Commission for the Conservation of
Southern Bluefin Tuna

みなみまぐろ保存委員会

Report of the Twelfth Meeting of the Scientific Committee

10 - 14 September 2007
Hobart, Australia

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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**.
3. The Scientific Committee was adjourned while the Extended Scientific Committee met.

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

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

Agenda Item 3. Other business

5. There was no other business.

Agenda Item 4. Adoption of report of meeting

6. The report of the Scientific Committee was adopted.

Agenda Item 5. Closure of meeting

7. The meeting was closed at 11:18am, on 14 September 2007.

List of Appendices

List of Participants
Twelfth Meeting of the Scientific Committee
10 - 14 September 2007
Hobart, Australia

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Commission for the Conservation of
Southern Bluefin Tuna

みなみまぐろ保存委員会

Appendix 2

Report of the Extended Scientific Committee for the Twelfth Meeting of the Scientific Committee

10 - 14 September 2007
Hobart, Australia

Report of the Extended Scientific Committee for
the Twelfth Meeting of the Scientific Committee
10-14 September 2007
Hobart, Australia

Agenda Item 1. Opening

1. The meeting was opened by the Chair of the Extended Scientific Committee (ESC), Dr Annala, who welcomed participants.

1.1 Introduction of participants

2. Participants who were not present at the preceding SAG meeting introduced themselves. The list of participants is shown in **Attachment 1**.

1.2 Administrative arrangements

3. There were no new administrative arrangements since the previous meetings.

Agenda Item 2. Appointment of rapporteurs

4. It was agreed that the agenda items of 4, 5, 6, 7, 8, 9 and 13 would be rapporteured primarily by Members, with the other items being rapporteured by the Secretariat. Rapporteurs were then appointed for specific agenda items.

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**.
7. The Chair noted that CCSBT13 gave the ESC clear directions regarding the types of outcomes sought. This included clear prioritisation of scientific activities, including components for the Scientific Research Program, future development of indicators and other activities such as future management procedure development. The Extended Commission also expected the ESC to consider and further review the Australian farm study. Finally, Extended Commission Members have also agreed to conduct a full stock assessment with the assistance of the CCSBT scientific advisory panel for discussion at the CCSBT meeting in 2009 (see paragraph 74 of the CCSBT13 report).

Agenda Item 4. Review of SBT fisheries

4.1 Presentation of national reports

8. Members agreed that presentation of National Reports would be limited to new information or information not presented during the SAG.

9. Australia presented CCSBT-ESC/0709/SBT Fisheries-Australia. Fourteen commercial vessels landed SBT in 2005/06, and 99.9% of the catch was taken by purse seine, with the remainder taken by longline. The total catch for 2005/06 was 5,308 tonnes (the previous year was 5,248 tonnes). The excess catch in 2005/06 has been deducted from the next season's quota holdings. The length frequency data show a continued shift to smaller fish since 2003/04. During 2006/07 the observer coverage was 5.6% of purse seine sets and SBT catch. Observers were deployed according to a schedule similar to that in previous years that achieved 10% coverage however the effort distribution in this season was different to previous years. Australia will review its observer deployment to ensure that the 10% observer coverage is met in the future. Observers also monitored 30% of longline sets in the east coast longline fishery in areas and times where SBT occur. Australia provided the following responses in relation to questions on its National Report:

   - The reason why length frequency data was not recorded from all observed SBT mortalities (as outlined on page 23 of Australia's national report) was due to confusion regarding the instructions to the foreign observer. Australia noted that this would be addressed in future briefings.
   - Towing vessels with observers had reported lower rates of mortality than towing vessels without observers.
   - The 30% observer coverage for the longline fishery is the observed rate for the core and buffer zones of east coast longline sector. For the core area where SBT are caught on the east coast, there is 100% observer coverage and the cost of this is met by industry.
   - SBT is not a primary target species of longline fishing by Australian vessels. The low catch rates and changes in targeting practices in the fishery means that CPUE data from this fishery would be of limited use for SBT stock assessment purposes.
   - Live bait boats are used during purse seine operations to bring the fish to the surface during setting.
   - The size difference between mortalities during towing and the fish in pens may be due to larger fish being more likely to die during towing. There is some anecdotal evidence supporting this view. However, the level of mortality during towing is quite small, and it is not considered that this has led to a shift in targeting smaller fish.
   - The number of longline hooks set on the east coast peaked at 12 million in 2003 and declined to 9 million in 2005. The majority of effort in the east coast longline fishery is north of where SBT are located.
   - Regarding 5.6% observer coverage of purse seine operations for 2006/07, observed catch mortalities were 2 while unobserved catch mortalities were 126.

10. Korea presented CCSBT-ESC/0709/SBT Fisheries-Korea and reported that there has been some seasonal targeting of SBT from 2006 by Korean registered vessels. There were 8 vessels that caught 108 tonnes in 2006. Korea provided the following responses in relation to questions on its National Report:

    - It is unclear as to why there was increased targeting of SBT in 2006, this depends on economic considerations and the strategies of the companies.
    - The increased catch in 2007 is due to an increase in the number of boats targeting SBT.

11. Taiwan presented CCSBT-ESC/0709/SBT Fisheries-Taiwan. Approximately 963 tonnes of SBT were caught in 2006, which is an increase of 22 tonnes. Since 2005 some vessels have shifted to target oilfish in the waters off South Africa, the number of vessels registered to fish for SBT in 2006 decreased to 36 from about 100 during 2003-2004. The nominal CPUE of SBT in 2006 was preliminarily estimated as 2.61. The higher CPUE may be caused by high fuel price, since some vessels departed the SBT fishing grounds when they did not experience good SBT catching conditions, so that those vessels remaining in the SBT fishing ground were more efficient than in the past. Three observers were deployed on three SBT fishing vessels in 2006. The observer coverage rate by vessels was 8.3% and by hooks was about 12.8% in 2006.

12. In response to a question about observer coverage of SBT catch, Taiwan undertook to provide further information after the meeting. New Zealand suggested that national reports should include observer rates by amount of SBT catch as well as by vessels and hooks.

13. Australia thanked Taiwan for providing trade data for its catch. Australia also suggested that a small working group be tasked to compile a table that provides effort and catch observer rates for consideration of the Extended Scientific Committee. Japan noted that a table was prepared at ESC 10 and suggested that this table could be updated including the performance of observers (e.g. number of otoliths collected). The updated table is provided at **Attachment 4**.

14. New Zealand presented CCSBT-ESC/0709/SBT Fisheries-New Zealand and provided comment on the non-commercial catch of SBT in New Zealand. New Zealand has set aside 5 tonnes of its national allocation for non-commercial catches. In the last 2 years however, a new sport fishery has developed with some SBT caught as bycatch. Information on the SBT catch from this sport fishery will be provided next year. Reports received so far suggest that most SBT caught are tagged and released, as the SBT is not the target species. New Zealand provided the following responses in relation to questions on its National Report:

    - In relation to the decrease in CPUE in 2003, 04 and 05, and increase in 2006, there have been no changes in targeting for SBT that New Zealand is aware as SBT is the only known target species in that area. The CPUE is consistent with size composition data.

- There has been a large decrease in the number of vessels in the domestic fleet, resulting in a reduction in targeted effort, but the reduction in region 6 specifically is mostly due to one large scale longliner leaving the fishery.
- In response to a question about the variance in CPUE among charter vessels, New Zealand commented that there is 100% observer coverage of these vessels, so there is a high level of confidence in the data. The difference is due to differences in the ability of fishers. New Zealand commented on the importance of including vessel information in CPUE analyses to account for such factors.

15. Japan thanked New Zealand for providing information on non-commercial catch and requested that New Zealand provide information to the Compliance Committee and the Extended Commission on how they are monitoring non-commercial catch in relation to the CDS.

16. Japan presented CCSBT-ESC/0709/SBT Fisheries-Japan and advised that the report provides information for 2006. Japan introduced the tables and figures within the report. Japan provided the following responses in relation to questions on its National Report:

- Regarding when Japan can provide revised catch and effort data that takes account of the catch anomalies as outlined in the market review report, the review concluded two possibilities for the catch anomalies: (1) Japanese vessels; and (2) foreign vessels. Japan advised that currently they do not have any further information to provide on this issue, and at the present time they are not conducting any investigations to determine whether the catch anomalies were from Japanese or foreign vessels.
- In response to whether meaningful CPUE can be obtained when the allocation per boat remains at 20 tonnes, this would depend on the vessels' spatial and temporal patterns, i.e. the data would be meaningful provided the vessels' spatial and temporal coverage is sufficient. So far, operational patterns do not appear to have changed; however possible future changes in operational patterns need to be carefully considered.
- In response to the question about discarding and high-grading, Japan stated that CCSBT-ESC/0709/31 shows the size frequency data collected by observers and others and that there has been no appreciable difference in length frequency distribution.
- All vessels that have SBT quota are subject to inspection and other vessels are randomly inspected. Obtaining or trading illegally caught SBT is subject to penalties. It is highly unlikely there will be a breach or infringement of new regulations.
- Information on inspection rates is confidential and should be discussed in the Compliance Committee with the proper protection of confidentiality.
- Regarding time lags between catching, landing and marketing fish, Japan can track the time between catching and landing; however, it is very difficult to estimate the time between landing and sale. Japan will report the results of its studies of this matter to the SAG/SC in 2008.

- Regarding tag reporting rates, observers report the tags they recover and tags are also recovered in port. The reason why the number of tags returned in the Japanese longline fishery is low compared to Australia would be due to the older age of the SBT caught and the longer distance of the longline fishing grounds from the tagging areas.

17. Australia identified that for 2003, 2004 and 2005, the figures in Table 1 of Japan's national report were larger than those in the Secretariat's global catch table presented in CCSBT-ESC0709/06. It was not possible to identify the reason for the discrepancies at the meeting, but Japan and the Secretariat agreed to investigate and report on the reason after the meeting.

18. New Zealand emphasised the importance of investigating the anomalies identified through the market review report to determine what proportion of the catch anomalies could be attributed to the Japanese fleet. Australia supported New Zealand.

19. Australia requested that Japan include information on imports of SBT in its National Report as it had done in previous reports. Japan commented that this information is now available through the TIS and does not need to be provided separately in National Reports. The Secretariat was requested to provide the TIS information for Scientific Committee meetings. Australia commented that the TIS provides good estimates of export of SBT to Japan and the data correlate well with the market review report and Japanese import statistics. This suggests one main source for catch anomalies and Australia encouraged Japan to further investigate catch and effort, and to provide revised data to the ESC.

20. Australia requested that all members provide details of how they estimate tag-reporting rates and what these rates are in their future national reports.

4.2 Secretariat review of catches

21. The Secretariat presented the global SBT catch estimates from document CCSBT-ESC/0709/06. These global catch estimates are provided at **Attachment 5**. The Secretariat noted that the catches for the European Commission (EC) have been separated from the miscellaneous category because the EC is now a Cooperating Non-Member of the CCSBT. However, the catches presented for the EC are preliminary and await verification and correction by the EC. The Secretariat also noted that the IUU catch scenario presented in the global catch table is only one of a range of overcatch scenarios that were considered at SAG7. The scenario presented was Longline Case L4 and Surface 20% from the Report of the Seventh Meeting of the Stock Assessment Group.

22. Australia noted that the annual totals in the global catch table did not include the research mortalities in the column for "Other" for 2001 and onwards. The Secretariat explained that this was an outcome from previous discussions amongst Members and was to avoid bias in the time series since this information had not been compiled for earlier years. The Secretariat also advised that at SC11, a deadline of 30 April 2008 was agreed for Members to provide this historical information, after

which it would be appropriate to fully include the "Other" catches in the annual totals.

23. Australia was asked if its recreational catch was included in its reported catch or whether this catch was reported as part of "Other" catches. In response, Australia advised that its recreational catch was not included in its reported catch within the global catch table. The meeting believed that all mortalities should be included in the global catch figures regardless of the category in which they were classified. The Secretariat agreed to make suggestions for resolving the reporting of recreational catch in the global catch table in time for next year's meeting.

24. The ESC requested that the Secretariat coordinate an intersessional task for Members to provide information on how they raise processed weights to whole weights for reporting their total catches. The Secretariat was also asked to include this information in conjunction with the global catch table provided to next year's meeting.

Agenda Item 5. Report from CPUE modelling workshop

25. A brief summary of the outcomes of the CPUE workshop held in May 2007 was presented. The recommendations to the ESC were summarised against each of the six Terms of Reference (TORs) of the workshop. These recommendations can be found in **Attachment 6**.

26. The SAG chair provided a summary of the discussions undertaken by the SAG on the report from the CPUE modelling workshop. These discussions are outlined in paragraphs 15-23 of the SAG8 Report. The recommendations provided by the SAG to the ESC are summarised in paragraphs 24-25 of the SAG8 report. It was noted that most of the recommendations were provided to address further investigations into the key issues that were discussed at the CPUE modelling workshop.

27. Participants noted that in the future it will be necessary to re-evaluate which CPUE series will provide the basis for the operating model and that it may be necessary to consider alternative CPUE series to those used in the past. It was also noted that any new CPUE series must also be examined in light of the market anomalies. A discussion on a default CPUE series was made and a list of future analyses needed was identified, as detailed below.

Future Work

28. **Proposed default case:** A standardized CPUE based on shot-by-shot or 5x5 data needs to be provided as a default should agreement fail to be reached for a single CPUE for the MP process. It should include hooks-per-basket as an explanatory variable so that targeting impacts can be explicit. The hooks per basket analysis should be carried out on both a shot-by-shot basis and at a 5x5 level using a median value of hooks-per-basket. Japan advised that in the light of the results, it would give further consideration to whether more information at a 5x5 level could be generally provided. A "core fleet" subset similar to the one selected at the 2007

CPUE Workshop should be used from dataset A (areas 4-9, months 4-9). Age 4+ has been the standard in the past, so that this is recommended for the default. In CCSBT-ESC/0709/38, Figure 1.6 (page 15), the ST (spatio-temporal window) index could be used as an alternative (consistent with past practices) should agreement on a new default fail. This model includes factors for year, month, and area and other factors and interactions as used in the $W_{0.5}$ and $W_{0.8}$ series.

29. **Proposed inter-sessional standardized CPUE analyses:** CPUE standardization should proceed with shot-by-shot data and model vessel-year interactions as a random effect (or just vessel), with fixed effects to include, in addition to the defaults, a "fishing season" factor (whether the record occurred during the Japanese SBT fishing season) and hooks-per-basket. A formal model selection approach (preferably showing the impact of adding/removing each factor) should be used (see **Attachment 7**). In particular, the extent that vessel effects are important relative to hooks-per-basket should be investigated, with this being evaluated using shot-by-shot and compared to 5x5 data. A "core fleet" similar to the one selected at the 2007 CPUE Workshop and dataset A (areas 4-9, months 4-9) is to be used.

30. Based on the above framework, the impact of reported market anomalies needs to be evaluated as suggested in the SAG report. This should include analyses comparing vessels with and without observers. The SAG8 report states:

> "Conduct further investigation into CPUE year trends with and without observers. This would include adding a category for 'observer type' (e.g. '0' – no observer, '1' – ex-fisher scientific observer, '2' –other scientific observers). It was recommended that the model with many explanatory variables in Figure B5 in CCSBT-ESC/0709/46 be used as the basis for this analysis. NZ offered to provide Japan with shot by shot data of JV vessels in areas 5 and 6 to include in the analysis. This was agreed by the group to be a good idea."

31. The years where there are large differences between observed and unobserved CPUE (1995, 1996 and 1999) should be treated appropriately to allow for known effects of the policy to release small fish in 1995 and 1996 and, potentially, the EFP during 1999. The degree to which this may be confounded with an observer effect should be investigated.

32. **Process:** Regarding activities in the near term, options include:

    (1) Intersessional work with no meeting (but with strict report preparation/review deadlines).
    (2) Intersessional work and a meeting.
    (3) At the SAG in 2008 (with no prior review of results obtained intersessionally).

33. Option "3" was rejected given opinions expressed during the SAG/ESC. The ESC proposed an interim solution. First, begin with the most cost-effective option (option "1") and if at the end of January 2008, sufficient progress has been achieved, continue with this option. If progress is inadequate, plan for the third CPUE workshop to be held in Shimizu, May 2008. Under either option, a completed multi-authored paper by selected nominees from each member country and from a panel

member giving a CPUE standardization approach for the 2008 SAG/ESC is required. The NZ charter-boat and Australian joint-venture shot-by-shot data should be provided to Japan by the end of November 2007 to be combined with the Japanese database for this analysis, if issues of data confidentiality can be assured.

