REPORT OF THE INTERSESSIONAL MEETING OF PANEL 2
(Sapporo, Japan, 20-21 July 2016)

1. Opening of the meeting

The Chair of the Panel 2, Mr. Masanori Miyahara (Japan), opened the meeting and welcomed the delegates to this intersessional meeting of Panel 2.

2. Nomination of Rapporteur

Ms. Rachel O'Malley (USA) was nominated as rapporteur.

3. Adoption of the Agenda and meeting arrangements

Japan requested time for Dr. Kotaro Yokawa to make two presentations, reflecting his views on the North Atlantic albacore assessment and on the management strategy evaluation (MSE) for albacore. The European Union expressed their intention to introduce a document requesting clarification on matters related to caging operations for eastern Atlantic/Mediterranean bluefin tuna, under Other matters. The United States requested that the Secretariat provide an update on the activities of the Kobe Working Group on MSE, under Other Matters. The Agenda was adopted with these additions and is attached as **Appendix 1**.

The Executive Secretary introduced the Contracting Parties present at the meeting. The Panel 2 members in attendance were: Algeria, Belize, Brazil, Canada, People's Republic of China, European Union, Japan, Republic of Korea, Tunisia, and the United States. Other Contracting Parties in attendance were: Gabon, Republic of Guinea, Senegal, and Côte d'Ivoire. The Executive Secretary also introduced Chinese Taipei as a Cooperating non-Contracting Party, Entity, or Fishing Entity. Ecology Action Center (EAC), International Sustainable Seafood Foundation (ISSF), and Pew Charitable Trusts (Pew) participated as observers. The List of Participants is attached as **Appendix 2**.

4. Consideration of the report of the 2016 ICCAT North and South Atlantic albacore stock assessment meeting

The Chair of the Albacore Group of the Standing Committee on Research and Statistics (SCRS), Dr. Haritz Arrizabalaga, gave a presentation on the methods and outcomes of the North and South Atlantic albacore assessments conducted in May 2016. This presentation included an overview of the biology, fishery indicators, stock status, outlook, management recommendations, and recommendations on research and statistics. He noted that the SCRS has not yet reviewed the report and that final management recommendations will be provided to the Commission this fall.

Dr. Kotaro Yokawa (Japan) gave a presentation entitled "A Proposal for Smoother, Faster and Safer Management of Atlantic Albacore: Lessons from Northern Albacore Assessment," which he summarized as follows. The north Atlantic albacore stock assessment conducted in May 2016 showed a strong retrospective pattern, and was also largely affected by CPUEs used in the analysis. One of major reasons is that recent peak of CPUE, which is due to the strong year class, appeared in different years in different magnitudes. In the north Atlantic, each fleet covers only part of the stock and different CPUEs represent different age groups, which react in different ways to the year class. In these conditions, use of a production model analysis may be a serious problem. In addition, delay in the submission of CPUEs and shortage of Task II data contributed to this problem. In Dr. Yokawa's view a full scale stock assessment should be re-conducted with improved data and CPUEs and then the performance of a management strategy should be tested using actual data.

Dr. David Die, Chair of the SCRS, noted that this presentation represents one view, but there are other views within the Albacore Working Group. He explained that issues associated with the stock assessment should and will be fully discussed within the SCRS through their usual process.

Dr. Die gave a presentation on advances in MSE within ICCAT. He contrasted the current ICCAT management process with the one envisioned under the application of harvest control rules (HCR) and MSE. He reminded the Panel that this process began in 2011 at the Second Meeting of the Working Group on the Future of ICCAT, and continued through discussions at the 2013 Atlantic Albacore stock assessment meeting, the 2013 Meeting of the ICCAT Working Group on Stock Assessment Methods, and the adoption of Recs. [15-04] and [15-07] by the Commission. Dr. Die reviewed the basic stages of an MSE and defined the relative roles of the Commission and the SCRS in this process.

