

OUTCOMES OF THE SIXTEENTH SESSION OF THE SCIENTIFIC COMMITTEE AND THE EIGHTEENTH SESSION OF THE COMMISSION

PREPARED BY: IOTC SECRETARIAT, 4 DECEMBER, 2014

PURPOSE

To inform the Working Party on Methods (WPM) of the recommendations arising from the Sixteenth Session of the Scientific Committee (December 2nd-6th, 2013), and the Eighteenth Session of the Commission (June 1st-5th, 2014) specifically related to the work of the WPM.

BACKGROUND

Scientific Committee:

At the 16th Session of the Scientific Committee (SC16), the following recommendations on Management Strategy Evaluation and CPUE standardisation were agreed to:

Outcome of the workshop on CPUE standardisation

- 1) **NOTING** the CPUE issues identified by the WPTT in 2010, 2011, 2012 and 2013 and the Scientific Committee in 2012, as well as the informal CPUE workshop in 2013, the SC **RECOMMENDED** that further inter-sessional work be carried out in conjunction with the IOTC Secretariat on the major longline CPC's in the Indian Ocean in early 2014 using operational data to address issues identified in the CPUE Workshop Report ([para. 128](#)).

Management Strategy Evaluation

- 2) The SC **NOTED** the need for the Commission, its Committee's and CPCs to develop a better understanding of management strategy concepts, including reference points, harvest control rules and the role of management strategy evaluation. There is also a need to explain and clarify the roles of the Commission, the SC and MSE through the process. To achieve this, the SC **RECOMMENDED** a process of familiarisation and capacity building at multiples levels as follows:
 - The Chair of the Commission considers including an agenda item for each Commission meeting, which would provide Commissioner's with annual updates and explanatory material to ensure they are kept abreast of the methods and processes being undertaken as part of the broader IOTC MSE process. This should also cover a dialogue among scientists, managers and stakeholders on issues related to the specific formulation of management objectives that are required for a complete formulation and evaluation of management plans through MSE. In order to accelerate this process the SC **REQUESTED** that the IOTC Secretariat seek funding for, and coordinate a 'side event' on the topic associated with the 2014 Commission meeting. In addition, to prepare a workplan for the MSE dialogue in consultation with the WPM.
 - The IOTC Secretariat coordinate the development and delivery of several training workshops focused on providing assistance to developing CPCs to better understand the MSE process, including how reference points and harvest control rules are likely to function in an IOTC context. The implications of IOTC Resolution 12/01 *on the implementation of the precautionary approach* and IOTC Resolution 13/10 *on interim target and limit reference points and a decision framework* should be incorporated into the workshops. The SC **REQUESTED** that the Commission's budget incorporate appropriate funds for this purpose, as detailed in [Table 12. \(para. 115\)](#)
- 3) The SC **RECOMMENDED** that the Commission allocate funds in the 2014 and 2015 IOTC budgets, for an external expert on MSE to be hired for 30 days per year, to supplement the skill set available within IOTC CPCs, and for the establishment of a participation fund to cover the planned WPM workshops, as detailed in [Table 12. \(para. 116\)](#)

TABLE 12. Estimated budget for IOTC consultants to be engaged in MSE training workshops in 2014 and 2015

Description	Unit price	Units required	Total
2014			
Training materials	US\$2,000	1	2,000
Consultant fees	\$350	30	7,500
Travel (2 trips)	US\$10,000	2	20,000
2015			
Training materials	US\$2,000	1	2,000
Consultant fees	\$350	30	7,500
Travel (2 trips)	US\$10,000	2	20,000
Total estimate (US\$)			59,000

DISCUSSION

Commission:

At the 18th Session of the Commission (S18), the following recommendations on Management Strategy Evaluation and CPUE standardisation were agreed to:

Management Strategy Evaluation (MSE)

