A SIMPLE CANDIDATE MANAGEMENT PROCEDURE USING INDEX OF JAPANESE LONGLINE INDICES

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SUMMARY

This paper presents a candidate MP for ABT only using the indices of Japanese longline in each area. The simple MP makes it easy not only to obtain the indices sustainably but also promotes understanding of managers and stakeholders. This paper presents results of the candidate MP tuned to the target discussed by Panel 2 meeting in March 2022 which were calculated by R package "ABTMSE" ver. 7.5.0.

RÉSUMÉ

Ce document présente une possible procédure de gestion (MP) pour l'ABT en utilisant uniquement les indices de la palangre japonaise dans chaque zone. La simplicité de la MP permet non seulement d'obtenir facilement les indices de manière durable, mais aussi de favoriser la compréhension des gestionnaires et des parties prenantes. Ce document présente les résultats de la possible MP calibrée à la cible discutée lors de la réunion de la Sous-commission 2 en mars 2022 et calculée par le paquet R "ABTMSE" ver. 7.5.0.

RESUMEN

Este documento presenta un MP candidato para el atún rojo del Atlántico utilizando solo índices del palangre japonés en cada zona. El MP simple hace más fácil no solo obtener los índices de forma sostenible, sino que también fomenta la comprensión entre los gestores y las partes interesadas. Este documento presenta los resultados del MP candidato calibrado con el objetivo discutido por la Subcomisión 2 en la reunión de marzo de 2022 que se calcularon con el paquete R 'ABTMSE' ver. 7.5.0.

KEYWORDS

Management strategy evaluation,
Candidate management procedure, Japanese longline

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1. Introduction

Management strategy evaluation (MSE) is widely considered to be the most appropriate way to evaluate the trade-offs achieved by alternative management strategies and to assess the consequences of uncertainty for achieving management goals (Punt *et al.* 2014). The MSE for Atlantic bluefin tuna (ABT) is now under the development by SCRS (Rec [15-07], Anon 2019). The management procedure (MP) involves assessing the consequences of alternative options for management actions, for example determination of total allowable catch (TAC) (Rademeyer *et al.* 2007).

This paper presents a candidate MP for ABT which is simple and empirical. The simple and empirical MP makes it easy not only to obtain the indices sustainably but also promotes the understanding of managers and stakeholders. This paper presents results of the candidate MP tuned to the target discussed by Panel 2 meeting in March 2022 which were calculated by R package "ABTMSE" ver. 7.5.0.

2. Material and Method

For candidate MP developers of MSE for ABT, there are 8 candidate indices suggested, while we use the only Japanese longline indices for respective area because these indices are one of the reliable information on the bluefin stock assessment so far. In addition to the reliability, one of the key features of a sustainable MP is the ease and continuity of data collection, therefore we believe that fishery dependent index should be the primal index in future MP of ABT. If the performance of MPs with and without fishery independent survey are similar, one without fishery independent survey has a cost advantage.

There are the 4 tuning parameter for this candidate MP as below.

k_1_E: adjustment value for increase of TAC in eastern Atlantic
k_2_E: adjustment value for decrease of TAC in eastern Atlantic
k_1_W: adjustment value for increase of TAC in western Atlantic
k_2_W: adjustment value for decrease of TAC in western Atlantic

For the sake of simplicity, the formulation is described without suffix of area in the index and the tuning parameter. The respective index rate for JPN_LL_West2 and JPN_LL_NEAtl2 are calculated by bellow:

$$Index\ rate = \frac{mean(Index[y{-}2{:}y{-}4])}{mean(Index[y{-}5{:}y{-}7])} \tag{1}$$

then New TAC is calculated by the trend of index. When index shows increase trend, which mean index rate are 1 and over, new TAC is calculated by below:

$$New\ TAC = Current\ TAC * \min(\{1 + max\ change\ rate\ of\ TAC\}, \{1 + (Index\ ratio - 1) * k_1\}\ ))$$

On the other hand, when index shows decrease trend, which mean index rate is less than 1, new TAC is calculated by below:

$$New\ TAC = Current\ TAC * \max\left(\{1 - max\ change\ rate\ of\ TAC\}, \left\{1 - \frac{(1 - Index\ ratio))}{k_2}\right\}\right))$$

When k_1 is set to higher than 1, the increase of TAC become bigger than multiplication by original index rate, and vice versa. When k_2 is set to higher than 1, the decrease of TAC become smaller than original multiplication by original index rate. Therefore, higher values of parameters on both, k_1 and k_2, lead to more aggressive CMPs, while lower values of parameters make CMP precautionary. There is a possibility to have negative TAC value when adjustment with small k_2 value, although maximum change rate of TAC prevents TAC from getting the negative values.

Result

We conduct the tuning for target 2 (i.e., Br30 in West: 1.25, BR30 in East 1.50) with the maximum ratio of TAC change either for 20 % increase or 30% decrease. The detailed results for those will be included in the ABTMSE shiny app. The values of parameter for both CMP is in **Table 1**.

Reference

Anon. 2019, Report of the 2018 ICCAT Bluefin Tuna Species Group MSE intersessional meeting, Collect. Vol. Sci. Pap. ICCAT, 75(6), 1056-1159.

Punt, A. E., Butterworth, D. S., Moor, C. L., Oliveira, J. A. A., Haddon, M., 2016, Management strategy evaluation: best practices, fish and fisheries, 17, 303-334.

Rademeyer, R. A., Plaganyi, E. E., Butterworth, D. S., 2007, Tips and Tricks in designing management procedures, ICES Journal of Marine Science, 64(4), 618-625.

Table 1. The parameter values and derived values of Br 30 came from each CMP.

CMP	k_1_E	k_2_E	k_1_W	k_2_W	Br30 E	Br30 E
TN2a	0.52	1.05	1.12	1.11	1.25	1.55