Agenda Item 6. Report from Australian SBT farm study

34. The ESC considered paragraphs 42-44 from the CCSBT13 report in structuring discussions under this agenda item.

6.1 Examination of results in 2006/07 and revised experimental design for 2007/08

35. Australia presented paper CCSBT-ESC/0709/24 comparing the range of procedures used to monitor catches of bluefin tuna farm operations in the Mediterranean, Mexico and Australia. The report reviewed information on the methods used for estimating catch, growth and mortality rates from the available literature, supplemented with interview information. All countries counted fish entering farms with the aid of video. The Mediterranean countries and Mexico estimated the weight of fish by industry diver visual estimates. Australia's farm monitoring differed by using an independently verified direct weight measurement of 40 fish from each tow cage. The Australian farm management arrangements were the only ones to directly measure individual fish. Taking into consideration the range of monitoring of bluefin tuna farm catches, Australia viewed its current management arrangements as world's best practice.

36. Australia presented paper CCSBT-ESC/0709/28 detailing Australia's experimental design for stereo video trials in the 2006-07 and 2007-08 seasons. The trials aim to verify the accuracy and precision of the stereo-video technology under a range of environmental conditions as well as the robustness of the equipment in an operational setting. The trials will also present options for converting length measurements to weight estimates.

37. Australia indicated that they had considered several options before deciding on the stereo-video system. Increasing the size of the 40 fish sample was not considered feasible due to the negative impacts on the fish being sampled and the associated cost. Back calculation had also been considered and rejected (see paragraph 51 for discussion). The use of laser technology was not considered feasible as the strength of laser required to work under commercial conditions exceeded that considered safe for divers working in the pens. Acoustic technology was not considered sufficiently advanced to be used at the time of this review, in 2002.

38. Japan noted that in Mexico, where harvesters sell their fish to farmers, an acoustic method, namely dual frequency identification sonar system, was used to measure weights of individual fish. Australia thanked Japan for this observation and commented that it had rejected this technology in its original considerations due to concerns about accuracy; however, Australia would be pleased to consider further information from Japan.

39. Some members of the ESC viewed that progress to date was slower than that agreed to at CCBST 13 (paragraph 14). Australia indicated that it considered progress to date to be in line with its statement at CCSBT 13. Delays in implementing experiments were a result of delay in receiving comments from some members, the nature of the comments received, and delays in obtaining some equipment. In particular the entire experimental approach had to be modified due to conflicting proposals from members, and an unwillingness to contribute funding or approve the requests for RMA.

40. In response to a question about whether the initial experiments would attempt to quantify the selectivity of the 40 fish sample, Australia responded that this was not the goal of the initial set of experiments. They indicated that the initial experimental work would be around the development of a stereo video system that would work under the range of conditions experienced under commercial operations and thereby provide greater confidence in estimates of the size distribution of the catch. Once confidence in this system was achieved, then further experimental work could be undertaken that considered the 40 fish sample, but until such time that the stereo-video system is operational, Australia were not in a position to agree to the nature and extent of any future experiments.

41. The ESC noted that if successful, the stereo-video system would provide information on the length composition of the catch, but that further information would be required to convert fish lengths to weights. It was noted that the condition of the fish (e.g. length-weight relationship) could vary both between and within years. There was discussion about the potential of using the stereo-video for measurements other than length alone. Australia noted that the initial stereo video experiments will present options for converting lengths to weights.

42. The ESC noted that any concerns over the 40 fish sample were more a question of potential bias rather than variance, so that increasing the size of the sample would not necessarily address these concerns.

43. In terms of the method used to obtain the 40 fish sample there was discussion of hook selectivity. Australia stated that it had not tested the selectivity of the hook which is used in the 40 fish sampling. The ESC noted that some scientific studies had shown that hook selectivity is generally Gaussian, but other participants suggested that this effect was likely to be small in this case.

44. With regard to issues regarding the number of fish transferred into farm pens, the Australia stated that the Australian farm report had concluded that there was little potential for under-reporting of numbers of fish transferred.

6.2 Other relevant information

45. No additional information was presented.

6.3 Scientific advice/recommendations on Australian SBT farm study from the ESC to the Extended Commission

46. Australia stated that the approach for 2007 was to test the stereo-video system on 500 fish prior to harvest. The 2007 trials were limited to pre-harvest fish due to the timing of captures prior to the agreement of experimental design. In 2008 the proposal is to test the stereo-video multiple times on a pen of 500 fish. The reliability of stereo-video technology could not be verified until after the completion of trials in mid 2008. As a result, if the technology is proven suitable the earliest that stereo video would be able to be used in commercial fishing operations would be the 2008/09 fishing season.

47. In response to concerns raised by some members that the work on the testing for bias in the 40 fish sample was not proceeding quickly enough, Australia indicated that the time to complete this work is a function of the RMA and money available. They reiterated that without verification of stereo video, such experiments would be of little value and very expensive. They commented further that in conducting these experiments the fish are put under stress, so that it is difficult to conduct this development work as part commercial activities.

48. Other members and the Independent panel strongly encouraged Australia to test the stereo-video system under commercial conditions as soon as possible and in parallel with the 40 fish sample so that the nature of any bias in the 40 fish sample can be determined. Australia indicated that due to the cost recovery nature of this fishery, there are financial consideration that must be addressed prior to undertaking such experiments.

49. An Australian industry representative stated that the stereo-video would hopefully take over from the 40 fish sample (once the approach was proven) and if so, it would overcome the problems of potential bias in the 40 fish sample. If stereo-video was implemented the 10 kg rule[1] would no longer be applied, and this could change targeting towards smaller fish.

50. The ESC discussed other work that might be conducted to test for bias in the 40 fish sample while awaiting the work on the stereo-video system. Issues considered included: analysis of the 40 fish sample data, back calculation based on harvest data, and the use of acoustic techniques.

51. Australia indicated that the data had not been collected in a way that would allow for analyses to determine if there were trends in the sizes of fish taken during a single 40 fish sample. In terms of using back-calculation, Australia considered this unsuitable for estimating mean weight for quota monitoring purposes, but may be useful for estimating catch-at-age. Australia noted that they have considered this approach and concluded that any such analyses would need to consider factors such as: variation in the time that fish go into pontoons and are harvested, that the length-weight relationship for farmed fish differs from that for wild fish, the individual packing weight data is not necessarily representative of the harvest weights (i.e. these exist for fish harvested for the fresh market rather than for the frozen market). Overall

[1] Estimation of the mean weight of SBT in a tow cage involves taking the mean weight of 40 fish sampled by handline with a weight greater than 10kg (i.e. fish less than 10kg are excluded from the sample used to estimate average weight for quota purposes).

Australia believed that any bias has in estimating the catch by the surface fishery would be less for the 40 fish sample approach than for a back-calculation method.

52. In line with Australia's research proposal, the ESC supported collecting and analysing the impact of all factors that might influence the performance of the stereo-video (e.g. light levels, sea conditions, fish size) so that they can be included in any statistical modelling that forms part of the calibration experiments.

53. There was discussion of the potential need for a back-up in case the stereo-video approach didn't work, but Australia indicated that their scientists had confidence in the approach and believed that it would be shown to be the best way to determine the size of fish.

54. The ESC briefly discussed how results of any bias in the 40 fish sample might be used to correct historical catch and catch composition estimates. The ESC noted that any attempt to correct any historical 40 fish samples for any biases would need to consider factors such as the: density of fish in the pen (during 40 fish sampling) and size composition of the fish in the pen (including the known bias of excluding fish under 10kg from average weight estimates). The ESC recognised that a single time-invariant correction factor would not be appropriate.

55. The Australian proposed timetable for work is:

- September 2007: submit the results of this year's trials to all Members.
- October-November 2007: analysis of data from trials performed in September 2007.
- February 2008: repetitive measures of SBT transfers of 500 fish under varying environmental conditions.
- 2008-2009 Season: trial of stereo-video equipment used in commercial farm transfers.

Agenda Item 7. SBT assessment, stock status and management

7.1 Review of fisheries indicators

56. The reviews of Japanese SBT market anomalies and Australian SBT farming anomalies in 2006 raised serious doubts on the reliability of the total catch and Japanese LL CPUE indicators, thus interpretation of many of the indicators is more difficult than in previous years. However, Japan has strengthened domestic management for its SBT fleet from 2006; consequently data from this fleet should be more reliable from that date.

57. The indicators continue to support the previous conclusion of poor 2000 and 2001 year classes, and the evidence is stronger now that the 2002 year class was also poor. The size distribution in the NZ LL fishery and the Japanese LL fishery indicate poor 1999, 2000, 2001 and 2002 recruitments (noting potential catch anomaly bias in the Japanese data), and the aerial spotting survey is consistent with a reduction in average recruitment below the 1994-1998 levels. The high fishing mortality rate estimates for age 3 and 4 from recent SRP tagging are also consistent with low

recruitments in these years. Trends in year class strength in the Japanese LL fleet show poor strength of the 2000, 2001 and 2002 year classes, but indicate the 2003 year class may be similar in size to the average between 1980 and 1999. However, this indicator could be biased by catch anomalies as in the case of the 2000-2002 year classes. SRP tag returns may suggest declining recruitment between 1999 and 2003. The GAB aerial survey indicates poor recruitment through to 2004.

58. Reported catch rates of fish aged 12 and older in the Japanese LL continue to indicate a drop in spawning stock biomass from about 1995, but this is of course potentially impacted by catch anomalies. Since the Japanese LL CPUE is the primary indicator of stock abundance the potential anomalies make the spawning stock status less certain. The increase in tonnage of the Indonesian catch in 2004-2005 as well as the increase in proportion of SBT in the Indonesian catch was associated with a possible shift in the behaviour of the Indonesian fleet to target SBT south of the spawning ground. This change in behaviour complicates the interpretation of the age and size structure of catches from the spawning stock. Catch tonnages in Indonesia declined in 2005-2006 to levels similar to 2003-2004. However, the SAG noted there has been a progressive decline in the age/size of fish taken by the Indonesian fleet since 2000-01.

59. Reported Japanese LL CPUE of SBT for all ages combined suggests that the exploitable biomass for these gears has remained fairly constant during the past 10 years, though this level is low compared to historical values. Confidence in this indicator has diminished considerably due to the uncertainty associated with catch anomalies. Reported CPUE indicate increases in the CPUE of ages 8-11 since about 1992, but there is a slight decline in 2003 and 2004, with a slight increase in 2005, and 2006 is similar to 2005. Reported CPUE of fish aged 4-7 has increased since the mid 1980s but has been declining in recent years.

7.2 Review of other relevant analyses

60. No other analyses were discussed

7.3 Status of the SBT stock

61. No new model-based assessment was conducted in 2007. The indicators do not provide any appreciable sign of change in stock status. There is thus no basis to revise the SAG conclusions in 2006. Because of the uncertainty in historical catch and CPUE a series of alternative scenarios that encompass a range of possible circumstances was evaluated in 2006. The outcomes of these scenarios and their management consequences are consistent with each other. The scenarios are also consistent with the 2005 SAG report regarding overall stock status and 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. All scenarios suggest that recruitment in the 1990s fluctuated with no overall trend. Analysis of several independent data sources and the scenarios indicate low recruitments in 2000 and 2001, and probably also in 2002 and 2003, although the low estimates of 2003 year class strength is inconsistent with the Japanese length frequency data from 2006.

62. While the scenarios are consistent with each other, there are conflicts between scenario output and some of the indicators, especially regarding the 2002 and 2003 year class strengths. The new indicator data available in 2007 suggest that the 2002 cohort is also weak.

63. The primary implication of the higher catch levels used in the scenarios in 2006 compared to the assumed catch history used in the 2005 SAG is that estimated absolute spawning stock size is more than double that assessed at the 2005 SAG.

64. In the scenarios considered, future total catches of 14,925t would result on average in a short-term decline followed by generally stable but not recovering spawning biomass, but it must be appreciated that there is the possibility that the stock will increase or decrease under this level of catch. Any continued catch over 14,925t poses very serious threats to the stock. Rebuilding the spawning biomass requires catch reductions to below 14,925t under all scenarios considered in 2006. The ESC noted that the reported global catch in 2006 was 11,850t and that the Extended Commission had set a global TAC of 11,810 t per year for the period 2007-2009.

65. 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 8**.

7.4 SBT management recommendations

66. In 2006 the report of ESC 11 recommended the following:

To ensure a high probability of sustainability and rebuilding of the SBT spawning stock requires three steps.

- First, an immediate catch reduction below 14,925t to decrease the probability of further stock declines.
- Second, there needs to be immediate action to restore confidence in estimates of total catch and CPUE series. Also, monitoring of recruitment and of the Indonesian fishery must continue, and where possible, be improved.
- Third, an interim management procedure needs to be adopted within the next 3-5 years, with a full management procedure thereafter designed to ensure a high probability of stock rebuilding. For example, if recruitment indicators in the next few years revert to the low levels of 2000 and 2001 very substantial catch reductions would be required.

67. At CCSBT 13 the Extended Commission agreed to a new TAC of 11,810 t for the three-year period from 2007 – 2009. Furthermore, both Taiwan and the Republic of Korea undertook to maintain their actual catch at a level below 1000 t each for a

minimum of three years. Therefore, the actual catch level is expected to be below 11,530 t for each year between 2007 and 2009.

68. With regard to historical total catch and CPUE series, only limited progress has been made in the further resolution of the level of market and farm anomalies that impact these two series. With regard to future information on total catch and CPUE, it is Japan's view that there is no need to consider any possible overcatch for their fleet since management changes in the Japanese SBT fishery were implemented in April 2006. The SAG noted that the Australian farm experimental programme is ongoing and the uncertainty in reported size composition and weight of catches remains until this work is complete.

69. Considering this situation, the ESC made the following management recommendations:

- The indicator analysis did not provide any appreciable signs of change in stock status and hence there is no basis to revise the SAG conclusions in 2006 (see paragraph 61). The SAG will continue to monitor indicators in 2008.
- Because the TAC has been set for 2007-2009 and no changes are anticipated until 2009, the SAG will need to consider available information in 2009 and use scenario modeling to evaluate the impact of different future catch levels on stock status.
- To ensure a high probability of stock rebuilding, all unreported and under-reported catches must be eliminated, and a management procedure needs to be adopted as a basis to provide TAC advice in 2011 or 2012 when catch quotas will again be reconsidered by CCSBT. A work plan has been agreed to advance the development of an MP, with initial emphasis placed on re-conditioning the operating model and refining the scenarios used for testing different candidate decision rules, and the extent to which they will result in management objectives being achieved in the face of uncertainties.
- While some progress has been made towards development of new historical CPUE series, further work is needed to reduce the uncertainty about historical catches (including that associated with possible bias in the 40-fish sampling used to estimate size composition and mean weight of the surface catch), and to evaluate the effect of market anomalies on CPUE and determine appropriate adjustments.
- Previous MP development used LL1 CPUE and its age structure as the sole input. The ESC agreed that future MPs should be based on inputs from a broader range of indicators.
- In terms of future data, accurate catch and effort estimates are critical to any stock assessment or management procedure. There needs to be assurance that these data are accurate through some combination of comparison of data from vessels with and without observers, and other monitoring and compliance measures, including the possibility of further market and farming monitoring. Increased levels and quality of observer coverage would increase the value of these analyses as well as the value of information from tagging programmes, though this needs to be considered in the light of cost and benefit analyses. Also, monitoring of

recruitment and of the spawning biomass must continue, and where possible, be improved.

Agenda Item 8. Review of the SRP

70. Paper CCSBT-ESC/0709/41 was presented by Japan for each component of the SRP. Catch characterization has been progressed, with agreement reached on the data that must be collected for each fishery. Agreement has also been reached on the data submission process which has operated smoothly. Since the mid-1990s the catch and size of SBT landed in Indonesia have been obtained. Currently effort data were not collected in an adequate way. Independent reviews into Japanese Market anomaly and Australian Farming anomaly occurred in 2006.

71. The paper noted that the analysis and interpretation of CPUE as well as the development of a new CPUE series had been delayed due to increased focus of efforts to develop the operating Model and Management Procedure. The second CPUE workshop was held in 2007 and several subjects were investigated.

72. Paper CCSBT-ESC/0709/41 noted that CCSBT Scientific Observer Program Standards were developed and agreed by the ESC. All the ESC members have developed and conducted observer programs as part of the SRP. Japan viewed that detailed and comprehensive research items and biological samples were collected for longline fisheries, while less were collected for purse seine fishery. The target of 10% observer coverage was attained in near shore fisheries, while the target was not reached in the high-seas longline fisheries for all years and fleets.

73. The paper noted that tag releases in the CCSBT conventional tagging program were successful. The major shortcoming of the tagging program has been the uncertainty surrounding the mixing of tagged fish, possible of changes of fish distribution as well as low reporting rates. Archival and PAT tagging has been conducted by several members.

74. Paper CCSBT-ESC/0709/41 noted that direct ageing protocols were established in 2002 and many of ESC members have been carried otolith collection and age estimation for SBT. Recruitment motoring of age 1 fish have been monitored by the acoustic survey and the trolling survey while age 2-4 fish have been monitored by the aerial survey and commercial spotting survey.

