Consideration of meta-rules for implementation of a Management Procedure for Southern Bluefin Tuna

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Prepared for the 15th Meeting of the Extended Scientific Committee
4-11 September 2010, Taipei, Taiwan

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CCSBT-ESC/1009/12

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ABSTRACT

This paper is in response to the request from the Third Operating Model and Management Procedure Technical Meeting (June 2010) to provide papers on meta-rules for this ESC meeting. We take as a starting point the meta-rule framework developed for the previous MP (Attachments 8 and 9 to the Report of the MPWS4) and consider refinements that are particular to the current OM, robustness trials and MPs.

1. Introduction

This paper provides a scientific discussion of metarules and related implementation issues in response to a request from the 3rd Operating Model and Management Procedure (OMMP) meeting for papers to be submitted to the Extended Scientific Committee (ESC) on this subject. More detailed consideration of other issues associated with the implementation of a management procedure (MP) is provided in CCSBT-ESC/1009/13.

This paper focuses on the circumstances for which meta-rules are likely to be required and identification of classes of exceptional circumstances that would invoke a meta-rule. It draws directly on the previous work done by the ESC as part of the earlier MP development and selection process (CCSBT-MP/0505/05, Anon 2005 a and b). The issues raised and approach developed and agreed as part of that earlier MP process remain relevant to the ESC considerations of meta-rules and exceptional circumstances for the current MP selection process. An important element of this is that the meta-rules and associated exceptional circumstances form an integral part of the MP implementation framework and should be agreed and documented as part of the final MP selection and recommendation to the Commission.

2. Metarules of scientific relevance

Meta-rules, in the context of the implementation of an MP, can be thought of as pre-agreed "rules and procedures" that specify what should happen if and when unexpected, "exceptional circumstances" arise during the implementation of an MP.

Exception circumstances are generally defined in the context of being outside the range of uncertainty and/or the operational context for the fishery in which the MP testing was conducted. These may be very specific, for example, the historical range of observations of actual CPUE or aerial survey data, or more general, for example, "substantial changes in the operation of one or more of the fishing fleets".

Another important aspect of MP implementation where meta-rules are important is in formalising the monitoring and review of MP performance over the medium to long term (5-10 yrs). It will be important for the CCSBT to periodically review whether there have been such substantial unforeseen changes in the fishery or the information available to warrant, for example, reconditioning and/or retuning of the chosen decision rule (the term decision rule, DR, is used here for the rule which generates a TAC from the data) and timing and procedures for such a review.

It should, however, be noted that frequent changes to a DR, are not desirable because this can undermine the advantages of implementation of a tested MP over ad-hoc decision-making. Frequent changes to a DR can lead to actual performance being very different from that assessed during evaluation. It is therefore desirable to implement the results of the MP as the default 'action' and only make changes when necessary and in the context of well defined exceptional circumstances and meta-rules. The relatively slow dynamics of the SBT stock and the information content of one additional year's data, as seen in the historical data, suggest that changes are likely only to make sense in a multi-annual framework (i.e. every several years, not annually).

It is necessary to have meta-rules that predefine what constitutes "exceptional" circumstances and an agreed response by the ESC and the Commission so that there is both transparency and clarity in the decision making process. Meta-rules are not a mechanism to avoid decisions, but are meant to deal with truly "exceptional" circumstances. It is also important that there is a well-defined process for determining when meta-rules should be applied. A meta-rule should be sufficiently well described that conditions under which it applies and the actions/process to follow are unambiguous. However,

they should also not be so prescriptive that we are forced to either continue doing something that doesn't make sense, or unnecessarily make changes such as recondition the operating model or retune the MP, if the considered view of the ESC is that this is unlikely to result in any demonstrable benefit (in terms of the substance of the advice to the Commission).

To summarise, a meta-rule should have three components:
a) the definition of the exceptional circumstances the meta-rule has been designed to address
b) a process and criteria for deciding whether the exceptional circumstances apply or not (deciding applicability)
c) response/action or process and timeframe for arriving at an action.

