REVIEW OF CONSERVATION AND MANAGEMENT MEASURES RELATING TO METHODS

PREPARED BY: IOTC SECRETARIAT[1], 24 OCTOBER 2016

PURPOSE

To encourage participants at the Working Party on Methods (WPM) to review the existing Conservation and Management Measures (CMM) relating to Methods, noting the CMMs contained in document IOTC–2016–WPM07–04; and as necessary to 1) provide recommendations to the Scientific Committee on whether modifications may be required; and 2) recommend whether other CMMs may be required.

BACKGROUND

In addition to the CMMs outlined in document IOTC–2016–WPM07–04, Methods are currently subject to several other CMMs adopted by the Commission, including:

Recommendation 14/07 *To standardise the presentation of scientific information in the annual Scientific Committee report and in Working Party reports*. This Recommendation builds upon the excellent work to date by the Scientific Committee, its working parties and the IOTC Secretariat to standardise the presentation of scientific information in their annual reports, including via the 'Executive Summaries' for each stock. In this context and in order to support scientific advice made available by the IOTC Scientific Committee, the executive summaries of the annual IOTC Scientific Committee report which present the stock assessment results may include, when possible as defined in this proposal, clearly: Stock status; Model outlooks; Data quality and limitations of the assessment models; Alternative approach (data poor stocks).

Resolution 15/10 *On target and limit reference points and a decision framework*. This Resolution establishes the general principles that would guide the application of the precautionary approach in the context of IOTC, including the adoption of provisional reference points that would apply until such time as the Commission decides to update the reference points after considering the advice of the Scientific Committee. The Resolution also considers a decision framework to facilitate management measures that are currently being undertaken by the Commission. This Resolution superseded Recommendation 13/10.

Resolution 12/01 *On the implementation of the precautionary approach*. This Resolution establishes the general principles that would guide the application of the precautionary approach in the context of the IOTC. The basic tenet being: do not take actions that would have an unacceptably high risk of compromising the health of the resource or its environment in the long term. The provisions also include ecosystem considerations in the form of impacts on non-target and associated or dependent species and their environment, or the effects of unanticipated environmental events.

DISCUSSION

As part of best practice, the WPM is obliged to review existing CMMs and consider whether their science-based components need to be updated. If this is the case, then the WPM should provide clear, science-based recommendations for the Scientific Committee's consideration.

RECOMMENDATION

That the WPM **NOTE** paper IOTC–2016–WPM07–05 which aimed to encourage the WPM to review the existing Conservation and Management Measures (CMMs) relating to Methods, and as necessary to 1) provide recommendations to the Scientific Committee on whether modifications may be required; and 2) recommend whether other CMMs may be required.

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APPENDICES

Appendix A: Recommendation 14/07 *To standardise the presentation of scientific information in the annual Scientific Committee report and in Working Party report*

Appendix B: Resolution 15/10 *On target and limit reference points and a decision framework*

Appendix C: Resolution 12/01 *On the implementation of the precautionary approach.*

APPENDIX A

RECOMMENDATION 14/07

TO STANDARDISE THE PRESENTATION OF SCIENTIFIC INFORMATION IN THE ANNUAL SCIENTIFIC COMMITTEE REPORT AND IN WORKING PARTY REPORTS

The Indian Ocean Tuna Commission (IOTC),

RECOGNISING the importance of sound scientific advice as the centre piece for the conservation and management of tuna and tuna-like species in the Indian Ocean and adjacent seas in line with international law and the information needs of the Commission;

NOTING that participants of the first Global Summit of Tuna RFMOs in 2007 in Kobe, Japan agreed that stock assessment results be presented in a standardised "four quadrant, red-yellow-green-orange" format that is now referred as the "Kobe Plot" which is widely embraced as a practical, user-friendly method to present stock status information;

FURTHER NOTING that, at the Second Joint Meeting of Tuna RFMOs in June 2009 in San Sebastian, Spain, a "Strategy Matrix" was adopted to provide fisheries managers with the statistical probability of meeting management targets, including ending overfishing and rebuilding overfished stocks, in a standardised manner as a result of potential management actions;

ACKNOWLEDGING that the Strategy Matrix is a harmonised format for RFMO science bodies to convey advice, and that this format for presenting stock assessment results facilitates the application of the precautionary approach by providing Commissions with the basis to evaluate and adopt management options at various levels of probability of success;