With the application of HCR/MSE, there will be some changes in the way the SCRS conducts assessments and provides advice. There would still be annual updates of the information. Stock assessments would be conducted every 5-10 years, and the objectives of the assessment would be expanded to include a review of the HCR. At 1-3 year intervals ICCAT will use a management strategy to interpret stock status and develop management advice, the result will be a very specific and pre-agreed recommendation on the TAC. This new system has many advantages, such as relieving some of the pressure for frequent stock assessments, more time for strategic research to support the assessment, and a more predictable path to management recommendations.

Dr. Die emphasized that this is an ongoing and iterative process. There will be a set of scientific outputs through simulation but also a need for regular dialogue between scientists and managers, which will ultimately lead to the development of a management strategy including HCR. A management strategy has the following components: data collection, indicators of stock status, and the HCR. He explained further that the HCR determines actions that will be taken by the Commission on the basis of stock status. This could be a simple proportion of a defined reference point, or it could be something more complex.

The SCRS will test the performance of alternative management strategies, including HCRs, through an operating model that provides the best description of how the simulations perform. Uncertainties can be taken into account within the simulations. The SCRS evaluates candidate HCRs in light of the performance indicators determined by the Commission, which correspond to management objectives for the stock. Based on the outcomes of these analyses, the Commission selects an HCR, the total allowable catch (TAC) is implemented, and the CPCs continue to report data. It is up to the Commission to decide which HCR performs the best in terms of balancing multiple management objectives.

Dr. Die presented a summary of the NALB MSE work conducted by Dr. Gorka Merino *et al.* This work was undertaken with funding from the EU and support from the Secretariat, as described in SCRS/2016/015. The authors conducted a full set of simulations where multiple HCRs were evaluated on the basis of the combination of different values for B threshold, F target and a B limit of $0.4B_{MSY}$.

A Pareto frontier graph can be used to illustrate the tradeoffs between two performance indicators (e.g., mean catch and the probability of the stock being in the green zone). The area of non-feasibility in the graph shows that it is not possible to achieve both management objectives with high certainty simultaneously. Butthe HCR performs best when it is as close to the frontier as possible. One limitation of the Pareto plot is that it can present the results of only two performance indicators at a time. Spider graphs are another alternative to represent the analysis of how multiple performance indicators are being met. When approaching the edge of the spider graph, the HCR is closer to achieving multiple management objectives.

Dr. Die presented an outline of next steps. He emphasized that the scientific work that might be accomplished between now and the SCRS meeting is limited and dependent upon additional funding. However, he explained that complications in the stock assessment don't prevent further progress on MSE work. To inform this work, Dr. Die asked the Panel to provide input on a series of questions beginning with the list of performance indicators used by Merino *et al*. The CPCs appreciated Dr. Die's presentation and congratulated him on his clarity, including some who noted the importance he identified on the scientist/manager dialogue.

Dr. Yokawa (Japan) presented a comparison of MSE processes between north albacore and CCSBT for southern bluefin tuna, which he summarized as follows. In his view, the study suggests the importance of a performance check of the management procedure using actual data, because available indices for north albacore are highly fluctuating and some show contradicting trends. Assessment results show a strong and inconsistent retrospective pattern. CCSBT is using a simple age-structured model and feedback style of HCR, which would be useful to test for the north albacore MSE in the future. Dr. Yokawa suggested that these

problems should be solved before further study of the north Atlantic albacore MSE because any performance checks of the management procedure using actual data would not work well under current circumstances. He also noted that continued feedback between the SCRS and Commission is important for the finalization of MSE. While Dr. Yokawa's presentation offered an interesting perspective, several CPCs stated that it would be more appropriate to hold these types of scientific debates within the SCRS process.

5. Consideration of candidate reference points for northern albacore identified by SCRS and development of harvest control rules

Dr. Die asked the Panel to provide feedback on a series of questions.

1) Is the current list of performance indicators enough/excessive?