- 1) The Commission **RECALLED** that at its 15th Session, Members ‘*endorsed the development of a Management Strategy Evaluation (MSE) in the framework of IOTC and requests that this process be continued in 2011*’ (para. 43 of the S15 report). MSE is a procedure whereby the performance of alternative management strategies are evaluated using simulations of stock and fishery dynamics (para. 18 of the S17 report).
2. The Commission **ACKNOWLEDGED** the work that has been carried out inter-sessionally by the WPM MSE group and thanked its members for the progress achieved so far. The development of tools that would best allow the evaluation of the likely impacts and the relative merits of alternative management options was considered to be a necessary step for the precautionary management of IOTC stocks.
3. The Commission **AGREED** on the need for the Commission, its Committees and CPCs to develop a better understanding of management strategy concepts, including reference points, harvest control rules and the role of management strategy evaluation. There is also a need to explain and clarify the roles of the Commission, the SC and MSE through the process.
4. The Commission **NOTED** the informal working group meeting which took place immediately prior to the S18, aimed at promoting a dialogue among scientists, managers and stakeholders on issues related to the specific formulation of management objectives that are required for a complete formulation and evaluation of management plans through MSE. The Commission **AGREED** to establish a specific series of workshops as detailed in Resolution 14/03.

Proposals for Conservation and Management Measures adopted by the Commission

At the 18th Session, the Commission **CONSIDERED** and **ADOPTED** 7 proposals as Conservation and Management Measures (7 in total consisting of 6 Resolutions and 1 Recommendation), as detailed below. Note that Resolution 14/03 is related directly to the WPM. Possibly Recommendation 14/07 should also have some input from WPM.:

Resolutions

- Resolution 14/01 *On the removal of obsolete Conservation and Management Measures*
- Resolution 14/02 *For the conservation and management of tropical tunas stocks in the IOTC area of competence*
- Resolution 14/03 *On enhancing the dialogue between fisheries scientists and managers*
- Resolution 14/04 *Concerning the IOTC record of vessels authorised to operate in the IOTC area of competence*

- Resolution 14/05 *Concerning a record of licensed foreign vessels fishing for IOTC species in the IOTC area of competence and access agreement information*
- Resolution 14/06 *On establishing a programme for transshipment by large-scale fishing vessels*

Recommendations

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

Pursuant to Article IX.4 of the IOTC Agreement, the above mentioned Conservation and Management Measures became binding on Members, 120 days from the date of the notification communicated by the Secretariat in IOTC Circular 2014–60 (10 June 2014, i.e. **8 October 2014**).

The updated *Compendium of Active Conservation and Management Measures for the Indian Ocean Tuna Commission* may be downloaded from the IOTC website at the following link, dated **8 October 2014**:

English: <http://iotc.org/cmms>

French: <http://iotc.org/fr/mcgs>

RECOMMENDATION

That the Working Party on Methods **NOTE** the recommendations of the Fourteenth Session of the Scientific Committee and the Sixteenth Session of the Commission, relevant to the WPM, and consider how to progress these issues at the present meeting.

APPENDICES

Appendix A: [Resolution 14/03](#) *On enhancing the dialogue between fisheries scientists and managers*

Appendix B: [Resolution 13/10](#) *On Interim Target and Limit Reference Points and a decision framework*

Appendix C: [Recommendations 14/07](#) *To standardise the presentation of scientific information in the annual Scientific Committee report and in Working Party reports s*

APPENDIX A**RESOLUTION 14/03**
ON ENHANCING THE DIALOGUE BETWEEN FISHERIES SCIENTISTS AND MANAGERS

The Indian Ocean Tuna Commission (IOTC),

HAVING responsibility for the sustainable utilisation of tuna and tuna-like species in the Indian Ocean;

RECOGNISING the need for action to ensure the achievement of IOTC objectives to conserve and manage tuna resources in the IOTC area of competence;

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), on the strengthening of existing organisations and arrangements;

NOTING recommendation 30 of the Performance Review Panel, adopted by the Commission as Resolution 09/01 *on the performance review follow-up* requesting that new guidelines for the presentation of more user-friendly scientific reports in terms of stock assessments should be developed;

