Commission for the Conservation of
Southern Bluefin Tuna

みなみまぐろ保存委員会

Report of the Seventh Operating Model and Management Procedure Technical Meeting

3-4 September 2016
Kaohsiung, Taiwan

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Opening

1. The Chair of the Seventh Operating Model and Management Procedure Technical Meeting (OMMP), Dr. Ana Parma, opened the meeting and welcomed participants.
2. The list of participants is provided at **Attachment 1.**
3. A modified agenda (item 3.3 was added) was adopted and is provided at **Attachment 2**.
4. The list of documents for the meeting is shown at **Attachment 3**.
5. Dr Shelton Harley and Dr Campbell Davies agreed to co-ordinate the preparation of the report with Dr Jim Ianelli.

Agenda Item 1. Reconsideration of OM structure

6. The Chair introduced the background of this agenda item, including the importance of recognising the difference between using the OM model structure for MP development and using it for a stock assessment. For the former the focus of the exercise was on ensuring robustness of an MP and, therefore, there may be more weight given to more pessimistic options. In contrast for the latter the focus was on providing "best assessment" of status of the stock and, therefore, it was important to seek balance of most plausible models in the reference set of OM. The Chair further noted that the terms 'sensitivity run' (for stock assessment) and 'robustness tests' (for MP development) for runs/scenarios not included in the Reference Set of OMs were useful in this regard.
7. The new data sources available for the 2017 stock assessment are summarised in Table 1.
8. Paper CCSBT-OMMP/1609/04 was presented which addressed a number of structural changes to the current OM for: non-member and attributable catch, new data sources, and changes to the projection code for the upcoming MP work. For non-member catch it was suggested to follow the approach used in the non-member catch work, which apportioned non-member effort to have either Japanese or Taiwanese attributes like catchability and selectivity. For attributable catch the approach suggested was to either include them in fleets with similar attributes, or define new fleets with suitable selectivity relationships (assumed or fitted). In terms of new data sources there are gene tagging and close-kin half-sibling (HSP) data. The specific gene tagging estimator was outlined, accounting for uncertainty in age-at-length, and the recommended likelihood for the OM was the beta-binomial model to account for potential over-dispersion. The specifics of finding an HSP among two juveniles was outlined, and these data do seem sensibly modelled via the beta-

binomial model. In terms of changes for the projection code the paper explored options for including robustness tests that look at mechanistic ways to include future variation in both growth and selectivity, based on potential drivers in the OM (most notably abundance) that caused them to vary in the past.

9. The new data sources that need to be considered in the reconditioning of the OMs are:

    - The components of attributable catches as defined by the 2014 Extended Commission (EC) meeting (as defined in the report from CCSBT 21 – paragraph 50) and previously unaccounted for in the OM
    - Unaccounted mortalities: any additional mortality by non-cooperating non-members, cooperating non-members, or members not accounted for under attributable catches
    - Estimate of 2-year old abundance from genetic tagging; and
    - Parent Offspring Pair (POP) and Half-sibling Pair (HSP) data from Close-kin Mark Recapture (CKMR).

1.1. Data inputs

Additional Catches

10. The meeting noted that the EC decision on un-accounted mortalities and attributable catches will mean that new catch / mortality information will become available that may be required to be included in the reconditioning of the OMs. For each new set of catch information/scenario a decision will need to be made as to whether the catches be added to an existing fishery or whether a new fishery would be created.

11. The meeting noted that many fisheries currently included in the assessment have a history of selectivity changes and that these would also need to be considered if new catches are added to an existing fishery.

12. The meeting agreed that catches should be incorporated into existing fisheries unless there is a compelling reason not to, and this would be considered further when the situation arises.

Gene-tagging

13. The meeting noted that two new data sources, based on genetic mark - recapture techniques would be available for inclusion in the OMs and/or MPs. The gene tagging (GT) would provide estimates of absolute abundance of age 2 fish, while the half-sibling-pairs (HSPs) from CKMR would provide estimates of absolute abundance and mortality of the spawning stock.

14. The meeting noted there was minimal risk of incorrectly mistaking one year olds for two year olds, but that there was more substantial overlap in the size distributions of ages 2s with 3s and, in particular, 3s with 4s. The meeting noted that while the original design study had focussed only on release of 2 year olds and recaptures of 3 year olds, the methods developed for the incorporation of the GT data into the OMs and for data generation accounted for the likely reality of mixed ages in releases (mostly 2s, very few 3s) and

recaptures (predominantly 3, some 4s). In addition, the field protocols for sampling were designed to minimize the impact of this. The meeting noted that adequately accounting for length at age for 3 and 4 year olds, in particular, would be an important consideration in the implementation of the GT monitoring.

