Commission for the Conservation of
Southern Bluefin Tuna

みなみまぐろ保存委員会

# Report of the Fifteenth Meeting of the Scientific Committee

**11 September 2010**
**Narita, Japan**

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## Agenda Item 1. Opening of meeting

1. The independent Chair, Dr Annala, declared the Scientific Committee meeting open and welcomed all participants.
2. The list of participants is at **Appendix 1**.

## Agenda Item 2. Approval of decisions taken by the Extended Scientific Committee

3. The Scientific Committee endorsed all the recommendations made by the Extended Scientific Committee for the Fifteenth Meeting of the Scientific Committee, which is at **Appendix 2**.

## Agenda Item 3. Other business

4. There was no other business.

## Agenda Item 4. Adoption of report of meeting

5. The report of the Scientific Committee was adopted.

## Agenda Item 5. Closure of meeting

**6.** The meeting was closed at 4:05 pm, on 11 September 2010.

## List of Appendices

**Appendix 1**

# List of Participants
# Fifteenth Meeting of the Scientific Committee

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Commission for the Conservation of
Southern Bluefin Tuna

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**Appendix 2**

# Report of the Extended Scientific Committee for the Fifteenth Meeting of the Scientific Committee

**4 - 9 September 2010**
**Taipei, Taiwan**

**Report of the Extended Scientific Committee for**
**the Fifteenth Meeting of the Scientific Committee**
**4-9 September 2010**
**Taipei, Taiwan**

## Agenda Item 1. Opening

1. The Director General of the Taiwan Fisheries Agency, Mr James Sha, opened the meeting and welcomed participants.

### *1.1 Introduction of Participants*

2. Participants introduced themselves. The list of participants is shown in **Attachment 1**.

### *1.2 Administrative Arrangements*

3. The Executive Secretary announced the administrative arrangements for the meeting.

## Agenda Item 2. Appointment of Rapporteurs

4. Australia, Japan and New Zealand assigned rapporteurs to produce and review the text relating to agenda items 5 to 12.1 inclusive.

## Agenda Item 3. Adoption of Agenda and Document List

5. The agreed agenda is shown in **Attachment 2**.
6. The agreed document list is shown in **Attachment 3**.

## Agenda Item 4. Review of SBT Fisheries

### *4.1 Presentation of National Reports*

7. Each Member presented the main highlights of its national report (CCSBT-ESC/1009/SBT Fisheries/…).
8. Japan presented CCSBT-ESC/1009/SBT Fisheries/Japan. In the 2009 fishing year, the national catch allocation of Japan was 3000t, and 99 longline vessels caught 2816t SBT (100 vessels caught 2656t in the calendar year). Nominal CPUE in 2009 represented higher levels than in the recent past especially in the major CCSBT statistical areas (Area 4, 7, 8, and 9). However it should be noted that catch and effort in 2009 were based on the RTMP. Japan conducted a scientific observer program with 7 longline vessels in 2009. Observer coverage

was 7.4% in terms of number of vessels, 4.6% in terms of the number of SBT caught, 4.8% in terms of the number of hooks used. Observer activity is detailed in CCSBT-ESC/1009/18. From Japanese longline vessels, 77 conventional tags recaptured from 58 SBT individuals were reported, and 28 of those (from 18 individuals) were reported by observers. Details of tag recapture and release are provided in CCSBT-ESC/1009/19.

9. Japanese scientific observer activity in the 2009 season was summarised in CCSBT-ESC/1009/18. Japanese observers collected otoliths (from 279 individuals), stomachs (from 253 individuals), and muscle (from 321 individuals) as a scientific sample of SBT during 2009 fishing season.

10. Japanese tag and recapture activity in the 2009 season was summarised in CCSBT-ESC/1009/19. During the trolling survey in January-February 2010, a total of 149 SBT was tagged with CCSBT conventional tags, and 80 of these fish were also tagged archival tags. In addition, eight pop-up archival tags were deployed. From Japanese longline vessels, 58 individuals with conventional tags were recovered between August 2009 and July 2010 (77 CCSBT tags from 48 individuals, nine CSIRO tags from eight individuals, and two NSW tags from two individuals). In addition, one archival tag which was released by CSIRO was also recovered. Over the past nine years, Japan has released 401 archival tags on large SBT from offshore by Japanese longline vessels and 234 archival tags on juvenile SBT from the south coast of Western Australia. To date, 19 tags released from offshore have been recaptured.

11. New Zealand presented CCSBT-ESC/1009/SBT Fisheries/New Zealand. Its SBT catch in 2009 was around 418t, including commercial catches and estimated discards (~1t), and estimated non-commercial catches (~0.1t). The increases in catch were attributed to both an increase in effort and increased abundance of small fish. Observer coverage of the charter fleet in 2008/09 was 89% and 82% for catch (numbers) and effort (hooks) respectively. For the domestic fishery coverage was 10% of both catch and effort.

12. Taiwan presented CCSBT-ESC/1009/SBT Fisheries/Taiwan. The annual catches of SBT of Taiwan fleet fluctuated between 841 tons and 1,298 tons from 2002 to 2009. The annual catch for the 2009 quota year is 934 tons, and for the calendar year is 916 tons. Table 1 of Taiwan's report shows the annual catches of SBT from the 1972 to the 2009 for calendar year. Figure 2 shows the nominal CPUE trend of the Taiwanese longline fishery for SBT from 2002-2009. The CPUE (number of fish caught per 1,000 hooks) varies from 0.9 to 2.11 during 2002-2008. The CPUE for 2009 is preliminary estimated as 1.20. For size frequency, fishers are requested to measure the individual length of SBT caught since 2002. Figure 3 shows the distributions of length frequency of SBT during 2004-2009 for which the predominant range was from 110 cm to 130 cm. The number of active vessels fishing for SBT is 30-100 from 2002 to 2009 as shown as Table 2. In 2009, the active vessels t fishing for SBT totalled 67 with an increase of 26 vessels compared to 2008. The SBT fishing grounds have remained unchanged: one is the central Indian Ocean around $55^{o}$E-$95^{o}$E, $30^{o}$S-$40^{o}$S, and the other one located off the southeast coast of Africa around $20^{o}$E-$55^{o}$E, $35^{o}$S-$45^{o}$S. In the 2009 calendar year, 3 observers were placed on 4 seasonally targeting SBT vessels. The observer coverage rate by vessels was about 11.8%, and by hooks

was about 10.2 %. There were no tagged SBT recaptured during the presence of observers on board in 2009.

13. Southern bluefin tuna (Thunnus maccoyii – SBT) is the one of tuna species that is caught seasonally by the longline fishery in Indonesia. The total catch in 2009 contributed by this fishery to the national catches was 0.46% (640 tons) in weight of total tuna species. The numbers of registered tuna longline fishing vessels operating in the Indian Ocean decreased from 1795 in 2007 compared to 1075 in 2000 (IOTC, 2009). The SBT caught in the year 2009 were well below the catch quota with the highest landing occurring in January (197.1 tons) and the lowest in June (1.27 tons). The first quarter (January to March) commonly has a high catch. During these months the average size is larger compared to other months. May to August show a lower catch with smaller individual sizes. In the other hand, during April to September the catch of other tuna species increases in number, particularly in June and July. The length frequency recorded by scientific observer has a wide range of 126 – 220 cm (FL) and is mainly distributed from 150 cm – 200 cm. Farley et al (2010) report that the mean of the size distribution declined from 188.1 to 166.8 cm between 1993/94 and 2002/03, and fluctuated between 168.3 and 171.0 cm for the following six seasons. In 2009/10, the mean length of SBT caught was 168.5 cm. There are several by-catches recorded in the fishery. Scientific observer performance in 2010 reveals a lower coverage compared to subsequent years.

14. Korea presented its historical trend of the number of longline vessels and SBT catches, noting that the catch and effort data for 2008 and 2009 were provisional. It then noted that the future data would be compiled in time for submission as the logsheet data have been reported in electronic format since 2010. In 2009, 19 longline vessels operated and they caught 1117t of SBT in whole weight from the Korean catch limit of SBT of 1140t for the year 2009. The fishing ground was mainly off South Africa during March to August and secondarily off Western Australia during July to December. The nominal CPUE (number of fish caught per 1000 hooks) was 2.1-3.3 during 2000-2003 and decreased to 0.5 in 2004 but markedly increased to 3.4 in 2008 and 4.7 in 2009, respectively. The length distribution of the SBT had two or three modes, where the modes around smaller length were for the fish caught off South Africa and the mode around larger length for those off Western Australia. Korea also reported the results of the scientific observation that it deployed two observers in 2009 and collected all the relevant data related to the SBT fishery, including ecologically related species in the south western Indian Ocean, between 30S°-43°S and 11E°-43°E, for four months from March to June 2009.

15. Australia presented paper CCSBT-ESC/1008/SBT Fisheries-Australia. The paper summarises catches and fishing activities in the SBT fishery up to and including the 2008–09 quota year (Dec–Nov) and some preliminary results for 2009–10. A total of 30 commercial fishing vessels landed SBT in Australian waters in 2008–09 for a total catch of 5242t. A total of 95.7% of the catch was taken by purse seine with the remainder taken by longline. Seven purse seiners fished off South Australia for the farm operations, but live bait, pontoon-towing and feeding vessels were also involved. Purse seine fishing commenced in early December 2008 and finished in early April 2009. The 2008–09 quota year catch was 5242t from a quota of 5265t. In 2009–10, observers in the farm sector monitored 9.0% of purse seine sets where fish were retained and 13.5% of the estimated SBT

catch. In 2009, observers also monitored 17.2% of longline hook effort in the Eastern Tuna and Billfish Fishery (ETBF) during the months and in the areas of the SBT migration through that fishery, while 8.5% of longline hook effort was monitored in the Western Tuna and Billfish Fishery.

16. Paper CCSBT-ESC/1009/08 describes Australia's data preparation. The aggregated catch and effort, catch by fleet, raised catch, catch at size, and non-retained catch data sets submitted to CCSBT by Australian are compiled from a number of databases. The daily fishing logbooks, catch disposal records and fisheries observer reports, collected and managed by the Australian Fisheries Management Authority are the main data sources. The Australian catch of SBT from the surface (purse seine) fishery is also sampled by contracted field staff prior to release into farm cages. The sample data includes size and weight measurements that are used to calculate representative size distributions and average weights. Relational databases, spreadsheets and query scripts are used to integrate and process the source data sets and create the data files required for the CCSBT data exchange.

17. In response to questions from participants, the following information was provided in addition to that in the national reports:-

    - Japan advised that:
        - It was considering increasing its observer coverage by focusing on areas where there are more operations and vessels. As a consequence, it did not expect its observer coverage in area 7, where small numbers of operations are conducted, to increase.
        - The length frequency of SBT recorded by its observers differs from that recorded in the RTMP. This has been reported in the past and is due to observers recording fish released, but there is no field to record releases in the logbooks. However, for the past two years, this information has been recorded in the RTMP. Also, at least 70-80% of fish are released in a good state and are expected to survive after release.
        - In relation to the economics of fishing, Japan's SBT vessels are engaged in fisheries other than just SBT. Consequently, where there is a reduction in the SBT quota, some vessels might try to use their quota as soon as possible to move to other fisheries or other fishing grounds. Other vessels might change their fishing practices to concentrate on more valuable SBT. It was noted that there is a need to monitor fishing practices in relation to interpretation of CPUE, but that according to paper CCSBT-ESC/1009/BGD01, there has not been an appreciable change in the operation of the Japanese SBT fleet.
        - The number of hooks reported for 2009 (which was approximately half the number of hooks reported for 2008) was obtained from RTMP data, which is based on vessels targeting SBT. This is provisional information and the final number of hooks is likely to be slightly higher when data for the entire fleet becomes available through the official logbooks.
    - Taiwan advised that:
        - Reported observer coverage rate in 2009 related to vessels seasonally targeting SBT, which was 34 vessels from a total fleet of 67 vessels. The reported observer coverage rate excluded the SBT bycatch vessels.

- In the 2009 fishing season, five observers were placed on six vessels seasonally targeting SBT. Two observers were dispatched to two SBT fishing vessels operating in the southern and western Indian Ocean. Due to another mission for these two observers, they had just come back to Taiwan, so their data are still being compiled and had not yet been included in the national report. The record in the national report is for the 2009 calendar year.
- The SBT catches in 2008 and 2009 from 25° to 40°S in the Atlantic Ocean were due to bycatch from the Atlantic albacore fishery operating in the western waters off South Africa.

- Australia advised that:
  - It does not have an estimate for its recreational catch in 2009. The recreational catch is managed by the individual Australian states and recreational catch surveys are not conducted on an annual basis. The Commonwealth is discussing with states regarding how annual estimates can be obtained in the future.
  - The length frequency sampling of the purse seine fishery is currently obtained through the "40 fish" sampling regime of tow cages and the sample size was therefore at least 40 fish from each of about 30 tow cages.
  - Small scale purse seining occurred on the east coast in 2009. It is not certain if this will continue, but it is not expected to expand. The SBT caught were of a size consistent with that of the ETBF longline catch and were thus reported as part of that fishery rather than the Great Australian Bight purse seine fishery.
- General comments arising from the discussion of national reports included that:
  - All mortalities (including discards/releases and recreational catches) should be reported. If mortalities are to be included in assessments, this needs to go back in time and be provided for all fleets. The meeting considered this under agenda item 10.
  - New Zealand noted that their direct ageing data indicated that ages 7, 8, 9 and 10 were well represented in the charter fleet catch despite being known to be poor year classes. Some Members suggested the possibility of ageing error. Participants agreed to examine this further and compare the results with cohort sliced data intersessionally.
  - Given the recent reductions in Indonesia's monitoring program, particularly the consequences for representativeness of observer coverage, the ESC agreed on the importance of obtaining data and monitoring of the Indonesian fishery, which takes place in the spawning ground, for both key assessment data and the close kin project.
  - It was noted that some Members had not achieved the target observer coverage of 10% of effort during the 2009 season and they were encouraged to do so in future years.

### *4.2 Secretariat Review of Catches*

18. The Secretariat presented paper CCSBT-ESC/1009/04. Revisions to the paper were provided for the 2009 catches of Japan and the European Union. With the

revisions, the estimated SBT catch for the 2009 calendar year was 11,916t, including the unreported catch scenarios. The global SBT reported catch by flag is shown at **Attachment 4**. The unreported catch estimate scenarios have not been included in **Attachment 4**, and the Secretariat advised that Attachment A of CCSBT-ESC/1009/04 should remain confidential due to the unreported catch and surface fishery bias scenarios contained in that Attachment.

19. Summary statistics from the Trade Information Scheme (TIS) included in Attachment B of the Secretariat's paper showed 8 cases where the annual total catch from the TIS was higher than the nationally reported catch. Taiwan advised that the single case relating to its catch (in 2003) was due to weights for the TIS being measured at sea, which is not as accurate as its landed weight measurements (which were lower). According to Taiwan's regulations, fishers are requested to report landed weight after the sale of the catch relating to each TIS document. Taiwan advised that the landed whole weight was not higher than its reported catch. Taiwan will provide the detailed data to the Secretariat for comparison. This will be footnoted in any future TIS reports containing this information. Korea advised that it would work with the Secretariat to resolve the differences between the TIS estimates and its nationally reported catches.

20. The Secretariat distributed descriptions of product types (processed states) provided intersessionally by Australia, Japan and New Zealand as requested by the previous meeting of the Extended Scientific Committee (ESC). It was noted that there were differences in the descriptions of both "gilled and gutted" and "dressed" product of Australia and Japan. The main difference for gilled and gutted product was whether it included tail on or off. For dressed product, the main difference was whether it included the head or not. The Secretariat advised that for the CCSBT's Catch Documentation Scheme, it would probably be necessary to distinguish between the two types of gilled and gutted product and between the two types of dressed product.

## Agenda Item 5. Australian SBT Farm Study

21. Japan presented CCSBT-ESC/1009/21 on age composition of Australian farmed SBT in 2009, which was estimated based on data on size at harvest. The paper presented age decompositions based on length frequencies using the framework of a mixture of normal distributions, estimated independently for each month and product type. The age composition was estimated as 18% for age 2, 33% for age 3, 48% for age 4 and 1% for age 5. The total catch of the Australian purse seine fisheries in the 2009 fishing season was estimated to be 6,529t using the methodology in paper 21. This figure is 30% larger than the reported Australian purse seine catch (5,005t). The paper recommended urgent examination of the bias in the 40 fish sampling, which is used by Australia to calculate its reported purse seine catch, and improvement of the method used to obtain the age composition and amount caught by the Australian surface fishery.

22. The ESC noted that this topic was discussed in detail at the 2009 ESC meeting, and recalled the comments of the independent scientific panel and individual members at that time.

23. Australia reiterated its concerns that the approach has an inherent bias because final harvest weights (and lengths) at the individual pontoon and fish level are affected by a range of factors, including different farming, feeding and holding practices, as well as differential growth rates at different ages, different grow-out periods, and the variable size of fish going into the farms. Australia requested Japan provide the raw shipment data used in its analysis (including dates and sources of shipments) so they could better understand the results produced. Australia also provided an update on progress with implementing the stereo video camera system for estimating catches from the surface fishery. Trials will take place in February 2011 covering 10% of SBT transferred. Following a tender process, a preferred provider has been selected to carry out the trial. The results of this trial will be presented at either the ESC or the Extended Commission meeting in 2011, pending completion of the trial including analyses. Japan emphasised the desirability that results be presented at the next meeting.

24. Japan provided additional clarifications of the methodology it used, noting the comments of the independent scientific panel at the 2009 ESC meeting that despite some potential technical problems, overall the methodology was an appropriate means of estimating catches from the surface fishery. However, Australia recalled the comments of the panel that the solution to estimating the surface fishery catch is not an improved analysis of length frequency data of imports, but rather the implementation of stereo video monitoring. Japan considered ensuring accurate data inputs (including estimates of surface fishery catches) was particularly important in the context of adopting a management procedure for setting future TACs. Japan further noted that while stereo video monitoring held great potential for improving estimates, that at this stage it was important to look at a range of methodologies.

25. The meeting also briefly discussed other potential sources of information for verification of data from the surface fishery, including growth rates from tag seeding data, and weight and length information from the catch documentation scheme. It was noted that such data could be of value, and that the Compliance Committee would consider such matters, noting that the discussions under agenda item 12 of the ESC meeting were also of relevance. Japan offered to supply the R code used in the analysis presented in paper 21, but noted that because of the way that the data were collected and confidentiality issues, they were unable to agree to provide the data used in the analysis to Australia at this time.

## Agenda Item 6. Monitoring of Japanese markets

26. The ESC considered papers CCSBT-ESC/1009/31 and CCSBT-ESC/1009/32, which present updates from Australia and Japan, respectively, on monitoring of Japanese domestic markets.

27. Japan presented CCSBT-ESC/1009/32. This document is an update of the reports on Japanese domestic market monitoring. This monitoring has been conducted to validate the reported SBT catch by the Japanese longline fisheries. The calculation methods are almost the same as the Independent Review of Japanese SBT Market Anomalies Report (JMR) in 2006. The ratio of wild/farmed frozen fish at Tsukiji market, domestic/imported ratio of auctioned fish, and time-lag

information between catch and sale were all updated. These are the major differences between this document and the Australian document (CCSBT-ESC/1009/31). Recent discrepancies between reported catch and estimated catch were small; therefore Japan concluded that there was no evidence for under/over-catch reporting by Japanese longline vessels.

28. In presenting paper 31, Australia emphasised the potential value of such market analyses as an additional source of information for verifying data on SBT catches. Australia noted that it continued to follow the methodology outlined in the JMR, despite likely changes in some components (e.g. the ratio of wild to farmed fish, and the ratio of domestic to imported fish). Australia noted its support for greater transparency on market data, and raised some specific questions about how the updated information had been collected and applied; in the interim Australia considered it appropriate to continue to apply the JMR methodology until these issues were resolved and data made available for analyses by other Members.

29. Paper 31 provided estimates of retrospective Japanese domestic unreported catch of SBT for 2007, 2008 and 2009 using the methods and assumptions of the 2006 JMR, updating the paper presented at ESC14 in 2009 (CCSBT-ESC/0909/9). Estimates of unreported catches for Case 1 ranged from 1,409 t to 2,986t. Since 2008, a number of assumptions applied by the JMR have been revised by Japan (see CCSBT-CC/0810/21). These revisions alter the estimates of Japanese domestic wild SBT sold through Japanese seafood markets appreciably. Australia noted that although these revisions are plausible given the changes in the fishery, little information to support these revisions has been made available. Specifically, to ensure confidence and transparency in the market-based estimates of Japanese domestic catches, it was recommended that the following data be provided: 1) the auction data for Tokyo and Yaizu markets and other emerging markets (i.e. the weight and number of the SBT that had been auctioned); 2) the catching flag-state of the SBT being auctioned at those markets and comparison with import data. In addition, a separation in the data from wholesalers between auction and non-auction sales was requested. With the pending implementation of the MP, Australia noted that all Members should continue to ensure accuracy in their catch estimates to resolve uncertainties in global catches.

30. Japan noted that its market monitoring is undertaken to confirm that its fisheries management system is effective, with the aim of eliminating the possibility of illegal catches being landed by its fleet. Japan considered the level of accuracy of its market monitoring was sufficient, and did not think it would be worthwhile to use more detailed data than the data used in paper 32 for the revised calculations as requested by Australia.

## Agenda Item 7. Report from the Joint Meeting of Tuna RFMOs on the Provision of Scientific Advice

31. The Secretariat provided some background to the Kobe process and the outcomes of the Kobe II workshop on provision of scientific advice. The Chair and Executive Secretary prepared a table outlining the recommendations of the workshop, noting the status of the recommendations in relation to the CCSBT (completed/underway or not, relevance to CCSBT, and recommendations relating

to further action including opportunities for improvements in current actions). The table was discussed and modified by the meeting, with the final table provided at **Attachment 5**.

## Agenda Item 8. Report from the CPUE modelling group

8.1 Report from the intersessional work

32. The Chair of the CPUE modelling working group (Professor John Pope) gave a summary of the intersessional work that has been undertaken since the 2009 meeting of the ESC. A web meeting was conducted in March 2010, and discussions were held during the Operating Model and Management Procedure Technical Meeting (OMMP) in Seattle (June 2010). The report of the CPUE modelling work is Attachment 5 of the OMMP report.

33. Four issues were identified for discussion at the OMMP meeting in Seattle: 1) further investigation of 2008 data and CPUE estimate, 2) post 2006 changes in the operation of the Japanese LL fishery, 3) MP meta-rules for CPUE and 4) the need to specify the method of CPUE standardisation for the MP.

34. At the OMMP meeting, three papers were presented:

- CCSBT/OMMP/1006/08 provided an update of CPUE standardisations to include 2009 data.
- CCSBT/OMMP/1006/09 discussed the change in operation patterns in the Japanese LL fishery subsequent to management changes in 2006. The main change seen has been an extended fishing season. There has been a sharp decrease in effort in areas 5 and 6 in part due to the decrease in quota for Japan.
- CCSBT/OMMP/1006/11 reviewed the CPUE standardisation and recommended that the year interaction terms be dropped.

35. Additional runs were made during the course of the meeting to clarify the effect of including various interaction terms. The V3 model "reduced base case" was evaluated as an alternative to the base model V6. Although trends in the unweighted series were somewhat different, the area weighted series showed very similar trends, and the increase in CPUE in 2008 was robust across alternative models.

36. The CPUE standardisation process for pre-1986 data was discussed. The method used at present involved updating this every year. To stabilise calibration between the pre and post 1986 series, it was decided to freeze the historical series based on the fit and the calibration in 2010, which used data up to 2008.

37. Subsequent to the Seattle OMMP meeting, paper CCSBT/ESC/1009/24 was produced for the 2010 meeting of the ESC.

### *8.2 Report of Discussions at the ESC*

38. The CPUE modelling group met in the margins of the ESC. A report of the discussions is attached in **Attachment 6**.

39. The group agreed that the base case CPUE series (see **Attachment 7**), adjusted for the effect of an assumed 25% unreported catch, be used for MP implementation.

40. The group agreed the need to continue to check for appreciable changes in the fishing patterns of the Japanese longline fleet that might result from changes to management in 2006. They thanked Japan for the reports they had provided and requested that these be continued.

41. The group considered that meta-rules relating to CPUE should be handled as part of the wider set of meta-rules. However, the group also considered it would be wise if they also closely monitored the base series against other CPUE series in order to detect early signs of any problems that might emerge. Suitable monitoring series were agreed and are described in **Attachment 6** and the proposed new series are specified in **Attachment 7**.

42. The group discussed its future work program at agenda item 14.

## Agenda Item 9. Report from the Third Operating Model and Management Procedure Technical Meeting

43. The Chair of the Operating Model and Management Procedure Technical Meeting (OMMP), held in Seattle in June 2010, provided a summary of the outcome of the meeting. The meeting discussed the recommendations from the 2nd Strategy and Fisheries Management Working Group (SFMWG) in April 2010 regarding tuning options, short term checkpoints, maximum and minimum TAC changes, frequency of TAC change and implementation time lags. The operating model and data inputs were reviewed. A change was made to the specification of the aerial survey in the OM. The range of values for steepness was revisited and a decision was made to maintain the five steepness values agreed in 2009, and to use the likelihood weighting for sampling of steepness values. The reference set and robustness trials were updated and a list of robustness trials was compiled in paragraph 65 of the OMMP report.

44. A large range of candidate MPs were presented, based on empirical, model based and fuzzy logic methods. Some set the TAC based on CPUE slope or target CPUE, while some used aerial survey data or CPUE data or both. From these candidates, two MPs were chosen for further evaluation. The two MPs selected use both the CPUE series and the aerial survey series. One (BREM) is model-based and the other (HK) is empirical. Details were specified at the meeting on additional features that should be explored within these MPs for 2010 ESC meeting.

## Agenda Item 10. Development of Management Procedure

### *10.1. Evaluation of performance of candidate MPs*

45. The author presented paper CCSBT-ESC/1009/29. This was a concept paper suggesting a possible future MP or assessment model based upon the non centred moments of size distributions. The use of a moment based model is attractive because it is parsimonious, closely linked to measures of biological interest

(abundance and biomass) and can be updated by a linear process whose structure can be based upon the established growth, mortality and maturity schedule of the stock. These features make it well adapted to using an extended Kalman filter approach to making updates of the state-vector that take account of the annual observations of CPUE and the aerial survey.

46. The paper shows the model could be adapted to provide an MP but might also be used to make both short and long term assessments. For example the model provides estimates of long-term yield and SSB under combinations of harvest rate and size selection.

47. The ESC noted the potential value of the approach but also that the concept had not been developed as an MP for selection.

48. Paper CCSBT-ESC/1009/10 provides an updated analysis of the performance of the estimation part of the "Biomass Random Effect Model" (BREM) suite of MPs, which includes an additional year of CPUE data (2009) and scientific aerial survey (2010) data since the OMMP meeting, as well as the changes made to the BREM harvest control rule given the recommendations from the 3rd OMMP meeting. The estimation procedure performed well on the latest set of historical data that are inputs to the MP itself. The changes to the harvest control rule were flexible enough to accommodate the OMMP recommendations. The fixed parameters and default settings of the MP were detailed.

49. The OMMP meeting had requested that some changes be examined in the BREM models, to reduce the reactivity and this was explored as a memory effect where the TAC calculated by the MP includes a proportion of the previous year's TAC. The memory effect helps to smooth the TAC changes and to reduce fluctuations.

50. Paper CCSBT-ESC/1009/11 details an initial evaluation of the updated BREM suite of MPs. As with previous MP work using the BREM model there was a clear trade-off between short-term average catch and the probability of future SSB declines together with the speed of the SSB rebuilding. In terms of robustness trials, MP performance was negatively affected (relative to the reference set) by the pessimistic trials and the CPUE trials where catchability is artificially increased in the period post-2006. The less reactive the MP, the more the performance decreased, in terms of rebuilding and avoiding further SSB declines. For optimistic trials, more reactive MPs performed better in terms of higher average catches, without any observable decrease in SSB rebuilding performance. Little difference was observed in performance, relative to the reference set, for the robustness trials relating to how much over-catch contributes to CPUE, alternative over-catch histories, the tag mixing hypothesis for the 1990s tagging data and the $SSB_0$ regime-shift trial (new $SSB_0$ estimated from 1978 to the present).

51. CCSBT-ESC/1009/22 presented evaluation results of the "HK" MP using empirical algorithms to determine TACs using information from the longline CPUE series and the aerial survey (AS) index. The authors have revised the MPs based on recommendations made during the third OMMP meeting held in June 2010. The exploration of HK variants showed that this MP can behave in a variety of ways as its control parameters and sub-algorithms are changed. In the document, the authors put forward five MPs from the variants to cover a wide range from less reactive to more reactive. Comparison of these five MPs showed

that MPs with larger TAC reduction in the early years, which might not be preferred from a socio-economic viewpoint, enable quicker stock rebuilding and greater TAC increases in later years, while still achieving the same long-term management target for spawning biomass recovery (though this comparison is complicated by transient effects). The authors also examined the effect of constraints and implementation conditions such as the implementation time lag used for this MP exercise. For example, the time lag did not impact on results for the reference set (Fig. A9b of CCSBT-ESC/1009/22).

52. The choice of the number of years over which the trend in CPUE is measured was discussed in the meeting. Five and seven years were considered reasonable, but 10 years was considered too long and it was suggested that 3 or 4 years could give anomalous results. CCSBT-ESC/1009/22 compared biomass statistics for two time periods for the CPUE trend. MPs that used the shorter time period (the trend calculated over five years) showed a slightly higher risk to biomass than MPs that used the longer time period (seven years), as a result of higher initial TACs given the recent upward trend in the CPUE data.

53. Questions were raised regarding the possibility of a change in carrying capacity of the stock and if MPs will result in relatively low TAC for the very long term. The question was posed of whether the MPs had a mechanism to deal with these possibilities. Respondents noted that the MP targets are low fractions of initial biomass, and that the initial goal is to rebuild to small fractions of $SSB_0$ or BMSY, and therefore the actual values of $SSB_0$ and the carrying capacity of the stock are not important at this point in time. How the MPs perform for a different $SSB_0$ level was examined in the regime-shift robustness test shown in paper CCSBT-ESC/1009/11, where the effect was observed to be minimal. It was noted that estimating carrying capacity and $SSB_0$ would be an important task to be conducted in a stock assessment, and is not a question to be resolved by the MP; however, performance of the MP could be assessed in terms of this issue in the review process (in the medium term timeframe).

54. Further discussion of the performance of the MPs occurred in a technical working group, as documented in **Attachment 8**.

### *10.2. Finalise MP selection to recommend at CCSBT 17*

55. The ESC recommended three candidate MPs for consideration at CCSBT 17.

56. The recommended MPs were selected by comparing the trade-off in catch, and the risk to the biomass in the short to medium term. The rationale for selecting from the candidate MPs is documented in **Attachment 8**.

57. The ESC selected two MPs, which cover two types of performance in terms of reactivity to input data signals: 1) a more “reactive” MP, which has on average lower catches in the short term, a lower risk to biomass in the short term, and higher catches in the longer term, and 2) a less “reactive” MP which has higher average catches in the short term, and a higher risk to biomass in the short term. The two MPs were different in terms of model structure; one is a model based MP that uses a target for CPUE and aerial survey to set the TAC, the other is an empirical MP that uses trend in CPUE and aerial survey target to set the TAC. Both MPs were tuned to the 6 tuning levels requested at the SFMWG2.

58. To show intermediate behaviour between these two MPs a combined procedure was tested, that uses both MPs to produce a TAC. The Commission could use any weighting to combine the two MPs and a 50% weighting for each MP was evaluated in the meeting.

59. The results provided here are for a 1-year lag in implementation of the TAC, which was one option requested at the SFMWG2. Results for MPs without the lag have not been provided in this meeting except for a variant of the HK MP. The difference between the two cases was evaluated at the OMMP meeting and it was agreed that there is only a very small effect for the reference set. If the Commission decides that there should not be an implementation lag, the two MPs can be retuned intersessionally (using the existing operating model and data) to provide the final MP parameters.

60. Results are presented for all tuning levels (see Table 2), but more detail is provided for tuning levels 5 (70% probability of 0.2 $SSB_0$ by 2040) and 2 (70% probability of $0.2SSB_0$ by 2035). It was agreed at the OMMP meeting, that tuning level 3 (90% probability of $0.2SSB_0$ by 2035) was the most risk averse, and did not provide enough contrast between MP results to enable selection based on performance. The general types of performance for all the other tuning levels were represented by tuning levels 2 and 5. Tuning level 5 provided more contrast in the performance results, and tuning level 2 provided a more risk averse tuning level.

61. The MPs that have been selected have been named MP1 and MP2, and the combined case based on 50% weighting of these two MPs is called “Average MP”.

62. Performance results for the recommended MPs are in Figs 1 to 6 and Table 1.

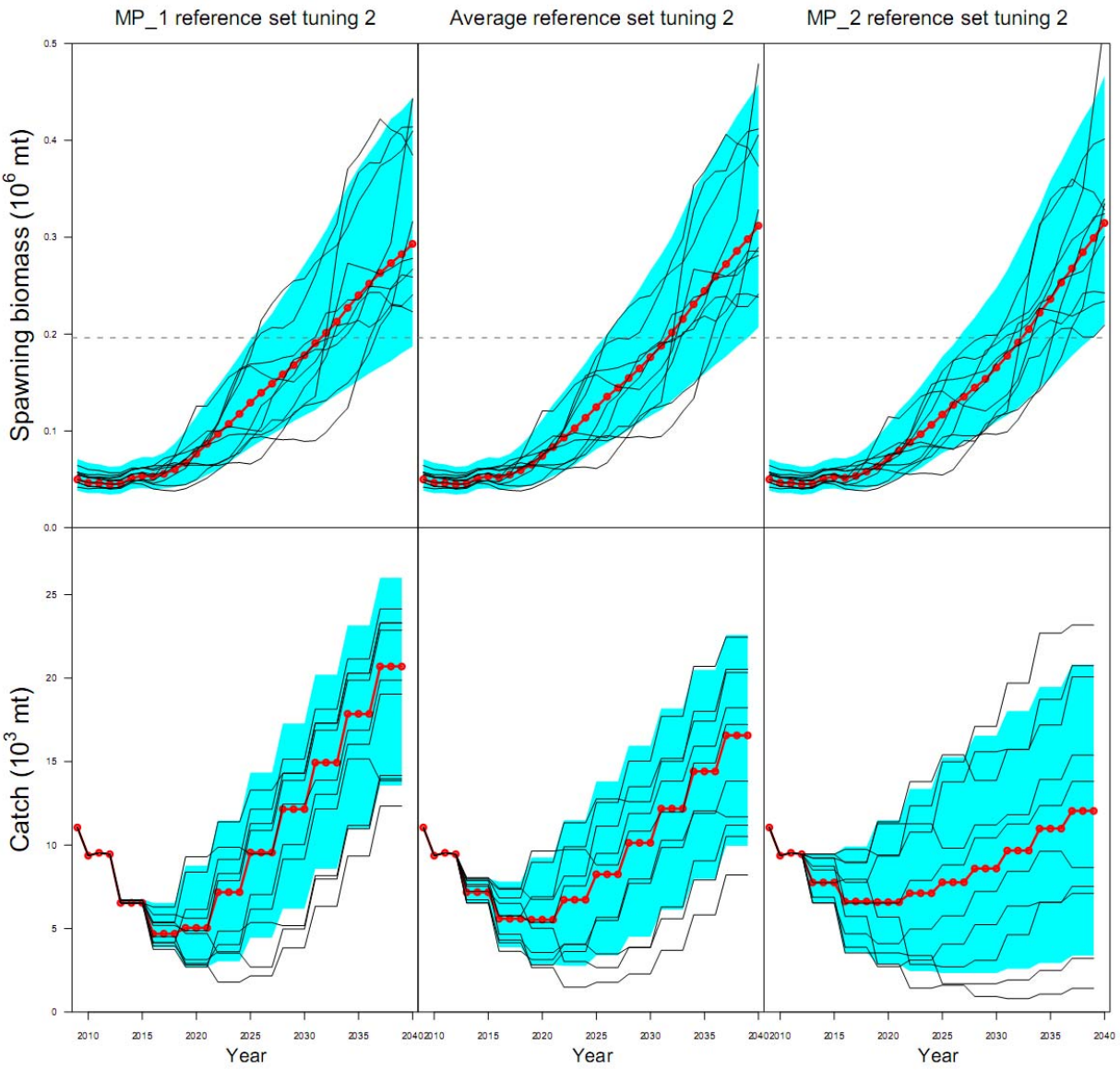


Figure 1. Projected spawning biomass (top row) and catch (bottom row) by MP (columns) for the reference set and **tuning option 2** (70% probability of $0.2SSB_0$ by 2035). The shaded regions represent range between the $10^{th}$ and $90^{th}$ percentile of the 2000 simulations and the individual lines represent a sample of the different realizations. The thick bulleted line represents the median from the simulations. The dashed line reflects the median estimate of $0.2SSB_0$.

