Overview of MSE for tropical tunas at IATTC, recap of previous MSE workshops

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5th IATTC Tropical Tuna MSE Workshop, May 30, 2025 / *5to Taller CIAT sobre EEO para atunes tropicales, mayo 30 2025*

EPO tropical tuna Management Strategy Evaluation

- Tropical Tuna Harvest Control Rules (Resolution C-16-02, Resolution C-23-06)

"…management strategy evaluation (MSE) is necessary to evaluate the HCR; and alternative HCRs should be considered that include hard and soft limit reference points, that use reference points based on biomass, and that establish well-defined scientific management recommendations"

- Workshops Terms of Reference (Resolution C-19-07)
- SAC Recs. supported staff's MSE workplan
- 5-year IATTC staff MSE Workplan (SAC-12-01)
- Intro HS workshops (2015-2019), 4 IATTC MSE workshops (2019-2025) (WSMSE-1; WSMSE-2; WSMSE-3; WSMSE-4)

Online

- 2021-2023 MSE funding from the European Union
  - Two components:
    - Consultative/dialogue process (e.g. series of MSE workshops)
    - Technical implementation of MSE

European Commission

- 2024 new permanent harvest strategy IATTC staff position, securing MSE work

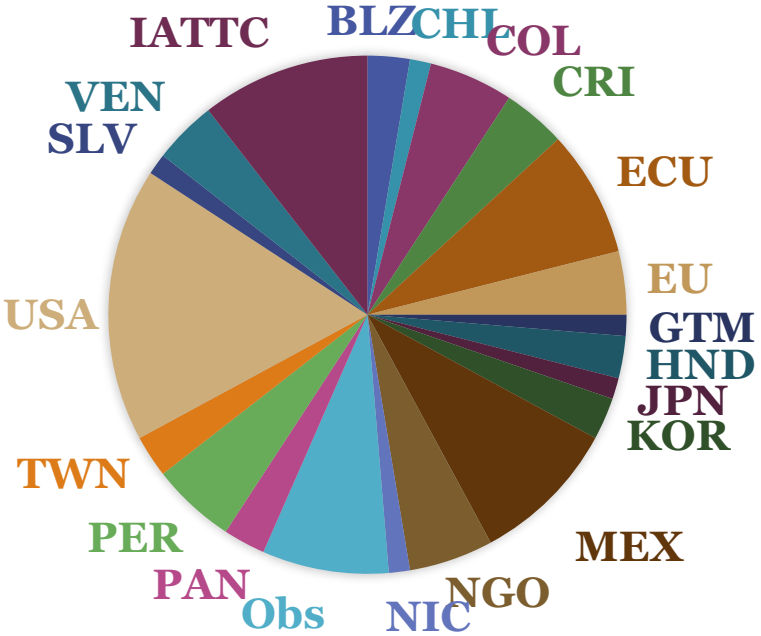
CIAT IATTC

MSE dialogue and stakeholder input

- Training and enhancing dialogue / communication among scientists, managers, and other stakeholders regarding harvest strategies and the MSE process
- Input and feedback on important elements to use in the MSE process
- Intro Harvest Strategy workshops and MSE workshops
- Requests by stakeholders for the establishment of a dedicated dialogue Working Group (WG), to enhance or replace the MSE workshops.
- 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.
- Resolution C-24-08: creation of an *ad hoc* Working Group to strengthen the dialogue among scientists, managers and other stakeholders on Management Strategy Evaluation (meeting on May 31, 2025)

3rd IATTC Tropical Tuna MSE Workshop, December 2022, participants
3er Taller CIAT sobre EEO, Diciembre 2022, participantes

