Comisión Interamericana del Atún Tropical
Inter-American Tropical Tuna Commission

CIAT
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Discusión sobre Objetivos de Manejo y Métricas de Desempeño

1er Taller CIAT sobre EEO de atunes tropicales, San Diego, California (USA), 9-10 de Diciembre, 2019

Objetivos de ordenación

- Describen de manera explícita, específica e inequívoca los objetivos
  - Sociales (e.g. empleo, acceso a alimentos)
  - Económicos (e.g. rentabilidad)
  - Biológicos (e.g. riesgo de colapso)
  - Ecosistema (e.g. bycatch, diversidad)
  - Políticos (e.g. distribución oportunidades de pesca)

Métricas de desempeño

"I want it all, and I want it now…"

Freddie Mercury

- Captura total a largo plazo
- Captura promedio a largo plazo
- Variabilidad en capturas a largo plazo
- Variabilidad en capturas a corto plazo

- CPUE promedio a largo plazo
- Esfuerzo (días de pesca) promedio a largo plazo

- Probabilidad de caer bajo de puntos de referencia
- Probabilidad de recuperación de stock

- Muchos más!

Compromisos *(Tradeoffs)*

"You can't always get what you want…"

Mick Jagger

- Captura a largo plazo & CPUE a largo plazo
- Captura a largo plazo & *Prob.* bajo puntos de referencia
- Captura a largo plazo & Captura a corto plazo
- CPUE a largo plazo & variabilidad anual en capturas
- Esfuerzo a largo plazo & *P* recuperación del stock

Riesgo

- Medidas de riesgo
  - Probabilidad de sobrepesca
  - Probabilidad de colapso (económico o biológico)
  - Probabilidad de clausuras temporales o espaciales

- Tipos de comportamiento al riesgo
  - Aversión (tendencia a evitar riesgo)
  - Propenso (tendencia a preferir riesgo)
  - Neutro (indiferente al riesgo)

Tipos de Objetivos de Ordenación

- **Estado:** Maximizar la probabilidad de mantener poblaciones en la zona verde de la grafica de Kobe (e.g., sin estar en sobrepesca ni sobre pescando).
- **Seguridad:** Minimizar la probabilidad que la población caiga debajo del punto de referencia limite de biomasa B_{LIM}.
- **Rendimiento:** Maximizar captura (o esfuerzo) a través de regiones y/o artes de pesca/pesquerías.
- **Abundancia:** Maximizar tasas de captura para incrementar rentabilidad.
- **Estabilidad:** Maximizar estabilidad en capturas para reducir incertidumbre comercial minimizando variabilidad en capturas entre años.

Indian Ocean Tuna Commission, “Report of the 2nd IOTC Management Procedure Dialogue” (April 2015)

Tipos de Objetivos de Ordenación

Table 1. Performance statistics suggested for the evaluation of management procedures.