There was extensive discussion of the performance indicators used in the northern albacore MSE. This set of indicators was developed by Merino *et al*., based on the management objectives established in Rec. 15-04. Dr. Die explained how each performance indicator was derived and on what basis it is measured. The European Union introduced a proposal for a revised Rec. 15-04, *¨Draft recommendation by ICCAT to establish harvest control rules for the north Atlantic albacore stock¨* (**Appendix 3**), which contained a modified list of performance indicators in **Annex 2 to Appendix 3**. They explained that this Annex was inspired by the table of performance indicators adopted by the IOTC for skipjack. The Panel discussed and debated the usefulness of each indicator. Results of this discussion are reflected in an amended list of performance indicators, agreed by Panel 2, *¨Performance indicators from SCRS/2016/015 and PA2-003, Annex 2¨* (**Appendix 4**). This document will be referred to the SCRS.

There was interest in exploring ways to limit the variability of the catch from one year or management period to the next, both in cases of increasing and decreasing TAC. Under the current performance indicators, the SCRS would report the variability of catch under various HCRs and let the Commission decide which is preferable. It is also possible to develop an HCR that explicitly limits the variability of catch so that if the biomass changes enough, the resulting adjustment to the TAC would be limited (e.g., never change >10% or 20% in one year or management period). However, the current simulations are not set up to do this. Rather, the concept of limiting the variability of catch is considered a constraint that would result in the elimination of a particular candidate HCR that the Commission considers undesirable due to too much variability in catch.

2) Are the data/method components of the tested MS appropriate?

Several CPCs noted the importance of reliable and stable assessment results. Dr. Die was asked: is it premature to do MSE given some of the questions regarding the data and methods used in the assessment? Or can the necessary work to improve the stock assessment be conducted in parallel with MSE? Dr. Die responded that there will always be uncertainty regarding whether a particular CPUE tracks biomass. These kinds of factors can be taken into account in the MSE process. What must be done is to characterize the variability and incorporate this in the simulation of the MSE. This has been done to a certain extent, but could be done to a greater extent in the future.

In response to some questions about the northern albacore CPUEs, Dr. Die explained that the current CPUEs were used to fit a production model. While the interannual variability and geographic variability has some impact, it is the overall trend that primarily affects the estimation of stock status in the case of northern albacore. By contrast, in the case of CCSBT, there is a much stronger link between variations in CPUE and variations in TAC for southern bluefin tuna.

It was noted that the northern albacore MSE has not addressed the issue of exceptional circumstances. The determination of when exceptional circumstances can be invoked depends in part on whether the testing of the robustness of management strategies considers a shift in productivity. One source of uncertainty is whether there is a relationship between CPUE and abundance. If CPUE is completely unrelated to biomass, that would be an exceptional circumstance.

In response to a question about the use of biomass vs. spawning stock biomass (SSB) in the simulations, Dr. Die explained that the production model does not allow the determination of SSB. However, scientists make the assumption that biomass and SSB are linked, so if the stock is managed on the basis of biomass, it will achieve the correct SSB. It is also possible to add a performance metric that corresponds to the level of SSB.

From his perspective as SCRS Chair, Dr. Die advised that the MSE process should not be delayed until we have the perfect assessment because there will always be uncertainties and doubts. At every assessment, the SCRS learns more about stock dynamics. The 2016 assessment revealed things that may lead us to make some changes to the simulations and improve the outputs.

3) Is the range of HCR tested appropriate? Should we narrow it?

One CPC responded that the range of HCRs tested was appropriate and they hoped further testing could proceed as soon as possible. There were no specific suggestions to modify the range of values tested for B_{limit}, $B_{threshold}$ and F_{target} at this time

4) Are the Pareto plots and spider diagrams useful?

There was consensus that these diagrams are useful to communicate results to an audience of fisheries managers. However, other tools will be needed to communicate results to stakeholders in terms of future benefits and trade-offs. These concepts will also be easier to understand when they include actual numbers.

5) What additional work is needed and what are resources needed to do it?

In terms of specific work needed in the near term, the Albacore Working Group provided the MSE modelers with some feedback during the stock assessment, but there is limited time for any adaptations or updates of the MSE before the SCRS and Commission meetings this fall. The main challenge is that many of the scientists conducting the modeling for the assessment are the same people working on the MSE. The SCRS may need other MSE experts to get involved to help advance the work in a timely way. An outside contract could be one way to involve additional expertise. One of the CPCs present at the meeting noted its commitment to continue to finance the albacore MSE. The meeting agreed that the SCRS should develop an estimated budget of the cost of continuing and expanding the northern albacore MSE work and provide this estimate to the Commission.

