Commission for the Conservation of
Southern Bluefin Tuna

みなみまぐろ保存委員会

Report of the Eleventh Meeting of the Scientific Committee

12-15 September 2006
Tokyo, Japan

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Agenda Item 1. Opening of meeting

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

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

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

Agenda Item 3. Other business

4. There was no other business.

Agenda Item 4. Adoption of report of meeting

5. The report of the Scientific Committee was adopted.

Agenda Item 5. Closure of meeting

6. The meeting was closed at 7:10pm, on 15 September 2006.

List of Appendices

Appendix 1

List of Participants
Eleventh Meeting of the Scientific Committee
12 - 15 September 2006
Tokyo, Japan

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Southern Bluefin Tuna

みなみまぐろ保存委員会

Appendix 2

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

12 - 15 September 2006
Tokyo, Japan

Report of the Extended Scientific Committee for

the Eleventh Meeting of the Scientific Committee

12-15 September 2006

Tokyo, Japan

Agenda Item 1. Opening

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

1.1 Introduction of participants

2. Participants who were not present during the Stock Assessment Group (SAG) meeting were introduced at the opening of the ESC meeting. 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 agenda items 5 and 6 would be rapporteured by Members and that the remainder would be rapporteured by the Chair and the Secretariat.

Agenda Item 3. Adoption of agenda and document list

5. The draft agenda was adopted and is shown in **Attachment 2**.
6. The agreed document list is shown in **Attachment 3**. Specific papers relevant to this meeting were identified.

Agenda Item 4. Review of SBT fisheries

4.1 Presentation of national reports

7. Australia presented CCSBT-ESC/0609/SBT Fisheries-Australia, which summarises catches and fishing activities in the Australian SBT fishery up to and including the 2004-05 quota year and some preliminary results for the 2005-06 season. A total of 23 commercial fishing vessels landed SBT in Australian waters in 2004–05. A total of 99.3% of the catch was taken by purse seine with the remainder taken by longline.

Seven purse seiners fished during the 2004-05 quota year, but live bait, pontoon-towing and feeding vessels were also involved. Purse seine fishing commenced in early December 2004 and finished in mid April 2005. The 2004-05 quota year catch was 5244t compared with the previous quota year catch of 5120 t. In the 2005-06 quota year, observers monitored 9.5% of purse seine sets and 10.2% of the estimated SBT catch. In 2005, observers also monitored 37.5% of longline sets in the Eastern Tuna and Billfish Fishery during the months and in the areas of the SBT migration through that fishery. Observers monitored 9% of longline sets in the entire Southern and Western Tuna and Billfish Fishery.

8. Taiwan presented CCSBT-ESC/0609/SBT Fisheries-Taiwan. The total annual catch of SBT of Taiwan in 2005 was preliminarily estimated as 903t. The nominal CPUE appeared to be varied from 0.85 to 1.1 during 2002-04. The CPUE of 2005 is preliminarily estimated as 1.06. During 2002-05, the size predominately ranged from 100 cm to 130 cm. In 2005, there was one mode observed between 114 to 120 cm. In 2005, there were 65 active SBT vessels. Seasonally, SBT was caught in the southern and central Indian Ocean from June to September, and in the southern and western Indian Ocean extending to the eastern boundary of the Atlantic Ocean from October to February of the following year. In 2005, four observers were deployed on 4 vessels. The coverage rate by vessel was about 6.15%.

9. Japan presented CCSBT-ESC/0609/SBT Fisheries-Japan. Longline is the only method that Japanese fleets used to catch southern bluefin tuna. The document summarizes catch, effort, nominal CPUE, size composition, and fleet size and distribution of the Japanese commercial fisheries in 2005, as well as for historical period. Catch and effort in area 7 has decreased since 2003. The mean size of the weak 2000 and 2001 cohorts has increased to around 140 cm as these cohorts have grown (Figure 15, Attachment 7, SAG7 report). On the other hand, the proportion of small fish around 90-130 cm has increased compared to proportions prior to 2004. Nominal CPUE increased until 2002 and then decreased. CPUE values in 2005, compared to 2000-2004, were lower in area 4, 7 and 9 but higher in area 8.

10. CCSBT-ESC/0609/34 was presented for Japanese scientific activities. In 2005, Fisheries Agency of Japan employed 15 scientific observers and sent them to 16 longline vessels in the SBT longline fishery (3 in areas 4 and 7, 5 in area 8, and 8 in area 9). Observers for the Japanese SBT fleet covered 9.9% of the number of vessels, 4.9% of the number of hooks used (3.0% in 2002, 5.5% in 2003 and 5.0% in 2004), and 4.0% in the number of SBT caught. Taking account of the duration of observations during hauling, the number of hooks observed was estimated as 3.9% of total hauling duration by all SBT vessels. The length frequency distributions of SBT corresponded well between vessels with and without observers in area 8 and 9, but not in areas 4 and7. Observers retrieved SBT tags from 22 individuals. The major problem on the Japanese observer program is that deployment of observers depends on supply vessels. Therefore, the number of days that observers are involved in research activities was reduced to 74% of total days of employment, and there is a possibility that observers have to transfer in dangerous rough sea conditions.

11. In response to a question from Australia, Japan advised that it deployed observers in proportion to the number of vessels per area and that within each area, it then randomly selects vessel to be observed.

12. New Zealand presented the report on its fisheries (CCSBT-ESC/0609 SBT Fisheries-New Zealand), which is summarised below:

    - New Zealand's fishing year starts 1 October and finishes 30 September of the following year. SBT is seasonally present from March/April to August/September. Fishing takes place in two areas, off the east coast of the North Island north of 42^0S and off the west coast of the South Island south of 42^0S.
    - There has been a decline in both catch and participation in the New Zealand fishery in recent years. Fishing for SBT takes place using chartered and domestically owned vessels. The number of vessels catching SBT peaked in 2002 and has since declined to 101 vessels in 2004 and only 58 vessels in 2005. The most recent fishing season (2004-05) resulted in the lowest New Zealand catch in ten years. This is attributed to two main factors: the absence of new recruitment into the NZ longline fishery leading to decreased vulnerable biomass and the decline in longline effort from the domestic and charter fleets.
    - There has been a very clear reduction in the range of sizes of SBT taken in the New Zealand fishery since 2001 and new data suggest that this has continued into 2006. The lack of small fish reflected in the length data corresponds to a series of weak (or absent) cohorts in the fishery, based on proportional ageing data.
    - Charter CPUE averaged around 3 SBT per 1000 hooks over 1997-2002. Associated with a lack of new recruitment, CPUE declined dramatically in 2003 and has stayed at these low levels in 2004 and 2005. A small increase in CPUE occurred in 2005, this is attributed to the increased effort on the east coast North Island fishing grounds. The domestic CPUE has followed a similar pattern over time to the charter CPUE, although it is traditionally lower.
    - Observer coverage for 2004 and 2005 is measured in two ways, proportion of catch (in numbers of fish) observed and proportion of hooks observed. In terms of catches, over 98% of the catch was observed (and measured) in the charter fleet in 2004 and 2005. For the domestic fleet, 15% of the catch was observed in 2004, but only 9% in 2005. In terms of effort, over 90% of hooks were observed on the charter vessels. For the domestic fleet 15% of the effort was observed in 2004 and 12% in 2005.

13. Korea presented CCSBT-ESC/0609/SBT Fisheries-Korea. The Southern bluefin tuna (SBT) catch of the Korean longline fleet reached a maximum in 1998, followed by continuous decrease until 2005. By the voluntary regulation of fleet size among fishing industries, the annual fleet size for SBT fishery never exceeded 16 registered vessels and the number of longline vessels active was 6 in 2004 and 7 in 2005. In 2005, 7 out of 16 registered longliners fished for SBT and caught 33t (reported as processed weight), a decrease of about 71% from 2004. This was mainly due to a shift of fishing ground and most of Korean longliners operated in the EEZ area of the Republic of South Africa for targeting bigeye and yellowfin tuna. In 2004-05, two observers were deployed on Korean SBT longline fishing vessel operating in the

EEZ of South Africa and adjacent waters of Mozambique, respectively and the results were presented at the ERSWG6 meeting in this year. MOMAF and NFRDI published guidebooks and posters to support fisherman through recent information and an identification key for bycatch species in tuna fisheries in this year.

4.2 Secretariat review of catches

14. The Data Manager presented CCSBT_ESC/0609/06, which contained an update of the estimated global SBT catches. There were 3 main differences in the global catches presented in CCSBT_ESC/0609/06 from that in the report of the Tenth meeting of the Scientific Committee, these being:

    - Inclusion of a range of unreported catch estimates;
    - Separation of South Africa's catch from the Miscellaneous category; and
    - Inclusion of mortalities associated with Japan's non-retained catch in 1995 and 1996.

15. Two new statistical areas (14 and 15) were described in CCSBT_ESC/0609/06 and the meeting agreed to adopt these statistical areas as defined in the paper. The meeting further agreed that there should be full reporting of effort within these new statistical areas (regardless of whether SBT was caught) and that this will therefore require re-provision of historical catch and effort data for these areas.

Agenda Item 5. SBT assessment, stock status and management

5.1 Review of fisheries indicators and scenario modelling results

Indicators

16. The reviews of Japanese SBT market anomalies and Australian SBT farming anomalies raise serious doubts on the reliability of the catch and Japanese LL CPUE indicators, thus interpretation of many of the indicators is more difficult than in previous years.

Interpretation of Indicators of Recruitment

17. The indicators continue to support the 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 2000 and 2001 recruitments, and the aerial spotting survey and commercial spotting index are both 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 and 2001 year classes, but recent data indicates an increase in juveniles after the 2002 year class. However, this indicator could be biased by catch anomalies.

Spawning stock biomass

18. Reported catch rates of fish aged 12 and older in the Japanese LL continue to indicate a drop in spawning stock biomass in 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 than last year. The increase in tonnage of Indonesian catch as well as the increase in proportion of SBT in the Indonesian catch was associated with a 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.

Exploitable biomass for the longline fishery

19. 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. Reported CPUE of fish aged 4-7 has increased since the mid 1980s but has been declining in recent years.

20. The ESC noted that there were three elements to future work on indicators. The first relates to verifying the extent to which the indicators and data sets used in the historical assessment and management procedure have been affected by the catch anomalies. The second relates to the indicators which we can have confidence have not been affected by the past catch anomalies and can be used in the context of a short-term “interim management procedure”. Finally, there is a need to identify alternative data sources and indicators that may be developed and used in an MP in the longer term which will reduce reliance on any particular fishery dependent indicator.

21. The ESC reviewed the current indicators and assessed the extent to which they were potentially affected by the past catch anomalies, the information that would be required to determine the extent to which the indicator was affected and the extent to which future funding was secure (Table 1).

22. On the basis of this review, the ESC noted the increased reliance on a smaller suite of indicators (aerial survey, conventional tagging, NZ charter fleet, Indonesian catch monitoring) due to the impact of the catch anomalies on the level of confidence in fisheries dependent indicators, in particular the Japanese LL CPUE. It was further noted that the continuity of a number of these indicators was not secure and that it would be important to prioritise the remaining indicators in terms of their relative utility in the short-term and recommend that available resources be allocated accordingly.

23. In light of this, the ESC recommended that to ensure verified and reliable indicators are available, the highest priority should be given to the following set: catch and CPUE verification, aerial surveys, Indonesian monitoring, and tagging together with verification of reporting rates.[1]

Table 1: Potential influence of catch anomalies (affected, potentially affected, or unaffected) and funding limitations for the SBT fisheries indicators.

Indicator	Influence of catch anomalies	Information to determine extent of effect	Security of future provision of data
CPUE trends in Japanese LL fishery	Affected	Independent verification using fine-scale data. Further analysis of observer data*.	Ongoing, but expect coverage and continuity to change
CPUE by year/age class in Japanese LL fishery	CPUE affected, proportions by age potentially affected	Independent verification of fine-scale data. Further analysis of observer data*.	Ongoing, but expect coverage and continuity to change
Length frequency in Japanese LL Fishery	Potentially Affected	Independent verification of fine-scale data. Further analysis of observer data*.	Ongoing, but expect coverage and continuity to change
CPUE and length frequency for New Zealand LL charter fishery	Unaffected		Ongoing
CPUE and length frequency for New Zealand LL domestic fishery	Unaffected		Ongoing
Indonesian catch, age composition, and CPUE	Unaffected		No funding beyond May 2007+
Estimates of past total SBT catch	Affected	Resolve uncertainties in farm and market anomaly reviews	Will require increased resources for a comprehensive catch verification system

[1] Unless longline reporting rates can be improved, then the value of tagging programs are substantially diminished (note tag-seeding projects provide estimates of reporting rates within farm operations and will be continued).

Acoustic index	Unaffected		Funding ceased in 2006
Troll survey	Unaffected		At feasibility stage
Fishery independent aerial survey	Unaffected		Funding secure for 06/07 season only
Commercial spotting index	Unaffected		Ongoing
Conventional tagging	Potentially affected	Reporting rates from LL fisheries	Funding ceased 2006, future funding awaits Commission decision
Growth Rates	Unaffected		Partially dependent on tagging program

* Availability of detailed data may be limited for reasons of confidentiality

+ Indonesian fishery indicators may be affected by shifts in catch locations and targeting

Scenario modelling

Introduction

24. The SAG did not conduct an assessment this year. The results presented under that agenda item in the SAG7 report, and summarised below, are results from the operating model (which was developed and used for the testing of the management procedures) reconditioned with new data up to 2005 and under different assumptions about past catches and CPUE. The need for such 'scenario modelling' arose from the Commission's request to the SAG/ESC for advice on the impact of a minimum set of alternative scenarios for recent longline catch, surface fishery catch and nominal CPUE (Attachment 7 of the Special Report of the Commission, July 2006).

25. The ESC took note of the distinction between an assessment and scenario modelling. The term 'scenario modelling' is used here because the operating model was not evaluated with respect to different structural assumptions or input parameters in light of the alternative catch and CPUE inputs. The term is also appropriate because the inputs, historic catches and CPUE, currently reflect possible scenarios rather than actual data.

26. Advice from the Commission on market and farm anomalies (Attachment 7, Report of the Special Meeting of the Commission) represented potentially over 100 scenarios (once combinations and alternative technical interpretations[2] are considered) and calculations for all these scenarios was not possible within the time available. However, a large set of scenarios were explored, some of which were presented in CCSBT-ESC/0609/25 and CCSBT-ESC/0609/42, and others in section 7.1 of the SAG7 report.