80 participants / *participantes*



	1st MSE WS	2nd MSE WS	3rd MSE WS
Cooperating Non-Members	FALSE	FALSE	FALSE
	FALSE	TRUE	TRUE
	FALSE	FALSE	TRUE
	FALSE	FALSE	FALSE
	FALSE	FALSE	FALSE
Members	TRUE	TRUE	TRUE
	FALSE	TRUE	FALSE
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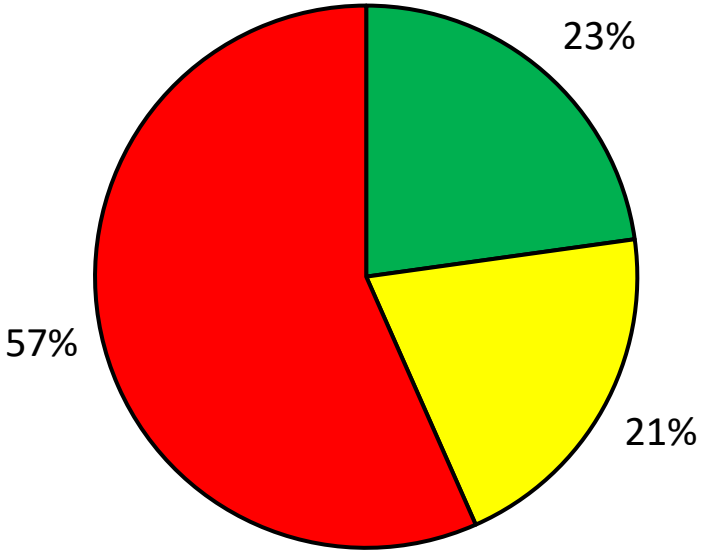
	FALSE	FALSE	FALSE
	TRUE	TRUE	TRUE
Participants	44	97	80
Members (%)	13 (62%)	15 (71%)	16 (76%)

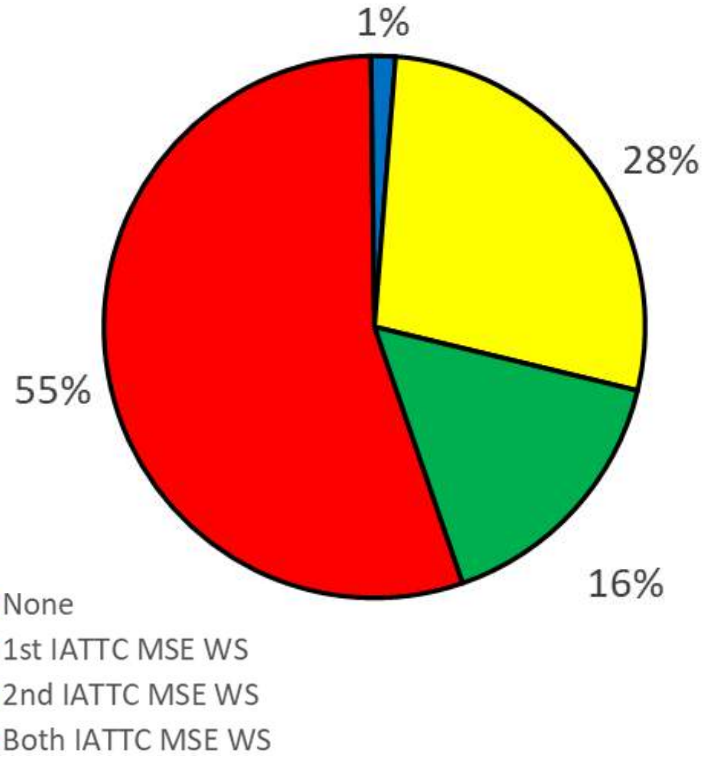
Participation in previous EPO tropical tuna MSE workshops
Participación en talleres previos de EEO de atunes tropicales en el OPO

2nd Workshop / *2do Taller*



1st IATTC MSE WS *1er Taller CIAT EEO*
Other EPO MSE WS *Otro Taller EEO en OPO*
None *Ninguno*