RECALLING that the IOTC Scientific Committee has initiated a process leading to a Management Strategy Evaluation process to improve upon the provision of scientific advice on Harvest Control Rules (HCRs);

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

CONSIDERING scientific advice provided by the Scientific Committee as the corner stone for establishing an effective management framework for stocks and fisheries under the purview of the IOTC;

RECOGNISING that the Commission has limited time during its annual Sessions to consider the level of detail contained within the annual report of the Scientific Committee, and that a dedicated Science-Management Dialogue process be instituted to assist in the synthesis of the SC recommendations and in particular on how they may be used to develop scientifically-based Conservation and Management Measures would be highly beneficial to the IOTC process;

HIGHLIGHTING the need to further enhance the dialogue between fisheries managers and scientists in the coming years in order to achieve the Agreement objectives in the most efficient and effective way;

STRESSING that such enhanced dialogue should, in particular, allow the Commission to focus on the establishment of management frameworks that take into account the recommended interim Target and Limit Reference Points, consistent with [Resolution 13/10](#) *on interim target and limit reference points and a decision framework*, or any subsequent revision;

RECALLING that provisions laid down in Resolution 10/05 *on the establishment of a meeting participation fund for developing IOTC Member and Non-Contracting Cooperating Parties (CPC's)* [Superseded by Resolution 14/01; now contained in the IOTC Rules of Procedure (2014)], establishing a meeting participation fund should ease the attendance of fisheries scientist and managers from developing Contracting Parties and therefore contribute to an inclusive and participative dialogue;

EMPHASISING that the Commission management decisions should be based on the best available science independently developed by the Scientific Committee;

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

1. A Science and Management Dialogue process dedicated to enhance the decision making response of managers to existing Resolutions and recommendations made by the Scientific Committee to the IOTC, is established with the objective of:

- a) Enhancing communication and to foster mutual understanding between fisheries managers, stakeholders and scientists;
 - b) Promoting the efficient use of scientific resources and information;
2. In order to achieve the aforementioned objectives
- a) The Secretariat shall institute a series of Science and Management Dialogue Workshops;
 - b) These Science and Management Dialogue Workshops shall be held in 2015, 2016 and 2017, as needed, prior to the respective Commission Annual Sessions;
 - c) The Commission shall review the products of the Workshops at its Annual Session and also provide further directions to the Secretariat for conduct of subsequent Science and Management Dialogue Workshops; In the light of this review, the Commission may suggest additional topics to be examined by this dialogue.
 - d) The Science and Management Dialogue Workshops shall be open to Contracting Parties, Cooperating Non-Contracting Parties, advisers, Scientific Committee members and accredited observers. Other experts may be invited depending on the topics to be discussed;
 - e) The structure of the meetings shall include an open forum/dialogue;
 - f) To the degree possible, the Secretariat should investigate all sources of funding including the Meeting Participation Fund to support participation by up to two individuals from each CPC requiring such support.
3. The Terms of Reference, for the Science and Management Dialogue Workshops should include:
- a) Identifying and recommending management strategies for the IOTC fisheries, which are consistent with the objectives of the IOTC Agreement, including such as, socioeconomics, food security, etc., identified by the Commission, ecosystem-based approach to fisheries and the precautionary approach for the consideration of the Commission. Specifically, consideration of the following:
 - b) Overarching management objectives to guide the development of management strategies for the IOTC fisheries;
 - c) Target and Limit Reference Points with reference to the use of interim B_{MSY} and F_{MSY} or other proxies as Target and Limit Reference Points as identified in Resolution 13/10 *on interim target and limit reference points and a decision framework* (or any subsequent revision);
 - d) Harvest Control Rules (HCRs), and associated probabilities of achieving these targets or limits, allowing, in particular, the implementation of a precautionary approach as required by Resolution 13/10 *on interim target and limit reference points and a decision framework* (or any subsequent revision);
 - e) Risks to the fishery and the resource at these limit and target reference points in the context of different hypothetical HCR's and assessing the time and probability to rebuild stocks to the prescribed targets for stocks identified in Resolution 13/10 *on interim target and limit reference points and a decision framework* (or any subsequent revision).
4. The effectiveness of the Science and Management Dialogue Workshops shall be reviewed no later than at the Annual Session of the Commission in 2018.