27. In addition to the time constraints associated with running large numbers of scenarios, the full cross (all possible combinations) of all scenarios could have produced a large, indigestible amount of output. The SAG used two approaches to reduce the volume of scenarios while retaining the range of uncertainty implied by the Commission's request (see paragraphs 47 to 49 of the SAG7 Report). The first of these processes resulted in a selection of three of the Commission scenarios chosen to span the range of behaviour.

[2] Technical interpretations refer to the assumptions that need to be made to translate/convert the Market and Farm review outcomes into inputs to the operating model.

28. The results for these three scenarios, with technical interpretations as close as possible to the Commission's specifications, are presented in paragraphs 73 to 76 of the SAG7 report.

29. During discussion of the results in CCSBT-ESC/0609/25 and CCSBT-ESC/0609/42, the SAG identified issues related to the interpretation of the scenarios for input to the operating model. Five issues were considered for further scenario runs to be computed at the meeting:
    (i) lagging of the official catches when calculating the Market Review anomalies to take account of the period between catch and sale
    (ii) the assumptions required to calculate the unreported catch in 2005
    (iii) including or excluding the 2004 and 2005 CPUE inputs
    (iv) adjusting the age structure of the surface fishery catch (rather than the numbers caught) when calculating the Australian Farming Operation anomalies.

    The fifth issue does not specify a scenario, but relates to the way in which projection results are integrated over the grid of parameters and factors which reflect the main uncertainties in the operating model, using either objective function weights or prior weights for juvenile natural mortality level. The details of these issues and the reasons for their pertinence are discussed in paragraphs 51-57 of the SAG7 report.

30. Some participants indicated that the results using CPUE data for 2004 and 2005 were more uncertain as they involved assumptions about the market anomaly in 2006 and 2007 (see paragraph 53, SAG7 report).

31. The SAG considered that the changes outlined under points (i) and (iv) to the technical interpretation of the scenarios derived from the market and farm reviews are an improvement over the original set which was run prior to the meeting, a view with which the Committee concurred. The full list of additional scenarios is specified in Table 1 of Attachment 6 to the SAG7 report.

32. The SAG looked at comparisons between model results (in terms of aggregated age 2-4 biomass and estimates of juvenile fishing mortality) for the scenarios and two indicators (the aerial survey and estimates of fishing mortality from the recent CCSBT tagging data), as well as size frequency data for 2006, which are not yet included in the operating model. The SAG found incompatibilities between model results from scenarios and both the indicators and the recent size frequency data (see paragraphs 62-69 of the SAG7 Report)

33. The ESC endorsed the SAG consensus that there is insufficient information to come to any firm conclusions about the implications of the incompatibilities between model results from scenarios and the indicators (tagging data and aerial survey). The SAG noted that there had also been insufficient time to conduct some of the analyses that may shed further light on this.

34. The SAG evaluated the results from a large number of scenarios (see Tables 2-5, SAG7 report Attachment 6). After careful consideration, the SAG concluded that five of these scenarios provided an appropriate set for summarizing the range of

uncertainties and the effects of future catches. These five scenarios considered options across the three main axes of uncertainty:

- three levels for the percent of market anomalies assumed to affect CPUE: scenarios b (25%), c (50%), d (75%);
- exclusion of the 2004 and 2005 CPUE data points (scenario g (50% for CPUE); and
- the prior weights on juvenile mortality (scenario c_ (50% for CPUE).

The results for these 5 scenarios are presented in paragraphs 80 to 96 of the SAG7 Report.

35. Although there are difficulties in providing unequivocal advice about the relative likelihood of the various scenarios, nevertheless there does appear to be a reasonably robust set of outcomes about the status of the stock from the scenario modelling.

36. Tables 7-8 in the SAG7 report and Figures 8, 9 and 11-14 (Attachment 6 of the SAG7 report) summarise the results for the key scenarios.

37. Stock projections to 2022 were conducted to examine short and longer-term consequences of a range of constant catch policies. It should be noted that projections beyond 2014 are a function of model assumptions made about future recruitment and the stock recruitment relationship. Given the low status of the stock, there is a risk that further decreases in spawning biomass may compromise future recruitment.

38. The SAG concluded that, in general terms, the results for the five selected scenarios are rather similar:

- all scenarios show a substantial depletion, B2006/B0 (median levels between 10% and 13%);
- all scenarios show median spawning biomass levels in 2006 (110-170 thousand tonnes) that are well above those estimated in 2005 (median of 50 thousand tonnes) as a result of the incorporation of catch anomalies;
- a catch level of 14,925t does not lead to longer term rebuilding or to meeting an objective of a 50% probability of B2014>B2004 for any of the scenarios ;
- the catch levels that will result in a short term target of a 50% probability of B2014>B2004, are in a relatively narrow range (see Table 8 of the SAG7 Report);
- with catch levels moderately lower than 14,925t, all scenarios lead to a projected longer term increase in estimates of median spawning biomass, varying only in the timing and extent;
- the median CPUE in all scenarios is projected to increase in the medium term; and
- continuation of catches in excess of 14,925t are likely to result in continuing decline of spawning biomass.

39. The ESC noted the additional comments and clarifications on the previous paragraph:

- Under the selected scenarios, the narrow range of catch levels that will result in 50% probability of B2014>B2004 is from 10,000 to 12,000t.

- Regarding the projected long-term increases in median spawning biomass these should be considered more uncertain due to the fact that they depend on assumptions about stock relationships and future recruitment (see paragraph 37).
- Catches maintained at current TAC levels will likely result in continuing declines. Furthermore, under a catch of 9,925t, projections also indicate a 40% chance of further spawning stock reductions by 2014.

5.2 Status of the SBT stock

40. Because of the uncertainty in historical catch and CPUE a series of alternative scenarios that encompass a range of possible circumstances was evaluated. 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 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.
41. 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.
42. The primary implication of the higher catch levels in the scenarios compared to the assumed catch history used in the 2005 SAG is that estimated total spawning stock size is more than double that assessed at the 2005 SAG.
43. A stock status report for submission to FAO and other RFMO's was produced and is at **Attachment 4**.

5.3 Management Procedure implications

44. The ESC noted paragraph 163 of the SAG report which stated that: "Paper CCSBT-ESC/0609/26 described a number of monitoring and data validation measures that could be used to reduce the data uncertainties associated with the market and farm reviews. Proposed measures for reducing longline catch and CPUE uncertainty included exchanging fine scale logbook and observer data, market and fleet research, independent at sea data verification, centralised VMS, international port monitoring and a catch documentation scheme. Uncertainty in catch composition in the farms could be reduced by the addition of stereo video cameras during tow cage transfers and feeding during towing to reduce weight loss."

45. The ESC further noted that (SAG7, paragraph 169) "The SAG recognized that the market review had a major impact on perceptions of what an MP could deliver in the short-medium term, as there is now, and will likely remain, considerable uncertainty about catch and CPUE time series over the period 1985 to 2005".

46. In light of the extent of the impact of the farming and market anomalies on the estimates of past total catch and CPUE, the ESC agreed that it was not possible to proceed with the current MP and that urgent consideration of a short-term "interim MP", incorporating indicators unaffected by the catch anomalies was required.

47. The ESC noted that the work completed in the recent MP development and evaluation process would mean that the SAG and ESC would be well placed to proceed with development of new interim and longer-term MPs, as much of the necessary modelling framework was in place. The primary limiting factor on progress would be the time required to provide revised, verified catch and effort data and, if necessary, develop sufficient time series of any new or revised indicators for use in a longer-term MP and also possibly in an interim MP.

48. The ESC noted that it was essential to obtain verified catch data in the future for all components of the fishery and reliable future indices of abundance. Ideally this would also apply to past CPUE, but it was noted that in the short-term this would need to be prioritised based on the extent to which past series may have been compromised by the market anomaly.

49. In this regard, the meeting agreed that the priority should be on the provision of verified, high quality data that will be most informative in the context of applying an interim and a longer-term MP into the future and resolving, to the extent possible, the current status of the SBT stock. In addition, it was noted that, in the context of an MP the concern of most immediate importance was improved accuracy and reducing the degree of bias. The ESC noted that the lower the precision associated with the input data for an MP, the lower the catches would need to be to achieve the same probability of rebuilding.

50. SAG7 (paragraph 169) noted that: "It was agreed that data collection and MP development in the next 5-10 years should be prioritized to focus on rebuilding the stock to a point where the biological and economic risk associated with the current high depletion and high fishing mortality is greatly reduced. Objectives of identifying and moving toward optimal reference point targets might be established over the longer term, once the stock is rebuilt to safer levels and reliable data collection and monitoring procedures are established".

51. SAG7 (paragraph 170) identified the following data for potential use in an MP, noting the need to independently verify the data:

    - Total Catch
      - including discards and other fishing-related mortality
    - Commercial CPUE
      - at sufficient spatial-temporal resolution and coverage
      - including species composition to quantify targeting

- CPUE based on observer data if coverage was sufficiently high
- Catch size sampling
  - linked to CPUE data for size/age-based indices
- Industry-based, scientifically-designed CPUE sampling
- Aerial survey in the Great Australian Bight
- Tagging studies
  - Conventional tags for estimating fishing mortality
  - Potentially, based on genetic markers

52. SAG7 (paragraph 171) noted that "It was recognized that all these data are desirable for stock assessment, but the SAG would work toward identifying a more parsimonious list of 'required and sufficient' data that would meet the specific needs for an MP. It was noted that effective MP decision rules might be based on a relatively small subset of data (but the operating model conditioning process should attempt to draw on as much information as possible to quantify the uncertainty in the system and ensure robustness)".

53. SAG7 (paragraph 172) also noted that, for the short term, it was accepted that the Japanese LL CPUE would likely continue to provide the only index of stock abundance for use in a management procedure. However, it was suggested with the medium to long term in mind that alternatives need to be sought in the near future. Because of the CPUE reliability issue associated with the market anomalies, and potential changes to the nature of the CPUE series as a result of recent changes to Japanese fishery management, there will likely be substantive inconsistencies in the CPUE series before and after 2006. These inconsistencies will be problematic for assessments and operating model conditioning. Some of the data required to reduce the uncertainty in past catch and CPUE may exist in industry archives, and the SAG considered it worthwhile to continue to try to gain access to these data (see Table 1). However, it was considered likely that some inconsistency will remain and will best be handled through scenario modelling and the development of management procedures that are robust to these uncertainties.

5.4 SBT Management recommendations

54. In 2005 the ESC recommended catch limit reductions for the southern bluefin tuna stock. The ESC recommended that the Commission accept CMP_2 as its management procedure (MP), subject to a corresponding reduction in the annual assumed global catch (14,930t) specified for 2006 (by 5,000t) or 2007 (by 7,160t). The ESC also recommended that the MP be tuned so that there is an estimated 90% probability that the 2022 biomass will be at or above the 2004 biomass.

55. In 2006 the discovery of large past catch anomalies has led to a reconsideration of this advice. Although unable to present a formal assessment at this stage, the ESC has considered a range of scenarios for past catch anomalies. Management advice from the ESC is now based on the range of modelled scenarios and associated performance measures.

56. The ability for management to achieve rebuilding the spawning stock depends on the ability to monitor trends in abundance and to reduce catch in the future if the stock continues to decline. In the absence of reliable data and a rapid feedback system the TAC would need to be much lower to ensure a reasonable probability of rebuilding under future constant catch levels.

57. Table 2 shows the results averaged (with their ranges) across all scenarios considered for short term projections up to 2014 for different levels of constant catch. The implications for catches between the levels shown can be ascertained by interpolation. Although these scenarios represent different hypotheses about past catches and CPUE, amongst which the ESC was unable to choose, they were reasonably consistent with each other in terms of current stock status, recruitment trends, and projected stock biomass under specific catch levels (Table 7 of the SAG7 report). These scenarios represent the basis for best available scientific advice.

58. The scenarios show that in order to reduce the short term risk (to 2014) of further declines in stock size a meaningful reduction in catch below 14,925t is required, in addition to assurance that all unreported catches are eliminated. Table 8 (SAG7 Report) shows performance statistics, including the probability of further declines for the stock across the selected scenarios for the effect of different future constant catches. Clearly, the larger the level of catch reductions the lower the risk of further spawning stock declines. Furthermore constant catches at the range of levels examined (Table 8, SAG7) over an extended period have a high risk of further spawning stock declines associated with them. Given the low stock status and recent low recruitments, there is a risk that further stock decline could jeopardize short and longer-term recovery prospects.

59. 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.

Table 2: Average across scenarios (with ranges in parentheses) for performance statistics from the SAG7. Longer-term projections represented in the last two columns should be considered more uncertain due to the fact that they depend on assumptions about stock relationships and future recruitment. See paragraph 36 in section 5.1.

	Short/medium-term performance statistics			Longer-term performance statistics	
Future catch	Probability of B2014 > B2004	B2014/B2004 median	B2014/B2004 10th percentile	B2022/B2004 median	B2022/B2004 10th percentile
14,925	0.25 (0.19, 0.32)	0.89 (0.85, 0.94)	0.72 (0.66, 0.75)	0.97 (0.88, 1.06)	0.46 (0.33, 0.54)
12,425	0.41 (0.34, 0.48)	0.96 (0.93, 0.99)	0.78 (0.74, 0.81)	1.20 (1.13, 1.27)	0.66 (0.58, 0.72)
9,925	0.57 (0.50, 0.64)	1.03 (1.00, 1. 05)	0.85 (0.82, 0.87)	1.44 (1.36, 1.48)	0.86 (0.82, 0.91)
7,425	0.69 (0.64, 0.73)	1.10 (1.07, 1.11)	0.89 (0.88, 0.91)	1.69 (1.60, 1.79)	1.01 (0.98, 1.04)
4,925	0.81 (0.78, 0.83)	1.17 (1.14, 1.20)	0.94 (0.93, 0.95)	1.94 (1.83, 2.10)	1.16 (1.13, 1.18)

Agenda Item 6. Update on SRP Activities and Implications of Overcatch

60. A full review of the SRP was originally scheduled for the 2006 ESC. However, examining the implications of the farm and market reviews took higher priority this year, and only limited discussion was possible as detailed under the individual SRP components below.

6.1 Characterisation of SBT catch

61. Given the outcomes of the market and farm reviews, it is clear that the catch characterization component of the SRP has not been successful.

