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Meta-rules: consideration of exceptional circumstances in 2018

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Contents

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Abstract

The annual review of the CCSBT Management Procedure (MP) input data series, and stock and fishery indicators is intended to identify conditions and/or circumstances that may represent a substantial departure from conditions against which the MP was tested, termed “exceptional circumstances”, and where appropriate recommend the required action. In 2018, the ESC will review MP implementation in the context of the TAC set for 2019 which was recommended at the 2016 meeting of the ESC.

Issues identified in 2018 include: 1) changes in estimates of the population dynamics and productivity of the stock identified in 2017 through the updated stock assessment; 2) the unresolved shift in size distribution towards small fish in the Indonesian spawning ground fishery since 2013; 3) the potential for total catches (members and non-members) to be greater than the TAC (either annually or over the 3 year quota block), and 4) the planned absence of the index of recruitment from the scientific aerial survey in 2018. These issues, and their cumulative impacts, will need to be considered by the ESC and principles and process for action agreed, if required.

The meta-rules provide a safety-net around the MP TAC recommendations for circumstances or events not included in the MSE testing phase and will continue to be an essential component of MP development and implementation.

1 Introduction

The meta-rules for the CCSBT Management Procedure (MP) include: an annual review of the input monitoring series for the MP, and fishery and stock indicators; periodic assessments of the status of the stock via reconditioned operating models (3 year intervals); and an in-depth review of the MP performance (6 years intervals). The meta-rules are used to determine whether there is evidence for exceptional circumstances at each of these stages and decide what, if any, action should be taken to deviate from the TAC recommended by the MP (Attachment 10 of the 2013 ESC report (Anon, 2013)). 'Exceptional circumstances' are, conditions and/or circumstances that may represent a substantial departure from which the MP was tested.

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Issues of identified in 2018 include: 1) changes in estimates of the population dynamics and productivity of the stock identified in 2017 through the updated stock assessment; 2) the unresolved shift in size distribution towards small fish in the Indonesian spawning ground fishery since 2013; 3) the potential for total catches (members and non-members) to be greater than the TAC (either annually or over the 3 year quota block), and 4) the planned absence of the index of recruitment from the scientific aerial survey in 2018. These issues will need to be considered by the ESC and principles and process for action agreed, if required.

These issues also have potential impacts on re-conditioning operating models and associated work on the development of a new MP. Additional exceptional circumstances may be identified at the ESC following review of stock and fisheries indicators.

2 Meta-rules and exceptional circumstances

The SBT meta-rules include a process for identifying exceptional circumstances. Exceptional circumstances are events, or observations, that are outside the range for which the CCSBT MP was tested and, therefore, indicate that application of the total allowable catch (TAC) generated by the management procedure (MP) may be highly risky, or highly inappropriate.

The exceptional circumstances process under the meta-rules involves the following three steps:

1. Determining whether exceptional circumstances exist;

2. A "process for action" that examines the severity (and implications) of the exceptional circumstances for the operation of the MP, and the types of actions that may be considered;

3. "Principles for action" that determine how recommendations from the MP might be altered, if at all, based on the most recent reconditioning of the Operating Model (OM).

The meta-rules process as adopted by CCSBT can be found at Attachment 10 of the 2013 ESC report (Anon, 2013).

The meta-rules process for review of implementation of the MP TAC decisions is a central component of the implementation and review of the MP. The consideration of exceptional circumstances has identified issues that the Commission or ESC have subsequently responded to, where required, e.g. action on accounting for all sources of mortality and dealing with missing data. The meta-rules provide a safety-net around the MP TAC recommendations and will continue to be an essential component of the new MP being developed.

3 Exceptional circumstances in 2018 and potential severity for MP implementation

The following items may represent exceptional circumstances:

1) changes in estimates of the population dynamics and productivity of the stock, identified in 2017;
2) the unresolved shift in size distribution towards small fish in the Indonesian spawning ground fishery since 2013;
3) potential for fishing mortality (from members and non-members) to be greater than the TAC recommended by the MP;
4) the pre-arranged absence of aerial survey data for 2018.

The first three were reviewed at the 2017 ESC (Preece et al., 2017; Anon, 2017), and are only briefly addressed again here. The fourth item is new in 2018.

