Commission for the Conservation of
Southern Bluefin Tuna

みなみまぐろ保存委員会

Report of
The Twelfth Meeting of the Ecologically Related Species Working Group

21-24 March 2017
Wellington, New Zealand

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Agenda Item 1. Opening

1. The independent Chair of the Ecologically Related Species Working Group (ERSWG), Mr Alexander Morison, welcomed participants and opened the meeting.
2. Each delegation introduced its participants. The list of participants is shown at **Attachment 1**.
3. New Zealand welcomed participants to New Zealand and provided opening remarks to the meeting.

1.1. Adoption of agenda

4. The agenda was adopted and is included at **Attachment 2**.

1.2. Adoption of Document List

5. The list of documents presented to the meeting is at **Attachment 3**. The Chair noted that some documents were submitted after the due date for the meeting. The meeting agreed to accept these late documents.

1.3. Appointment of Rapporteurs

6. Australia and New Zealand volunteered to rapporteur agenda items 5, 6.3 and 6.4. The Secretariat rapporteured the remainder of the meeting.

Agenda Item 2. Annual reports

2.1. Members

7. Annual reports from most Members were tabled and Members responded to questions of clarification that were raised by other Members and observers. The European Union did not submit an Annual Report to the meeting.
8. General items arising during the discussion included:
    - There were large differences in bycatch rates among fleets. Participants agreed there was a need for collaborative analysis to identify the reasons for these differences, including the effects of different areas and seasons.
    - The high level of detail reported by some Members with respect to bycatch rates was appreciated by the meeting and considered to be very valuable.
    - Some Members did not provide estimates of total mortality in their reports. Those Members explained that the level of uncertainty was considered to be

too high for an estimate to be provided. It was noted that the relevant table of the template was designed for Members to have a standard estimation of total mortalities that was derived from the rest of the table. Further discussion is required if changes to the reporting template are necessary.

- It was clarified that some operations of longline fleets can be very long, starting at night and not finishing until after dawn. This has consequences on the combination of mitigation measures used and how these can be reported. Long operations also cause issues for observers since they cannot observe the full operation without a break. Hooks observed should be based on the number of observed hooks hauled (not total hooks per set) in order to get an accurate BPUE.
- There were some discussions on the level of detail collected by Members with respect to the mitigation measures used by fisheries. Some Members stated that greater detail was now being collected by observers, and some required fishers to report the mitigation measures used on logbooks.

9. Neither Indonesia nor South Africa were able to attend the Meeting, so their reports were tabled and questions of clarification or comments were to be passed on to the relevant Member by the Secretariat. Discussion on these reports included:

- It was noted that the very high usage of all three seabird mitigation measures in South Africa in recent years has contributed to this reduction seabird mortalities by 90%. Clarification on whether it was mandatory to use all three measures is required from South Africa.
- It was also noted that South Africa had not operated an observer program for its domestic fleet since 2011 and it was hoped that South Africa would be able to reinstate its domestic observer program in relation to SBT soon.
- Members noted the large numbers of Indonesian vessels operating in SBT areas and the very low observer coverage rate, which was less than 1% in 2015.
- Clarification was required from Indonesia on Table 3 of its report, in particular the units used for observed mortality rates.

2.2. Cooperating Non-Members

10. The Philippines did not submit an Annual Report to the meeting.

Agenda Item 3. Reports of meetings and/or outcomes of other organisations relevant to the ERS Working Group

11. BirdLife international presented a summary of its work in relation to albatrosses in 2015 – 2016 (CCSBT-ERS/1703/19. This has included participation in the bycatch and ecosystem working groups of the five tuna RFMOs (tRFMOs); continuation of the Albatross Task Force in seven countries; a range of activities to support various tuna fleets to implement seabird bycatch mitigation measures; continuation of the albatross and petrel tracking database; as well as a number of species-specific activities.