3rd Workshop / *3er Taller*



Objectives, quantities, performance indicators

OBJECTIVE	Quantity	Performance Indicators
Safety *Maintain stock above limit reference points*	*Equilibrium virgin spawning biomass* SB_0 • *< 10% probability SB below 7.7% of* SB_0 • *< 5% probability SB below 7.7% of* SB_0 < 10% P SB < SBmsy Flim (< 5% *P* F > Fmsy)	Ratio of SB_{yr} over SB_0 Probability calculated over projected 30 years (All years, any year by replicates)
Status Maintain stock in green quadrant of Kobe plot	SB≧ dynamic SB_{MSY} and $F<F_{MSY}$ • *60% probability* • *75% probability*	% of simulated runs falling in Kobe's green quadrant Probability calculated over projected 30 years
Stability Maintain low variability of catch and effort limits, gradual changes in management measures. Caps at 10% (effort), 15% (catch)	Standard deviation of annual catch, effort Average interannual proportional change (catch, effort)	% change in catch and/or effort between years Calculated over projected 3, 15 and 30 years
Yield/Abundance Maintain catches/effort/CPUE above historical ranges	Average catch/effort/CPUE by fishery (PS and LL) • *1994-2019 (since FAD expansion)* • *2017-2019 (latest status quo)*	Ratio of projected 3, 15 and 30-year average catch/effort/CPUE by fishery over historical period
Status quo Maintain the stock at levels near the (2017-2019) status quo	Spawning biomass, Index (LL CPUE)	Ratio of projected 3, 15 and 30-year average SB, Index (LL CPUE) over status quo period (2017-2019)

Discussed during previous IATTC MSE workshop (from WSMSE-4 RPT)

Objectives, Ref. points, Probabilities, Timelines

(Working table from WSMSE-05-01)

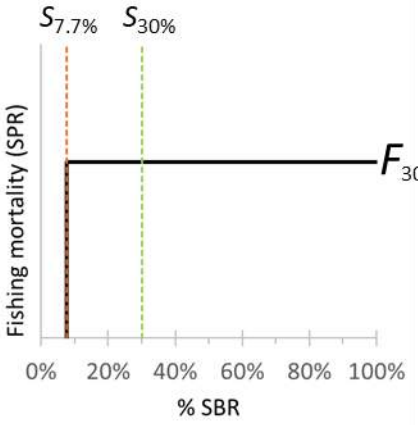
Objective from WS	Conditions	Interpreted from IATTC instruments	Workshop discussions
Safety Maintain above LRP	Define LRP(s) Define probability Define timeline Reduce *F* before LRP	*Resolution C-23-06* P(S< $S_{7.7\%}$) <= 10% P(F> $F_{7.7\%}$) <= 10%	P(S< $S_{7.7\%}$) <= 10% or 5% P(S<S_{MSY}) <= 10% 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)*

Management Model / Modelo de Ordenación

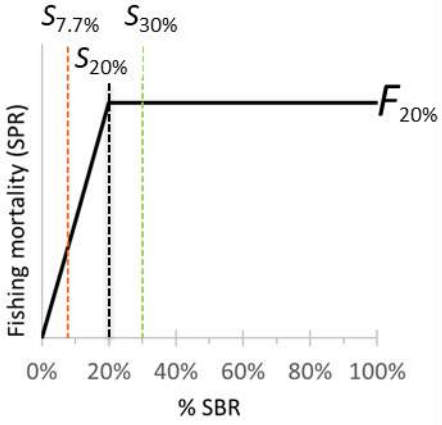
-Model-based Harvest Control Rules, based on surplus production model (ASPM-R, ASPM-R+)

-Evolving staff view on Target Reference Points for tropical tunas (SAC-15-05), from MSY-based quantities to MSY proxies ($0.3B_0$)

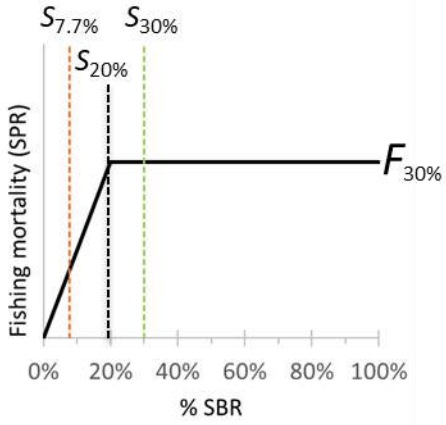
HCR 0: IATTC-like
RCE 0: similar a la CIAT