75. In summary, CCSBT-ESC/0709/41 noted that the most serious problem in the SRP is that the stock assessment of SBT in the CCSBT is heavily reliant on the Japanese longline fishery CPUE series. To attain more robust stock assessment in the future, multiple indices including Taiwanese, Australian, New Zealand's, Korean and Indonesian longline CPUE and Australian purse seine CPUE need to be used. The development of additional data series such as research surveys should be encouraged. The current weakness early juvenile recruitment monitoring is seen problematic particularly considering the low abundance cohorts in recent years. The paper noted that all past components of the SRP are important to be continued in the future SRP

with any appropriate modifications. The future of the SRP is heavily reliant on confirmed accuracy of catch data.

76. Paper CCSBT-ESC/0709/16 was presented by Australia. The document reviewed the core and ancillary components of the SRP and provided specific recommendations for potential ways forward. The summary of the review notes, that while some progress has been made in a number of areas, overall the specific objectives of the SRP have not been met. With respect to Catch Characterisation, the previous conclusion of the ESC that "Given the outcomes of the market and farm reviews it is clear that the catch characterisation component of the SRP has not been successful" was supported and extended to include CPUE. The need for accurate, verified catch and effort information to restore confidence in the assessment and management of the fishery was emphasised. In addition, the paper noted that the continued lack of agreement on the form (spatial and temporal resolution and bycatch species) of catch and effort data provided to the CCSBT ESC continues to limit the scientific analyses that the ESC can complete and agree on standardisation methods. The paper encouraged all members to provide fine-scale (shot by shot, by species) data for this purpose.

77. The paper noted the progress made in developing observer programs by all fleets and encourages further efforts by all members to increase the total coverage and the representative nature of the distribution. Notwithstanding this progress, with few exceptions the annual coverage for all fleets is appreciably less than the 10% target and much less than the 30% required for reasonably precise estimates of fishing mortality for the longline component of the fishery from the conventional tagging program.

78. CCSBT-ESC/0709/16 noted the original objectives of the CCSBT tagging program were to provide: i) age specific estimates of fishing and potentially M for as many cohorts as possible; ii) information on migration and mixing patterns; and iii) estimates of growth rates. The program has been successful in providing estimates of fishing mortality for age 2, 3, 4 and possible 5 year olds in the GAB for a number of cohorts. However, in more recent years, the estimates are compromised to some extent by the declining reporting rates for the surface fishery. For the other components of the stock, i.e. exploited by longline fleets, estimates were considered less precise due to the lack of reliable reporting rates. Regarding migration and mixing patterns, the program has provided valuable information on movement of juveniles from the GAB and indicates that the patterns of movement have shifted in comparison to the early 1990s, with a much smaller portion of fish moving to the Tasman Sea than for the equivalent cohorts in the 1990s. These shifts in movement are also reflected in the archival tagging data obtained through the global spatial dynamics project and earlier archival tagging programs conducted by CSIRO. Estimates of growth rates from the current tagging program, indicate that the higher growth rates of juvenile SBT evident from earlier tagging programs have been maintained or possibly increased through the 1990s. It was noted that these results have not been included in the stock assessments and would be important to include in future.

79. The ancillary components of the SRP were also reviewed and further details are provided in ESC/0709/23.

80. The ESC noted that the last review of the SRP occurred in 2003 and later reviews had been delayed to focus efforts on developing an operating model and management procedure for the CCSBT. Elements of the SRP including the Characterization of SBT Catches and CPUE interpretation and analysis had been discussed in depth under other agenda items at the SC. These elements are referenced in this report.

81. The ESC noted that the SRP included elements funded through the Extended Commission as well as elements that have historically been funded by individual members. It was agreed that the SRP review and future planning will encompass all elements. The panel agreed to develop a table of important/relevant future research programs and their estimated cost to assist the Extended Commission's prioritisation of research funding. This table is at **Attachment 9**.

8.1 Characterisation of SBT catch

82. The Japanese Market Review and the Australian SBT Farm Review were undertaken in 2006. These reviews revealed a substantial level of uncertainty in the historical catch data. Japan has implemented a new catch monitoring system since 2006 that they indicate will provide much more reliable data, and could provide information on the time lag between catch and landing from that date. Australia is investigating new methodology to obtain the size distribution of fish being transferred into cages and this should provide a method to estimate potential bias in the 40 fish sampling.

83. Australia gave a presentation detailing its current farm catch monitoring arrangements. To increase the ESC understanding of Global Catch Monitoring arrangements, all members were encouraged to provide information on their current monitoring arrangements at the next ESC meeting.

84. The CCSBT had recognised the critical importance of adopting and fully implementing at the earliest possible time compliance measures which would ensure the elimination of unreported catch and provide accurate data as a basis for proper stock assessment. At its 13th annual meeting, the CCSBT adopted draft resolutions on the following compliance measures:

- A Catch Document Scheme (CDS)
- A Vessel Monitoring System; and
- Regulation of trans-shipments by large scale fishing vessels.

85. Members noted the agreement at CCSBT 13 to adopt a CCSBT Catch Documentation Scheme (CDS). The ESC supported the development of a CDS as a measure to improve the accuracy of catch statistics. Australia stated that any CDS should provide valuable data for both compliance and stock assessment purposes. Australia commented that the form in which data are collected for stock assessment purposes can differ from that required for compliance.

86. The ESC supported the continued attendance of the ESC Chair at future annual meetings of the Compliance Committee to ensure scientific requirements are taken into consideration.

87. The importance of data provision at an appropriate spatial and temporal resolution for stock assessment was discussed.

8.2 CPUE interpretation and analysis

88. The development of a suitable CPUE series for assessment purposes was viewed as vital. The ESC discussed at length analyses to refine the current CPUE series. The ESC supported the continuation of analyses into appropriate longline CPUE series and noted an additional CPUE workshop may be required.

89. The ESC noted that the CPUE WG had developed Terms of Reference (TOR) to address the major uncertainties in the current series and to develop additional indices. The group also agreed that pursuing the TOR developed for the last CPUE WS was appropriate (**Attachment 6**).

90. The specific Term of Reference regarding the development of a sentinel survey on either the spawning or feeding grounds was discussed. Members noted the SAG recommendation that the ESC develop a specific work plan for developing spawning or feeding ground surveys. In preparing sentinel survey proposals and associated costing, members were asked to consider previous designs developed by SC working groups as well as the potential to undertake surveys that account for the potential bias in CPUE resulting from the probable range contraction of the SBT stock.

8.3 Scientific observer program

91. The initial SRP proposal had recommended scientific observer coverage to assist catch characterization, biological sampling and the estimation of tag recovery rates. It was agreed that the deployment of observers to estimate tag recovery rates would be discussed after discussion of tagging elements of the SRP.

92. As a possible alternative to observers, the potential for port sampling was discussed. The use of tags on individual SBT for compliance purposes was seen as providing an opportunity to collect biological samples (such as otoliths) in ports with a clear understanding of the time and location of capture. The use of future CDS information was also seen to assist any possible port monitoring program. Concerns regarding the legal ownership of fish and the potential for refusal of sampling by fishers were raised. Members noted that any port sampling program would be cheaper to implement than an at sea observer program.

93. The importance of scientific observers for ERSWG matters was noted and the ESC noted that any future changes to the observer program may need consultation with the group responsible for ERS matters.

8.4 SBT tagging program

Conventional tagging

94. The ESC noted that for a successful conventional tagging program, it was important to either implement systems to estimate reporting rates, or use cryptic tags that circumvent this problem. The potential to use PIT tags or genetic tagging was discussed.

95. Japan noted that there are potential food safety issues associated with the use of PIT tags. Other members noted that Japan currently accepts fish tagged with plastic PIT tags developed specifically to pass Japanese food safety issues. It was also noted that glass PIT tags are deployed on Patagonian toothfish and other species which are later exported to Japan. These tags are generally easily located and removed prior to sale. Japan responded that the matter would have to be discussed domestically before any commitments could be made.

96. The ESC noted the benefits of increasing the distribution of tag deployments over both small and large spatial scales in any future conventional tag deployments. Members noted that the current conventional tagging program guidelines (Report of the Tagging Program Workshop 2001) requests that tags are deployed across a broad spatial scale. It was noted that increasing the deployment of tags across a wider scale is likely to result in a decline in the number of tags deployed. In addition to the current tagging of SBT through pole and line activities the ESC noted, there was potential for releasing tags through the scientific observer program.

97. It was noted that many tagging programs often emphasize tag deployment and under invest in tag recovery. The ESC supported the development of cost benefit analysis on the balance of efforts on tag deployment and tag recovery, which took account of the number of tags deployed for the SBT population.

98. The ESC considered three broad options for the CCSBT conventional tag deployments: no further tag deployments; continued conventional tagging; and PIT tagging. It was noted that regardless of further tag deployments, there are currently a considerable number of tags in the population. The level of information that can be recovered from these tags is directly linked to reliable tag reporting rates, which is largely dependent on levels of observer coverage.

99. Australia noted that the level of certainty surrounding tag reporting rate estimates at differing levels of observer coverage was presented in paper 19 as analysis presented to the CCSBT Tagging Workshop held in 2001. This analysis noted that a minimum of 20% coverage would be required to provide reasonable confidence in reporting rate estimates with more confidence at 30% observer coverage.

100. Australia completed some indicative analysis of expected tag recoveries at differing observer coverage levels based on analyses presented in paper CCSBT-ESC/0409/16. It was noted that higher observer coverage is important for getting a more precise estimate of the reporting rate in the longline fishery. The ESC also noted that most of the information currently available from the CCSBT Conventional tagging program is from the surface fishery through tag recovery at harvest and estimating the reporting rate from longline fisheries would increase our understanding of the

whole SBT stock. The decision on whether to increase observer coverage is largely a question of cost effectiveness.

Non-conventional Tagging

101. The ESC noted the considerable benefits that can be gained through electronic tagging. The five year Global Spatial Dynamics Project has deployed many archival tags on 2-3 year old SBT. The final deployment of archival tags during this project will cease in 2007-08, with recoveries and analysis scheduled through to 2011.

8.5 Recruitment monitoring

102. The aerial survey and commercial spotting indices were viewed as important aspects of the SRP as both are unaffected by the current catch uncertainties. Australia reported that it did not see substantial benefit in more detailed analytical refinement of the commercial spotting index. It was noted that an increase in observing effort would increase the certainty in the scientific aerial survey. Australia noted that there are a number of logistical considerations that may limit the ability to increase survey effort but that there was active consideration of how to overcome these (e.g. using two planes).

103. Members of the ESC noted concerns around the representativeness of the acoustic survey due perhaps to sub-optimal choice of time and area and to lack of consistency with other recruitment indices. Further refinement of the piston line trolling survey design was seen as beneficial, and should include a design study to examine the options for dealing with the potential lack of independence of observations and the narrow spatial and temporal window of the current survey.

104. The ESC noted the importance of additional research to determine what proportion of the juvenile SBT population enters the GAB as large variability or trends in the proportion would complicate the interpretation of these recruitment series. Options for further research into the issue included proposed acoustic and archival tagging off the west coast of Australia. The results of close-kin genetics project may also provide information on the relationship between juveniles in the GAB recruits and those in the wider Indian Ocean.

8.6 Direct aging

105. Members endorsed an investigation to determine options for including the catch at age data in future assessment models. Members noted that uncertainty still exists in assigning fish to cohorts when caught during the winter period.

106. Members noted that the direct ageing data provide an opportunity to re-analyse growth rates, and possible growth rate changes.

8.7 Other SRP activity

107. The ESC welcomed the proposed research to estimate the size of the spawning stock biomass through close kin genetic techniques. Furthermore there is potential for the project to provide information on the relationship of the juveniles in the GAB with the recruits in the Indian Ocean.

108. The potential for future collection of genetic samples as an alternative to conventional tagging was also seen as a possibility for further research. Genetic techniques are rapidly developing and they may prove cost effective in the future. Such genetic tagging would also eliminate the requirement to estimate reporting rates (as with PIT tags). Genetic analysis of historical scale collection was also seen as an option for further investigation.

109. The ESC members noted the importance of progressing the development of an MP as part of the SRP. In particular members viewed it important to consider options for constructing an MP that is less reliant on historical catch and CPUE data.

110. Additional research ideas to pursue included using satellite information or remotely operated aircraft to increase coverage of aerial survey efforts. Members noted that these options had been considered in the 1990s, although they now warrant further investigation due to recent improvements and reduced cost of current technology.

8.8 Future CCSBT SRP

111. There is still a great deal of uncertainty surrounding key aspects of the SBT stock, in particular the absolute abundance of the stock, the trends in spawning stock biomass and the trends in recruitment. **Attachment 9** indicates future work required to address those uncertainties and other matters with a subjective indication of relative importance ranging from essential to low.

112. After reviewing the results of the CCSBT conventional tagging program, the ESC expressed its concern that the requirement for the voluntary return of tags was restricting the value that could be obtained from this work. The ESC recommended that tag deployments not occur during the 2007/08 season and instead work would focus on methods of tagging that do not require voluntary reporting. The SRP work plan includes the review of reports on the feasibility and possible designs of a PIT tagging project and of using genetic tagging at the next ESC so that a new tagging project could be initiated in 2009. The ESC endorsed the continued efforts to increase tag recovery rates and estimate tag reporting rates, including tag seeding experiments in the Australian surface fishery.

Agenda Item 9. Management procedure

9.1 Development of Interim Management Pr.ocedure

113. The ESC noted that the SAG participants discussed some of the advantages and disadvantages of having an interim (short term) or longer term MP or both. It was noted that in 2006 a three year TAC was set and that this will provide an opportunity to examine the effect of a constant TAC on the various indicators. It was also noted

that due to the three year TAC, developing a MP was not as high a priority as it was considered to be at the ESC in 2006.

114. The SAG participants noted the need to ask the Extended Commission whether an MP would be required in 2009. It was noted that in 2006 the Extended Commission decided not to go ahead with progressing the MP and instead placed the emphasis on CPUE (through supporting a CPUE workshop held in May 2007), given the demonstrated effect of CPUE uncertainty on the operating model.

115. The SAG participants raised concerns that although an MP is an appropriate goal, there would be little point in this unless in future there are processes put in place to ensure that the data used are reliable and accurate, e.g. verified through comparison of data for vessels with and without observers. It was agreed that a small working group would meet to set out a schedule of activities needed to progress the development of an MP and associated validation.

116. The ESC endorsed the SAGs view that the most benefit would be achieved through making improvements to the conditioning for the operating model over the next two years, rather than attempting the development of an interim MP. Advice on TACs in 2009 would be provided based on constant-catch projections conducted using the new set of models or scenarios developed.

9.2 Issues and workplan for development for a future MP

117. The ESC endorsed the SAGs recommendation that participants undertake interim work on the conditioning model, using the scenario approach, between now and the next ESC. This work should include at a minimum investigating the conditioning aspects of the operating model using the input "data" components that are currently being fitted. These "data" components include:

- Catch by the 6 fleets
- Commercial CPUE (LL1; see CPUE WS2 report)
- Tagging data 1990s (including reporting rates)
- Age composition from Indonesia
- Age composition from surface fishery
- Size composition from other fleets
- Biological input data (eg. age-length, weight at age)

118. The components affected by the catch anomalies will be replaced by the scenarios agreed to in the SAG7 meeting as a minimum. The set of base case scenarios to be used in future analysis would be based on the same assumptions as the scenarios "b", "c" and "d" defined in the report of the SAG7 (Table 6, page 17). Intersessional work on CPUE will be conducted (see "Future Work" in agenda item 5) to define a new base-case CPUE series to be used as a replacement for the five different series used in the past for conditioning the old reference set. If new information becomes available, other scenarios will be explored by the SAG.

119. The ESC also noted that the SAG discussed conducting analyses to consider the potential of using other data that has not been used to condition the operating model in the past. These data may include:

- Aerial survey
- Commercial spotting
- Trolling survey
- New tagging data
- Direct ageing data (replace size composition from other fleets?)

120. The need to revisit other aspects of the conditioning was also discussed. These aspects may include:

- Revisiting priors on M (the most important of these aspects)
- Treatment of 1990s tagging data – (to treat yearly releases as separate cohorts instead of pooling them as is currently done in the fitting)
- Treatment of recruitment (eg. random effect)
- Catch equation
- Selectivity
- Spatial structure

121. The ESC endorsed the SAGs view that it would be unwise at this stage to increase the complexity of the structure of the operating model (e.g. by including spatial structure) given other priorities related to the change in the main data inputs.

122. The ESC noted that the results of this work will be reviewed at the next SAG and used as the basis for updating the operating model. Once the model structure and details about the data inputs and likelihood assumptions are specified, the conditioning code will be updated and made available to all participants as was done in the past. A process for testing new candidate MPs will be initiated after the next SAG. The projection code will need to be modified to include simulation of new indicators that may be used to drive the candidate MPs. Details will be specified at the next SAG.

123. The ESC noted that the reason the SAG had reduced the number of scenarios to be considered in future analyses, compared to the number considered in 2006, was not due to an improved understanding of the relative plausibility of the scenarios but was due to a need to reduce the future workload of participants, noting that previous scenario modelling results were very similar for some of the scenarios.