Examples to clarify this are given below. We find it useful to consider five categories of issues or events, which should invoke a meta-rule:
1. substantial improvements in knowledge, or new knowledge, about the biology and dynamics of the stock, or substantially improved measures of abundance and/or fishing mortality rates;
2. stock assessment results are substantially 'narrower' than, or outside, the simulated range of dynamics considered in the evaluation of the performance of the MP;
3. Input data (observations) to the DR that are outside of the bounds predicted by the operating model used to test the MP.
4. clear signs of exceptional circumstances (e.g. recruitment failure);
5. Missing input data for the MP, or circumstances, which lead to an inability to calculate a TAC from the MP.

A brief discussion of each of these categories is given below.

Category 1: Substantial improvements or new knowledge

Examples of this category are new estimates of stock abundance, mortality rates or growth, particularly where they are very different from current estimates used in the conditioning and tuning of the MP. A sensible response would be to review whether the new knowledge is likely to imply stock dynamics that are outside the 'envelope' generated by the existing/underlying conditioning and simulation testing, or whether the new data would lead to a marked change in the range of uncertainty that was originally considered. If so, then reconditioning and retuning of the existing MP to the Commission's chosen tuning level would be a sensible approach. This should not imply any disruption to the implementation of the MP.

In terms of the three components of a meta-rule, an example based on the above, could be:
a) circumstances: new or substantially improved estimates of stock abundance or mortality rates.
b) deciding applicability: agreement in the ESC that estimates are substantially improved and that results are likely to be sufficiently different that action is required
c) response: recondition and retune[1] MP to the Commission's chosen tuning level, within an agreed timeframe.

Note that parts (b) and (c) of the example above are the same as for both types of new knowledge, and only the definition differs - one relates to stock abundance, the other to mortality rates. This suggests

[1] Exactly what is meant by recondition and retune will need careful consideration and specification because there are implicit technicalities, which are not obvious. One simple example is that if tuning was done with respect to B2025/B2009 and in real time we're beyond 2025, how should 'retuning' be done? 'Reconditioning' is likely to imply a different extent of changes to the operating model depending on what the new knowledge is, and the process could be slow and labour intensive.

that one could group these together in a meta-rule which has a more general definition, along the following lines for example:
a) circumstances: new or substantially improved knowledge about abundance/mortality/growth
(parts (b) and (c) stay as in the above examples).

This illustrates the potential for meta-rules to be grouped together, or to cover several similar circumstances, thus avoiding the need to set up large numbers of separate meta-rules. We think it best to define fewer general meta-rules, because the alternative of defining very detailed meta-rules for every possible scenario would be unmanageable and unnecessary.

Category 2: Stock assessment results differs from simulated dynamics

There are two reasons why one may want to run periodic stock assessments: (i) to assess whether stock abundance and dynamics are within or similar to the 'envelope' generated by the existing/underlying conditioning and simulation testing using the OM and (ii) to measure the performance of the implemented MP. This category (stock assessment) is obviously linked with the one above (new knowledge), in that new knowledge is likely to feed into a stock assessment at some stage. However, here we primarily have in mind a stock assessment updated with several years' more catch, CPUE, size-at-age and aerial survey data.

Recall that the MPs considered so far do not provide an estimate of abundance. If stock assessment results (not just in terms of biomass, but also in terms of other estimated quantities such as selectivity patterns, for example) are far outside the range implied by the conditioning and simulation evaluations, then reconditioning and retuning of the existing MP, to the previously agreed tuning level, may be required to meet the Commissions objectives. Again, there should be no need to disrupt the implementation of the MP. This is particularly true if the TAC is not changed/recalculated annually, because a periodic assessment review can be scheduled to occur in between the years when the TAC is calculated.

An example of a meta-rule in this category may be:
a) circumstances: the stock assessment is substantially outside the range of simulated stock dynamics considered in evaluations
b) deciding applicability: agreement in the ESC that this is the case
c) response: recondition and retune DR to the original tuning level, within an agreed timeframe.

As more data accumulate, a stock assessment could in future also imply a range of dynamics that is narrower than (though still falling inside) the range used in the simulation evaluations. This could, for example, come about if better estimates of steepness can be obtained or a time series of spawning biomass can be obtained (e.g. from the close-kin abundance method). In such a case, reconditioning and retuning could be done with the appropriate changes to the range of uncertainty that needs to be considered.