62. The Chair of the CCSBT Compliance Committee forwarded a request to the ESC for information on the data requirements for the scientific objectives of the Commission. The CPUE steering committee, chaired by Prof. John Pope, composed a response to the request, which provides detail on the requirements to attain reliable data related to:

- Total catch (numbers and weight);
- CPUE; and
- Size composition.

63. These data are required for all fisheries, and must be verifiable. It was noted that this response should be provided to the Commission, which could forward it to the Compliance Committee.

64. The ESC emphasized that the data verification was a serious issue for all fisheries, and several options for addressing the problem were discussed (summarized in CCSBT-ESC/0609/26), including:

- Observer programs with representative temporal and spatial coverage;
- VMS;
- Video cameras and drum (longline hauling) monitors; and
- Stereo video for farm tow cage transfers.

65. The ESC emphasized that verification data should be provided to the scientific process at a sufficient level of detail to allow the accuracy and precision of verified catch and effort data to be independently assessed. This would not include compliance data.

66. The ESC recognized that all fleets have commercial confidentiality concerns. The requests of the ESC (and Compliance Committee) need to be balanced against the benefits achieved from the monitoring. It was noted that compliance needs and scientific data requirements were not identical. For example, for scientific purposes, it is essential to access catch, effort and size data for the stock assessment, but specific vessel and skipper names are not required.

67. Japan indicated that a number of measures were already being implemented for its fleet. SBT can only be landed at 8 designated ports now, and each of the landings is inspected by fisheries inspectors. Each SBT must be fixed with a sequentially-numbered tag at the time of capture that must be retained until landing. The RTMP and observer programs will also be maintained.

68. The ESC indicated that VMS provided the means to verify that effort was reported in the correct time and area.

69. Japan was questioned as to how discards would be monitored during the transition to IQ management. Japan responded that observers confirmed whether there were any discards or not. Except in 1995 and 1996, observers have not observed any discards

70. It was questioned whether the Japanese fleet would fish on the spawning grounds. Japan noted that Japanese longline vessels have not targeted SBT in the spawning grounds. In case of by-catch in other targeting fisheries, it will be reported to CCSBT.

71. The ESC noted that there still remains the problem of verification of surface fishery catch sizes. Japan stated that the direct estimation of growth rates is essential for the verification of historical catch of Australian surface fishery.

72. Methods for sampling the Australian surface fishery at the time of capture were discussed. The farm review indicated that numbers in the catch are reliable but there are still doubts about the representativeness of the 40 fish sample. It was suggested that comparisons of stereo video and 40 fish sampling results could be compared to estimate bias in 40 fish sample, which might help estimate past farm anomalies.

73. Australia stated that preliminary results had already been released in publicly available documents. Other methods of length sampling at the time of capture were not considered appropriate for this fishery because they would involve handling live fish. Australia also noted that stereo video cameras had undergone extensive field testing and demonstrated reliable performance under experimental conditions. These cameras are expected to be implemented during transfers in the near future, as soon as the systems can be demonstrated to be robust enough for routine farm application. Operational trials will be implemented in the 2006/07 fishing season.

6.2 CPUE interpretation and analysis

74. The CPUE modelling group met to consider implications for CPUE of the market and farm anomalies. Their report was adopted by the ESC and is at **Attachment 5**. In addition the CPUE modelling group considered the request from the Compliance Committee for advice on scientific data requirements. The ESC endorsed the response, which is shown below.

Response to the Compliance Committee's request

75. Accurate catch data by weight and number by area and by size are vital inputs to the process of providing scientific advice on the management of SBT. These should be bias free and must include estimates of any discarded catch as well as landed catch.

76. Catch per Unit of Effort data are also vital components in providing scientific advice. As well as trying to avoid bias in the collection of these, it is also important to collect data at a resolution which will allow any potential biases in the trends to be estimated. Such biases may result from changing spatial or temporal distributions of the stock and/or the fishery, or targeting behaviour of the fishery (note that paper CCSBT-ESC/0609/44 addresses these problems).

77. Thus, while fully noting the confidentiality issues that need to be respected with dis-aggregated data, a scientifically appropriate data set requires accurate and verified measures to be collected where possible (there is a separate decision whether the fine scale data should be exchanged), namely:

- What numbers and weight are caught (landings plus any discards) per shot.
- Numbers and weight of by-catch (particularly commercial by-catch such as other tuna species) per shot.
- A representative sample of the size distribution of fish caught.
- The fishing effort utilised per shot to catch these (to include measures of effort such as hook numbers per line, searching time).
- The date, time (e.g. start and end of set and retrieval), duration and location at which gear was deployed by shot.
- Appropriate vessel characteristics (such as length, vessel number, fishing master number[3], electronic fish finding gear).

78. Such data should be associated with a process that can verify their statistical accuracy and estimate their precision. This requires appropriate design and data collection such as observer data, VMS, effort monitoring and port sampling data sets. Appropriate data verification is a matter for the Commission. The ESC notes that paper CCSBT-ESC/0609/26 lists some options for improved monitoring and provision of data required by the ESC for the purposes of stock assessment and management procedure studies.

[3] Note: it is only necessary for potentially sensitive information, such as fishing master and vessel identifier, to be identified by a unique code. It is not necessary to know the actual identity of the vessel or fishing master for the purpose of these analyses.

79. If the Compliance Committee are discussing issues relevant to the ESC it would be preferable that there is good co-ordination (including appropriate prioritisation) between the Compliance Committee and the ESC. Extended Scientific Committee representation on the Compliance Committee would be beneficial.

80. The data collected by the Compliance Committee that is relevant should be available to the ESC, with appropriate and stringent safeguards as to confidentiality, for full scientific analysis.

2007 CPUE Workplan

81. In response to the CPUE modelling group's recommendation for a CPUE workshop in 2007, the ESC noted that value of such a workshop would depend to some extent on progress made by the Commission in resolving uncertainties regarding catch anomalies and impact on CPUE. It was emphasised that the workshop would need to specifically evaluate the impacts on CPUE indices of these anomalies.

6.3 Scientific observer program

82. The ESC referred to papers (CCSBT-ESC/0609/24, 34, and national reports) in discussions about observer programs. Table 3 summarizes the observer coverage by country for 2005.

Table 3: Summary of CCSBT observer coverage by fleet.

Member	Coverage
Australia purse seine	9.5% of sets, 10.3% of catch
Australia longline	37.5% of sets in east coast tuna fishery and 9.0% of all longline sets in the western tuna and billfish fishery
Japan	9.9 % of vessels, 4.9% of hooks, 3.9% of hauls
New Zealand charter	98% of catch, 90% of effort
New Zealand domestic	9% of catch, 12% of effort
Taiwan	6.2% of vessels observed with 444 observation days
Korea	2 observers placed

83. Participants suggested that future ESC meetings produce observer coverage summary tables in the same format as that produced by the SC10 meeting.

84. Japan noted that the RTMP program collected data on catch numbers, size composition and sex, and considered this to provide equivalent catch, effort, size and sex ratio information as observer data.

85. Australia expressed several concerns about the SRP observer programs to date:

- The market review indicates that monitoring of the total catch has been inadequate and the current observer program has not been effective in monitoring total catch;
- The Commission target of 10% coverage for all fleets has not been met;
- Spatial and temporal coverage is not very well distributed;
- Observer coverage has been insufficient to obtain tag recovery reporting rate estimates; and
- Observer data were not available for analyses as originally intended.

86. Japan noted that Australian observers of the surface fishery do not measure catch and length of fish caught, and it is important to review not only the coverage rate but also the types of information collected by observers.

87. Australia noted the difficulty in using observers to measure the surface fishery catch and expected that this will be accomplished using the stereo video monitoring system.

88. In light of these problems, the ESC felt that it would be appropriate to review the observer program at the next ESC. The costs and benefits of the program should be reviewed. While it is desirable to minimise direct costs of the observer program, it is important to realize that good observer data should lead to better management of the fishery, reduced risk of over-fishing, and higher yields for the same level of risk. New Zealand noted that the observer program had additional benefits beyond the SRP objectives (e.g. by-catch estimation for ERS), but these items were not relevant to the SRP objectives, and were not discussed further.

89. It was recognized that other monitoring methods (video surveillance, drum monitoring, tag monitoring) provide less expensive options that could augment the observer programs and partially reduce the need for observers.

90. The 2005 SC10 meeting recognised the value of exchanging observer data. However, the Secretariat noted that attempts to coordinate an observer data exchange process failed because none of the countries responded to the secretariat requests. The ESC noted that exchange of analyses of observer data, or ideally of observer data will greatly facilitate the observer review.

6.4 SBT tagging program

91. The 5 year SRP conventional tagging program finished deploying tags in 2005, and the ESC was required to make a recommendation as to whether the program should be continued this year.

92. The Executive Secretary introduced CCSBT – EC/0609/07. The 2005-06 tagging season was successful with over 20,000 fish being tagged compared with a target of 15,000 fish. The paper provided observations from the tag deployment contractors including qualitative comment on fish schooling and behaviours as well as data on tag deployment and recovery.

93. The Executive Secretary reported a new initiative on recovering tags from fish being harvested from farms and exported direct to Japan on freezer vessels. There had been some concern that for reasons associated with processing speeds on the freezer vessels that a number of tags where not being recovered. The Secretariat arranged for an agent to attend 20 days of processing on freezer vessels to recover all tags present on fish being processed and record the number of fish where there was evidence of the recent removal of tags earlier in the processing chain. The results showed that 66 fish were recovered with 94 tags and an additional 27 fish showed evidence of fresh tag removal.

94. The meeting noted the data produced by the freezer boat exercise and considered that for future years this exercise be constructed carefully to avoid any confounding of the estimation of reporting rates from tag seeding experiments.

95. The Executive Secretary advised that the Extended Commission approval for the tagging program expired at the end of the 2005-06 fishing season and provided a budget for 2006-07 for the ESC to consider if it wished to recommend that the program be continued. He recommended that for logistical reasons a two year extension was desirable.

96. The secretariat also submitted a request for 8t of RMA for 2006 to continue the tagging program. As in 2005, the full amount of RMA was not expected to be used, but it was considered desirable to have a buffer so that the program would not have to be shut down prematurely if the RMA was used.

97. CCSBT-ESC/0609/43 was presented on Japan's view and consideration on the future of the SRP tagging program. Given concerns regarding possible low recruitment in recent years, continuation of the CCSBT conventional tagging is considered important because this tagging is currently the only way to provide an indicator of fishing mortality (F) of juveniles for surface fishery.

98. The ESC noted that the tagging program (extensively discussed in CCSBT-ESC/0609/15) was the most successful component of the SRP, despite the absence of reporting rate estimates for any fleet other than the Australian surface fishery. This echoes the views expressed by SAG7 (paragraphs 149 and 150), in which conventional tagging data provided the only direct estimates of juvenile fishing mortality for the indicator analysis, and in combination with archival tag results, provided an interesting insight into variable rates of east and west migration from the Great Australian Bight.

99. It was agreed to recommend that the surface fishery tagging program continue in 2006-07 and for the ESC to consider further extension after a review of the SRP at SC12. Sufficient tags for an extension into 2007-08 should be included in the budget proposed for Commission approval.

100. Japan noted that domestic funding decisions will be made after December 2006. Australia noted that its endorsement of the tagging program was contingent on being able to estimate tag reporting rates from the longline fisheries. This is linked to the issues of observer coverage and data availability. Estimates of reporting rates would

greatly improve the value of information from the program, and allow it to meet the original SRP objectives.

101. The ESC noted that the tagging program would have been much more successful if tags could have been released from a much broader range of locations and age classes. It was noted that observers of longliners would probably provide the only possible means of deploying worthwhile numbers of tags in other areas, as well as on older SBT. In relation to the juveniles, it was noted that additional tagging could be conducted off Western Australia (Albany) if juvenile SBT are as easy to locate in 2006/07 as they were in 2005/06.

102. CCSBT-ESC/0609/14 provides an update on tag-seeding activities in 2005/06 in order to obtain estimates of reporting rates which is a continuation of the annual seeding activities that began in 2003. In 2004/05 tag seeding took place for 34 of the 36 tow cages (an increase on the previous year), and overall tags from 34.9% of the fish were recovered. Harvesting operations for 2005/06 are still under way and as such the total number of returns is unknown at this point. For all years there have been no reports of any of the tag seeded fish dying prematurely or other negative impacts on fish from the tag seeding. The tag seeding experiments have produced annual estimates of tag reporting rates for the surface fishery and these are the only direct estimates of reporting rates for any SBT fishery component for the SRP conventional tagging program.

103. The ESC recognized the value of the tag seeding experiments and encouraged continuation of the tag seeding experiments.

104. It was questioned whether tag seeding experiments could be used to quantify individual SBT growth rates of farmed fish in order to back calculate the size composition at the time of capture from the size at harvesting. This was not possible because the seeding experiments relied on voluntary participation on the farms, and growth rates are considered commercially confidential. Australia indicated that the stereo video camera results should provide a much more accurate and precise means of quantifying catch sizes because they have the potential to measure almost 100% of the SBT before they enter the farm pens. This is expected to provide substantially better length frequency information that complicated back calculation.

105. CCSBT-ESC/0609/36 was presented for Japanese archival tagging. Medium and large size SBT from a longline vessel were released in south-eastern Indian Ocean during October to December 2005. The numbers of SBT individual released by this program over five years, were 1159 with conventional tags only, 283 with archival tags and 15 with PAT. An archival tagging survey has also been conducted since August 2006 in the same manner in 2005. 11 archival tags have been recovered.

106. CCSBT-ESC/0609/43 was also presented in regard to archival and pop-up tagging. Japan prefers to establish a comprehensive collaborative tagging program under the CCSBT, including all processes of planning for deployment, tag purchase and deployment, and data sharing under a common database to be managed by the CCSBT Secretariat.

107. CCSBT-ESC/0609/21 presented an up date on Global Spatial Dynamics Project, This project involves the archival tagging of juvenile (3–4 year old) SBT throughout their range (i.e. from South Africa to New Zealand) with the objective of estimating movement and mixing rates, and periods of residency in different parts of this range. The project has been implemented as a collaborative project between New Zealand (NZ), Taiwan and Australia. Attempts to expand the collaboration to other CCSBT members have been unsuccessful to date, but would be welcomed.