124. Some participants were concerned that the minimum set of scenarios agreed by the SAG may not be adequate to test the robustness of a MP. The ESC agreed that the set of scenarios were a minimum and future analyses may indicate a need to expand or reconsider the reference set to include additional factors that are demonstrated to be highly influential.

125. The agreed MP workplan is at **Attachment 9**.

Agenda Item 10. Data exchange

10.1 Requirements for data exchange in 2008

126. The report of the data exchange working group is at **Attachment 11**. The ESC adopted the report.

Agenda Item 11. Ecologically Related Species Working Group

127. Japan on behalf of the Chair of the ERSWG, presented the report from the Ecologically Related Species Working Group (ERSWG) which met during June 2007 in Tokyo. The ERSWG considered sharks and sea birds and discussed data relating to these species as well as draft recommendations on seabird bycatch mitigation, management of sharks, and data collection and provision. However, as summarised in paragraph 96 of the ERSWG7 meeting report, the ERSWG was not able to agree on recommendations and was not able to provide advice to the Extended Commission. Instead, the ERSWG has sought guidance from the Extended Commission on how to proceed with its six draft recommendations.

128. Japan also commented that the ERSWG considers issues concerning sea birds, sharks and turtles, but that it does not discuss bycatch of other species of tuna, which is the role of the ESC to consider.

129. Australia and New Zealand commented that it was unfortunate that ERSWG did not make more progress and that they look forward to the Extended Commission's advice. They disagreed with Japan's view on the scope of the ERSWG and stated that they considered that the ERSWG's terms of reference included other species of tuna. Australia and New Zealand also remarked on the urgent need to collect data on bycatch species and that both the ERSWG and ESC have had considerable discussion on exchange of data of species other than SBT and noted with interest that members of both groups have asked for the same data in some cases.

Agenda Item 12. Research mortality allowance

130. Australia presented document CCSBT-ESC/0709/22 concerning Australia's proposed use of CCSBT Research Mortality Allowance (RMA) to tag 20 adult SBT with pop-up satellite archival tags in the Tasman Sea and possibly the Indian Ocean. The request was for 5t of RMA. Australia advised that it used 2.1t of RMA for this project in the current year.

131. The ESC agreed to recommend that the Extended Commission allocate 5t of RMA to this project.

132. Japan presented CCSBT-ESC/0709/42 regarding its RMA use in 2006/07 and its application for RMA in 2007/08. In 2006/07, Japan used 0.14t (43 fish) of the 5t RMA that it was granted. For 2007/08, Japan requested 1t of RMA for CCSBT

conventional tagging during the trolling survey (CCSBT-ESC/0709/37) and for the acoustic tagging survey (CCSBT-ESC/0709/44) off Western Australia.

133. The ESC agreed to recommend that the Extended Commission allocate 1t of RMA to this project.

134. Australia advised that it sought 15t of RMA for assessing the stereo-video technique proposed in document CCSBT-ESC/0709/28. Australia noted that the 15t was twice the mortalities that it expected and that this was to allow for unexpected circumstances or fish of a larger than normal size being caught. The request is in line with Australia's advice at CCSBT13 that RMA would be required to conduct the Australian farm experiments discussed at CCSBT 13. Australia also noted that the ESC had discussed the assessment of stereo-video experiments under the catch characterisation item of the scientific research program and had given this work a high priority.

135. Japan did not support Australia's request for two reasons:

- The request was not consistent with CCSBT resolution on "Research Mortality Allowance within the Framework of CCSBT" adopted in November 2000. .
- Japan considered that the Australian experiment was a flag State responsibility that was required to advance Australia's management of its own fishery. Consequently, Japan believed that mortalities should come from within Australia's national allocation.

136. New Zealand elaborated on the CCSBT RMA resolution and noted that the resolution required that "The total level of RMA shall not exceed 10 tonnes each year" and that the resolution also excluded "Fish taken for experiments such as TS measurement in a cage or pinger tracking". New Zealand observed that while stereo-video was not specifically excluded from the resolution, this general type of research seems to be excluded.

137. New Zealand noted that its concerns did not necessarily relate to the research itself or the amount of RMA requested, but that the CCSBT procedures and resolutions needed to be followed and in cases of uncertainty the matter should be referred to the Extended Commission. New Zealand also noted the possibility that the Australian stereo-video experiments could potentially include testing of the PIT tag technology, which would be consistent with the RMA framework.

138. Given the issues involved, the ESC noted that the allocation of RMA to Australia for assessing the stereo-video technique was a matter for the Extended Commission to consider.

139. Australia noted that it would review its request for 15t of RMA before it asked the Extended Commission to consider this matter.

Agenda Item 13. Australian proposal on use of genetics in verification of species identification and legal origin during trade of southern bluefin tuna

140. Paper CCSBT-ESC/0709/25 summarised information on the genetic identification of SBT. The ESC noted that genetic testing has been used in Australia since 2002 to discriminate SBT from other species of tuna and that recent work by CSIRO on SBT genetics would likely provide a good basis for the development of a DNA register (i.e. a database of DNA 'fingerprints' of individuals).

141. The ESC noted that, while the costs of various genetic testing techniques were decreasing every year, the costs of establishing and maintaining a DNA register for legally-caught SBT (400,000+ individual p.a.) were high. The ESC noted that the necessity and the cost-effectiveness of using genetics to discriminate SBT from other species and/or check whether an individual was legally caught was an issue for the Compliance Committee and the Extended Commission.

142. Recalling experiences with genetic testing in the International Whaling Commission, some participants enquired about the likelihood of false negatives for SBT. Other participants responded that it is important for genetic testing to be designed for the specific purpose at hand and felt that the recent work by CSIRO would provide a good basis for further work to ensure the likelihood of false negatives would be small if DNA fingerprinting of SBT was required by the Extended Commission.

Agenda Item 14. Workplan, timetable and research budget for 2008

143. The ESC developed the following workplan for 2008 and 2009. However, the schedule for 2009 will be reviewed and revised if necessary at the 2008 ESC meeting.

144. The ESC recommended that a computer programmer be hired to provide support during the MP workshop in 2008 and to update the code needed for scenario modeling and MP development. It is estimated that completing the tasks outlined in the workplan for 2008 will require a week of work by the MP coordinator, attendance of the MP workshop in September 2008 by the programmer and two weeks of extra work after the meeting.

2008

Item	Time	Nature	Who[2]
Aerial survey of GAB	Jan-08	field work	Australia
Workshop to review CPUE if necessary[3]	May-08	workshop	CCSBT
Data exchange by all parties	April-May-08	report	All parties
Report of Australian stereo-video experiments[4]	May-08	report	Australia
Review revisions in historical catch numbers and size[4]	ESC	report	All parties
Report on potential genetic tagging	ESC	report	Australia
Report on potential PIT tagging project	ESC	report	New Zealand
Report on potential for spawning and feeding ground surveys[4]	ESC	report	Australia
Report on ongoing data collection and analysis: catch, length, age, CPUE, aerial survey, scientific observer program, indicators and archival tagging	ESC	report	All parties
Report on potential for integration of direct age in OM	MP workshop	report	All parties
MP development, scenario development OM modelling workshop	Sep-08	MP workshop	CCSBT
ESC meeting	Sep-08	meeting	CCSBT

2009

Item	Time	Nature	Who[2]
Initiate new tagging program	Jan-09	field work	CCSBT
Aerial survey of GAB	Jan-09	field work	Australia
Data exchange by all parties	April-May-09	report	All parties
Report on operational implementation of stereo-video work	ESC	report	Australia
Initial report on close kin analysis	ESC	report	Australia
Intersessional scenario modelling workshop	Determined at 2008 ESC	workshop	CCSBT
Report on ongoing data collection and analysis	ESC	report	All parties
SAG/ESC meeting: • Advice on stock status and short-term risk associated with various TACs (constant catch projections), based on scenario modelling • Set up initial MP trials and refine 2-3 year workplan for future MP development	Sep-09	meeting	CCSBT

Agenda Item 15. Other matters

[2] It should be noted that this column indicates who may do the work rather than who would pay.
[3] See agenda item 5.
[4] Distinguished from general report on ongoing data collection and analyses as these are new items.

145. Australia noted that scientific papers accepted by the SAG and SC are not readily available to those outside the CCSBT. While papers are made available on request (with conditions including the agreement of the authors), scientific papers are not made publicly available through the CCSBT website. This situation is not consistent with international, scientific best-practise. In other RFMOs the default arrangement is that papers, or at least abstracts, will be made publicly available through the relevant website. Australia presented a proposal concerning the public release of CCSBT scientific papers to improve scientific communication and minimise the risk of duplication. It proposed that the ESC recommend to the Extended Commission that:

    - All future scientific papers accepted by the SAG and ESC should be publicly available via the CCSBT website. Papers would only be made available after the Extended Commission meeting in the year they are presented. The SAG/ESC or Extended Commission could agree that some papers will not be made available but the expectation would be that public release would be the default position.
    - A list of past scientific papers should be considered for web publication at the 2008 meetings. A list of past scientific papers presented to the SAG/SC shall be compiled by the Secretariat with the assistance of members. Based on this list, each member would nominate papers that it considers should be made publicly available on the CCSBT website. This list would then be considered by the ESC and subsequently the Extended Commission ahead of web publication of approved papers. Members would be responsible for providing electronic copies of the agreed papers

146. Japan commented that it had not been given sufficient time to consider the proposal and that the proposal might be inconsistent with rules 10(7) and 10(8) of the CCSBT Rules of Procedure. Japan reserved its opinion on the proposal until it had the opportunity to consult with its Ministry of Foreign Affairs concerning whether the proposal conformed to the CCSBT Rules of Procedure.

147. Australia was content to simply note the proposal at the ESC and advised that it will refer the proposal to the Extended Commission.

Agenda Item 16. Adoption of meeting report

148. The report was adopted.

Agenda Item 17. Close of meeting

149. The MP workshop and next ESC meeting is scheduled for 2-12 September 2008, at Rotorua, New Zealand.

150. The meeting closed at 11:16am on 14 September 2007

List of Attachments

Attachment

Attachment 1

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10 - 14 September 2007
Hobart, Australia

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Attachment 2

Agenda
Extended Scientific Committee for the Twelfth Meeting of the Scientific Committee
Hobart, Tasmania
10-14 September 2007

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. **Report from CPUE modelling workshop**

6. **Report from Australian SBT farm study**
   - 6.1. Examination of results in 2006/7 and revised experimental design for 2007/8 (Reason: to respond to paragraph 44 of Extended Commission report)
   - 6.2. Other relevant information (reason: Japan plans to submit some information)
   - 6.3. Scientific advice/recommendations on Australian SBT farm study from the ESC to the Extended Commission

7. **SBT Assessment, Stock Status and Management**
   - 7.1. Review of Fisheries Indicators
   - 7.2. Review of other relevant analyses
   - 7.3. Status of the SBT Stock
   - 7.4. SBT Management Recommendations

8. Review of the SRP

8.1. Characterisation of SBT Catch
8.2. CPUE Interpretation and Analysis
8.3. Scientific Observer Program
8.4. SBT Tagging Program
8.5. Recruitment Monitoring
8.6. Direct Ageing
8.7. Other SRP Activity
8.8. Future CCSBT SRP

9. Management Procedure

9.1. Development of Interim Management Procedure
9.2. Issues and workplan for development for a future MP

10. Data Exchange

10.1. Requirements for Data Exchange in 2008.

11. Ecologically Related Species Working Group

12. Research Mortality Allowance

13. Australian proposal on use of genetics in verification of species identification and legal origin during trade of southern bluefin tuna (reason: Extended Commission referred the (Australian) proposal on use of genetics to ESC. See paragraph 38 of the Extended Commission report)

14. Workplan, Timetable and Research Budget for 2008

14.1. Requirements/need for Stock Assessment and Management Procedure in 2008
14.2. Other Workplan Requirements
14.3. Overview, time schedule and budgetary implications of proposed 2008 research activities.

15. Other Matters

16. Adoption of Meeting Report

16.1. Next meeting

17. Close of Meeting

Attachment 3

List of Documents
8th Meeting of the Stock Assessment Group and
Extended Scientific Committee for the 12th Meeting of the Scientific Committee

(CCSBT-ESC/0709/)

01. Draft Agenda of the 8th SAG
02. List of Participants of the 8th SAG
03. Draft Agenda of the Extended SC for the 12th SC
04. List of Participants of the 12th SC and Extended SC
05. List of Documents - The Extended SC for the 12th SC & 8th SAG
06. (Secretariat) 4.2. Secretariat Review of Catches
08. (Secretariat) 11. Data Exchange
09. (Australia) The catch of SBT by the Indonesian longline fishery operating out of Benoa, Bali in 2006: Proctor, C., Andamari, R., Retnowati, D., Iskandar Prisantoso, B., Poisson, F., Herrera, M. and Fujiwara, S.
10. (Australia) Update on the length and age distribution of SBT in the Indonesian longline catch: Farley, J., Andamari, R. and Proctor, C.
11. (Australia) An update on Australian Otolith Collection Activities: 2006/07: Stanley, C., Clear, N. and Polacheck, T.
12. (Australia) Aerial Survey: updated index of abundance and preliminary results from calibration experiment: Eveson, P., Bravington, M. and Farley, J.
13. (Australia) Commercial spotting in the Australian surface fishery, updated to include the 2006/7 fishing season: Farley, J. and Basson, M.
14. (Australia) Fishery indicators for the SBT stock 2006/07: Hartog, J., Preece, A. and Kolody, D.
15. (Australia) An update on the use of the Indonesian Fishery school dataset to obtain a standardised CPUE series for SBT on the spawning grounds: Basson, M., Andamari, R., Sadiyah, L. and Proctor, C.
16. (Australia) A review of the Commission's Scientific Research Program, and considerations of current priorities and ways forward: Davies, C., Preece, A. and Basson, M.
17. (Australia) The management procedure: options for ways forward: Basson, M., Polacheck, T. and Davies, C.
18. (Australia) A method for estimating the absolute spawning stock size of SBT, using close-kin genetics: Bravington, M. and Grewe, P.
19. (Australia) Analyses of tag return data from the CCSBT SRP tagging program - 2007: Polacheck, T. and Eveson, P.

20. (Australia) Update on the Global Spatial Dynamics archival tagging project - 2007: Polacheck,T., Chang, K.S., Hobday. A., and West, G.
21. (Australia) Estimates of reporting rate from the Australian surface fishery based on previous tag seeding experiments and tag seeding activities in 2006/2007: Hearn, B., Polacheck, T. and Stanley, S. and Rowlands, M.
22. (Australia) Proposed use of CCSBT Research Mortality Allowance to facilitate electronic tagging of adult SBT as part of Australia's contributions to the CCSBT SRP in 2007-08: Evans, K.
23. (Australia) Update and summary of SRP-related work conducted by Australia over the period 2001-2007: Basson, M. and Evans, K.
24. (Australia) Tuna farm monitoring review: Mediterranean, Mexico and Australia: Sands, A., Hender, J.
25. (Australia) Genetic identification of SBT: Findlay, J.
27. (Australia) Preparation of the BRS component of Australia's data submission for 2007: Hobsbawn, P.
28. (Australia) Assessing operational feasibility of stereo video and Evaluating monitoring options for the SBTF Farm Sector: Hender, J., Murphy, R.
29. (Australia) Preliminary investigation into the Australian surface fishery CPUE data: Hender, J., Lawrence, E.
31. (Japan) Report of Japanese scientific observer activities for southern bluefin tuna fishery in 2006/2007: Osamu SAKAI, Tomoyuki ITOH, Yukito NARISAWA and Toshiyuki TANABE
32. (Japan) Activities of otolith collection and age estimation and analysis of the age data by Japan in 2006: Tomoyuki ITOH, Akio HIRAI and Kenichiro OMOTE
33. (Japan) Report of activities for conventional and archival tagging and recapture of southern bluefin tuna by Japan in 2006/2007: Osamu SAKAI, Tomoyuki ITOH and Shungo OSHITANI
34. (Japan) Report on the piston-line trolling survey in 2006/2007: Tomoyuki ITOH and Osamu SAKAI
35. (Japan) Some examination on the recruitment index of age 1 southern bluefin tuna derived from the trolling survey: Tomoyuki ITOH
36. (Japan) The effect of the spatial and temporal distribution of juvenile SBT on acoustic and trolling survey abundance estimates.: R. Kawabe, K. Fujioka, A. Hobday, Y, Takao, K. Miyashita and T. Itoh
37. (Japan) Proposal for the recruitment monitoring trolling survey in 2007/2008: Tomoyuki ITOH and Osamu SAKI
38. (Japan) Summary of Fisheries Indicators in 2007: Norio TAKAHASHI and Tomoyuki ITOH
39. (Japan) Change in operation pattern of Japanese SBT longliners in 2007 resulting the enforce of the individual quota system: Tomoyuki ITOH

41. (Japan) Review of CCSBT Scientific Research Program: Tomoyuki ITOH, Hiroyuki Kurota and Norio Takahashi
42. (Japan) Report of the 2006/2007 RMA utilization and application for the 2007/2008 RMA: Fisheries Agency of Japan
43. (Japan) Migration paths for juvenile southern bluefin tuna in southern Western Australia determined via acoustic monitoring . summary of 2003-2007 experiments: Hobday, Alistair J., Kawabe, Ryo., Takao, Yoshimi, Miyashita, Kazushi, and Itoh, Tomoyuki
44. (Japan) Proposal: Proportion of juvenile southern bluefin tuna moving into southern Western Australia - implications for fishery-independent assessment: Hobday, Alistair J., Kawabe, Ryo., Takao, Yoshimi, Miyashita, Kazushi, and Itoh, Tomoyuki
45. (Taiwan) Taiwanese otolith collection and otolith direct ageing
46. (Japan) Further investigation of the difference in two datasets raised by the second CPUE modeling workshop, used for CPUE analyses of SBT: Shono, H., and T. Itoh

(CCSBT-ESC/0709/SBT Fisheries)

Australia	Australia's 2005-06 Southern Bluefin Tuna Fishing Season, Hobsbawn, P. Hender, J., Findlay, J., McLoughlin, K.
Japan	Review of Japanese SBT Fisheries in 2006: Osamu SAKAI, Tomoyuki ITOH and Yukito NARISAWA
New Zealand	The New Zealand southern bluefin tuna fishery in 2006
Taiwan	Review of Taiwanese SBT Fishery of 2005/2006
Korea	Review of Korean SBT Fishery of 2005/2006: Doo-Hae An, Seon-Jae Hwang, Dae-Yeon Moon, and Soon-Song Kim

(CCSBT-ESC/0709/Info)

01. (Australia) Movements and behaviour of large SBT in the Tasman Sea and Indian Ocean regions determined using pop-up archival satellite tags: a summary of results for 2006-07.: Evans, K. and Patterson, T

04. Ocean: Sadiyah, L., Andamari, R., Iskandar Prisantoso, B., Retnowati, D., and Proctor, C

05. (Australia) Southern Bluefin Tuna Aquaculture Subprogram: Tuna Environment Subproject: Evaluation of Waste Composition and Waste Mitigation.: Fernandes, M., Lauer, P., Cheshire, A., Svane, I., Putro, S., Mount, G., Angove, M., Sedawie, T., Tanner, J., Fairweather, P., Barnett, J. & Doonan, A.

