INTER-AMERICAN TROPICAL TUNA COMMISSION

5th WORKSHOP ON MANAGEMENT STRATEGY EVALUATION (MSE) FOR TROPICAL TUNAS

La Jolla, California (USA)
May 30, 2025

REPORT OF THE MEETING

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CONTENTS

SUMMARY

The fifth IATTC workshop on Management Strategy Evaluation (MSE) for tropical tunas was held during May 30, 2025. The workshop was held as a bilingual (Spanish and English with simultaneous interpretation) meeting in a hybrid format (in person and videoconference). The objectives of this workshop, the fifth one funded and organized by the IATTC, were 1) To present and discuss the staff's proposed candidate harvest strategy (Document SAC-16-06) and 2) To complete the discussion with stakeholders on the elements still needed to formulate candidate harvest strategies to be tested in the Management Strategy Evaluation (MSE) for bigeye in 2025 and 2026 (Document WSMSE-05-01). Although the presentations and discussions were relevant to tropical tuna in general, the main focus was on the staff's proposed harvest strategy for BET and on specific elements (Harvest Control Rules, Reference Points, etc.) of the developing of harvest strategies and the ongoing MSE for bigeye tuna. The workshop was attended by representatives from CPCs, non-governmental organizations (NGOs) and IATTC staff. Although a list of potential management objectives developed in previous workshops was presented, the focus of discussion was on the elements of the staff's proposed harvest strategy for BET and on eliciting harvest strategy elements to define candidates for evaluation in the ongoing MSE. A list of 24 candidate harvest strategies proposed and discussed during the workshop, including the one proposed by the staff were made available to the first meeting of "Ad Hoc Working Group To Strengthen The Dialogue Among Scientists, Managers And Other Stakeholders On Management Strategy Evaluation" (Working Group on MSE), which followed this workshop on May 31st 2025 as proposed by CPCs during the 4th IATTC MSE workshop.

1. BACKGROUND

Management Strategy Evaluation (MSE) is a process to compare the performance of alternative management strategies (sometimes referred to as harvest strategies or management procedure depending on the organization and level of specification) in meeting fishery management objectives. MSE uses computer simulations and relevant fisheries performance metrics to compare alternative strategies. MSE is recognized as best practice to evaluate alternative management strategies (Punt *et al*., 2016) and has been widely used both nationally (*e.g*. Australia, New Zealand, South Africa and the United States) and internationally (*e.g*. ICES, IWC, NAFO), including all tuna regional fisheries management organizations (RFMOs: IATTC, IOTC, WCPFC, ICCAT and CCSBT), which are in different stages of evaluation and implementation (Nakatsuka *et al*. 2017, Valero *et al.* 2025).

The IATTC has adopted elements of a harvest strategy for tropical tunas, such as the interim reference points and harvest control rule (HCR), in Resolution C-16-02 and Resolution C-23-06. The IATTC Strategic Science Plan includes a work plan for evaluating the IATTC's current strategy, along with alternatives, using MSE. Because the elements, concepts and approaches involved in MSE were mostly new for managers and other stakeholders, a series of workshops was planned to introduce them to MSE. With financial support from the FAO-GEF Common Oceans project, introductory workshops on MSE for tropical tunas in the eastern Pacific Ocean (EPO) were held in Panama (2015) and the United States (2018), aimed at managers, and a further five, aimed at the tuna industry, took place during 2019 in Colombia, Ecuador, Mexico, Panama, and the United States.

The IATTC MSE work plan has included a series of workshops, the first held at the end of 2019, a second one in May 2021, a third one in December 2022 and a fourth one in March 2025 whose terms of reference were established in Resolution C-19-07. This report summarizes the fifth MSE workshop for tropical tunas in the EPO, funded and organized by the IATTC and held during May 30, 2025. Its goals were to explain and clarify the MSE process, enhance communication and foster mutual understanding among fisheries scientists, managers, and other stakeholders on matters related to harvest strategies and MSE, and further discuss potential management goals, performance metrics, alternative reference points and harvest control rules (identified during the previous workshops) with managers and other stakeholders. The workshop was followed on May 31st 2025 by the first meeting of the MSE Dialogue Working group as proposed by CPCs during the 4th IATTC MSE workshop, to continue the dialogue and foster mutual understanding among fisheries scientists, managers, and other stakeholders on matters related to management strategies and their evaluation, as well as to refine elements of candidate strategies for further evaluation and presentation to the SAC and Commission Annual meeting during 2025 and beyond.