There may be cases when a stock assessment, with or without other changes to inputs (e.g. new knowledge), could imply stock dynamics that are so different that the tuning level needs to be revisited, for example, because it can no longer be achieved. This can become part of the response, for example, "recondition and retune to the original tuning level UNLESS there is agreement that the tuning level should be revisited." (See footnote 1, however). There would then be a further description of the course of action when the tuning level needs to be revisited.

A second reason for doing an assessment is to measure the performance of the implemented MP. In the same way that the simulation trials were used to assess the performance of different MPs,

performance measures can be set up to assess whether the implemented MP is likely to achieve its goals. This would again only be required periodically, and a meta-rule would only be invoked if there is strong evidence that the MP is not performing as anticipated.

Category 3: Data used in DR outside bounds of OM used to test MP

Another important issue is what to do when input data for the MP is judged to be outside the bounds predicted by the OM used to test and select the MP. This issue was given preliminary consideration at the 3rd OMMP meeting this year in relation to recent observations in longline CPUE series and prediction data from the most recent OM. The general issue applies to any of the data used in the MP.

An additional aspect to this issue is if the results of a "stock assessment" or future scenario analyses being outside the bounds of the OM used in testing and selection, is that there are multiple options for the error used to simulate future data for the input data sets for alternative MPs. In this case, one level of error for a data series may generate observations outside the bounds whereas, for another it may not. Consideration needs to be given to whether or not what level of difference would qualify as "exceptional circumstances" in such a situation.

The notion of "red" and "yellow" cards was raised in discussion of these issues at the OMMP meeting referring to scenarios where the meta-rules are triggered versus those that would be identified as "of concern", respectively. One approach to dealing with this distinction, given multiple levels of data simulation error, may be:

- Red Card – single data set: Instances in which observed input data for the MP is judged as being outside the bounds predicted by the OM used in testing for the largest levels of simulation error constitutes a red card;
- Yellow Card – single data set: Instances in which observed input data for the MP is judged as being outside the bounds predicted by the OM for the smallest levels of simulation error constituted a yellow card for the data set in question;
- Red Card – multiple data sets: In the instance that each input data set to the MP have received a "yellow card" then this constitutes an automatic "red card" which would trigger a the appropriate meta-rule.

Each of the above assumes that the OM has NOT itself been judged to require reconditioning.

Naturally, the specifics of the above for each of the input data sets and the levels of error used in the data generation and MP testing needs to be considered in more detail. However, the above provides a useful framework for considering meta-rules for the interaction of between the bounds for "real" observations and the levels of error used in the data generation for OM testing and selection.

Category 4: Unexpected exceptional circumstances

Meta-rules in this category should be designed to manage situations where there are clear signs of exceptional circumstances, particularly events that have potentially serious consequences for the fishery and/or the stock, e.g. series of exceptionally low years of recruitment; unexpected changes in the age/size distribution of the spawning stock. This is particularly relevant where the 'signs' are unlikely to be detected by an MP, as the information is not used by the MP. In the case of the former example, the current set of MPs each include indices of recruitment from the aerial survey, hence one might consider it less likely to have an "unexpected exceptional circumstance" for recruitment in this regard. However, there are other indicators of recruitment, for example, used by the ESC in their

assessment of the status of the stock which are independent of the aerial survey, which will continue to be monitored and may reflect changes in the spatial dynamics of early year classes.

As noted above, care needs to be taken when constructing meta-rules, because sufficient flexibility is required to be able to respond when necessary but, at the same time, circumstances need to be sufficiently well described to avoid frequent interference with the implementation and operation of the MP. Frequent interference or adjustments to outcomes from an MP could substantially compromise the realised performance compared to its performance expected from the simulation testing.

One option is to use something like the approach that has been taken while developing the MP. For example, a work program could be developed to do an assessment every 3rd, and in years when an assessment is not being done, to consider a set of indicators to monitor. The meta-rule could then specify a course of action if the ESC assesses that there are 'exceptional circumstances' on the basis of the indicators. The response to this category of events is more likely to be immediate management action or intervention, rather than reconditioning and/or retuning which could be done over a slightly longer timeframe.