06. (Australia) Southern Bluefin Tuna (Thunnus maccoyii) Aquaculture Environmental Monitoring Program 2005.: Loo, M., Ophel-Keller, K., McKay, A., Drabsch, S., Hartley, D. & Cheshire, A.

(CCSBT-ESC/0709/Rep)

01. Report of Tagging Program Workshop (October 2001)
02. Report of the CPUE Modeling Workshop (March 2002)
03. Report of the Special Management Procedure Technical Meeting (February 2005)
04. Report of the Fourth Meeting of the Management Procedure Workshop (May 2005)
05. Report of the Management Procedure Special Consultation (May 2005)
06. Report of the Sixth Meeting of the Stock Assessment Group (September 2005)
07. Report of the Tenth Meeting of the Scientific Committee (September 2005)
08. Report of the Special Meeting of the Commission (July 2006)
09. Report of the Seventh Meeting of the Stock Assessment Group (September 2006)
10. Report of the Eleventh Meeting of the Scientific Committee (September 2006)
11. Report of the First Meeting of the Compliance Committee (October 2006)
12. Report of the Thirteenth Annual Meeting of the Commission (October 2006)
13. Report of the First Meeting of the Compliance Committee Working Group (April 2007)
14. Report of the Second CPUE Modelling Workshop (May 2007)
15. Report of the Seventh Meeting of the Ecologically Related Species Working Group (July 2007)

Attachment 4

Table 1: Summary of observed catch and effort coverage by country, year and sector

Country	Year	Sector	Observers Deployed	Sea Days	Sets/Tows Observed	Observed Vessels	Observed Effort (%, units)	Observed Catch (%, units)	Total Cost
Australia	2002	Purse Seine[a]	N/A	47	24		11% (sets)	11% (est. total weight)	60,000 (A$)
Australia	2002	Towing[a]	N/A	19	1		2.6% (tows)		(included above)
Australia	2002	East Coast Longline	17	323	198		14.4% (hooks)	35.5% (no. retained catch)	NA
Australia	2002	West Coast Longline	N/A	N/A	N/A		N/A (hooks)	N/A (no. retained catch)	NA
Australia	2003	Purse Seine[a]	2	27	21		13% (sets)	12.8% (est. total weight)	60,000 (A$)
Australia	2003	Towing[a]	2	30	2		5.6% (tows)		(included above)
Australia	2003	East Coast Longline	10	242	168		14.9% (hooks)	55.2% (no. retained catch)	303,000 (60,000 A$ SBT component)
Australia	2003	West Coast Longline	4	72	54		2.0% (hooks)	4.5% (no. retained catch)	42,247 (A$)
Australia	2004	Purse Seine[a]	2	36	15		11.2% (sets)	8.5% (est. total weight)	60,000 (A$)
Australia	2004	Towing[a]	2	24	2		5.7% (tows)		(included above)
Australia	2004	East Coast Longline	11		68		11.7% (hooks)	5.4% (no. retained catch)	966,000 (150,000 A$ SBT component)
Australia	2004	West Coast Longline			59		3.9% (hooks)	0% (no. retained catch)	57,384 (A$)
Australia	2005	Purse Seine[a]	2	47	14		9.2% (sets)	10.1% (est. total weight)	78,000 (A$)

Country	Year	Sector	Observers Deployed	Sea Days	Sets/Tows Observed	Observed Vessels	Observed Effort (%, units)	Observed Catch (%, units)	Total Cost
Australia	2005	East Coast Longline	14		128		37.5% (hooks)	62.8% (no. retained catch)	723,289 (160,000 A$ SBT component)
Australia	2005	West Coast Longline			47		9.1% (hooks)	(no observed catch)	0
Australia	2006	Purse Seine[a]	2	19	9		5.6% (sets)	5.6% (est. total weight)	68,000 (A$)
Australia	2006	Towing[a]	2	38	2		6.0% (tows)		(included above)
Australia	2006	East Coast Longline	17		156		30.2% (hooks)	23.2% (no. retained catch)	180,000 (A$)
Australia	2006	West Coast Longline			10		1.9% (hooks)	(no observed catch)	15,589 (A$)
Japan	2002	Longline	16	1135	642	9%	3% (hooks)	3%	31,607,000 (Yen)
Japan	2003	Longline	15	1135	694	9%	6% (hooks)	5%	37,941,000 (Yen)
Japan	2004	Longline	14	1441	653	8%	5% (hooks)	4%	37,240,000 (Yen)
Japan	2005	Longline	16	1178	913	10%	5% (hooks)	4%	43,439,000 (Yen)
Japan	2006	Longline	14	1257	1092	10%	9% (hooks)	6%	43,500,000 (Yen)
Korea*	2002								
Korea*	2003								
Korea*	2004								
Korea*	2005								
Korea*	2006								
New Zealand	2002	Charter	4	177	100%	100%	100% (hooks)	100%	88,500 (NZ$)
New Zealand	2002	Domestic	5	104			8% (hooks)	NA	52,000 (NZ$)

Country	Year	Sector	Observers Deployed	Sea Days	Sets/Tows Observed	Observed Vessels	Observed Effort (%, units)	Observed Catch (%, units)	Total Cost
New Zealand	2003	Charter	4	194	100%	100%	100% (hooks)	100%	97,000 (NZ$)
New Zealand	2003	Domestic	5	127			7% (hooks)	NA	63,500 (NZ$)
New Zealand	2004	Charter	4	363	100%	100%	96% (hooks)	100%	181,500 (NZ$)
New Zealand	2004	Domestic	10	231			15% (hooks)	16%	115,500 (NZ$)
New Zealand	2005	Charter	2	225	100%	100%	89% (hooks)	100%	181,500 (NZ$)
New Zealand	2005	Domestic	8	260			12% (hooks)	9%	130,000 (NZ$)
New Zealand	2006	Charter	2	225	100%	100%	94% (hooks)	100%	112,500 (NZ$)
New Zealand	2006	Domestic	14	214			9% (hooks)	4%	107,000 (NZ$)
Taiwan	2002	Longline	1	202	126	1.64%	6.08% (hooks)	0.97%	560,000 (NT$)
Taiwan	2003	Longline	2	177	133	2%	3.61% (hooks)	0.55%	630,000 (NT$)
Taiwan	2004	Longline	5	263	165	5%	6.52% (hooks)	3.06%	940,000 (NT$)
Taiwan	2005	Longline	4	681	444	7.02%	13.27% (hooks)	6.65%	1,600,000 (NT$)
Taiwan	2006	Longline	3	296	253	8.33%	12.78% (hooks)	4.26%	1,250,000 (NT$)

* Korea to supply information intersessionally.

Table 2: Number of biological samples taken in observer programs separated by country, year and sector

Country	Year	Sector	Otoliths	Sex	Tags	Stomach contents	Length Measurement
New Zealand	2002	Combined	1199	3013	15	2340	2996
New Zealand	2003	Combined	838	1658	5	1537	1668
New Zealand	2004	Combined	1140	1961	5	1846	2008
New Zealand	2005	Combined	432	1099	4	972	1121
New Zealand	2006	Combined	444	1252	4	1071	1281
Japan	2002	Longline	308	2683	2	229	2712
Japan	2003	Longline	338	4719	21	563	4757
Japan	2004	Longline	655	4112	20	671	4155
Japan	2005	Longline	522	3915	22	563	3949
Japan	2006	Longline	469	4244	13	766	4372
Taiwan	2002	LL	-	-	0	-	338
Taiwan	2003	LL	102	-	0	-	174
Taiwan	2004	LL	316	86	0	93	1290
Taiwan	2005	LL	210	261	0	257	2217
Taiwan	2006	LL	56	57	0	57	1484

Attachment 5

Global SBT Catch by Flag

This attachment is confidential (see paragraphs 125-128 and 221 of the Report of the Fourteenth Annual Meeting of the Commission) and has therefore been excluded from the public version of this report.

Attachment 6

Recommendations from the Second CPUE workshop to the Extended Scientific Committee

(extracted from the Report of the Second CPUE Modelling Workshop)

Terms of Reference 1: Description of any changes in fishing patterns

1. It was concluded that, despite the changes in the Japanese management system, from the evidence seen the Japanese effort distribution in 2006 was not markedly different from previous years. However, the response of the Japanese fleet to the new management system was still developing. Consequently there was a need both to understand what changes would be of most concern and to monitor how well new data corresponded to past distributions.

2. Given the uncertainties about the fishing patterns that the Japanese longline fleets may have in the 2007 fishing season it would be helpful if Japan could provide suitable details of its distribution to SAG/SC. Also, because of possible changes in fishing strategies of the Japanese fleet after the 2007 fishing season, depending heavily on Japanese fleet data in stock assessment process may lead to further uncertainty in the stock status. Therefore, it is necessary to develop reliable stock indices from the other fisheries and/or research, which will be used in the stock assessment process in addition to the Japanese CPUE (as discussed under Agenda item7). The following recommendations regarding ToR 1 are proposed:

   - Provide information on any changes in fishing patterns which might affect CPUE
   - Continued monitoring of:
     - SBT/sum(BET+YFT) catch by area for the areas and seasons which are selected for CPUE standardisation.
     - Median latitude and longitude by area the areas and seasons which are selected for CPUE standardisation.

Terms of Reference 2: Analyse past long line CPUE data to best specify one or more robust future CPUE series for high seas components of the SBT stock

3. Recommendations for ToR 2 are as follows:

   - The approach of sub-setting the fleet to a set a core vessels may provide more robust indices;
   - Consideration of bycatch data are clearly critical for the interpretation of CPUE and development of robust CPUE series. The workshop agreed that bycatch data be analysed for any fleets for which CPUE should be considered and some workshop members felt that these data should be submitted as part of the data exchange;
   - When set-specific details are incorporated into GLMs (e.g. HPB and vessel ID), different trends are estimated to those implied by aggregated data that does not consider these factors.

- Further efforts should be directed at comparing shot by shot and aggregated data to see which provides a better reflection of the stock, but it is likely that the information provided by shot by shot data should lead to more robust indices.
- Efforts should be made to include better information in relation to targeting practices in CPUE analyses.
- There is a significant difference in the CPUE trends for the traditional CPUE strata compared to the Japanese fishery management areas (Figure 12). This problem requires collaborative intersessional work to resolve.
- Further collaborative work is required on approaches for modelling observed zeros and the comparisons between fixed and random effects approaches to modelling effects.

Terms of Reference 3: Is additional commercial sentinel fishing or scientific effort needed and is this practical?

4. These possible approaches were not developed further at the meeting. Document CCSBT-CPUE/0705/05, presented at the workshop, indicated that there were no remarkable changes in fishing patterns in 2006 following the introduction of individual quotas. The 2007 fishing season began on 1 April 2007, thus there is limited information on changes in the fishery for this year. Examination of changes in the fishery in 2007 as data become available throughout the year may reveal the need for developing these options further.

5. Since the situation for the 2007 season will become clearer as the season advances, recommendation on this Term of Reference are best left until the time of the SAG\SC meetings. This will also allow any decision on such initiatives to be taken in the context of the review of wider scientific research priorities. This should be considered simultaneously with the analysis of CPUE data for the Indonesian fleet.

Terms of Reference 4: Is it possible to calibrate future series to past series?

6. This Term of reference was dealt with concurrently with Term of reference 2 and is reported under that heading.

Terms of Reference 5: Is it possible to correct past CPUE series?

7. The data examined showed no clear evidence on if or how to correct CPUE series. It was suggested

   - Ideally CPUE would be based on vessels in which we have good confidence in their data.
   - It is unsuitable to develop CPUE based solely on observed vessels because the scientific observer program was not designed to collect CPUE solely.
   - Analyses undertaken at the workshop comparing observed and unobserved datasets on all and just the core vessels were not conclusive as to whether the

effects of the market anomalies could be detected – this is in part due to levels of observer coverage across the vessels varying from 4-9.6%.

- Analyses comparing nominal CPUE for the 12 vessels that had very high catch reporting at the end of 2005 to the core fleet were not conclusive. In some areas CPUE for the 12 vessels were lower than the core (as would be expected if they under-reported), but in other areas they were higher.
- Given the sensitivity of the assessment to the assumption that overcatch should impact on the CPUE used in the assessment, Japan is therefore encouraged to undertake future analyses of this kind for components of the fleet for which they have greater (or lesser) confidence in the accuracy of their catch reporting.

Terms of Reference 6: Analyse fisheries to try to develop or improve additional indices other than Japanese longline

8. Conclusions under this ToR were summarised under three categories based on the portion of the stock that could be monitored. Three categories were: juveniles (ages 1-4), longline vulnerable biomass (ages 5-9), and spawning biomass (ages 10+). The conclusions reached in this section are of direct relevance to ToR 2.

9. Juvenile stock: Fish of these ages are typically poorly selected by the longline fisheries and are predominantly taken in the Australian surface fishery. It was recognised that the nature of the purse seine fishery means that the CPUE (e.g. catch per set) from this fishery is not useful as an index of abundance. Further, it was noted that there were several issues relating to the analysis and interpretation of the commercial spotting data.

10. The partial and convoluted coverage of the GAB by commercial spotting makes it difficult to interpret these data and thus how much effort to devote to their future collection and analysis needs to be carefully prioritised against other more promising approaches to estimating the abundance of recruiting aged SBT in the GAB. This prioritisation could best be done at the SRP review to take place in 2007.

11. Juvenile SBT are taken as by-catch in the Taiwanese albacore fishery in the mid-Indian Ocean and can sometimes comprise up to 30% of the NZ longline fishery catch, so it may be possible to derive indices for these fisheries that provide information on juvenile abundance. In the case of the Taiwanese fishery, special care would be needed given that it is predominantly a bycatch fishery. In particular it will be important to incorporate any target information and appropriately model any observed zeros. In the case of the New Zealand fishery, it was noted that it may not be possible to derive historical indices, and that the interpretation of any indices that area developed will need to consider how abundance in the Tasman Sea relates to the broader stock. Series could be calculated separately for the domestic vessels and for those charter vessels that have carried observers (which is almost all).

12. It was also noted, however, that there are several fishery independent indicators of recruitment, such as estimates of Z from tagging, the GAB aerial survey and the other research programmes undertaken as part of the recruitment monitoring

programme such as the trolling monitoring survey in Western Australia. Fishery independent research programmes that are appropriately implemented should provide more reliable data than fishery dependent data (e.g. commercial CPUE) so this should be considered when prioritising resources for monitoring the juvenile stock.

13. Longline vulnerable biomass (intermediate ages): Both the NZ and Taiwanese data may provide useful information for this component of the population, but the same concerns noted above for these fisheries were also relevant here.

14. Spawning age fish: Indonesia is presently the only fleet to fish on or near the spawning ground. It was noted that there were problems in the historical data available from this fishery, but that considerable work was been undertaken to collect better data. Continuation of this work was strongly encouraged and this work may be enhanced by additional scientific initiatives (see discussion on ToR 3). The status of this key part of the SBT stock is the most serious gap in our knowledge of the stock. Further work with Indonesia to develop a viable CPUE series is to be strongly encouraged.

