories considered in the MSE". The trend should be within the values considered in the OMs for every single year, and, if not, EC would be identified by the SCRS.

Merino G., Kell L.T., Arrizabalaga H., Santiago J. 2020. Updated consolidated report for North Atlantic albacore management strategy evaluation. Col. Vol. Sci. Pap. ICCAT 77 (7), 428-461.

3. Actions to be taken in light of ECs

If the SCRS determines that an EC exists that precludes the application of the MP or makes the application of the MP or the implementation of its results unadvisable based on the principles outlined in Section 1, the SCRS shall evaluate the nature of the EC and advise the Commission on:

(A) alternative management options for the coming fishing year aimed at ensuring, at a minimum, stability in the status of the stock, including the implications of: (i) maintaining the status quo total allowable catch (TAC), (ii) reducing the TAC by **20%** or another appropriate percentage, in particular in light of indications of stock decline, and (iii) any other appropriate conservation and management actions;

(B) whether the existing MP can and should be adjusted or whether development of a new MP is required; and

(C) whether a stock assessment is needed for providing management advice in the interim.

Based on the SCRS advice, the Commission shall decide on the alternative management action(s) to be taken. Unless the SCRS advises that there is a sufficient scientific basis to deviate, the Commission shall reduce the TAC of North Atlantic albacore by **20%** for the following year. In addition, as needed and appropriate, the SCRS shall conduct a new stock assessment and/or provide advice on new candidate MPs as soon as possible.

See the flowchart below for a schematic representation of the above process:

The SCRS shall check if ECs exist using the indicators specified in the table in Section 2 above and according to the indicated frequency.

Year 1 & 2:

1. check for new studies of growth, maturity, and natural mortality;
2. update CPUE indices;
3. update catch.

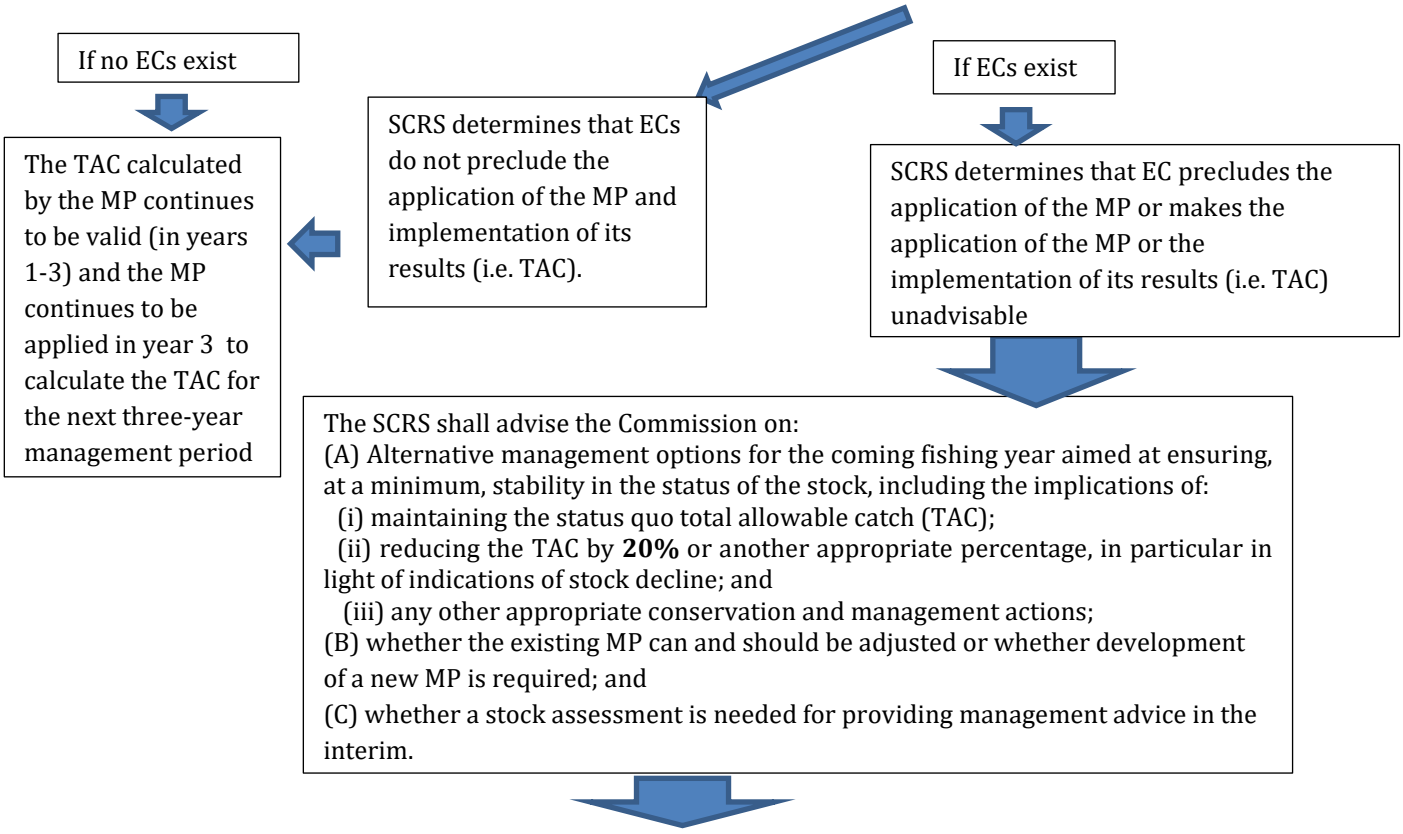
- checking that all three of these are within the range of values specified in the table in Section 2 above.