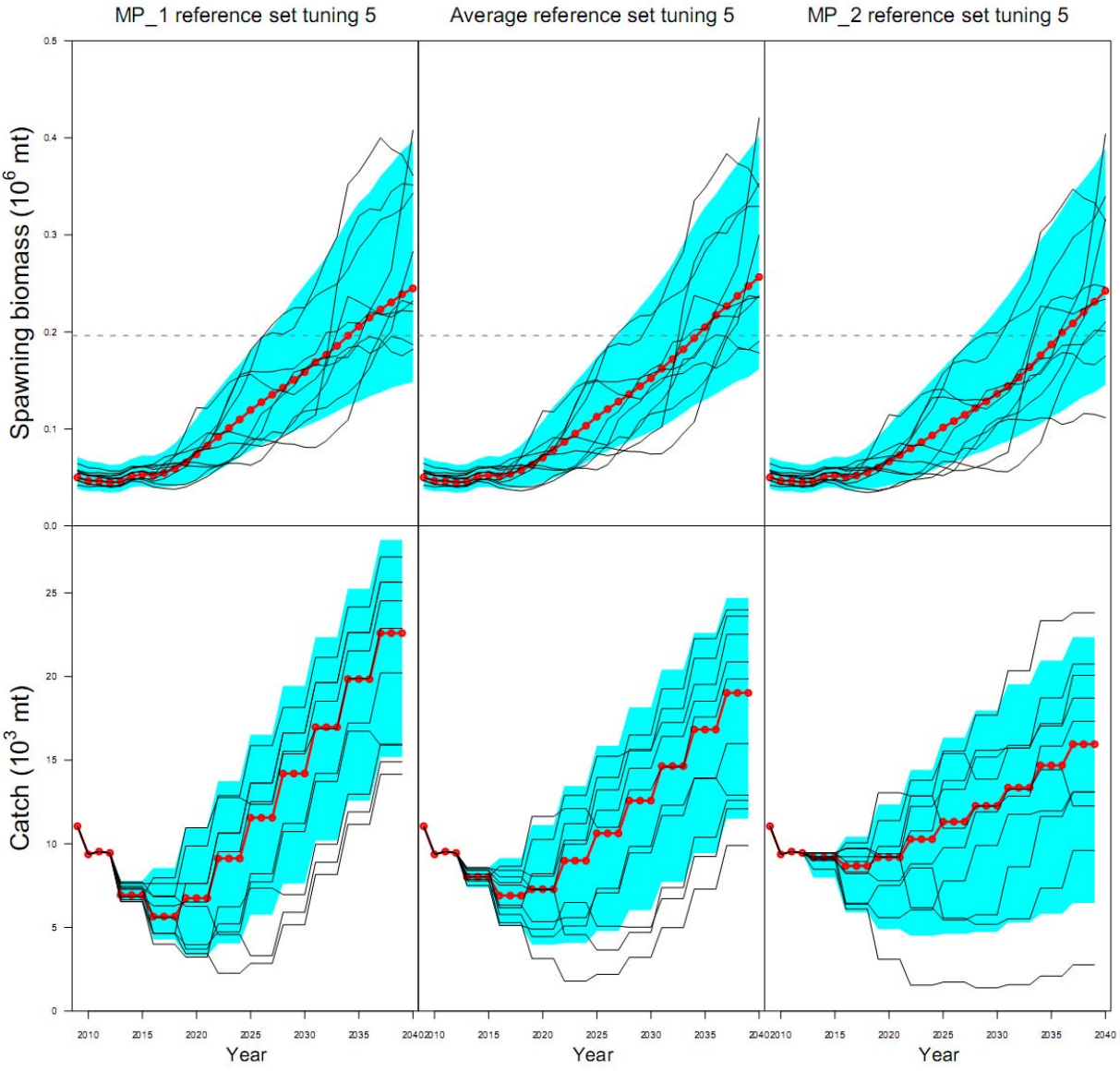


Figure 2. Projected spawning biomass (top row) and catch (bottom row) by MP (columns) for the reference set and **tuning option 5** (70% probability of $0.2SSB_0$ by 2040). The shaded regions represent range between the $10^{th}$ and $90^{th}$ percentile of the 2000 simulations and the individual lines represent a sample of the different realizations. The thick bulleted line represents the median from the simulations. The dashed line reflects the median estimate of $0.2SSB_0$.

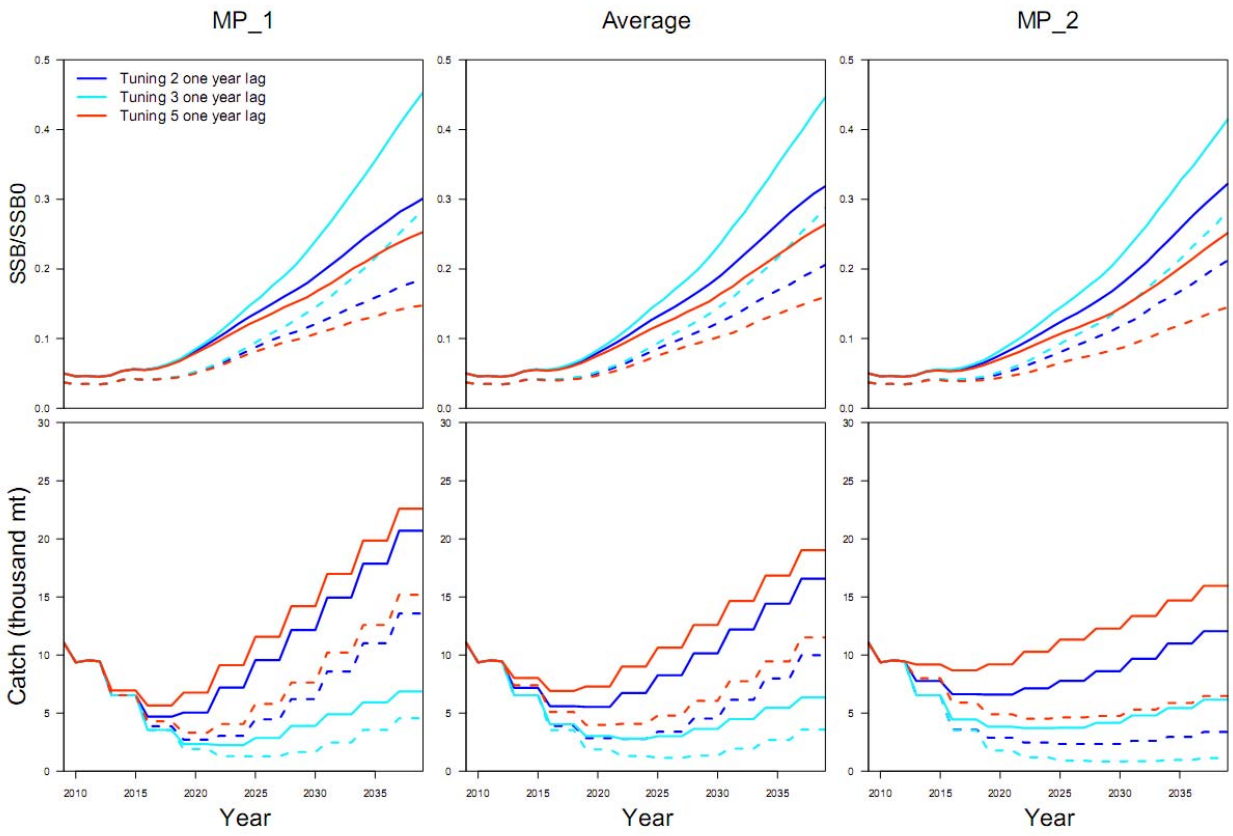


Figure 3. Projected spawning biomass (top row) and catch (bottom row) by MP (columns) for the reference set and **three tuning options.** The solid lines represent the median values from the 2000 simulations and the dashed lines are the 10$^{th}$ percentiles.

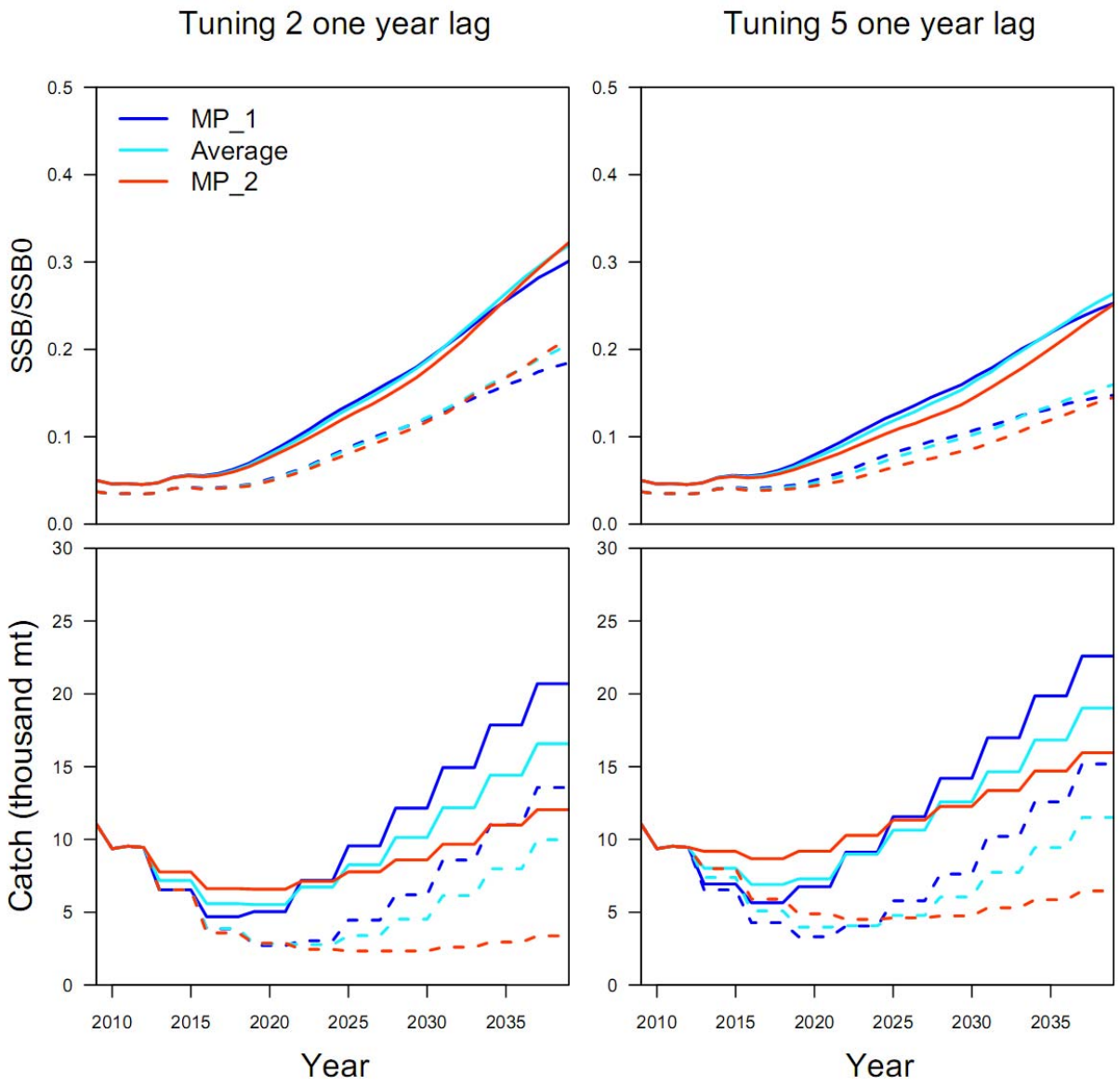


Figure 4. Projected spawning biomass (top row) and catch (bottom row) by two tuning options (columns) for the reference set and **three MPs.** The solid lines represent the median values from the 2000 simulations and the dashed lines are the 10$^{th}$ percentiles.

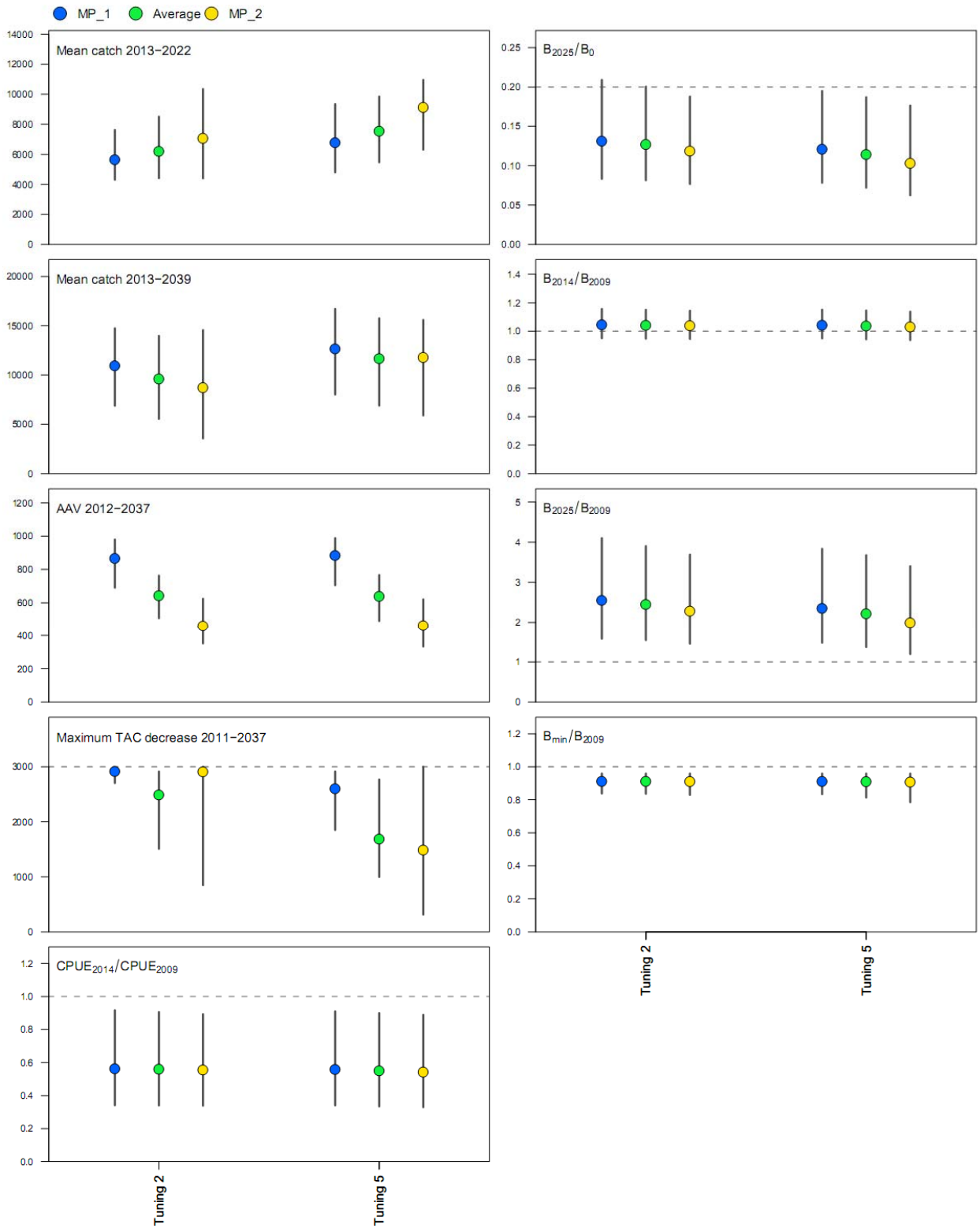


Figure 5. Summary statistics for catch (left column) and spawning biomass (right column) for the reference set over the three MPs (medians and 10$^{th}$ and 90$^{th}$ percentiles) and the two tuning levels (groups of points).

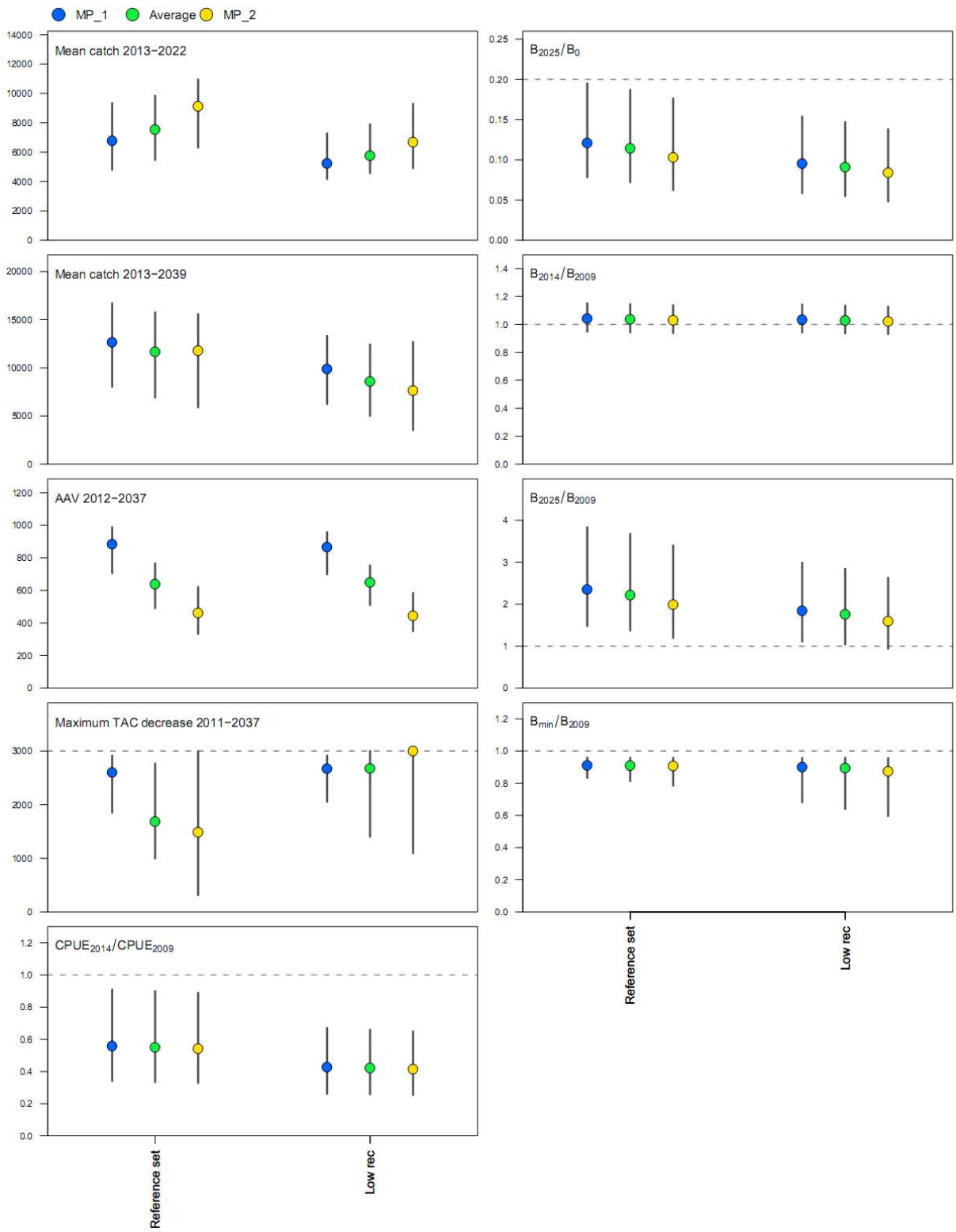


Figure 6. Summary statistics for catch (left column) and spawning biomass (right column) for the reference set over the three MPs (medians and 10$^{th}$ and 90$^{th}$ percentiles) comparing the reference set (left hand group of points) with the "low recruitment" sensitivity (right hand group).

Table 1. Tuning levels and check point years requested by the Commission. *NOTE:* $B_0$, $B_{2025}$ and $B_{2009}$ are in units of spawning biomass. Note that the bold face rows were selected for a number of figures and presentations.

| MP | Tune option | $P[B_T > 0.2B_0]$ | Tuning year ($T$) | Check point year ($t$) | $P[B_t > 0.1B_0]$ | $P[B_t > 2B_{2009}]$ | $\frac{B_{2025}}{B_{2009}}$ | Median avg. catch (2013-2022) | Median avg. catch (2013-2039) |
|---|---|---|---|---|---|---|---|---|---|
| Zero | NA | 0.99 | *2035* | *2022* | 0.89 | 0.86 | 3.88 | 0 | 0 |
| catch* | NA | 0.99 | *2040* | *2025* | 0.99 | 0.97 | 3.88 | 0 | 0 |
| MP_1 | 1 | 0.60 | 2035 | 2022 | 0.45 | 0.41 | 2.42 | 6,340 | 12,070 |
| | **2** | **0.70** | **2035** | **2022** | **0.48** | **0.44** | **2.55** | **5,640** | **10,930** |
| | 3 | 0.90 | 2035 | 2022 | 0.53 | 0.49 | 2.83 | 3,960 | 4,370 |
| | 4 | 0.60 | 2040 | 2025 | 0.66 | 0.61 | 2.22 | 7,480 | 13,450 |
| | **5** | **0.70** | **2040** | **2025** | **0.71** | **0.66** | **2.35** | **6,770** | **12,650** |
| | 6 | 0.90 | 2040 | 2025 | 0.79 | 0.76 | 2.60 | 5,310 | 10,250 |
| MP_2 | 1 | 0.60 | 2035 | 2022 | 0.34 | 0.29 | 2.16 | 7,920 | 9,990 |
| | **2** | **0.70** | **2035** | **2022** | **0.38** | **0.33** | **2.28** | **7,060** | **8,710** |
| | 3 | 0.90 | 2035 | 2022 | 0.50 | 0.46 | 2.65 | 4,810 | 4,770 |
| | 4 | 0.60 | 2040 | 2025 | 0.49 | 0.44 | 1.90 | 9,470 | 12,510 |
| | **5** | **0.70** | **2040** | **2025** | **0.53** | **0.49** | **1.99** | **9,120** | **11,770** |
| | 6 | 0.90 | 2040 | 2025 | 0.66 | 0.62 | 2.22 | 7,420 | 9,260 |
| Average MP | 1 | 0.63 | 2035 | 2022 | 0.40 | 0.35 | 2.33 | 6,870 | 10,760 |
| | **2** | **0.73** | **2035** | **2022** | **0.43** | **0.40** | **2.45** | **6,190** | **9,600** |
| | 3 | 0.90 | 2035 | 2022 | 0.52 | 0.48 | 2.76 | 4,370 | 4,390 |
| | 4 | 0.65 | 2040 | 2025 | 0.59 | 0.56 | 2.10 | 8,170 | 12,560 |
| | **5** | **0.76** | **2040** | **2025** | **0.64** | **0.60** | **2.21** | **7,540** | **11,660** |
| | 6 | 0.93 | 2040 | 2025 | 0.74 | 0.70 | 2.46 | 6,180 | 9,210 |

*Note that for the zero catch projection, the year that 20% $SSB_0$ is attained for the $10^{th}$, $50^{th}$, $90^{th}$ percentiles are 2022, 2025, and 2030 respectively.

### *10.3. Specification of input data and methods used to calculate indices for MP implementation*

63. The CPUE modelling group agreed that the base CPUE series used for MP testing should be used for MP implementation. A full specification is provided in **Attachment 7**.

64. Paper CCSBT-ESC/1009/14 details the survey protocols, data and standardisation models explored for the aerial survey in 2010. A final specification for the standardisation model and dataset used to provide an index for use in the MP can be found in **Attachment 9.**

65. The two recommended MPs use the scientific aerial survey index of abundance, and the longline CPUE data (see paragraph 41).

66. The ESC discussed the need for verification of the input data to the MP and OM.

67. Australia presented paper CCSBT-ESC/1009/13 describing the information requirements associated with the implementation of the MP. These requirements include the collection and verification of the key data inputs that drive the MP (i.e. global catches, longline CPUE, scientific aerial survey) and the resourcing necessary to acquire that data. Verification of longline CPUE is of particular importance as it represents the underlying index of exploitable biomass. One method of verifying longline CPUE data is through the use of a Regional Observer Program, as is used in other regional fisheries management organisations. In addition, the raw data used to calculate the key data inputs (i.e. shot x shot CPUE data) should be exchanged among Members for greater

transparency and confidence in the outcomes of the MP. Information that will further inform the MP includes a regular review process, such as an annual review of the fishery indicators and stock assessments conducted every three years, and routine model code updates and maintenance.

68. Australia presented paper CCSBT-ESC/1009/30 describing the elements of a potential Regional Observer Program (ROP) for CCSBT. In order for Members and Co-operating Non-Members to have greater confidence in key data inputs to the MP, particularly longline CPUE data, and noting the shortcomings of the CCSBT Scientific Observer Program, such as the low coverage rates, it is timely to consider the development of an ROP. An ROP could build on current national observer programs by facilitating the international exchange of national observers; these international observers could be augmented by independent observers from non-Members. An ROP could also provide other benefits in the long term, such as information on bycatch and discarding.

69. The objectives of the ROP proposed in paper 30 include verification of key data sources for use in the MP. It was recognised that independent observers are one method for data verification and collection, but that other methods also exist. It was acknowledged that not all the required data can be collected by observers, but that there were many potential positive gains in data collections and verification that can be obtained by observers. It was noted that some of the national observer programs in 2009 were not providing the 10% coverage of catch and effort mentioned in the CCSBT Resolution on action plans to ensure compliance with Conservation and Management Measures. It was also noted that the data currently collected by national observer programs could potentially be used more effectively to provide greater confidence in the CPUE series and catch reporting data.

70. Electronic monitoring can mitigate some of the difficulties associated with deploying observers to sea for long periods of time and meet higher coverage levels, but these types of programs will provide different data to human observer programs. In Australia, cameras are being trialled on board vessels in the Eastern Tuna and Billfish Fishery.

71. The high cost of the ROP was raised and Australia suggested that costs could be offset from funds already used for national observer programs.

72. It was agreed that there should be ongoing monitoring and verification of the key data sets for the MP and OM, including CPUE indices, aerial survey and catches.

73. In relation to questions about verification of data from the scientific aerial survey, it was noted that it is a fishery independent index and has different issues compared with CPUE, which is a fishery dependent index. Technical questions do exist regarding the aerial survey and Australia invited interested participants to further engage in discussions of this work. The cost of the aerial survey has been covered by Australia since its inception, and Australia will raise the issue of resourcing the survey at the Extended Commission, now that it is an established and critical input to the OM and MP.

74. A proposal to update and implement a version control system for the OM and MP codes was put forward. Australia offered to employ a programmer to undertake this work under the direction and review of Ana Parma, Hiro Kurota and Rich

### *10.4. Evaluation of Need for Emergency Measures (Metarule Process)*

75. Paper ESC/1009/12 presented a potential structure for a metarule process within the current MP framework. The paper used the meta-rule process outlined in the previous MP work as the basis (attachments 8 and 9 from the report of the 4th Management Procedure Workshop), with some changes and additions given the current OM, robustness trials and candidate MPs. The basic structure of a metarule was outlined and five relevant example categories were given - covering new knowledge, updated OM results, plausibility of new data, exceptional circumstances, and missing MP input data - along with example metarule triggers and potential responses. Issues of scientific relevance (reviewing MP performance, data submission, implementation) were also addressed. General conclusions of paper 12 are; that fewer general meta-rules are preferred to a large number of case-specific and detailed metarules and that these should be a well-defined process for arriving at decisions in the event of a metarule being triggered. Paper 12 also suggested small changes that are likely to make little difference should be discouraged and a sensible review schedule for the MP and the OM that does not impact the efficacy of the MP is advisable.

76. A metarules process is specified in **Attachment 10** and provides a broad overview of the processes to determine if exceptional circumstances exist and how to proceed in such cases. Exceptional circumstances may include recruitment values outside the range for which the MP was tested, aerial survey or CPUE results outside the range for which the MP was tested and substantial improvements in knowledge or missing input data for the MP. The ESC recommended that the indicators are reviewed each year, a stock assessment is conducted every three years and a review of the MP every six years as specified in **Attachment 10**.

## Agenda Item 11. SBT Assessment, Stock Status and Management

### *11.1. Review of fisheries Indicators*

77. Japan presented papers CCSBT-ESC/1009/23 and 25 and tabled papers CCSBT-ESC/1009/20, 24, and BGD paper 1 for questions; a summary of each paper is provided.

78. Paper CCSBT-ESC/1009/23 presents a summary of the fisheries indicators. Various indicators examined generally support a view that the current stock levels for 3, 4, 5, 6&7 age groups are above those observed in the late 1980s, which are the historically lowest levels. When looking at recent years, CPUE indices for these age classes show increasing trends. Age classes 8-11 and 12+ tend to be stable after 2003 with some variability. Current levels for these age groups, however, are still low and similar to those observed in the recent past. Many indices indicate low recruitment of 1999, 2000, 2001, and 2002 cohorts. The indices for past acoustic survey suggested sequential low recruitments for these four years. On the other hand, some inconsistencies in recruitment level

estimates are evident from comparisons between some fishery-dependent indicators and the results of the 2005 and 2006 acoustic surveys. The longline CPUE indices for age 3 in 2007, for age 4 in 2009, and for age 5 in 2009 show large upturns. Whether these large positive upturns reflected increased stock abundance and/or the introduction of the individual quota system to the Japanese longline fishery is still unknown.

79. Japan reported the results of the trolling survey carried out in January 2010 in CCSBT-ESC/1009/25. The survey was carried out for 18 days in southern Western Australia including 6 days on the piston-line. 149 SBT were tagged with CCSBT conventional tags and released. The trolling index, the number of SBT age one school per 100 km searched, was higher for the 2005-2009 year classes than the 1995-1998 year classes when taking into account both the trolling survey and the trolling catch data in the acoustic survey.

80. The Secretariat was thanked for their assistance and support for this project. The ESC encouraged Japan to continue this research in upcoming years.

81. In response to a query on the method used in generating the trolling index, Japan noted that the trolling index is actually comprised of three different indices that have changed over time. They all reflect the number of SBT schools per 100 km, but were not merged or converted to be quantitatively the same.

82. In CCSBT-ESC/1009/20, Japan reported that otoliths were collected from 327 individual SBT in 2009. Ages were estimated for 190 individual SBT which were caught between 2007 and 2008 with an age range of 2 to 29, and the data were submitted in the CCSBT data exchange process.

83. Japan presented CCSBT-ESC/1009/24 which provides a summary of standardized CPUE for the longline fishery for SBT which is used for input to the MP. The paper describes data preparation, the base model and other models for CPUE standardization using GLM.

84. For CCSBT-ESC/1009/26, Japan presented the results of the acoustic tagging in Western Australia 2009-10, a joint program involving Japanese and Australian scientists and providing useful information on survey design of the trolling survey in terms of SBT distribution and migration. Listening stations were deployed off the western and southern coast of Western Australia, and 146 age-1 SBT were released with acoustic tags. So far, 28 SBT were detected but there was no evidence of movement between the west and south coast this year.

85. Japan presented CCSBT-ESC/1009/BGD01 which concerned monitoring changes in the operating pattern of Japanese SBT longliners in 2009 resulting from the introduction of the individual quota system in 2006. Changes observed in 2009 in catch and effort are considered to be the results not only of the change of the fishery regulation system but also of the changes of TAC, age composition of the SBT stock and complex socio-economic factors.

86. Australia presented papers CCSBT-ESC/1009/9, 14 and information paper 2 and tabled papers CCSBT-ESC/1009/15, 16, 17 and Information paper 3 for questions; a summary of the paper is provided.

87. Australia presented paper CCSBT-ESC/1009/09 on fishery indicators. Overall, there were positive signals in the indicators in 2009. The general increase in many of the indicators may be reflective of improvements in the status of the

stock, as well as the reduction in global catches. Two of the three indicators of juvenile (age 1–4) SBT abundance in the Great Australian Bight exhibited increases over the past 12 months (scientific aerial survey index and surface abundance per unit effort (SAPUE) / commercial spotting index). Similarly, indicators of age 4+ SBT exhibited some upward trends such as the New Zealand domestic catch per unit effort (CPUE). However, the trolling index and mean age of SBT on the Indonesian spawning grounds declined.

88. Paper CCSBT-ESC/1009/14 provides an update on the scientific aerial survey of juvenile SBT in the Great Australian Bight. The estimate of relative juvenile abundance from the 2010 scientific aerial survey is the highest estimate since 1996; however, it remains lower than the average level in the period 1993-1996. The current year (2010) was the first year that planes with only one observer were part of the survey. The results provided for the CCSBT data exchange used only data from flights with two observers in order to make them directly comparable to results provided in past. In order to include the data from flights with only one observer, the analysis needs to take into account the fact that the number of sightings is expected to be fewer with one observer than with two observers. A method for doing so was proposed in last year's report (CCSBT-ESC/0909/12) and is described in greater detail in this year's report. Paper ESC/1009/14 notes that the environmental conditions in 2010 were highly favourable for spotting bluefin, with lower average wind speed and higher average sea surface temperature (SST) than experienced in any of the past surveys. New data, especially data from extreme conditions, can appreciably affect the estimated model coefficients and, consequently, the relative abundance estimates; thus, the covariates being included in the models and their influence on the abundance indices were explored. Results are presented which highlight the complexity of model selection and the importance of regularly exploring the models as new data become available.

89. Information paper 2 gave an update on progress with the "SBT close-kin abundance estimation project", in which the adult spawning stock size is estimated from the number of parent-offspring pairs found when comparing DNA samples of juvenile and adult SBT. The method requires very few assumptions, is fishery-independent, and is not vulnerable to the reporting-rate issues that can plague conventional tagging programs. Nearly 5000 fish have now been genotyped. About 1/3 of the planned number of checks have now been made, and a number of definite parent-offspring pairs have been found. The current results are not for abundance estimation because sample sizes are still too small and because more pairs might be revealed by quality-control checks which are not yet complete. The project is on track to deliver an estimate of absolute spawner abundance (backdated to c. 2006) by CCSBT 2011, and collection of samples is continuing so that a time series of estimates can be developed in future. Extrapolating from results so far, the number of pairs found by next year may limit the ability to conduct model-checking. This could be addressed by genotyping some or all of the 18000 samples that are held in reserve.

90. In response to questions on Information paper 2, it was noted that an increase in sample size is expected, at a minimum, to linearly increase the number of parent and offspring pairs (POPs) found - with extra increases of both juvenile and adult sampling levels this increase is stronger than linear. However, a pro rata increase in the number of POPs scaled to the expected total sample size (7000 samples)

would result in a number of POPs that is slightly below the provisionally expected number.

91. Paper CCSBT-ESC/1009/15 detailed the processing of the sighting data of SBT schools in the Great Australian Bight (GAB) into a fishery-dependent index of juvenile SBT abundance (surface abundance per unit effort or SAPUE). Spotting data have now been collected and analysed over nine fishing seasons (from 2001/2002 to 2009/2010). As with previous analyses seasonal, temporal, spotter and environmental covariates were used in the standardisation model and targeting effects were also explored. As before abundance estimates from the 2003 and 2004 seasons (expected to cover the 1999-2002 cohorts) were the lowest of the series, with the 2010 estimate the highest of the series, with an estimate around 1.5 times the series mean and lower confidence bound around 1.25 times the series mean.

92. Paper CCSBT-ESC/1009/16 provided an update on Australia's otolith sampling from SBT caught by the Australian surface fishery, CSIRO tagging operations, and the recreational fishery during the 2009/10 fishing season. Age was estimated for 100 SBT caught by the surface fishery in the 2008-09 season from otoliths collected and archived last year. The proportions at age of SBT caught in the surface fishery for the 2001/02 to 2008/09 seasons were estimated using three methods – the standard Age-Length Key, the Morton and Bravington method with known growth, and the Morton and Bravington method with unknown growth.

93. Paper CCSBT-ESC/1009/17 updated previous analyses of SBT length and age data from the Indonesian longline fishery operating out of the port of Benoa, Bali. Length-frequency data for 2009–10 and age-frequency from direct ageing data for 2008–09 spawning seasons are now available for the fishery. As noted in previous reports to the ESC, considerable change has occurred in the size distribution of SBT caught on the spawning ground since monitoring began.

    - Length distribution: the mean of the size distribution declined from 188.1 to 166.8 cm between 1993–94 and 2002–03, and has fluctuated between 168.3 and 171.0 cm over the following six seasons. In 2009/10, the mean length of SBT caught was 168.5 cm.
    - Age distribution: the mean of the age distribution declined from around 19–21 years in the mid- and late-1990s to around 14–15 years since 2001–02. In the 2007–08 season, the mean age of SBT caught was 16.7 years and this declined slightly in 2008/09 to 15.6 years.