RECALLING recommendations of the Kobe II Workshop of Experts to Share Best Practices on the Provision of Scientific Advice and of the Kobe III recommendations, in particular on development on research activities to better quantify the uncertainty and understand how this uncertainty is reflected in the risk assessment inherent in the Kobe II strategy matrix;

FURTHER RECALLING the provisions of the Recommendation 12/15 *on the best available science*, that requests the provision of clear, transparent, and standardised formats for scientific advice delivered to the Commission;

TAKING INTO ACCOUNT that Resolutions 12/01 *on the implementation of the precautionary approach* and 13/10 *on interim target and limit reference points and a decision framework*, make possible the implementation of the precautionary approach thanks to the adoption of interim target and limit reference points;

NOTING the excellent work to date by the Scientific Committee, its working parties and the IOTC Secretariat to standardise the presentation of scientific information in their annual reports, including via the '*Executive Summaries*' for each stock;

STRESSING the importance of further refining the presentation of scientific information to facilitate appropriate utilisation by the Commission;

RECOMMENDS, in accordance with paragraph 8 of Article IX of the IOTC Agreement, that:

1. In support of the scientific advice made available by the IOTC Scientific Committee, the '*Executive Summaries*' within the annual IOTC Scientific Committee report which present stock assessment results, include when possible:

   Stock status

   a) A Kobe plot/chart showing:

      i. Any Target and Limit Reference Points adopted by the Commission, e.g. F_{MSY} and F_{LIM}, SB_{MSY} and SB_{LIM} or B_{MSY} and B_{LIM}, depending on the assessment models used by the Scientific Committee, or proxies where available;

      ii. The stock estimates, expressed in reference to Target Reference Points adopted by the Commission, e.g. as $F_{CURRENT}$ on F_{MSY} and as $SB_{CURRENT}$ on SB_{MSY} or as $B_{CURRENT}$ on B_{MSY};

      iii. The estimated uncertainty around estimates, provided that statistical methods to do so have been agreed upon the Scientific Committee and that sufficient data exist;

iv. The stock status trajectory.

b) A graphical representation showing the proportion of model outputs of the years used for advice from the last stock assessment that are within the green quadrant of the Kobe plot/chart (not overfished, not subject to overfishing), the yellow and orange quadrants (overfished or subject to overfishing) and the red quadrant (overfished and subject to overfishing).

Model outlooks

c) Two Kobe II strategy matrices:

i. A first one indicating the probability of complying with the Target Reference Points adopted by the Commission, e.g. the probability of either $SB>SB_{MSY}$ or $B>B_{MSY}$ and of $F<F_{MSY}$ for different levels of catch across multiple years;

ii. A second one indicating the probability of being inside safe biological limits expressed through Limit Reference Points adopted by the Commission, e.g. the probability of either $SB>SB_{LIM}$ or $B>B_{LIM}$ and of $F<F_{LIM}$ for different levels of catch across multiple years;

iii. When the Commission agrees on acceptable probability levels associated with the target and limit reference points on a stock by stock basis, the Scientific Committee could prepare and include, in the annual report, the Kobe II strategy matrices using colour coding corresponding to these thresholds.

Data quality and limitations of the assessment models

d) A statement qualifying the quality, the reliability and where relevant the representativeness of input data to stock assessments, such as, but not limited to:

i. Fisheries statistics and fisheries indicators (e.g. catch and effort, catch-at size and catch at age matrices by sex and, when applicable, fisheries dependent indices of abundance);

ii. Biological information (e.g. growth parameters, natural mortality, maturity and fecundity, migration patterns and stock structure, fisheries independent indices of abundance);

iii. Complementary information (e.g. consistencies among available abundance indices, influence of the environmental factors on the dynamic of the stock, changes in fishing effort distribution, selectivity and fishing power, changes in target species).

e) A statement qualifying the limits of the assessment model with respect to the type and the quality of the input data and expressing the possible biases in the assessment results associated with uncertainties of the input data;

f) A statement concerning the reliability of the projections carried out over the long term.

Alternative approach (data poor stocks)

2. When, due to data or modelling limitations, the IOTC Scientific Committee is unable to develop Kobe II strategy matrices and associated charts or other estimates of current status relative to benchmarks, the IOTC Scientific Committee will develop its scientific advice on available fisheries-dependant and fisheries-independent indicators and provide similar caveats as those detailed in paragraph 1(d).

Additional information and review of the structure and templates of the '*Executive Summaries*'

3. The Commission encourages the IOTC Scientific Committee to include either in its annual report or in the detailed reports, where possible and if considered as relevant and useful, any other tables and/or graphics supporting scientific advice and management recommendations. In particular, the IOTC Scientific Committee will include, where possible, information on the recruitment trajectories, on the stock-recruitment relationship and some ratio such as yield per recruit or biomass per recruit.