This fall, the SCRS will consider how to continue adjusting the observational model again in light of the 2016 assessment, considering which CPUE to include in the management strategy, and elaborating or expanding the sources of uncertainty with respect to implementation. This work is part of an ongoing process and it is up to the SCRS and the Commission to jointly decide when they have enough information to select a management strategy.

In summary, many CPCs were satisfied with progress to date on HCR/MSE. It was noted that under Rec. 15-07, this has been established as the way of managing in the future. Several CPCs expressed the desire to have a fuller understanding of work conducted by the SCRS before the Commission adopts HCRs. Dr. Die reminded the Panel that although we can describe this exercise in a series of steps, it is not a simple, linear process. Some steps may need to be repeated several times before the Commission commits to a management strategy.

There was a question about how realistic and practical it is for the Commission and the SCRS to follow an HCR/MSE approach for all stocks. Dr. Die replied that the Commission and SCRS have to be courageous. We will learn from our experience with northern albacore. Some stocks have complicated management issues and may take longer than others. But it would be tremendously useful for the Commission to take a step forward so that the lessons learned can be applied to other stocks.

The Panel 2 Chair referred again to the EU proposal **(Appendix 3)**, which contains many elements for the Panel to consider, in addition to the performance indicators. He suggested that a detailed discussion of the operative text would be premature at this time, given that the SCRS has not yet reviewed the stock assessment or provided final management advice. The full text of the ¨*Draft recommendation by ICCAT to establish harvest control rules for the north Atlantic albacore stock*¨ is appended to the report as a working document so that CPCs can give it full consideration and provide any feedback to the EU in advance of the Annual meeting.

6. Other matters

Dr. Die gave a presentation summarizing recent work by the SCRS on bluefin tuna MSE. He explained that the interim objective is to use the MSE framework for improving the current scientific advice. New models will be tested to support the 2017 bluefin tuna assessment. Efforts to improve the data that will support the assessment are ongoing through the ICCAT GBYP. One CPC observed that the MSE for bluefin tuna is more comprehensive and flexible than the northern albacore MSE, with more scenarios and options for managers to choose from. The external review of the ICCAT GBYP will partially address the question of necessary resources, and the Steering Committee will make a recommendation about what proportion of resources should be devoted to modeling vs. other work.

The Executive Secretary, Mr. Driss Meski, provided an update on the work of the Kobe MSE Working Group, which is coordinated by the ICCAT Secretariat and convened by Dr. Laurie Kell. Work to date has been conducted on a virtual basis. The first in-person meeting of this Group will take place in Madrid (2-4 November 2016). The Group will examine computational aspects of the MSE, sharing code among the RFMOs, and how each RFMO has conducted MSE in their own areas of competency. This technical meeting will be open to all interested persons, with some funding available to support scientists from developing coastal States.

The United States thanked the Secretariat for this important effort and noted the availability of ABNJ funds for this purpose.

The observer from ISSF noted that there had been some concern about how interested technical experts can access the MSE Working Group's discussion. The ISSF has a strong interest in continuing to support this type of initiative.

The EU introduced ¨*Request by the European Union for Clarification by the Commission Regarding the Use of Algorithms for the Purpose of Bluefin tuna Caging Operations*¨ (**Appendix 5**). Dr. Die suggested that the Bluefin Tuna Working Group could review this when they meet in Madrid next week. It was agreed to append this document to the report and return to this issue in light of SCRS advice at the Panel 2 meeting in November.

7. Adoption of report and adjournment

The report was adopted by Panel 2 and the meeting was adjourned.