94. Paper CCSBT-ESC/1009/Info-3 provided an update on progress in the Global Spatial Dynamics project and the workplan for 2010-2011. This project involved the archival tagging of juvenile (2–4 year old) SBT from South Africa to New Zealand, with the objective of estimating movement and mixing rates and periods of residency in different parts of this range. The project has been implemented as a collaborative project between New Zealand, Taiwan and Australia, with a total of 568 archival tags being released in New Zealand, Australian, central Indian Ocean and South African waters with 73 tags recaptured. The tag deployment phase of the project has been completed, and the analysis phase will be completed in the next 12 months. As reported last year, the movement patterns of the archival tags returned in the 2000s differ from those seen from the archival tagged fish released during the 1990s in the extent of their eastward and

westward movements. These analyses are currently being updated. The development of approaches to combine archival and conventional tagging data in a spatial mark recapture model is near completion. Modelling of movement dynamics and seasonal residence times has also commenced. The approach is based on the integration of position, temperature and depth data from tags with oceanographic data.

95. The following is a summary of the fishery indicators. Indicators are also summarised in **Attachment 11**.

*Trends in juvenile abundance*

- Two of the three indices of juvenile abundance—the scientific aerial survey index and SAPUE index for age 2 to 4 in the GAB—exhibited increases over the past 12 months while the trolling index for age 1 in Western Australia exhibited a decline. The updated estimate of the 2010 scientific aerial survey was above the 2005–10 average, the estimate of the 2010 trolling index was below the 2006–09 average of the piston line survey, and the estimate of the SAPUE index was above the 2002–09 average. However, the scientific aerial survey index for ages 2-4 in the GAB has fluctuated with no clear trend over 2005–2010.
- The level of longline CPUE for age 3 in 2009 was slightly higher than the 2005–2009 average.
- The trolling indices for the 2005–2010 year classes are higher than for the 1999–2002 year classes.

*Trends in age 4+ SBT*

- Indicators of age 4+ SBT exhibited some upward trends.
- CPUE in the New Zealand domestic fishery increased in 2009 compared with 2008. In the New Zealand charter fishery, the CPUE for area 5 increased in 2009 compared to 2007. Although the CPUE for area 6 declined slightly in 2009 from 2008, the CPUE is still well above the ten year mean. The proportion of age 5 SBT increased in both fisheries.
- Median size of SBT caught on the Indonesian spawning grounds increased in 2009 from 2008, but then decreased in 2010. Median age of SBT on the Indonesian spawning grounds decreased in 2009 compared with 2008.
- Standardised CPUE for age classes 4, 5, 6 & 7, 8-11, and 12+, all showed increasing trends in 2007-2009 and the index levels in 2009 were above the 2005–2009 average.

### *11.2. Maximum sustainable yield and available yield when the interim reference rebuilding target is reached*

96. The April 2010 SFMWG meeting requested that the ESC provide estimates of both Maximum Sustainable Yield (MSY) and the replacement/equilibrium yield at the interim rebuilding target (20% of $SSB_0$). However, Member scientists felt more time was required to fulfil the request in light of the complex modelling issues: changes in growth rate potentially related to decreased stock abundance

(density-dependent growth), recruitment variability, and changes in selectivity pattern.

97. The meeting was reminded of the specifics of the MSY calculation in relation to the current conditioning code – in particular the key assumptions about selectivity, catch allocation and growth. It was agreed that any method for estimating MSY should use the most recent fishery-specific selectivity ogives but also assume that the catch allocation across fisheries be maintained at a pre-specified level. Given the observed changes in growth over time it was acknowledged that the current assumption of constant future growth at the current rate may not be correct. However, it was agreed that this remains a sensible first assumption in future calculations, until such time as the group is provided with analyses that can address the issue.

98. The meeting agreed that a priority for the coming year would be to address the scientific challenge of providing a robust estimate of MSY and other related reference levels. Members of the group stated their intention to investigate MSY estimation methods that can incorporate stochastic recruitment and growth variability, as well as the parametric uncertainty covered by the grid approach for the reference set of operating models, and report this work to the ESC in 2011. It was also noted that any new methods should include the same assumptions about selectivity and allocation as the conditioning code to ensure as much comparability as possible between any new methods and the current method. It was agreed that alternative MSY calculations should be made based on a stock-recruit relationship estimated from 1978 to the present (as done for the regime-shift robustness trial).

99. A number of proposed methods for estimating the annual replacement yield at the interim SSB rebuilding target were discussed. The simplest proposal was to use a deterministic approach similar in principle to that used in the current conditioning code to estimate MSY. A second proposal was to run constant catch projections using one of the tuned MPs (from either 2035 or 2040) until a catch level is found that maintains the median SSB at the interim level (20% of $SSB_0$). It was observed that, although this approach provides reasonable results, a number of SSB trajectories declined to zero even while the median SSB level was maintained at the interim level. Given that members expressed their intentions to incorporate stochasticity in MSY calculations it was suggested that this issue could be addressed in these analyses.

### *11.3. Status of the SBT Stock*

100. The 2009 ESC meeting reported the status of the SBT stock in 2009 based on the reconditioned CCSBT Operating Model (OM). The reference set OM and six plausible scenarios all indicated that the spawning stock biomass (SSB) remained at a very low level; typically about 5% or less of $SSB_0$.

101. As reported in the 2009 ESC, recruitments during the last two decades were estimated to be well below the levels over 1950-1980. Recruitment in the 1990s fluctuated at a low level without any overall trend, but recruitments for 2000 to 2002 were poor. The two following year classes were somewhat stronger, though still below the average 1990s level. Recruitment since 2005 cannot be estimated

precisely as yet. Although some data give positive signals, it remains probable that at least some of these year classes were as weak as in 1999-2002.

102. The 2009 ESC recommended a reduction to the current TAC in order to rebuild the spawning stock and thereby also reduce the risk in the short term of further poor recruitments. Based on this recommendation, the Extended Commission reduced the effective catch limit by about 20% to 9449 t (average annual catch for 2010-11).

103. Since the assessment in 2009, there have been several positive signals about the outlook for the stock. These include:

- Reduction in the total reported global catch
- Confirmation of increases in longline CPUE since 2007 (as checked in the inter-sessional CPUE analyses)
- Increased scientific aerial survey and SAPUE indices (reflective of potentially improved recruitment of recent year classes).

104. Increases in a number of CPUE indices in the most recent years, such as the New Zealand domestic fishery and Japanese longline fishery for age classes 4 and 5 suggest stronger year classes in recent years. Caution should nevertheless continue to be exercised in interpreting the longline CPUE data, where there is underlying uncertainty in the past data and regarding potential changes in fishing operation patterns since 2006, which remains to be resolved.

105. The ESC advice on the estimated status of the stock based on indicators in 2009-10, remains unchanged from the advice provided by the ESC in 2009. The current SSB remains very low, however, the outlook for the stock may be more positive due to the factors described in paragraph 103.

106. The ESC updated the annual report on biology, stock status and management of SBT that it prepares for provision to FAO and the other tuna RFMOs. The updated report is at **Attachment 12**.

### *11.4. SBT Management Recommendations*

107. If the Management Procedure (MP) is implemented in 2011 with a 1-year lag, the ESC recommends that the current TAC of 9449t remain for 2012. If the MP is implemented in 2011 with no lag, the ESC recommends that the MP guide the TAC setting for 2012.

108. Noting the Extended Commission's intent to adopt an MP at its 2010 annual meeting, the ESC recommends that the Extended Commission take steps to ensure accurate future catch and effort reporting.

## Agenda Item 12. Data Confidentiality and Exchange

### *12.1. Data Confidentiality Rules and Arrangements*

109. The Secretariat presented paper CCSBT-ESC/1009/07 in relation to proposed CCSBT data confidentiality rules and arrangements.

110. A working group was established to consider the draft "Rules and Procedures for the Protection, Access to, and dissemination of Data Compiled by the CCSBT" from the Secretariat's paper. The group considered the draft rules and suggested a number of minor revisions. The revised rules are provided at **Attachment 13**. Some items within the revised rules are square bracketed for further consideration by the Compliance Committee or Extended Commission.

### *12.2. Recommended Requirements for Exchange of Confidential Data in 2011*

111. The meeting noted that this issue was raised at the meetings of the Strategy and Fisheries Management Working Group (SFMWG) and Extended Commission. The SFMWG in 2009 noted the importance of providing data at a suitable level of resolution, which for catch and effort data was considered to be the operational level. The SFWMG also agreed that if the confidentiality issues could be overcome then it should be possible for Members to provide operational level data.

112. Some Members of the ESC reiterated the importance of providing operational level longline catch and effort data in order to better interpret the CPUE data, which are a key input to the Management Procedure, and to provide increased transparency and confidence in the data. The Members noted recommendation four of the Kobe II science workshop on this topic, and the results of the CCSBT performance review and the draft Strategic Plan.

113. Some Members also considered it important to obtain access to the length/weight data collected through the CCSBT Catch Documentation System and to provide other information, such as tag seeding data, that could be used to further interpret the growth rate of farmed fish.

114. Consensus was not achieved for the provision of any of the above confidential data items.

### *12.3. Requirements for Data Exchange in 2011*

115. It was agreed that future analyses by the ESC should be based on data using the new growth curve. Consequently, the data exchange requirements for 2011 incorporate a transition to using the new growth curve, including provision for an evaluation of the resultant data before final transition to the new growth curve. The agreed data exchange requirements for 2011 are provided at **Attachment 14**.

## Agenda Item 13. Research Mortality Allowance

116. Japan presented CCSBT-ESC/1009/27, which was a proposal for the recruitment monitoring survey including a trolling survey in 2010/2011. Japan also requested permission to use CCSBT tags for the survey.

117. Japan advised that its Research Mortality Allowance (RMA) utilisation in the 2009/2010 season was 214.3kg as reported in CCSBT-ESC/1009/28. Japan also

presented an application for 1.0t of RMA for the 2010/2011 season for the above surveys.

118. The Extended Scientific Committee endorsed Japan's request for a RMA and the usage of CCSBT tags.

## Agenda Item 14. Workplan, Timetable and Research Budget for 2011

### *14.1. Overview, time schedule and budgetary implications of proposed 2011 research activities.*

***Tag recovery in 2011***

119. The Secretariat presented paper CCSBT-ESC/1009/05, which provided an update of the surface fishery tagging program, including a proposed budget for tag recoveries in 2011. It was noted that there has been an increase in the number of recaptures where the primary and secondary tags from single fish were being reported separately and with slightly different information. The Secretariat requested Members to advise their fishers that rewards are provided for each tag (not each fish), so it would be preferable if the tags were reported together with the correct information. The Secretariat also noted that the decline in longline tag recoveries from 2007/08 to 2008/09 may not be as large as indicated in the paper because additional tag recovery data were received after completion of the paper. Japan noted that the reduction in tag recoveries was also due to the increasing number of years since the SRP tagging finished and/or catch reductions.

120. The meeting endorsed the proposed tag recovery budget for 2011 and the Secretariat's recommendation for cessation of freezer vessel sampling in 2011.

***Stock assessment in 2011***

121. A small group convened to discuss a number of issues that need to be addressed in preparation for the stock assessment to be presented at the ESC meeting in 2011. At a minimum a revised stock assessment will involve:

- An update of the OM code by including the two most recent years of data in conditioning.
- Evaluation of the effects of updating the size at age parameters used in the conditioning code and for ageing the catch.
- Investigation of stock status with respect to conventional reference points: MSY and spawning-biomass per recruit relative to unfished conditions (see agenda item 11.2 for details relating to MSY).
- Estimation of annual surplus production associated with a stock rebuilt to the intermediate recovery target of 20% $SSB_0$ (see agenda item 11.2 for details).

122. Possible modifications to the current operating model were also considered, including incorporation of results from the close-kin analysis, dealing with the current uncertainty relating to the selectivity of the aerial survey, and development of approaches to include data from the recent SRP tagging program.

123. If the close-kin analysis proceeds as expected, estimates of the size of the spawning stock and associated error will become available. The sensitivity of the

model estimates to the potential incorporation of this information (given possibilities of bias) as a new likelihood term would need to be examined.

124. No new information on stock structure is expected for next year that might motivate modifications in how stock structure is modelled. The close-kin analysis will require larger sample sizes and an increase in the number of matches in order to allow investigation of different issues related to the dynamics of the spawning stock (e.g. differential residence times and other spawning behaviour not captured in the current maturity ogive). Australia is also conducting a longer-term project that uses archival tags to evaluate global spatial dynamics of SBT. While any further advances will be reported for next year's ESC, results will not be available to become part of the stock assessment.

125. Estimates of longline discards/releases from the Japanese fishery are available since 2009. Alternatives for incorporating this new information into the assessment model will need to be developed.

126. In addition to the current OM, other assessment models may be used. The benefits of using different types of models in the assessment were emphasized.

127. The meeting considered that in order to complete the tasks outlined and allow sufficient time for evaluation of sensitivity of the stock assessment to new approaches and new information, a small technical meeting would need to be convened around July 2011 to give enough time for member scientists to conduct analyses after the new data become available. Sufficient time should be allowed between the technical meeting and the ESC.

128. A proposal from Australia to revise and verify the current OM code, which has become the default base model used to conduct stock assessments was discussed and endorsed. The current code was developed over many years and by different people, with many changes in model assumptions and approaches. It needs to be cleaned and a version-control system needs to be implemented to ensure transparency and reliability.

***Summary workplan***

129. The ESC developed the following workplan for 2011:

| Activity | Approximate Period | Resources or approximate budgetary implications |
|---|---|---|
| Continuation of tag recovery efforts. | Tag recovery is continuous. | $27,470 for tag recovery as per draft budget in Attachment E of CCSBT-ESC/1009/05. |
| Provide SBT Stock Status report to the other tuna RFMOs. | Sep-Nov 10 | N/A |
| Update and verify OM & MP code | Oct-Dec 10 | Australia [FG] leading, with advisory input from Australia [RH], Japan [HK] and the MP coordinator |
| Special Data Exchange to implement usage of the new growth curve | Sep 10 – Jan 11 | N/A |
| Evaluation of re-calculated data based on the new growth curve | Feb - Mar | N/A |
| Standard Scientific Data Exchange. | Apr – Jul | N/A |

| Activity | Approximate Period | Resources or approximate budgetary implications |
|---|---|---|
| Update OM with latest data | Early July (*preliminary aerial survey index not available till late June*) | Allocate 3 days for MP development work by MP Coordinator during 2011 (*not just this update*) |
| Provision of CPUE monitoring series (as specified in the report of the CPUE modelling group) | Jun – Jul | Australia and Japan |
| Evaluation of trends in CPUE series and interpretation of CPUE results to identify any potential difficulties. | Jun – Jul | Members and JP [allocate 1 day in case results indicate web meeting required] |
| Intersessional small technical meeting to:<br>• Update stock assessment & evaluate stock status with respect to reference points (MSY & spawning biomass per recruit),<br>• Evaluation of new alternative models & procedures,<br>• Consider new abundance estimates (e.g. Close Kin) and ways to incorporate new discard information,<br>• Run MP and evaluate projections,<br>• Discussion of CPUE series evaluation. | 5 days, mid July, Seattle. | 1 interpreter; no Secretariat; 15 panel days (AP, JI, JP), 5 consultant days (TB), plus associated expenses and travel days. |
| Extended Scientific Committee for the 16th meeting of the Scientific Committee meeting. | 7 days (*could be less depending on Seattle outcome*), Sep 4-10, Bali. | ESC Chair, full panel including consultant, full interpretation and Secretariat involvement. |

### *14.2. Timing, length and structure of next meeting*

130. The next ESC meeting is proposed to be for 7 days and held from 4 September to 10 September 2011, in Bali, Indonesia. The ESC noted that the time required for its 2011 meeting could be less if the proposed Seattle meeting does not encounter any difficulties in the assessment.

## Agenda Item 15. Other Matters

131. New Zealand provided a brief verbal update on the preliminary ecological risk assessment (ERA) for seabirds and sea turtles that was agreed at the eighth meeting of the Ecologically Related Species Working Group in 2009. In association with ACAP (Agreement on the Conservation of Albatrosses and Petrels), New Zealand is undertaking the ERA, along with other members of CCSBT who wish to participate. The assessment will use a 'level 1' methodology consistent with that used by other RFMOs including IOTC and ICCAT.

132. The level 1 methodology examines potential risk by looking at the overlap of fishing effort with seabird distribution, which can be supplemented by additional information e.g. on vulnerability of specific seabird species, and expert opinion

on risks. A two-step process was outlined, first considering the basic risk assessment and then subsequently considering management of risks that are identified. In response to a question, New Zealand clarified that where available, observer data on seabird captures is useful to go beyond a relative risk scale based only on overlap of fishing effort and bird distribution.

## Agenda Item 16. Adoption of Meeting Report

133. The report was adopted.

## Agenda Item 17. Close of meeting

134. The meeting closed at 6:35pm on 9 September 2010.

## List of Attachments

Attachment

1. List of Participants
2. Agenda
3. List of Documents
4. Global Reported Catch by Flag
5. ESC Consideration of Recommendations from the Meeting of Experts to share Best Practices on the Provision of Scientific Advice
6. Report of CPUE Discussions
7. Specification of standardised CPUE for the MP
8. Summary of MP technical working group selection and discussion of the MPs
9. Data and Model Specifications for the Aerial Survey Index used in the MP
10. CCSBT Management Procedure: METARULE Process
11. Trends in selected indicators of the SBT stock
12. Report on Biology, Stock Status and Management of Southern Bluefin Tuna: 2010
13. Rules and Procedures for the Protection, Access to, and Dissemination of Data Compiled by the CCSBT
14. Requirements for the 2011 Data Exchange

**Attachment 1**

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**Attachment 2**

# Agenda

## Extended Scientific Committee for the Fifteenth Meeting of the Scientific Committee

## Taipei, Taiwan

## 4-9 September 2010

1. **Opening**
   - 1.1. Introduction of Participants
   - 1.2. Administrative Arrangements
2. **Appointment of Rapporteurs**
3. **Adoption of Agenda and Document List**
4. **Review of SBT Fisheries**
   - 4.1. Presentation of National Reports
   - 4.2. Secretariat Review of Catches
5. **Australian SBT Farm Study**
6. **Monitoring of Japanese markets**
7. **Report from the Joint Meeting of Tuna RFMOs on the Provision of Scientific Advice**
8. **Report from intersessional CPUE modelling work**
9. **Report from the Third Operating Model and Management Procedure Technical Meeting**
10. **Development of Management Procedure**
    - 10.1. Evaluation of performance of candidate MPs
    - 10.2. Finalise MP selection to recommend at CCSBT 17
    - 10.3. Specification of input data and methods used to calculate indices for MP implementation
    - 10.4. Evaluation of Need for Emergency Measures (Metarule Process)

**11. SBT Assessment, Stock Status and Management**

11.1. Review of fisheries Indicators

11.2. Maximum sustainable yield and available yield when the interim reference rebuilding target is reached

11.3. Status of the SBT Stock

11.4. SBT Management Recommendations

**12. Data Confidentiality and Exchange**

12.1. Data Confidentiality Rules and Arrangements

12.2. Recommended Requirements for Exchange of Confidential Data in 2011

12.3. Requirements for Data Exchange in 2011

**13. Research Mortality Allowance**

**14. Workplan, Timetable and Research Budget for 2011**

14.1. Overview, time schedule and budgetary implications of proposed 2011 research activities.

14.2. Timing, length and structure of next meeting

**15. Other Matters**

**16. Adoption of Meeting Report**

**17. Close of Meeting**

**Attachment 3**

**List of Documents**
**Extended Scientific Committee**
**for the Fifteenth Meeting of the Scientific Committee**

**(CCSBT-ESC/1009/)**

1. Draft Agenda
2. List of Participants
3. List of Documents
4. (Secretariat) Secretariat Review of Catches (ESC agenda item 4.2)
5. (Secretariat) Surface Fishery Tagging Program – an update
6. (Secretariat) Data Exchange (ESC agenda item 12.3)
7. (Secretariat) Data Confidentiality Rules and Arrangements (ESC agenda item 12.1)
8. (Australia) Preparation of Australia's southern bluefin tuna catch and effort data submission for 2010. Hobsbawn, P.I., Sahlqvist, P.
9. (Australia) Fishery indicators for the southern bluefin tuna stock 2009-10. Patterson, H., Preece, A., Hartog, J.
10. (Australia) Updated technical specifications and performance analyses for the BREM(Biomass Random Effect Model) suite of candidate management procedures. Hillary, R., Eveson, P., Basson, M., Davies C.
11. (Australia) Results of the performance of the BREM suite of candidate management procedures. Hillary, R., Giannini, F., Eveson, P., Basson, M., Davies, C., Barnes, B., Begg, G.
12. (Australia) Consideration of metarules for use with the newly developed MPs. Davies, C., Hillary, R., Basson, M.
13. (Australia) Data and information requirements for management procedure implementation. Begg, G., Giannini, F., Patterson, H.
14. (Australia) The aerial survey index of abundance: updated analysis methods and results for 2009/10 fishing season. Eveson, P., Farley, J., Bravington, M.
15. (Australia) Commercial spotting in the Australian surface fishery, updated to include the 2009/10 fishing season. Farley, J., Basson, M.
16. (Australia) An update on Australian otolith collection activities, direct ageing and length at age keys for the Australian surface fishery. Farley, J., Eveson, P., Clear, N.
17. (Australia) Update on the length and age distribution of SBT in the Indonesian longline catch. Farley, J., Andamari, R., Proctor, C.

18. (Japan) Report of Japanese scientific observer activities for southern bluefin tuna fishery in 2009/2010. Osamu Sakai, Tomoyuki Itoh, Yuujirou Akatsuka and Toshiyuki Tanabe
19. (Japan) Report of activities for conventional and archival tagging and recapture of southern bluefin tuna by Japan in 2009/2010. Osamu Sakai and Tomoyuki Itoh
20. (Japan) Activities of otolith collection and age estimation and analysis of the age data by Japan in 2009. Tomoyuki Itoh, Osamu Sakai, Akio Hirai and Kenichiro Omote
21. (Japan) Analysis of age composition of southern bluefin tuna used for farming in 2009. Tomoyuki Itoh, Tetsuya Kawashima and Takahisa Yamamoto
22. (Japan) Further evaluation of empirical management procedures based on longline CPUE index and aerial survey index. Hiroyuki Kurota, Ko Fujioka, Osamu Sakai, Norio Takahashi, and Doug S Butterworth
23. (Japan) Summary of Fisheries Indicators in 2010. Norio Takahashi and Tomoyuki Itoh
24. (Japan) CPUE standardization for MP input. Tomoyuki Itoh and Norio Takahashi
25. (Japan) Report of the piston-line trolling survey in 2009/2010. Tomoyuki Itoh and Osamu Sakai
26. (Japan) Preliminary report on west-to-south movement rate of juvenile southern bluefin tuna determined by acoustic tagging in Western Australia 2009-10. Ryo Kawabe, Alistair J. Hobday, Tomoyuki Itoh, Ko Fujioka, Osamu Sakai and Yoshimi Takao
27. (Japan) Proposal for the recruitment monitoring survey in 2010/2011. Tomoyuki Itoh, Osamu Sakai, Ryo Kawabe and Alistair J. Hobday
28. (Japan) Report of the 2008/2009 RMA utilization and application for the 2010/2011 RMA. Fisheries Agency of Japan, Government of Japan
29. (Panel) What might be learned for Management Procedure purposes from a simple Moment based and Kalman Filter tuned model of the SBT. John Pope
30. (Australia) Scoping study for the development of a CCSBT Regional Observer Program (ROP). Kirby DS, Begg G.
31. (Australia) Japanese market update 2010. Patterson H, Begg G.
32. (Japan) Monitoring on Japanese domestic markets: 2010 update. Sakai O., Itoh T., Yamamoto T. and Kawashima T.

**(CCSBT- ESC/1009/BGD)**

1. (Japan) Change in operation pattern of Japanese SBT longliners in 2009 resulting from the introduction of the individual quota system in 2006. Tomoyuki Itoh (Originally CCSBT-OMMP/1006/09)
2. (Australia) Updated analyses of tag return data from the CCSBT SRP tagging program. Eveson P, Polacheck T. (2009) (Originally CCSBT-ESC/0909/19)

**(CCSBT-ESC/1009/SBT Fisheries -)**

| | |
|---|---|
| Australia | Australia's 2008-09 southern bluefin tuna fishing season. Hobsbawn, P.I., Patterson, H., Begg, G. |
| New Zealand | Annual Review of National SBT Fisheries for the Scientific Committee, New Zealand, 2010 |
| Japan | Review of Japanese SBT Fisheries in 2009. Osamu Sakai, Tomoyuki Itoh and Tetsuya Kawashima |
| Taiwan | Review of Taiwan SBT Fishery of 2008/2009 |
| Korea | Review of Korean SBT Fishery of 2009 |
| Indonesia | Indonesia Southern Bluefin Tuna Fishery |

**(CCSBT-ESC/1009/Info)**

1. (Secretariat) Report of the Joint Tuna RFMOs Meeting of Experts to Share Best Practise on the Provision of Scientific Advice
2. (Australia) Update on the close-kin genetics project for estimating the absolute spawning stock size of SBT. Bravington, M., Grewe, P., Davies, C.
3. (Australia) Update on the global spatial dynamics archival tagging project - 2010. Basson, M., Eveson, P., Hobday, A., Landsdell, M.

**(CCSBT-ESC/1009/Rep)**

1. Report of the Third Operating Model and Management Procedure Technical Meeting (June 2010)
2. Report of the Second Meeting of the Strategy and Fisheries Management Working Group Meeting (April 2010)
3. Report of the Sixteenth Annual Meeting of the Commission (October 2009)
4. Report of the Fourteenth Meeting of the Scientific Committee (September 2009)
5. Report of the Operating Model and Management Procedure Technical Meeting (July 2009)

6. Report of the Strategy and Fisheries Management Working Group Meeting (April 2009)
7. Report of the Fifteenth Annual Meeting of the Commission (October 2008)
8. Report of the Thirteenth Meeting of the Scientific Committee (September 2008)
9. Report of the Ninth Meeting of the Stock Assessment Group and Fifth Meeting of the Management Procedure Workshop (September 2008)
10. Report of the Independent Expert on the Performance Review (September 2008)
11. Report of the Performance Review Working Group (July 2008)
12. Report of the Twelfth Meeting of the Scientific Committee (September 2007)
13. Report of the Eighth Meeting of the Stock Assessment Group (September 2007)
14. Report of the Second CPUE Modelling Workshop (May 2007)
15. Report of the Thirteenth Annual Meeting of the Commission (October 2006)
16. Report of the Eleventh Meeting of the Scientific Committee (September 2006)
17. Report of the Seventh Meeting of the Stock Assessment Group (September 2006)
18. Report of the Special Meeting of the Commission (July 2006)
19. Report of the Management Procedure Special Consultation (May 2005)
20. Report of the Fourth Meeting of the Management Procedure Workshop (May 2005)

# Attachment 4

**Global Reported Catch By Flag**

Reviews of southern bluefin tuna data presented to a special meeting of the Commission in 2006 suggested that the catches may have been substantially under-reported over the previous 10 to 20 years. The data presented here do not include estimates for this unreported catch.

Catches are presented as whole weights in tonnes. Numbers in **bold** font differ from those in Attachment 5 of the SC14 report. All shaded figures are subject to change as they are either preliminary figures or they have yet to be finalised. Blank cells are unknown catch (many would

| | Australia | | | New Zealand | | | | | | | | | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calendar Year | Commercial | Amateur | Japan | Commercial | Amateur | Korea | Taiwan | Philippines | Indonesia | South Africa | European Union | Miscellaneous | Research & Other |
| 1952 | 264 | | 565 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1953 | 509 | | 3,890 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1954 | 424 | | 2,447 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1955 | 322 | | 1,964 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1956 | 964 | | 9,603 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1957 | 1,264 | | 22,908 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1958 | 2,322 | | 12,462 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1959 | 2,486 | | 61,892 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1960 | 3,545 | | 75,826 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1961 | 3,678 | | 77,927 | 0 | | 0 | 0 | 0 | 0 | 145 | 0 | 0 | |
| 1962 | 4,636 | | 40,397 | 0 | | 0 | 0 | 0 | 0 | 724 | 0 | 0 | |
| 1963 | 6,199 | | 59,724 | 0 | | 0 | 0 | 0 | 0 | 398 | 0 | 0 | |
| 1964 | 6,832 | | 42,838 | 0 | | 0 | 0 | 0 | 0 | 197 | 0 | 0 | |
| 1965 | 6,876 | | 40,689 | 0 | | 0 | 0 | 0 | 0 | 2 | 0 | 0 | |
| 1966 | 8,008 | | 39,644 | 0 | | 0 | 0 | 0 | 0 | 4 | 0 | 0 | |
| 1967 | 6,357 | | 59,281 | 0 | | 0 | 0 | 0 | 0 | 5 | 0 | 0 | |
| 1968 | 8,737 | | 49,657 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1969 | 8,679 | | 49,769 | 0 | | 0 | 80 | 0 | 0 | 0 | 0 | 0 | |
| 1970 | 7,097 | | 40,929 | 0 | | 0 | 130 | 0 | 0 | 0 | 0 | 0 | |
| 1971 | 6,969 | | 38,149 | 0 | | 0 | 30 | 0 | 0 | 0 | 0 | 0 | |
| 1972 | 12,397 | | 39,458 | 0 | | 0 | 70 | 0 | 0 | 0 | 0 | 0 | |
| 1973 | 9,890 | | 31,225 | 0 | | 0 | 90 | 0 | 0 | 0 | 0 | 0 | |
| 1974 | 12,672 | | 34,005 | 0 | | 0 | 100 | 0 | 0 | 0 | 0 | 0 | |
| 1975 | 8,833 | | 24,134 | 0 | | 0 | 15 | 0 | 0 | 0 | 0 | 0 | |
| 1976 | 8,383 | | 34,099 | 0 | | 0 | 15 | 0 | 12 | 0 | 0 | 0 | |
| 1977 | 12,569 | | 29,600 | 0 | | 0 | 5 | 0 | 4 | 0 | 0 | 0 | |
| 1978 | 12,190 | | 23,632 | 0 | | 0 | 80 | 0 | 6 | 0 | 0 | 0 | |
| 1979 | 10,783 | | 27,828 | 0 | | 0 | 53 | 0 | 5 | 0 | 0 | 4 | |
| 1980 | 11,195 | | 33,653 | 130 | | 0 | 64 | 0 | 5 | 0 | 0 | 7 | |
| 1981 | 16,843 | | 27,981 | 173 | | 0 | 92 | 0 | 1 | 0 | 0 | 14 | |
| 1982 | 21,501 | | 20,789 | 305 | | 0 | 182 | 0 | 2 | 0 | 0 | 9 | |
| 1983 | 17,695 | | 24,881 | 132 | | 0 | 161 | 0 | 5 | 0 | 0 | 7 | |
| 1984 | 13,411 | | 23,328 | 93 | | 0 | 244 | 0 | 11 | 0 | 0 | 3 | |
| 1985 | 12,589 | | 20,396 | 94 | | 0 | 241 | 0 | 3 | 0 | 0 | 2 | |
| 1986 | 12,531 | | 15,182 | 82 | | 0 | 514 | 0 | 7 | 0 | 0 | 3 | |
| 1987 | 10,821 | | 13,964 | 59 | | 0 | 710 | 0 | 14 | 0 | 0 | 7 | |
| 1988 | 10,591 | | 11,422 | 94 | | 0 | 856 | 0 | 180 | 0 | 0 | 2 | |
| 1989 | 6,118 | | 9,222 | 437 | | 0 | 1,395 | 0 | 568 | 0 | 0 | 103 | |
| 1990 | 4,586 | | 7,056 | 529 | | 0 | 1,177 | 0 | 517 | 0 | 0 | 4 | |
| 1991 | 4,489 | | 6,477 | 164 | | 246 | 1,460 | 0 | 759 | 0 | 0 | 97 | |
| 1992 | 5,248 | | 6,121 | 279 | | 41 | 1,222 | 0 | 1,232 | 0 | 0 | 73 | |
| 1993 | 5,373 | | 6,318 | 217 | | 92 | 958 | 0 | 1,370 | 0 | 0 | 15 | |
| 1994 | 4,700 | | 6,063 | 277 | | 137 | 1,020 | 0 | 904 | 0 | 0 | 54 | |
| 1995 | 4,508 | | 5,867 | 436 | | 365 | 1,431 | 0 | 829 | 0 | 0 | 201 | 296 |
| 1996 | 5,128 | | 6,392 | 139 | | 1,320 | 1,467 | 0 | 1,614 | 0 | 0 | 295 | 290 |
| 1997 | 5,316 | | 5,588 | 334 | | 1,424 | 872 | 0 | 2,210 | 0 | 0 | 333 | |
| 1998 | 4,897 | | 7,500 | 337 | | 1,796 | 1,446 | 5 | 1,324 | 1 | 0 | 471 | |
| 1999 | 5,552 | | 7,554 | 461 | | 1,462 | 1,513 | 80 | 2,504 | 1 | 0 | 403 | |
| 2000 | 5,257 | | 6,000 | 380 | | 1,135 | 1,448 | 17 | 1,203 | 4 | 0 | 31 | |
| 2001 | 4,853 | | 6,674 | 358 | | 845 | 1,580 | 43 | 1,632 | 1 | 0 | 41 | 4 |
| 2002 | 4,711 | | 6,192 | 450 | | 746 | 1,137 | 82 | 1,701 | 18 | 0 | 203 | 17 |
| 2003 | 5,827 | | 5,770 | 390 | | 254 | 1,128 | 68 | 565 | 15 | 3 | 40 | 17 |
| 2004 | 5,062 | | 5,846 | 393 | | 131 | 1,298 | 80 | 633 | 19 | 23 | 2 | 17 |
| 2005 | 5,244 | | 7,855 | 264 | | 38 | 941 | 53 | 1,726 | 24 | 0 | 0 | 5 |
| 2006 | 5,635 | | 4,207 | 238 | | 150 | 846 | 50 | 598 | 9 | 3 | 0 | 5 |
| 2007 | 4,813 | | 2,840 | 379 | 4 | 521 | 841 | 46 | 1,077 | 41 | 18 | 0 | 3 |
| 2008 | **5,033** | | 2,952 | 319 | 0.4 | 1,134 | **913** | 45 | 926 | 45 | **14** | 4 | 10 |
| 2009 | 5,108 | | 2,659 | 419 | 0.1 | 1,117 | 916 | 47 | 641 | 32 | 2 | 0 | 0 |

**European Union** From 2006, estimates are from EU reports to the CCSBT. Earlier catches were reported by Spain and the IOTC.

**Miscellaneous:** Before 2004, these were from Japanese import statistics (JIS). From 2004, the higher value of JIS and CCSBT TIS was used combined with available information from flags in this category.