4. As far as needed, the IOTC Scientific Committee shall review recommendations and templates for the Kobe II strategy matrices, plot and graphical representations as laid down in this Recommendation and will advise the Commission on possible improvements.

APPENDIX B

RESOLUTION 15/10
ON TARGET AND LIMIT REFERENCE POINTS AND A DECISION FRAMEWORK

The Indian Ocean Tuna Commission (IOTC),

CONSIDERING the objectives of the Commission are to maintain stocks in perpetuity and with high probability, at levels not less than those capable of producing their maximum sustainable yield as qualified by relevant environmental and economic factors including the special requirements of developing States in the IOTC area of competence;

BEING MINDFUL of Article XVI of the IOTC Agreement regarding the rights of Coastal States and of Article 87 and 116 of the UN Convention of the Law of the Sea regarding the right to fish on the high seas;

RECALLING that Article 6, paragraph 3, of the Agreement for the Implementation of the Provisions of the United Nations Convention of the Law of the Sea of December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA), establishes the application of precautionary reference points as a general principle for sound fisheries management;

FURTHER RECALLING that Annex II of UNFSA provides guidelines for the application of precautionary reference points in the conservation and management of straddling fish stocks and highly migratory fish stocks, including the adoption of provisional reference points when information for establishing reference points is absent or poor;

NOTING that the Scientific Committee noted that the interim limit reference points contained in Resolution 13/10 [superseded by Resolution 15/10] are not consistent with FAO and UNFSA guidelines;

NOTING that Article 7.5.3 of the FAO Code of Conduct for Responsible Fisheries also recommends the implementation of stock specific target and limit reference points, *inter alia*, on the basis of the precautionary approach;

NOTING that recommendations 37 and 38 of the Performance Review Panel, adopted by the Commission as Resolution 09/01 [superseded by Resolution 16/03], indicate that pending the amendment or replacement of the IOTC Agreement to incorporate modern fisheries management principles, the Commission should implement the precautionary approach including, *inter alia*, precautionary reference points, as set forth in the UNFSA;

NOTING Resolution 12/01 *On the implementation of the precautionary approach* that recommends adoption of provisional reference points, and that the IOTC Scientific Committee proposed provisional values at its 14th Session;

RECALLING ALSO that the IOTC Scientific Committee commenced a process leading to a management strategy evaluation (MSE) process to improve upon the provision of scientific advice on Harvest Control Rules (HCRs);

HIGHLIGHTING that the IOTC Scientific Committee is now in a position to provide advice on stock status relative to reference points for several stocks of tropical, temperate or neritic tunas and billfish;

FURTHER NOTING that the IOTC Scientific Committee at its 17th Session made recommendations on possible alternates to limit and target reference points derived from B_{MSY} and F_{MSY}, when those are considered as insufficiently robust, that are derived from proportions of B_0, being the estimated virgin biomass;

FURTHER NOTING the Scientific Committee also recommended that in cases where MSY-based reference points cannot be robustly estimated, biomass limit reference points be set at 20 % of the virgin biomass (B_{LIM}=0.2 B_0).

ACKNOWLEDGING that continuing dialog between scientists and managers is necessary to define appropriate HCRs for the IOTC tuna and tuna-like stocks;

ADOPTS in accordance with paragraph 1 of Article IX of the IOTC Agreement, that:

Interim Target and Limit Reference Points (TRPs and LRPs)

1. When assessing stock status and providing recommendations to the Commission, the IOTC Scientific Committee should, where possible, apply MSY-based target and limit reference points for tuna and tuna-like species and in particular the interim reference points agreed by the Commission in 2013 for albacore,

swordfish and the three (3) tropical tunas (Bigeye tuna, Skipjack tuna, Yellowfin tuna) (per Resolution 13/10 *On interim target and limit reference points and a decision framework*) [superseded by Resolution 15/10]), as listed in **Table 1**. B_{MSY} refers to the biomass level for the stock that would produce the Maximum Sustainable Yield; F_{MSY} refers to the level of fishing mortality that produces the Maximum Sustainable Yield.

Table 1. Interim target and limit reference points.