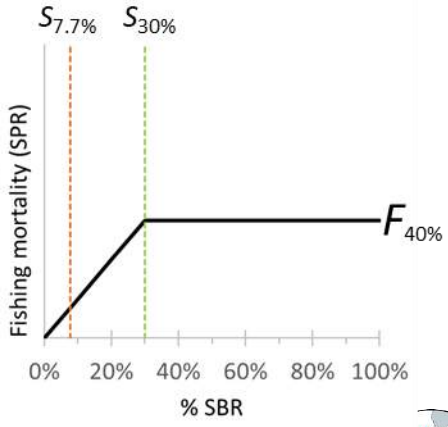
HCR 1
RCE 1



HCR 2: Moderate
RCE 2: Moderada



HCR 3: Conservative
RCE 3: Conservativa



Summarized during the 4th IATTC MSE workshop (from WSMSE-4)

Individual HS elements, harvest control rules (HCR)

(Working table from WSMSE-05-01)

Component of HCR	Staff	Workshops	Options
F_{max}	$F_{30\%}$	$F_{20\%}$, $F_{30\%}$, $F_{40\%}$, $F_{45\%}$, F_{MSY}	
$S_{control}$	$S_{20\%}$	$S_{7.7\%}$, $S_{20\%}$, $S_{30\%}$, $S_{40\%}$, S_{MSY}	
$S_{F=0}$	0		
S_{fmin}	NA		
F_{min}	NA		
EM	ASPM-Rdev+ Base reference 2024 / Gear-aggregated SAM		

Candidate HS: combining HS elements, HCR, EM, Data

(Working table from WSMSE-05-01)

Component of HCR	Staff	Candidate 1	Candidate 2	Candidate 3	Candidate 4	Candidate 5	Candidate...
F_{max}	$F_{30\%}$						
$S_{Control}$	$S_{20\%}$						
$S_{F=0}$	0						
S_{Fmin}	NA						
F_{min}	NA						
EM							
Model type	ASPM-Rdev+						
Model	Base reference 2024						
Data	Catch, CPUE, LF index + LL						

Challenges / *Desafíos*

- **COVID-19 pandemic** / *Pandemia de COVID-19*

  Limitations of virtual workshops, changes to workplan timeline

  Inhabilidad de tener talleres en persona, cambios en el cronograma de trabajo

- **Limited-representation** by some CPCs, high turnover of representatives

  Representación limitada de algunas CPCs, alto recambio de representantes

- Multiple extraordinary meetings during 2020-2021

  Múltiples reuniones extraordinaries durante 2020-2021

- Some challenges expected to ameliorate/*Algunos desafíos se espera que mejoren*
  - End of COVID pandemic
  - Full time harvest strategies position at staff since January 2024
  - 2024 BET assessment resolved structural issues of previous BET assessments, new OMs to update MSE should result in a better strategy being selected
  - Resolution C-24-08: *ad hoc* Working Group on MSE (May 31, 2025)

IATTC BET MSE focus of work at the onset

- Recent large changes in the modeling of BET in the EPO
  - 2020 benchmark BET assessment issues (bimodal results, recruitment shift)
  - Review of data and modelling for tropical tuna assessments (Oct-Nov 2023)
  - Substantial changes and improvements on modelling for BET assessment (2024)
- Revisiting Tropical Tuna reference points (SAC-15-05)
- Staff proposed candidate harvest strategy for BET (SAC-16-06)
- Continue technical work on BET MSE
  - Incorporate stakeholder feedback between preliminary runs and final runs
- Finalize BET MSE and plan to present results during 2025 / 2026
- Move onto the other tropical tuna MSE

Beyond bigeye tuna MSE

- EPO tropical tuna fisheries have multispecies (BET, YFT, SKJ), multi-gear (PS, LL) and fishing modes (FAD, Dolphin, NOA) present several challenges:
  - More difficult to simulate and evaluate
  - Different objectives for different fisheries?
  - Weak-stock management? Or 3 species individually? or two species?
- Very few truly multispecies MSEs in the world, focus on gear interactions
- Need to plan, part of the next 5-year IATTC Scientific Strategic plan (SAC-16-07)

	Species	2026	2027	2028	2029	2030
Stock Assessments	BET	Update	Benchmark			Benchmark
	YFT		Update		Benchmark	
	SKJ			Exploratory	Benchmark	
MSE	BET	Finalize				
	YFT	Start		Finalize		
	SKJ				Start	Finalize

Harvest strategy Chronogram for EPO tropical tunas

(WSMSE-05-01)

	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.

Questions? / ¿Preguntas?