**Research and other:** Mortality of SBT from CCSBT research and other sources such as discarding practices in 1995/96.

**Retrospective catch estimate scenarios:** The Longline catch scenario here is as updated at SC13, and the Surface scenario is 20% as used in the past

*: JIS for 1993, 1994 and 1998 are higher than these official statistics and are: 117, 147 and 1897 respectively. Assessments would normally use

**Attachment 5**

## ESC Consideration of Recommendations from the Meeting of Experts to share Best Practices on the Provision of Scientific Advice

(√ = underway, done or recommended, X=not underway and not done, P=partially underway/done, or partially relevant, ?=uncertain)

| | *Underway / Done* | *Recommendation when not underway* | |
|---|---|---|---|
| | | *Not currently Relevant to the CCSBT* | *Recommended to Commence/Improve* |
| ***Routine data collected by year: Catch, effort and size data*** | | | |
| 1. All members of t-RFMOs are called upon to give a top priority to the provision of data of good quality in a timely manner, according to the existing mandatory data requirements of tuna RFMOs, in order to facilitate the work of tuna RFMOs scientific bodies in the provision of scientific advice based on the most recent information. | √ | | |
| 2. Lags in the submission of fishery data should be reduced making a full use of communication technologies (e.g. web based) and efforts should be undertaken that basic data formats are harmonized. | √ | | |
| 3. Efforts should be undertaken so that basic data used in stock assessment (catch, effort and sizes by flag and time/area strata) provided by members should be made available via the websites of tuna RFMOs or by other means. | √ | | |
| 4. Fine scale operational data should be made available in a timely manner to support stock assessment work, and confidentiality concerns should be addressed through RFMOs rules and procedures for access protection and security of data. | X | | ?[1] |
| 5. Tuna RFMOs should ensure adequate sampling for catch, effort and size composition across all fleets and especially distant water longliners for which this information is becoming limited. | P | | √[2] |
| 6. Tuna RFMOs should cooperate to improve the quality of data, in particular for methods to estimate: (1) species and size composition of tunas caught by purse seiners and by artisanal fisheries and (2) catch and size of farmed tunas. | P | P | |
| 7. Tuna RFMOs should use alternative sources of data, notably observer and cannery data, to both validate the information routinely reported by Parties and estimate catches from non-reporting fleets. | √ | | |
| ***Biological data*** | | | |
| 8. Regular large scale tagging programs should be developed, along with appropriate reporting systems, to estimate natural mortality growth and movement patterns by sex, and other fundamental parameters for stock assessments. | √[3] | | |

[1] No agreement has been reached for making operational level data available for stock assessment within the CCSBT. Refer to the discussion at agenda item 12.
[2] This is a recommendation to continue to improve existing data collection, particularly the coverage and representativeness of observer programs.
[3] Noting that the current CCSBT program continues to collect tags but large scale tagging activities have not been undertaken since 2007.

| | *Underway / Done* | *Recommendation when not underway* | |
|---|---|---|---|
| | | *Not currently Relevant to the CCSBT* | *Recommended to Commence/Improve* |
| 9. Archival tagging should be an ongoing activity of tagging programs as it provides additional insights into tuna behavior and vulnerability. | √ | | |
| 10. Spatial aspects of assessment should be encouraged within all tuna RFMOs in order to substantiate spatial management measures. | √ | | |
| 11. The use of high-resolution spatial ecosystem modeling frameworks should be encouraged in all tuna RFMOs since they offer the opportunity to better integrate biological features of tuna stocks and their environment. | P[4] | √ | |
| ***Stock assessment*** | | | |
| 12. Tuna RFMOs should promote peer reviews of their stock assessment works. | √ | | |
| 13. Tuna RFMOs should use more than one stock assessment model and avoid the use of assumption-rich models in data-poor situations. | √ | | |
| 14. Chairs of Scientific Committees should jointly develop checklists and minimum standards for stock assessments. | X | √[5] | |
| ***Communication by tuna RFMOs*** | | | |
| 15. Standardized executive summaries should be developed for consideration by all tuna RFMOs to summarize stock status and management recommendations. These summaries should be discussed and proposed by the chairs of the Scientific Committees at Kobe 3. | X | √[5] | |
| 16. The application of the Kobe 2 strategy matrix should be expanded and applied primarily to stocks for which sufficient information is available. | √[6] | | |
| 17. Tuna RFMOs should develop mechanisms to deliver timely and adequate information on their scientific outcomes to the public. | √ | | |
| 18. All documents, data and assumptions related to past assessments undertaken by tuna RFMOs should be made available | X[7] | | √[7] |

[4] Aspects of integrating environmental and spatial modelling are important. Work on interpreting CPUE in relation to these aspects are being pursued within the CCSBT, particularly in relation to spatial fleet dynamics. Spatial ecosystem modelling may be examined in the future by individual Members.

[5] This is of more relevance to the other tuna RFMOs which are dealing with numerous species and stock assessment. The CCSBT conducts assessment for a single stock only. These are detailed assessments and a checklist or a "standardized" executive summaries are not likely to be of significant value to the CCSBT.

[6] Most of the relevant information for this is available through the MP work, but not in the specific Kobe matrix format. The precise format is not a major issue for the CCSBT due to the single species nature of the CCSBT.

| | *Underway / Done* | *Recommendation when not underway* | |
|---|---|---|---|
| | | *Not currently Relevant to the CCSBT* | *Recommended to Commence/Improve* |
| in order to allow evaluation by any interested stakeholder. | | | |
| ***Enhanced cooperation between tuna RFMOs*** | | | |
| 19. Chairs of Scientific Committees should establish an annotated list of common issues that could be addressed jointly by tuna RFMOs and prioritize them for discussion at the Kobe 3 meeting. | X | | ?[8] |
| 20. Tuna RFMOs should actively cooperate with programs integrating ecosystem and socio-economic approaches such as CLIOTOP to support the conservation of multi-species resources. | X | √[9] | |
| ***Capacity-building*** | | | |
| 21. Where determined by a Tuna RFMO, a review of the effectiveness of capacity-building assistance already provided should be undertaken. Reviews of tuna scientific management capacity in developing countries, within the framework of the respective RFMO may also be conducted at their request. | This is an issue for consideration by the Extended Commission | | |
| 22. Developed countries should strengthen in a sustained manner their financial and technical support for capacity-building in developing countries, notably small island developing States, on the basis of adequate institutional arrangements in those countries and making full use of local, sub-regional and regional synergies. | | | |
| 23. Tuna RFMOs should have assistance funds that cover various forms of capacity-building (e.g. training of technicians and scientists, scholarships and fellowships, attendance to meetings, institutional building, development of fisheries). | | | |
| 24. Tuna RFMOs, if necessary, should ensure regular training of technicians for collecting and processing of data for developing states, notably those where tuna is landed. | | | |
| 25. The structural weaknesses in the receiving mechanism for capacity building within a country should be improved by working closely with Tuna RFMOs. | | | |

[7] The total catches used in assessments are not available to stakeholders other than Members and Cooperating Non-Members due to confidentiality of the JMR and AFR reports. It would be valuable to seek ways of addressing this issue to make the data used in the assessment more transparent.
[8] It is not yet clear what common issues that could be addressed jointly might be relevant to the CCSBT.
[9] However, if the ESC or Secretariat was approached by programs such as CLIOTOP, consideration would be given within the constraints of its available resources.

**Attachment 6**

## Report of CPUE Discussions

A brief presentation was made to the group by John Pope regarding the issues that needed to be addressed at this meeting, which included:

1. Decide on CPUE series to use for MP implementation.
2. Closely specify the chosen CPUE series
3. Discuss provision of CPUE meta-rules and monitoring series.
4. Discuss monitoring of post 2006 changes
5. Discuss any intersessional program required.

Base Case CPUE series to use for MP implementation

In relation to which standardisation model was most appropriate, model 3 (reduced base case) or model 6 (base case), the group was asked if there was anything relating to the conclusions made after extensive discussion at the Seattle OMMP meeting that has changed. The group agreed, that there would have to be a very strong case put forward to move from the base case to another model at this stage, for both MP testing and implementation

The major theoretical argument for model 6 was the inclusion of year-area interactions which are, in principle, able to capture spatio-temporal effort and stock distribution effects – both of which are known to change for this stock and fishery. An updated analysis of the statistical basis for choosing the base-case model was presented to the CPUE group. In the initial work, the selection of model 6 by two key model-selection measures (the AIC and BIC) was equivocal and no clear conclusions could be made in this regard. The inter-sessional work indicated that with alternate data aggregations (for example at the 5x5, month and vessel level), it appears that model 6 is the most appropriate under both model selection statistics. The various series, without the area weighting, showed strong contrast in some years for various data aggregation levels – in particular the shot-by-shot data showed a substantially smaller increase in CPUE in 2009. However, once the area weighting was applied to the data this contrast was substantially smaller. The group agreed that model 6 would remain as the base-case model and the model to be used to compute the CPUE used in the MP. The full specification is provided at **Attachment 7**

Specification of CPUE Series

In relation to the RTMP data calibration factor to be used in future, the group was reminded that the current factor of 0.925 is based on the average from the years 2004 to 2006 and was asked if this approach was to be retained or revised. One suggestion was to compute a 3 year moving average of this factor and this approach was supported by the group. With regard to the area weighting used to compute the actual CPUE series used in the OM and the MPs, the group agreed to stay with the current set of weights. However, the weighting and the rationale behind it should be placed in a more recent reference (for example a paper submitted to the relevant future group meeting) given the importance in relation to the OM and the MPs.

Metarules and monitoring series

Given the strong recent increases in the last two CPUE data points the group considered how best to deal with this issue if further increases (or decreases) were outside of the bounds of what we would judge as plausible. Given that paper ESC/1009/12 outlines a potential meta-rule process to deal with this issue for all data used in the candidate MPs the group decided to concentrate on what selection of future monitoring series might be useful in ensuring the ongoing quality control of the CPUE. The alternate model (model 3) and the series derived using model 6 but with different data aggregation levels were suggested as good candidates. Also, the Laslett and ST Windows series would serve well as an envelope for the base-case series, given they have formed the recent upper and lower bounds of the old 5 series, respectively.

Post 2006 Changes

The impact of the changes in the fishing pattern and regulations of the Japanese long-line fleet after 2006 were judged to be in need of ongoing work, as future management outcomes and stock dynamics occurred. A request was made that collaborative work between scientists and industry from relevant nations be completed.

Future Work

With regard to future work, the issue of by-catch was raised as one example where some work has already been done but that was still an area worthy of further investigation. The group agreed that more interaction between member countries on the issues relating to CPUE was to be encouraged. The group's Chair was to be congratulated on his work in keeping the momentum of the group going at such a key time, and the group appreciated his commitment to continue into the next year.

**Attachment 7**

## Specification of Standardised CPUE for the MP

### Data to be used

The CPUE dataset to be used in the implementation of the Management Procedure (MP) is based on the longline catch and effort data of Japanese, Australian (RTMP in the 1990s) and New Zealand (NZ) charter vessels at the shot-by shot resolution. SBT aged 4 years or older are used in the CPUE dataset. In the most recent year of the dataset, CPUE is calculated from Japanese data available at the time which are mainly RTMP and New Zealand data. From this dataset, a set of core vessels are selected which meet certain conditions. These conditions are: Area 4-9, Month 4-9, x (top rank of SBT catch in a year) = 52, and y (number of years in the top ranks) = 3.

The dataset each year is further corrected by:

- deleting records from operations south of 50 degree S
- combining operations from Area 5 and Area 6 into one area (Area 56)
- deleting operations with extremely high CPUE values (>120).

The shot-by-shot data are then aggregated into 5x5 degree cells by month before standardization. Aggregated data cells with little effort (<10,000 hooks) are deleted.

### CPUE standardization

*Unweighted CPUE*

The aggregated CPUE dataset is standardized using the following Generalised Linear Model (GLM) (Eq-1):

$$log(CPUE+0.2) = Intercept + Year + Month + Area + Lat5 + BET\_CPUE + YFT\_CPUE + (Month*Area) + (Year*Lat5) + (Year*Area) + Error, \quad \text{(Eq-1)}$$

where

| | |
|---|---|
| Area | is the CCSBT statistical area |
| Lat5 | is the latitude in 5 degree |
| BET_CPUE | is the bigeye tuna CPUE |
| YFT_CPUE | is the yellowfin tuna CPUE |

*Area weighted CPUE*

With the estimated parameters obtained from the CPUE standardization above (Eq-1) the Constant Square (CS) and Variable Square (VS) CPUE abundance indices are computed by the following equations (Eq-2, Eq-3):

$$CS_{4+,y} = \sum_m \sum_a \sum_l (AI_{CS})_{(yy\text{-}present)} [\exp(Intercept + Year + Month + Area + Lat5 + BET\_CPUE + YFT\_CPUE + (Month*Area) + (Year*Lat5) + (Year*Area) + \sigma^2/2) - 0.2] \quad \text{(Eq-2)}$$

$$VS_{4+,y} = \sum_m \sum_a \sum_l (AI_{VS})_{ymal} [\exp(Intercept + Year + Month + Area + Lat5 + BET\_CPUE + YFT\_CPUE + (Month*Area) + (Year*Lat5) + (Year*Area) + \sigma^2/2) - 0.2] \quad \text{(Eq-3)}$$

where

| | |
|---|---|
| $CS_{4+,y}$ | is the CS abundance index for age 4+ and y-th year, |
| $VS_{4+,y}$ | is the VS abundance index for age 4+ and y-th year, |
| $(AI_{CS})_{(yy\text{-}present)}$ | is the area index of the CS model for the period yy-present (yy=1969 or 1986 depending on the period of standardization, |
| $(AI_{VS})_{ymal}$ | is the area index of the VS model for y-th year, m-th month, a-th SBT statistical area, and l-th latitude, |
| $\sigma$ | is the mean square error in the GLM analyses. |

The w0.5 and w0.8 (B-ratio and geostat proxies) CPUE abundance indices are then calculated using the following equation (Eq-4):

$$I_{y,a} = wCS_{y,a} + (1-w)VS_{y,a} \qquad \text{(Eq-4)}$$

**Data calibration**

The estimated CPUE value in the most recent year, which is mainly derived from RTMP data, is corrected using the average of the "Logbook based CPUE / RTMP based CPUE" ratio for the most recent three years of logbook data.

The area weighted CPUE series between 1986 and the most recent year are then calibrated to the historical CPUE series between 1969 and 2008 with the following GLM (Eq-5), described in Nishida and Tsuji (1998) for 5x5 degree cells by month data for all vessels in Areas 4-9 and Months 4-9:

$$log(CPUE+const) = Intercept + Year + Quarter + Month + Area + Lat5 + (Quarter*Area) + (Year*Quarter) + (Year*Area) + Error, \qquad \text{(Eq-5)}$$

where *const* is 10% of the mean nominal CPUE.

**CPUE series for monitoring**

Two additional CPUE series will be used for monitoring purposes of the status of the stock and MP implementation. These include:

(1) Same procedure as specified above, but at the shot-by-shot level rather than the aggregated 5x5 level.

(2) Same procedure as specified above, but using the reduced base case given by GLM(Eq-6)

$$log(CPUE+0.2) = Intercept + Year + Month + Area + Lat5 + (Month*Area) + Error, \qquad \text{(Eq-6)}$$

**Reference**

Nishida, T., and S. Tsuji. 1998. Estimation of abundance indices of southern bluefin tuna (*Thunnus maccoyii*) based on the coarse scale Japanese longline fisheries data (1969-97). Paper submitted to the Commission for the Conservation of Southern Bluefin Tuna, Scientific Meeting. CCSBT/SC/9807/13.27 pp.

**Attachment 8**

**Summary of MP technical working group selection and discussion of the MPs**.

The Working Group agreed that the results for the recommended MP(s) would be provided to the Commission for each of the six tuning levels. Performance relative to the SFMWG checkpoints would also be provided.

A set of nine initial MPs were compared: BREM_S1 – S4, HK7_21, 29, 39, 24 and 30.

MPs were compared in terms of the trade-off in the likelihood and magnitude of the reduction of catch (often described as "early pain"), and the risk to the biomass in the short to medium term (often described as "risk").

It was agreed that performance be judged initially based on the results of the pessimistic robustness tests: omega75 and lowR. The lowR scenario was considered to be a robustness test that these MPs were to be evaluated against, because this scenario has been seen in the past, and because we are currently at very low biomass levels. The robustness tests were used to compare performance in risk to biomass. Comparisons were made using tuning level 5d which showed more contrast in results, and then checked by examining performance at tuning level 2d (which is more risk averse).

The results provided here are for a 1 year lag in implementation. Results for MPs without lag have not been provided here, except for a variant of the HK MPs. This was evaluated at the OMMP meeting and it was agreed that there was a very small effect for the reference set.

Results are presented for all tuning levels, but more detail is provided for tuning levels 5d and 2d. Tuning level 3d was the most risk averse, and did not provide enough contrast between MP results to enable selection based on performance. The other tuning levels were represented by tuning levels 2d and 5d. Note (Fig. 1) that in terms of catch and spawning biomass median trajectories, tuning levels 4d and 5d produce very similar results, and tuning levels 1d, 2d and 6d also produce very similar results.

Models were compared in 2 groups – S3, S4, HK21, HK29, HK39 were compared first. These were the "less reactive" MPs, which had higher risk to biomass, and higher catches in the short term. It was agreed that because models S3 and S4 resulted in higher short-term risk to biomass under the more pessimistic robustness trials, and lower relative median catches in the short term compared to HK21, 29, 39, they should be dropped. In examining HK21, 29, 39, it was decided that HK29 and HK39 should be re-tuned with an additional cap in the rule that would not allow a TAC increase in the first year, and HK_21 was excluded given poorer relative performance compared with HK29 and HK39.

The group agreed that MPs should not allow an increase in the catch during the first time period in which the procedure is applied. The group's rationale was that (a) the stock is at or near a historical low level, (b) the recent improvement in stock status

indicators (e.g., CPUE, aerial survey) need to be confirmed by a continuation of the positive trend into the future, and (c) the most recent estimate of fishing mortality is high (Figure 2 and Table 3, Report of ESC14) compared to the level associated with MSY (high by a factor of about 2, para 103, 2009 report of the ESC). Thus, a TAC constraint ($TAC_{2012\text{-}2013} \leq$Current TAC) was incorporated into all of the MP options recommended to the Commission.

MPs HK29 and HK39 were re-run with the TAC cap in the first year. These new runs were labelled HK29b and HK39b. In addition to the cap, new MPs based on HK29b and HK39b were requested, where the number of years over which the CPUE trend is calculated is five rather than seven years (these were labelled HK29c and HK39c)

The effect of including the cap in runs HK29b and HK39b was not large, because TAC increases, where they had occurred, were very small. There was poorer performance in the MPs which used a five year average slope in CPUE instead of seven years. HK29b and HK29c in general performed better in terms of short term pain (magnitude of the average decreases in catches). It was agreed after consideration of reference and robustness tests to drop all HK39 MPs and to select HK29b as the best example of the set of "less reactive" MP.

The remaining group of more reactive MPs were compared in terms of performance (MPs S1, S2, HK24, HK30). For the more reactive MPs, S1, S2 and HK30 behaved in similar ways in terms of lowest risk to biomass (at the $10^{th}$ percentile), and S2 was selected for further evaluation because for a similar "risk to biomass" level, there was a smaller expected reduction in catches in the short term. MPs S1, HK24 and HK30 were not considered further. Recalculations with a TAC cap was not necessary for S1 and S2, since the number of runs with a TAC increase in the first step was too small (<0.1%) to affect performance indicators.

S2 and HK29b were selected as the final MPs for further evaluation using a variety of diagnostics shown in figures 1 to 9.

In addition to the two separate MPs a combined MP was evaluated, to test that a combination MP that equally weighted the two separate parts (S2 and HK29b), reacted in a linear manner. The 2 MPs were renamed "MP1" and "MP2" and the combined MP which is a 50% weighted average of the TACs output by both MPs is named "Average MP". The Average MP was tuned at 50% weighting between the two MPs for illustrative purposes, and to demonstrate linearity between the MPs. Other weightings could be chosen by the Commission.

Evaluation of the performance of the Average MP indicated that it was intermediate between the two component MPs as expected. There were small deviations from an exact linear trend in a few performance measures, but these were not considered to be a concern. For tuning level 5d (70% probability 0.2SSB by 2040) the combined MP reached the target for 76% of the simulations, and for tuning level 2d 73% of the simulations reached the target in 2035, which is above the tuning level target of 70%.

The "Average MP" simulation loop involved calculating the TAC for each MP (MP1 and MP2) and using the average of these as the TAC for that year. The average TAC was used as the total catch taken in the next annual loop of the simulation model.

Worm plots were examined to look at the individual trajectories in catch and biomass for the two MPs, to identify any anomalous trends, such as catch going up while SSB goes down, or catch increases that lead to subsequent decreases. It was noted from these figures that the early catch reductions did pay off in terms of higher catches later, and that worms plots demonstrate how individual trajectories are quite different to the median. Some trajectories for MP2 appeared to take catch to a very low level in the later period and keep it there, even in the case of an increasing SSB. Others did not increase/decrease catch monotonically with increasing/decreasing SSB. There was some concern about using the CPUE slope rather than a target in the MP2. However, in CCSBT-ESC/1009/22 some additional MPs were trialled with a third component based on target CPUE, but the extra component did not improve the performance.

It was noted that the quality of the indicators used in the alternative MPs had not been discussed. There was some discussion of the merits of using a model based approach versus an empirical rule (variance reduction and robustness to missing or spurious data versus some degree of relative ease of explanation to stakeholders and decision makers), but it was decided that selection of the MPs would be based on performance only.

Work done in paper ESC/1009/11 demonstrated that all MPs in that paper reduced exploitation rates (given an implied effort proxy) to almost a third of the current level and exploitation rates never increased above 50% of the current level. Given the SSB was also increasing at the median and lower 10$^{th}$ percentile level, it was suggested that catch levels for the suite of MPs never reached unsustainable levels and were unlikely to impair further growth beyond the interim rebuilding target (by 2040). We would assume that the MP and OM would be revised well before 2040, and that there would then be considerably more information to inform the models on stock status and productivity, etc.

Table 1 provides a description of the different sensitivities evaluated for each management procedure. These were examined in detail and a final set presented in the main report was selected for presentation purposes. Table 2 shows results for selected MPs over the six different tuning options and selected sensitivities and Table 3 presents comparisons of median catch levels and spawning biomass ratios.
The following lists the performance statistics presented in Fig. 2 through Fig. 7.

(1) and (2) Short-term and long-term mean catch:

$$\frac{\sum_{y=2013}^{y=2022} C_y}{10} \qquad \frac{\sum_{y=2013}^{y=2039} C_y}{27}$$

where *Cy* is total catch in year *y*.

(3) Catch variability:

$$\text{AAV} = \frac{\sum_{y=2013}^{y=2037} \left|\Delta TAC_y\right|}{25} \quad \text{where} \quad \Delta TAC_y = C_y - C_{y-1}$$

(4) Maximum TAC decrease:

$Min\lfloor \Delta TAC_y \rfloor$

(5) CPUE in 2014 relative to $CPUE_{2009}$

(6) Spawning biomass in 2025 relative to $SSB_0$.

(7) Spawning biomass in 2014 relative to 2009.

(8) Spawning biomass in 2025 relative to 2009.

(9) Minimum spawning biomass relative to current:

$$\text{SSBmin/SSB2009} = Min\left\{\frac{SSB_y}{SSB_{2009}}\right\} \text{ over 31-year projections}$$

Trade-off figures for the selected MPs are shown in Fig. 8 and 9 for tuning options 2 and 5. Fig. 1 shows the catch and spawning biomass trajectories for the 6 different tuning options for each MP.

Table 1. Table describing the different sensitivities examined by the OMP working group. The final set presented in the report was selected for presentation purposes.

| Name | Description |
|---|---|
| c0s1l1, c2s1l1, c3s1l1 | Effects of overcatch on CPUE: S = 0%, 50% and 75%. |
| c1s1l2 | LL1 overcatch scenario based on Case 2 of Market Report. |
| downwearlysize | Downweight the initial size composition data |
| aerdome, aerflat | Change selectivity of aerial survey (ages 2-4) throughout the series to [0.3,1,0.3] and [1,1,1] (instead of [0.5,1,1] assumed in the reference set). It was noted that it may be possible to reduce the options by closer inspection of the spotter data. |
| highAerialCV | Increase CV of aerial survey to 0.50 while leaving CV of CPUE at 0.20. |
| highCPUECV | In conditioning, increase lower bound of CV of CPUE to 0.30 (from 0.20 in base) and fix process error for aerial survey (tau_aerial) to 0.05. In projections use CV of CPUE = 0.30 and aerial CV=0.30. |
| mixtag | Incomplete tag mixing: assume that season-1 F's (H) (during which the surface fishery occurs) used in the tagging likelihood are 50% higher than the corresponding F's applied to the whole population. |
| lowR | 4 years (from 2009) where recruitment is 50% lower than predicted, uncorrelated with subsequent recruitments. |
| recuncor | Projected recruitment deviates uncorrelated to historical estimates from conditioning. |
| regimeshift | Regime shift: the stock-recruitment relationship changes in 1978. The two relationships share the same steepness parameter but two separate B0 are estimated, one for each period. |
| troll | Include troll survey data. |
| omega75 | Omega value of 0.75 (CPUE non-linearity factor) or a higher value that is more supported by data (note that the value of that 0.75 has little support relative to the linear relationship). |
| run3, run6 | Substitute alternative CPUE series based on glm models referred to as run3 and run6. |
| Laslett, STwin | Substitute alternative CPUE series by Laslett and ST-windows (the most extreme trends) to represent alternatives for changes in spatio-temporal distribution of fishing effort. |
| truncCPUE | Drop first 10 years of CPUE data. |
| downq | Step function change in catchability 20% down between 2006 and 2007 unknown to the MP. |
| downupq | Catchability goes down by 20% in 2007 and returns to normal in 5 years as fishermen adjust to new management regime. Coding to be as for above, but with ramp back to "normal" in 5 years. |
| updownq | Catchability goes up by 50% in 2009 and returns to normal in 5 years as fishermen adjust to new management regime. Uncorrelated with subsequent CPUE observations. |
| upq | Step function change in catchability 30% up between 2006 and 2007 unknown to the MP. |

Table 2. Summary of performance for the three MPs for all tuning levels for each of the robustness tests. Performance is shown here for average short term catch and for the two checkpoints prescribed by the SFMWG2. The MP that averages the MP_1 and MP_2 TAC formulae were done for the Reference set and LowR cases only due to time limitations. *NOTE:* $B_0$, $B_{2025}$ and $B_{2009}$ refer to spawning biomass. Note that catch figures are rounded to the nearest 10 tonnes.

| Case | MP | Tuning | Tuning year ($T$) | Check point year ($t$) | Median average catch (2013-2022) | P[$B_t > 0.1B_0$] | P[$B_t > 2B_{2009}$] |
|---|---|---|---|---|---|---|---|
| Reference set | TAC=0 | NA | | | 0 | 0.99 | 0.97 |
| | MP_1 | 1 | 2035 | 2022 | 6,340 | 0.45 | 0.41 |
| | | 2 | **2035** | **2022** | 5,640 | 0.48 | 0.44 |
| | | 3 | 2035 | 2022 | 3,960 | 0.53 | 0.49 |
| | | 4 | 2040 | 2025 | 7,480 | 0.66 | 0.61 |
| | | 5 | **2040** | **2025** | 6,770 | 0.71 | 0.66 |
| | | 6 | 2040 | 2025 | 5,310 | 0.79 | 0.76 |
| | MP_2 | 1 | 2035 | 2022 | 7,920 | 0.34 | 0.29 |
| | | 2 | **2035** | **2022** | 7,060 | 0.38 | 0.33 |
| | | 3 | 2035 | 2022 | 4,810 | 0.50 | 0.46 |
| | | 4 | 2040 | 2025 | 9,470 | 0.49 | 0.44 |
| | | 5 | **2040** | **2025** | 9,120 | 0.53 | 0.49 |
| | | 6 | 2040 | 2025 | 7,420 | 0.66 | 0.62 |
| | Average | 1 | 2035 | 2022 | 6,870 | 0.40 | 0.35 |
| | | 2 | **2035** | **2022** | 6,190 | 0.43 | 0.40 |
| | | 3 | 2035 | 2022 | 4,370 | 0.52 | 0.48 |
| | | 4 | 2040 | 2025 | 8,170 | 0.59 | 0.56 |
| | | 5 | **2040** | **2025** | 7,540 | 0.64 | 0.60 |
| | | 6 | 2040 | 2025 | 6,180 | 0.74 | 0.70 |
| c0s1l1 | zeroTAC | 5 | | | 0 | 1.00 | 0.99 |
| | MP_1 | 2 | **2035** | **2022** | 5,350 | 0.61 | 0.46 |
| | | 5 | **2040** | **2025** | 6,390 | 0.82 | 0.73 |
| | MP_2 | 1 | 2035 | 2022 | 6,990 | 0.51 | 0.36 |
| | | 2 | **2035** | **2022** | 6,070 | 0.56 | 0.40 |
| | | 3 | 2035 | 2022 | 4,370 | 0.63 | 0.49 |
| | | 4 | 2040 | 2025 | 9,240 | 0.64 | 0.51 |
| | | 5 | **2040** | **2025** | 8,460 | 0.70 | 0.59 |
| | | 6 | 2040 | 2025 | 6,470 | 0.83 | 0.73 |
| c2s1l1 | zeroTAC | 5 | | | 0 | 0.99 | 0.97 |
| | MP_1 | 2 | **2035** | **2022** | 5,640 | 0.46 | 0.40 |
| | | 5 | **2040** | **2025** | 6,790 | 0.69 | 0.66 |
| | MP_2 | 1 | 2035 | 2022 | 7,110 | 0.35 | 0.28 |
| | | 2 | **2035** | **2022** | 6,210 | 0.39 | 0.34 |
| | | 3 | 2035 | 2022 | 4,370 | 0.49 | 0.44 |
| | | 4 | 2040 | 2025 | 9,440 | 0.50 | 0.43 |
| | | 5 | **2040** | **2025** | 8,620 | 0.55 | 0.52 |
| | | 6 | 2040 | 2025 | 6,660 | 0.71 | 0.67 |
| c3s1l1 | zeroTAC | 5 | | | 0 | 1.00 | 0.93 |
| | MP_1 | 2 | **2035** | **2022** | 5,790 | 0.48 | 0.31 |
| | | 5 | **2040** | **2025** | 7,020 | 0.68 | 0.55 |
| | MP_2 | 1 | 2035 | 2022 | 7,330 | 0.38 | 0.21 |
| | | 2 | **2035** | **2022** | 6,420 | 0.42 | 0.25 |
| | | 3 | 2035 | 2022 | 4,470 | 0.51 | 0.34 |
| | | 4 | 2040 | 2025 | 9,580 | 0.49 | 0.36 |
| | | 5 | **2040** | **2025** | 8,890 | 0.55 | 0.42 |
| | | 6 | 2040 | 2025 | 6,800 | 0.69 | 0.55 |

| Case | MP | Tuning | Tuning year ($T$) | Check point year ($t$) | Median average catch (2013-2022) | P[$B_t$ >0.1$B_0$] | P[$B_t$>2$B_{2009}$] |
|---|---|---|---|---|---|---|---|
| downq | zeroTAC | | | | 0 | 1.00 | 1.00 |
| | MP_1 | 2 | **2035** | **2022** | 5,360 | 0.70 | 0.58 |
| | | 5 | **2040** | **2025** | 6,380 | 0.91 | 0.84 |
| | MP_2 | 1 | 2035 | 2022 | 7,340 | 0.60 | 0.45 |
| | | 2 | **2035** | **2022** | 6,530 | 0.64 | 0.50 |
| | | 3 | 2035 | 2022 | 4,550 | 0.71 | 0.59 |
| | | 4 | 2040 | 2025 | 9,300 | 0.74 | 0.66 |
| | | 5 | **2040** | **2025** | 8,760 | 0.81 | 0.71 |
| | | 6 | 2040 | 2025 | 6,880 | 0.90 | 0.82 |
| downupq | zeroTAC | | | | 0 | 1.00 | 1.00 |
| | MP_1 | 2 | **2035** | **2022** | 5,930 | 0.67 | 0.54 |
| | | 5 | **2040** | **2025** | 7,180 | 0.87 | 0.78 |
| | MP_2 | 1 | 2035 | 2022 | 7,520 | 0.56 | 0.42 |
| | | 2 | **2035** | **2022** | 6,600 | 0.61 | 0.48 |
| | | 3 | 2035 | 2022 | 4,550 | 0.69 | 0.57 |
| | | 4 | 2040 | 2025 | 9,830 | 0.70 | 0.61 |
| | | 5 | **2040** | **2025** | 9,170 | 0.77 | 0.67 |
| | | 6 | 2040 | 2025 | 7,000 | 0.88 | 0.80 |
| lowR | zeroTAC | | | | 0 | 0.99 | 0.96 |
| | MP_1 | 2 | **2035** | **2022** | 4,540 | 0.08 | 0.07 |
| | | 5 | **2040** | **2025** | 5,230 | 0.45 | 0.41 |
| | MP_2 | 1 | 2035 | 2022 | 5,730 | 0.04 | 0.03 |
| | | 2 | **2035** | **2022** | 4,940 | 0.05 | 0.03 |
| | | 3 | 2035 | 2022 | 3,790 | 0.10 | 0.08 |
| | | 4 | 2040 | 2025 | 7,070 | 0.27 | 0.24 |
| | | 5 | **2040** | **2025** | 6,680 | 0.32 | 0.29 |
| | | 6 | 2040 | 2025 | 5,320 | 0.45 | 0.41 |
| | Average | 5 | **2040** | **2025** | 5,760 | 0.39 | 0.37 |
| omega75 | zeroTAC | | | | 0 | 0.80 | 0.98 |
| | MP_1 | 2 | **2035** | **2022** | 4,550 | 0.10 | 0.23 |
| | | 5 | **2040** | **2025** | 5,360 | 0.20 | 0.41 |
| | MP_2 | 1 | 2035 | 2022 | 4,930 | 0.06 | 0.15 |
| | | 2 | **2035** | **2022** | 4,310 | 0.07 | 0.20 |
| | | 3 | 2035 | 2022 | 3,680 | 0.11 | 0.27 |
| | | 4 | 2040 | 2025 | 7,310 | 0.10 | 0.21 |
| | | 5 | **2040** | **2025** | 6,280 | 0.12 | 0.31 |
| | | 6 | 2040 | 2025 | 4,530 | 0.22 | 0.48 |
| STwin | zeroTAC | | | | 0 | 0.94 | 0.95 |
| | MP_1 | 2 | **2035** | **2022** | 4,760 | 0.15 | 0.25 |
| | | 5 | **2040** | **2025** | 5,590 | 0.34 | 0.50 |
| | MP_2 | 1 | 2035 | 2022 | 6,090 | 0.09 | 0.15 |
| | | 2 | **2035** | **2022** | 5,270 | 0.10 | 0.19 |
| | | 3 | 2035 | 2022 | 3,950 | 0.17 | 0.27 |
| | | 4 | 2040 | 2025 | 8,300 | 0.17 | 0.25 |
| | | 5 | **2040** | **2025** | 7,350 | 0.20 | 0.33 |
| | | 6 | 2040 | 2025 | 5,620 | 0.33 | 0.50 |

| Case | MP | Tuning | Tuning year ($T$) | Check point year ($t$) | Median average catch (2013-2022) | P[$B_t$ >0.1$B_0$] | P[$B_t$>2$B_{2009}$] |
|---|---|---|---|---|---|---|---|
| updownq | zeroTAC | | | | 0 | 0.99 | 0.97 |
| | MP_1 | 2 | **2035** | **2022** | 6,490 | 0.43 | 0.39 |
| | | 5 | **2040** | **2025** | 8,190 | 0.59 | 0.55 |
| | MP_2 | 1 | 2035 | 2022 | 8,150 | 0.33 | 0.27 |
| | | 2 | **2035** | **2022** | 7,140 | 0.37 | 0.31 |
| | | 3 | 2035 | 2022 | 4,690 | 0.50 | 0.46 |
| | | 4 | 2040 | 2025 | 10,030 | 0.45 | 0.40 |
| | | 5 | **2040** | **2025** | 9,620 | 0.50 | 0.46 |
| | | 6 | 2040 | 2025 | 7,560 | 0.64 | 0.60 |
| upq | zeroTAC | | | | 0 | 0.97 | 0.99 |
| | MP_1 | 2 | **2035** | **2022** | 5,510 | 0.25 | 0.35 |
| | | 5 | **2040** | **2025** | 6,650 | 0.40 | 0.56 |
| | MP_2 | 1 | 2035 | 2022 | 6,290 | 0.17 | 0.24 |
| | | 2 | **2035** | **2022** | 5,410 | 0.20 | 0.30 |
| | | 3 | 2035 | 2022 | 4,010 | 0.29 | 0.41 |
| | | 4 | 2040 | 2025 | 9,000 | 0.25 | 0.34 |
| | | 5 | **2040** | **2025** | 7,890 | 0.32 | 0.44 |
| | | 6 | 2040 | 2025 | 5,830 | 0.47 | 0.63 |

Table 3 Summary of robustness sets for tuning option 5 for the different MPs. The MP that averages the MP_1 and MP_2 TAC formulae were done for the Reference set and LowR cases only due to time limitations. *NOTE:* $B_{2025}$ and $B_{2009}$ refer to spawning biomass. Note that catch figures are rounded to the nearest 10 tonnes.

| Case | MP | Median average catch (2013-2022) | Median average catch (2013-2039) | $B_{2025}/B_{2009}$ Lower 10$^{th}$ percentile | $B_{2025}/B_{2009}$ Median |
|---|---|---|---|---|---|
| Reference set | MP_1 | 6,770 | 12,650 | 1.48 | 2.35 |
| | MP_2 | 9,120 | 11,770 | 1.20 | 1.99 |
| | Average | 7,540 | 11,660 | 1.37 | 2.21 |
| lowR | MP_1 | 5,230 | 9,880 | 1.11 | 1.84 |
| | MP_2 | 6,680 | 7,640 | 0.94 | 1.59 |
| | Average | 5,760 | 8,580 | 1.04 | 1.76 |
| c0s1l1 | MP_1 | 6,390 | 11,900 | 1.61 | 2.44 |
| | MP_2 | 8,460 | 10,400 | 1.42 | 2.15 |
| c2s1l1 | MP_1 | 6,790 | 12,420 | 1.45 | 2.30 |
| | MP_2 | 8,620 | 10,480 | 1.27 | 2.03 |
| c3s1l1 | MP_1 | 7,020 | 12,620 | 1.30 | 2.09 |
| | MP_2 | 8,890 | 10,610 | 1.15 | 1.86 |
| downq | MP_1 | 6,380 | 12,280 | 1.83 | 2.73 |
| | MP_2 | 8,760 | 11,490 | 1.56 | 2.39 |
| downupq | MP_1 | 7,180 | 13,450 | 1.73 | 2.58 |
| | MP_2 | 9,170 | 11,830 | 1.52 | 2.30 |
| omega75 | MP_1 | 5,360 | 7,990 | 1.01 | 1.84 |
| | MP_2 | 6,280 | 4,560 | 0.88 | 1.58 |
| STwin | MP_1 | 5,590 | 9,600 | 1.23 | 2.00 |
| | MP_2 | 7,350 | 7,270 | 1.03 | 1.67 |
| updownq | MP_1 | 8,190 | 12,860 | 1.31 | 2.09 |
| | MP_2 | 9,620 | 11,390 | 1.14 | 1.93 |
| upq | MP_1 | 6,650 | 11,860 | 1.34 | 2.11 |
| | MP_2 | 7,890 | 8,680 | 1.18 | 1.90 |

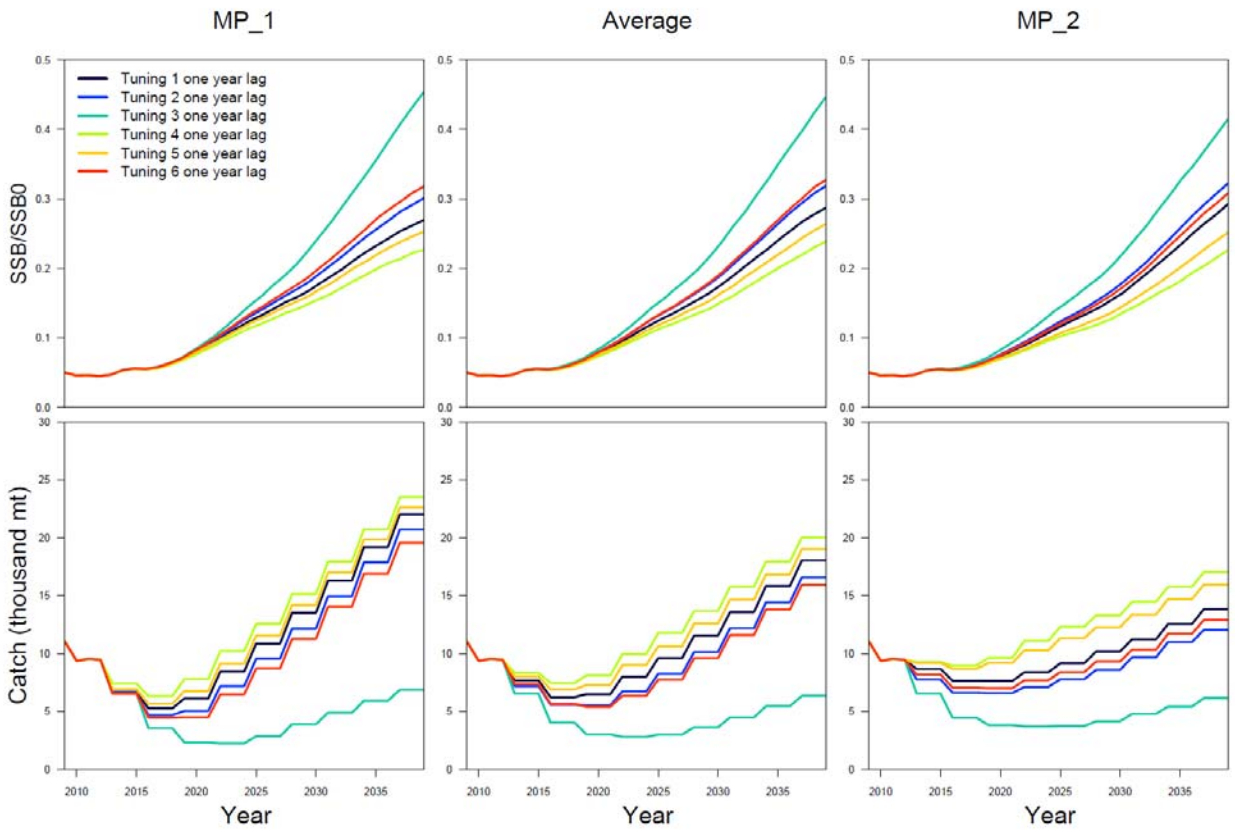



Figure 1. Comparison of median spawning biomass (SSB), relative to unexploited spawning biomass ($SSB_0$), and median catch, for the final three MPs, across all six tuning levels.