2. OBJECTIVES OF THE REPORT

This report summarizes the activities conducted during the workshop, including presentation outlines, and discussions on tropical tunas in general, and in particular for the ongoing MSE for EPO bigeye tuna.

3. WORKSHOP DESIGN

This workshop aimed to provide background skills on management strategies for new participants and a refresher for participants of previous MSE workshops. Presentations and discussions were used to illustrate how MSEs contribute to the development of robust and functional management strategies. The intention was to empower the participants with knowledge and skills related to MSE in general, to foster communication among stakeholders, and to elicit input (such as alternative/refined objectives, performance metrics, reference points and harvest control rules) required for the technical component of the work. The specific objectives of this workshop, the fifth one funded and organized by the IATTC, were 1) To present and discuss the staff's proposed candidate harvest strategy (Document SAC-16-06) and 2) To complete the discussion with stakeholders on the elements still needed to formulate candidate

harvest strategies to be tested in the Management Strategy Evaluation (MSE) for bigeye in 2025 and 2026 (Document WSMSE-05-01). The workshop was designed to go beyond general concepts, which were covered in previous workshops, and into specific characteristics of the IATTC context, with a focus to finalize objectives, performance metrics, reference points and harvest control rules for the ongoing bigeye tuna MSE, as discussed during previous workshops on the ongoing MSE for bigeye tuna in the EPO. Introductory materials on harvest strategies and MSE were provided by the Ocean Foundation and made available as background documents for the workshop.

The languages of the workshop sessions and workshop materials were Spanish and English, with simultaneous translation. The agenda (Appendix 1) was intended to be flexible, to allow it to be modified based on feedback during the workshop, encouraging active two-way dialogue and discussion rather than a focus on a one-way series of presentations.

4. WORKSHOP DESCRIPTION

4.1. Overview

The workshop was chaired Dr. Alexandre Da-Silva, IATTC's Coordinator of Scientific Research, who opened the workshop and helped facilitate the meeting during questions and discussion sessions. The workshop was attended by 87 participants (Appendix 2), mainly tuna industry stakeholders, managers, scientists, non-governmental organizations (NGOs) and IATTC staff.

4.2. Presentations

The presentations were followed by questions and answer or discussions on each topic. The workshop started with an overview of the workshop's goals, modality, agenda and logistics.

The **first** presentation was on the Staff proposed candidate harvest strategy (Document SAC-16-06, response to paragraph 43 on Resolution C-24-01). During the discussion it was noted that it was important to find areas of agreement and disagreement or where work was needed to firm up candidate elements for the harvest strategy. The initial discussion focused on reference points and their application on the harvest strategy. Up to this point management at IATTC used Fmsy and its proxies, however a future strategy may use other reference points, the point of these meetings is to propose, discuss and agree which candidates to use during formulation of candidate harvest strategies and their evaluation. There was also a discussion on clearly defining reference points and their usage for example for determining stock status or as control points of a harvest control rule. The interpretation and usage of exceptional circumstances was discussed, noting differences between how it is used in the staff's proposed candidate harvest strategy and how it is used in other fora.

The **second** presentation was a recap of the previous IATTC workshops on MSE for tropical tunas, a review of the list of objectives, performance metrics and harvest control rules proposed and discussed so far, along with current MSE workplan status and next steps.

The **third** presentation was an overview followed by discussion on harvest strategy elements in place for tropical tunas at the IATTC. First element discussed was the general management objectives set by the Antigua Convention, highlighting the need to further specification of operational objectives along with a table of objectives and performance indicators that were developed based on previous IATTC MSE workshops (Table 1). IATTC Target and Limit reference points adopted for tropical tunas were discussed, as well as the staff recent revisit of target reference points (Maunder et al. 2024) and proposed more global approach to defining MSY (given historical changes in overall fisheries selectivity due to the expansion of purse-seine fleets), which is designed to support a range of proportioning of catch among the fleets, supports a less depleted target biomass (30%B_0). The distinction between reference points as levels used to evaluate the performance of different harvest control rules, versus control points (or trigger

reference points) which define the shape of the HCR was discussed. Needed further specifications for the data collected for an eventual complete strategy were discussed, including recent changes such as the Individual Vessel Threshold (IVT) program on catches of bigeye tuna and the Enhanced Monitoring Program (EMP) program. Also presented were the different roles and timing of the full stock assessment vs. estimation model used in the harvest strategy as well as alternatives for continuation of the MSE work for the other tropical tunas beyond current work on bigeye tuna.