In considering the potential for exceptional circumstances arising from these issues, we examine whether: 1) the inputs to the MP are affected, 2) the population dynamics are potentially significantly different from those for which the MP was tested (as defined by the 2011 Reference and Robustness sets of OMs), 3) the fishery or fishing operations have changed substantially, 4) total removals are greater than the MP's recommended TACs, and 5) if there are likely to be impacts on the performance of the SBT rebuilding plan as a result.

The events are considered individually, however, the implications of the combination of events for the performance of the MP and the ability of the ESC to provide robust advice on the status and trends of the stock should also be considered. Further exceptional circumstances may also be identified at the ESC's annual review of stock and fishery indicators.

3.1 Changes in population dynamics and productivity of the stock

The 2017 stock assessment (Hillary et al., 2017) indicated that there were substantial differences in the rebuilding timeframe and estimates of stock productivity from the 2011 operating model results used to test and tune the current MP. The most recent years showed an improvement in stock status (relative depletion) and potential for much earlier rebuilding to the interim target (70% probability of rebuilding to 20%B_0 by 2035) than previously anticipated. Sensitivity tests identified that recent high aerial survey results (2014 and 2016) were the most influential factors in the change in population dynamics.

The 2017 ESC reviewed this potential exceptional circumstance through the meta-rules process, and noted that:

1. Changes to the operating model do not affect the operation of the MP;
2. The operating model changes are positive and lead to earlier rebuilding, even when the 2016 Aerial Survey data are excluded in sensitivity tests (Hillary et al., 2017);

3. The TAC increase recommended by the MP for the 2018-20 quota block was driven by the sustained positive trend in CPUE, with the aerial survey index having a relatively minor influence (Anon, 2016).

The 2017 ESC concluded there was no reason to modify the 2018 TAC recommendation. We suggest that this reasoning also applies to the 2019 TAC. These changes in population dynamics and productivity will affect management strategy evaluation of candidate MPs. The operating models will be reconditioned in 2019 for further testing of candidate management procedures.

3.2 Potential changes in the Indonesian fishery selectivity

Since 2013, unusually large numbers of small fish have been recorded in the Indonesian catch monitoring data from Benoa, Bali (see Sulistyaningsih et al., 2018). It has not been possible to determine whether these fish were caught on or off the spawning ground, and/or whether these data indicate a substantial shift in the selectivity of the Indonesian fishery. Although this is a priority issue for the ESC, it remains unresolved.

The potential shift in selectivity does not affect the data inputs to the MP, but may indicate changes in the operation of the Indonesian fishery that were not included in the OMs used at the time of testing the MP. We recommend that the advice from the 2015-17 ESCs regarding this issue remain the same: the potential change in selectivity is of concern but the immediate implications for the operation of the MP are insufficient on their own to constitute a basis for recommending modification to the MP TAC. The previously recommended need for action to resolve this uncertainty should be urgently pursued by the CCSBT and Indonesia so that the shift may be addressed in the next reconditioning of the operating models in 2019 for management strategy evaluation of candidate MPs.

3.3 Total fishing mortalities exceeding the TAC

The design and simulation testing of the current MP assumed that all removals from the stock were accounted for, i.e. the implementation of the TAC was exact. Additional unaccounted mortality by members and non-members has the potential to undermine the MP-based rebuilding strategy of the Commission. Sensitivity tests, using the reconditioned models for the 2017 stock assessment and an additional catch scenario (UAM1) developed in 2014 (Anon, 2014), indicated that additional catches would impact rebuilding of the stock but the target would still likely be met (given the optimistic population dynamics in the 2017 reconditioning). The agreements at previous ESC meetings were that if these unaccounted catches are occurring they would trigger exceptional circumstances. The 2017 ESC agreed that the scenario was still considered plausible (Anon, 2017).

Accounting for sources of additional mortalities by members has progressed, with the Extended Commission defining a common definition for member's "attributable catch". Members will account for all sources of mortality, as defined by the Commission, within their TAC from 2018 onwards and report on their attributable catches to the ESC and Compliance Committee. If the catch quantities to be attributed to total catch by members do not account for their total fishing mortality, then the potential for impact on the rebuilding plan for SBT will remain.