Year 3:

1. check that all datasets required in running the MP are available
2. re-run MP and check stock biomass and fishing mortality resulting from the MP's production model is within the 2.5% to 97.5% percentile range of values that occurred in the production model results when the accepted MP was tested by MSE;
3. same checks done in Year 1 & 2.

Any year:

- if a stock assessment has been conducted by the SCRS, check that the stock biomass and fishing mortality resulting from the stock assessment are within the 2.5% to 97.5% percentile range of values from the OMs used in the MSE when the accepted MP was tested.



The SCRS shall advise the Commission on:
(A) Alternative management options for the coming fishing year aimed at ensuring, at a minimum, stability in the status of the stock, including the implications of:
(i) maintaining the status quo total allowable catch (TAC);
(ii) reducing the TAC by **20%** or another appropriate percentage, in particular in light of indications of stock decline; and
(iii) any other appropriate conservation and management actions;
(B) whether the existing MP can and should be adjusted or whether development of a new MP is required; and
(C) whether a stock assessment is needed for providing management advice in the interim.

Based on the SCRS advice, the Commission shall decide on the alternative management action(s) to be taken. Unless the SCRS advises that there is a sufficient scientific basis to deviate, the Commission shall reduce the TAC by **20%** for the following year. In addition, as needed and appropriate, the SCRS shall conduct a new stock assessment and/or provide advice on new candidate MPs as soon as possible.

Annex 3

Procedure to establish the Total Allowable Catch for each management period

The 3-year constant annual TAC shall be set as follows on the basis of reference points and management procedure set in **Annex 1** above:

(a) if the current biomass (B_{CURR}) is estimated to be at, or above, the threshold biomass (i.e., $B_{CURR} \geq B_{MSY}$), then the catch limit shall be set at

1. $TAC = F_{TAR} * B_{CURR}$

(b) if the current biomass (B_{CURR}) is estimated to be below the threshold biomass but greater than B_{LIM} (i.e., $B_{CURR} > 0.4*B_{MSY}$), then the catch limit shall be set at

1. $TAC = F_{NEXT} * B_{CURR}$

Values for F_{NEXT} are reported in **Appendix C of Annex 1** and can also be calculated through the formula reported in paragraph 4.c therein.

(c) if the current biomass (B_{CURR}) is estimated to be at, or below, the B_{LIM} (i.e., $B_{CURR} \leq 0.4*B_{MSY}$), then the catch limit shall be set at

1. $TAC = F_{MIN} * B_{CURR}$

with a view to ensure a level of catch for scientific monitoring.