108. The early results of the program, describing an apparent shift in the east/west movement dynamics, were presented in CCSBT-ESC/0609/28 and discussed in the SAG (see SAG7 Report). To date this project has released archival tags in NZ, Australian and central Indian Ocean waters. 88 tags were released in 2004, 104 in 2005 and 114 so far in 2006 fishing years (December through November). Out of the 88 released in 2004, 18 have been recaptured, including the first recoveries ever from archival tags released in the central Indian Ocean. From the 2005 releases, three tags have been recovered, and one from the 2006 releases. It is planned to extend archival tagging operations to other parts of the Indian Ocean during the remainder of 2006 and the extent of releases in 2007 will depend upon the tagging success during the remainder of 2006. Further releases will not be conducted once existing tags have been deployed.

109. CCSBT-ESC/0609/Info01 provides an update on the SBT Tasman Seas Pop-up Satellite Archival Tags (PSATs) project. PSATs were deployed on 51 adult size SBT (156–200cm length) in the western Tasman Sea during the austral winters of 2001-2005. SBT were resident in the Tasman Sea for up to six months, with movements away from the tagging area occurring at highly variable rates. In general, SBT moved south into the Southern Ocean, west along the southern continental margin of Australia and then into the Indian Ocean. Three individuals moved east into the central Tasman Sea, with one individual reaching New Zealand waters before returning to the western Tasman Sea. The results include the first observed migration of a SBT from the Tasman Sea onto the Indian Ocean spawning grounds south of Indonesia. In general, tagged individuals spent most of their time on the continental shelf/slope region with an estimated 84 % of time spent in the Australian Fishing Zone. While inconclusive, the movement data collected so far by this project raise the possibility that SBT estimated to be recruited to the spawning stock are not obligate annual spawners.

110. The ESC observed that a large number of archival tags have now been deployed and recovered, and this information is being used in the SAG and ESC. Migration patterns provide insight into spawning frequency, and rates of East and West migration from the Great Australian Bight.

111. All parties recognized that collaborative arrangements should be pursued to share the results of these studies within the CCSBT, while respecting the specific intellectual interests of the participants.

6.5 Recruitment monitoring

112. Document CCSBT-ESC/0606/Info02 (CCSBT-ESC/0509/26) describes the proposal by Australia to continue the aerial survey in the Great Australia Bight in 2006-07. The plan includes calibration of spotters using two aircraft flying the same transect.

113. There was a question as to whether the survey could provide an absolute abundance index (as opposed to a relative index), as this could be useful for interpreting the mortality estimates from the tagging studies. An absolute index is unlikely to be feasible for several reasons: biomass estimates show consistent differences among spotters, there are no reliable estimates of the proportion of fish in a school that are visible at the surface (and the proportion of schools at the surface appears to be highly variable), and the proportion of fish in the Great Australian Bight is not known. Previous attempts to interpret the index as a minimum estimate of absolute abundance were not very useful because the biomass levels were unrealistically low.

114. One of the important issues affecting the estimates of the aerial survey relates to migration into and out of the Great Australian Bight, in relation to the apparent change in east/west movement (CCSBT-ESC/0509/28). Whether or not the juvenile fish migrate east or west from the Great Australian Bight for the Austral winter is not important; however, interannual variability in the proportion of juveniles that return to the Great Australian Bight would increase the variability in the index and any consistent change would bias trend estimates. Currently, tagging studies (conventional, archival or possibly acoustic) represent the only potential means of estimating the proportion of juveniles that return to the Great Australian Bight.

115. The use of acoustic surveys to estimate proportions of juvenile SBT at the surface and at depth was suggested as a possible means of assisting the aerial survey. This was not considered possible because the acoustic and aerial surveys operate in different regions and index different ages. Depth distributions might be quantified with electronic tags, but the data are not sufficient at present, and do not supply sufficient spatial resolution to use in analyses of the aerial survey.

116. The ESC recognized the value of the aerial survey, and recommended continuation of the survey and further analytical effort to improve the indices. Continued efforts to integrate the survey into the assessment models were encouraged.

117. Australia expressed the desire to have the aerial survey program transferred to the CCSBT SRP. However, the ESC recognized that this is an expensive program and needs to be prioritized relative to the alternative research and monitoring programs.

118. Japan noted that troll and sonic tagging experiments have been conducted in Western Australia for several years as part of the RMP. As these surveys have been interpreted as indicators of recent recruitment for age 1, Japan expressed the desire to also have these programs transferred to the CCSBT SRP.

6.6 Direct ageing

119. CCSBT-ESC/0609/12 provides an update on SBT otolith sampling in Australia and reports on progress with respect to the CCSBT agreement to maintain regular collection programs. 342 otolith samples were collected from the Australian SBT surface fishery during the 2005-06 season and an additional 269 samples were

collected from fish that died during CCSBT tagging operations in Western Australia, South Australia and New South Wales. The fish collected for otolith sampling from the surface fishery cover the full size range of fish caught. The current sampling protocol does not provide either a fixed number of otoliths from each length class or representative samples of otoliths from all length classes in the fishery, with a disproportionate number of large fish being sampled. Nevertheless, the samples can provide an adequate basis for constructing age/length keys as demonstrated in CCSBT-ESC /0609/12.

120. The reasons for the unrepresentative size sampling in the Australian fishery were sought. It was noted that the otolith collection procedure had been reviewed at previous ESC meetings. The otoliths from the 40 fish farm samples are not collected because these fish are returned live to the pens. The otoliths are collected from 10 mortalities in each pen during, or soon after towing. There is a difference in the length distribution of the otolith and 40 fish samples. The differences appear to result from higher mortalities of larger fish in the towing and farming operations. However, even with these differences between the samples, the full range of farmed fish are sampled for otoliths in adequate numbers to produce reliable age-length keys.

121. CCSBT-ESC/0609/13 provides information on age reading of otoliths by the Australian Central Ageing Facility and CSIRO since the last Scientific Committee in relation to the agreement made at the 2003 SC meeting to provide annual direct ageing data from members fisheries. The ages of a sample of SBT caught in the Australian surface fishery were estimated by examining transverse sections of sagittal otoliths. Ages were assigned to 152 fish caught during the 2004-05 fishing season. Annual age-length key summarizing these results and those from 2001-02 through 2003-04 are provided. The proportion at age in the catch were estimated using this age-length key and suggest a change in the last two years in the age-structure of the catch.

122. It was noted that Australian observers were no longer applying strontium chloride injections for growth ring validation, and no further age validation studies have been undertaken since the 1990s RMP tagging program.

123. CCSBT-ESC/0609/35 was presented for Japanese activity on otolith collection and age estimation. Otoliths were collected from 1340 SBT individuals in 2005. Ages were estimated for 802 SBT individuals and the data were submitted to the CCSBT Secretariat.

124. Papers CCSBT-ESC/0609/10 and 11 were cited in relation to otolith collection from Indonesia. Otoliths were sampled from 1532 SBT on the spawning grounds in 2004-5. Of these, 500 were selected for reading, and 493 ages were successfully estimated.

125. The New Zealand country report indicted that 429 otoliths were collected in 2005, and are archived for reading later in the year. It was noted that there were technical difficulties in ageing smaller fish captured mid-year, and this problem would be analysed this year.

126. Taiwan reported the collection of 210 otoliths from the Indian Ocean in 2005. Of these, 80 were analysed for age estimation, and 77 were successfully read. These

samples were all in the range of ages 3-10, and 85% were aged 4-6. The remaining 130 otoliths have not been read, so the results are still preliminary.

127. Korea reported no otolith samples, as there was no SBT targeted fishery in 2005.

128. The ESC was reminded that the intention of the otolith collections was to develop estimates of catch-at-age for use in stock assessment models. These models have not been actively pursued to date in part because of other intervening assessment priorities. However, members were encouraged to continue the collections and to age the samples that are available. It was noted that the original targets for otolith sampling were established as guidelines to get the collections started. The actual sampling design might be due for revision as these data are incorporated into the assessment models, and the new targets might be designed in relation to the desired precision and accuracy that might be attained by incorporating these data into the assessment models.

6.7 Other SRP requirements

129. No other SRP items were identified.

Agenda Item 7. Data exchange

7.1 Requirements for data exchange in 2007

130. The data exchange requirements for 2007 were agreed and are provided in the report of the data exchange working group at **Attachment 6**.

Agenda Item 8. Ecologically Related Species Working Group

131. Taiwan, which chaired the Sixth Meeting of the Ecologically Related Species Working Group (ERSWG), presented a summary of the outcome of the meeting. A copy of the presentation is at **Attachment 7**.

132. The ESC noted that the ERSWG had focused on seabird and shark related issues and had not discussed other tuna species. Collecting data on other tuna catches was necessary for the interpretation of CPUE, as it is likely that fishing practices are likely to change. The ESC noted the reference to collection of this data in the report of the CPUE Working Group and agreed that this issue will be discussed intersessionally.

Agenda Item 9. Research mortality allowance (RMA)

133. In CCSBT-ESC/0609/41, Japan reported RMA used in 2005-06. 1.81t was taken by the acoustic survey and 0.53t by the trolling survey, in total of 2.34t. Japan expressed

its appreciation to Members for rapidly agreeing to the additional RMA requested by Japan during the survey. Japan requested 10t of RMA for the 2006-07 trolling survey.

134. Following discussion of Japan's RMA request, Japan reduced its request to 5t. This was agreed on the basis that if further RMA was required a rapid response would be provided to an intersessional request for increase in this RMA allowance.

135. Australia presented CCSBT-ESC/0609/22 concerning the Global Spatial Dynamics archival tagging program and the Tasman Sea pop-up tagging program of mature SBT. Australia advised that no RMA had been used for the archival tagging program and estimated that 2.1 tonnes of RMA would be used for the pop-up tagging program.

136. For the 2006-2007 fishing season it was agreed to provide 5 tonnes of RMA for the Global Spatial Dynamics tagging program and 12 tonnes for the pop-up tagging program.

Agenda Item 10. Workplan, timetable and research budget for 2007

10.1 Requirements/need for stock assessment and Management Procedure in 2007

2007 Review of Fisheries Indicators

137. The ESC recognised the importance of the review of fisheries indicators to be conducted by the SAG in 2007. Given the uncertainties in catch and CPUE raised by the Market and Farm Anomaly Reviews, it will be particularly important to review indicators that are considered to remain unaffected by the anomalies, and which might be useful to an Interim Management Procedure.

Development of an Interim Management Procedure

138. The ESC noted the need to plan realistically to give effect to intentions to put an interim management procedure (IMP) into place for SBT within the next 2-3 years. To achieve this goal, this process will have to be initiated within the next inter-sessional period. The ESC therefore proposed that:

- A small inter-sessional workshop be held approximately midway during the 2006/07 inter-sessional.
- The workshop be attended by two members of the Panel (one as the chair) and at most three scientists from each member country/fishing entity.
- The Terms of Reference for the workshop be:
  - In the interests of speed, to consider the possible use of the existing operating model as implemented for scenarios developed at SAG7 (and possible further variants thereof) as the basis for testing candidate IMPs.
  - To generalize the associated projection software to output future values for possible indices (such as the Great Australian Bight aerial survey) that might perhaps be inputs to an IMP, and to specify appropriate associated statistical properties (with variations thereof as robustness tests).

- To discuss the structure of potential simple control rules for such candidate IMPs, and to specify appropriate performance statistics for evaluation purposes.

- After the workshop, a consultant be contracted to update the existing code to implement the recommendations from the workshop.
- This code be circulated in time for scientists from member nations/fishing entities to have sufficient time to report initial results to SAG8.

139. Dr Ana Parma of the Advisory Panel agreed to act as convenor of the process to plan this workshop, and to work with the Secretariat to plan details regarding venue, timing and budgetary implications of the workshop. This workshop would most likely be held in Seattle in late May 2007.

10.2 Other workplan requirements

CPUE Modelling Workshop

140. The ESC endorsed the proposal by the CPUE Modelling Group to hold a dedicated CPUE Workshop in May/June 2007. This workshop would most likely be held in Shimizu in early May 2007. The ESC noted the potential inter-dependence of the outcomes of the proposed workshops on CPUE and Interim Management Procedure development, and recommended that the workshop participants consider how best to relate the outcomes of the two workshops.

Review of the CCSBT Scientific Research Program (SRP)

141. The ESC recommended that the review of the SRP initially intended for the 2006 SC11 meeting, be conducted at SC12 in 2007. While all components of the SRP would be reviewed, emphasis would be placed on a detailed technical review of the CCSBT conventional tagging program, and its relationships with catch characterization and the CCSBT scientific observer program. Members were encouraged to cooperate in preparing reviews of experiences and results with the various tagging programs contributing to the SRP.

10.3 Overview, time schedule and budgetary implications of proposed 2007 research activities.

Activity	Approximate Period
Report to other RFMOs and FAO	November 2006
Surface fishery tagging program	Dec 2006 – March 2007
Secretariat coordination of the tagging program, including rewards.	ongoing
Data exchange	October 2006 - June 2007
CPUE Modelling Workshop, Shimizu	5 days, prior to SAG, early May 2007
Interim Management Procedure Workshop, Seattle	4 days, prior to SAG late May
8th Stock Assessment Group Meeting, Australia	5 days first week in September 2007
12th Scientific Committee Meeting including review of SRP, Australia	5 days, second week in September 2007
Presentation of ESC report to Extended Commission at CCSBT13	Oct 2007

Agenda Item 11. Other matters

11.1 Status of cited working papers

142. CCSBT-ESC/0609/27 noted that at the 2005 Extended Scientific Committee Meeting, a working paper was produced and tabled during the meeting. This working paper was presented to the ESC and extensive discussion of portions of it occurred. Results in the working paper were used to form part of the agreed conclusions from the meeting (see paragraphs 40 and 49, 50, 53 in the report). Because this was simply a working paper at the meeting and was neither attached to the report nor included in the document list for the meeting, the document ceased to exist after the meeting. As such there is no record or documentation of the basis of the actual results that the ESC used to form its conclusions. This would appear to not constitute an appropriate level of supportive documentation for a scientific report. CCSBT-ESC/0609/27 therefore proposed a solution to this problem, involving the automatic tabling of any such cited document as the next meeting of the SC.

143. The ESC Chair acknowledged the inconsistency of citing a paper in the report that was not taken up in the supporting documents for the meeting. The Chair proposed that more rigorous attention be given at future meetings to deciding whether interim working papers tabled during scientific meetings were either:

- Discarded after the meeting, if they were considered to no longer serve any purpose;

- Be taken up as full attachments to the report, if the meeting agreed that the working papers remained important in their entirety; or
- Relevant and important parts of the working papers be absorbed directly as paragraphs in the body of the report, where the entire working paper was not considered necessary as an attachment.