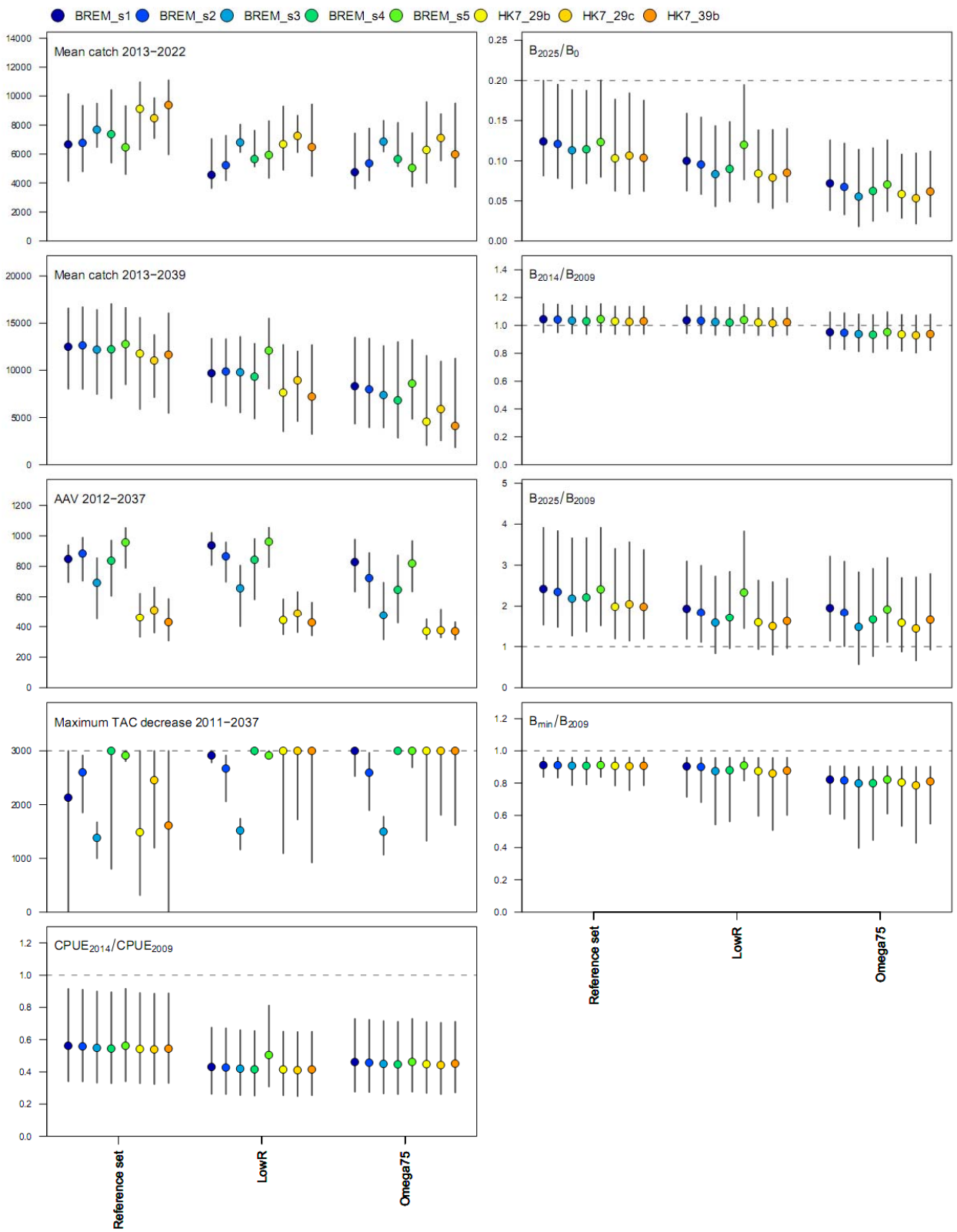



Figure 2. Comparison of the candidate MPs considered at the meeting under **tuning level 5**. BREM_s2 was chosen as MP_1, while HK7_29b was chosen as MP_2.

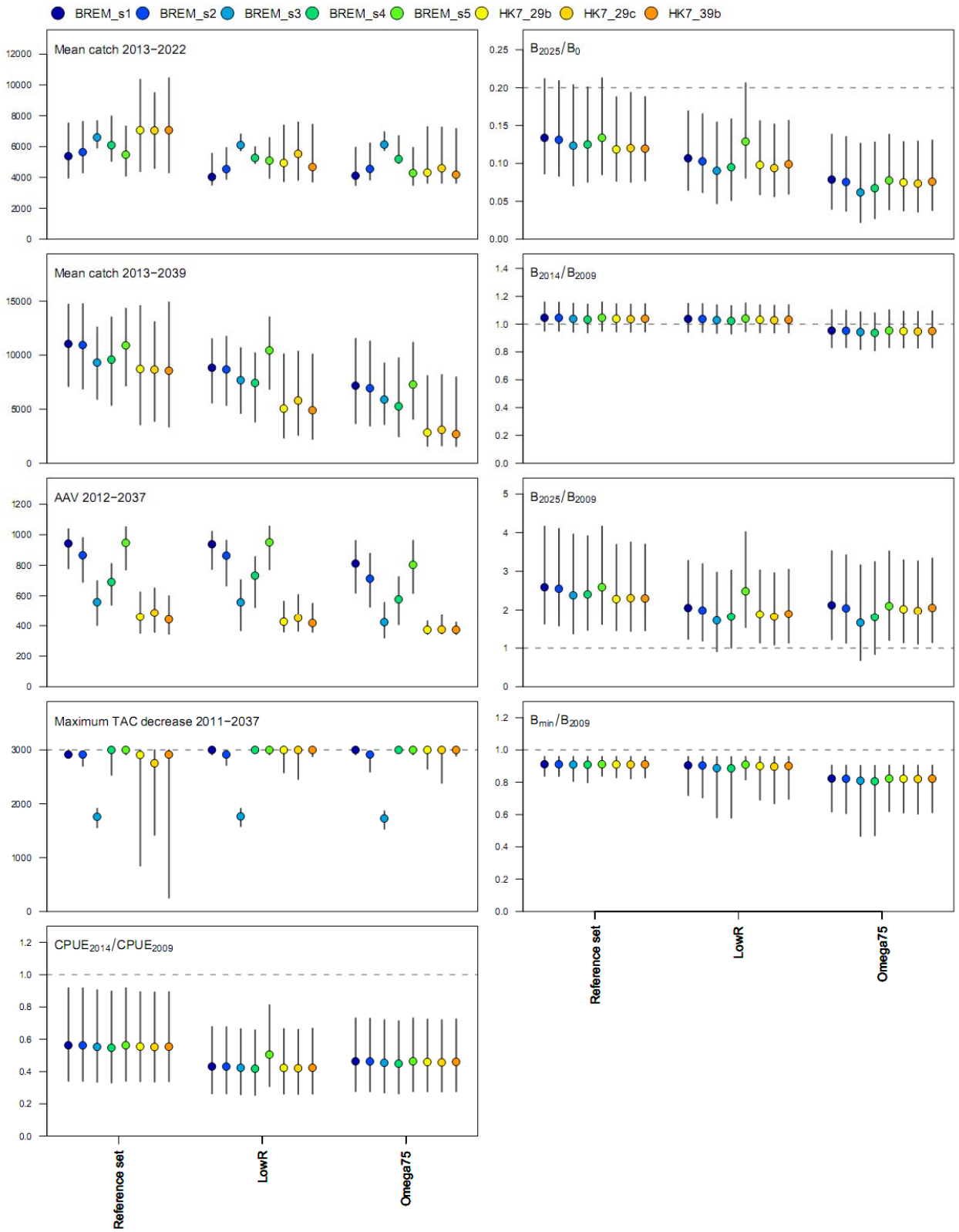



Figure 3. Comparison of the candidate MPs considered at the meeting under **tuning level 2**. BREM_s2 was chosen as MP_1, while HK7_29b was chosen as MP_2.

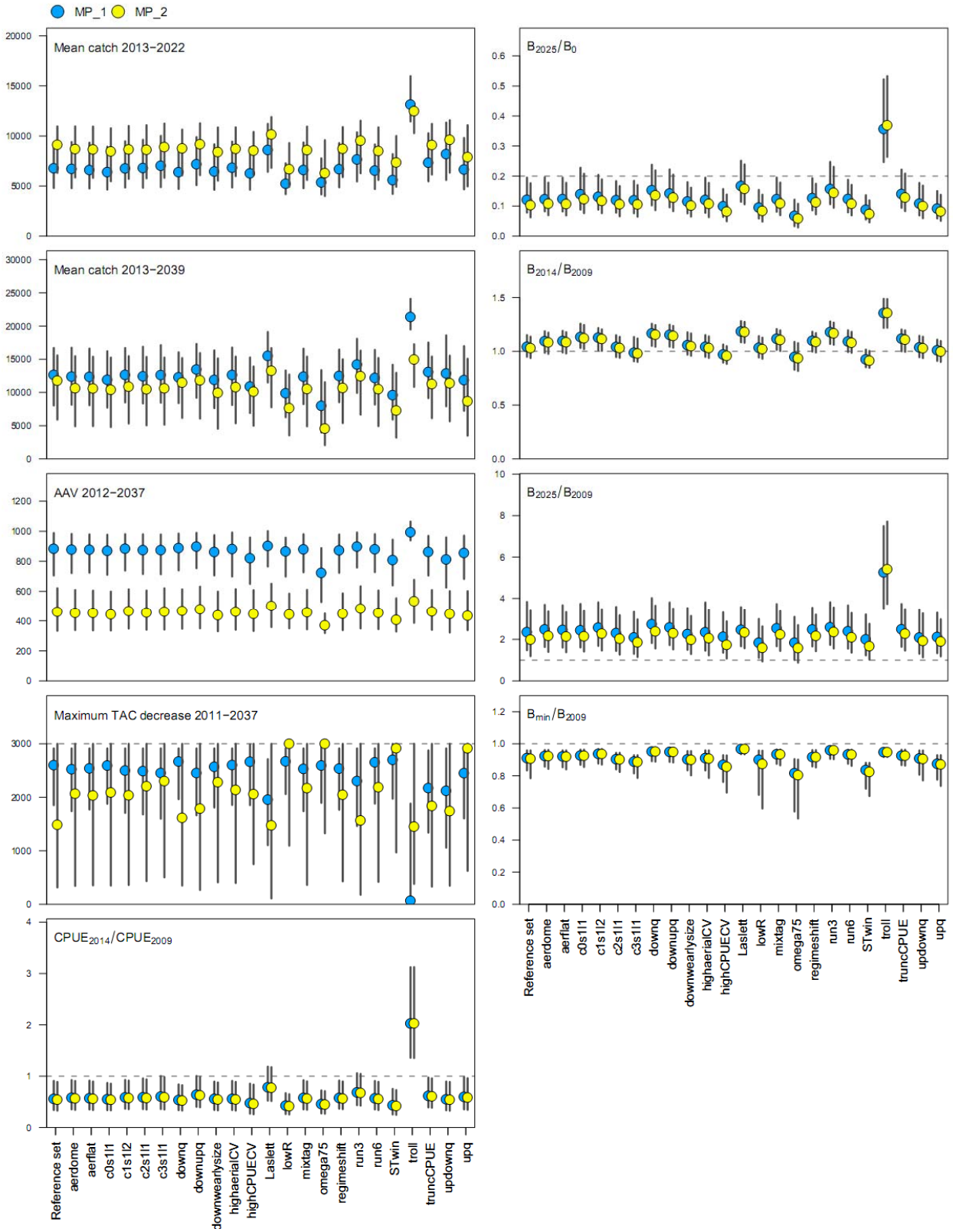



Figure 4. Comparison of the performance of the two chosen individual MPs for the reference set and for a variety of robustness tests, under **tuning level 5**.

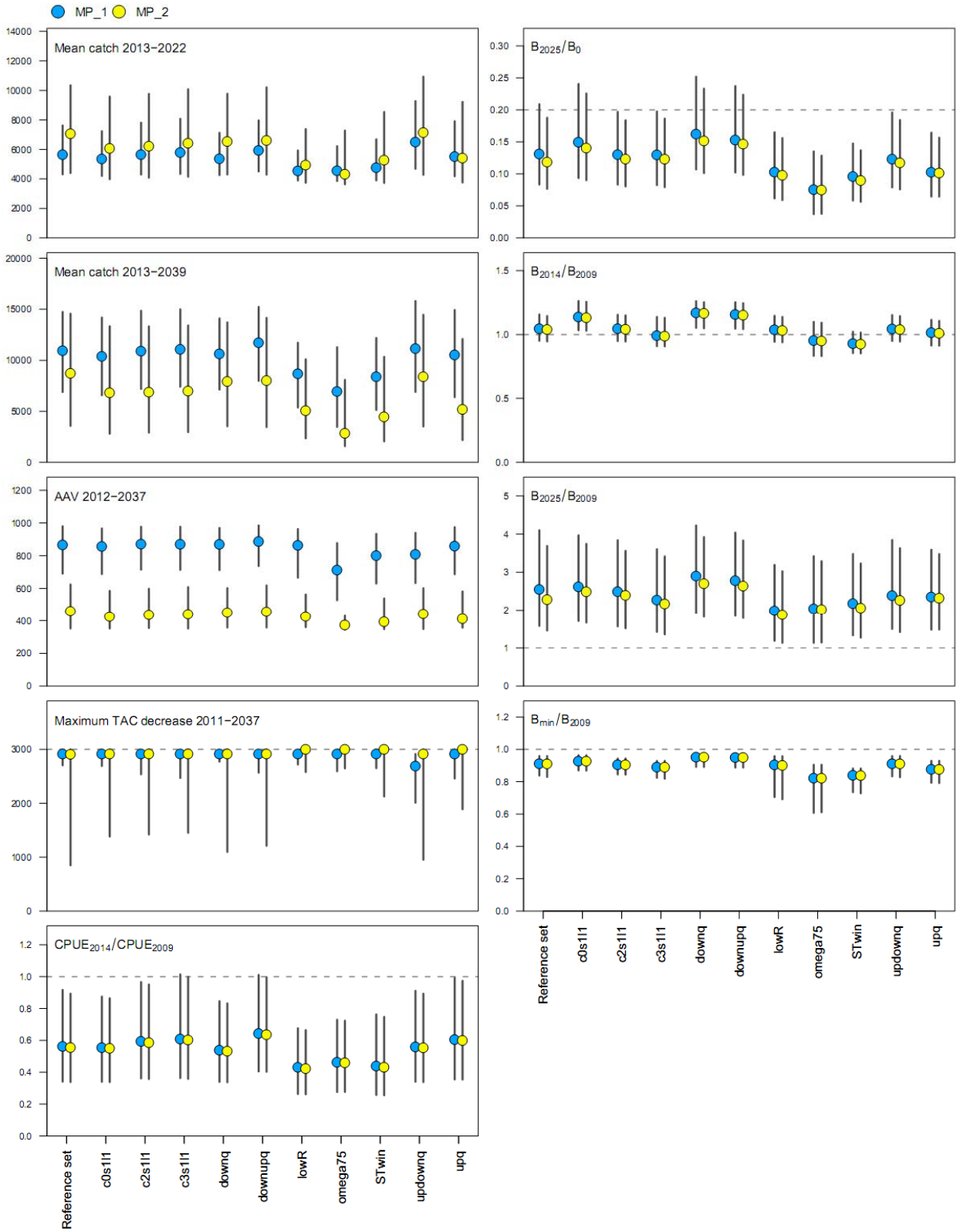



Figure 5. Comparison of the performance of the two chosen individual MPs for the reference set and for a variety of robustness tests, under **tuning level 2**.

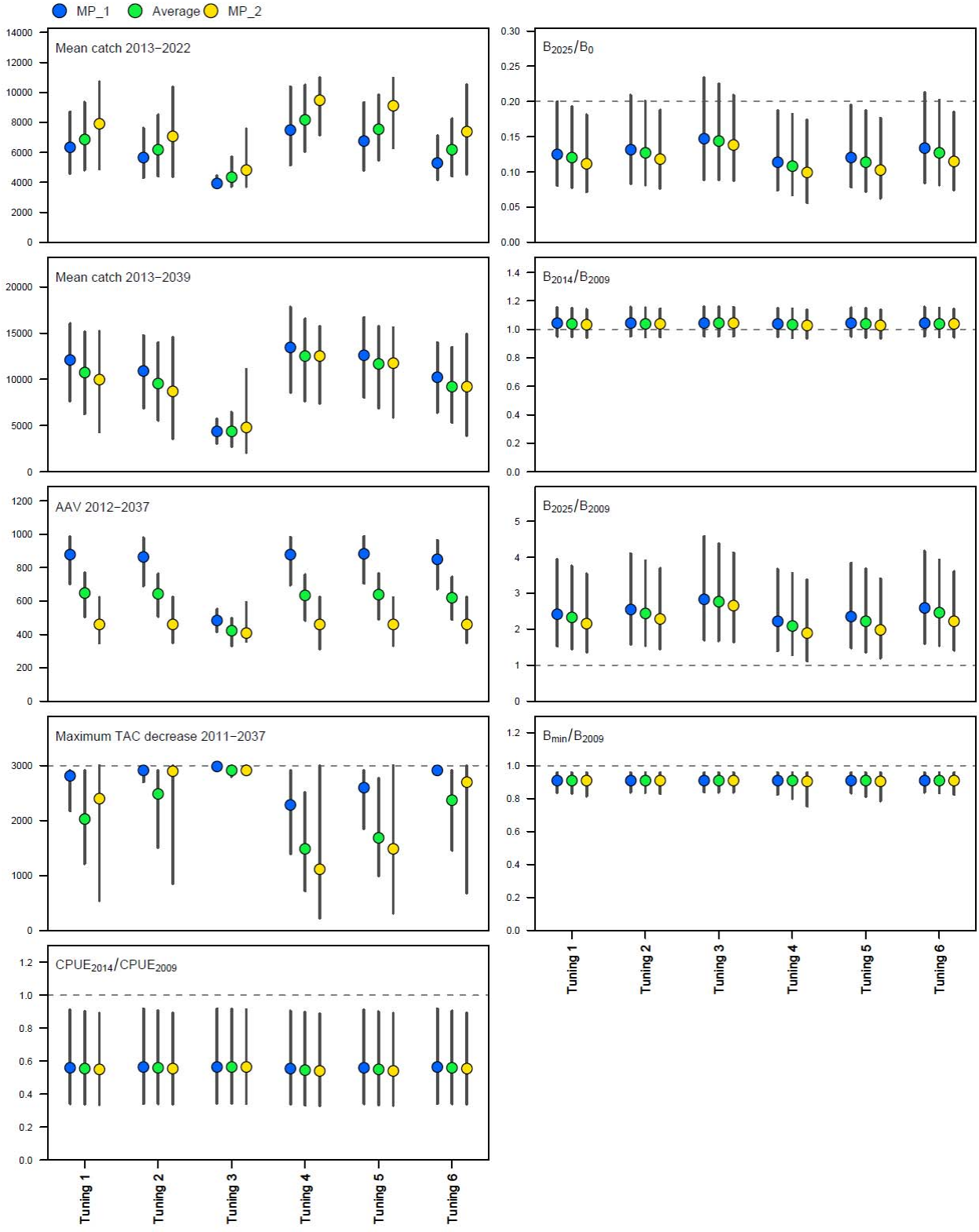



Figure 6. Comparison of the performance of the two chosen individual MPs and the Average MPs for the reference set under **all six tuning levels**.

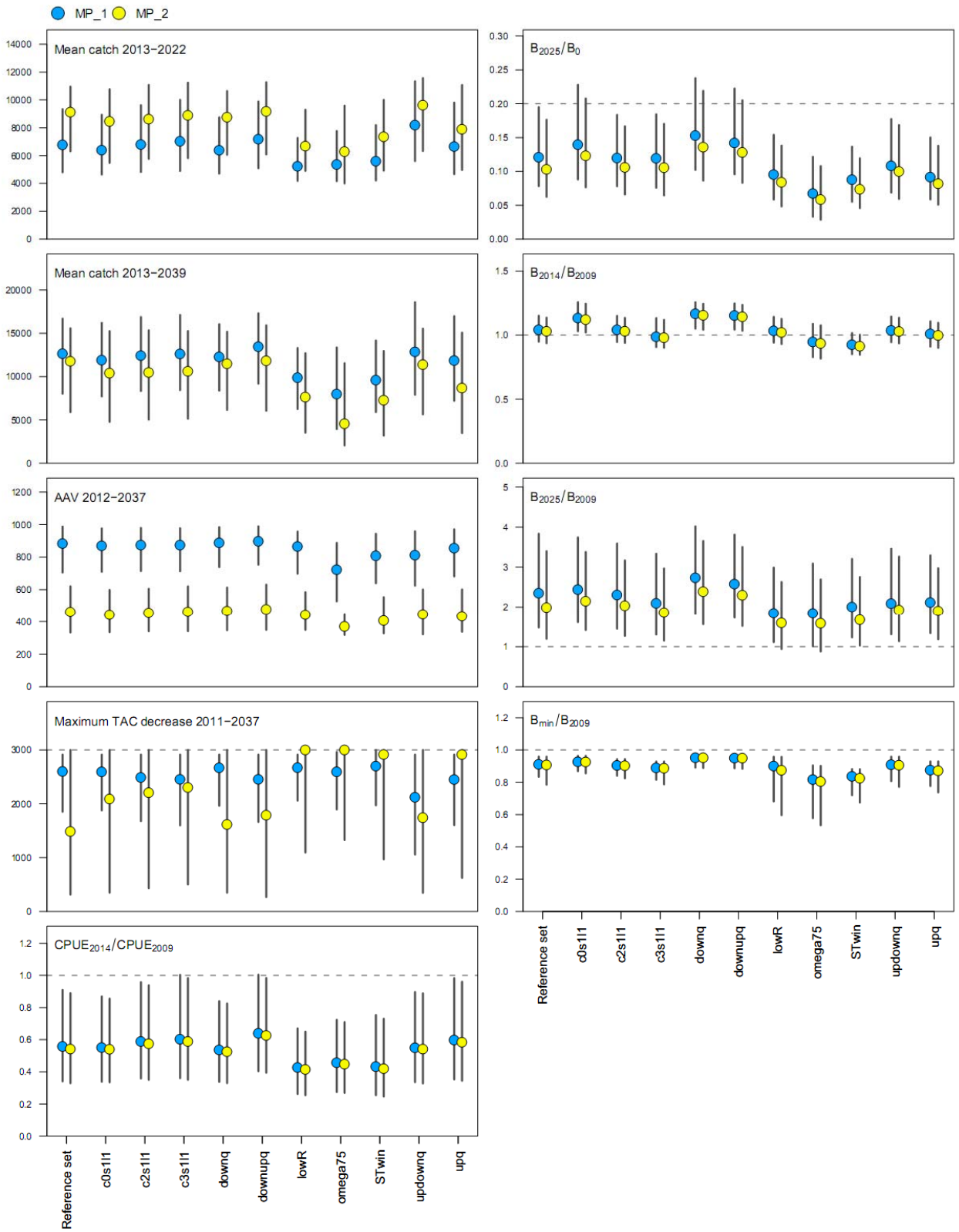



Figure 7. Comparison of the selected individual MPs for the reference set and all robustness tests.

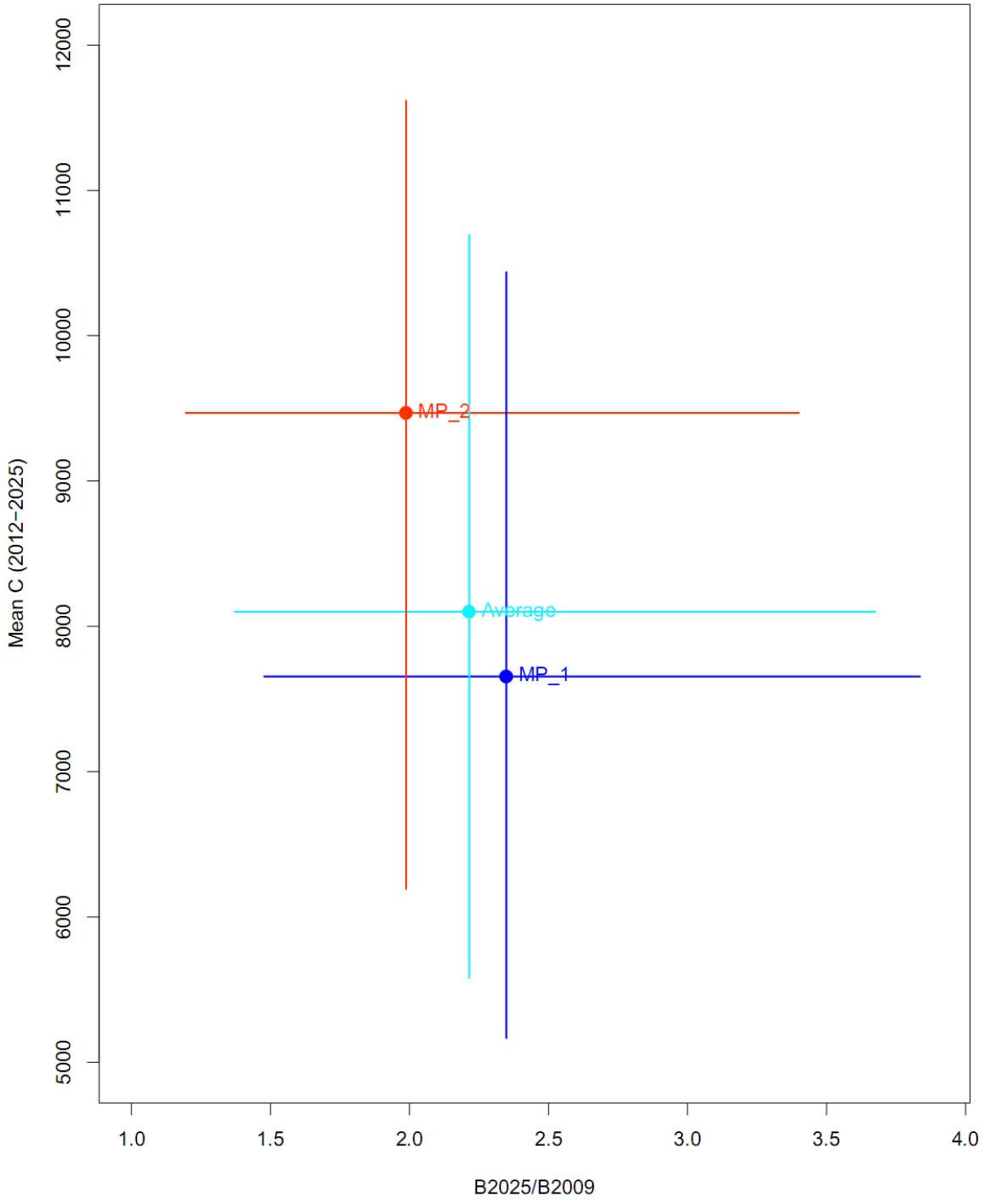



Figure 8. Tradeoff between spawning biomass in 2025 (relative to 2009) against mean catch from 2012 to 2025, for the reference set with **tuning level 5**.

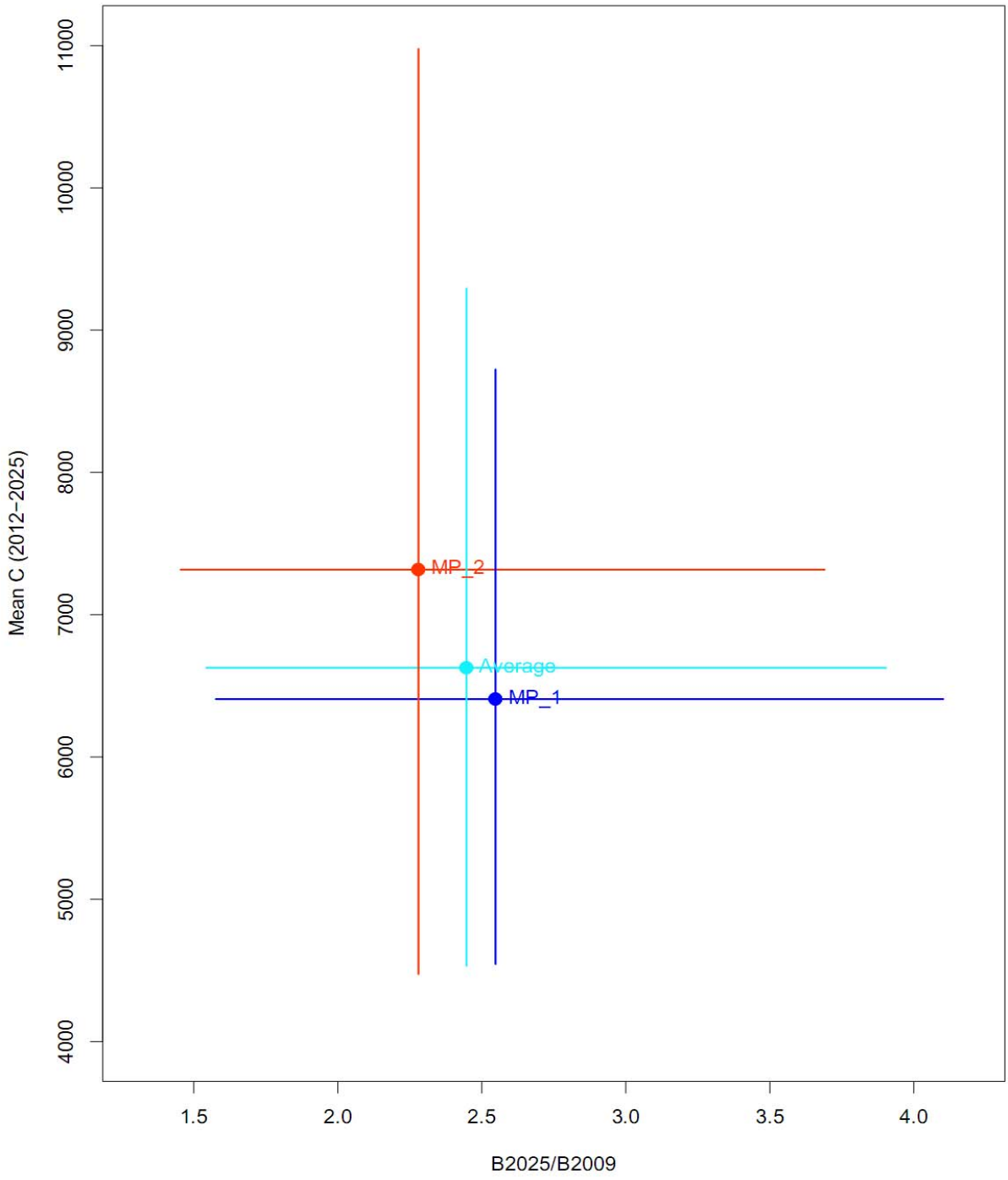



Figure 9. Tradeoff between spawning biomass in 2025 (relative to 2009) against mean catch from 2012 to 2025, for the reference set with **tuning level 2**.

**Attachment 9**

## Data and Model Specifications for the Aerial Survey Index used in the MP

### Data

The scientific aerial survey data are estimates of the biomass of SBT patches in the Great Australian Bight (GAB) as observed by dedicated spotters and a spotter-pilot. There are 15 North-South transects which cover the surveyed area of the GAB (from around 128E to 134E degrees longitude). Depending on the conditions at the time of the survey, several replicate searches of the survey area are normally completed.

The data consists of biomass estimates of each sighted SBT patch, distance covered, environmental covariates - such as sea surface temperature (SST), swell, haze, wind speed, and sea shadow - and are recorded for each spotter and the spotter-pilot. As of next year there will be no spotter-pilot in the survey, only dedicated spotters and a non-spotting pilot. Work has been done to assess the impact of this change on the standardised index and Eveson et al. (2010) explores this issue in depth. This will be an ongoing analysis but for the purposes of the provision of an index this year the data used were those corresponding to flights with two observers only.

### Standardisation model

The raw data are standardised in two stages, in terms of biomass-per-sighting (BpS) and sightings-per-mile (SpM), and then combined together to produce a single standardised abundance index with accompanying CV-by-year (see Eveson et al.(2010) for the details of this combination process).