An example of a metarule in this category could be something like this:
a) circumstances: clear signs of a gap in the age structure on the spawning grounds that indicate recruitment to the spawning population is substantially lower than predicted by the OM or the MP.
b) deciding applicability: agreement in the ESC that there are clear signs a gap in the age structure on the spawning grounds;
c) response: Commission to decide on the immediate management action to take.

Category 5: No data or incomplete data

Meta-rules in this category are meant to cope with situations where the data required by the MP are not available, or where the data are incomplete (e.g. only partial catch data are available).

An example of a meta-rule for such a situation may be:
a) circumstances: no aerial survey data can be provided for the MP in a particular year
b) applicability: agreement in the ESC that these data or inputs are not available
c) response: i) In a TAC-setting year (i.e. the MP needs to be applied but cannot) - Commission to decide on the immediate management action to take. ii) If it is NOT a TAC-setting year (i.e. the MP does not have to be run) - describe a course of action to try to obtain those data for the next application of the MP, or action to ensure data in the following year(s).

Some aspects of this category may in fact become part of the implementation details and could in principle be programmed into the DR rather than being meta-rule, as such (see below under 'Implementing the MP code'). This could be the case for a model-based MP as, depending on the form of the model, it may have some short-term predictive capability that can simulate predicted levels of the input data/index used in the DR in the absence of a year of data that would be available under normal circumstances.

3. Implementation issues of scientific relevance

Implementation issues primarily pertain to the data and other inputs required to run the MP, and safeguards to avoid or minimise the chances of failure of the MP code. A important component of any MP is the reliability of the data used by the DR to adjust future TACs. The evaluation of an MP's performance is based on assumptions about the reliability and consistency of the data provided to it. Thus, a central issue with respect to the implementation of an MP is the integrity and consistency of

the data inputs. Mechanisms and types of verification are largely a management issue, but the scientific advice about an MP's performance is under the assumption that this issue is appropriately dealt with. This subject is addressed more fully in CCSBT-ESC/1009/13 so we make limited specific comments here.

Data related issues

Recall that a DR has two components: (1) the data and other input parameters, and (2) the method for using those data and parameters to calculate a quota or TAC. The current MP testing is based on a consistent set of simulated data from the OM. When implementing an MP, it is important that the inputs to the rule are DR defined to ensure consistency with the testing conditions.

Implementation requires:

- specification of the data required
- whom to submit to (e.g. Secretariat), in what form, by when
- if inputs are derived from raw data, a description of how the inputs should be derived (e.g. CPUE standardisation, AS index estimation)
- who should do data preparation for input to DR and by when
- who should run the DR (e.g. Secretariat).

Implementing the DR code

The last point above also relates to issues of transferring and validating the code of the chosen DR. For example, if the Secretariat is to run the DR, then the 'developer' would have to transfer the code to the Secretariat, and there may be a need to verify that the code is running properly (i.e. same results for simulation trials run on Secretariat set-up as those presented to ESC).

There may be advantages to making the code robust to missing data and this could potentially incorporate aspects of a meta-rule associated with missing data (as discussed above). For example, if the DR is run every 3 years, and the data are available for the most recent year, but not for the year before that, one option would be to make the DR capable of handling that, rather than producing an error message! Such an approach would have the advantage that there will not be a need to continue having to invoke a meta-rule as soon as there was one incident of 'missing data'. With some of the current model-based MPs that use the aerial survey data this process is already in operation on the historical data (missing from 2001-2004) and could be extended to deal with possible missing future data in both the data sets used in the MP.

Verification of a model-based MP

In the case that a model-based MP is selected for implementation then some thought must be given to the verification of the model fit every time a TAC decision is taken. As a model-based MP corresponds to a simple form of stock assessment a similar approach to the checking mechanisms suggested for the OM outputs/updates may be appropriate. The model under-pinning the MP is fitted to the relevant data and the fits to these data are then analysed, as they would be in a normal stock assessment context. If the model is found to be performing adequately, then no other action is required and the calculation of the TAC can proceed as normal. If the model were not performing adequately, then this would trigger the relevant part of the meta-rule process that deals with this eventuality. The ESC or MP working group should consider whether the "red card-yellow card" framework proposed above may be usefully applied in this context of diagnostics of fits for the application of the DR.