144. However, in line with past practice, the Chair noted that, for such a paper to remain as a citeable reference after the meeting, and to be cited as such within the report, it would need to be accepted by the meeting as a late submission paper, and converted to a properly numbered paper to the meeting.

11.2 Availability of past scientific documents

145. Participants asked whether it would be feasible to make scientific documents tabled at past SAG and SC meetings available for downloading from the CCSBT website. It was recognised that these papers are not available in electronic format prior to SC7, and that there would be substantial additional workload associated with making past papers before this date available. The ESC agreed to request Commission permission to make papers from SC7 onwards available on the CCSBT website. The Commission will need to decide if these are to be on the public or private part of the web site.

Agenda Item 12. Adoption of meeting report

146. The report was adopted.

Agenda Item 15. Close of meeting

147. The meeting closed at 7:05pm on 15 September 2006

List of Attachments

Attachment 1

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12 - 15 September 2006
Tokyo, Japan

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Attachment 2

Agends

Extended Scientific Committee for the Eleventh Meeting of the Scientific Committee

Tokyo, Japan

12-15 September 2006

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 SBT Assessment, Stock Status and Management

5.1 Review of Fisheries Indicators and scenario modelling results

5.2 Status of the SBT Stock

5.3 Management Procedure Implications

5.3 SBT Management Recommendations

6. Update on SRP Activities and Implications of Overcatch

6.1 Characterisation of SBT Catch

6.2 CPUE Interpretation and Analysis

6.3 Scientific Observer Program

6.4 SBT Tagging Program

6.5 Recruitment Monitoring

7.6 Direct Ageing

6.7 Other SRP Activity

7. Data Exchange

7.1 Requirements for Data Exchange in 2007.

8. Ecologically Related Species Working Group

9. Research Mortality Allowance

10. Workplan, Timetable and Research Budget for 2007

10.1 Requirements/need for Stock Assessment and Management Procedure in 2007

10.2 Other Workplan Requirements

10.3 Overview, time schedule and budgetary implications of proposed 2007 research. activities.

11. Other Matters

12. Adoption of Meeting Report

13. Close of Meeting

Attachment 3

List of Documents
7th Meeting of the Stock Assessment Group and
Extended Scientific Committee for the 11th Meeting of the Scientific Committee

(CCSBT-ESC/0609/)

01. Draft Agenda of 7th SAG
02. List of Participants of 7th SAG
03. Draft Agenda of the Extended SC for 11th SC
04. List of Participants of the 11th SC and Extended SC
05. List of Documents - The Extended SC for 11th SC & 7th SAG
06. (Secretariat) 4.2. Secretariat Review of Catches
07. (Secretariat) 6.4. SBT Tagging Program
08. (Secretariat) 7. Data Exchange
09. (Secretariat) Farm and Market Reviews - Advice to SAG-SC
10. (Australia) The catch of SBT by the Indonesian longline fishery operating out of Benoa, Bali in 2005: Proctor, Andamari, Retnowati, Herrera, Poisson, Fujiwara and Davis
11. (Australia) Update on the length and age distribution of SBT in the Indonesian longline catch: Farley, Proctor and Davis
12. (Australia) An update on Australian Otolith Collection Activities: 2005/06: Stanley and Polacheck
13. (Australia) Estimates of proportions at age in the Australian surface fishery catch from otolith ageing and size frequency data: Farley
14. (Australia) Estimates of reporting rate from the Australian surface fishery based on previous tag seeding experiments and tag seeding activities in 2005/2006: Polacheck, Hearn, Stanley and Rowlands
15. (Australia) Analysis of tag return data from the CCSBT SRP tagging program: Polacheck and Eveson
16. (Australia) The aerial survey index of abundance: updated analysis methods and results: Eveson, Bravington and Farley
17. (Australia) Commercial spotting in the Australian surface fishery, updated to include the 2005/6 fishing season: Basson and Farley
18. (Australia) Trends in reported catch, effort and nominal catch rates in the Japanese longline fishery for SBT - 2006 update: Hartog, Polacheck and Cooper
19. (Australia) Fishery indicators for the SBT stock 2005/06: Hartog, Preece and Kolody
20. (Australia) Description of the data provided by CSIRO for the 2006 CCSBT Data

exchange: Preece, Hartog and Cooper

21. (Australia) Update on the Global Spatial dynamics Archival Tagging project-2006: Polacheck, Chang, Hobday and West
22. (Australia) Proposed use of CCSBT Research Mortality Allowance to facilitate electronic tagging of juvenile and adult SBT as part of Australia's contributions to the CCSBT SRP in 2005-06: Polacheck and Gunn
23. (Australia) Increased growth rates of juvenile SBT in recent years (1990s to present): Eveson, Polacheck and Farley
24. (Australia) Information and Issues Relevant to the Plausibility and Implications of Alternative Catch and Effort Time Series for Southern Bluefin Tuna Stock Assessments: Polacheck, Preece and Hartog
25. (Australia) Investigation of the implications of information in two catch reviews (Japanese Market review and Australian Farm review) for SBT stock status and short term projections: Basson, Hartog, Polacheck, Lawrence and Findlay
26. (Australia) Consideration of requirements for monitoring and data validation for stock assessment and management procedures in light of independent catch reviews: C. Davies, T. Polacheck, J. Hender, J. Findlay
27. (Australia) The Status of Cited Working Papers and Attachment 3 from Working Paper 1 from the 2005 Extended Scientific Committee Meeting: Polacheck, Basson, Kolody and Hartog
28. (Australia) Comparison of East-West Movements of Archival Tagged Southern Bluefin Tuna in the 1990s and early 2000s: Polacheck, Hobday, West, Bestley and Gunn
29. (Australia) Peer review of the report of the independent review of the Australian SBT farming anomalies
30. (Australia) Fisheries indicators and the impact of the Independent reviews: J. Hender, J. Findlay, C. Davies
31. (Australia) Implication of the Japanese market review anomaly on CPUE interpretation: J. Hender, J. Findlay
32. (Australia) Preparation of the BRS component of Australia’s data submission for 2006: P. Sahlquist, P. Hobsbawn, K. McLoughlin
33. (Australia) Background information on catch levels: B.Jeffriess
34. (Japan) Report of Japanese scientific observer activities for southern bluefin tuna fishery in 2005: Itoh, Narisawa and Tanabe
35. (Japan) Activities of otolith collection and age estimation and analysis of the age data by Japan in 2005: Itoh, Hirai and Omote
36. (Japan) Report of activities for conventional and archival tagging of southern bluefin tuna by Japan in 2005/2006 and proposal of tagging in 2006/2007: Itoh, Takahashi, Kurota and Oshitani
37. (Japan) Acoustic Index of age one southern bluefin tuna abundance by the acoustic survey in 2005/2006: Itoh

38. (Japan) Report on the piston-line trolling survey in 2005/2006: Fisheries Agency of Japan: Itoh and Kurota

39. (Japan) CPUE comparison of Japanese longline vessels between with observed and without observer: Sakai and Itoh

40. (Japan) Summary of fisheries indicators in 2006: Takahashi and Itoh

41. (Japan) Report of the 2005/2006 RMA utilization and application for the 2006/2007 RMA: Fisheries Agency of Japan

42. (Japan) SBT Stock Assessment and Projection under Overcatch Scenarios Using the Operating Model: Hiroyuki Kurota, Doug S Butterworth and Osamu Sakai

43. (Japan) Some Considerations of SRP tagging program: Takahashi and Kurota

44. (Japan) Matters arise from changing of Japanese fishery regulation: Itoh

45. (Japan) Analyses of genetic stock structure of the southern bluefin tuna (*Thunnus maccoyii*) using nuclear DNA variation: Nakadate, Suzuki, Itoh, Kurota, Tsuji and Chow

46. (Taiwan) CPUE standardization of southern bluefine tuna caught by Taiwanese longline fishery

47. (Japan) Future Use of "ST windows" index calculated by a new method: A proposal: Takahashi

(CCSBT-ESC/0609/SBT Fisheries)

Australia	Australia's 2004-05 southern bluefin tuna fishing season: P. Hobsbawn, J. Hender, J. Findlay, K. McLoughlin
Japan	Review of Japanese SBT Fisheries in 2005: Itoh and Narisawa
New Zealand	The New Zealand southern bluefin tune fishery in 2005: Shelton Harley and Terese Kendrick
Republic of Korea	Korean longline fishery for southern bluefin tuna in 2005:
Fishing Entity of Taiwan	Review of Taiwanese SBT Fishery of 2004/2005

(CCSBT-ESC/0609/Info)

01. (Australia) Examining the movement and residency of adult SBT in the Tasman Sea and on their spawning grounds south of Indonesia using pop-up archival tags: Gunn, Evans, Patterson and Carter

02. (Australia) Proposal for continued monitoring of southern bluefin tuna recruitment via scientific aerial survey of juveniles in the Great Australian Bight: Davies, Farley, Eveson, Basson and Bravington

03. (Australia) Review of southern bluefin tuna catch monitoring procedures: DSI Consulting PTY LTD

04. (Australia/Japan) Japanese SBT Market Data Anomalies (Access to this document is

restricted)

05. (Australia/Japan) Australian SBT Farming Operation Anomalies (Access to this document is restricted)

(CCSBT-ESC/0609/Rep)

01. Report of Tagging Program Workshop (October 2001)
02. Report of the First Meeting of Management Procedure Workshop (March 2002)
03. Report of the CPUE Modeling Workshop (March 2002)
04. Report of the Second Meeting of the Management Procedure Workshop (April 2003)
05. Report of the Third Meeting of the Management Procedure Workshop (April 2004)
06. Report of the Special Meeting of the Commission (April 2004)
07. Report of the Special Management Procedure Technical Meeting (February 2005)
08. Report of the Fourth Meeting of the Management Procedure Workshop (May 2005)
09. Report of the Management Procedure Special Consultation (May 2005)
10. Report of the Sixth Meeting of the Stock Assessment Group (September 2005)
11. Report of the Tenth Meeting of the Scientific Committee (September 2005)
12. Report of the Twelfth Annual Meeting of the Commission (October 2005)
13. Report of the Sixth Meeting of the Ecologically Related Species Working Group (February 2006)
14. Report of the Special Meeting of the Commission (July 2006)

Attachment 4

REPORT ON BIOLOGY, STOCK STATUS AND MANAGEMENT OF SOUTHERN BLUEFIN TUNA: 2006

A review of fisheries indicators was conducted by the CCSBT Stock Assessment Group during 2006. 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. 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 2005 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 11th meeting of the CCSBT Scientific Committee in 2006. 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 2000 and 2001 recruitments, and the aerial spotting survey and commercial spotting index are both 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 and 2001 year classes, but recent data indicates an increase in juveniles after the 2002 year class.

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 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 data sources and the scenarios indicate low recruitments in 2000 and 2001, 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, 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 14,925t (the current total allocated TAC) would result, on average, in a short-term decline followed by generally stable but not recovering spawning biomass. 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 the scenarios considered.

4. Current Management Measures

SBT were managed by means of quota limits agreed at tri-partite meetings between Australia, Japan and New Zealand from 1985 through to the establishment of the CCSBT in 1994. The global quota was reduced several times after the initial level of 38,650t for the 1984/85 season. The combined quota for these three countries was maintained at 11,750t from the 1989/90 season through to 2002/03. Following increases in membership of the CCSBT (Republic of Korea, and the Fishing Entity of Taiwan joined in 2001 and 2002 respectively), the CCSBT applied the following national catch limits from 2003/04 to 2006/07:

Japan	6,065 tons
Australia	5,265 tons
Republic of Korea	1,140 tons
Fishing Entity of Taiwan	1,140 tons
New Zealand	420 tons
Total	14,030 tons

An additional catch limit of 895 tonnes was also allocated in 2005/06 for cooperating non-members, of which 50 tonnes was allocated to the Philippines (which was recently admitted as a cooperating non-member), and 800 and 45 tonnes set aside for Indonesia and South Africa respectively should they become cooperating non-members. In 2006, South Africa confirmed their intention to become a cooperating non-member of the CCSBT.

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.

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 catch not to exceed 14030t for members (Australia, Fishing Entity of Taiwan, Republic of Korea, Japan, and New Zealand), 95t limit for cooperating non-members (Philippines & South Africa), plus a provision of 800t for future cooperating non-members.

[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.

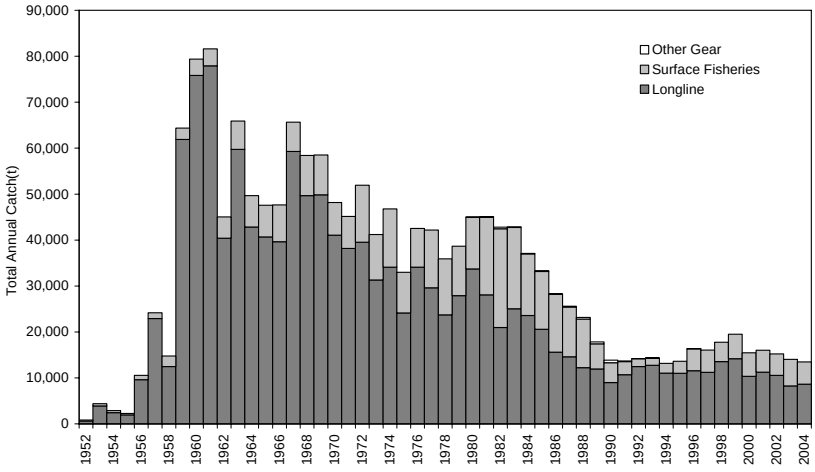

Figure 1. Reported southern bluefin tuna catches by fishing gear (t), 1952 to 2004[2].