All presentations and background materials are available at the IATTC workshop website in both Spanish and English.

4.3. General discussion and next steps

The last presentation included a summary of proposed next steps towards MSE development and implementation for bigeye tuna (Table 2) and beyond. The MSE work plan in the IATTC Strategic Science Plan focused initially on bigeye tuna, and will move to the other tropical tuna towards the end of the plan. Alternative candidate Harvest Control Rules were discussed during the workshop as candidates for evaluation during the bigeye tuna MSE (Figure 1). Candidate Harvest Strategies and their elements proposed and discussed during the workshop are listed in Table 3. Based on requests by stakeholders for the establishment of a dedicated dialogue Working Group (WG), to enhance or replace the MSE workshops, along with recommendations from SAC-14 and from staff in SAC-15 for the Commission consider a Science-Management Dialogue (SMDWG) or informal workshops approach to continue the MSE process, the Commission resolved via Resolution C-24-08 the creation of an ad hoc Working Group to strengthen the dialogue among scientists, managers and other stakeholders on MSE, whose first meeting followed the conclusion of this workshop.

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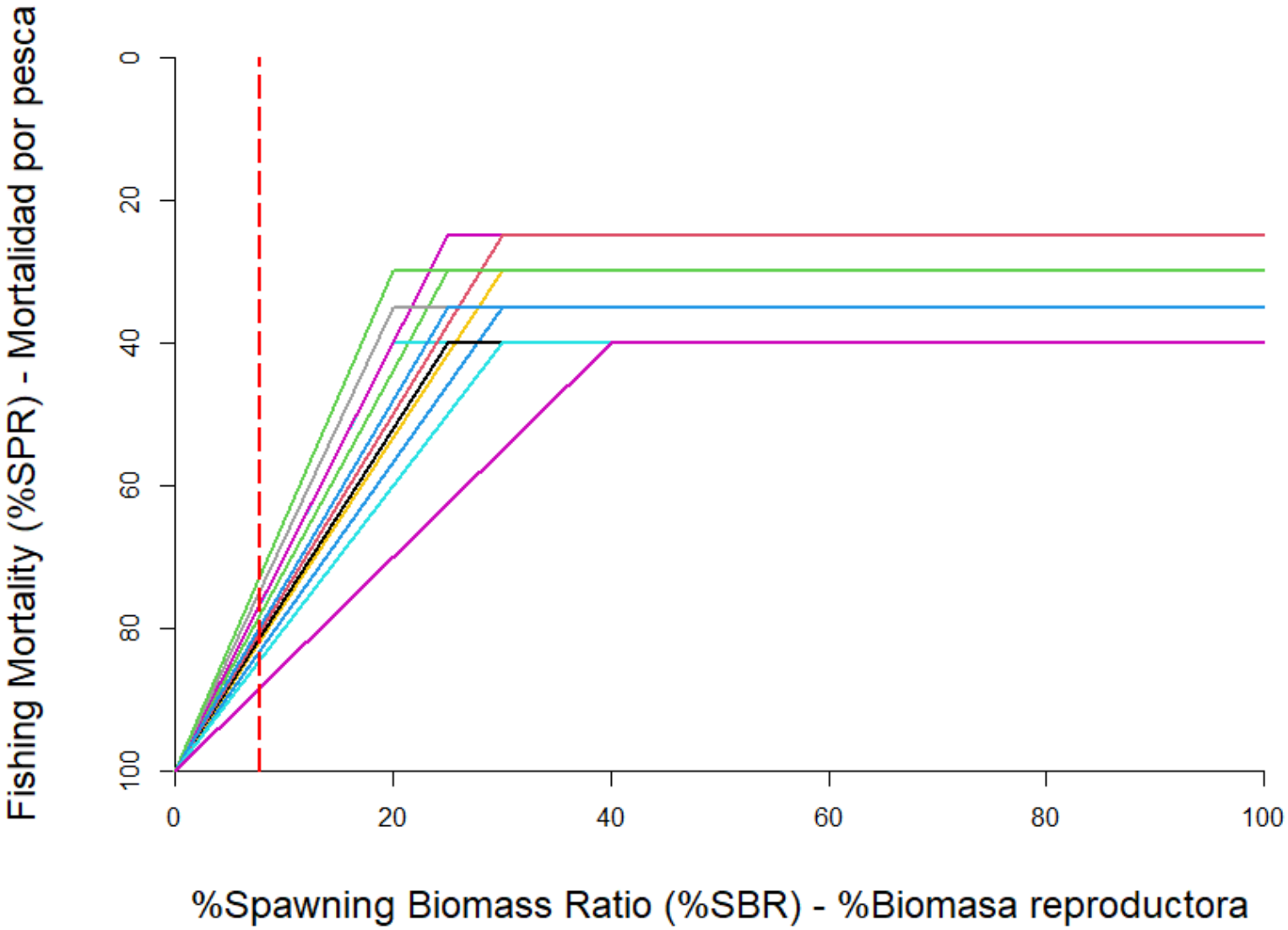