Where this occurs, the Commission shall immediately adopt severe management actions in order to reduce the fishing mortality rate to F_{MIN}, including measures to reduce the fishery to a level that would not exceed this level and to implement a scientific monitoring quota to be able to evaluate the stock status. The Commission shall not consider re-opening the fishery beyond this level until the current biomass (B_{CURR}) exceeds B_{LIM} with a high probability. Furthermore, before reopening the fishery beyond this level, the Commission shall develop a rebuilding programme in order to ensure that the stock returns to the green quadrant of the Kobe plot consistent with the terms of the *Recommendation by ICCAT on the Principles of Decision Making for ICCAT Conservation and Management Measures* (Rec. 11-13).

(d) the catch limit resulting from the above calculations shall be below the maximum catch limit (C_{MAX}) as reported in paragraph 4(e) of **Annex 1** and shall not increase by more than 25% or decrease by more than 20% from the previous catch limit except when $B_{CURR} < B_{THRESH}$ or unless otherwise required pursuant to an agreed management response when exceptional circumstances are determined to have occurred by the SCRS pursuant to **Annex 2** of this Recommendation.

(e) in the case of subparagraph (c) above, the catch limit could be set at a level lower than $F_{MIN} * B_{CURR}$ if the SCRS considers it sufficient to ensure a level of catch proper for scientific monitoring.

Annex 4

Performance metrics to be provided by SCRS to support decision-making

Underlined bold metrics are the subset to be regularly provided for easy communication.

ACRONYM	*PERFORMANCE INDICATORS AND ASSOCIATED STATISTICS*	*UNIT OF MEASUREMENT*	*TYPE OF METRICS*
	1 Status		
B_{MIN}	1.1 Minimum spawner biomass relative to B_{MSY}	B/B_{MSY}	Minimum over [x] years
B_{MEAN}	1.2 Mean spawner biomass relative to B_{MSY}[1]	B/B_{MSY}	Geometric mean over [x] years
F_{MEAN}	1.3 Mean fishing mortality relative to F_{MSY}	F/F_{MSY}	Geometric mean over [x] years
pGr%	**1.4 Probability of being in the Kobe green quadrant**	B, F	Proportion of years that $B \geq B_{MSY}$ & $F \leq F_{MSY}$
pRed%	1.5 Probability of being in the Kobe red quadrant[2]	B, F	Proportion of years that $B \leq B_{MSY}$ & $F \geq F_{MSY}$
	2 Safety		
pB_{LIM}%	2.1 Probability that spawner biomass is above B_{LIM} ($0.4B_{MSY}$)[3]	B/B_{MSY}	Proportion of years that $B>B_{LIM}$
pB_{INT}%	**2.2 Probability of $B_{LIM}<B<B_{THRESH}$**	B/B_{MSY}	Proportion of years that $B_{LIM}<B<B_{THRESH}$
	3 Yield		
ShortY (kt)	3.1 Mean catch – short term	Catch	Mean over 1-3 years
MediumY (kt)	3.2 Mean catch – medium term	Catch	Mean over 5-10 years
LongY (kt)	**3.3 Mean catch – long term**	Catch	Mean in 15 and 30 years
	4 Stability		
MAP%	**4.1 Mean absolute proportional change in catch**	Catch (C)	Mean over [x] years of $(C_n-C_{n-1})/C_{n-1}$
var	4.2 Variance in catch	Catch (C)	Variance over [x] years
Pshut	4.3 Probability of shutdown	TAC	Proportion of years that TAC=0
P10%	4.4 Probability of TAC change over a certain level[4]	TAC	Proportion of management cycles when the ratio of change[5] $(TAC_n-TAC_{n-1})/TAC_{n-1}>X\%$
MaxTACc	4.5 Maximum amount of TAC change between management periods	TAC	Maximum ratio of change[6]

[1] This indicator provides an indication of the expected CPUE of adult fish because CPUE is assumed to track biomass.

[2] This indicator is only useful to distinguish the performance of strategies which fulfil the objective represented by 1.4.

[3] This differs slightly from being equal to 1- Probability of a shutdown (4.3), because of the choice of having a management cycle of 3 years. In the next management cycle after B has been determined to be less than B_{LIM} the TAC is fixed during three years to the level corresponding to F_{LIM}, and the catch will stay at such minimum level for three years. The biomass, however, may react quickly to the lowering of F and increase rapidly so that one or more of the three years of the cycle will have $B>B_{LIM}$.

[4] Useful in the absence of TAC-related constraints in the harvest control rule.

[5] Positive and negative changes to be reported separately.

[6] Positive and negative changes to be reported separately.