15. The probability of small (<10) numbers of recaptures was raised as a potential concern for the GT. It was noted that an advantage of the estimator was that the smaller the year classes, the more recaptures would be obtained and the more precise the abundance estimate for the particular year class. Conversely, for large year classes the number of recaptures will be proportionally lower; however, the simulations to date suggest that with current sampling regime and OM estimates of recruitment the numbers of recaptures is unlikely to be zero (CCSBT-OMMP/1609/07).

Half-sibling Pairs

16. The likelihood of "missing data" was raised in the context of the likelihood of not having sufficient HSP to provide an estimate of adult abundance in any one year. Australia noted that HSP are typically more abundant than POP's, particularly for broadcast spawners such as SBT. In the case of the previous "POP-only" SBT CKMR study 45 POPs were identified which resulted in a CV of < 0.2 on the abundance estimate. Given this, and the initial work completed to date (CCSBT-ESC/1509/19) the expected number of HSP is in the 100s.

CPUE for the domestic component of the New Zealand fishery

17. New Zealand indicated that in the future it may be possible to develop a CPUE index for its domestic fleet, but it would not be possible to develop an index in time for the 2017 assessment. New Zealand noted that the changing composition of its domestic fleet may make it difficult to satisfactorily standardise those CPUE data.

1.2. Model structure (size-age, fleets, seasons, etc.)

18. The meeting noted the recent change in the age composition of catches from the Indonesia fishery with the influx of smaller fish. Australia noted that while it assumes that Indonesia will address this issue during the ESC, it was understood that these data for smaller fish reflected catches from fishing south of the spawning ground by a fleet operating from a different port to the traditional fishery.

19. The meeting noted that age composition data for the spawning ground were an important indicator of the spawning stock and important for informing the relative plausibility of alternative natural mortality hypothesis. The meeting agreed that efforts to reconcile the source of the catches (and samples from the catch monitoring program) should be given a high priority. If this was not possible then, for the purposes of reconditioning the OM, the meeting agreed that a temporal change in selectivity would need to be included in the OM.

1.3. Assumptions about selectivity, catchability, recruitment, growth, etc.

20. The meeting noted that historical data indicated clear changes in mean lengths-at-age over time and that future changes in growth could impact on rates of rebuilding.

21. Of three hypotheses proposed in CCSBT-OMMP/1609/04, density-dependent growth, if occurring, would have the greatest and most predictable impact (e.g., growth rates would decline as the stock rebuilt). The meeting agreed to consider density dependent growth scenarios in future versions of the OM. Further consideration would be required as to the specific approach implemented and whether it would be considered within the grid or as a robustness test.

22. The potential for size/age at maturity to change over time as a function of density was also raised. The meeting noted that there were activities underway by members to provide direct estimates of size and age at maturity via samples collected off the spawning grounds (CCSBT-ESC/1609/15, CCSBT-ESC/1409/23).

23. The meeting noted that the process driving selectivity changes over time were more complex and less amendable to modelling (compared to density-dependent growth). The meeting discussed the potential for using a state-space approach for modelling historical and future changes in selectivity, but noted that the benefits would likely not outweigh the costs. The meeting agreed to retain the current approach for modelling past and future selectivity.

24. A summary of many of the factors considered in sensitivity runs undertaken for previous assessments is provided in Table 2 and the meeting agreed that this would be revisited as progress was made towards the stock assessment at OMMP 8 in 2017.

1.4. Likelihoods

25. The meeting considered both the forms of likelihoods for individual data sets and the weighting across data sets under this item.

26. The meeting agreed that the relative weighting of different data sets was best considered during the stock assessment process so would be revisited in 2017.

27. The meeting noted the recent development by the MULTIFAN-CL development team of a 'self-scaling multinomial with random effects' for size composition data[1]. The meeting considered that consideration of this new approach, or other size composition likelihood functions, was not a priority at this time and agreed to continue with the current approach for modelling composition data.

28. The meeting discussed the form of the likelihood for the genetic tagging, parent offspring pairs (POPs), and half-sibling pairs and agreed that the beta-binomial approach, with the capacity to consider over-dispersion, was the best approach.