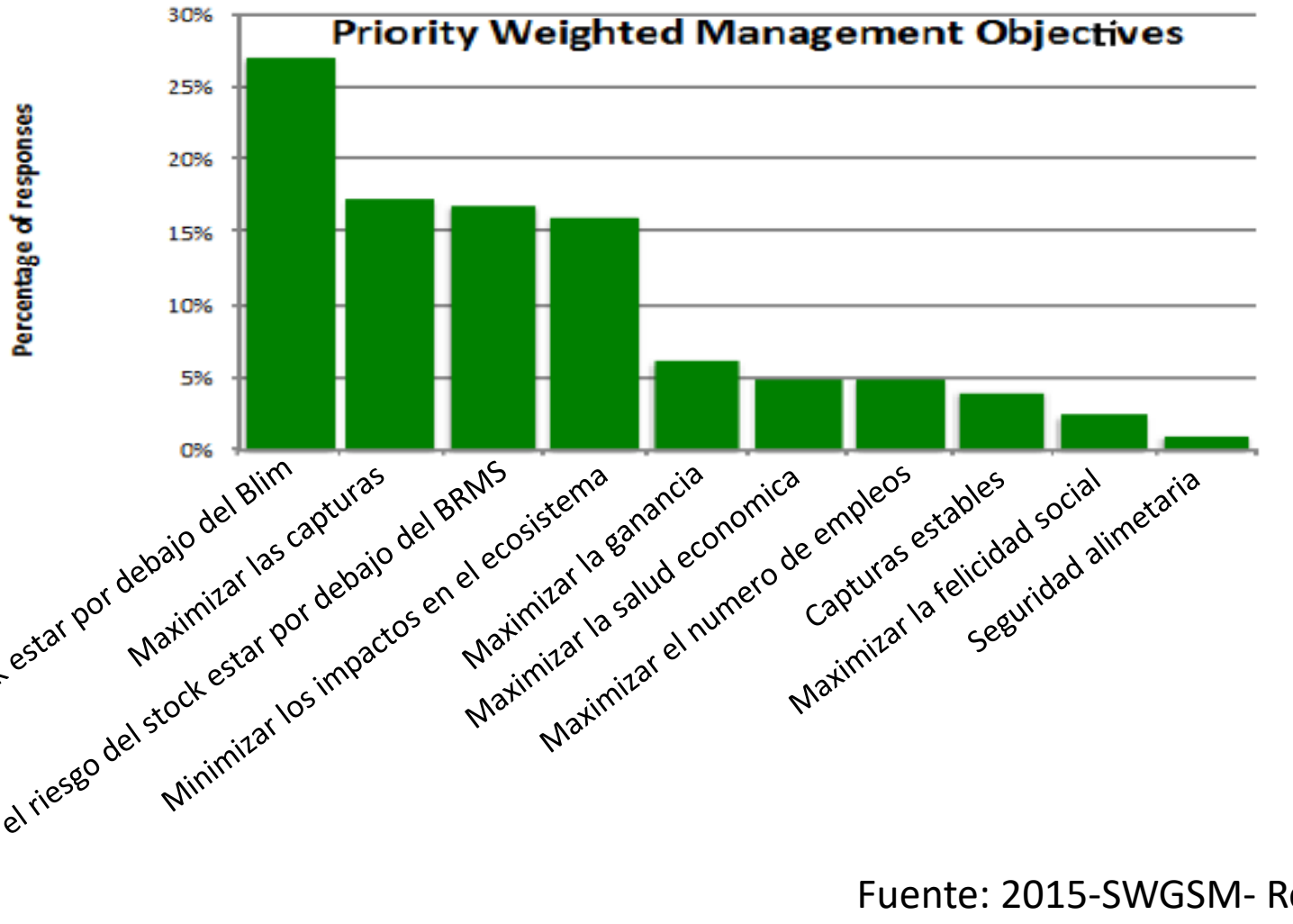
Management objective and associated performance statistics	Performance measure/s	Summary statistic
Status : maximize probability of maintaining stock in the Kobe green zone		
Mean spawner biomass relative to unfished	$B/B0$	Geometric mean over years
Minimum spawner biomass relative to unfished	$B/B0$	Minimum over years
Mean spawner biomass relative to *Bmsy*	$B/Bmsy$	Geometric mean over years
Mean fishing mortality relative to target	$F/Ftar$	Geometric mean over years
Mean fishing mortality relative to *Fmsy*	$F/Fmsy$	Geometric mean over years
Probability of being in Kobe green quadrant	B,F	Proportion of years that $B \geq Btar \& F \leq Ftar$
Probability of being in Kobe red quadrant	B,F	Proportion of years that $B < Btar \& F > Ftar$
Safety : maximize the probability of the stock remaining above the biomass limit		
Probability that spawner biomass is above 20% of $B0$	B	Proportion of years that $B > 0.2B0$
Yield : maximize catches across regions and gears		
Mean catch	C	Mean over years
Mean catch by region and/or gear	C	Mean over years
Abundance: maximize catch rates to enhance fishery profitability		
Mean catch rates by region and gear	A	Geometric mean over years
Stability: maximize stability in catches to reduce commercial uncertainty		
Mean absolute proportional change (MAPC) in catch	C	Mean over years of $\text{abs}(C_t/C_{t-1}-1)$
Variance in catch	C	Variance over years
Probability of shutdown	C	Proportion of years that $C=0$

Indian Ocean Tuna Commission, “Report of the 2nd IOTC Management Procedure Dialogue” (April 2015)

Ejemplos de otros objetivos (CICCA – ICCAT)

- En questionario respondido anonimamente durante la segunda reunion del *Standing Working Group to Enhance Dialogue Between Fisheries Scientist and Managers* de la CICCA (ICCAT) los participantes apuntaron los siguientes objetivos:

"Liste uno o mas objetivos importantes para Ud."