12. BirdLife also provided the meeting with an update on the CCSBT SMMTG[1] outcomes and ERSWG 11 recommendations that have been taken up as part of the GEF Common Oceans project, as requested by ERSWG 11. In particular this includes facilitating a joint tRFMO seabird bycatch assessment and a program of work aimed at national scientist capacity building in relation to seabird bycatch analysis. The Common Oceans project is supporting two regional workshops in 2017, and plans global seabird bycatch assessment workshops in 2018/19. The first regional workshop was held in South Africa in February 2017, attended by national scientists from Japan, Taiwan, South Africa, Brazil, Uruguay, Mozambique, Namibia and the Seychelles. Participants at this workshop supported the CCSBT ERSWG 11 proposal of the value of taking a two-tier approach to seabird bycatch assessment by combining regular monitoring by each tRFMO with periodic joint tRFMO seabird assessment. The workshop recommended taking a modelling approach to estimate BPUE in order to monitor BPUE over time. The workshop also identified that where fleets differ in their bycatch rates, it would be highly valuable to have collaborative analyses to identify the factors causing these differences.

13. The meeting recognised the value of the activity planned Birdlife International under the Common Oceans (ABNJ) Tuna Project to conduct a joint assessment with national scientists of the effectiveness of seabird mitigation in tuna RFMOs.

14. The Chair presented his report on the Joint Meeting of tRFMOs on the Implementation of the Ecosystem Approach to Fisheries Management held in Rome on the 12th – 14th December 2016 (CCSBT-ERS/1703/09). The final report of this meeting was not available at the time of the ERSWG meeting but will be provided to participants when available. The Chair noted that an ecosystem approach to fisheries is largely a management planning exercise, requiring the identification of explicit objectives, so it must be initiated at a Commission level. An additional workshop may be held later in 2017 to further progress the issue. The Chair also noted the different nature of CCSBT, compared to other tRFMOs that have specific areas of competence specified in their Conventions. The Chair pointed out that it would be helpful for the ERSWG to consider which are its responsibility to assess and which may be more appropriately within the jurisdiction of another tRFMO. The Chair also thanked CCSBT for its support to attend this meeting.

15. The ERSWG noted that there was a need for a common definition of ecosystems based fisheries management (EBFM) in the context of tuna fisheries. Implementation of EBFM is a potentially large area of work, and it was considered that Commissions need to decide on the objectives to be addressed for individual RFMOs and to provide direction to their scientific bodies.

16. The Secretariat briefly introduced papers CCSBT-ERS/1703/Info01 and CCSBT-ERS/1703/Info02 which provided updates from the IOTC[2] and ICCAT[3] Secretariats in relation to work those RFMOs have commenced to assess the effectiveness of the mitigation measures they have adopted. Both have been hampered by lack of data for these analyses. Both RFMOs are continuing their

[1] Effectiveness of Seabird Mitigation Measures Technical Group.
[2] The Indian Ocean Tuna Commission
[3] The International Commission for the Conservation of Atlantic Tunas

work in 2017-18, including pursuing progress intersessionally through the Common Oceans (ABNJ) Tuna Project.

17. The Chair briefly introduced paper CCSBT-ERS/1703/Info14 containing the final report of the January 2015 tRFMO Expert Working Group Harmonisation of Longline Bycatch Data Collected by tRFMOs. The final report of this meeting was not available when the ERSWG last met.

18. The convenor of this Expert Working Group advised that at a broad level, the observer data standards across the tRFMOs are quite consistent and harmonised, but subtle differences existed in the detail. Two particularly relevant conclusions from the meeting were: (1) to trial a uniform data form (e.g. ERSWG style) in all other tRFMOs to achieve consistency in reporting across bycatch species (WCPFC[4] have been trialling some methods to do this). This would allow collaboration for global analysis of observer data collected by tRFMOs. (2) that effective analysis of mitigation measures may require more than an assessment of whether a measure was used or not, and details on specifications of mitigation measures being used. In many cases this information has not been collected by observer programs.

19. It was noted that identification of best practice for observer data fields was as important, if not more important, than simply harmonising data fields, because of the risk of dropping to the lowest common denominator. Therefore, tRFMOs should work toward continuous improvements appropriate to their individual needs.