Appendix 1

Agenda

1. Opening of the meeting
2. Nomination of Rapporteur
3. Adoption of the agenda and meeting arrangements
4. Consideration of the Report of the 2016 ICCAT North and South Atlantic Albacore stock assessment meeting
5. Consideration of candidate reference points for northern albacore identified by SCRS
6. Development of Harvest Control Rules based on Agenda Item 5
7. Other matters
8. Adoption of Report and Adjournment

Appendix 2

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Appendix 3

Draft recommendation by ICCAT to establish harvest Control rules for the north Atlantic albacore stock

(Proposal by the European Union)

RECALLING the *Supplemental Recommendation by ICCAT concerning the North Atlantic Albacore Rebuilding Program* [Rec.13-05];

NOTING that the objective of the Convention is to maintain populations at levels that will support maximum sustainable catch (usually referred to as MSY);

[…]

CONSIDERING that the Standing Working Group to Enhance Dialogue between Fisheries Scientists and Managers (SWGSM) has proposed, among other case studies, the northern albacore stock as a suitable candidate to examine harvest control rules;

CONSIDERING the outcomes the 2016 Standing Committee on Research and Statistics (SCRS) stock assessment concluded that the northern albacore stock…[to be completed after SCRS meeting];

CONSIDERING the discussions held at the 2016 intersessional meeting of Panel 2 [to be completed after Panel 2 meeting];

NOTING the progress achieved so far by the SCRS in the work for testing harvest control rules and conducting management strategy evaluations for northern albacore and in particular the Kobe II Strategy matrix showing the different levels of probability of being in the green quadrant for different combinations of reference point values;

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

1. The management objective for northern albacore stock is

   a) to maintain the stock in the green zone 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 time as possible, by 2020 at the latest, while maximizing average catch and minimizing inter-annual fluctuations in TAC levels.

2. In 201x/By 2020, the SCRS shall refine the testing of candidate reference points (e.g., $SSB_{THRESHOLD}$, SSB_{LIM} and F_{TARGET}) and associated harvest control rules (HCRs)[2] that would support the management objective expressed in paragraph 1 above and/or any other management objectives agreed by the Commission. The SCRS shall also provide statistics to support decision-making (see **Annex 2**).

3. The result of the analyses described in paragraph 2 will be discussed in a dialogue between scientists and managers to be organised in 201x/by 2020, either during a meeting of the SWGSM or as an inter-sessional meeting of Panel 2.

[2] **Annex 1** provides a generic form of the HCR recommended by SCRS in 2010 that would be consistent with UNFSA.

4. Based on the SCRS inputs and advice provided pursuant to paragraph 2 above and the dialogue process indicated in paragraph 3, the Commission shall then adopt HCR for the northern albacore stock, including pre-agreed management actions to be taken under various stock conditions. For this specific purpose, the management actions below will be considered by the Commission and updated as necessary:

    a) If the average spawning stock biomass (SSB) level is less than SSB_{LIM} (*i.e., $SSB<SSB_{LIM}$*), the Commission shall adopt severe management actions immediately to reduce the fishing mortality rate, including measures that suspend the fishery and initiate a scientific monitoring quota to be able to evaluate stock status. This scientific monitoring quota shall be set at the lowest possible level to be effective. The Commission shall not consider re-opening the fishery until the average SSB level exceeds SSB_{LIM} with a high probability. Further, before reopening the fishery, the Commission shall develop a rebuilding program in order to ensure that the stock returns to the green zone of the Kobe plot.

    b) If the average SSB level is equal to or less than $SSB_{THRESHOLD}$ and equal to or above SSB_{LIM} (*i.e., $SSB_{LIM} \leq SSB \leq SSB_{THRESHOLD}$*) and
        i. F is at or below the level specified in the HCR, the Commission shall assure that that applied management measures will maintain F at or below the level specified in the HCR until the average SSB is above $SSB_{THRESHOLD}$;
        ii. F is above the level specified in the HCR, the Commission shall assure that in maximum 3 annual steps F is reduced to the level specified in the HCR to ensure F is at a level that will rebuild SSB to SSB_{MSY} or above that level.