15. It was noted that the current size composition of the catch from the NZ fleet is very similar to that of the Indonesian fishery. Therefore, while noting the concerns raised above about limitations of the NZ data, it may be possible to develop an abundance index for spawning age fish from the NZ fishery.

16. **Summary:** Conclusions from discussions under this ToR are summarised in the table below. The methodological approaches for undertaking the analyses (e.g. aggregated versus shot by shot data were discussed under ToR 2).

Stock component	**Potential CPUE indices**	**Other information**
Juvenile	Taiwanese CPUE NZ domestic CPUE Australia commercial aerial spotting	Tagging GAB aerial survey Other recruitment monitoring programmes e.g. trolling monitoring survey
Longline vulnerable	Taiwanese CPUE New Zealand CPUE	Possible sentinel / scientific fishing effort
Spawning aged fish	Indonesian logbook and observer data New Zealand CPUE	Possible sentinel / scientific fishing effort

Attachment 7

GLM diagnostics based on standard statistical package output information

Given the SAG and SC discussions, and being cognisant of the need not to overburden various delegation members, there are several suggestions for a suggested set of GLM/GLMM diagnostics and plots. The idea is that they are either standard options for most generic statistical modelling packages (R, SAS, GENSTAT etc.) or can be easily calculated from standard GLM regression statistics (log-likelihood, summary tables of deviance explained and significance etc.).

Individual fits of a single model to a data set

If we are considering running a single model (not a whole suite of options), this run would ideally be accompanied with the GLM summary table, which normally comes with the estimate of each (fixed) effect, along with the deviance it explains and its significance, and normally the log-likelihood and/or the AIC (Akaike Information Criterion) - these last two are effectively meaningless if we are only running one model so we leave their use until later. In terms of summary plots, the standard QQ plot would be suggested (potential deviations from the assumption of normality in the residual error terms) and, dependent on the number of data points and effects, the actual residual plots themselves.

Fitting multiple candidate models to a data set

If we are exploring the structure of the GLM by running multiple candidate models, it is appreciated that one cannot realistically display all the above information in a single manageable document, but it would be highly useful for the purposes of checking differences in parameter estimates etc. if the relevant summary information were available on request.

With respect to assessing whether a more complex model improves on a simpler model, the statistical significance of any improvements can be assessed using all the information normally available in the standard outputs detailed above. Given a simpler model *A* and a more complex model *B*, with *n* more parameters than model *A*, then twice the difference in the maximum log-likelihood values of model *B* and model *A*, *deltaL = 2 * Logl(B)-Logl(A)*, is a chi-squared random variable, with the degrees of freedom being the extra number of parameters in model *B*, *n*. Given the two output summaries of models *A* and *B*, these two quantities are readily available and all statistical packages enable one to perform a simple Pearson's chi-squared test to see the significance. For example, in the R package, if one had the log-likelihood difference, *deltaL*, then the significance is given by:

> psig <- pchisq(*deltaL*, *n*, lower.tail = FALSE)

but the SAS package among others also easily allows one to perform such a simple significance test. The point is that this is an easy way to statistically test if a move to a more complex model is explaining the data better than a more simplistic one.

An example of the type of summary table that might be computed during the intersessional work is shown below:

Table 6. Statistical results from the standardisation of Tasmania giant crab data. Models are defined in Table 5. *N* is the number of data records, # Params is the number of parameters (*K*), df Params is the degrees of freedom for the statistical model, df Resids is the residual degrees of freedom (*N-K*), Model SS is the variation described by the model, Resid SS is the sum of squared residual errors, AIC is Akaike's Information Criterion, Var% is the raw R^2 value, AdjR^2 is the adjusted R^2, and Δ AdjR^2 are the improvements of each model's AdjustR^2 compared to the previous model (the values for Models 7 to 11 are relative to Model 6). Model 10 provided the optimum fit (in bold). The vertical line separates simple models (Models 1-6) from those that include interaction terms (Models 7-11).

Model	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
N	9910	9910	9910	9910	9910	9910	9910	9910	9910	9910	9910
# Params	11	58	82	93	150	151	406	408	383	974	617
df Resid	9899	9852	9828	9817	9760	9759	9504	9502	9527	8936	9293
df Params	10	57	81	92	149	150	405	407	382	973	616
Model SS	1178	3535	4522	5127	5548	5697	6770	6589	6733	8290	7453
Resid SS	11817	9460	8472	7868	7447	7298	6225	6405	6262	4705	5542
AIC	1766	-345	-1389	-2100	-2532	-2730	-3796	-3509	-3784	**-5435**	-4526
Var%	0.091	0.272	0.348	0.395	0.427	0.438	0.521	0.507	0.518	**0.638**	0.574
AdjR^2	0.090	0.268	0.343	0.389	0.418	0.430	0.501	0.486	0.499	**0.599**	0.545
Δ AdjR^2	0.090	0.178	0.075	0.046	0.029	0.012	0.071	0.056	0.069	**0.169**	0.116

Attachment 8

REPORT ON BIOLOGY, STOCK STATUS AND MANAGEMENT OF SOUTHERN BLUEFIN TUNA: 2007

A review of fisheries indicators was conducted by the CCSBT Stock Assessment Group during 2007. In response to indications from a 2006 review of SBT farming and market data that catches over the past 10 to 20 years may have been substantially under-reported, a range of alternate past catch scenarios was also explored in 2006, but was not updated in 2007. This report updates description of fisheries and 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.

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 end 2006 are shown in Figures 1 - 3. However, as a result of indications in SBT farming and market data that there may have been substantial under-reporting of SBT catches over the past 10 - 20 year period, 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 81,605t in 1961 (Figures 1 - 3). Over the period 1952 - 2003, 79% of the reported catch has been made 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 30% 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 73% of the SBT catch has been made in the Indian Ocean, 21% in the Pacific Ocean and 6% in the Atlantic Ocean (Figure 2). The reported Atlantic Ocean catch has varied widely between about 300t and 8,200t since 1968 (Figure 2), averaging about 1,000t 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). The reported Indian Ocean catch has declined from about 54,000t to 11,000t, averaging about 14,600t, and the reported Pacific Ocean catch has ranged from about 1,200t to 19,000t, averaging about 2,100t, over the same periods (although SBT farming and market data analyses indicate that these catches may be under-estimated).

3. Summary of Stock Status

SBT stock status indicators were reviewed at the 12th meeting of the CCSBT Scientific Committee in 2007. The indicators continue to support previous evidence for poor recruitment in the 2000 and 2001 year class, and ongoing recruitment below the 1994-1998 levels. The size distribution in the NZ LL fishery and the Japanese LL fishery continue to indicate poor 1999, 2000, 2001 and 2002 recruitments, and the aerial spotting survey is consistent with a reduction in average recruitment below the 1994-1998 levels. The high fishing mortality rate estimates for age 3 and 4 from recent tagging are also consistent with low recruitments in these years. Trends in year class strength in the Japanese LL fleet show poor strength of the 2000, 2001 and 2002 year classes, but indicate the 2003 year class may be similar in size to the average between 1980 and 1999. However, this indicator could be biased by catch anomalies as in the case of the 2000-2002 year classes. Scientific Research Programme tag returns may suggest declining recruitment between 1999 and 2003. The Great Australian bight aerial survey indicates poor recruitment through to 2004.

In 2006 the SBT Operating Model was used to evaluate a range of possible past under-reported catch scenarios, to investigate the potential effect of these scenarios on current understanding of the state of the SBT stock. The Operating Model was not updated in 2007, so these conclusions are based on the 2006 results. The scenario evaluation results were consistent with the 2005 assessment of the overall stock status and 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. Recruitments in the last decade are estimated to be well below the levels in the period 1950-1980. All scenarios suggest that recruitment in the 1990s fluctuated with no overall trend. Analysis of several independent fishery indicators indicate low recruitments in 2000, 2001 and 2002, and the scenarios suggest low recruitment in 2002 and 2003, although the low estimates of 2003 year class strength is inconsistent with the Japanese length frequency data from 2006.

The primary implication of the higher catch levels in the scenarios evaluated in 2006,

compared to the assumed catch history used in the 2005 assessment, is that estimated total spawning stock size is more than double that assessed at the 2005 meeting. Nonetheless, in the scenarios considered, future total catches of 14,925 t (the total allocated TAC in 2006) would result, on average, in a short-term decline followed by generally stable but not recovering spawning biomass. Any future catch over 14,925 t poses very serious threats to the stock. Rebuilding the spawning biomass requires catch reductions to below 14,925 t under all the scenarios considered. In 2006 the Commission set a global TAC of 11,810 t per year for the period 2007 – 2009.

4. Current Management Measures

At its Thirteenth annual meeting the CCSBT agreed to a total allowable catch (TAC) for 2007-2009 of 11,810 tonnes, which is a TAC reduction of 3,115 tonnes. The TAC will only be reviewed before 2009 if exceptional circumstances emerge in relation to the stock. The allocation of the TAC amongst Members, Cooperating Non-Members and Observers are specified below:-

Members

The allocations below are fixed to 2011 for Japan and to 2009 for other Members.

Japan	3,000 tonnes
Australia	5,265 tonnes
Republic of Korea	1,140 tonnes
Fishing Entity of Taiwan	1,140 tonnes
New Zealand	420 tonnes

Cooperating Non-Members and Observers

The allocations amongst Cooperating Non-Members and Observers has only been set for 2007.

Indonesia	750 tonnes
Philippines	45 tonnes
South Africa	40 tonnes
European Community	10 tonnes

Furthermore, to contribute to the recovery of the SBT stock, Taiwan and the Republic of Korea undertook to maintain their actual catch below 1,000 tonnes for a minimum of 3 years. This will result in an actual catch level below 11,530 tonnes for a 3 year period.

The CCSBT has also implemented a Trade Information Scheme (TIS) for SBT. This 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 and are used to maintain a database for monitoring catches and trade. As markets for SBT are now developing outside CCSBT member countries, the TIS scheme was recently amended to require the document to be issued for all exports, and to include the country of destination.

At its annual meeting in October 2003, the CCSBT agreed to establish a list of vessels over

24 metres in length which are approved to fish for SBT, to be completed by 1 July 2004. The list included vessels from CCSBT members and cooperating non-members. At its annual meeting in October 2004, the CCSBT agreed to expand the list to include all of the vessels, regardless of size, that are authorised to catch SBT. Members and cooperating non-members are required to refuse the import of SBT caught by vessels not on the list.

The CCSBT has recognised the critical importance of adopting and fully implementing at the earliest possible time an integrated package of compliance measures which would ensure the elimination of unreported catch and provide accurate data as a basis for proper stock assessment. At its Thirteenth annual meeting, the CCSBT adopted draft resolutions on the following compliance measures and work will be undertaken during 2007 towards refining and implementing these measures:

- A catch documentation scheme;
- A vessel monitoring system; and
- Regulation of transhipments by large scale fishing vessels.

5. CCSBT Management Procedure

The 10th meeting of the CCSBT Scientific Committee held in 2005 finalised the development and evaluation of candidate management procedures for SBT, and recommended a final management procedure and initial catch reduction for consideration by the Commission. However, implementation of this management procedure has been postponed until uncertainties in estimates of past catch and CPUE levels can be resolved. The magnitude of these past catch uncertainties is such that the management procedure will likely have to be modified. Substantial efforts will also have to be made to improve the reliability of total catch and CPUE series before these can be used as the basis of a management procedure.

SOUTHERN BLUEFIN TUNA SUMMARY (global stock)	
Maximum Sustainable Yield	Not estimated
Current (2005) Catch	Reported to be 15,690t, although review of SBT farming and market data suggests that this may be an underestimate.
Current Replacement Yield	Not estimated
Current Spawner Biomass	112,272 - 166,312 t [1]
Current Depletion	SSB_{2006} / SSB_K : 0.101 - 0.127 [1]
Current Management Measures	Global TAC for Members and Cooperating Non-Members of 11,060t plus a provision of 750t for Indonesia (which has yet to become a Cooperating Non-Member).

[1] These are the ranges in estimates of median spawning biomass obtained from evaluation of a range of alternate possible past catch scenarios during the 2006 Stock Assessment Group meeting.

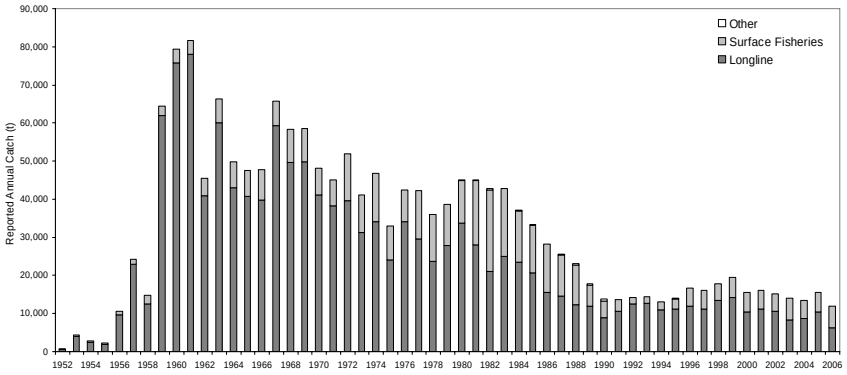

Figure 1. Reported southern bluefin tuna catches by fishing gear, 1952 to 2006[2].

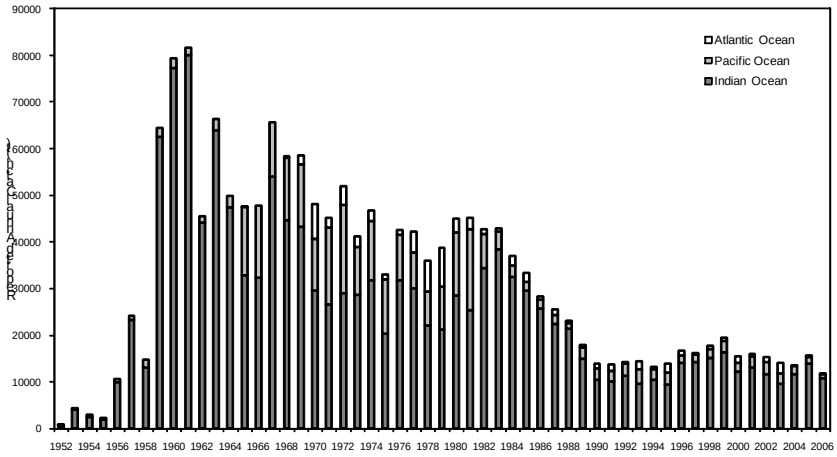

Figure 2. Reported southern bluefin tuna catches by ocean, 1952 to 2006[2].

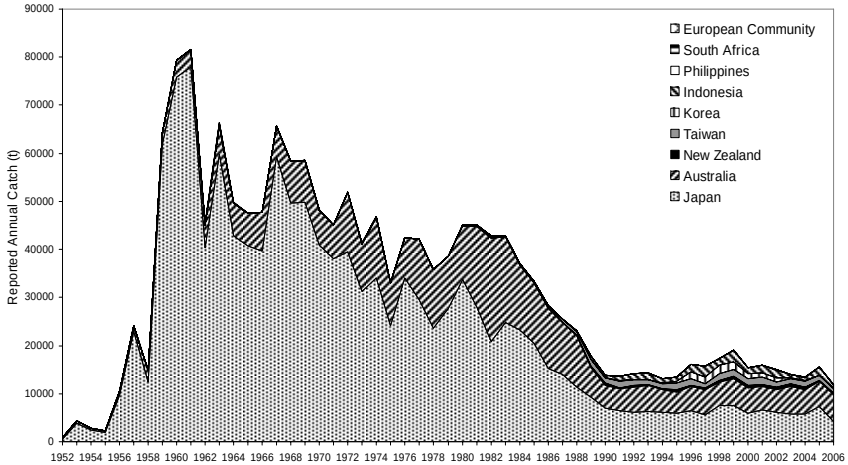

Figure 3. Reported southern bluefin tuna catches by flag, 1952 to 2006[2].

[2] Recent review of SBT farming and market data suggests that these catches may have been substantially under-reported over the past 10 to 20 years.