[1] http://www.wcpfc.int/system/files/SC12-SA-IP-10%20MULTIFAN-CL.pdf

1.5. Handling of within-cell uncertainty

29. The meeting reviewed the status and work done to include the within-cell uncertainty for the OM. The current approach to covering the uncertainty used for the CCSBT assessment and for operating model projections involves resampling over the "grid" dimensions (an ensemble of 320 alternative model specifications referred to as a "cell"). For each plausible cell in the ensemble the maximum posterior density (MPD) is estimated and used to form a pseudo posterior distribution of 2000 alternative parameter value sets. These 2000 parameter vectors are then used for stock assessment purposes and in OM data generation / MP testing. To account for the uncertainty around the MPD estimates within a cell, the model code was refined to ensure that a covariance matrix could be estimated (first working at the 2014 ESC meeting). Although this extended the time required to compute all the MPD estimates, the advantage of accounting for this source of uncertainty was considered important.

30. During ESC 20, the implementation details were sketched out and some parts of the code was implemented. Further work was completed at OMMP 7 and ESC 21. The details involve calling a multivariate-normal random number generator based on the MPDs and covariance estimates to replace the MPDs that are used presently. The meeting noted that for OMMP 8, this approach will be working, but for fast creation of the MPD set, the option to ignore the within-cell variability would still be available.

1.6. Other

31. The Chair proposed discussion of the need for any projections as part of the assessment of stock status to be conducted in 2017. It was noted that as the CCSBT we were moving to a new MP, there was limited value in undertaking projections with the old MP.

32. There was some concern that the presentation of constant catch projections could lead to confusion given that the Commission has adopted an MP approach, but also there was recognition that, such projections provide some indication as to whether the overall estimate of stock productivity has changed.

33. The meeting agreed to consider options for how to best present updated information on the productivity of the stock at OMMP 8.

Agenda Item 2. Technical issues for evaluation of unaccounted sources of mortality

34. Australia presented the technical aspects of paper CCSBT-OMMP/1609/05, CCSBT-ESC/1609/BGD03) on including unaccounted non-cooperating, non-member (referred to as non-member) fishing mortalities in advice for TAC recommendations. The full paper will be presented to the ESC on the merits of two approaches proposed by the Extended Commission. The distinction

between the two approaches is that the “direct approach” does not include unaccounted mortalities in testing and tuning the MP, whereas the “MP approach” does involve retesting and tuning an MP. Therefore, the technical issues relate only to the “MP approach”. The “MP approach” can account for the impact of non-member catches, and more broadly for all sources of fishing mortality in future TAC advice if all sources of additional fishing mortality are included in reconditioned operating models and testing and retuning the MP. The methods and code changes in the OM implemented in 2014, for the unaccounted mortality sensitivity tests, can be used in reconditioning the OM. If sufficient levels of additional fishing mortality are incorporated into the operating models used in the evaluation of the new candidate MPs, the TAC advice from the selected MP will be robust to those levels of fishing mortality and uncertainties in them. The MP approach will ensure best-practice science-based management of the fishery for which the CCSBT has reconfirmed its commitment (Anon. 2015) and been recognised as an international leader. The data available to the ESC to consider impacts of all sources of unaccounted mortalities remains quite limited. Very little new data has become available since the 2014 ESC consideration of this issue. The time-series of catches (past and future) for these sources of fishing mortalities (member and non-member) will need to be resolved and specified prior to the reconditioning of operating models in 2017, for management strategy evaluation (MSE) of the new Management Procedure (MP) and stock assessments.

35. With respect to the UAM, the meeting noted that a decision on the best estimates for the non-cooperating non-member components would be made by the ESC. The agreed catches would be assigned to the relevant fishery (e.g., LL1 or LL2) based on the assumptions made in the estimation (e.g., target versus bycatch), the China Market Survey (CCSBT-ESC/1609/36) and or other sources of information that may become available.

36. The meeting noted that assumption regarding future levels of UAM would be important for MP evaluation. New Zealand suggested that it may be more appropriate to predict levels of effort rather than catch directly, e.g., UAM catch may increase due to increasing stock size if it is taken as bycatch.

37. The meeting agreed that the ‘MP approach’ was technically the best approach for considering additional catches in the OM. The meeting also agreed that, given no more specific information on the nature of the additional catches, the same, or similar approach used in the 2014 stock assessment to implement the additional catch scenarios should be used.