Mismatch between TAC and actual catches

The current set of evaluation trials are all based on the assumption that the catches taken are equal to the TAC set by the MP. A substantial mismatch between the TAC and actual catches would require the consideration of two issues. First, whether the MP needs to and/or does properly distinguish

between the two. For example, the limits on changes in TACs, built into the DR, are presumably meant to apply to the TAC rather than to the actual catch. Also, where the DR uses catch data, is it coded to use TACs or actual catches (e.g. when fitting a stock production model)?

Second, a large mismatch between TACs and actual catches would affect the actual performance of the MP compared to its expected performance evaluated via simulations. The Commission would therefore need to consider which measures to take to avoid large mismatches between TACs and actual catches (if catches are much greater than TACs), in order to maintain the performance of the MP. Consideration needs to be given to meta-rules which may be required if measures are not effective in avoiding mismatches. When the mismatch is such that the catches are much less than the TACs, there may still be a need for a meta-rule which at least aims to establish why this is occurring (e.g. lack of fish or external socio-economic factors).

Making performance measures operational

The CCSBT has indicated that it wishes to be able to assess, periodically, whether they are likely to achieve the agreed management objectives following implementation of an MP, i.e. whether the MP is performing as indicated by the results of the simulation testing. This may require definition of reasonable operational performance measure that would only lead to a meta-rule being invoked if the performance is deemed to be well outside the expected performance. In principle, the performance measures used in the simulation trials could also be used in reality. In practice, however, should the the details of implementation, such as the frequency of TAC setting and timing of implementation, or any additional requirements the Commission may request in agreeing on an MP, will mean that there is a need to specify revised technical interpretations of the performance measures that are consistent with the Commissions intent and technically reasonable to estimate. For example, (B_{2022} or B_{2025})/B_{2009} may be useful for comparing the relative performance of two rules during the evaluation and selection phase, but may be less informative about the performance of the adopted MP during implementation.

Timing issues

Evaluation of the performance of MPs are made on the basis that the DR is implemented for the full period (until 2035 or 2040, depending on the final tuning level) in an unchanged and uninterrupted manner. The length of the period is largely defined on the basis of the slow population dynamics of the stock and the expected timeframe for recovery. If frequent changes are made to any aspect of the MP, its control parameters, the nature of the input data sets or its TAC-output (e.g. via reconditioning, retuning or 'over-riding' of the TAC by a meta-rule) then the actual performance of the MP could be very different from what was assessed during simulation evaluations.

One point of view with regard to the implementation of an MP is that one could simply set the MP running without intervention for at least the period for which it was tested. The reasoning behind this is that a key point of the process of MP evaluation is the quantification of risk and the choice of an MP is based on choices of acceptable levels of risk. It is, however, recognised that this is dependent on a range of assumptions, for example, the assumption that future actual dynamics (of stock, fishery etc.) would be within the range of simulated dynamics. If this is not the case, then it could be risky and misleading to continue applying the MP without any adjustment to take into account the changed dynamics and new knowledge.

The key question is then: how often should we "check" whether adjustments are required (e.g. do an assessment)? How often should "new knowledge" be incorporated? In practice, there will be advantages if these activities (e.g. stock assessment) can be scheduled to occur in between years when TACs are set, if they are not set annually. It was noted above that frequent changes to a DR (or MP) can undermine the advantages of the MP process and affect the realised performance of an MP compared to its performance in simulation trials. There is a fine balance to strike between being too

reactive or too rigid with regard to making changes to a MP. Also, care needs to be taken that one is not simply adjusting an MP to "noise" in the data. Given the relatively slow dynamics of SBT and relatively low information content of one year's data, multi-year timeframes for reviews should be considered and a work plan scheduled and recommended by the ESC to the Commission.

4. Concluding Remarks

Given the above, we consider that fewer general meta-rules are preferable to a large number of very detailed and case-specific meta-rules. The general meta-rules should still contain the key components (a,b,c defined above), but the focus is more likely to be on a well-defined process for dealing with the exceptional circumstances and arriving at appropriate action, rather than try to describe in detail every possible eventuality.