20. The meeting was informed that after the Expert Working Group meeting, WCPFC and SPC[5] developed a CCSBT-like template for reporting observer bycatch information (WCPFC-SC12-2016/EB WP-12) and information will be posted online in digital form and loaded into the Bycatch Management Information System (BMIS). IOTC is working towards a similar template for observer bycatch data and in 2016, IATTC[6] made all of its public domain purse seine and longline observer data for sharks available online.

21. The Secretariat introduced paper CCSBT-ERS/1703/Info15 which provided an update of the status of sharks and rays under the Convention on the Conservation of Migratory Species of Wild Animals and the Memorandum of Understanding on the Conservation of Migratory Sharks (CMS-Sharks). There were twelve species that CMS-Sharks considered to be of relevance to the CCSBT based on the distribution of those species. Three of these species (the Great White shark, Basking shark and Giant Oceanic Manta Ray) are listed in CMS Appendix I. The Secretariat suggested that the ERSWG should comment on the degree of interaction, or lack of, between these species and the SBT fishery and that this could be considered under the agenda item on sharks.

22. The Chair noted that the paper made potentially erroneous assumptions about the extent of fishing operations that fell under CCSBT's jurisdiction and that obtaining data about the extent to which the SBT fishery interacts with the listed shark species would help determine the relevance of these species to the CCSBT.

[4] Western and Central Pacific Fisheries Commission
[5] Pacific Community
[6] Inter-American Tropical Tuna Commission

Agenda Item 4. Review of progress with the work program from ERSWG 11

23. The Chair suggested that the workplan be streamlined to remove routine items at the end of the meeting. The workplan would then identify specific projects to be conducted intersessionally together with who is responsible for those projects. This is to be discussed further in agenda item 9.

24. The Secretariat advised the meeting that one item on the workplan, related to BMIS, was not scheduled for discussion elsewhere in the agenda. The Secretariat advised that BMIS team in SPC is considering approaches for including information about observer programs in BMIS as requested by the ERSWG. The BMIS team has also signalled its interest to have relevant ERSWG papers (or at least the meta-data about such papers) made available via BMIS and the Secretariat asked whether the ERSWG supported making publicly available ERSWG papers available on-line via BMIS. The meeting agreed to this approach.

25. The WCPFC advised that the BMIS website is currently being hosted by the WCPFC. The web address for BMIS is http://www.wcpfc.int/bmis. It was also noted that a new BMIS web site is being developed.

Agenda Item 5. Information and advice on ERS

5.1 Seabirds

5.1.1 Information on stock status

26. ACAP presented a summary of the status and trends of all ACAP listed species whose range overlaps with the SBT fishery (CCSBT-ERS/1703/15). Of 22 albatross species listed by ACAP, 18 overlap with SBT fishing effort and of the nine petrel species listed, seven overlap with SBT fishing effort. Of the 25 species considered, 11 are declining, seven are stable, two are unknown and five are increasing. The most notable change in population trends since ERSWG11 was for shy albatross, changing from an increasing trend to decreasing. Of the 25 species considered, two are listed as Critically Endangered, five as Endangered, ten as Vulnerable, six as Near Threatened and two as Least Concern on the IUCN Red List. In addition to the species levels trends identified in the paper, ACAP advised that a number of high priority populations had been identified which exhibited particularly concerning declines. Six of these populations overlap with SBT fishing effort.

27. New Zealand advised the meeting that a recent study[7] of the Antipodean albatross has indicated the population is in continuous decline since 2004. A preliminary hypothesis is that these albatross are suffering from nutritional stress

[7] Elliot, G. and Walker, K. (2017). Antipodean wandering albatross census and population study 2017. *Albatross Research. 13pp.*

which may have contributed to the expansion of the foraging range of tracked adults especially females and reduced nesting success.