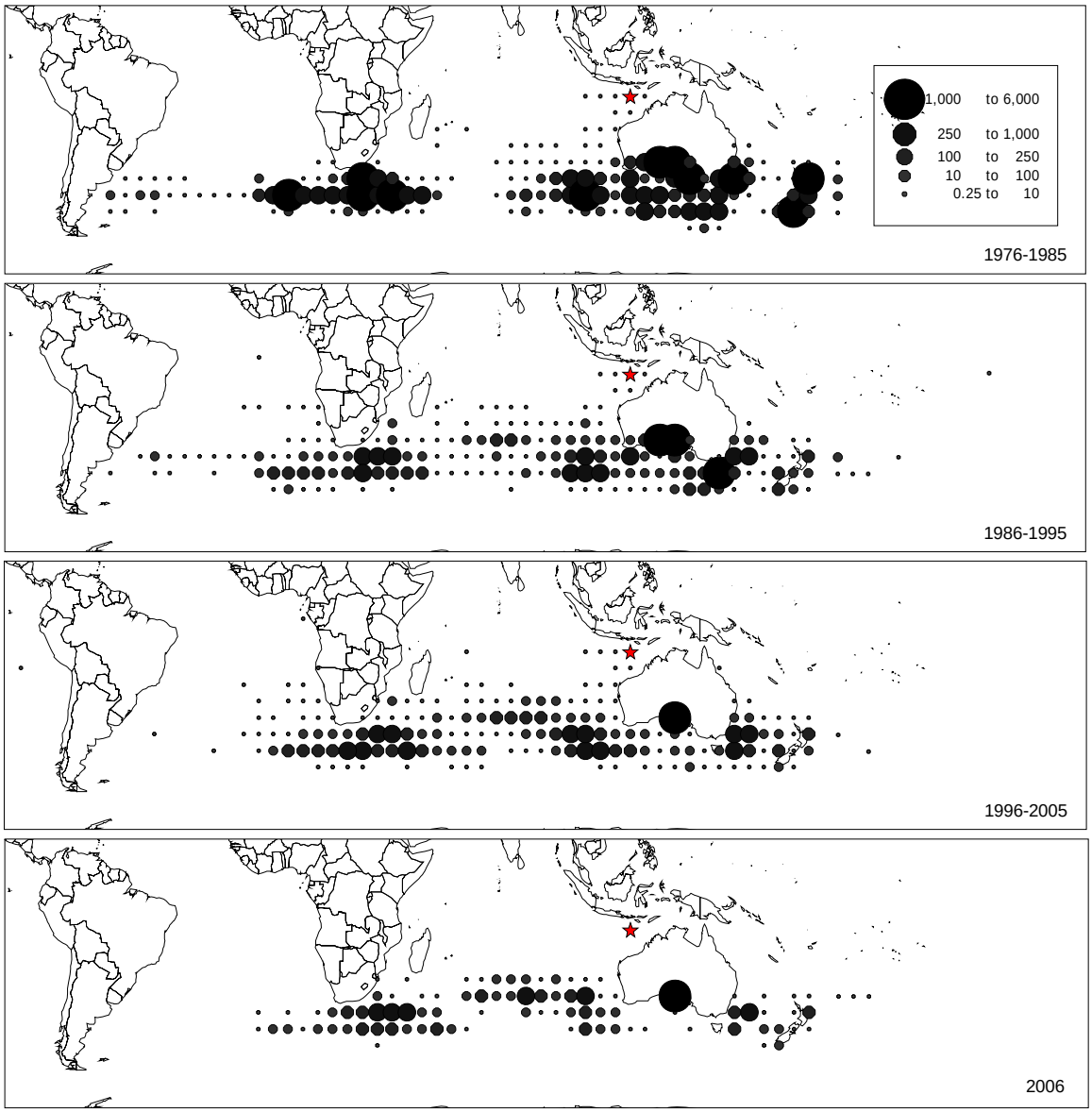

Figure 4[3]. Geographical distribution of average annual southern bluefin tuna catches (t) by CCSBT members and cooperating non-members over the periods 1976-1985, 1986-1995, 1996-2005 and 2006 per 5° block by oceanic region. The area marked with a star is an area of significant non-member catch. Block catches averaging less than 0.25 tons per year are not shown.

[3] This figure may be affected by past anomalies in catch.

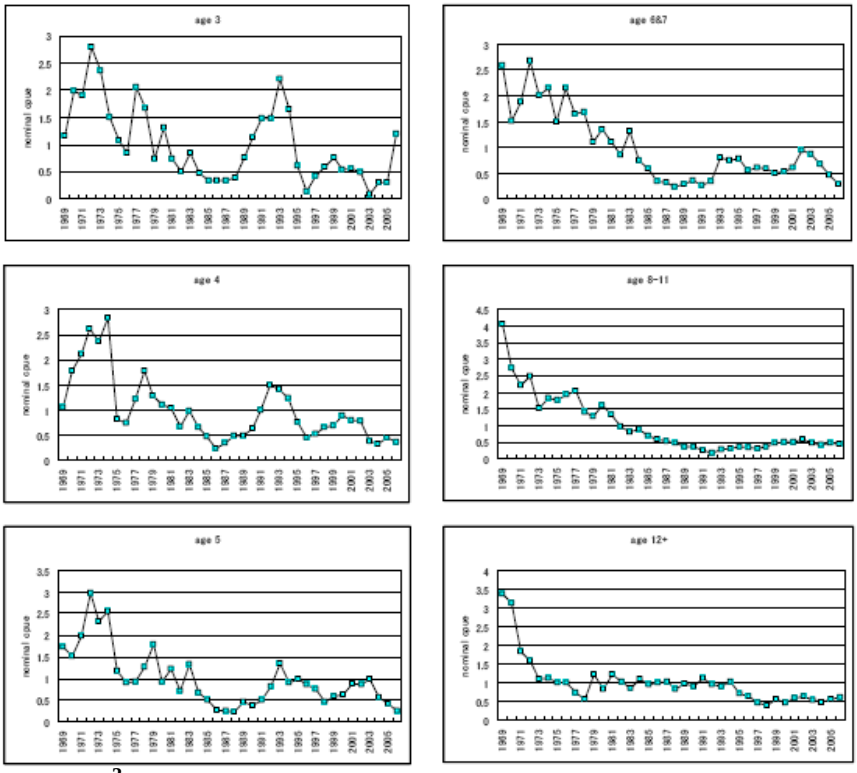

Figure 5[3]. Trends in nominal catch rates (numbers per 1000 hooks) of SBT by age group (ages 3, 4, 5, 6-7, 8-11 and 12+) caught by Japanese longliners operating in CCSBT statistical areas 4-9 in months 4-9.

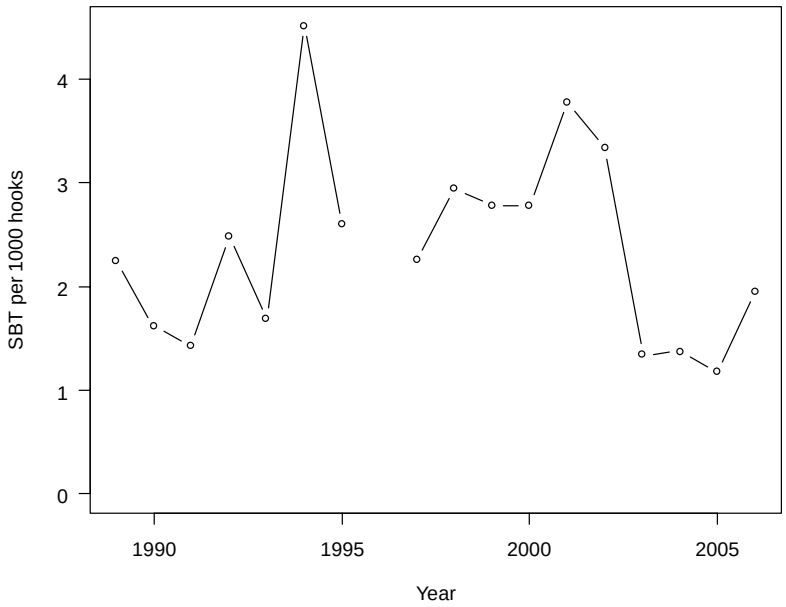

Figure 6. Nominal catch per unit effort (number of SBT per thousand hooks) from the New Zealand charter fleet in Region 6 (west coast South Island).

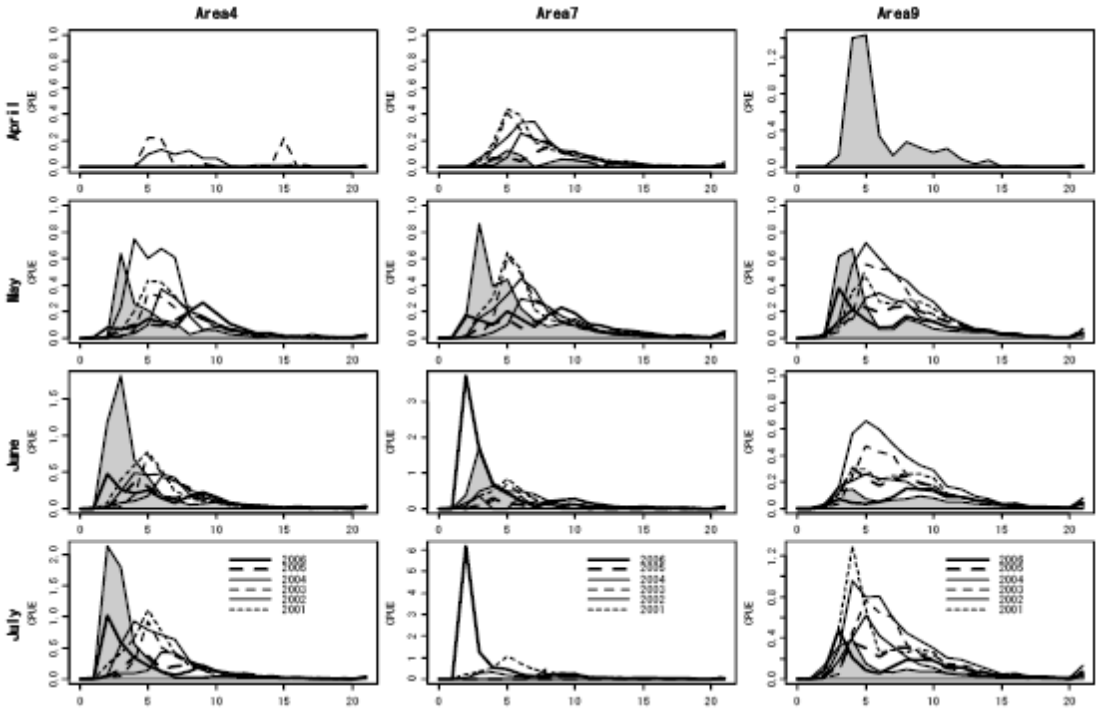

Figure 7[3]. Size composition of nominal CPUE of Real Time Monitoring Program data for the Japanese longline fishery for recent seven years by month and area.

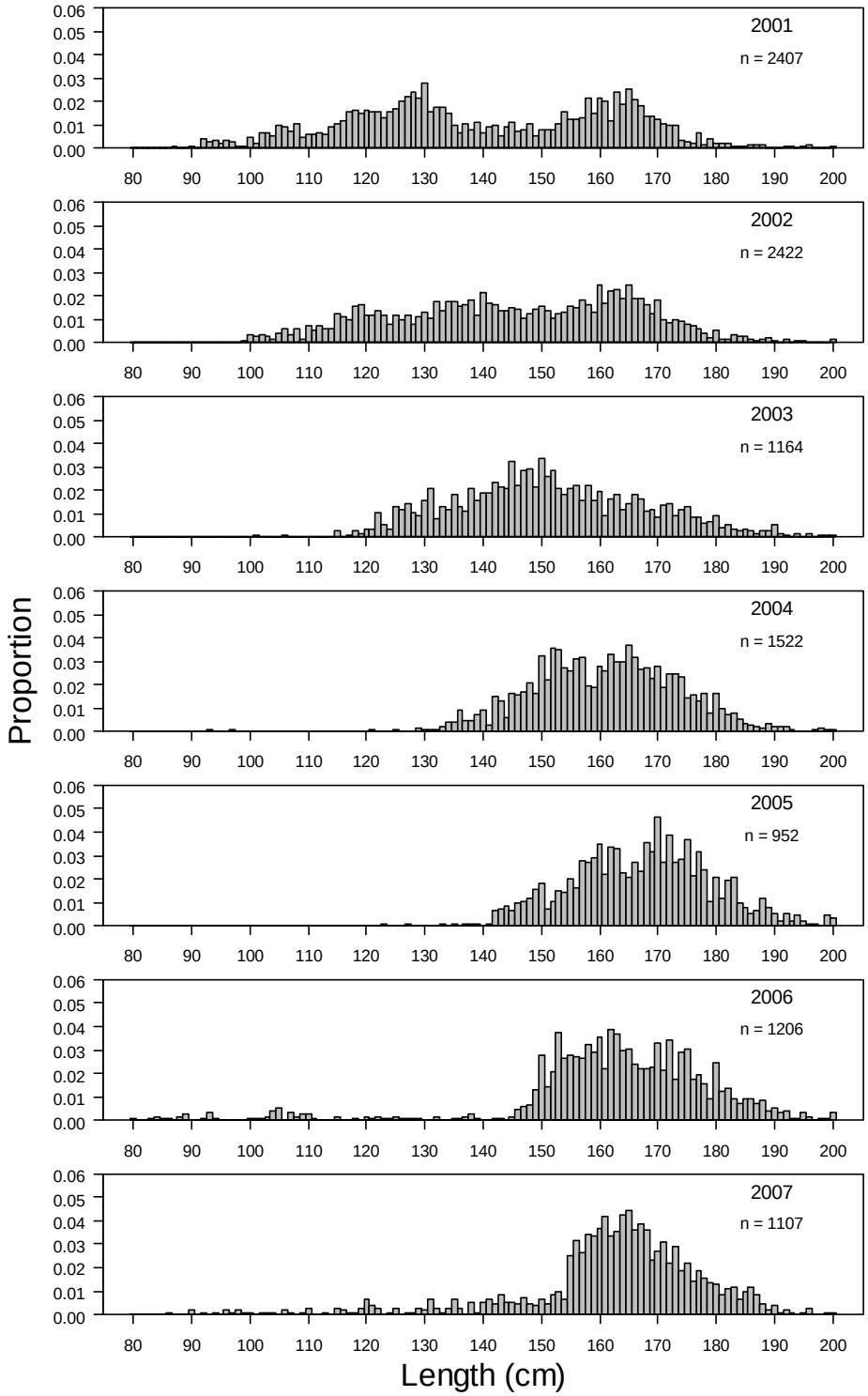

Figure 8. Proportion at length of SBT from the New Zealand charter fleet for 2001 to 2007 (Data for 2007 is preliminary and does not contain data from all vessels).

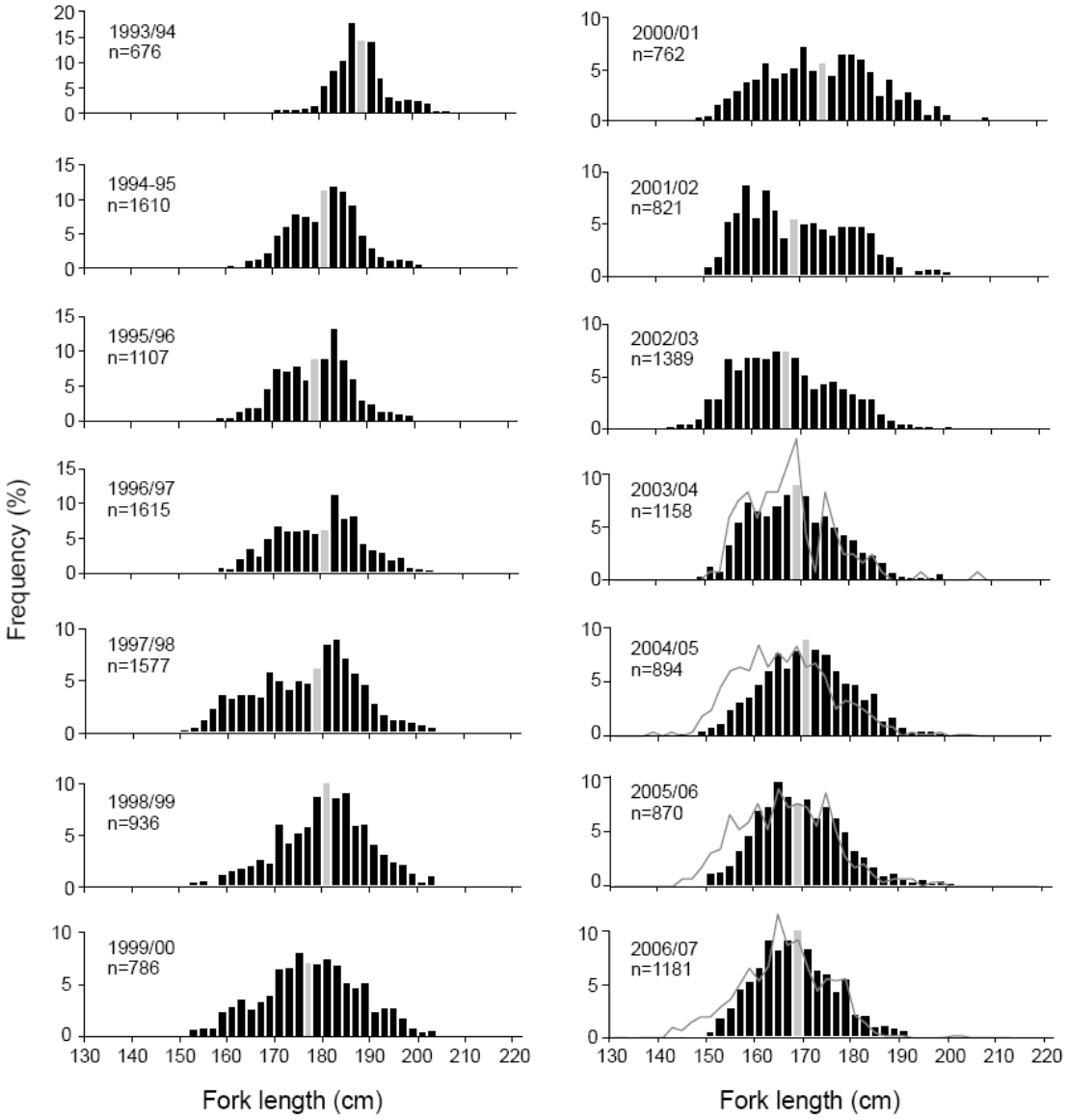

Figure 9. Length frequency (2cm intervals) of SBT by spawning season from the Indonesian spawning ground longline fishery from 1993/94 to 2006/07. The grey bar shows the median length class. For comparison, the length distribution of SBT thought to be caught south of the spawning ground is shown for the 2003/04 (n=121), 2004/05 (n=685), 2005/06 (n=311) and 2006/07 (n=411) seasons (grey line). A spawning season is defined as July 1 of the previous year to June 30 of the given year.