*Biomass-per-sighting (BpS) model*

For the biomass-per-sighting (BpS) standardisation various subsets of the covariates (spatio-temporal and environmental) are explored each year as most statistically appropriate. Given the changing nature of the environmental information in each year, and the shortness of the time series, these can change with time but for 2010 the following model was assumed for the biomass-per-sighting model:

$$\log(BpS) \sim Year*Month*Area + SST + WindSpeed \quad (1)$$

The Year, Month and Area effects were considered as factors (with Year*Month*Area covering all 1, 2 and 3 way interactions and the 2 and 3-way effects were fitted as random effects given the sometimes sparse data coverage).

*Sightings-per-mile (SpM) model*

For the sightings-per-mile (SpM) model, as with the biomass-per-sighting model, the covariates included and the functional nature of their inclusion (linear/polynomial) can change over time as new data is recorded and future analyses are undertaken. For 2010, the following model was assumed:

$$\log(N\_sightings) \sim \text{offset}(\log(Distance)) + Year*Month*Area + \log(ObsEffect) + SST + WindSpeed + Swell + Haze + MoonPhase \quad (2)$$

N_sightings is the number of patch sightings and Distance is the distance covered and included as an offset, given SpM = N_sightings/Distance. As with the BpS model the 2 and 3-way spatio-

temporal effects are fitted as random effects.

**Generating the standardised index**

The specific details of the combination of the two standardised indices into one index can be found in Eveson et al. (2010). Combining the index to obtain a mean index is straightforward, with a weighted average of the biomass in each strata being summed to obtain the total index. The calculations to obtain the CV-by-year for the index are more complex, involving the delta method, given the lack of independence of both the SpM and BpS estimates across strata.

**Reference**

Eveson, J.P., Farley, J. and Bravington, M. 2010. The aerial survey index of abundance: updated analysis methods and results for the 2009/10 fishing season. CCSBT-ESC/1009/14.

**Attachment 10**

## 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 total allowable catch (TAC) generated by the management procedure (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 exist is described below. The need for invoking a metarule should only be evaluated at the Extended Scientific Committee (ESC) based on information presented and reviewed at the ESC.

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

1. Process to determine whether exceptional circumstances exist

Every year the ESC 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, or a series of recruitment values outside the range for which the MP was tested
- a scientific aerial survey or CPUE result outside the range for which the MP was tested
- substantial improvements in knowledge, or new knowledge, concerning the dynamics of the population which would have an appreciable effect on the operating models used to test the existing MP
- missing input data for the MP, resulting in an inability to calculate a TAC from the MP.

"Ranges" mentioned above refer to 95% probability intervals for projections for the measure in question under the reference set of the operating models used to test the MP.

Every three years (not coinciding with years when a new TAC is calculated from the MP) the ESC 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 (an example of exceptional circumstances would be if the stock assessment was substantially outside the range of simulated stock trajectories considered in MP evaluations).

Every six years (not coinciding with years when a new TAC is calculated from the MP) the ESC will:

- review the performance of the MP
- on the basis of the review determine whether the MP is on track or a new MP is required.

If the ESC concludes that there is no or insufficient evidence for exceptional circumstances, the ESC will:

- report to the Commission that exceptional circumstances do not exist.

If the ESC has agreed that exceptional circumstances exist, the ESC will:

- determine the severity of the exceptional circumstances
- follow the "Process for Action".

2. Process for Action

Having determined that there is evidence of exceptional circumstances, the ESC will in the same year:

- consider the severity of the exceptional circumstances (for example, how severely "out of bounds" is the CPUE or recruitment)
- follow the Principles for Action (see below)
- formulate advice on the action required (for example, 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 ESC)
- report to the Commission that exceptional circumstances exist and provide advice on the action to take.

The Commission will:

- consider the advice from the ESC
- decide on the action to take.

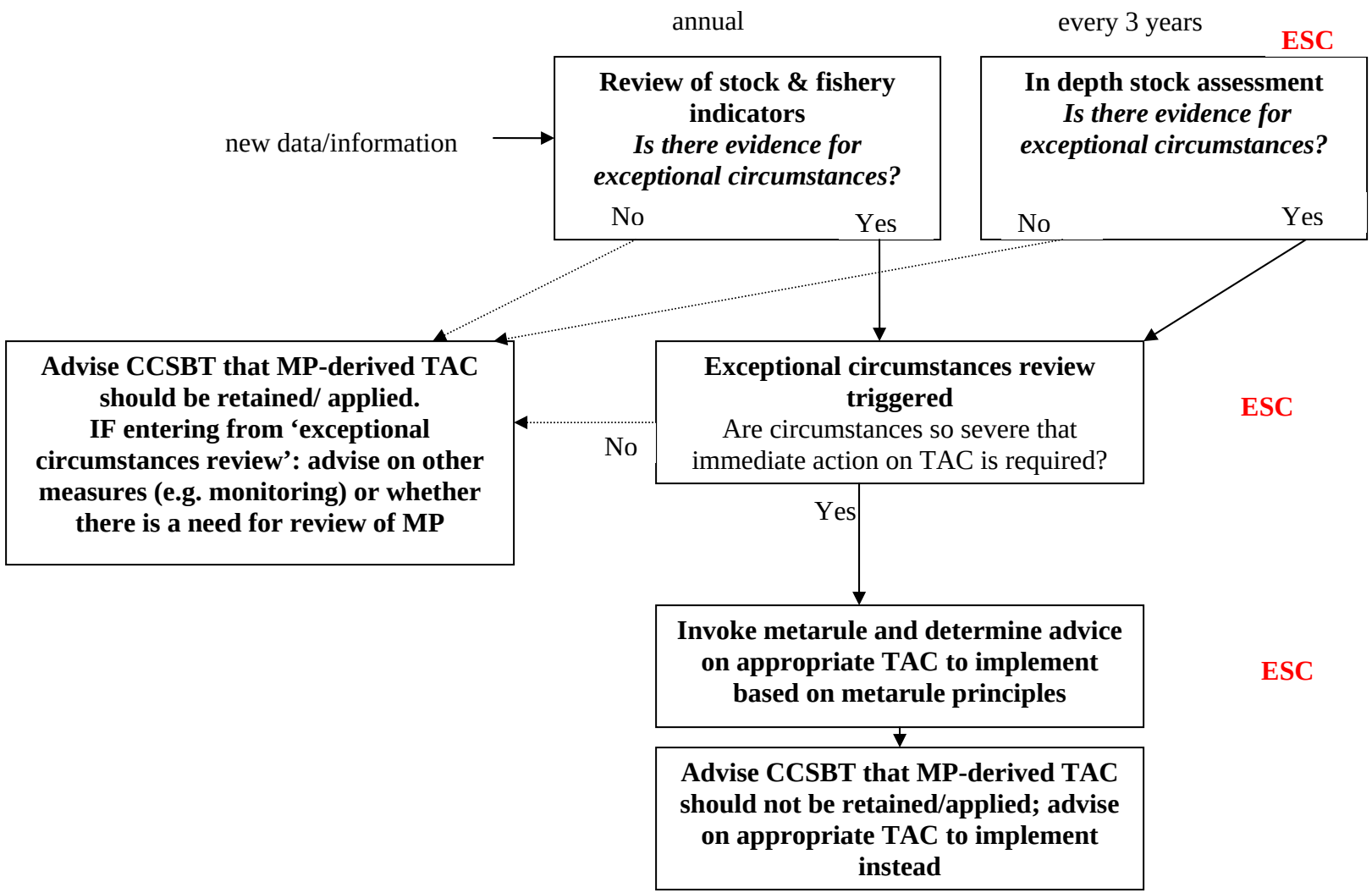
3. Principles for Action

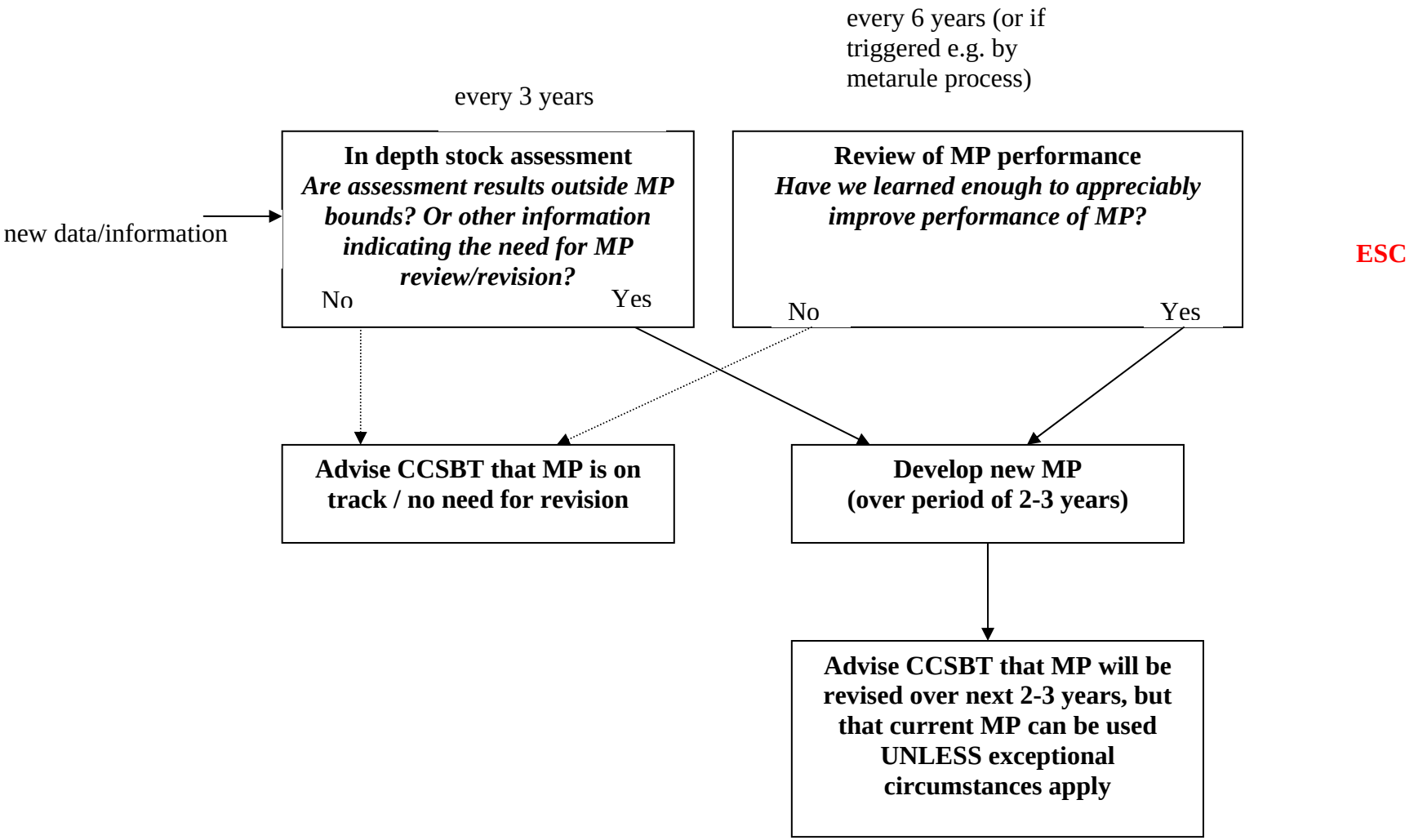
If the risk is to the stock, principles may be:
a) the MP-derived TAC should be an upper bound
b) action should be at least an x% change to the TAC, depending on severity.

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.

An urgent updated assessment and review of indicators will take place, with projections from that assessment providing the basis to select the value of the x% referred to above.

**Figure 1: Flowchart for Metarules process**




every 6 years (or if triggered e.g. by metarule process)
every 3 years
new data/information
In depth stock assessment
Are assessment results outside MP bounds? Or other information indicating the need for MP review/revision?
No
Yes
Review of MP performance
Have we learned enough to appreciably improve performance of MP?
No
Yes
ESC
Advise CCSBT that MP is on track / no need for revision
Develop new MP (over period of 2-3 years)
Advise CCSBT that MP will be revised over next 2-3 years, but that current MP can be used UNLESS exceptional circumstances apply

**Attachment 11**

## Trends in selected indicators of the SBT stock

### Table 1: Recent Trends in selected Indicators

*(taken from CCSBT-ESC/1009/09 and CCSBT-ESC/1009/23)*

| Indicator | Period | Min. | Max. | 2006 | 2007 | 2008 | 2009 | 2010 | 12 month trend | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 2008 to 2009 | 2009 to 2010 |
| **Scientific aerial survey (age 2-4)** | 1993–2000<br>2005–10 | 0.491 (2007) | 1.180 (2010) | 0.513 | 0.491 | 0.821 | 0.545 | 1.181 | ↓ | ↑ |
| **SAPUE index (age 2-4)** | 2002–10 | 0.51 (2004) | 1.55 (2010) | 0.86 | 0.94 | 1.35 | 0.88 | 1.55 | ↓ | ↑ |
| **Trolling index (age 1)** | 1996–2003<br>2005–06<br>2006–10 | 2.817 (2006) | 5.426 (2008) | 2.817 | 4.723 | 5.426 | 3.578 | 2.918 | ↓ | ↓ |
| **NZ charter nominal CPUE (Areas 5+6)** | 1989–2009 | 1.339 (1991) | 4.881 (2008) | 2.011 | 1.746 | 4.881 | 4.326 | | ↓ | |
| **NZ domestic nominal CPUE** | 1989–2009 | 0.000 (1989) | 1.249 (2009) | 0.458 | 0.715 | 0.870 | 1.249 | | ↑ | |
| **NZ charter age/size composition (proportion age 0–5 SBT)** | 1989–2009 | 0.001 (2005) | 0.414 (1993) | 0.049 | 0.082 | 0.237 | 0.333 | | ↑ | |
| **NZ domestic age/size composition (proportion age 0–5 SBT)** | 1980–2009 | 0.001 (1985) | 0.404 (1995) | 0.161 | 0.004 | 0.114 | 0.092 | | ↓ | |
| **Indonesian age composition: mean age on spawning ground, all SBT** | 1993–94 to 2008–09 | 14 (2005–06) | 24 (1995–96) | 14.4 | 15.1 | 16.7 | 15.6 | | ↓ | |
| **Indonesian age composition: median age on spawning ground** | 1994–95 to 2008–09 | 13 (2001–03) | 21 (1994–97, 1998–99) | 14 | 16 | 18 | 16 | | ↓ | |

| Indicator | Period | Min. | Max. | 2006 | 2007 | 2008 | 2009 | 2010 | 12 month trend | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 2008 to 2009 | 2009 to 2010 |
| **Standardised JP LL CPUE (age 3)[1]** | 1969–2009 | 0.161 (2003)<br>0.186 (2003) | 2.735 (1972)<br>2.567 (1972) | 0.498<br>0.541 | 0.499<br>0.583 | 0.592<br>0.809 | 0.453<br>0.578 | | ↓<br>↓ | |
| **Standardised JP LL CPUE (age 4) [1]** | 1969–2009 | 0.268 (2006)<br>0.296 (2006) | 2.784 (1974)<br>2.566 (1974) | 0.268<br>0.296 | 0.402<br>0.462 | 0.534<br>0.728 | 1.056<br>1.415 | | ↑<br>↑ | |
| **Standardised JP LL CPUE (age 5)[1]** | 1969–2009 | 0.270 (2006)<br>0.304 (1988) | 2.624 (1972)<br>2.503 (1972) | 0.270<br>0.311 | 0.300<br>0.362 | 0.468<br>0.618 | 1.071<br>1.465 | | ↑<br>↑ | |
| **Standardised JP LL CPUE (age 6+7)[1]** | 1969–2009 | 0.226 (2007)<br>0.272 (2007) | 2.699 (1976)<br>2.607 (1976) | 0.251<br>0.275 | 0.226<br>0.272 | 0.404<br>0.514 | 0.631<br>0.864 | | ↑<br>↑ | |
| **Standardised JP LL CPUE (age 8-11)[1]** | 1969–2009 | 0.261 (1992)<br>0.276 (1992) | 3.345 (1969)<br>3.089 (1969) | 0.415<br>0.473 | 0.272<br>0.329 | 0.424<br>0.518 | 0.434<br>0.582 | | ↑<br>↑ | |
| **Standardised JP LL CPUE (age 12+)[1]** | 1969–2009 | 0.415 (2007)<br>0.506 (2007) | 3.227 (1970)<br>2.957 (1970) | 0.585<br>0.670 | 0.415<br>0.506 | 0.546<br>0.691 | 0.635<br>0.848 | | ↑<br>↑ | |

[1] JP LL CPUE were standardized by the previously used GLM model (different from the current GLM model agreed in the SC13 for OM input) using CPUE input data for all vessels which were provided by the Secretariat. Values of the table were extracted from CCSBT-ESC/1009/23. This series may be affected by past anomalies in catch. The first and second rows correspond to w0.5 (B-ratio proxy) and w0.8 (Geostat proxy), respectively.

## Fishery Indicators

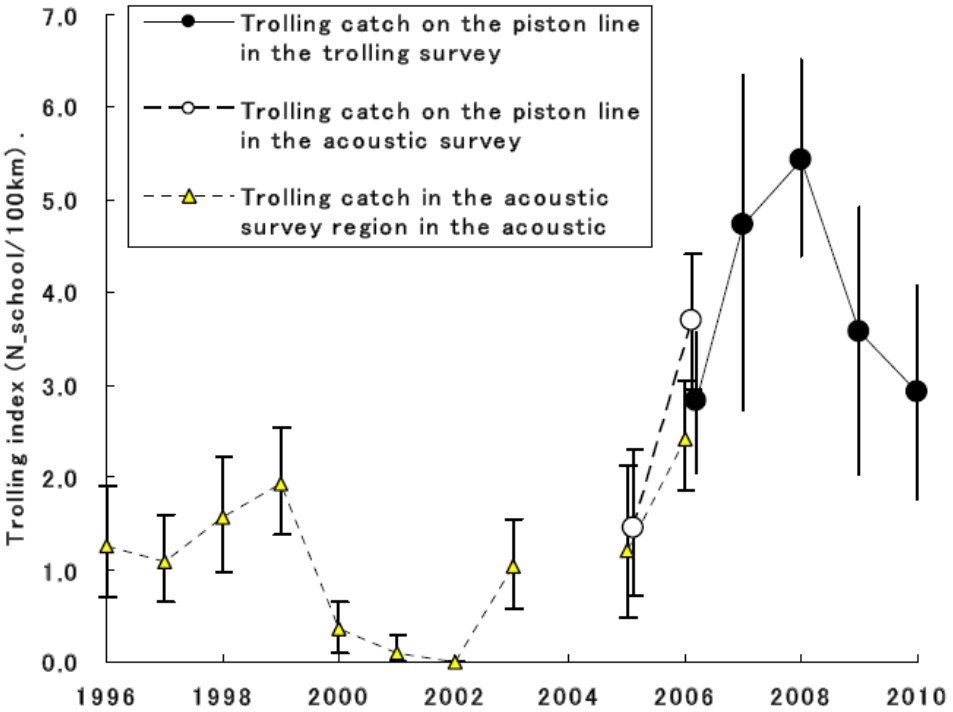



**Figure 1:** Trends of trolling catch index of age 1 SBT in the Western Australia. Plots are median and bars are 90% confidence intervals from 1000 replicates.

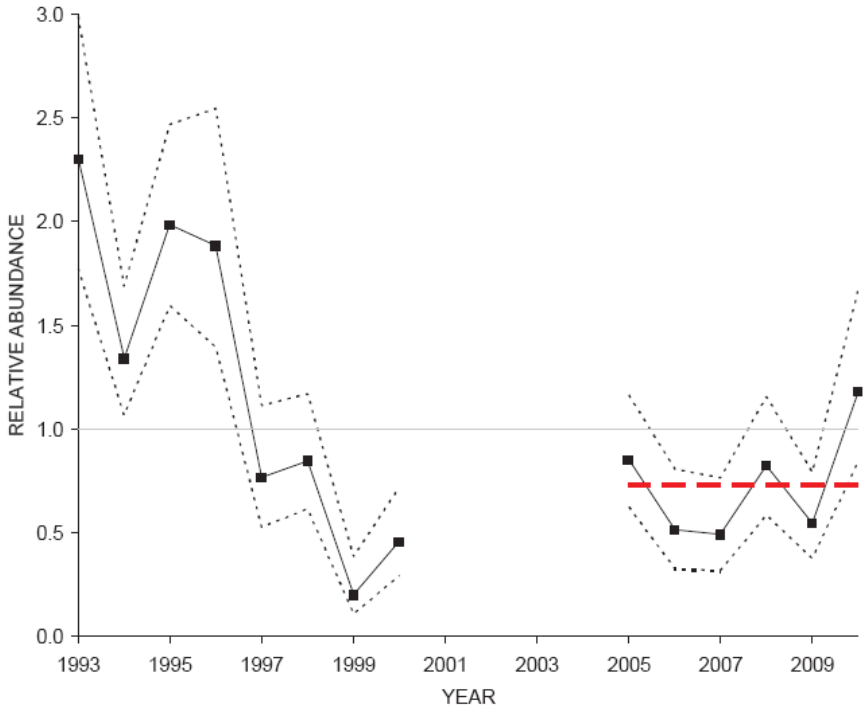



**Figure 2:** Scientific aerial survey index of relative abundance of juvenile SBT in the Great Australian Bight, Jan–Mar (hence the 2010 value represents the 2009–10 fishing season etc)from Eveson et al. (2010). Dotted lines are 90% confidence intervals. The horizontal line represents a relative abundance of 1.0; dashed horizontal line represents the average 2005–10 median value.

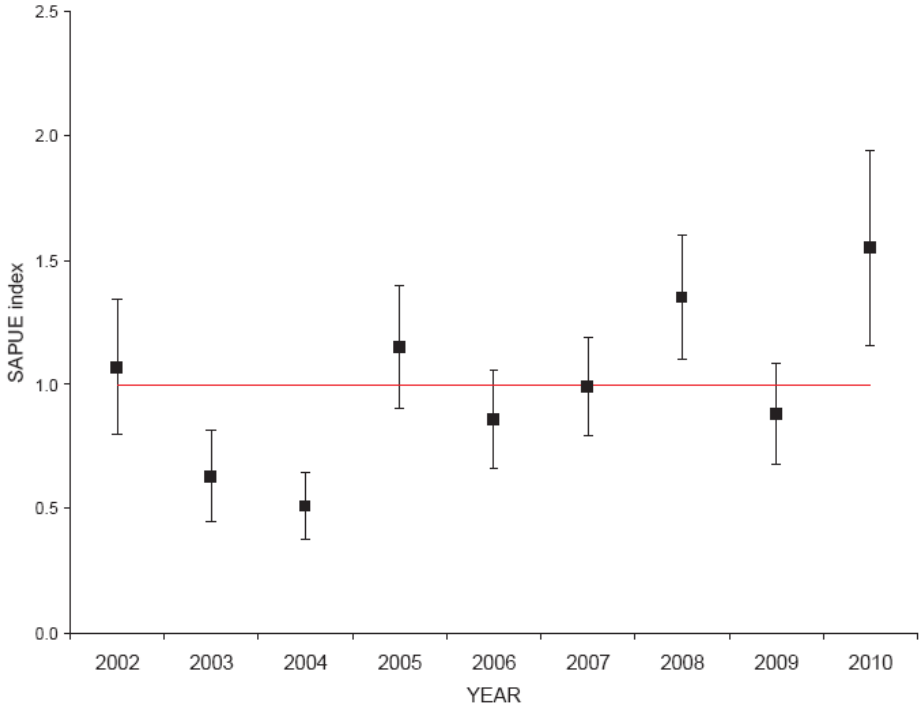



**Figure 3:** SAPUE index of relative surface abundance of juvenile SBT in the Great Australian Bight, Dec–Mar (Farley & Basson 2010). Estimates are median ± 2 standard errors, scaled by the mean over 2001–02 to 2009–10 (represented by the horizontal line). Data are for all months, December–March. 'Year' represents the second year in a split-year fishing season, i.e. '2010' is the 2009–10 fishing season.

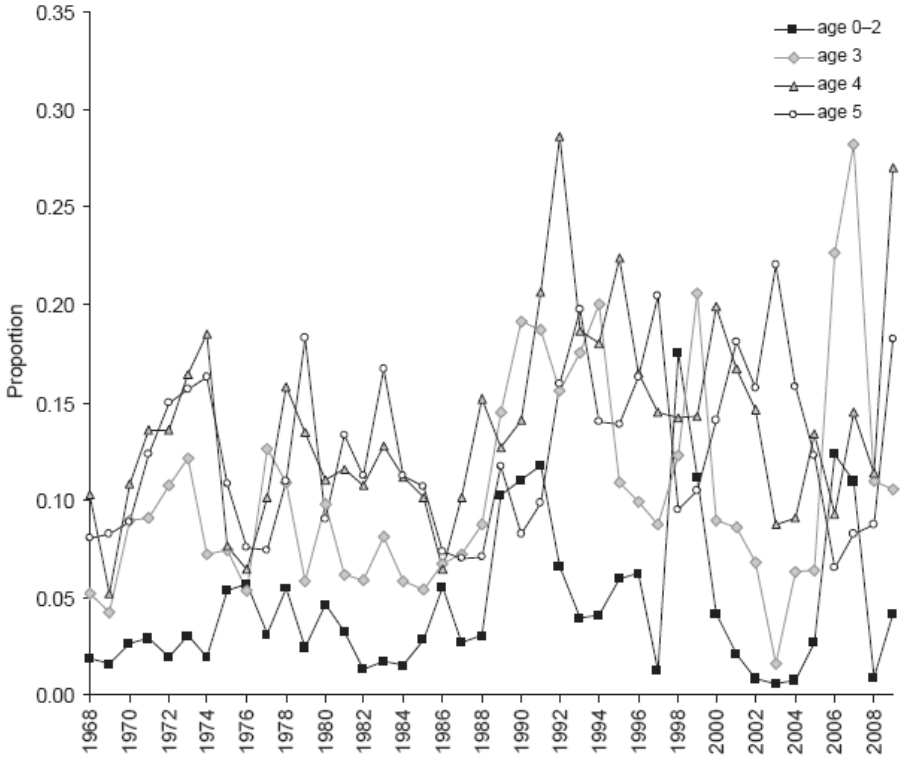



**Figure 4:** Age composition (proportion of total catch) of ages 0–2, 3, 4 & 5 in the Japanese longline fishery in statistical areas 4–9, months 4–9

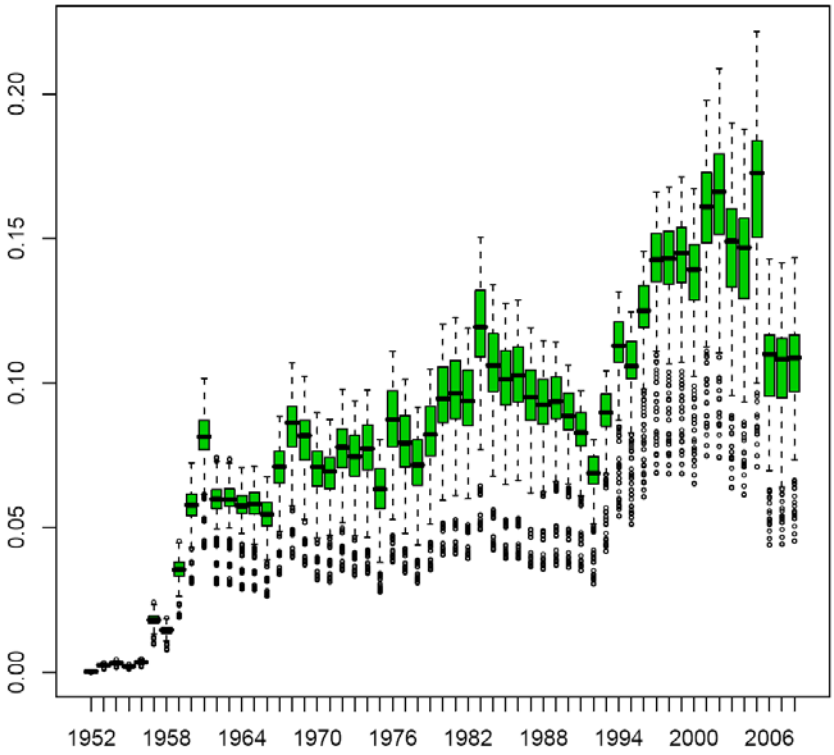



**Figure 5:** Total catch to total (age 1 plus) biomass ratio as an indicator of relative exploitation rates for the reference set from 1952 to 2008.

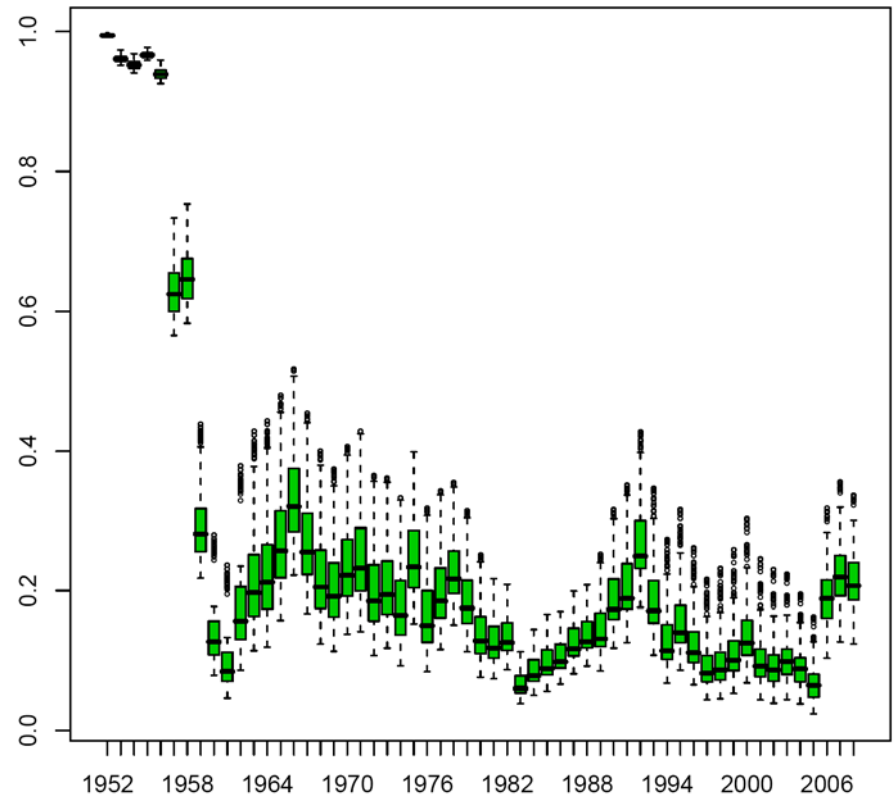



**Figure 6:** Spawning stock biomass per recruit (SPR) relative to unfished SPR for the reference set from 1952 to 2008.

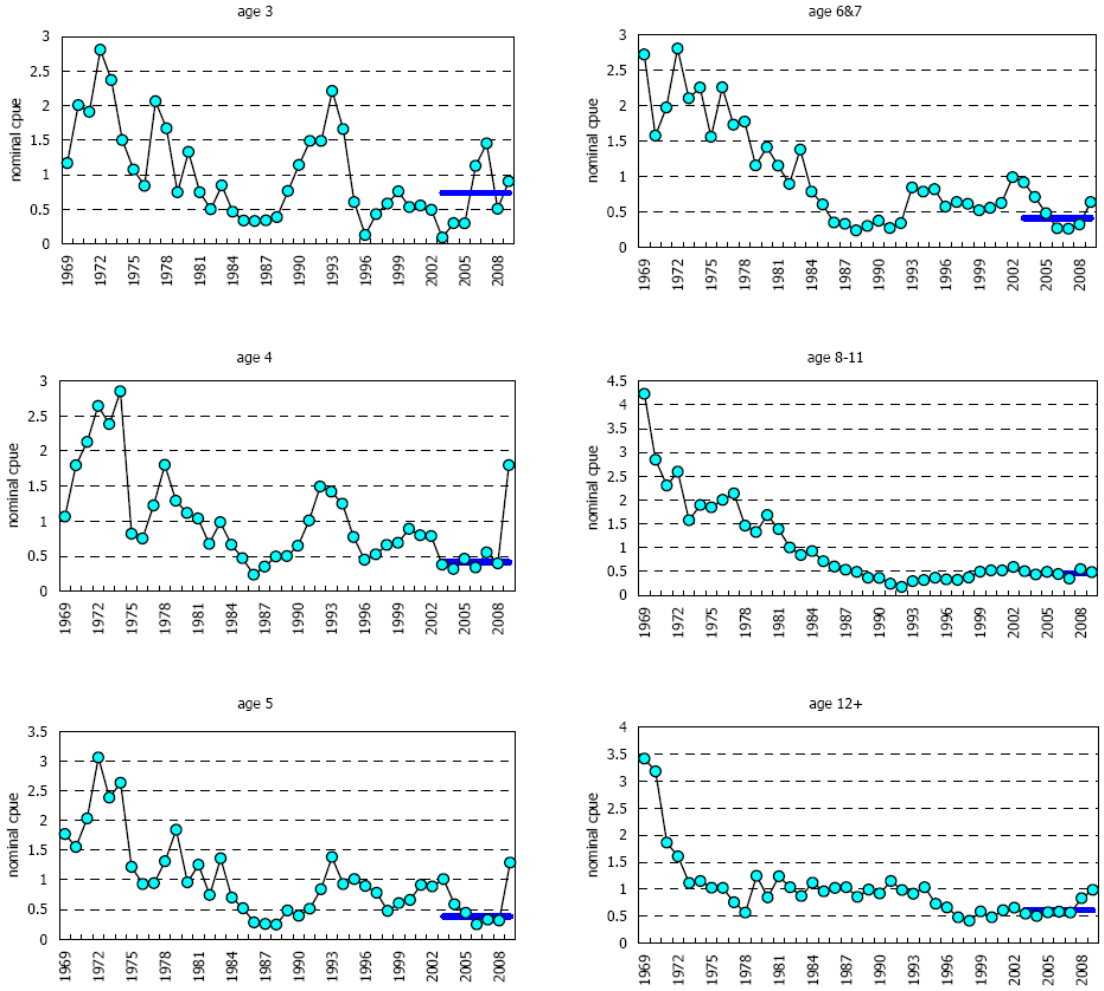



**Figure 7:** Trends in nominal catch rates (numbers per 1000 hooks) of SBT by age group (ages 3, 4, 5, 6-7, 8-11 and 12+) caught by Japanese longliners operating in CCSBT statistical areas 4-9 in months 4-9. The Horizontal line indicates the past 5-year averages over 2004-2009. Note: This figure may be affected by past anomalies in catch.

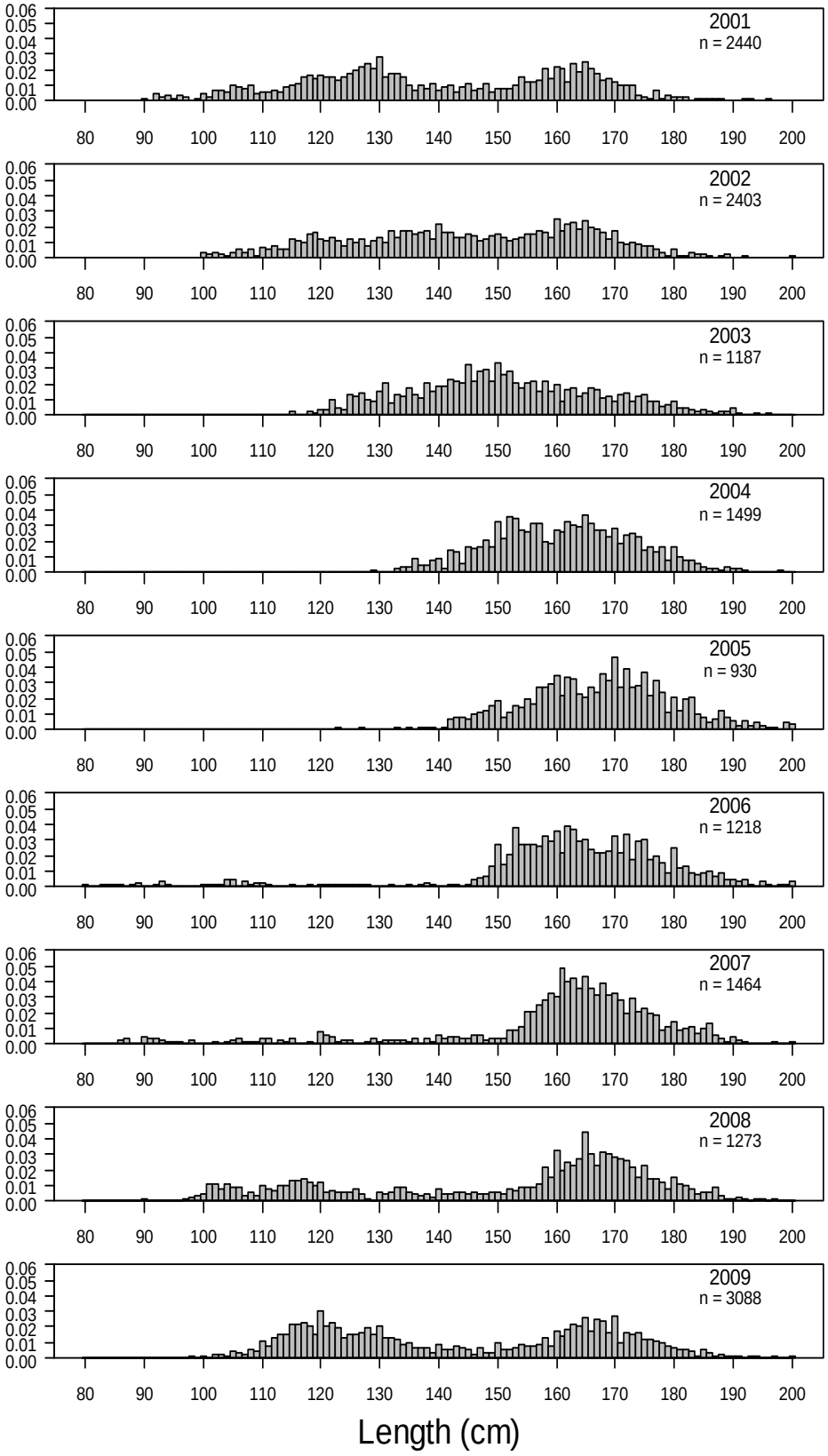



**Figure 8:** Proportion at length of SBT from the New Zealand charter fleet for 2001 to 2009.

**Attachment 12**

**Report on Biology, Stock Status and Management of Southern Bluefin Tuna: 2010**

The CCSBT Extended Scientific Committee conducted a review of fisheries indicators in 2010 to provide information on the stock status. This report updates description of fisheries and the state of stock, and provides fishery and catch information, in the light of these evaluations.