Stock	Target Reference Point	Limit Reference Point
Albacore Yellowfin tuna Swordfish	$B_{TARGET} = B_{MSY}$; $F_{TARGET} = F_{MSY}$	$B_{LIM} = 0.40\ B_{MSY}$ $F_{LIM} = 1.40\ F_{MSY}$
Bigeye tuna	$B_{TARGET} = B_{MSY}$ $F_{TARGET} = F_{MSY}$	$B_{LIM} = 0.50\ B_{MSY}$ $F_{LIM} = 1.30\ F_{MSY}$
Skipjack tuna	$B_{TARGET} = B_{MSY}$ $F_{TARGET} = F_{MSY}$	$B_{LIM} = 0.40\ B_{MSY}$ $F_{LIM} = 1.50\ F_{MSY}$

Alternate interim Target and Limit Reference Points

2. Where the IOTC Scientific Committee considers that MSY-based reference points cannot be robustly estimated, biomass limit reference points will be set at a rate of B_0. Unless the IOTC Scientific Committee advises the Commission of more suitable limit reference point for a particular species, by default, the interim B_{LIM} will be set at 0.2 B_0 and fishing mortality rate limit reference point at $F_{0.2\ Bo}$ (the value corresponding to this biomass limit reference point). These interim limit reference points will be reviewed no later than 2018.

3. Where the IOTC Scientific Committee considers that MSY-based reference points cannot be robustly estimated, target reference points based on the depletion proportion (i.e. reference points with respect to the ratio of current biomass to B_0, B_0 being the virgin biomass estimate) should be used as a basis for B_{TARGET} and F_{TARGET}, as follows:

   a) the interim biomass target reference point B_{TARGET} could be set at a ratio of B_0, the virgin biomass;

   b) the interim fishing mortality rate target reference point F_{TARGET} could be set at a level consistent with the target biomass reference point, the fishing mortality rate corresponding then to the adopted ratio of B_0, the virgin biomass).

4. These target and limit reference points, referred to in paragraphs 1, 2 and 3, shall be further reviewed by the IOTC Scientific Committee according to the program of work at **Annex 1** and in accordance with paragraph 6. The results shall be presented to the Commission for adoption of species-specific reference points.

5. The IOTC Scientific Committee shall continue to provide advice on the status of stocks and on recommendations for management measures in relation to the reference points referred to in paragraphs 1, 2 and 3, where available, until the Commission adopts other reference points that achieve the IOTC's conservation and management objectives and are consistent with paragraph 6.

6. The IOTC Scientific Committee shall recommend to the Commission for its consideration options for harvest control rules for IOTC species in relation to agreed reference points and, in doing so, shall take into account:

   a) the provisions set forth in the UNFSA and in Article V of the IOTC Agreement;

   b) the following objectives and any other objective identified through the Science and Management Dialogue process designed in Resolution 14/03 [superseded by Resolution 16/09] (or any revision thereof) and agreed thereafter by the Commission:

      i. Maintain the biomass at or above levels required to produce MSY or its proxy and maintain the fishing mortality rate at or below F_{MSY} or its proxy;

      ii. Avoid the biomass being below B_{LIM} and the fishing mortality rate being above F_{LIM};

   c) the following guidelines:

      i. For a stock where the assessed status places it within the lower right (green) quadrant of the Kobe Plot, aim to maintain the stock with a high probability within this quadrant;

ii. For a stock where the assessed status places it within the upper right (orange) quadrant of the Kobe Plot, aim to end overfishing with a high probability in as short a period as possible;

iii. For a stock where the assessed status places it within the lower left (yellow) quadrant of the Kobe plot, aim to rebuild these stocks in as short a period as possible;

iv. For a stock where the assessed status places it within the upper left quadrant (red), aim to end overfishing with a high probability and to rebuild the biomass of the stock in as short a period as possible.

Final Clauses

7. Bearing in mind Article 64 of UNCLOS and Article 8 of UNFSA, the entirety of this Resolution is subject to Article XVI (Coastal States' Rights) of the IOTC Agreement for the Establishment of the Indian Ocean Tuna Commission, and Articles 87 and 116 of the UN Convention of the Law of the Sea regarding the right to fish on the high seas;

8. The IOTC Scientific Committee is requested to evaluate the performance of any harvest control rules with respect to the species specific target and limit reference points adopted for IOTC species, but not later than 10 years following their adoption, and the Commission will consider, as appropriate and consistent with the scientific advice, these harvest control rules.

9. As soon as advice from the IOTC Scientific Committee regarding the appropriateness of TRPs and LRPs, as required under **Annex 1**, is available to the Commission, and where possible no later than at the IOTC Commission meeting in 2020, this Resolution will be reviewed with the view to adopting revised TRPs and LRPs.