38. With respect to attributable catches, the meeting noted the discussion that already occurred under agenda item 1.1 and the Chair sought views on technical approaches to incorporating UAM and attributable catches in MP development. CCSBT-OMMP/1609/05 provides one suggestion on how both sources of additional catches into MP testing.

39. The meeting agreed to reiterate its previous requests that relevant CDS and market data be made available to allow technical evaluation of catch assumptions to be used in the OM and MP testing process.

Agenda Item 3. Design of a new MP

40. Australia presented CCSBT-OMMP/1609/06 which provides some initial considerations on the process for development, testing and selection of a new MP for CCSBT. At its 2015 meeting the Extended Commission agreed to implement a new recruitment-monitoring program, using gene-tagging, to estimate absolute abundance of 2 year olds as a replacement for the scientific aerial survey provides a relative abundance index for 2-4 year olds. As the aerial survey is used in combination with the standardised longline CPUE in the CCSBT "Bali Procedure", the change in the recruitment monitoring method means it will be necessary to develop a revised/new MP for implementing the Commission's stock rebuilding plan. The work program for the development, testing, selection and implementation of a new MP is ambitious: commencing at the 2016 OMMP Technical Meeting with the aim of completion in time to recommend the 2021-2023 TAC block with a new MP in 2019. The paper summarises the process for developing and testing candidate MPs and selecting and implementing a final MP, and recaps on the objectives for the Commission's rebuilding plan, their technical specification in the current Bali Procedure and the operational constraints included in the decision rule to achieve the desired behavioural characteristics from the MP. An important aspect of the last MP development exercise was the development of a wide range of candidate MPs for initial testing, followed by an iterative selection process. This had many positive benefits and is considered an important aspect of the process for the ESC. The paper also provides an overview of the available monitoring series for each component of the SBT population (i.e. recruits, sub-adults and spawning adults) that may be considered appropriate for use in candidate MPs and the rationale behind the use of model and empirical decision rules in MPs. Finally, it gives some consideration to the "process", both technical and engagement with the ESC and Commission, with a view of increasing engagement, understanding and collaboration.

41. The meeting noted that the decisions of CCSBT 22, with respect to funding of the aerial survey, GT and collection and processing of samples for CKMR, substantially changed the circumstances relative those at ESC 20. In addition, Australia noted that it was very likely that funding had been secured to process the historical collection of CKMR samples (2006-2010) and those collected subsequent to the original CKMR study (Bravington et al. 2014). The meeting noted that this involves considerable work to be undertaken over the next two years, and in the next 12 months in particular.

42. The meeting expressed concern about the ability to conduct both a full stock assessment to provide advice on stock status in 2017 and, at the same time, progress the OM/MP development work, as proposed in 2015. The meeting agreed to update the timeline for these streams of work, for the ESC's consideration. This is provided in Table 3.

43. The meeting noted that it was likely that contracted resources would be required for R and OM-related tasks. It was noted that for OM-development it was likely necessary to use somebody already familiar with the code. The meeting recommended that the ESC provide estimates of the resources required to achieve the different tasks identified in Table 3.

3.1. MP Structure

44. Paper CCSBT-OMMP/1609/07 was presented to the group. The paper detailed methods for generating the underlying gene tagging, parent-offspring (POP) and half-sibling (HSP) pair close-kin data. It also explored the potential for these data to be developed into informative indicators for the purposes of inputs to a candidate MP. For the gene tagging, with a sampling program concomitant with the gene tagging design study, a five year moving average of age 2 abundance performed well. It correlated with the true values at median values at the 0.9 level, and with a lower 10%ile above 0.75, even for scenarios where mean recruitment was increasing by around 50% over time. The incidence of zero recaptures was also very rare (less than 0.1%) across the scenarios explored. For the POP data empirical indices of relative spawner abundance were generated and were shown to correlate with true values at a level similar to a survey of spawner abundance with a 30% CV. For the HSP data a similar relative index was shown to perform at a level of a survey with a CV of somewhere between 20-25%. An additional HSP index of the trend in adult total mortality was explored, but seemed to work only with an increasing trend for the SBT example. This was driven by the low ratio of *F* to *M* on the adults, where there is little contrast in the HSPs for decreasing fishing mortality. Overall, the gene tagging showed promise in terms of generating a relative recruitment index that is both informative and likely robust to the current key mixing hypotheses. The POP and more so the HSP indices also correlated very promisingly with the spawner abundance, on a par with a hypothetical survey with a CV of around 25%.