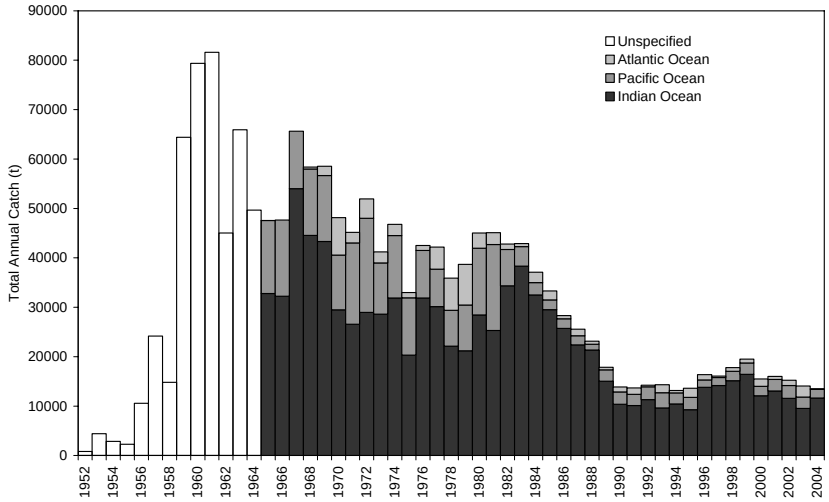

Figure 2. Reported southern bluefin tuna catches by ocean (t), 1952 to 2004[2].

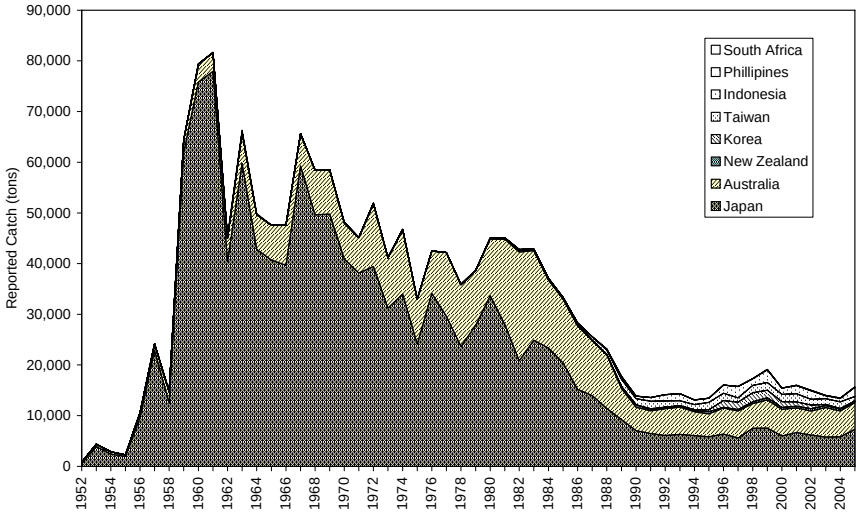

Figure 3. Reported annual southern bluefin tuna catch (t) by flag, 1952 to 2005[2].

[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. Due to the uncertainties in catch data, the catch by gear and catch by ocean figures have not been updated from last year's report.

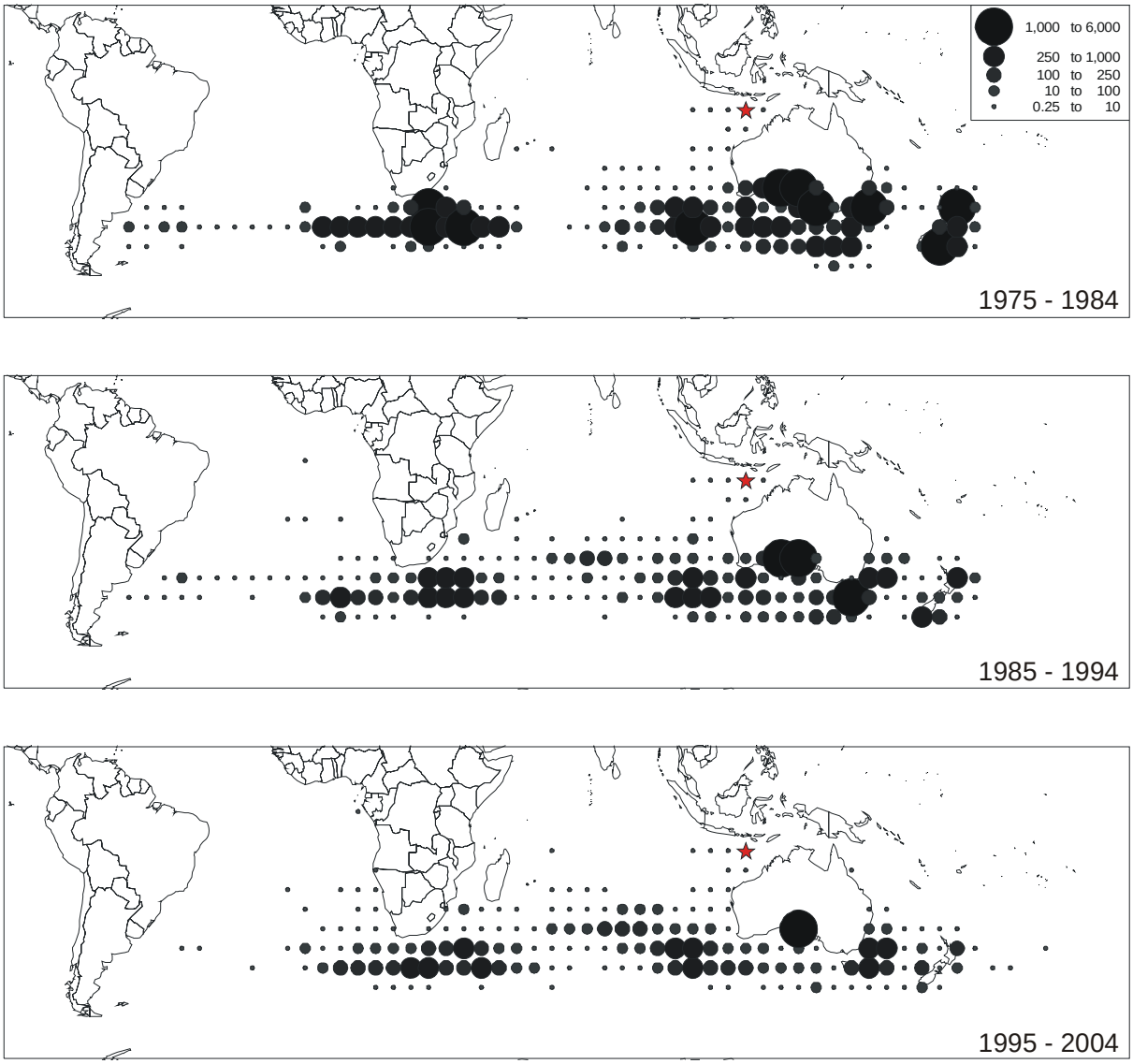

Figure 4[3]. Geographical distribution of average annual southern bluefin tuna catches (t) by CCSBT members and cooperating non-members over the decades 1975-1984, 1985-1994 and 1995-2004 per 5° block by oceanic region. The area marked with a star is an area of significant non-member catch. Block catches averaging less than 0.25 tons per year are not shown.

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

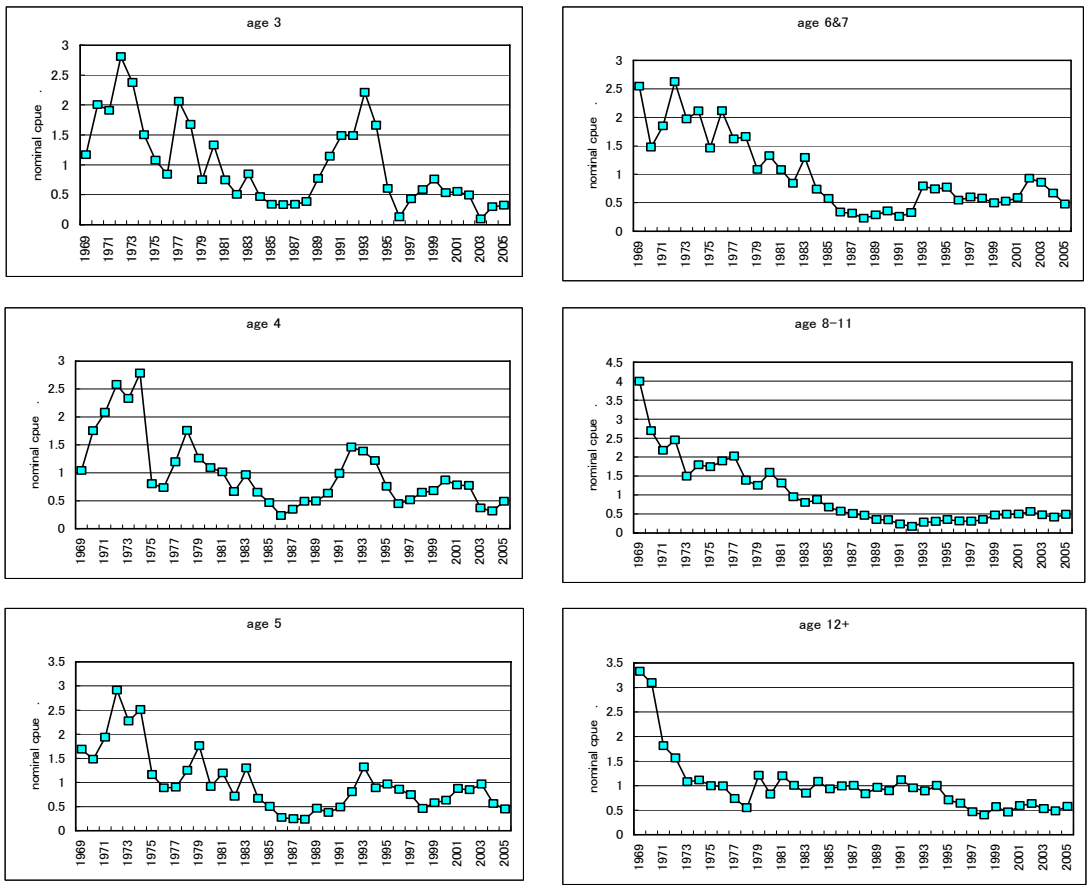

Figure 5. Trends in nominal catch rates (numbers per 1000 hooks) of SBT by age group (ages 3, 4, 5, 6-7, 8-11 and 12+) caught by Japanese longliners operating in CCSBT statistical areas 4-9 in months 4-9.

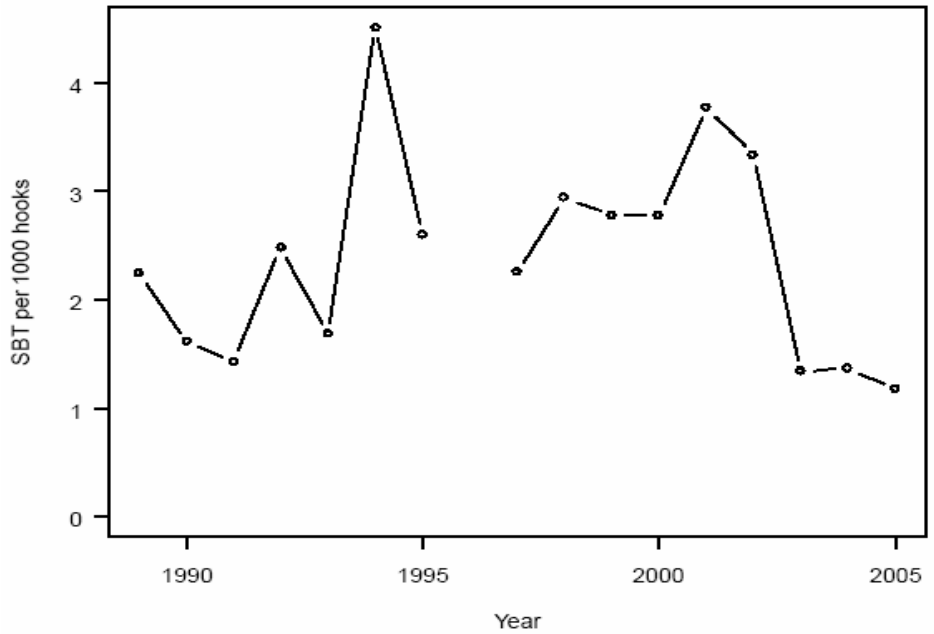

Figure 6. Nominal catch per unit effort (number of SBT per thousand hooks) from the New Zealand charter fleet in Region 6 (west coast South Island).

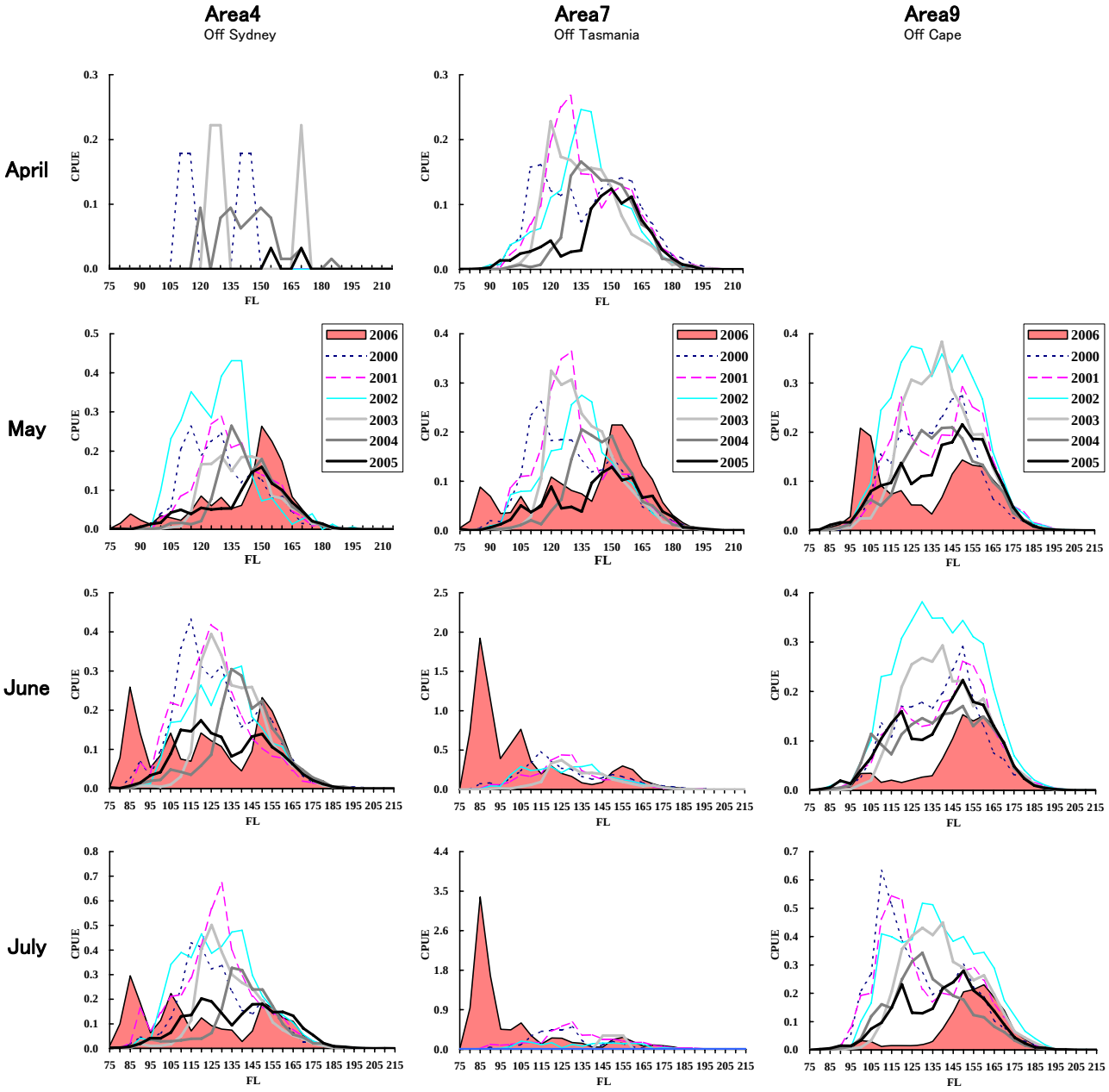

Figure 7. Size composition of nominal CPUE of Real Time Monitoring Program data for the Japanese longline fishery for recent seven years by month and area.