Priorities and estimated costs of scientific research program components

Item	Overall	Informs	Annual Cost ($1,000s)	Australia	Korea	Taiwan	New Zealand	Japan	Indonesia
Characterization of catch									
Future									
Catch amount	Essential	S, SSB, M		Essential	Essential	Essential	Essential	Essential	Essential
Size structure	Essential	S, SSB, M		Essential	Essential	Essential	Essential	Essential	Essential
Past									
Catch amount	High	S, SSB							
size structure	High	S, SSB							
Japanese Market Anomaly	High	S, SSB							
Australian Farming anomalies	High	S, SSB							
Australian stereo video	High	S, SSB	$350						
CPUE interpretation									
Future									
Commercial gear	Essential	ST, SSBT, R		low	low	low	Essential	Essential	High
SAPUE (Commercial sightings)	Medium	ST, SSBT, R		Medium/high					
Experimental fishing	Medium	ST, SSBT, R							
Past									
Commercial gear	High	ST, SSBT, R	$100						
Spawning biomass index									
From Indonesian CPUE	high	SSBT, M	$20						
From close kin analysis	high	SSB, SSBT, M	$200						
Experimental fishing	Medium	SSBT, M							
Scientific Observer Program	High	S, SSBT	$945	$260			$250	$435	
SBT Tagging		see fotnote b							
Conventional Tagging	low	R, S	$600						
PIT tagging	high	R, S	$600						
Genetic Tagging	low	R, S	nknown at present						
Archival Tagging	low/medium	see footnote c	$1,000	$500			$200	$300	
Recruitment Monitoring									
Aerial survey	high	R	$575	$575					
Piston Line	Medium	R	$200					$200	
Acoustic	low	R	$700					$700	
Direct Aging									
sample collection/aging	high	ST, SSBT	$100	$50			$20	$30	
Analysis for stock assessment	high	ST, SSBT							
MP Development	high	M							

Symbols
S=Exploitatable Stock size absolute level
ST=Trend in exploitable stock size
SSB= Spawning stock biomass
SSBT=Trend in spawning stock biomass
R=Trend in recruitment
M=Management TAC setting rules

a Note that potentially all indices will likely contribute to future management decision
b Tagging will provide estimates of recruitment and exploitable stock biomass through estimates of harvest rate and the model structu
c Archival tagging primarily provides information on movement and stock structur

Attachment 10

Management Procedure Workplan

Activity/mtg	Task
SAG8/SC12 (2007)	**Clarified future approach for recommending TACs:** to 2009: constant catch projections; 2011 onwards: MP
	Identification of: - minimum set of overcatch/CPUE scenarios - potential data sets for inclusion in OM - specifications for default base-case CPUE series and further work on CPUE Advice to the Commission on the short and medium term work plans
MP Inter-sessional work (Secretariat / Panel / Members)	**Distribution of:** • Revise (clean) OM / grid code, and associated graphics code ..... Dec 2007 • Update data files for OM: - data up to 2006 ..... Dec 2007 - data up to 2007 ..... 15 Jun 2008 • Agreed data sets for other indices that might be included in OM..... Dec 2007
CPUE Inter-sessional work – meeting?	**Focus on:** • One CPUE series for OM (time/area strata, variables to include) Distribution of CPUE series..... June 15, 08 • Examination of potential biases in CPUE due to market anomalies •
Aust. farm experiments	Continue to examine the potential for bias in size composition of farm catches ..... Sept 2008
Inter-sessional work (members)	**OM development** Further examination of issues related to the Japan Market Review and Australian Farm Report Further data collection / analysis (OM inputs and projections) ..... Sept 2008
SAG9/SC13 (2008) – workshop followed by ESC	**Near final decisions on:** a) Method for constant catch projection in 2009, including - Overcatch and CPUE scenarios - Axes of uncertainty (development of grid) b) OM structure - Input data for conditioning - Overcatch and CPUE scenarios - Axes of uncertainty (initial development of grid) - Goodness of fit / diagnostics c) MP implementation - Forms of TAC options to be considered and how to compare performance d) Reconsider MP workplan and timetable (need for intersessional mtg?)
Inter-sessional work (Secretariat/ Panel/ Members)	• Update code of OM / grid for constant-catch projections and associated graphics files • Update agreed input data sets to include data up to 2008 • Scenario modelling
Inter-sessional OM meeting?	**Decisions on:** • Final grid structure (constant catch projections only)
Inter-sessional work members	Scenario modelling
SAG10/SC14 (2009)	• Advice on stock status and short-term risks associated with various TACs (constant catch projections), based on scenario modeling • Set up initial MP trials and refine 2-3 year workplan for future MP development

Attachment 11

Report of the Data Exchange Working Group

Members of the data exchange group met with the Data Manager in the margins of the ESC meeting to specify the data exchange requirements for 2008.

Some new data provision requirements have been added for the 2008 data exchange. The new requirements follow discussions by the SAG and ESC in relation to additional data being considered for conditioning of the operating model, and discussions by the ESC in relation to the global catch table (agenda item 4.2).

The agreed requirements for the 2008 data exchange are detailed in **Annex 1**. However, in order to provide additional time for developmental work on the operating model, it is intended that all dates in Annex 1 between 23 April 2008 and 15 June 2008 be moved ahead by two weeks (i.e. to between 9 April and 1 June). Members will advise the Secretariat if this is possible by 28 September 2007. The Secretariat will advise Members of the outcome and if all Members can achieve the earlier data provision dates, then the dates for the 2008 data exchange will be advanced by two weeks.

During the 2007 data exchange, intersessional discussions were held among the data exchange group on three topics. These were:

- Provision of catch and effort data in both raised and unraised forms.
- Improving the provision of data concerning non-retained catches.
- Confirmation or revision of the method for calculation of the CPUE input data for New Zealand by the Secretariat.

There was no consensus during intersessional discussion on the first issue, and the data exchange group at the ESC agreed not to pursue this further at the present time.

Intersession discussion of the second issue revealed that it is impractical for all Members to meet the full data provision requirements for the non-retained catch data in the foreseeable future due to a combination of not collecting these data from fishers, insufficient observer coverage for raising data, or SBT discards being too rare for sensible raising. However, it was agreed at the ESC that all Members should be encouraged to continue to improve their collection and provision of these data.

In relation to the third issue, it was agreed during the intersessional discussion that the calculations to be used by the Secretariat for the subsequent release of the CCSBT data CD should be conducted using the same data selection and raising method that the Secretariat used when providing these data for the 2006 data exchange. Further work was also to be conducted in relation to raising the New Zealand charter fleet data. In this respect, New Zealand has progressed examination of its historical data and has adjusted the allocation of catch to its charter and domestic fleets during 1995. It was agreed at the ESC that no further action was required on this issue.

Annex 1

Data Exchange Requirements for 2008

The following table shows the data that are to be provided during 2008 and the dates and responsibilities for the data provision.

Catch effort and size data should be provided in the identical format as that were provided in 2007. If the format of the data provided by a member is changed, then the new format and some test data in that format must be provided to the Secretariat by 31 January 2008 to allow development of the necessary data loading routines.

Data listed in the following table should be provided for the complete 2007 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 2006 data or very minor corrections to older data, then the changed data will not be used until discussed at the next SAG/SC meeting (unless there was specific agreement to the contrary). Changes to past data (apart from a routine update of 2006 data) must be accompanied by a detailed description of the changes.

Type of Data to provide[1]	Data Provider(s)	Due Date	Description of data to provide
Trolling survey index	Japan	1 Nov 07	Historical time series of the different trolling indices up to and including the 2006/07 season (ending Jan 2007)and including any estimates of uncertainty (e.g. CV). A description of each of the different indices should also be provided.
Commercial spotting index	Australia	1 Nov 07	Historical time series of the commercial spotting index up to and including the 2006/07 season and including any estimates of uncertainty (e.g. CV).
Raised Length Data	New Zealand	16 Nov 07	Revised raised length data for 1995 to incorporate the reallocation of 23.681t from the New Zealand charter fleet to the New Zealand domestic fleet[2].
CCSBT Data CD	Secretariat	31 Jan 08	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 2007 data exchange and any additional data received since that time, including: • Tag/recapture data (*The Secretariat will provided additional updates of the tag-recapture data during 2008 on request from individual members*); • Reallocation of 23.681t in 1995 from NZ charter fleet to domestic fleet and update of associated raised data sets (raised/official catch, catch at size/age, CPUE Inputs, MP/OM Data)[2]; • Updated Indonesian catch estimates from IOTC[3], and update associated raised catch at age and MP/OM data; and • Incorporate Japan's revised fishing effort data for areas 14/15 into Japan's catch and effort data[4]. Update the CPUE inputs file and MP/OM data accordingly (the latter is due to removal of 3 cells that previously had 31 SBT).

[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.
[2] See Data Exchange Update e-mail dated 16 May 2007.
[3] See Data Exchange Update e-mail dated 13 June 2007.
[4] See Data Exchange Update e-mail dated 14 June 2007.

Type of Data to provide[1]	Data Provider(s)	Due Date	Description of data to provide
Total catch by Fleet	all members and cooperating non-members	30 Apr 08	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. Members and cooperating non-members are also required to describe the methods (e.g. the use and value of conversion factors) by which any processed weights are converted to whole weights for estimating the total catch of each fleet. This information will be presented to the 2008 ESC meeting as part of the Secretariat's report on the global catch table.
Recreational catch	all members and cooperating non-members	30 April 08	Raised total catch (weight and number) of any recreationally caught SBT. A complete historic time series of recreation catch estimates should be provided. Where there is uncertainty in the recreational catch estimates, a description or estimate of the uncertainty should be provided. The recreational catch estimates will be included in the global catch table produced by the Secretariat for the 2008 ESC meeting.
SBT import statistics	Japan	30 Apr 08	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 08	The mortality allowance (kilograms) that was used in the 2007 calendar year. Data is to be separated by RMA and SRP mortality allowance. If possible, data should also be separated by month and location.
Catch and Effort	all members (& Secretariat)	23 Apr 08 (New Zealand)[5] 30 Apr 08 (other members, South Africa & Secretariat)	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. *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)	Taiwan, Korea	30 Apr 08	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. *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. However, as at SC12, only Japan had provided this information.*

[5] 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
Non-retained catches	All members	30 Apr 08	The following data concerning non retained catches will be provided by year, month, and 5*5 degree for each fishery: • Number of SBT reported (or observed) as being non-retained; • Raised number of non-retained SBT taking into consideration vessels and periods in which there was no reporting of non-retained SBT; • Estimated size frequency of non-retained SBT after raising; • Details of the fate and/or life status of non-retained fish.
Research and 'other' mortalities	All members	30 Apr 08	Research mortalities prior to 2001 and any other forms of mortalities up to 2006 that have not been provided as part of the data exchange. Data should be provided at 5*5 by month resolution if available, but otherwise at the best available resolution. *This due date was set at SC11. Therefore as at 30 April 2008, Members will have had nearly 20 months to comply with this requirement. From this date, these "other" mortalities will be counted as part of the total catches in future global catch tables produced by the Secretariat.*
RTMP catch and effort data	Japan	30 Apr 08	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 08	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.*
New Zealand and Australian joint venture shot by shot data[6]	New Zealand Australia	30 Nov 07	Shot by shot data for New Zealand and Australian joint venture vessels in statistical areas 5 and 6. These data should specify which shots had an observer on board. These data are only being provided to Japan and are to assist in the analysis recommended in paragraph 33, bullet 2 of the SAG8 report
Raised catch data for AU, NZ and KR catches	Australia, Secretariat	30 Apr 08	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).

[6] Subject to obtaining authorisation to release such data to Japan.

Type of Data to provide[1]	Data Provider(s)	Due Date	Description of data to provide
Observer length frequency data	New Zealand	30 Apr 08	Raw observer length frequency data as provided in previous years.
Raised Length Data	Australia, Taiwan, Japan, New Zealand	30 Apr 08 (Australia, Taiwan, Japan) 7 May 08 (New Zealand)[7]	Raised length composition data should be provided[8] 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.
RTMP Length data	Japan	30 Apr 08	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 08	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	30 Apr 08	Estimates of both the age and size composition (in percent) is to be generated for the spawning season July 2006 to June 2007. Length frequency for the 2007 calendar year and age frequency for the 2006 calendar year is also to be provided.
Direct ageing data	All members	30 Apr 08	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 2005 calendar year (see paragraph 95 of the 2003 ESC report). Members will provide more recent data if these are available. Australia will provide data for the 2006/07 season and Taiwan will provide data for 2006. The format for each otolith is: Flag, Year, Month, Gear Code, Lat, Long, Location Resolution Code[9], Stat Area, Length, Otolith ID, Age estimate, Age Readability Code[10], Sex Code, Comments.
Trolling survey index	Japan	30 Apr 08	Estimates of the different trolling indices for the 2007/08 season (ending Jan 2008), including any estimates of uncertainty (e.g. CV).
Tag return summary data	Secretariat	30 Apr 08	Updated summary of the number tagged and recaptured per month and season.
Catch at age data	Australia, Taiwan, Japan, Secretariat	14 May 08	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	IOTC/ Secretariat	15 May 08	The Secretariat is to liaise with the IOTC to obtain the required data for 2007.

[7] 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.

[8] 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.

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

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

Type of Data to provide[1]	Data Provider(s)	Due Date	Description of data to provide
Global SBT catch by flag and by gear	Secretariat	22 May 08	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 08[11]	These data will be provided for July 2006 to June 2007 in the same format as previously provided.
Raised catch-at-age for Indonesia spawning ground fisheries. **For OM**	Secretariat	24 May 08	These data will be provided for July 2006 to June 2007 in the same format as on the CCSBT Data CD. *In the past, Australia provided these data. However, since the Secretariat is maintaining the Indonesian catch estimates, it seemed sensible for the Secretariat to provide the raised catch at age based on the Indonesian age composition percentages provided by Australia.*
Total catch per fishery each year from 1952 to 2007. **For MP/OM**	Secretariat	31 May 08	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 08	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).
Catch at Age **for MP**	Secretariat	31 May 08	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. *These data are unlikely to be required in 2008. However, in accordance with past practises, these data should be produced to ensure that they are readily available in case they are required in the future.*
Global catch at age	Secretariat	31 May 08	Calculate the total catch-at-age in 2007 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 08	Catch (number of SBT and number of SBT in each age class from 0-20+ using proportional aging) and effort (sets and hooks) data[12] by year, month, and 5*5 lat/long for use in CPUE analysis.

[11] 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.

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

Type of Data to provide[1]	Data Provider(s)	Due Date	Description of data to provide
Tag releases / recoveries and reporting rates. **For OM**	Australia	31 May 08	The RMP tag/recapture data for the period 1991-1997 will be updated for any changed/new data in the database.
CPUE series. **For OM**	Australia / Japan	15 Jun 08 (earlier if possible)[13]	5 CPUE series are to be provided for ages 4+, as specified below: • Nominal (Australia) • Laslett Core Area (Australia) • B-Ratio proxy (W0.5) (Japan) • Geostat proxy (W0.8) (Japan) • ST Windows (Japan) • The number of 1*1 degree fished squares in each 5*5 degree square. These data will be accessed only by the Secretariat[14]. (Japan) The operating model uses the median of these series.
Aerial survey index	Australia	31 Jul 08	Estimate of the aerial survey index from the 2007/08 fishing season, including any estimates of uncertainty (e.g. CV).
Commercial spotting index	Australia	31 Jul 08	Estimate of the commercial spotting index from the 2007/08 season, including any estimates of uncertainty (e.g. CV).

[13] 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.

[14] 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.