45. In terms of the likely form of any future MP, the meeting noted that a ‘simple swop’ of the gene tagging for the aerial survey was not possible within the existing MP framework due to the difference in age classes covered by each data source (e.g., ages 2-4 for the aerial survey compared to age 2 for the gene tagging).

46. As a result, the meeting noted that new MPs could be quite different from the previous one and the meeting discussed the range of monitoring series (Table 4) and potential indices that could be used within the MP.

47. The meeting reiterated the concerns of ESC 20 that having an MP driven primarily by longline CPUE was not optimal and noted that an MP of the same form as the current MP (i.e., GT as recruitment index and LL1 CPUE) would be driven by the trend in the CPUE until some point in the future when sufficient GT estimates were available to form an influential series.

48. The meeting noted that the availability of the CKMR data series provided the basis for monitoring series on abundance and mortality of spawning adults for use in candidate MPs, in addition to the series on recruits and sub-adults. The meeting considered benefits and challenges of including an index of the adult spawning stock abundance within the MP, noting that while the CKMR abundance indices, and HSP in particular, appeared to correlate well with spawning abundance, there may be benefits to focussing MPs on indices which reflect trends in the components of the stock which are the target of the majority of the fishery impacts (i.e. 2-8 year olds).

49. The meeting also discussed possible approaches to include some monitoring indices as absolute rather relative abundance indices and combining indices that monitor the same stock component (e.g., take an average). The meeting noted that further discussion should occur during the MP development process.

50. The meeting noted the potential to develop candidate MPs that use either empirical (indicator) approaches or model-based approaches, as developed in earlier MP development exercises, including scope to combine indices from different monitoring series to form a composite index. It was noted that the current Biomass Random Effects Model underpinning the Bali Procedure requires checks of model fit diagnostics and recalculation of the "q-ratio" each time the MP is run. There was some concern that this additional complexity associated with model-based MPs may make them less accessible to the wider ESC and more difficult to communicate to stakeholders and decision makers. This contrasts with the attraction of simple empirical MPs which are more accessible and generally easier to explain in plain language; however, there is often a trade off in TAC variability. The meeting agreed it would be useful to explore a broad range of forms of candidate MPs and that performance under MSE testing was the primary test.

3.2. Operating model and testing method

51. The meeting did note that it would be difficult to estimate the level of over-dispersion for GT accurately until longer time series were available. It was noted that the over-dispersion term for the 1990s conventional tagging was estimated at 1.82, but that it might not be directly comparable to what might be anticipated for gene tagging. It was also noted that the design study completed for the GT pilot study considered that this value was likely to be high and provided an alternative estimate of 1.5. The meeting agreed that uncertainty in the level of over-dispersion would need to be assessed through sensitivity analyses and robustness tests.

52. For MP tuning it was preliminarily suggested that this should be conducted for the median of the distribution of biomass achieved in year chosen for tuning. This is because the previous tuning was based on probabilistic criteria, and with time different sources of uncertainty are included in the reference set of OMs, and probabilities are no longer comparable.

53. In reviewing the proposed schedule the meeting noted that it was not optimal for having the ESC recommend an MP and implement it at the same time, as this might lead to selection being made based on the initial TAC rather than longer-term performance. It was also noted that the proposed timeline only provided one formal opportunity for Commission-level consultation. The meeting noted that the timeline did not provide the level of opportunity for consultation previously allowed in the process leading up to the adoption of the Bali procedure.

3.3. Missing data

54. The meeting noted that typically in MP design, monitoring indices should have a very high probability of being available. However, the unanticipated can occur, for example the MP might use a survey index and for some reason (e.g., vessel breakdown) this might not be available in a given year.

55. In such circumstances it is important to have pre-agreed position on what to do if a monitoring index is not available. Ideally this agreement should be reached at the time the MP is developed and being tested, i.e., the full specification of the MP would include procedures for dealing with missing data.

56. The meeting agreed that candidate MPs need to include procedures for dealing with missing data. However it is possible that the ESC might adopt common approaches for this.