Non-member catches are difficult to quantify (Anon, 2017; Edwards et al., 2016). The Commission has deducted 306t from the annual TAC available for allocation to members for the 2018-2020 TAC block. This 'direct approach' aims to mitigate impact of unaccounted fishing mortality on performance of the MP while a new MP is being developed that is designed to be more robust to these uncertainties. The ESC has agreed that unaccounted mortality estimates will be included in the base set of operating models used for testing and tuning candidate MPs. This mechanism is intended to improve the robustness of the new MP to uncertainty in total mortality and, ideally, avoid the triggering of exceptional circumstances from this uncertainty in the future.

Absence of aerial survey data

The aerial survey was discontinued after completion of the 2017 survey. This was a planned cessation, agreed by the Commission in 2016. Members recognised the risks involved in foregoing future aerial survey results (Anon, 2016), and that this cessation would mean that a new recruitment monitoring program and management procedure would need to be developed.

The gene-tagging program was adopted as the replacement recruitment monitoring program, starting with the pilot study in 2016. The first abundance estimate (age 2 cohort in 2016) from the pilot gene-tagging program was provided in 2018. The gene-tagging and aerial survey abundance estimates are not directly comparable but do in-part overlap. The absolute abundance of the age 2 cohort in 2016 directly estimated by the pilot gene-tagging program would have been included in the 2016 and 2017 aerial survey relative abundance estimates of age 2, 3 and 4 year old fish (i.e., the 2-year old component in 2016 and 3-year old component in 2017).

In the context of the 2019 recommended TAC and exceptional circumstance advice, the absence of the aerial survey index in 2018 means that there is no information on whether the aerial survey index would have been inside or outside the bounds of the trajectories from the operating models used when testing and tuning the MP adopted in 2011. To examine the potential impact of this exceptional circumstance, we can look at recent information on recruitment to examine whether there is currently an increased risk of low recruitments and impact on the rebuilding plan, and whether there will be replacement recruitment data in the near future from the gene-tagging recruitment monitoring program. The key points on recent recruitment are: 1) the recent 3 points in the aerial survey index (2014, 2016-17) are substantially higher than the long term average of the series; 2) there in an increasing trend in stock assessment recruitment estimates since 2002; 3) the gene-tagging program has been established and the pilot project has delivered an estimate of abundance; and 4) the first abundance estimate from the pilot gene-tagging program is similar to recent recruitment estimates in the 2017 stock assessment. These 4 positive outcomes suggest that no action is needed on the TAC recommended for 2019 in light of the absence of the 2018 aerial survey data.

4 Conclusions

Through the meta-rules process we have examined changes in the (most likely) population dynamics since the MP was adopted in 2011, the potential shift in selectivity in the Indonesian fishery, the potential for fishing mortality to be greater than the TAC, and impact on MP implementation from the absence of the aerial survey data. The impacts of these issues have been considered in the context of the 2019 TAC (recommended in 2016).

The change in the estimates of the population dynamics in the reconditioned operating models does not affect running of the MP or the 2019 TAC recommendation.

The Indonesian selectivity change remains unresolved. Similarly, this does not directly impact on the running of the MP or TAC advice, but this issue will need to be addressed for reconditioning operating models in 2018 for management strategy evaluation of candidate MPs. As such it should remain a priority for CCSBT and Indonesia to resolve, particularly as this issue potentially impacts on the close-kin data collection into the future.

The potential for total catches to be greater than the TAC remains a concern. Action has been taken by the Commission so that members will need to account for their attributable catches from 2018 onwards, and an allowance for non-cooperating non-member catches has been made in the 2018-2020 TAC block.

The absence of aerial survey data in 2018 technically triggers exceptional circumstances, however, it is mitigated by the recent levels of higher recruitment and development of a replacement recruitment monitoring program which has provided a first abundance estimate for use in candidate MPs (Preece et al., 2018).

No change is recommended for the 2019 TAC. However, these potential exceptional circumstances have been considered in isolation from one another, and the ESC may wish to consider the risk that cumulative impacts could impose on performance of the MP and the ability of the ESC to provide robust advice on stock status.

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