Fuente: 2015-SWGSM- Report

Objetivos de manejo para NP albacore MSE

OBJETIVO	Cantidad	Métrica de desempeño	Ejemplo de resultado
1. Maintain spawning biomass above the limit reference point	• $20\%SSB_{CURRENT, F=0}$ • $14\%SSB_{CURRENT, F=0}$ (calculated as (1-M)*SSB20%) • $SSB_{0.5R0}$, where h = 0.75 (IATTC)	• SSB for each projected year / SSB-based LRP	• % of runs in which ratio ≥1 for 29/30, 27/30, 24/30; • Each run = 30 years
2. Maintain total biomass, with reasonable variability, around historical average depletion of total biomass	• Historical depletion is estimated as the depletion level of total biomass for 2006-2015	• Depletion of projected total biomass over 30 yrs /minimum historical depletion of total biomass (min. of 2006 - 2015)	• % of runs in which ratio ≥1 for 29/30, 27/30, 24/30; • Each run = 30 years
3. Maintain harvest ratios by fishery (fraction of fishing impact with respect to SSB) at historical average	• Historical harvest ratio by fishery estimated as the average of 2006 – 2015 • Historical variability in harvest ratio estimated from 2006 – 2015	• Harvest ratio (H) by fishery (i) for each year is calculated as $(1-SPR_i)/1-SPR_{total}$ • Projected harvest ratio by fishery over 30 yrs >= minimum historical harvest ratio by fishery (minimum of 2006 - 2015) and <= max. hist. harvest ratio by fishery (maximum of 2006 - 2015)	• % of runs within minimum and maximum for 29/30, 27/30, 24/30; • Each run = 30 years

Objetivos de manejo para NP albacore MSE

OBJETIVO	Cantidad	Métrica de desempeño	Ejemplo de resultado
4. Maintain catches by fishery above average historical catch	• Average catch by fishery over the 30 year period, 1981-2010.	• Total catch of each projected year / average total historical catch (1981 – 2010) • Catch by fishery of each projected year / average historical catch of the fishery (1981 – 2010) • Projected catch by fisheries over 30 yrs /lower 25% of historical catch (1981 - 2010) • Projected catch by fisheries over 30 yrs /upper 25% of historical catch (1981 - 2010)	• % of runs in which ratio ≥1 for 29/30, 27/30, 22/30, 15/30; • Each run = 30 years;
5. If a change in total allowable effort and/or total allowable catch occurs, the rate of change should be relatively gradual		• % change in TAE and/or TAC between years (separate increases vs decreases)	• Median ± 5 and 95% percentiles of maximum % change in TAE and/or TAC for all years over all runs • Median ± 5 and 95% percentiles of % of projected years where change (0-15%, 15-30%, >30%) in TAE and/or TAC for all years over all runs

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Objetivos de manejo para NP albacore MSE

OBJETIVO	Cantidad	Métrica de desempeño	Ejemplo de resultado
6. Maintain F at the target value with reasonable variability	• Various potential target values previously suggested by NC	• F-ratio-target = F-based TRP/ F of each projected year	• Median ± 5 and 95% percentiles of median of F-ratio-target over all runs • Median ± 5 and 95% percentiles of 10%, 95% of F-ratio-target over all runs
7. Maximize economic returns of existing fisheries (FUTURE WORK)			
8. Maintain interests of artisanal, subsistence and small-scale fishers, including limiting the regulatory impact on these fisheries (FUTURE WORK)			

Objetivos de Ordenación: N. Albacore (ICCAT)