FIGURE 1. Alternative candidate Harvest Control Rules discussed during the workshop as candidates for evaluation during the bigeye tuna MSE. Vertical dashed line represents the interim limit reference point of 7.7%B_0.

Table 1. Objectives, quantities and performance indicators discussed during the workshop (from WSMSE-05).

Objective from WS	Conditions	Interpreted from IATTC instruments	Workshop discussions
Safety Maintain above LRP	Define LRP(s) Define probability Define timeline Reduce *F* before LRP	*Resolution C-23-06* P(S< $S_{7.7\%}$) <= 10% P(F> $F_{7.7\%}$) <= 10%	P(S< $S_{7.7\%}$) <= 10% or 5% P(S<S_{MSY}) <= 10% or 5% P(F>F_{MSY}) <= 5% Timeline: Over 20 or 30 years
Status Maintain stock in green quadrant of Kobe plot	Define TRP(s) Define probability F_{max} <= F_{target}	*Antigua Convention* S >= S_{MSY} F <= F_{MSY} (implied) *Resolution C-23-06* F_{MSY} Skipjack $F_{30\%}$	P(S>dS_{MSY}) >= 50%, 60%, 70%, 75% or 80% P(F<F_{MSY}) >= 50%, 60%, 70%, 75% or 80% $F_{40\%}$, $F_{45\%}$ d$S_{40\%}$
Stability Low variability, catch, effort Gradual changes in management measures	$S_{control}$ << S_{target} Limits on management changes		Effort 10% change cap Catch 15% or 20% change cap
Yield Maintain catches above historical ranges		*Resolution C-21-04 (IVT)* Decrease for BET in PS	Average *1994-2019 (since FAD expansion)* *2017-2019 (latest status quo)* *Relative to other historical levels (maximize yield)*
Effort Maintain effort above historical ranges		*Resolution C-24-01* Increase PS OBJ (for other species) Eliminate Corralito	Average *1994-2019 (since FAD expansion)* *2017-2019 (latest status quo)*
Abundance/CPUE Maintain above historical ranges			Average *1994-2019 (since FAD expansion)* *2017-2019 (latest status quo)* *Relative to other historical levels (maximize yield)*

Table 2. Chromogram of harvest strategy implementation for EPO bigeye tuna.

	2025	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Management Measures	In place, Res. C-24-01		Set in 2026			Set in 2029		
SAC		BET MSE results BET update assessment	BET benchmark assessment YFT update assessment	YFT MSE results SKJ exploratory assessment	YFT benchmark assessment SKJ benchmark assessment	BET benchmark assessment SKJ MSE results		
IATTC	Select/Adopt BET MP	Select/Adopt BET MP Set Measures (2027-2029)			Set Measures (2030-2032)			Set Measures (2033-2035)
Harvest Strategy staff work	BET MSE YFT MSE plan	Collate data for BET MP Run BET MP Check Excep. Circumst. YFT MSE	Check Excep. Circumst. YFT MSE	Check Excep. Circumst. YFT MSE	Collate data for BET MP Run BET MP Check Excep. Circumst. SKJ MSE	Check Excep. Circumst. SKJ MSE	Check Excep. Circumst.	Collate data for BET MP Run BET MP Check Excep. Circumst.