***1. Biology***

Southern bluefin tuna (*Thunnus maccoyii*) are found in the southern hemisphere, mainly in waters between 30° and 50° S, but only rarely in the eastern Pacific. The only known spawning area is in the Indian Ocean, south-east of Java, Indonesia. Spawning takes place from September to April in warm waters south of Java and juvenile SBT migrate south down the west coast of Australia. During the summer months (December-April), they tend to congregate near the surface in the coastal waters off the southern coast of Australia and spend their winters in deeper, temperate oceanic waters. Results from recaptured conventional and archival tags show that young SBT migrate seasonally between the south coast of Australia and the central Indian Ocean. After age 5 SBT are seldom found in nearshore surface waters, and their distribution extends over the southern circumpolar area throughout the Pacific, Indian and Atlantic Oceans.

SBT can attain a length of over 2m and a weight of over 200kg. Direct ageing using otoliths indicates that a significant number of fish larger than 160cm are older than 25 years, and the maximum age obtained from otolith readings has been 42 years. Analysis of tag returns and otoliths indicate that, in comparison with the 1960s, growth rate has increased since about 1980 as the stock has been reduced. There is some uncertainty about the size and age when SBT mature, but available data indicate that SBT do not mature younger than 8 years (155cm fork length), and perhaps as old as 15 years. SBT exhibit age-specific natural mortality, with M being higher for young fish and lower for old fish, increasing again prior to senescence.

Given that SBT have only one known spawning ground, and that no morphological differences have been found between fish from different areas, SBT are considered to constitute a single stock for management purposes.

***2. Description of Fisheries***

Reported catches of SBT up to the end of 2009 are shown in Figures 1 - 3. However, a 2006 review of SBT data indicated that there may have been substantial under-reporting of SBT catches and surface fishery bias in the previous 10 - 20 year period and there is currently substantial uncertainty regarding the true levels of total SBT catch over this period. Historically, the SBT stock has been exploited for more than 50 years, with total catches peaking at 81,750t in 1961 (Figures 1 - 3). Over the period 1952 - 2003, 79% of the reported catch was taken by longline and 21% using surface gears, primarily purse-seine and pole&line (Figure 1). The proportion of

reported catch made by surface fishery peaked at 50% in 1982, dropped to 11-12 % in 1992 and 1993 and increased again to average 35% since 1996 (Figure 1). The Japanese longline fishery (taking a wide age range of fish) recorded its peak catch of 77,927t in 1961 and the Australian surface fishery catches of young fish peaked at 21,501t in 1982 (Figure 3). New Zealand, the Fishing Entity of Taiwan and Indonesia have also exploited southern bluefin tuna since the 1970s - 1980s, and Korea started a fishery in 1991.

On average 80% of the SBT catch has been made in the Indian Ocean, 16% in the Pacific Ocean and 4% in the Atlantic Ocean (Figure 2). The reported Atlantic Ocean catch has varied widely between about 18t and 8,200t since 1968 (Figure 2), averaging about 835t over the past two decades. This variation in catch reflecting shifts in longline effort between the Atlantic and Indian Oceans. Fishing in the Atlantic occurs primarily off the southern tip of South Africa (Figure 4). Since 1968, the reported Indian Ocean catch has declined from about 45,000t to 10,000t, averaging about 21,000t, and the reported Pacific Ocean catch has ranged from about 800t to 19,000t, averaging about 5600t, over the same periods (although SBT data analyses indicate that these catches may be under-estimated).

### *3. Summary of Stock Status*

The 2009 ESC meeting reported the status of the SBT stock in 2009 based on the reconditioned CCSBT Operating Model (OM). The reference set OM and six plausible scenarios all indicated that the spawning stock biomass (SSB) remained at a very low level; typically about 5% or less of $SSB_0$.

As reported in the 2009 ESC, recruitments during the last two decades were estimated to be well below the levels over 1950-1980. Recruitment in the 1990s fluctuated at a low level without any overall trend, but recruitments for 2000 to 2002 were poor. The two following year classes were somewhat stronger, though still below the average 1990s level. Recruitment since 2005 cannot be estimated precisely as yet. Although some data give positive signals, it remains probable that at least some of these year classes were as weak as in 1999-2002.

The 2009 ESC recommended a reduction to the current TAC in order to rebuild the spawning stock and thereby also reduce the risk in the short term of further poor recruitments. Based on this recommendation, the Extended Commission reduced the effective catch limit by about 20% to 9449 t (average annual catch for 2010-11).

Since the assessment in 2009, there have been several positive signals about the outlook for the stock. These include:

- Reduction in the total reported global catch
- Confirmation of increases in longline CPUE since 2007 (as checked in the inter-sessional CPUE analyses)
- Increased scientific aerial survey and SAPUE indices (reflective of potentially improved recruitment of recent year classes).

Increases in a number of CPUE indices in the most recent years, such as the New Zealand domestic fishery and Japanese longline fishery for age classes 4 and 5

suggest stronger year classes in recent years. Caution should nevertheless continue to be exercised in interpreting the longline CPUE data, where there is underlying uncertainty in the past data and regarding potential changes in fishing operation patterns since 2006, which remains to be resolved.

The ESC advice on the estimated status of the stock based on indicators in 2009-10, remains unchanged from the advice provided by the ESC in 2009. The current SSB remains very low, however, the outlook for the stock may be more positive due to the factors described in paragraph 103.

### *4. Current Management Measures*

At its Sixteenth annual meeting, the CCSBT agreed that the status of the southern bluefin tuna (SBT) stock was at a critical stage and that a meaningful reduction in the total allowable catch (TAC) was necessary in order to recover the stock and work toward reaching an interim rebuilding target reference point of 20% of the original spawning stock. Consequently, the CCSBT reduced the SBT global total allowable catch (TAC) for 2010 and 2011 to an average level over the two years of 80% of the previously allocated global TAC of 11,810 tonnes. The Effective Catch Limit for Members and Cooperating Non-Members combined averaged 9449 t annually over 2010-2011. The allocation of the TAC amongst Members and Cooperating Non-Members for the 2010 and 2011 fishing seasons is specified below (in tonnes). To help ensure compliance with the TAC, the CCSBT also adopted a Resolution on Actions Plans to Ensure Compliance with Conservation and Management Measures.

Effective Catch Limit for the 2010 and 2011 fishing seasons

Members

The “Nominal Catch” listed below is the catch before any reductions are applied, the “Allocated Catch” is the reduced catch allocated for 2010 and 2011 and the “Effective Catch Limit” is the effective catch after additional agreed voluntary reductions have been applied.

| | Nominal Catch | Allocated Catch | Effective Catch Limit |
|---|---|---|---|
| Japan | 5,665 | 2,261 | 2,261 |
| Australia | 5,665 | 4,270 | 4,015 |
| Republic of Korea | 1,140 | 859 | 859 |
| Fishing Entity of Taiwan | 1,140 | 859 | 859 |
| New Zealand | 1000 | 754 | 709 |
| Indonesia | 750 | 651 | 651 |

Cooperating Non-Members (for 2010)

| | |
|---|---|
| Philippines | 45 |
| South Africa | 40 |
| European | 10 |

Community

In addition to the reduced TAC, the CCSBT decided that it would work toward implementing a management procedure (MP) in 2011 and that the MP would be the basis for TAC setting in 2012 and beyond. An emergency rule will be developed as part of the MP for exceptional circumstances such as recruitment levels lower than historically low levels. Finally, the CCSBT has agreed to set a TAC of 5,000t-6,000t for the 2012 fishing season in the event that an MP cannot be finalised by 2012, unless the Extended Commission decides otherwise based upon the new stock assessment.

More complete information on the total catch and its allocation is provided in paragraphs 45 to 61 and Attachment 13 of the CCSBT16 Report.

On 1 June 2000, the CCSBT implemented a Trade Information Scheme (TIS) for SBT, in which a CCSBT TIS document must be issued for all exports of SBT. The scheme also requires all Members of the CCSBT to ensure that all imports of SBT are to be accompanied by a completed CCSBT TIS Document, endorsed by an authorised competent authority in the exporting country, and including details of the name of fishing vessel, gear type, area of catch, dates, etc. Shipments not accompanied by this form must be denied entry by Members and Cooperating Non-Members. Completed forms are lodged with the CCSBT Secretariat where they are used to maintain a database for monitoring catches and trade and for conducting reconciliations between exports and imports of SBT.

On 1 July 2004, the CCSBT established a list of fishing vessels over 24 metres in length which were approved to fish for SBT. The list was extended to include all vessels, regardless of size, from 1 July 2005.

On 31 December 2008, the CCSBT established a list of authorised farms that are approved to operate for farming SBT and on 1 April 2009, the CCSBT established a list of carrier vessels that are authorised to receive SBT at sea from large scale fishing vessels. Members and Cooperating Non-Members will not allow the trade of SBT caught by fishing vessels and farms, or transhipped to carrier vessels that are not on these lists.

The CCSBT Vessel Monitoring System (VMS) came into effect immediately after the Fifteenth Annual Meeting of the Commission, on 17 October 2008. It requires CCSBT Members and Cooperating Non-Members to adopt and implement satellite-linked VMS for vessels fishing for SBT that complies with the IOTC, WCPFC, CCAMLR, or ICCAT VMS requirements according to the respective convention area in which the SBT fishing is being conducted. For fishing outside of these areas, the IOTC VMS requirements must be followed.

The CCSBT Transhipment monitoring program came into effect on 1 April 2009. The program applies to transhipments at sea from tuna longline fishing vessels with freezing capacity (referred to as “LSTLVs”). It requires, amongst other things, for carrier vessels that receive SBT transhipments at sea from LSTLVs to be authorised to receive such transhipments and for a CCSBT observer to be on board the carrier

vessel during the transhipment. The CCSBT transhipment program is harmonised and operated in conjunction with those of ICCAT and IOTC to avoid duplication of the same measures. ICCAT or IOTC observers on a transhipment vessel that is authorised to receive SBT are deemed to be CCSBT observers provided that the CCSBT standards are met.

The CCSBT Catch Documentation Scheme (CDS) came into effect on 1 January 2010 and replaces the existing TIS system. The CDS provides for tracking and validation of legitimate SBT product flow from catch to the point of first sale on domestic or export markets. As part of the CDS, all transhipments, landings of domestic product, exports, imports and re-exports of SBT must be accompanied by the appropriate CCSBT CDS Document(s), which will include a Catch Monitoring Form and possibly a Re-Export/Export After Landing of Domestic Product Form. Similarly, transfers of SBT into and between farms must be documented on either a Farm Stocking Form or a Farm Transfer Form as appropriate. In addition, each whole SBT that is transhipped, landed as domestic product, exported, imported or re-exported must have a uniquely numbered tag attached to it and the tag numbers of all SBT (together with other details) will be recorded on a Catch Tagging Form. Copies of all documents issued and received will be provided to the CCSBT Secretariat on a quarterly basis for compiling to an electronic database, analysis, identification of discrepancies, reconciliation and reporting.

### *5. Scientific Advice*

If the Management Procedure (MP) is implemented in 2011 with a 1-year lag, the ESC recommends that the current TAC of 9449t remain for 2012. If the MP is implemented in 2011 with no lag, the ESC recommends that the MP guide the TAC setting for 2012.

Noting the Extended Commission's intent to adopt an MP at its 2010 annual meeting, the ESC recommends that the Extended Commission take steps to ensure accurate future catch and effort reporting.

## 6. Biological State and Trends

Analyses suggest the SBT spawning biomass is at a low fraction of its original biomass and well below the 1980 level as well as below the level that could produce maximum sustainable yield. Rebuilding the spawning stock biomass would almost certainly increase sustainable yield and provide security against unforeseen environmental events. Recruitments in the last decade are estimated to be well below the levels in the period 1950-1980.

Exploitation rate: High fishing mortality
Exploitation state: Overexploited
Abundance level: Low abundance

| SOUTHERN BLUEFIN TUNA SUMMARY (global stock) | |
|---|---|
| Maximum Sustainable Yield | Not estimated |
| Reported (2009) Catch | 10,940 t |
| Current Replacement Yield | Not estimated |
| Current (2009) Spawner Biomass | 44,040 (33,091 – 50,095t)[1] |
| Current (2009)Depletion | $SSB_{2009}$ / $SSB_0$ : 0.036 - 0.051[1] |
| Current Management Measures | Effective Catch Limit for Members and Cooperating Non-Members combined averaged 9449 t annually over 2010-2011. |

[1] These are the ranges in estimates of median spawning biomass obtained from evaluation of the base case and a range of six plausible scenarios during the 2009 Extended Scientific Committee meeting.

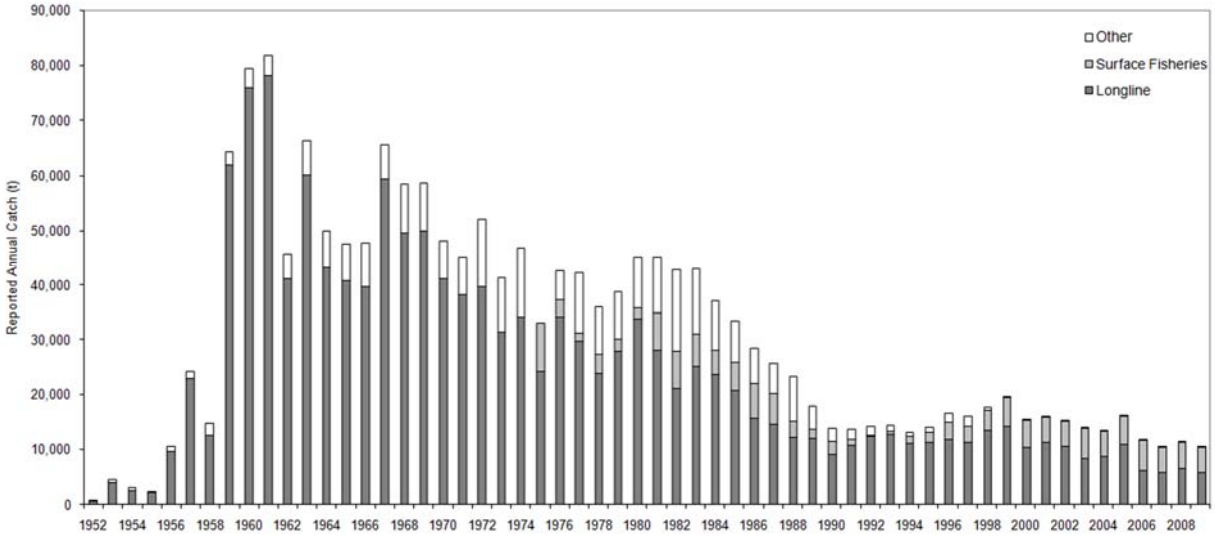



**Figure 1:** Reported southern bluefin tuna catches by fishing gear, 1952 to 2009. Note: a 2006 review of SBT data indicated that catches over the past 10 to 20 years may have been substantially under-reported.

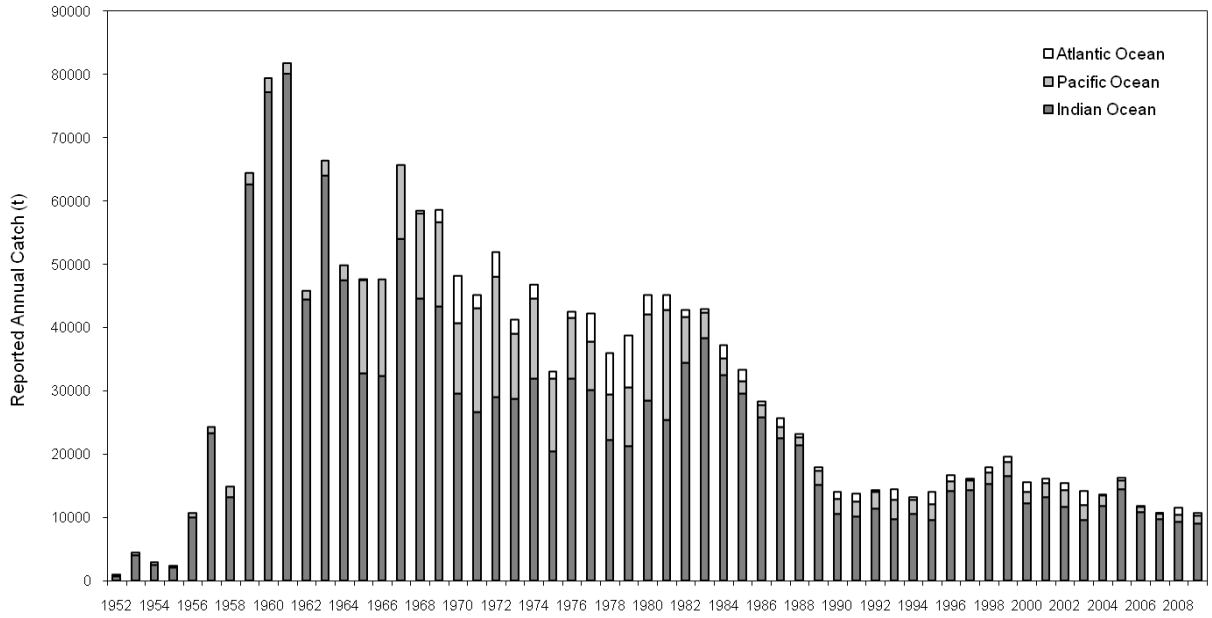



**Figure 2:** Reported southern bluefin tuna catches by ocean, 1952 to 2009. Note: a 2006 review of SBT data indicated that catches over the past 10 to 20 years may have been substantially under-reported.

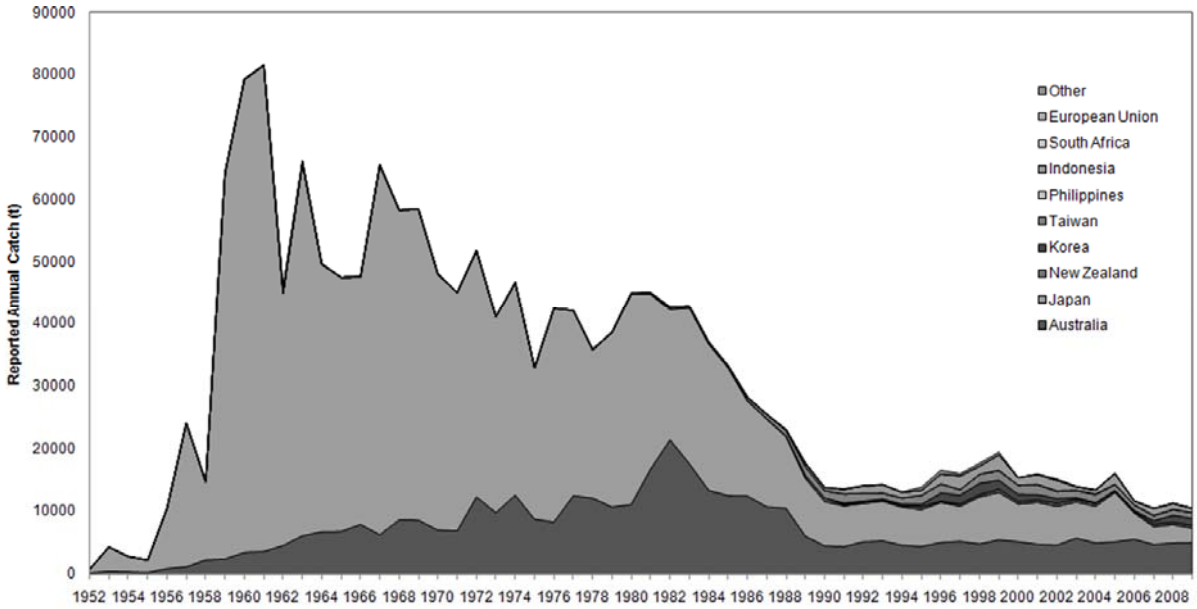



**Figure 3:** Reported southern bluefin tuna catches by flag, 1952 to 2009. Note: a 2006 review of SBT data indicated that catches over the past 10 to 20 years may have been substantially under-reported.

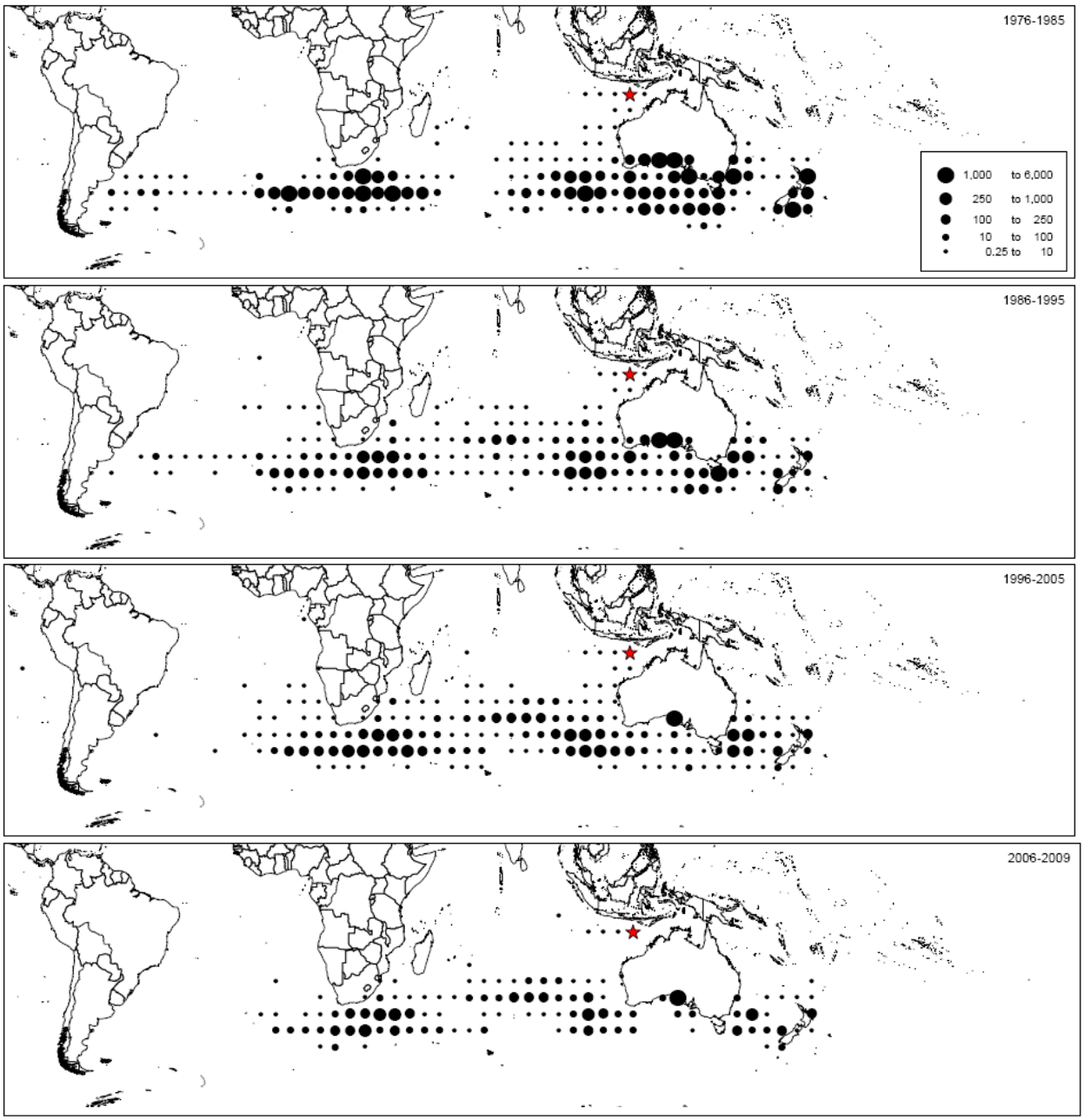



**Figure 4:** Geographical distribution of average annual southern bluefin tuna catches (t) by CCSBT members and cooperating non-members over the periods 1976-1985, 1986-1995, 1996-2005 and 2006-2009 per 5° block by oceanic region. The area marked with a star is an area of significant catch in the breeding ground. Block catches averaging less than 0.25 tons per year are not shown. Note: This figure may be affected by past anomalies in catch.

**Attachment 13**

# RULES AND PROCEDURES FOR THE PROTECTION, ACCESS TO, AND DISSEMINATION OF DATA COMPILED BY THE CCSBT

## 1. Basic principles relating to the dissemination of data by the CCSBT

1. Data and information specified in Table 1 and held by the CCSBT or its Secretariat, and by service providers or contractors acting on their behalf, shall only be released in accordance with these Rules and Procedures.

2. Data may be released if the Member (or Cooperating Non-Member) of the Extended Commission providing the data to the CCSBT authorises its release.

3. Persons duly authorised by the Executive Secretary within the CCSBT Secretariat[1] and service providers, who have read and signed the Commission's confidentiality protocol, shall have access to the data necessary to perform their CCSBT duties.

4. Officers of the Commission[2] and its subsidiary bodies, who have read and signed the Commission's confidentiality protocol, shall have access to the data necessary to perform their CCSBT duties.

5. Members [and Cooperating Non-Members (CNM)] of the Extended Commission shall have access to data to serve the purposes of the Convention, including data:

   (a) covering vessels flying their flag that were authorised or engaged in fishing for, retaining on board, transhipping or landing southern bluefin tuna.

   (b) covering any vessels fishing in waters under their jurisdiction for the time period during which such fishing occurred.

   [(c) covering vessels applying to fish in their national waters, unloading in their ports or transhipping fish within waters under their jurisdiction.

   (d) for the purpose of compliance and enforcement activities on the high seas, consistent with the Convention and the Conservation and Management Measures and other relevant decisions adopted by the Commission, subject to the rules and procedures for access and dissemination of such data that the Commission will adopt under paragraph 21.]

   (c) for the purpose of scientific and other research, if the Member or CNM of the Extended Commission that originally provided that data authorises the Extended Commission to release them or if the data have a "No risk" or "Low" confidentiality risk classification according to Table 1[3]. In cases where a Member or CNM of the Extended Commission elects to provide an ongoing authorisation for the release of such data, the Member or CNM may at any time cancel this authorisation by notifying the Secretariat that it has revised its earlier decision.

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[1] Persons duly authorised by the Executive Secretary within the CCSBT Secretariat are Secretariat staff and contractors that are appointed by the Executive Secretary that are responsible to the Executive Secretary.

[2] Officers of the Commission are people appointed by the Commission (e.g. Independent Chairs, Scientific Advisory Panel) to perform a specific function for the Commission and are responsible to the Commission for this function.

[3] These data are typically made available to Members through the private area of the CCSBT web site or the CCSBT Data CD.

6. To the greatest extent practical, the CCSBT, its Secretariat and their service providers or contractors acting on their behalf, should release data in a timely manner.

## 2. Risk classification and definition of confidentiality

7. Data covered by these Rules and Procedures will be classified in accordance with the risk classification methodology included in **Table 1**, which reflects *inter alia* the damage that would be done to the operations or credibility of the Extended Commission as a consequence of the unauthorised disclosure of such information.

8. Data covered by these Rules and Procedures are determined to be either public domain or non-public domain data in accordance with the confidentiality risk classification established in **Table 1**.

## 3. Dissemination of Public Domain Data

9. Except for data as described in Paragraph 10, the types of data listed in Table 1 with a "No risk" classification have been designated to be Public Domain data.

10. Data in the public domain shall not reveal the individual activities or identity of any vessel, entity or person. Catch and Effort data in the public domain shall be aggregated by flag, gear, year, month and 1ºx1º grid (for surface fisheries) or 5ºx5º grid (for longline fisheries) and, provided that the data contains information on the number of vessels in a strata, shall be made up of observations from a minimum of three vessels.

11. Public Domain data shall be available to any persons for (a) downloading from the Commission's website and/or (b) release by the Commission on request.

12. The Commission's website should contain a statement describing the conditions associated with the viewing or downloading of Public Domain data (for example, that the source of the data must be acknowledged), and should require the person requesting the data to "Accept" these conditions before viewing or downloading can begin.

## 4. Dissemination of Non-Public Domain Data

### *4.1 Definition of Non-Public Domain Data*

13. Subject to the decisions of the Extended Commission, all types of data not described in paragraph 9 shall be referred to as Non-Public Domain data.

### *4.2 General rules for dissemination of, and access to, Non-Public Domain data*

14. All access to and dissemination of Non-Public Domain data shall only be authorised in accordance with these Rules and Procedures and shall be protected in accordance with the CCSBT Data Security Standards specified in **Attachment 1**.

15. The CCSBT Secretariat shall log and report to the Extended Commission all access and release of Non-Public Domain data with a "Medium" or High" risk classification including where applicable, the name and affiliation of the person, the type of data accessed or released, the purpose for which the data were requested, the date when the data were requested, the date when the data were released and authorisations that were provided.

### *4.3 Access to Non-Public Domain data by the Staff of the Secretariat, the CCSBT Service Providers, and Officers of the Commission and its Subsidiary Bodies*

16. Pursuant to paragraphs 3 and 4, persons duly authorised by the Executive Secretary, within the CCSBT Secretariat and service providers, including the scientific advisory panel, shall have access to the data necessary to perform their CCSBT duties. Officers of the Commission and its subsidiary bodies shall have access to the data necessary to perform their CCSBT duties. All such persons shall sign a Confidentiality Agreement with the Executive Secretary and maintain the CCSBT Data Security Standards in respect of data to which they have access. The Executive Secretary shall maintain a Register of all such persons (including the purpose for which they require access to the data) and make the Register available to a Member [or CNM] of the Extended Commission on written request.

### *4.4 Access to Non-Public Domain data by Members [and CNMs] of the Extended Commission*

17. Members [and CNMs] of the Extended Commission shall have access to Non-Public Domain data to serve the purposes of the Convention, including data:

    (a) Covering vessels flying their flag that were authorised or engaged in fishing for, retaining on board, transhipping or landing southern bluefin tuna.

    (b) Covering any vessels fishing in waters under their jurisdiction for the time period during which such fishing occurred.

    [(c) Covering vessels applying to fish in their national waters, unloading in their ports or transhipping fish within waters under their jurisdiction.]

    (c) For the purpose of scientific and other research, if the Member or CNM of the Extended Commission that originally provided that data authorises the Extended Commission to release them or if the data have a "Low" confidentiality risk classification according to Table 1[3]. In cases where a Member or CNM of the Extended Commission elects to provide an ongoing authorisation for the release of such data, the Member or CNM may at any time cancel this authorisation by notifying the Secretariat that it has revised its earlier decision.

18. Members [and CNMs] of the Extended Commission shall notify the Secretariat of a small number of representatives (preferably only 2) authorised to submit requests[4] for access to Non-Public Domain data. Such notification will include name, affiliation, and contact information (e.g. telephone, facsimile, email address). The CCSBT Secretariat will maintain a list of such authorised representatives. Members [and CNMs] of the Extended

[4] The requests by the authorised representatives would usually be to grant access to data for other people (e.g. scientists), not for themselves. For data classified with a "low risk", the only requests that need to be made are requests for access to relevant parts of the private area of the CCSBT web site. These requests can be handled by simple e-mail correspondence directly with the Secretariat. For data with a "medium" or "high" risk, the procedures in Attachment 2 must be followed.

Commission and the Secretariat shall ensure the list of Member [and CNM] representatives is kept up to date and made available.

19. The authorised representative(s) of the Members [and CNMs] of the Extended Commission are responsible for ensuring the confidentiality and security of the Non-Public Domain data according to its risk classification and in a manner consistent with the CCSBT Data Security Standards.

[21. For the purpose of compliance and enforcement activities on the high seas, Non-Public Domain data will be made available subject to separate rules and procedures for the access and dissemination of such data, that the Commission will adopt for these purposes.

22. VMS data will be made available for scientific purposes, subject to the separate rules and procedures referred to in paragraph 21 above.]

23. Access to Non-Public Domain data by Members [and CNMs] of the Extended Commission shall be administered and authorised by the Executive Secretary on the basis of these Rules and Procedures in conjunction with the Procedures for Requesting the Release of Non-Public Domain data at **Attachment 2**.

25. A Member [or CNM] that has not fulfilled its obligations to provide data to the Extended Commission for two consecutive years shall not be granted access to Non-Public Domain data until all such obligations are met. A Member [or CNM] whose representative, authorised in accordance with paragraphs 18 and 19 above, failed to observe the rules stipulated in these Rules and Procedures shall not be granted access to Non-Public Domain data until appropriate actions have been taken.

[ ***4.5 Exchange of data with other regional fisheries management organisations***

27. If the Commission enters into agreements for the exchange of data with other regional fisheries management organisations (RFMOs) or other organisations, such agreements must include requirements that the other RFMO provides equivalent data on a reciprocal basis and maintains the data provided to them in a manner consistent with the CCSBT Data Security Standards. The data that may be exchanged are data with a risk classification of "no risk" or "low risk". Data with higher risk classifications may only be considered for sharing after specific approval from the Extended Commission. At each annual session the Executive Secretary will provide copies of data exchange agreements that exist with other RFMOs and a summary of the data exchanges that occurred during the previous 12 months under such agreements.]

***4.5 Disseminations of Non-Public Domain data in other circumstances***

26. Non-Public Domain data will be made available by the Secretariat to any persons[5] if the Member or CNM of the Extended Commission that originally provided that data authorises the Extended Commission to release them. In cases where a Member or CNM of the Extended Commission elects to provide an ongoing authorisation for the release of such data, the Member or CNM may at any time cancel this authorisation by notifying the Secretariat that it has revised its earlier decision.

[5] Including universities, researchers, NGOs, media, consultants, industry, federations, etc.

27. Conditions for access to Non-Public Domain data by each non-Member shall be determined on a case by case basis by the Member or CNM of the Extended Commission that originally provided the data. At the discretion of that Member or CNM, these conditions may or may not involve procedures similar to those specified at **Attachment 2.**

***4.6 Force majeure***

28. The Executive Secretary may authorise the release of Non-Public Domain data to rescue agencies in cases of *force majeure* in which the safety of life at sea is at risk.

## 5. Periodic Review

29. The Extended Commission or its subsidiary bodies will periodically review these Rules and Procedures, and subsidiary documents, and the rules and procedures referred to in paragraphs 21 and 22 above, and amend these if necessary.

30. When considering the provision of data not specified in Table 1, the Extended Commission or its subsidiary bodies should consider an appropriate risk classification for that data for inclusion in Table 1.

## 6. Final Clause

31. These Rules and Procedures do not prevent a Member or CNM from authorising the release of any data it has provided to the CCSBT.

**Table 1: Types of information and confidentiality risk classification.**
Information types that have not received a risk classification within this table will not be managed within these confidentiality rules. However, this table may be updated by the Extended Commission from time to time, including through intercessional agreement between Members of the Extended Commission, as required.