We also consider that small changes that make very little difference to outcomes and/or frequent changes to the MP should be avoided. The default should be that the MP applies unless "exceptional" circumstances invoke a meta-rule. There should, of course, be some meta-rules to deal with 'emergency' situations and which would require an immediate response. Other meta-rules which deal with less urgent and slower timeframe changes (e.g. improved knowledge about some aspect of stock dynamics) can be set up with a response that need not be immediate. In some cases the amount of work involved may mean that the response cannot be immediate.

Although it makes sense to consider a regular 'review' of the performance of the MP and stock status, we consider that the relatively slow dynamics of SBT and relatively low information content of one year's data imply that a multi-year timeframe should be considered.

6. Acknowledgements

This paper summarises and makes minor elaborations on the ideas and contributions of previous CCSBT SAG and SC participants. We acknowledge these previous contributions and take responsibility for any errors in interpretation. This paper was supported by CSIRO Wealth form Oceans Flagship and Division for Marine and Atmospheric Research.

7. References

Basson, M. and Polacheck, T. 2005 Metarules and Implementation: notes for discussion of the scientific issues. Working Paper to the the Fourth Meeting of the Management Procedure Workshop 16-21 May 2005 Canberra, Australia.

Anon 2005 a. Report of the Fourth Meeting of the Management Procedure Workshop 16-21 May 2005 Canberra, Australia

Anon 2005 b. Report of the 6th Meeting of the CCSBT Stock Assessment Group, September 2005 Taipei, Taiwan.

Appendix 1: Previous ESC consideration of meta-rules from Report of the 3rd OMMP workshop

5.2 Metarules

89. In discussion of CCSBT-MP/0505/05, the workshop noted that the responsibility for identifying exceptional circumstances would lie with the SC, and that the SC would be expected to reach consensus on such circumstances based on adequate proof. It was also noted that economic factors may either generate situations where management advice might need to be tailored to take account of market- related conditions, and not just the state of the stock. However, such decisions were the mandate of the Commission, and not the SC. In terms of designing metarules, it was also suggested that they should not be 'one-sided', but should 22consider the option of deviating from MP recommended TACs either upwards or downwards, depending on the nature of the exceptional circumstance. Small changes in risk should not be seen as a justification for invoking a metarule that would result in small changes in the TAC. It was again emphasised that decisions about whether to invoke a metarule should be data driven.

90. The workshop noted that, if a metarule is invoked, the intention would be to take immediate and adequate corrective action. Under such circumstances, any delays in taking action would be strongly discouraged. If further work on the MP is required, it should be pursued as part of the MP revision process.

91. Concerns were expressed about the potential for large changes in fishing pattern when the MP is implemented. This could affect, for example, CPUE and selectivity patterns. Information and data on fishing patterns should be reviewed, together with the other indicators, to establish whether the effects of changes are small or not, and whether there is a need to invoke a metarule, or a revision, or neither.

92. The workshop agreed to start the process of putting together a document that would form the metarule specification for the MP, and a similar document that would form the specification for the review and revision process for the MP. These documents are still being developed, but preliminary drafts are attached as **Attachments 8 and 9**.

Appendix 1 (cont'd):

Attachment 8 from 3rd OMMP workshop

DRAFT in PROGRESS CCSBT Management Procedure: METARULE Process
Preamble

Metarules can be thought of as "rules" which prespecify what should happen in unlikely, exceptional circumstances when application of the TAC generated by the MP is considered to be highly risky or highly inappropriate. Metarules are not a mechanism for making small adjustments, or 'tinkering' with the TAC from the MP. It is difficult to provide firm definitions of, and be sure of including all possible, exceptional circumstances. Instead, a process for determining whether exceptional circumstances exists is described below. The need for invoking a metarule should only be evaluated at the SAG/SC based on information presented and reviewed at the SAG/SC.

All examples given in this document are meant to be illustrative, and NOT meant as complete or exhaustive lists.

1. Description of process to determine whether exceptional circumstances exist

Every year the SAG will: review stock and fishery indicators, and any other relevant data or information on the stock and fishery. on the basis of this, determine whether there is evidence for exceptional circumstances. Examples of what might constitute an exceptional circumstance include, but are not limited to: recruitment well outside the ranges for which the MP was tested), CPUE trends that are notably outside the bounds predicted in the MP testing.