Table 3. Candidate Harvest Strategies proposed and discussed during WSMSE-05.

Comp. HCR/*RCE*	**Staff *Personal***	**C 1**	**C 2**	**C 3**	**C 4**	**C 5**	**C 6**	**C 7**	**C 8**	**C 9**	**C 10**	**C 11**	**C 12**
F_{max}	$F_{30\%}$	$F_{25\%}$	$F_{30\%}$	$F_{35\%}$	$F_{40\%}$	$F_{25\%}$	$F_{30\%}$	$F_{35\%}$	$F_{40\%}$	$F_{25\%}$	$F_{30\%}$	$F_{35\%}$	$F_{40\%}$
$S_{Control}$	$S_{20\%}$	$S_{20\%}$	$S_{25\%}$	$S_{30\%}$	$S_{20\%}$	$S_{25\%}$	$S_{30\%}$	$S_{20\%}$	$S_{25\%}$	$S_{30\%}$	$S_{20\%}$	$S_{25\%}$	$S_{30\%}$
$S_{F=0}$	0	0	0	0	0	0	0	0	0	0	0	0	0
S_{Fmin}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{min}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Stability *Estabilidad*	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$	10-day cap above $S_{cont.}$
LRP (Excep. Circ. rebuild)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ P<10%	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)
EM / *ME*													
Model type	ASPM-Rdev+												
Model / *Modelo*	Base reference 2024												
Data / *Datos*	Catch, CPUE, LF index + LL												

Table 3, Continued. Candidate Harvest Strategies proposed and discussed during WSMSE-05.

Comp. HCR/*RCE*	**Staff *Personal***	**C 13**	**C 14**	**C 15**	**C 16**	**C 17**	**C 18**	**C 19**	**C 20**	**C 21**	**C 22**	**C 23**	**C 24**
F_{max}	$F_{30\%}$	$F_{25\%}$	$F_{30\%}$	$F_{35\%}$	$F_{40\%}$	$F_{25\%}$	$F_{30\%}$	$F_{35\%}$	$F_{40\%}$	$F_{25\%}$	$F_{30\%}$	$F_{35\%}$	$F_{40\%}$
$S_{Control}$	$S_{20\%}$	$S_{20\%}$	$S_{25\%}$	$S_{30\%}$	$S_{20\%}$	$S_{25\%}$	$S_{30\%}$	$S_{20\%}$	$S_{25\%}$	$S_{30\%}$	$S_{20\%}$	$S_{25\%}$	$S_{30\%}$
$S_{F=0}$	0	0	0	0	0	0	0	0	0	0	0	0	0
S_{Fmin}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{min}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Stability *Estabilidad*	10-day cap above $S_{cont.}$	Always	Always	Always	Always	Always	Always	Always	Always	Always	Always	Always	Always
LRP (Excep. Circ. rebuild)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)	$7.7B_0$ (P<10%)
EM / *ME*													
Model type	ASPM-Rdev+												
Model / *Modelo*	Base reference 2024												
Data / *Datos*	Catch, CPUE, LF index + LL												

APPENDIX 1. Workshop Agenda

INTER-AMERICAN TROPICAL TUNA COMMISSION

5TH WORKSHOP ON MANAGEMENT STRATEGY EVALUATION (MSE) FOR TROPICAL TUNAS

La Jolla, California (USA)
30 May 2025

Tentative Agenda

1. Opening of the meeting
2. Adoption of agenda
3. Background presentations
4. Staff proposed candidate harvest strategy (response to paragraph 43 on Resolution C-24-01)
5. Discussion of the candidate harvest strategy
6. Overview of MSE process for tropical tunas at IATTC, including results of previous IATTC MSE Workshops (WSMSE-05-01)
7. Discussion on the elements to finalize the list of candidate harvest strategies to for the bigeye MSE
8. Summary of workshop outcomes
9. Other Business
10. Adjournment

APPENDIX 2. Participants list for the 5th IATTC Workshop for tropical tuna MSE

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