With the exception of approved summaries of certain information types below, the following broad dissemination principles apply to the four confidentiality risk classifications[6]:

- "No risk": Publicly available and may be place on the public area of the CCSBT web site.
- "Low Risk": Not publicly available. However, it is available to all Members [and CNMs] without specific approval and may be placed on the private area of the CCSBT web site and on the CCSBT Data CD.
- "Medium Risk": Not publicly available. Requires specific authorisation to be released. May not be placed on the CCSBT Data CD or on the private area of the CCSBT web site (unless in a special part of the private area that is further restricted to specifically authorised people).
- "High Risk": Not publicly available. Requires specific authorisation to be released. May not be placed on the CCSBT Data CD or on the private area of the CCSBT web site.

| **Information Type** | **Risk Classification** |
|---|---|
| Annual catch estimates and number of vessels stratified by gear and flag | No risk |
| Annual number of active SBT vessels, by gear type and flag[7] | No risk |
| Aggregated catch and effort data stratified by gear/year/month, 5x5 (LL) or 1x1 (surface), and flag – and made up of observations from a minimum of three vessels in those cases where the data contains information on the number of vessels in a strata. | No risk |
| CCSBT Records of Authorised Fishing Vessels, Carrier Vessels & Farms | No risk |
| | |
| | |
| Aerial survey, SAPUE and troll indices | No risk |
| Biological data (catch at size and age data) | No risk[8] - Low |
| Biological data (gender, direct aging, otoliths, stomach contents, maturity, genetic data, isotopic N15/C14 collected by samples) | Low |
| Conventional Tagging data | No risk[9] - Low |
| Aggregated SBT catch and effort data stratified by gear/year/month, 5x5 (LL) or 1x1 (surface), and flag, with no minimum number of vessels | Low |
| Aggregated catch and effort data of other species stratified by gear/year/month, 5x5 (LL) or 1x1 (surface), and flag, with no minimum number of vessels | Medium |
| Other data and information specified by the Extended Scientific Committee (and subsequently approved by the Extended Commission) for the routine Scientific Data Exchange that have not been explicitly identified elsewhere in this table | Low |
| Monthly catch reporting by flag | Low |
| Authorised CDS Validators | Low[10] |
| Initial quota allocations and final catch by vessel/company | Medium |

[6] The four risk classifications are also differentiated by the required level of security that applies to each classification as specified in the CCSBT Data Confidentiality Security Policy.
[7] This information does not currently exist, but will become available once the CDS has been in operation for 12 months.
[8] Catch at size and age data are considered to public after the annual Commission meeting each year. Other biological data are only considered public if adequate time has passed to allow the scientists that organised the collection of such data to publish a paper analysing it.
[9] Only data from the CCSBT operated tagging program are considered to be "No risk".
[10] Also available to non-Members that are cooperating with the CCSBT CDS.

| Information Type | Risk Classification |
|---|---|
| Aggregated catch and effort data for longline at a 1x1 resolution, with no minimum number of vessels[11] | Medium |
| Transhipment consignments | Medium |
| Certified transhipment observer personnel | Medium |
| Catch Documentation Scheme and Trade Information Scheme | Medium |
| Farming growth rates and tag seeding data | High |
| Individual SBT length data from stereo video observation of farm transfers | High |
| Operational level catch and/or effort data[12] | High |
| Aggregated Scientific observer data other than biological data specified above, including for seabirds, turtles and marine mammals | Medium |
| Operational level Scientific observer data other than biological data specified above | High |



[11] As part of the annual data exchange, the Secretariat provides aggregated catch effort data at this resolution for New Zealand from the operational level data New Zealand provides.
[12] Including target and/or non-target catch, this information is currently only provided by New Zealand.

## Table 2: Annotations on information types mentioned in Table 1.

| Information Type | Annotations |
|---|---|
| CCSBT Records of Vessels & Farms | Covers vessels & farms authorised to farm, fish and carry SBT. |
| Vessel and gear attributes from other open sources | Includes data collected by observers and port inspectors. Covers all vessels (i.e. includes vessels restricted to national jurisdiction–domestic fleets). Includes electronic equipment. |
| Oceanographic and meteorological data | "Oceanographic and meteorological data" in this context does not include information identifying the fishing vessel that collected the information, for example, which would otherwise alter its security classification. |
| Aerial survey, SAPUE and troll indices | Recruitment indices derived from aerial surveys (both scientific and commercial spotting – SAPUE stands for Surface Abundance Per Unit Effort) and scientific troll surveys. |
| Biological data | Biological data include catch at size and age data, data on gender and maturity, genetic data, direct aging and data on hard parts such as otoliths, stomach contents, and isotopic N15/C14 data collected by observers, port samplers and other sources. "Biological data" in this context does not include information identifying the fishing vessel, for example, which would otherwise alter its security classification. |
| Conventional Tagging data | Conventional Tagging data include release and recapture positions, lengths and dates. "No risk" Tagging data does not include information identifying the fishing vessel, company or individual that recaptured the tagged tuna (not even coded identifiers), for example, which would otherwise alter its security classification. |
| Other data and information specified by the Extended Scientific Committee (and subsequently approved by the Extended Commission) for the routine Scientific Data Exchange that have not been explicitly identified elsewhere in this table | Each year the Extended Scientific Committee (ESC) reviews the scientific Data Exchange Requirements for the following year and produces a table defining the types of data that are to be exchanged. The present information type relates to all information in that table produced by the ESC that are not explicitly classified elsewhere in Table 1 of these rules[13]. Any restrictions on the use of data specified in the Data Exchange requirements are to be observed in addition to following the procedures required for this data's classification within Table 1 of these rules. |
| Monthly catch reporting by flag | CCSBT reporting system where monthly catches shall be reported by Members and CNMs one month after the month fishing. |
| Initial quota allocations and final catch by vessel/company | CCSBT reporting system where Members and CNMs report the quota initially allocated to each vessel/company and the final catch for the season of each vessel/company. |
| Catch Documentation Scheme and Trade Information Scheme | Data collected through the CCSBT Catch Documentation and Trade Information Schemes |
| Operational level Catch Effort data | Non-aggregated, set by set data collected on fishing vessel logbooks and by observers. |
| Electronic tagging data | Detailed electronic tagging data include detailed records from pop-up or archival tags such as date, time, depth, temperature, light intensity, etc. |
| Certified inspection personnel | If identified by individual then Risk Classification would be assigned to HIGH. |
| Violations and infringements, detailed | May cover Individual Violations and infringements pending investigation and/or prosecution. Includes compliance information collected by observers. |
| Economic & Social data | Insufficient information currently available to determine Risk Classification. |

[13] For example, the following items usually appear in the scientific Data Exchange requirements but are not specifically listed within these rules: recreational catch estimates, SBT import statistics, mortality allowance usage, non-retained catches, CPUE indexes etc.

**Attachment 1**

## CCSBT Data Confidentiality Security Policy (DCSP)

The purpose of this policy is to help ensure that non-public data (within this attachment only, non-public data is referred to as "Data") is provided to and managed by Data receivers in a manner that maintains confidentiality. This policy is not intended to cover aspects of data security that are not related to protection of confidentiality, such as loss or damage to data (e.g. through fire, flood, accident, systems malfunction etc.).

Data receivers (including the CCSBT Secretariat) are required to manage the security of Data to at least the standards specified below. The standards below are intentionally brief in order to provide a clear overview of the scope of the requirements. Further information can be obtained on most items from ISO/IEC 27002:2005(e)[14].

The Executive Secretary may impose additional security requirements before releasing specific Data. The receiver of the Data will be required to observe any such additional security requirements. The Executive Secretary may also waive specific security requirements if requested to do so by the provider of the Data.

1) Human Resources Security
   - For data with a risk classification of "medium" or "high", only people approved by the Executive Secretary (herein referred to as "Approved People") shall be allowed access to the Data by the receiving organisation (herein referred to as "The Organisation"). For data with a "low" risk classification, people approved by the receiving Member [or CNM] shall be allowed to access the data (also referred to herein as "Approved People").;
   - The Organisation shall have appropriate terms and conditions in its contract/arrangement with Approved People to state their responsibilities for information security and to enable disciplinary action for Approved People who commit a security breach.
   - Approved People shall be provided, as appropriate, with information security awareness education and training by The Organisation.
   - The Organisation shall have termination procedures in place for maintaining confidentiality from Approved People whose role or employment changes. This will include as a minimum, the return or secure disposal[15] of the Data, cancellation of access to the Data by such approved people, and for Approved People with approval for access to "medium" and High" risk data, notification to the Executive Secretary of the person's changed status together with the action taken.

[14] International Standard on "Information technology – Security techniques – Code of practise for information security management".

[15] For data with a "medium" or "high" risk classification, "Secure Disposal" means that media containing the data should be disposed of through incineration or shredding of paper records and by physically destroying electronic media or deleting the information by overwriting the Data using techniques that make the original information non-retrievable rather than using standard delete or format functions. Secure Disposal of "medium" and "high" risk data requires all copies of the Data, including any backups, to be destroyed. For Data with a "low" risk classification, the disposal procedures required for higher risk Data can be adjusted to a more practical process providing that such processes maintain confidentiality. For example, instead of destroying backups containing low risk Data, it would be sufficient to keep those backups in a secure environment with procedures in place that prevented unauthorised access to the Data on those backups.

2) Physical and Environmental Security

- Any unencrypted Data and products of that Data shall be stored in a physically secure area which will at minimum consist of:
  - a robust security perimeter[16] and properly functioning entry controls (such as automatic locks with card controlled entry or manned reception desk) that prevent entry of unaccompanied non-approved people into the secure area; and
  - A properly functioning and monitored electronic intruder detection system that will detect an intrusion into the secure area.
- Data with a low to medium confidentiality classification and products of that Data that are encrypted as described in paragraph "5", may be used in a non-public area outside the secure area described above. When not in use, the media containing these encrypted Data shall be carried in person, or stored in a locked private facility and secured or hidden out of sight.
- Equipment used for displaying the Data (such as monitors and printers) shall be located and positioned in such a manner as to prevent unauthorised viewing, recording or copying of the displayed information. Printouts of the Data or products of the Data shall be removed from printers immediately.
- The Data shall be Securely Disposed[15] of:
  - for "medium" and "high" risk data, when the purpose for which the data were requested has been completed;
  - for all data, when the data are no longer required by the Organisation to serve the purposes of the Convention;
  - from any media that are scheduled for maintenance by non-Approved People and from any media prior to its disposal.

3) Communication and Operations Management

- Precautions shall be in place to detect and prevent the introduction of malicious code (such as computer viruses, Trojan horses and logic bombs) and unauthorised mobile code. These precautions will at least include:
  - Installation and regular (daily or less) update of malicious code detection and repair software to scan computers, media and e-mails for malicious code; and
  - The Organisation shall conduct education awareness campaigns, as appropriate, on the dangers of malicious code and how to reduce the risk of infection by malicious code.
- Appropriate network controls shall be implemented to maintain security for any Data that is accessible through the network.
- Cabling carrying the Data shall be protected from interception.
- The Data shall not be transmitted on public networks (such as the internet) unless the Data has been appropriately encrypted.
- Unencrypted Data shall not be transmitted on wireless networks unless the network is a private encrypted network and the Data has a low confidentiality classification. A computer that is connected to a wireless network may not contain Data with a medium or high confidentiality classification unless the Data are encrypted and the encrypted volume is not mounted (not active) while the computer is connected to the wireless network.
- Any actual or suspected security incidents shall be investigated and reported to the Executive Secretary.

[16] A ground floor office with windows would require additional protection for the windows, or physically secure internal enclosures for the security perimeter to be acceptable.

4) Access Control

- Access to the Data shall require successful logon by an Approved Person, involving a User ID and Password[17].
- The User ID shall be unique to the specific Approved Person.
- The Password must be kept confidential to the Approved Person only and should be subject to a suitable password management policy, including:
  - Provision of any temporary passwords in a secure manner and forcing passwords to be changed on first log on;
  - Forcing use of minimal length and complexity of passwords;
  - Prevent re-use of passwords;
  - Advising users to use quality passwords (easy to remember without writing down, not based on information that is easy to guess, not vulnerable to dictionary attacks, free of consecutive identical or sequential characters, contain both letters and numbers and have an acceptable minimum length) and changing passwords whenever there is an indication of possible password or system compromise, and at regular intervals;
  - Storing, transmitting and displaying passwords in protected (e.g. encrypted) form; and
  - Limiting the number of unsuccessful log-on attempts to only 3 and rejecting further attempts without specific authorisation.
- Accounts of Approved People shall be protected when unattended by use of a password protected screen saver[18] that activates after less than 10 minutes of inactivity.

5) Cryptographic Control

- The Data shall be encrypted using robust encryption techniques whenever it is not in a physically secure area as described in paragraph "2" above.
- Provision or transmission of Data by the Secretariat to data receivers or to the private area of the CCSBT web site[19] shall use encryption techniques (encrypted files or encrypted transmission protocols).
- Encryption may use either secret key techniques or public key techniques where each user has a public and a private key. For both types of techniques, a wide variety of suitable file encryption software is available for purchase (such as PGP) or for free (such as TrueCrypt).
- Encrypted volumes shall be automatically dismounted when there has been no activity (reading/writing to the encrypted volume) for 60 minutes, after entering a power saving mode, and when the user logs off.
- Secret and private keys shall be protected from unauthorised disclosure and shall be distributed to intended users in a secure manner.

[17] Other technologies for identification and authentication such as biometrics (e.g. finger-print verification) may be used.
[18] Or equivalent measure.
[19] Unless otherwise agreed by the provider of the Data, only Data with a medium confidentiality classification or less may be placed on the private area of the CCSBT web site. However, Data with a medium confidentiality classification must be placed in a further restricted part of the private area that can only be accessed by people specifically authorised to access that Data.

**Attachment 2**

## Procedures for Requesting the Release of Non-Public Domain Data

1. Member's and CNM's of the Extended Commission that have provided Non-Public Domain data to the CCSBT shall notify the Secretariat regarding their representatives with the authority to authorise the release of Non-Public Domain data by the CCSBT. Decisions whether to authorise the release of such data shall be made in a timely manner.

2. The remaining procedures below are not required for CCSBT Members [and CNMs] to obtain access to data when:
   - The data are listed with a "Low" confidentiality risk classification in Table 1 of the Rules and Procedures for Protection, Access to, and Dissemination of, Data Compiled by the CCSBT; or
   - The data were provided by the Member or CNM seeking access to that data.

3. A written request for access to Non-Public Domain data shall be provided to the Executive Secretary[20]. In the case of a Member [or CNM] of the Extended Commission that is seeking access to serve the purpose of the Convention, the Member [or CNM] shall specify the purpose of the Convention by reference to the relevant article(s). The written request shall use the CCSBT Data Request Form *(Annex 1 to this Attachment).* In addition, the Member [or CNM] requesting access shall:
   (a) undertake to only use such data for the purpose described in the written request;
   (b) complete and sign the CCSBT Data Confidentiality Agreement *(Annex 2 to this Attachment)*, and provide the signed agreement to the Executive Secretary; and
   (c) maintain the requested data in a manner consistent with the CCSBT Data Security Standards specified in **Attachment 1**.

4. For Members [or CNMs] of the Extended Commission seeking access to data under paragraph 17(c), the Executive Secretary shall forward the completed Data Request Form and the signed confidentiality agreement to the Member or CNM of the Extended Commission that originally provided the data and seek authorisation from that Member or CNM for the CCSBT to release the data.

5. The Executive Secretary shall not authorise the release of more data than is necessary to achieve the purpose described in the written request.

6. The Executive Secretary may attach conditions appropriate for the access to such data (such as that the data be deleted upon achievement of the purpose for which it was released or by a pre-determined date, that a register of persons accessing the data be maintained and furnished to the Extended Commission upon request, etc.)

7. Requests may be made for a standing authorisation, such that Members [and CNMs] of the Extended Commission may have multiple accesses to the requested data for the same purpose as of the original written request.

8. Dissatisfaction with the Executive Secretary's decisions in regard to access to non-public domain data by Members [and CNMs] of the Extended Commission shall be resolved by the Chair of the Extended Commission.

[20] Requests by Members should be provided only by the Authorised Representative as specified in section 4.4, paragraph 20.

*Annex 1 of Attachment 2*

**CCSBT Data Request Form**

1. Data Requested

   The specification of data being requested should refer to the type of data and any parameters relevant to the type of data, which may include, *inter alia*, the gear types, time periods, geographic areas and flags covered, and the level of stratification of each parameter.

   [Insert the list of data sets here]

2. Purpose

   If non-public domain data are being requested, the use of the data shall be authorised only for the purpose described below.

   [If non-public domain data are being requested, insert the description of the purpose for which the data is requested]

3. Persons for whom access to the data is requested if non-public domain data are being requested, the name(s), job title(s) and affiliation(s) of the authorised representative(s) for whom access to the data is being requested shall be listed below; the use of the non-public domain data shall be authorised only for the person(s) listed below.

   [Insert the list of persons here]

- Sign the Confidentiality Agreement.

## CCSBT Data Confidentiality Agreement

Confidentiality Agreement for the Dissemination of Non-Public Domain Data by the Commission for the Conservation of Southern Bluefin Tuna (CCSBT).

Applicants name(s) and full contact details and signatures

Full name Institution, address and

Contact details

Signature and Date

I/we agree to the following:

- To abide by any conditions attached to use of the data by the Executive Secretary;
- That the data shall be used only for the purpose for which the data are being requested, be accessed only by the individuals listed in Item 3 of the Data Request Form, and be securely destroyed[15] upon completion of the usage for which the data are being requested;
- To make no unauthorised copies of the data requested. If a copy of all, or part, of the data requested is made by the applicant, all copies, or part thereof, will be registered with the Executive Secretary and will be securely destroyed upon completion of purpose for which the data was requested;
- To abide by the CCSBT's Data Security Standards as specified in Attachment 1 of the Rules and Procedures for Protection, Access to, and Dissemination of, Data Compiled by the CCSBT;
- That prior to the publication of any report of an analysis for which the requested data will be used, the report shall be provided to, and cleared by, the Executive Secretary of the CCSBT, who shall ensure that no non-public domain data will be published;
- To provide copies of all published reports of the results of the work undertaken using the data released to the CCSBT Secretariat and to the relevant subsidiary body of CCSBT;
- Applicant(s) will not disclose, divulge, or transfer, either directly or indirectly, the confidential information to any third party without the written consent of the Executive Secretary;
- Applicant(s) shall promptly notify the Executive Secretary, in writing, of any unauthorised, negligent or inadvertent disclosure of confidential information of the CCSBT.
- Applicant(s) assume all liability, if any, in respect of a breach of this Confidentiality Agreement, once the data requested is released to the applicant(s).
- Pursuant to paragraph 25 of the Rules and Procedures for the Protection, Access to, and Dissemination of, Data Compiled by the CCSBT, Member(s) [and CNM(s)] of the Extended Commission shall not be granted access to non-public domain data until the appropriate actions have been taken to account for any disclosure in violation of the Agreement by the applicant or, *inter alia*, its affiliates, employees, attorneys, accountants, consultants, contractors, or other advisers or agents; and.
- That this Agreement may be terminated by the CCSBT giving written notice to the applicant.

**Attachment 14**

## Requirements for the 2011 Data Exchange

Catch effort and size data should be provided in the identical format as that were provided in 2010. If the format of the data provided by a Member is changed, then the new format and some test data in that format should be provided to the Secretariat by 31 January 2011 to allow development of the necessary data loading routines.

The data listed in **Attachment A**, include data required for changing to the new growth curve and data for the standard data exchange. The data required for changing to the new growth curve are specified at the start of **Attachment A**. These data should be provided historically and up to the end of the 2009 calendar year. The exchange of these data is to be finished by 15 January 2011, with a CD containing these data being circulated by 31 January 2011. Members then have until 31 March 2011 to evaluate the new data.

If no problems are identified with the data based on the new growth curve, the standard data exchange (which is listed second in **Attachment A**) will be conducted with data based on the new growth curve. However, if problems are detected, the standard data exchange will be conducted with data based on the old growth curve.

Data listed in **Attachment A** for the standard data exchange should be provided for the complete 2010 calendar year plus any other year for which the data have changed. If changes to historic data are more than a routine update of the 2009 data or very minor corrections to older data, then the changed data will not be used until discussed at the next ESC meeting (unless there was specific agreement to the contrary). Changes to past data (apart from a routine update of 2009 data) must be accompanied by a detailed description of the changes.

## Attachment A

| Type of Data to provide[1] | Data Provider(s) | Due Date | Description of data to provide |
|---|---|---|---|
| Special requirements for the change to the new growth curve | | | |
| Cut points for new growth curves | Australia | 30 Sep 10 | Australia to provide cut points for the new growth curves |
| Catch at age data | Australia, Taiwan, Japan, Secretariat | 30 Nov 10 | Using the new growth curve, re-calculate and provide **all past** longline catch at age (from catch at size) data by fleet, 5*5 degree, and month. The Secretariat will produce the catch at age for New Zealand using the same routines it uses for the CPUE input data and the catch at age for the MP. ***This is optional for Japan and Taiwan because the Secretariat will produce catch at age that can be used for Japan and Taiwan.*** |
| Raised catch-at-age for the Australia surface fishery **For OM** | Australia | 30 Nov 10 | Using the new growth curve, re-calculate and provide **all past** surface fishery catch at age data. |
| Selected operational level catch and effort data | Australia, New Zealand, Secretariat? | 15 Dec 10 | Using the new growth curve, re-calculate and provide the age 4+ AU joint venture and NZ charter vessel catch and effort data required by Japan to produce the agreed CPUE index for the OM and MP. Japan to liase with Australia, New Zealand and the Secretariat well before this date to confirm the exact information required. These data are only to be provided to Japan. |
| CPUE input data | Secretariat, Australia | 15 Dec 10 | The Secretariat to re-calculate and provided the CPUE input data based on the new catch at age data above (this does not include the joint venture data).<br><br>Australia to re-calculate and provide the CPUE input data for the its joint venture catches. |
| CPUE series. | Australia / Japan | 15 Jan 11 | 5 CPUE series are to be provided for ages 4+ as specified below, using the new CPUE input data:<br>• Nominal (Australia)<br>• Laslett Core Area (Australia)<br>• B-Ratio proxy (W0.5) (Japan)<br>• Geostat proxy (W0.8) (Japan)<br>• ST Windows (Japan) |
| Core vessel CPUE series | Japan | 15 Jan 11 | Re-calculate and provide the core vessel CPUE series that is now used by the OM and MP. |
| OM input files | Australia | 15 Jan 11 | Update the mean length at age and data relating to the Kolody variance in the sbtdataXX.dat file (a code change is also required separately to the data exchange) |
| CCSBT Data CD ("new age" version) | Secretariat | 31 Jan 11 | The Secretariat will produce and circulate a version of the CCSBT data CD that contains the data based upon the new growth curve. |

[1] The text "**For MP/OM**" means that this data is used for both the Management Procedure and the Operating Model. If only one of these items appears (e.g. **For OM**), then the data is only required for the specified item.

| Type of Data to provide[1] | Data Provider(s) | Due Date | Description of data to provide |
|---|---|---|---|
| Evaluation of re-calculated data | All Members | 31 March | All Members will compare the data based on the new and old growth curves and the likely impact of these data on assessments. Any concerns with the new data are to be reported to the Secretariat. The deadline for objecting to use of the new growth curve data is 31 March 2011. If no Member objects by this date, the new growth curve data are to be used (and exchanged in the future). If there are objections, the old growth curve data will be used and exchanged. |
| Standard Data Exchange requirements | | | |
| CCSBT Data CD ("original age" version) | Secretariat | 31 Jan 11 | An update of the data (catch effort, catch at size, raised catch and tag-recapture) on the data CD to incorporate data provided in the 2010 data exchange and any additional data received since that time, including:<br>• Tag/recapture data (*The Secretariat will provided additional updates of the tag-recapture data during 2010 on request from individual members*);<br>• Update the unreported catch estimates using the revised scenario (S1L1) produced at SAG9, |
| New Zealand joint venture summary of observed trips | New Zealand | 23Apr 11 | New Zealand to provide the secretariat with a summary of observed trips, by vesselID, for New Zealand joint venture vessels.<br><br>*<u>Secretariat Comment</u>: These data are required so that the Secretariat can provide NZ with a summary of Observed catch and effort data , which is required for NZ preparation of joint venture shot by shot data.* |
| Total catch by Fleet | all Members and Cooperating Non-Members (excluding Indonesia – which is specified later) | 30 Apr 11 | Raised total catch (weight and number) and number of boats fishing by fleet and gear. These data need to be provided for both the calendar year and the quota year. |
| Recreational catch | all Members and Cooperating Non-Members that have recreational catches | 30 April 11 | Raised total catch (weight and number) of any recreationally caught SBT if data are available. A complete historic time series of recreation catch estimates should be provided (unless this has previously been provided). Where there is uncertainty in the recreational catch estimates, a description or estimate of the uncertainty should be provided.<br><br>*Australia has advised that it will not be able to provide the expected level of detail to the 2011 Data Exchange.* |
| Selected operational level catch and effort data | New Zealand, | 30 April 11 | Provide the required NZ charter vessel shot by shot catch and effort data required by Japan to produce the agreed CPUE index for the OM and MP. |
| SBT import statistics | Japan | 30 Apr 11 | Weight of SBT imported into Japan by country, fresh/frozen and month. These import statistics are used in estimating the catches of non-member countries. |
| Mortality allowance (RMA and SRP) usage | all Members (& Secretariat) | 30 Apr 11 | The mortality allowance (kilograms) that was used in the 2010 calendar year. Data is to be separated by RMA and SRP mortality allowance. If possible, data should also be separated by month and location. |

| Type of Data to provide[1] | Data Provider(s) | Due Date | Description of data to provide |
|---|---|---|---|
| Catch and Effort | all Members (& Secretariat) | 23 Apr 11 (New Zealand)[2]<br><br>30 Apr 11 (other members, South Africa & Secretariat)<br><br>31 July 11 (Indonesia) | Catch (in numbers and weight) and effort data is to be provided as either shot by shot or as aggregated data (New Zealand provides fine scale shot by shot data which is aggregated and distributed by the Secretariat). The maximum level of aggregation is by year, month, fleet, gear, and 5x5 degree (longline fishery) or 1x1 degree for surface fishery. Indonesia will provide estimates based on either shot by shot or as aggregated data from the trial Scientific Observer Program.<br><br>*It was noted that with the implementation of two new statistical areas (areas 14 and 15), that catch and effort data should be provided with all fishing effort in these new areas regardless of whether SBT were caught (as is done for areas 1-10).* |
| Historical effort for areas 14 and 15 | Korea | 30 Apr 11 | The complete historic time series for areas 14 and 15 of all Members needs to be revised to provide full fishing effort in areas 14 and 15.<br><br>*This was to be provided as part of the 2007 data exchange (before SAG8) by all Members who had fished in areas 14 and 15. Only one Member has yet to provide (or advise in relation to) this information.* |
| Non-retained catches | All Members | 30 Apr 11 (most Members)<br><br>31 July 11 (Indonesia) | The following data concerning non retained catches will be provided by year, month, and 5*5 degree for each fishery:<br>• Number of SBT reported (or observed) as being non-retained;<br>• Raised number of non-retained SBT taking into consideration vessels and periods in which there was no reporting of non-retained SBT;<br>• Estimated size frequency of non-retained SBT after raising;<br>• Details of the fate and/or life status of non-retained fish.<br>Indonesia will provide estimates based on either shot by shot or as aggregated data from the trial Scientific Observer Program.<br><br>*Australia has advised that it will not be able to provide the expected level of detail to the 2011 Data Exchange.* |
| RTMP catch and effort data | Japan | 30 Apr 11 | The catch and effort data from the real time monitoring program should be provided in the same format as the standard logbook data is provided. |
| NZ joint venture catch and effort data at 1*1 spatial resolution | Secretariat | 30 Apr 11 | Aggregated New Zealand catch and effort data, to 1*1 degrees of resolution instead of 5*5 degrees. The Secretariat will produce and provide these data to Japan only for use in the $W_{0.5}$ and $W_{0.8}$ CPUE indices produced by Japan. *Other members may request approval from New Zealand to be provided with access to these data for necessary analyses.* |
| NZ joint venture catch and effort with Observers | Secretariat | 28 Apr 11 | A summary of NZ joint venture catch and effort data, to be provided to New Zealand only, specifying which shots had an observer on board.<br><br>*<u>Secretariat Comment</u>: These data are required so that New Zealand can provide shot by shot data for the NZ joint venture to Japan.* |

[2] The earlier date specified for New Zealand is so that the Secretariat will be able to process the fine scale New Zealand data in time to provide aggregated and raised data to members by 30 April.

| Type of Data to provide[1] | Data Provider(s) | Due Date | Description of data to provide |
|---|---|---|---|
| New Zealand joint venture shot by shot data | New Zealand | 30 Apr 11 | Shot by shot data for New Zealand joint venture vessels in statistical areas 5 and 6 for 2009. These data should specify which shots had an observer on board. These data are only being provided to Japan and are for use in the new CPUE index. |
| Raised catch data for AU, NZ and KR catches | Australia, Secretariat | 30 Apr 11 | Aggregated raised catch data should be provided at a similar resolution as the catch and effort data. Japan and Taiwan do not need to provide anything here because they provide raised catch and effort data. New Zealand does not need to provide anything here because the Secretariat produces New Zealand's raised catch data from the fine scale data provided by New Zealand. Similarly, the Secretariat will be calculating and providing the raised catch data for Korea (based on raising Korea's catch effort data to its total catch). |
| Observer length frequency data | New Zealand | 30 Apr 11 | Raw observer length frequency data as provided in previous years. |
| Raised Length Data | Australia, Taiwan, Japan, New Zealand | 30 Apr 11 (Australia, Taiwan, Japan)<br><br>7 May 11 (New Zealand)[3] | Raised length composition data should be provided[4] at an aggregation of year, month, fleet, gear, and 5x5 degree for longline and 1x1 degree for other fisheries. Data should be provided in the finest possible size classes (1 cm). A template showing the required information is provided in Attachment C of CCSBT-ESC/0609/08. |
| Raw Length Frequencies | South Africa | 30 Apr 11 | Raw Length Frequency data from the South African Observer Program. |
| RTMP Length data | Japan | 30 Apr 11 | The length data from the real time monitoring program should be provided in the same format as the standard length data is provided. |
| Raw Size Data | Korea | 30 Apr 11 | Raw length/weight measurement data should be provided by Korea instead of raised length data because Korea does not yet have a suitable sample size to produce raised length data. *However, Korea is encouraged to improve its sample sizes of length frequency data in the future.* |
| Indonesian LL SBT age and size composition | Australia Indonesia | 30 Apr 11 | Estimates of both the age and size composition (in percent) is to be generated for the spawning season July 2008 to June 2009. Length frequency for the 2009 calendar year and age frequency for the 2008 calendar year is also to be provided.<br><br>Indonesia will provide size composition in length and weight based on the Port-based Tuna Monitoring Program. Australia will provide age composition data according to current data exchange protocols. |

[3] The additional week provided for New Zealand is because New Zealand requires the raised catch data that the Secretariat is scheduled to provide on 30 April.

[4] The data should be prepared using the agreed CCSBT substitution principles where practicable. It is important that the complete method used for preparing the raised length data be fully documented.

| Type of Data to provide[1] | Data Provider(s) | Due Date | Description of data to provide |
|---|---|---|---|
| Direct ageing data | All Members | 30 Apr 11 | Updated direct age estimates (and in some cases revised series due to a need to re-interpret the otoliths) from otolith collections. Data must be provided for at least the 2006 calendar year (see paragraph 95 of the 2003 ESC report). Members will provide more recent data if these are available. The format for each otolith is: Flag, Year, Month, Gear Code, Lat, Long, Location Resolution Code[5], Stat Area, Length, Otolith ID, Age estimate, Age Readability Code[6], Sex Code, Comments. |
| Trolling survey index | Japan | 30 Apr 11 | Estimates of the different trolling indices for the 2010/11 season (ending Feb 2011), including any estimates of uncertainty (e.g. CV). |
| Tag return summary data | Secretariat | 30 Apr 11 | Updated summary of the number tagged and recaptured per month and season. |
| Catch at age data | Australia, Taiwan, Japan, Secretariat | 14 May 11 | Catch at age (from catch at size) data by fleet, 5*5 degree, and month to be provided by each member for their longline fisheries. The Secretariat will produce the catch at age for New Zealand using the same routines it uses for the CPUE input data and the catch at age for the MP. |
| Total Indonesian catch by month and % of Indonesian LL catch that is SBT | Indonesia | 15 May 11 | The 2010 catch of SBT in numbers and weight and the number of vessels fishing for SBT for each port and month. Also the 2010 total catch by weight of each species. |
| Global SBT catch by flag and by gear | Secretariat | 22 May 11 | Global SBT catch by flag and gear as provided in recent reports of the Scientific Committee. |
| Raised catch-at-age for the Australia surface fishery **For OM** | Australia | 24 May 11[7] | These data will be provided for July 2009 to June 2010 in the same format as previously provided. |
| Raised catch-at-age for Indonesia spawning ground fisheries. **For OM** | Secretariat | 24 May 11 | These data will be provided for July 2009 to June 2010 in the same format as on the CCSBT Data CD. |
| Total catch per fishery each year from 1952 to 2008. **For MP/OM** | Secretariat | 31 May 11 | The Secretariat will use the various data sets provided above together with previously agreed calculation methods to produce the necessary total catch by fishery data required by both the Management Procedure and the Operating Model. |
| Catch-at-length (2 cm bins) and catch-at-age proportions f**or OM** | Secretariat | 31 May 11 | The Secretariat will use the various catch at length and catch at age data sets provided above to produce the necessary length and age proportion data required by the operating model (for LL1, LL2, LL3, LL4 – separated by Japan and Indonesia, and the surface fishery). The Secretariat will also provide these catch at length data subdivided by sub fishery (e.g. the fisheries within LL1). |

[5] M1=1 minute, D1=1 degree, D5=5 degree.

[6] Scales (0-5) of readability and confidence for otolith sections as defined in the CCSBT age determination manual.

[7] The date is set 1 week before 31 May to provide sufficient time for the Secretariat to incorporate these data in the data set it provides for the OM on 31 May.

| Type of Data to provide[1] | Data Provider(s) | Due Date | Description of data to provide |
|---|---|---|---|
| Catch at Age **for MP** | Secretariat | 31 May 11 | Cohort slicing by month of the 5*5 raised length data provided by members. The data used is the data for LL1 fisheries only. For LL1 fisheries where raised length data are not available (i.e. Korea, Philippines, Miscellaneous), the Secretariat will use Japanese length frequency data as a substitute in the same manner as conducted when producing the length frequency inputs for the operating model. |
| Global catch at age | Secretariat | 31 May 11 | Calculate the total catch-at-age in 2010 according to Attachment 7 of the MPWS4 report except that catch-at-age for Japan in areas 1 & 2 (LL4 and LL3) is to be prepared by fishing season instead of calendar year to better match the inputs to the operating model. |
| CPUE input data | Secretariat | 31 May 11 | Catch (number of SBT and number of SBT in each age class from 0-20+ using proportional aging) and effort (sets and hooks) data[8] by year, month, and 5*5 lat/long for use in CPUE analysis. |
| Tag releases / recoveries and reporting rates. **For OM** | Australia | 31 May 11 | The RMP tag/recapture data for the period 1991-1997 will be updated for any changed/new data in the database.<br><br>*Australia has advised that no further update of the RMP tag/recapture data for this period are expected.* |
| Core vessel CPUE series for **OM/MP** | Japan | 31 May 11 | Provide the core vessel CPUE series for use in the OM and MP. |
| CPUE series. | Australia / Japan | 15 Jun 11 (earlier if possible)[9] | 5 CPUE series are to be provided for ages 4+, as specified below:<br>• Nominal (Australia)<br>• Laslett Core Area (Australia)<br>• B-Ratio proxy (W0.5) (Japan)<br>• Geostat proxy (W0.8) (Japan)<br>• ST Windows (Japan)<br>• The number of 1*1 degree fished squares in each 5*5 degree square. These data will be accessed only by the Secretariat[10]. (Japan) |
| Aerial survey index | Australia | 31 Jul 11 (every attempt will be made to provide this at least 4 weeks earlier) | Estimate of the aerial survey index from the 2010/11 fishing season, including any estimates of uncertainty (e.g. CV). |
| Commercial spotting index | Australia | 31 Jul 11 | Estimate of the commercial spotting index from the 2009/2010/11 season, including any estimates of uncertainty (e.g. CV). |

[8] Data restricted to months April to September, SBT statistical areas 4-9, and the Japanese, Australian joint venture and New Zealand joint venture fleets.

[9] When there are no complications, it is possible to calculate the CPUE series less than two weeks after the CPUE input data is provided. Therefore, if there are no complications, Members should attempt to provide the CPUE series earlier than 15 June.

[10] These data will be temporarily accessed, under Japan's supervision, by the Secretariat to allow the Secretariat to verify calculation of the ST Windows CPUE series.