Agenda Item 4. Code refinements and version control system

57. The meeting reviewed the workflow for the present CCSBT model and directory structure. It was noted that "tags" are used for the master branch at the time when the code was used for a final OM/MP set and that in the interim, work should be off of the "develop" branch (with separate branches from there for individuals to work on and merge back). He also noted that the "rsbt" package should be continued to use for members and technical aspects for contributions and improvements is encouraged. Finally, he suggested that the documentation for "recipes" on how to run the model should be maintained on the GitHub system as markdown files (the relevant extant word files were converted during the meeting) and that updating "readme.md" files should be considered to keep changes up-to-date. A small working group from all members should be formed to review best practices to ensure the version control system is effective.

Adoption of report

36. The report was adopted.

Close of meeting

37. The meeting closed at on 18:39 on 5 September 2016.

Tables

Table 1. Availability of new data for input to the 2017 assessment.

Data	Index of	Index for year	Years of data
Aerial survey	Ages 2-4	1993-2000, 2005-2014, 2016-2017	Same
Gene-tagging	Age 2	None available by 2017	
CPUE LL1	LL exploitable abundance	1969-2016	Same
POPs	Spawning stock	2002-2013	2005-2015/16
HSP	Spawning stock	2002-2013	2005-2015/16
	Sensitivity tests		
Taiwanese CPUE	LL exploitable abundance	2002-2015	Same
Korean CPUE	LL exploitable abundance	1996-2016	Same
Commercial Aerial SAPUE	Ages 2-4	2002-2014	Same
Trolling Piston-line index	Age 1	1996-2014, 2016-2017	Same
Grid-type trolling index	Age 1	1996-2014, 2016-2017	Same

Table 2. Preliminary candidate list of sensitivity runs to be conducted for the 2017 OMMP 8 assessment. Note that these are in addition to factors considered in the reference set of OMs.

Run	Description
Added catch (TBD)	Unaccounted catch mortality (see below)
SV_OverC	Continue 20% overcatch from Australian fishery as if the stereo video (SV) system was not implemented
LL1 Case 2 of MR	LL1 overcatch based on Case 2 of the 2006 Market Report
IS20	Indonesian selectivity flat from age 20+
High_aerialCV	In conditioning (set process CV to 0.4)
Aerial2014/2016	Sensitivity to 2014 and 2016 aerial survey data
CPUE related	
Upq2008	CPUE q increase to be estimated (permanent from 2008)
Omega=0.75	A power function for the relationship between biomass and CPUE with power = 0.75 (or alternative based on diagnostics)
CPUE_alternatives	Based on input from CPUE working group
Taiwanese CPUE	
Korean CPUE	
CPUE S=0	Overcatch had no impact on CPUE
CPUE S=0.50	50% of LL1 overcatch associated with reported effort
updownq	increase in catchability (0.5) in 2009 then returns to normal after 5 years
CPUE S=0.75	75% of LL1 overcatch associated with reported effort [check diagnostics]
CPUE CV=0.3	Increases the specified CV of the CPUE series to have a lower bound of 0.3
Include 2007-08 CPUE Upper	Uses most optimistic CPUE series (Laslett)
Include 2007-08 CPUE Lower	Uses most pessimistic CPUE series (ST Window)
Piston line	Includes the piston-line troll survey index
Grid-type trolling index	Troll survey index alternative
Tag F / Mixing	Account for potential incomplete mixing of tagged fish. (new information may inform on treatment of tag data)

Table 3. Proposed timeline for MP Development and assessment/OM refinements

No.	Activity/Meeting	Purpose	Timing
1	ESC 21	Develop plan both stock assessment and future OM/MP	Sept 2016
1i	Intersessional preparatory work	**Code development** o Model to incorporate new data for stock assessment (HSP, CK POP, UAM changes) o R code for diagnostics for new data evaluation o Update OM data files including new data types (specifically POP and HSP) o Conditioning May June o Projections for MP evaluation (POP, HSP, and GT data generation)	Webinar before June/July OMMP 8
2	OMMP 8	**Stock assessment** o Define sensitivity tests for stock assessment o Finalise OM conditioning o Final OM structure, weights, review grid, diagnostics o R code for graphics and diagnostics **Candidate MP development** o Include data generation o Robustness tests for MP	June-July 2017 (Note June preferred)
2i		Final stock assessment for ESC 22	Aug
3	ESC 22	**Stock assessment** o Review stock assessment o Stock status **Candidate MP development** o Performance indicators o Plan for MP testing o Confirm technical specifications reflect rebuilding objectives	Sept 2017
3i	Intersessional work	**Candidate MP development** o Analysis and code changes for robustness test – e.g. selectivity, growth o New conditioning to include GT estimate o Changes to projection code to run candidate MPs o Develop and code candidate MPs (with tuning as necessary)	
4	OMMP 9	o Review of Candidate MP performance o Finalise robustness tests o Improve candidate MPs o Informal dialog with commissioners on preliminary results candidate MP	June-July 2018
4i	Intersessional	Refinements to MP candidates	
5	ESC 23	Overview of candidate MP performance Advice to Commission on MP performance	Sep 2018
6	Commission	Further consideration of MP performance	Oct 2018
6i	Intersessional		
7	OMMP 10	If needed…	Jun 2019
8	ESC		Sep 2019
9	Commission		Oct 2019