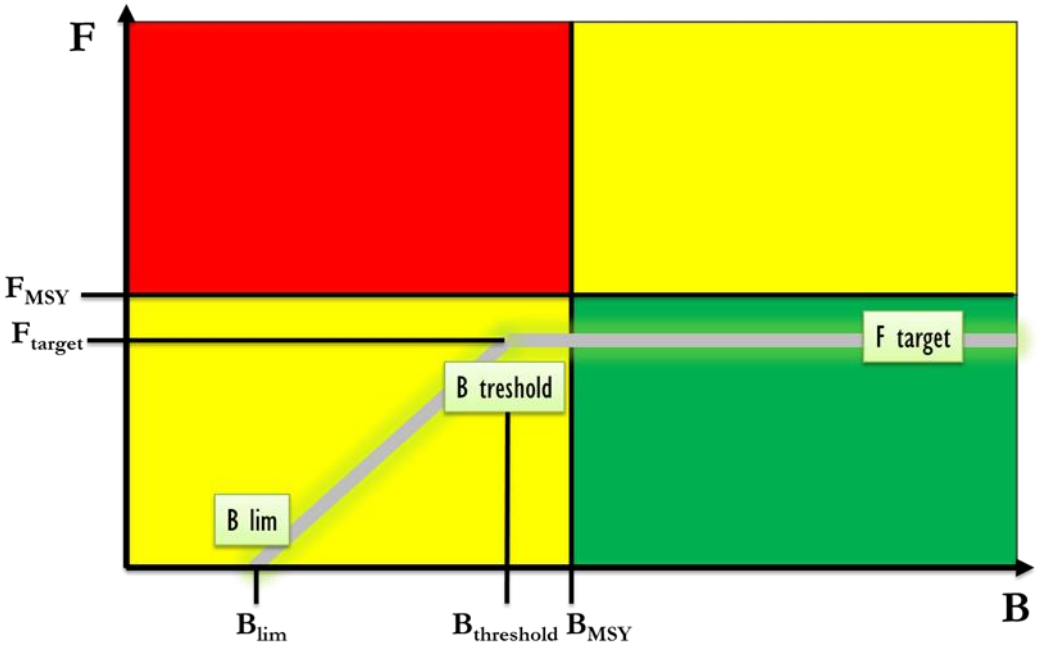
    c) If the average SSB is above $SSB_{THRESHOLD}$ but F exceeds F_{TARGET} (*i.e., $SSB>SSB_{THRESHOLD}$ and $F>F_{TARGET}$*), the Commission shall immediately take measures to reduce F to F_{TARGET} in maximum 3 annual steps.

    d) Once the average SSB level reaches or exceeds $SSB_{THRESHOLD}$ and F is less or equal than F_{TARGET} (*i.e., $SSB > SSB_{THRESHOLD}$ and $F \leq F_{TARGET}$*), the Commission shall assure that applied management measures will maintain F at or below F_{TARGET} and in case F is increased to F_{TARGET} this is done in minimum 3 annual steps.

5. These HCRs should be evaluated by SCRS through the management strategy evaluation process, including in light of new assessments of the stock. The Commission shall review the results of these evaluations and make adjustments to the HCRs as needed.

Annex 1

Generic form of the HCR recommended by SCRS in 2010 that would be consistent with UNFSA (Report of the 2010 WGSAM)



Annex 2

Indicative outline of the statistics to be provided by SCRS to support decision-making

PERFORMANCE METRICS AND ASSOCIATED STATISTICS	UNIT OF MEASUREMENT	TYPE OF STATISTICS
1 Status: maximize probability of maintaining stock in the Kobe green zone		
1.1 Minimum spawner biomass relative to B_{MSY}	B/B_{MSY}	Minimum over [x] years
1.2 Mean spawner biomass relative to B_{MSY}	B/B_{MSY}	Geometric mean over [x] years
1.3 Mean fishing mortality relative to F_{MSY}	F/F_{MSY}	Geometric mean over [x] years
1.4 Probability of being in the Kobe green quadrant	B, F	Proportion of years that $B \geq B_{MSY}$ & $F \leq F_{MSY}$
1.5 Probability of being in the Kobe red quadrant	B, F	Proportion of years that $B \leq B_{MSY}$ & $F \geq F_{MSY}$
2 Safety: maximize the probability of the stock remaining above the biomass limit		
2.1 Probability that spawner biomass is above B_{lim} ($0.4B_{MSY}$)		Proportion of years that $B > B_{lim}$
3 Yield: maximize catches		
3.1 Mean catch		Mean over [x] years
4 Abundance: maximize catch rates to enhance fishery profitability		
4.1 Mean catch rates (CPUEs)	CPUE	Geometric mean over [x] years
5 Stability: maximize stability in catches		
5.1 Mean absolute proportional change in catch	Catch (C)	Mean over [x] years of $\lvert(C_n - C_{n-1}/C_{n-1}\rvert$
5.2 Variance in catch	Catch (C)	Variance over [x] years
5.3 Probability in shutdown	Catch (C)	Proportion of years that C=0