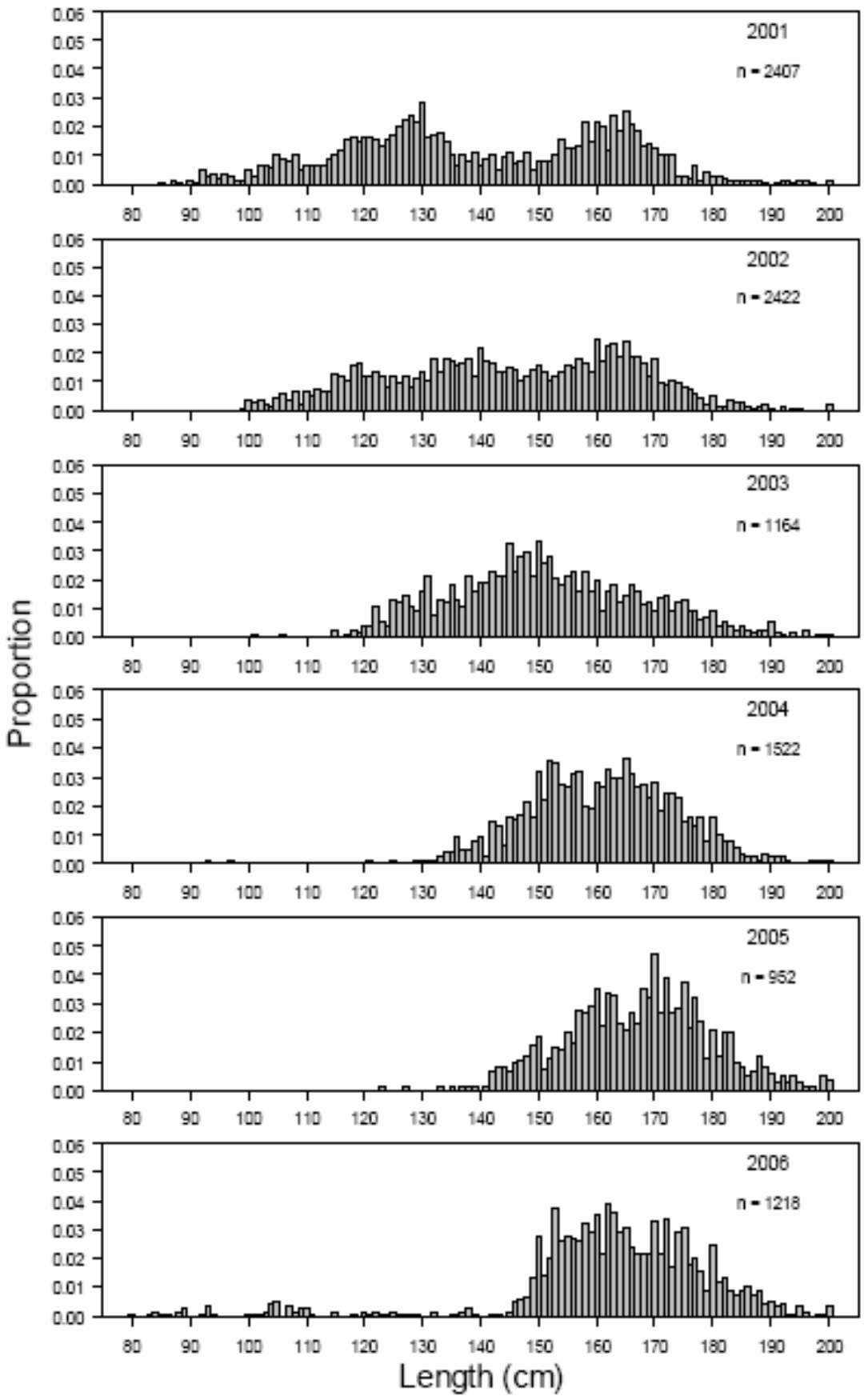

Figure 8. Proportion at length of SBT from the New Zealand charter fleet for 2001 to 2006. (Data for 2006 is preliminary.)

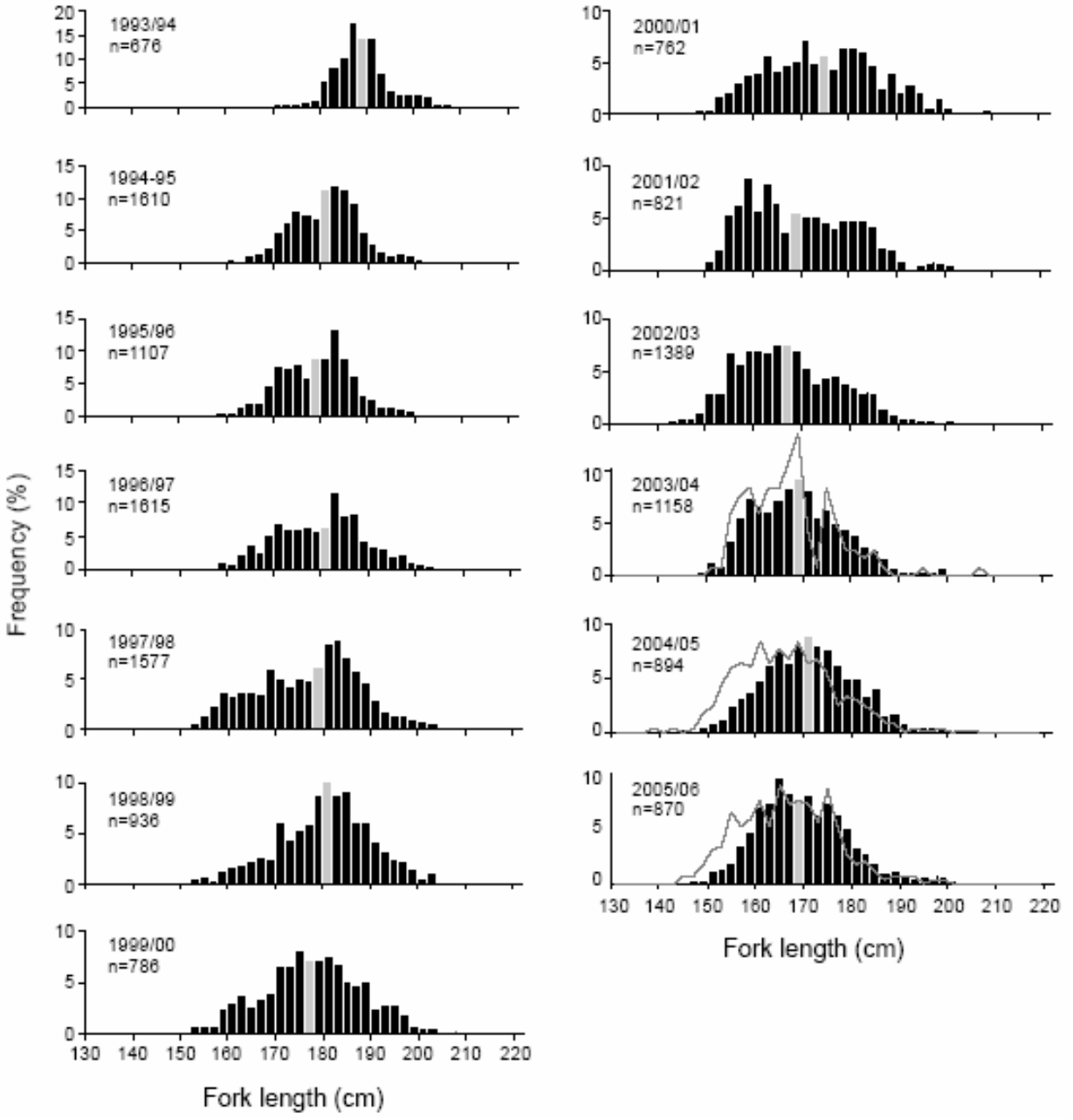

Figure 9. Length frequency (2cm intervals) of SBT by spawning season from the Indonesian spawning ground longline fishery from 1993/94 to 2005/06. The grey bar shows the median length class. For comparison, the length distribution of SBT thought to be caught south of the spawning ground is shown for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

Attachment 5

Report of the CPUE Modelling Group

The group met on 8 September 2006 (15:44-17:30) and on 11 September 2006 (11:45-12:50).

Statement of needs for CPUE measures for SBT and of associated problems.

The sub-group noted that there are needs for absolute or relative measures of stock size of each of distinct phases of the life history of SBT. These measures should be of an appropriate precision and either be unbiased through time or the trend in bias should be known. These main life history phases correspond to recruiting fish (caught by the surface fishery in the GAB), juvenile fish (caught by the NZ domestic and the high seas long line fleets) and spawning fish (caught in the Indonesian fishery). In principle Catch per unit of effort (CPUE), that is often expected to be linked to population abundance, has the potential to provide such measures. In practice purse seine fisheries never provide direct measures of catch rate per fishing time that correlate directly to abundance. A more appropriate measure for such fisheries is catch per searching time, which are collected for the surface fishery. In the surface fishery searching is conducted by aerial spotting and thus the commercial aerial spotting estimates are probably the most appropriate measure of CPUE for this fishery. By contrast direct CPUE of Japanese long liners has provided what are considered very valuable long term time-series of relative abundance of the pre-spawning fish based upon a wide geographical and temporal sampling of the stock. This CPUE series have potentially become distorted to an unknown extent in more recent years as a result of the market anomalies. There are also real concerns (see paper 44) that changes in the behaviour of this fleet may occur following changes to an IQ management system in 2006.
Other long line fleets have more restrictive historical and spatial coverage.
Problems may occur in CPUE series for any fishery. These problems include:

1. By-catch of SBT; The extent to which fishing was targeted to SBT rather than other species.
2. Changes in spatial temporal behaviour of the fleet.
3. Changes in catching behaviour
4. Discarding of SBT,
5. Data Verification
6. Changes in fish distribution relative to the distribution of this fleet.
7. Changes in catchability due to technological advances
8. Sparse or incomplete effort coverage
9. Resolution at which data are available being different to the scale of variation in the stock/effort dynamics.

Some of these problems must be anticipated for the Japanese CPUE series that has previously been the most valuable for SBT. Thus for this fishery particularly, given its valuable CPUE history, but also for other fleets there is a need to ensure:

- That a robust non biased measure of CPUE is maintained to provide inputs to the scientific needs of future Assessments, Indicators and Management Procedures.

- If necessary this might have to be maintained or augmented by scientific fishing or by an industry based "sentinel" survey.
- That, if possible, a link (i.e. a calibration) to past CPUE series is established and
- That, if possible, one or more pre 2006 CPUE series is/are corrected as necessary to allow for the effect of Market Anomalies.
- In addition to Japanese CPUE, reliable indices of stock be developed or improved from data in purse seine fisheries of Australia (Commercial) aerial abundance estimators and LL fisheries of all other members states, cooperating non-member states and if possible from the Indonesian fishery. Noting the importance of maintaining and, if possible, improving the fisheries independent aerial survey of juvenile STB of the GAB.

A Robust Ongoing CPUE series.

The desirable characteristics of such a series would include:-

- Appropriate accuracy and precision.
- Appropriate geographical/temporal coverage of the stock.
- Appropriate quality control (Quality of data, Ability to test for problems).
- Possibility of collaborative, transparent analysis.
- Appropriate analysis methods for correlated data.

What is possible?

A number of practical issues were raised by the sub group to help in making the desirable possible.

It may be more possible to maintain a future series if is based upon limited geographical and temporal coverage of the stock (for example the Takahashi Space Time Window CPUE series). However, such measures may suffer if stock distribution contracts at lower stock abundance (the constant squares variable squares issue). Good spatial information is important in order to check the accuracy of fishing effort and understand the impacts of future changes in fleet operations. VMS is becoming a statutory requirement and might be utilised for this purpose. Its use would be helped if VMS were adopted by all tuna commissions and became co-ordinated globally. It might also possibly be developed to provide direct measures of fishing effort. Some new data capture methods were also considered (see paper 26). Deck monitoring cameras, drum monitors etc. might provide accurate measures of catch and effort. Such measures would be more likely to be adopted if their use confers benefit to the fishers concerned, for example by reducing the need for and the cost of observers and reducing reporting costs. Increasing the proportion of observed trips would be another approach to improving quality control. The tagging and reporting of fish at their time of capture to enhance enforcement, catch monitoring and documentation may also provide a very useful source of fishing effort data and also size distribution of the catch. Regarding the surface fisheries stereo video cameras during tow cage transfers might provide more accurate information on size composition.

Such technological approaches can help ensure the initial quality of data. Scientific quality control also requires appropriate analyses to be made of detailed data sets. In many jurisdictions such data sets are subject to national requirements to preserve commercial confidentiality. There is thus a need to develop enduring mechanisms that allow scientific quality control while respecting the need for maintaining

confidentiality. The group noted that such mechanisms have been developed and successfully implemented over many years in other international bodies such as ICES.