List of Attachments

Attachments

1 List of Participants

2 Agenda

3 List of Documents

Attachment 1

List of Participants
The Seventh Operating Model and Management Procedure Technical Meeting

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Attachment 2

Agenda
Seventh Operating Model and Management Procedure Technical Meeting
Kaohsiung, Taiwan, 3-4 September 2016

Terms of Reference

A 2-day technical meeting, to take place immediately prior to ESC21, was recommended by the ESC20 with the following ToR:
(1) To define the structure of the Operating Model (OM) for the stock assessment to be conducted in 2017, and
(2) To initiate the design of a new MP that uses genetic tagging as the primary future index of recruitment index in lieu of the aerial survey index.

At its 2015 annual meeting, the EC agreed to Option A from the ESC (i.e. aerial survey in 2016 and 2017, pilot gene tagging starting from 2016 and development of a new MP).

Provisional Agenda

1. **Reconsideration of OM structure**
   - 1.1 Data inputs
   - 1.2 Model structure (size-age, fleets, seasons, etc.)
   - 1.3 Assumptions about selectivity, catchability, recruitment, growth, etc.
   - 1.4 Likelihoods
   - 1.5 Handling of within-cell uncertainty
   - 1.6 Other?

2. **Technical issues for evaluation of unaccounted sources of mortality**

3. **Design of a new MP**
   - 3.1 MP structure
   - 3.2 Operating model and testing methods
   - 3.3 Missing data

4. **Code refinements and version control system**

Attachment 3

List of Documents
Seventh Operating Model and Management Procedure Technical Meeting

(CCSBT-OMMP/1609/)

1. Provisional Agenda
2. List of Participants
3. List of Documents
4. (Australia) Reconsideration of OM structure and new data sources for 2017 reconditioning (*same as* **CCSBT-ESC/1609/BGD 04**) (OMMP Agenda Item 1)
5. (Australia) Advice on incorporating UAM in stock assessment and MP evaluation and implementation (*same as* **CCSBT-ESC/1609/BGD 03**) (OMMP Agenda Item 2)
6. (Australia) Initial consideration of forms of candidate management procedures for SBT (*same as* **CCSBT-ESC/1609/BGD 05**) (OMMP Agenda Item 3)
7. (Australia) Methods for data generation in projections (*same as* **CCSBT-ESC/1609/BGD 06**) (OMMP Agenda Item 3)

(CCSBT-OMMP/1609/Info)

1. (Australia) Post-release survival in tuna and tuna-like species in longline fisheries: an update (*same as* **CCSBT-ESC/1609/BGD 01**) (OMMP Agenda Item 2)
2. (New Zealand and Australia) Updated estimates of southern bluefin tuna catch by CCSBT non-member states (Rev.1) (*same as* **CCSBT-ESC/1609/BGD 02 (Rev.1)**) (OMMP Agenda Item 2)

(CCSBT-OMMP/1609/Rep)

1. Report of the Twenty Second Annual Meeting of the Commission (October 2015)
2. Report of the Twentieth Meeting of the Scientific Committee (September 2015)
3. Report of the Sixth Operating Model and Management Procedure Technical Meeting (August 2015)
4. Report of the Nineteenth Meeting of the Scientific Committee (September 2014)
5. Report of the Fifth Operating Model and Management Procedure Technical Meeting (June 2014)
6. Report of the Fourth Operating Model and Management Procedure Technical Meeting (July 2013)

7. Report of the Special Meeting of the Commission (August 2011)
8. Report of the Sixteenth Meeting of the Scientific Committee (July 2011)