Appendix 4

Draft working document:
Performance indicators from SCRS/2016/015 and PA2-003, Annex 2
With changes agreed by Panel 2

PERFORMANCE INDICATORS AND ASSOCIATED STATISTICS	*UNIT OF MEASUREMENT*	*TYPE OF METRICS*
Status		
1.1 Minimum spawner biomass relative to B_{MSY}	B/B_{MSY}	Minimum over [x] years
1.2 Mean spawner biomass relative to B_{MSY}[1]	B/B_{MSY}	Geometric mean over [x] years
1.3 Mean fishing mortality relative to F_{MSY}	F/F_{MSY}	Geometric mean over [x] years
1.4 Probability of being in the Kobe green quadrant	B, F	Proportion of years that $B \geq B_{MSY}$ & $F \leq F_{MSY}$
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		
2.1 Probability that spawner biomass is above B_{lim} ($0.4B_{MSY}$)[3]	B/B_{MSY}	Proportion of years that $B > B_{lim}$
2.2 Probability of $B_{lim} < B < B_{thresh}$	B/B_{MSY}	Proportion of years that $B_{lim} < B < B_{thresh}$
3 Yield		
3.1 Mean catch – short term	Catch	Mean over 1-3 years
3.2 Mean catch – medium term	Catch	Mean over 5-10 years
3.3 Mean catch – long term	Catch	Mean in 15 and 30 years
4 Stability		
4.1 Mean absolute proportional change in catch	Catch (C)	Mean over [x] years of $\lvert(C_n - C_{n-1}/ C_{n-1}\rvert$
4.2 Variance in catch	Catch (C)	Variance over [x] years
4.3 Probability of shutdown	TAC	Proportion of years that TAC=0
4.4 Probability of TAC change over a certain level[4]	TAC	Proportion of management cycles when the ratio of change[5] $(TAC_n - TAC_{n-1})/TAC_{n-1} > X\%$
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

Appendix 5

Request by the European Union for clarification by the commission regarding the use of algorithms for the purpose of bluefin tuna caging operations

(Document submitted by the European Union)

Caging operations for bluefin tuna are subject to significant controls, defined under Annex 9 of Recommendation [14-04]. Amongst these provisions, it is compulsory to use the most up-to-date Length/Weight relationships (algorithms) established by SCRS in order to convert lengths into weights.

New algorithms were adopted by SCRS in 2015 and should therefore have been used for the purpose of caging bluefin tuna in 2016. However, the publication of these algorithms on the ICCAT website created some level of uncertainty since an annual algorithm for the Eastern stock was provided (under Table 1 of the document on bluefin tuna conversion factors available on the ICCAT website[1]) along with monthly algorithms (Table 2 of the same document), leaving the possibility for farming CPCs to use either one. The outcomes from applying the annual or the monthly algorithm vary markedly and therefore have a very significant impact on the estimation of the quantities caged and ultimately on the quota uptake for each CPC. The European Union would like to request the Commission to clarify which algorithm(s) must be applied for the purpose of using stereoscopical cameras to estimate the quantities caged, starting in 2017. This clarification is necessary, in order to provide operators and administrations with the legal clarity to conduct the caging operations and also to ensure the necessary level playing field between the ICCAT CPCs.

In accordance with this clarification, the document containing the most recent algorithms updated by SCRS, and published on the ICCAT website, should also clearly identify which algorithm(s) are to be used for the purpose of caging operations.

[1] www.iccat.int/Documents/SCRS/Manual/Appendices/Appendix_4_III_BFT_ENG.pdf