Consultations with industry are valuable particularly for understanding their views of stock distribution and status, the likely future changes in fleet behaviour and the effect of any technical innovations (past or future) on catchability. Information on vessel characteristics is also a valuable resource for tracking changes in fishing effort and potential changes in catchabilty. Such details include individual vessel details, etc.

Fisheries "Independent/ Sentinal CPUE"

Traditional patterns of fishing in the Japanese Long Line Fleet may change as a result of the changes in management regime that have been introduced recently. If this occurs, then spurious trends might be expected in the CPUE series that have hitherto been used to indicate the abundance of the high seas components of SBT stock. It thus may become necessary to systematically sample catch rates of the high seas SBT stock either by establishing a scientific fishing program or by encouraging the relevant fishing industries to cooperate in a sentinel type survey. Sentinel surveys are those conducted by commercial vessels fishing to scientific protocols. In practice such an approach might require some commercial vessels to undertake to provide some minimal coverage of key areas and times. Japan is not able to charter commercial vessels for scientific surveys and any research fishing survey would have to be as part of a CCSBT financed program. With respect to Sentinel type surveys, the Japanese representatives, of course could not commit the long line fishing industry to specific actions but would discuss with their industry if any initiatives of this kind were possible with some kind of incentives for cooperation. Maintaining a CPUE series something like the Takahashi ST windows series might be an initial aim for such a survey because it would require sampling in a more limited selection of areas and times. Moreover the places and times concerned would be those where long line fishers are more likely to wish to visit during their normal commercial operations. It was noted that the industry itself and all CCSBT members might likely suffer unnecessarily if Nominal CPUE declined as a result of changing behaviour of the fleets and if this spurious decline was interpreted as being due to stock decline. Thus industry itself may have a strong interest in maintaining representative CPUE series.

If either a scientific programme by the CCSBT or an industry sentinel program were to be initiated it would need to be appropriately designed to achieve its aims at feasible cost and it would need to commence as a matter of urgency. Ways of achieving this planning in an expeditious fashion are discussed in the section below.

Linking Future CPUE to pre 2006 CPUE

If a future "robust" CPUE series can be developed it will be of much greater utility for management, particularly in the short term, if it can be linked (calibrated) to the past CPUE series. To be useful such a calibration would need to have fairly high precision and known bias.

Establishing a calibration between past and future CPUE series raises two problems. These are how to make the link and how to establish more confidence in the past CPUE series to which the link is made. There is a possible distortion in the past CPUE series, by the effect of the market anomalies. Again there may be utility in adopting a linked CPUE series that is based upon a restricted subset of catch and

effort data. This would both be because such a set might be less expensive to maintain into the future and because by its restrictive nature it may be easier to develop corrections to the past series. Japanese colleagues were asked to explore the possibility of making corrections to the past catch and effort series that would define such a CPUE series based upon a restrictive subset. Regarding the link of future CPUE to pre 2006 CPUE of Japanese LL, reliable indices from the other fisheries could help with calibration.

How best to move the process forward

The process of developing and calibrating CPUE series needs to be carried out expeditiously. This will partly be conducted by intersessional work. However, designing future CPUE series and if necessary proposing a CCSBT scientific program would be best achieved by holding a workshop on the subject as soon as possible following CCSBT 13. This would need to analyse historic Japanese long line CPUE data as well as other countries catch and effort information. Hence mechanisms that allow effective analysis which fully respect confidentiality considerations need to be agreed before hand. Such a workshop would most usefully need to be held at the National Research Institute of Far Seas Fisheries, and realistically be of 5 days duration.

Proceeding with the workshop will obviously be conditional upon members agreeing mechanisms for analysis of data and a commitment from CCSBT 13.
The specification of this Workshop would be:

- A workshop to improve and intercalibrate CPUE series will be held at National Research Institute of Far Seas Fisheries, Shimizu, Japan for 5 days in May/June?
- Chaired by J.G. Pope

The Terms of Reference are:

- Describe any changes in the fishery in the 2006-07 season.
- Analyse past long line CPUE data to best specify one or more robust future CPUE series for high seas components of the SBT stock.
- Advise on whether additional commercial sentinel fishing or scientific effort will be required to ensure the continuity of these series and if they are, how much additional effort is needed and at what cost.
- If possible indicate how any series proposed will be calibrated to the past CPUE series.
- Review the possibility of correcting past series for any effects of market anomalies and suggest corrections.
- Analyse all SBT fisheries to develop reliable indices of SBT stock in addition to Japanese LL CPUE.

The workshop will report to the SAG and Scientific Committee.

Costing to be developed

Other Business

The Sub Group endorsed the use of a revised version of ST windows. This was described in paper 47. The difference in the formulation is to allow this series to be

calculated consistently by the Secretariat. The Data Manager confirms that the redefinition has had this result. The technical difference in the methods was discussed. The sub group would welcome advice on how robust this measure might be to changing patterns of fish distribution or fishing practices.

The group discussed an interesting paper on CPUE standardisation (paper 46). It was considered that this provided a useful indication of problems such as handling by-catch fisheries that might affect the Japanese LL CPUE time-series following the change to IQ management. The problems of standardisation were discussed. This led to a wider discussion of the problems associated with standardisation. The possibility of considering economic models of fishing effort was also raised. It was agreed that members would circulate relevant papers illustrating modern statistical techniques in anticipation of the proposed workshop.

Attachment 6

Report of the Data Exchange Working Group

There was insufficient time at the ESC meeting for a full meeting of the data exchange working group. Consequently, members of the data exchange working group met individually with the Data Manager in the margins of the ESC meeting to determine the data exchange requirements for 2007.

The agreed requirements for the 2007 data exchange are detailed in **Annex 1**.

Some issues required discussion by a meeting of the group in order to adequately determine the requirements. Because the group was not able to meet, it was agreed that the Data Manager would lead intersessional discussion on these items, which were:

- Provision of catch and effort data in both raised and unraised forms.
- Improving the provision of data concerning non-retained catches[1].
- Confirmation or revision of the method for calculation of the CPUE input data for New Zealand by the Secretariat[2].

The group noted that South Africa had become a Cooperating Non-Member of the CCSBT and that catch estimates for South Africa should now be based on the catch series provided by South Africa instead of Japanese import statistics. It was also agreed that South Africa should be asked to provide details of its logbook and other data collection systems relating to southern bluefin tuna.

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[1] Data on non-retained catches were provided for the first time by Members during 2006. However, the type of data and length of historic time-series provided varied between members and no Member fully complied with the specifications of these data for the 2006 data exchange.

[2] In 2006, the data selected for use were charter vessel shots that targeted SBT or that had no target species recorded (which are the same data previously used by CSIRO) and the number of hooks were raised to be compatible with the raised catch data that were used. Concerns have been raised by CSIRO with both the selection of data and the raising of hook numbers.

Annex 1

Data Exchange Requirements for 2007

The following table shows the data that are to be provided during 2007 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 2006. 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 2007 to allow development of the necessary data loading routines.

Data listed in the following table should be provided for the complete 2006 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 2005 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 2005 data) must be accompanied by a detailed description of the changes.

Type of Data to provide[3]	Data Provider(s)	Due Date	Description of data to provide
CCSBT Data CD	Secretariat	31 Jan 07	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 2006 data exchange and any additional data (e.g. tag/recapture) received since that time. *The Secretariat will provided additional updates of the tag-recapture data during 2007 on request from individual members.*
Total catch by Fleet	all members and cooperating non-members	30 Apr 07	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.
SBT import statistics	Japan	30 Apr 07	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 07	The mortality allowance (kilograms) that was used in the 2006 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 07 (New Zealand)[4] 30 Apr 07 (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. A template showing the required information is provided in Attachment B of CCSBT-ESC/0609/08. 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).

[3] 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.
[4] 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[3]	Data Provider(s)	Due Date	Description of data to provide
Historical effort for areas 14 and 15)	All members who have fished in areas 14 and 15	As soon as possible before SAG8, but see footnote[5] if this is not possible	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.
Non-retained catches	All members	30 Apr 07	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.
RTMP catch and effort data	Japan	30 Apr 07	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 07	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.*
Raised catch data for AU, NZ and KR catches	Australia, Secretariat	30 Apr 07	Aggregated raised catch data should be provided at a similar resolution as the catch and effort data. Japan and Taiwan do not need to provide anything here because they provide raised catch and effort data. New Zealand does not need to provide anything here because the Secretariat produces New Zealand's raised catch data from the fine scale data provided by New Zealand. Similarly, the Secretariat will be calculating and providing the raised catch data for Korea (based on raising Korea's catch effort data to its total catch).
Observer length frequency data	New Zealand	30 Apr 07	Raw observer length frequency data as provided in previous years.
Raised Length Data	Australia, Taiwan, Japan, New Zealand	30 Apr 07 (Australia, Taiwan, Japan) 7 May 07 (New Zealand)[6]	Raised length composition data should be provided[7] 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.

[5] If it is not possible to provide a revised historic time series before SAG8, Members must provide 2 versions of the 2005 and 2006 catch and effort data for areas 14 and 15 in their catch and effort data update. One version must contain effort for areas 14 and 15 compatible with the data provided in the past and the other version must contain full effort for areas 14 and 15.

[6] 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.

Type of Data to provide[3]	Data Provider(s)	Due Date	Description of data to provide
RTMP Length data	Japan	30 Apr 07	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 07	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 07	Estimates of both the age and size composition (in percent) is to be generated for the spawning season July 2005 to June 2006. Length frequency for the 2006 calendar year and age frequency for the 2005 calendar year is also to be provided..
Direct ageing data	All members	30 Apr 07	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 2004 calendar year (see paragraph 95 of the 2003 ESC report). The format for each otolith is: Flag, Year, Month, Gear Code, Lat, Long, Location Resolution Code[8], Stat Area, Length, Otolith ID, Age estimate, Age Readability Code[9], Sex Code, Comments.
Tag return summary data	Secretariat	30 Apr 07	Updated summary of the number tagged and recaptured per month and season.
Catch at age data	Australia, Taiwan, Japan, Secretariat	14 May 07	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 07	The Secretariat is to liaise with the IOTC to obtain the required data for 2006.
Global SBT catch by flag and by gear	Secretariat	22 May 07	Global SBT catch by flag and gear as provided in recent reports of the Scientific Committee.
Raised catch-at-age (ages 0 – 30) for Australia surface and Indonesia spawning ground fisheries. **For OM**	Australia	24 May 07[10]	These data will be provided for July 2005 to June 2006 in the same format as previously provided.
Total catch per fishery each year from 1952 to 2004. **For MP/OM**	Secretariat	31 May 07	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.

[7] 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.

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

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

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

Type of Data to provide[3]	Data Provider(s)	Due Date	Description of data to provide
Catch-at-length (2 cm bins) and catch-at-age proportions f**or OM**	Secretariat	31 May 07	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 07	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. It was noted that these data would not be required in 2007. However, it was decided that 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 07	Calculate the total catch-at-age in 2006 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 07	Catch (number of SBT and number of SBT in each age class from 0-20+ using proportional aging) and effort (sets and hooks) data[11] by year, month, and 5*5 lat/long for use in CPUE analysis.
Tag releases / recoveries and reporting rates. **For OM**	Australia	31 May 07	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 07	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 operating model uses the median of these series.
Aerial survey index	Australia	31 Jul 07	Estimates from the 2006/07 fishing season.

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

Attachment 7

Report from ERSWG6 to the Extended Scientific Committee

The 6th ERS Working Group, received two strong and clear directions from the Extended Commission in 2005. The first was the issue of data provision on by-catch species and the second was the provision of management advice relating to ERS matters. These were the most important issues considered in the Working Group and the meeting allocated most of the time available to discussions associated with them. In this regard, the Chair considered there was insufficient time available to the authors of the papers submitted to the meeting for presentation and discussion.

There were many matters discussed in the meeting. However, this presentation is focused on two main issues.

Two members submitted papers to address the two issues. In the course of the meeting, a joint working paper by these two members was developed for discussion and for consideration by the CCSBT. The outcome of the discussions is shown in Attachment 6 to the report which contains three independents sections.

Attachment 6a and 6b relate to management advice on seabirds and sharks, respectively. A summary of the original papers on these maters is contained in paragraphs 26 to 29.

Attachment 6c relates to data collection and provision for ERS. This section of the attachment was developed as a draft for further discussion and consideration by members outside the ERSWG. This draft is available for further consideration by the CCSBT in Attachment 7.

The draft recommendation in Attachment 7 contains two sections: data collection and data provision relating to two sources of data - logbooks and observers. In the data provision section, the scale of catch and interactions by species (or taxonomic group) are to be provided to the Commission in 5 by 5 grids for longline and 1 by 1 grids for all other gears, by calendar month. However, in instances where the provision of data at this spatial scale would result in breaches of domestic confidentiality agreements, data should be provided at the finest possible scale, but no larger than the level of CCSBT statistical area.

During discussions of working papers on seabird and shark proposals, considerable progress was made in identifying issues of concern. Attachment 8 reflects some of these issues and is available for the consideration of the CCSBT.

Attachment 8a is a draft recommendation on reducing incidental bycatch of seabirds. There was general agreement on the spirit of the draft to reduce seabird mortality, to develop and implement National Plan of Actions, to collect and provide incidental catch data, to adopt mandatory use of tori poles in all SBT vessels below 30 degrees south, to encourage the use of a second tori pole or other additional effective measures if required, to undertake research into new mitigation measures and to develop a practice guide for their SBT fleets. However, members had differing

opinions on two paragraphs of the draft and their views are listed together for the consideration of the CCSBT. The two paragraphs are Paragraphs 1 and 3 and the issues are whether to specify an objective level of reduction of seabird mortality and whether to specify clearly the types of data to be collected and provided.

Attachment 8b is the draft recommendation on conservation and sustainable utilization of sharks. Members agreed on the majority of the text except the shaded and bracketed Paragraph 1 relating to the provision of shark data. The text of Paragraph 1 was based on the draft recommendation of data provision (Attachment 7), so there should be no objection on this paragraph when the draft on data provision is adopted.

An important development was that the ERS Working Group expressed a commitment to conclude agreements on advice to the CCSBT on reducing seabird incidental catch, conservation and sustainable utilization of sharks, and data collection and provision for ERS at ERSWG7.

Japan proposed, and it was agreed by the Working Group, to recommend to the Commission, that the ERSWG7 be convened in 2007, instead of 2008, in order to achieve agreement on outstanding matters as soon as possible.