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

1. The management objective for northern albacore stock is

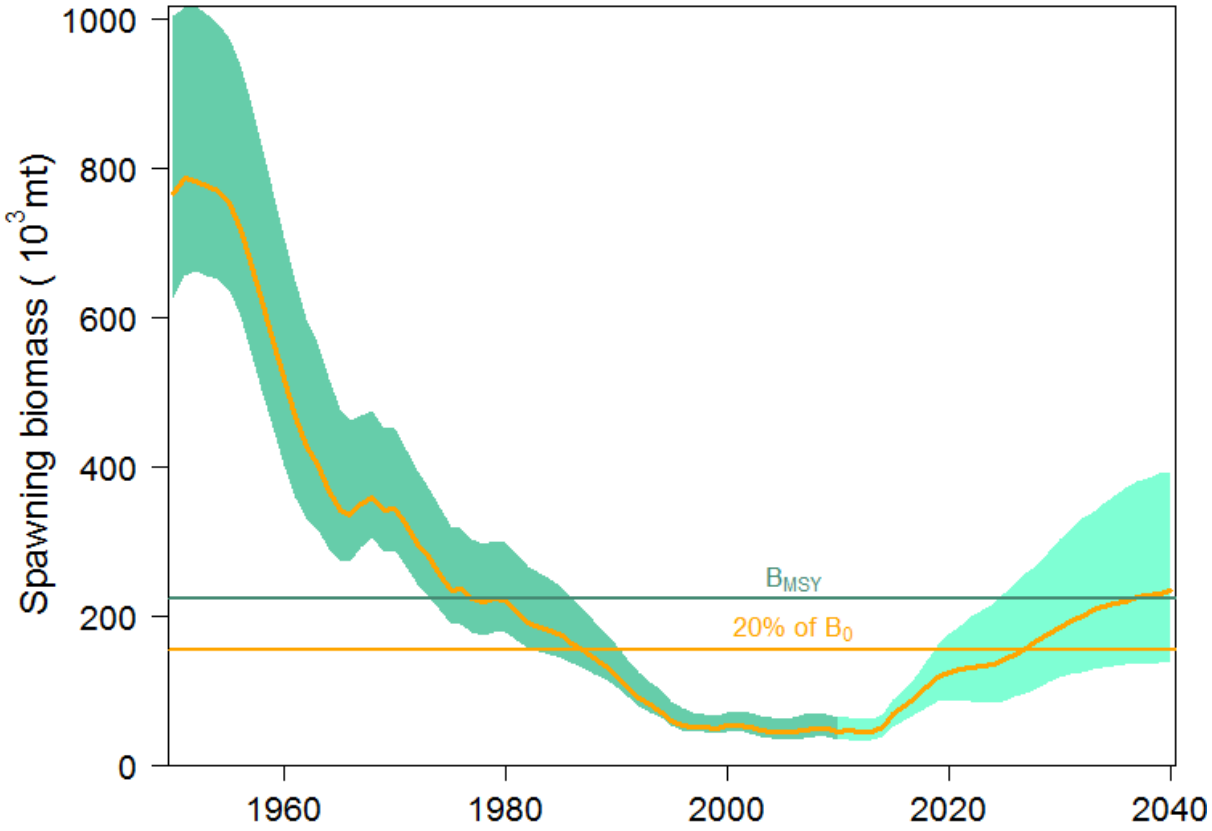
   a) to maintain the stock in the green zone of the Kobe plot, with at least a 60% probability, while maximizing long-term yield from the fishery, and

   b) where the spawning stock biomass (SSB) has been assessed by the SCRS as below the level capable of producing MSY (SSBMSY), to rebuild SSB to or above SSBMSY, 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.

https://www.iccat.int/Documents/Meetings/Docs/2016_PA2_Report_ENG.pdf

Objetivos de Ordenacion: Atun aleta azul del Sur (CCSBT)

- To rebuild the stock to an interim target of 20% B_0 by 2035, with a 70% probability
- Reduce inter-annual variability in TACs
  - set TAC in blocks of 3 years
  - limit TAC changes to 3000 tonnes



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¿Preguntas?