10. This Resolution supersedes Resolution 13/10 *On interim target and limit reference points and a decision framework*.

APPENDIX C

RESOLUTION 12/01
ON THE IMPLEMENTATION OF THE PRECAUTIONARY APPROACH

The Indian Ocean Tuna Commission (IOTC),

RECALLING that Article 5, paragraph c, of the Agreement for the Implementation of the Provisions of the United Nations Convention of the Law of the Sea of December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA), establishes the application of the precautionary approach as a general principle for sound fisheries management;

FURTHER RECALLING that Article 6, and Annex II, of UNFSA provide guidelines for the implementation of the precautionary approach, including the adoption of provisional reference points when information for establishing reference points is absent or poor;

NOTING that Article 7.5 of the FAO Code of Conduct for Responsible Fisheries also recommends the implementation of the precautionary approach, *inter alia*, on the basis of stock-based target and limit reference points;

NOTING that recommendations 37 and 38 of the Performance Review Panel, adopted by the Commission as Resolution 09/01, indicate that pending the amendment or replacement of the IOTC Agreement to incorporate modern fisheries management principles, the Commission should implement the precautionary approach as set forth in the UNFSA;

MINDFUL that Paragraph 29.6 of the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries, revision 1, 2009, and other eco-certification initiatives highlight the implementation of the precautionary approach as an important criterion to assess the sustainability of a fishery;

RECALLING the time–area closure adopted by the Commission towards the conservation of tropical tuna stocks, described in Resolution 10/01 [superseded by Resolution 12/13, then Resolution 14/02];

RECALLING that the IOTC Scientific Committee has initiated a process of management strategy evaluation to focus the provision of scientific advice on the information needs of the Commission;

RECOGNISING the need to ensure the sustainability of fisheries for tunas and tuna-like species for food security, livelihoods, economic development, multispecies interactions and environmental impacts in its decisions;

AGREES, in accordance with paragraph 1 of Article IX of the IOTC Agreement, to the following:

1. To apply the precautionary approach, in accordance with relevant internationally agreed standards, in particular with the guidelines set forth in the UNFSA, and to ensure the sustainable utilisation of fisheries resources as set forth in Article V of the IOTC Agreement.

2. In applying the precautionary approach, the Commission shall adopt, after due consideration of the advice supplied by the IOTC Scientific Committee,

    a) stock-specific reference points (including, but not necessarily limited to, target and limit reference points[2]), relative to fishing mortality and biomass, and

    b) associated harvest control rules[3], that is, management actions to be taken as the reference points for stock status are approached or if they are breached.

[2] Target Reference Points corresponds to a state of a fishery and / or a resource which is considered desirable; Limit Reference Points indicates the limit beyond which the state of a fishery and / or a resource is not considered desirable. Source: http://www.fao.org/fi/glossary (accessed 25 April 2012).

[3] Harvest Control Rule: A rule that describes how harvest is intended to be controlled by management in relation to the state of some indicator of stock status. Source: http://www.fao.org/fi/glossary (accessed 25 April 2012).

Reference points and harvest control rules shall be determined so that, according to the best available science, the risk of a negative impact on the sustainability of Indian Ocean resources of tuna and tuna-like species is minimised.

3. In the determination of appropriate reference points and harvest control rules, consideration must be given to major uncertainties, including the uncertainty about the status of the stocks relative to the reference points, uncertainty about biological, environmental and socio-economic events and the effects of fishing activities on non-target and associated or dependent species.

4. If an unanticipated event, such as a natural phenomenon has a significant adverse impact on the status of a stock or its associated environment, the Commission shall adopt Conservation and Management Measures on an emergency basis to ensure that fishing activity does not exacerbate such adverse impacts.

5. Initially and as an interim measure, the Commission may adopt provisional reference points and harvest control rules, taking into account the advice of the IOTC Scientific Committee; such measures would remain current until such time as the Commission chooses to update them.

6. Instruct the IOTC Scientific Committee to assess, through the management strategy evaluation process, the performance of reference points, including any interim reference points, and of potential harvest control rules to be applied as the status of the stocks approaches the reference points.

7. After completion of the management strategy evaluation, the IOTC Scientific Committee should provide the Commission with recommended reference points for all major stocks, and cast future advice on the status of the stocks relative to the adopted reference points, on the basis of the best available scientific evidence.

8. The IOTC Scientific Committee will report on the progress of the management strategy evaluation process at the Commission Session in 2014, with a view to confirming or updating any interim reference points and associated harvest control rules.