Conservation and Management Measures linked to Resolution 14/03

[Resolution 14/01](#)

[Resolution 13/10](#)

APPENDIX B

RESOLUTION 13/10

ON INTERIM TARGET AND LIMIT REFERENCE POINTS AND A DECISION FRAMEWORK

The Indian Ocean Tuna Commission (IOTC),

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 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, 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 has initiated a process leading to a management strategy evaluation (MSE) process to improve upon the provision of scientific advice on Harvest Control Rules (HCRs);

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:

- When assessing stock status and providing recommendations to the Commission, the IOTC Scientific Committee should apply the following interim target and limit reference points for the species of tuna and tuna-like species 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	$B_{MSY}; F_{MSY}$	$B_{LIM} = 0.40 B_{MSY}; F_{LIM} = 1.40 F_{MSY}$
Bigeye tuna	$B_{MSY}; F_{MSY}$	$B_{LIM} = 0.50 B_{MSY}; F_{LIM} = 1.30 F_{MSY}$
Skipjack tuna	$B_{MSY}; F_{MSY}$	$B_{LIM} = 0.40 B_{MSY}; F_{LIM} = 1.50 F_{MSY}$
Yellowfin tuna	$B_{MSY}; F_{MSY}$	$B_{LIM} = 0.40 B_{MSY}; F_{LIM} = 1.40 F_{MSY}$
Swordfish	$B_{MSY}; F_{MSY}$	$B_{LIM} = 0.40 B_{MSY}; F_{LIM} = 1.40 F_{MSY}$

- These interim target and limit reference points shall be assessed and further reviewed by the IOTC Scientific Committee and the results shall be presented to the Commission for adoption of species-specific reference points. If applicable, the IOTC Scientific Committee should endeavour to apply the interim reference points in the provision of advice on the status of stocks and on recommendations for management measures.

3. The IOTC Scientific Committee shall assess, as soon as possible and more particularly through the management strategy evaluation process (MSE) process, the robustness and the performance of the interim reference points, specified under paragraph 1 and other reference points based on the guidelines of International agreements taking into account: i) the nature of these reference points – target or limits, ii) the best scientific knowledge on population dynamics and on life-history parameters, iii) the fisheries exploiting them, and iv) the various sources uncertainty.
4. In addition the IOTC Scientific Committee shall develop and assess potential harvest control rules (HCRs) to be applied, considering the status of the stocks against the reference points assessed in paragraph 3 for albacore, bigeye tuna, skipjack tuna, yellowfin tuna and swordfish. Based on the results of the MSE and considering the guidelines set forth in the UNFSA and in Article V of the IOTC Agreement, the IOTC Scientific Committee will recommend to the Commission HCRs for these tuna and tuna-like species, which among other factors, taking account of the following objectives:
 - a) For stocks which assessed status will match with the lower right (green) quadrant of the Kobe Plot, aim at maintaining the stocks in a high probability within this quadrant;
 - b) For stocks which assessed status will match with the upper right (orange) quadrant of the Kobe Plot, aim at ending overfishing with a high probability in as short a period as possible;
 - c) For stocks which assessed status will match with the lower left (yellow) quadrant of the Kobe plot, aim at rebuilding these stocks in as short a period as possible;
 - d) For stocks which assessed status will match with the upper left quadrant (red), aim at ending overfishing with a high probability and at rebuilding the biomass of these stocks in as short a period as possible.
5. 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;
6. This Resolution supersedes Recommendation 12/14 *On interim target and limit reference points*.

Conservation and Management Measures linked to Resolution 13/10

[Resolution 12/01](#)

APPENDIX C

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.

Conservation and Management Measures linked to Recommendation 14/07

[Resolution 13/10](#)

[Resolution 12/01](#)

[Recommendation 12/15](#)