Every three years (not coinciding with years when a new TAC is calculated from the MP) the SAG will: conduct an in depth stock assessment on the basis of the assessment, indicators and any other relevant information, determine whether there is evidence for exceptional circumstances (a core example of exceptional circumstances here is if the stock assessment is substantially outside the range of simulated stock trajectories considered in MP evaluations)

(Every year) IF the SAG concludes that there is no or insufficient evidence for exceptional circumstances, the SAG will: report to the SC that exceptional circumstances do not exist The SC will consider the advice from the SAG and report to the Commission
IF the SAG has agreed that exceptional circumstances exist, the SAG will: determine the severity of the exceptional circumstances follow the "Process for action"

Attachment 82. Description of process for action Having determined that there is evidence of exceptional circumstances, the SAG will, at the same meeting/ in the same year: consider the severity of the exceptional circumstances (for example, how severely "out of bounds" are the CPUEs or recruitment) follow the principles for action (see examples below) formulate advice on the action required (There may be occasions, if there appears to be 'exceptional circumstances', but the severity is deemed to be low, when the advice is not for an immediate change in TAC, but rather a trigger for a review of the MP or collection of ancillary data to be reviewed at the next SAG) report to the SC on their suggested advice for action

The SC will: review the advice from the SAG report to the Commission that exceptional circumstances exist and provide advice on the action to take.
The Commission will: consider the advice from the SC decide on the action to take

EXAMPLES of 'Principles for action'

Examples which we still need to develop / discuss

If the risk is to the stock, principles may be: a) the MP-derived TAC should be an upper bound b) action should be at least an x% change to the TAC, depending on severity

If the risk is to the fishery, principles may be: a) the MP-derived TAC could be a minimum b) action should be at least an x% change to the TAC, depending on severity

Figure 1: Flowchart for Metarules process (see Report of 3rd OMMP workshop)

Appendix 1 (cont'd):

Attachment 9 from 3rd OMMP workshop

Attachment 9 CCSBT Management Procedure: Regular REVIEW and REVISION Process
Preamble

The procedure for regular review and potential revision of the MP is the process for updating and incorporating new data, new information and knowledge into the management procedure, including the operating model. This process should happen on a relatively long time-scale to avoid jeopardising the performance of the MP, but can be initiated at any time if the SAG/SC consider that there is sufficient reason for this, and that the effect of the revision would be substantial. During the revision process the MP should still be used unless a meta-rule is invoked.
All examples given in this document are meant to be illustrative, and NOT meant as complete or exhaustive lists.

1. Description of process for regular review Every year the SAG will: consider whether the procedure for Metarule Process has triggered a review/revision of the MP

Every three years the SAG will: conduct an in depth stock assessment and review stock and fishery indicators, and any other relevant data or information on the stock and fishery on the basis of this, determine whether the assessment (or other) results are outside the ranges for which the MP was tested (NOTE that evaluation for exceptional circumstances would be in parallell with this process; see procedure for Metarule Process) and whether this is sufficient to trigger a review/revision of the MP consider whether the procedure for Metarule Process triggered a review/revision of the MP

Every nine years since the last revision of the MP the SAG will: review whether we have learned enough to appreciably improve/change the operating model, or improve the performance of the MP, or to provide new advice on tuning level (the achievability of management objectives) on the basis of this, whether the new information is sufficient to trigger a review/revision of the MP

In any year, IF the SAG concludes that there is sufficient new information to trigger a review/revision of the MP, the SAG will:
outline the workplan and timeline (e.g. over a period of 2-3 years) envisaged for conducting a review
report to the SC that a review/revision of the MP is required with details of the proposed workplan and timeline
confirm to the SC that the MP can still be applied while the revision process is being completed

In any year, IF the SAG concludes that there is no need to commence a review/revision of the MP, the SAG will:
report to the SC that a review/revision of the MP is not yet required
The SC will: consider the advice from the SAG, and if the SC agrees with the SAG, prepare a report to the Commission:
summarising the need for a review/revision proposed workplan and timeline budgetary implications confirm to the Commission that the MP can still be applied while the revision process is being completed
The Commission will: review the report from the SC and decide whether to initiate the review/revision process