28. The relationship between the decreasing trend of Antipodean albatross populations and SBT fisheries was discussed. It was noted that overlap of Antipodean distribution and SBT fisheries has been tracked prior to 2004. Since 2004, foraging range of Antipodean albatross has increased, increasing the level of overlap. It was noted that adult survival has decreased from 0.96 to 0.90 since 2004[7], which is significant for a long lived, slow breeding species.
29. It was noted that the tuna longline fishery operated in much broader area with longer seasons and with much higher intensity in the 1980s and the 1990s, when the stock of antipodean albatrosses increased, than the period of the mid-2000s and after. The change in the relative overlap of southern bluefin tuna fisheries and Antipodean albatross range expansion needs investigation.
30. It was noted that there is serious concern for a range of species and until assessment updates provide evidence of improved population status, concern should remain.
31. It was noted that most seabird tracking data were for adult birds, particularly adult breeding birds, with few data from juveniles.
32. It was reiterated that the mandate of this working group is to discuss species that are affected by SBT fisheries and not to limit those discussions to cases where southern bluefin fishing is proven to be the primary cause of a population decline.
33. Taiwan presented paper CCSBT-ERS/1703/Info05, which is a preliminary report for Taiwanese longline fleets in the three oceans. This paper analysed the observer data from 120 Taiwanese tuna longline vessel trips south of 25°S between 2010 and 2016. Thirteen species of albatross were identified. The percentage of albatross was highest in the Pacific Ocean and lowest in the Atlantic Ocean. The nominal bycatch rate was higher in the southwestern Pacific Ocean and southwestern Atlantic Ocean. Although the bycatch numbers were higher in the area between 30° and 40°S, the bycatch rates were higher in the area south of 40°S.
34. It was noted that there has been potential misidentification of species and that Taiwan is working with Birdlife to check this.

5.1.2 Ecological risk assessment

35. New Zealand presented paper CCSBT-ERS/1703/12. As noted at CCSBT ERSWG 10 and 11, New Zealand has been intending to extend the risk assessment framework applied to main fishing methods within the New Zealand Exclusive Economic Zone (EEZ) to a broader set of fisheries as seabirds migrate widely and interact with a wide range of fisheries across multiple EEZ and RFMOs. This paper presents the progress on this to date, where the methodology has been applied to public tRFMO fishing data throughout the southern hemisphere for the 26 ACAP listed seabird species that breed in the southern hemisphere. The intention for this risk assessment is to undertake a second iteration later in 2017 including additional data for tRFMOs and including other fishing methods operating within the southern hemisphere.

36. New Zealand noted that where SBT was targeted but not caught, fishing effort may not have been attributed, or reported, to CCSBT. Therefore, the extrapolation was required to take account for these data gaps.

37. It was also noted that the uncertainties included in the risk assessment include seabird population parameters and vulnerability to capture and the assumption of common behaviour in vulnerability between New Zealand fisheries and other fleets. The authors welcome a collaborative approach to overcome such data constraints for future iterations of this research and will discuss fishing effort data constraints with the relevant RFMO Secretariats.

38. The need for better spatial data to be used in the assessment was highlighted, and it was suggested that the model should be tested against what we know of risk for some species.

5.1.3 Estimates of ERS mortality and associated uncertainty

39. ACAP presented a summary (CCSBT-ERS/1703/16) of work currently underway to monitor and report on the performance of ACAP using a Pressure-State-Response framework. The primary Pressure indicator for bycatch is comprised of two linked components: 1) the seabird bycatch rate across each of the fisheries of ACAP Parties, and 2) the total number of birds killed (bycaught) per year per ACAP species (per species where possible). The Seabird Bycatch Working Group of ACAP is currently undertaking work to identify issues that need to be considered in estimating and reporting against these bycatch indicators, such as undetected mortality and uncertainty in species identification, and to develop guidelines for dealing with these issues. It is also considering the range of estimation methods available, and seeking to propose guidance and recommendations to achieve consistent reporting. The framework for reporting is intended to allow a range of methodological approaches to be used, ranging from simple ratio estimates where data is sparse, through to quantitative risk assessment approaches that may use complex models. This paper provided an outline of the recommendations and guidelines that have been developed to date and ACAP sought to encourage linkages between this ACAP process and similar work being discussed and undertaken within CCSBT and other RFMOs.

40. It was noted that the seabird groupings of ACAP and CCSBT are not the same. ACAP noted their species groupings were designed with the intention of coping with species misidentification. The question was raised of whether using ACAP's groupings instead of CCSBT's could reduce the likelihood of species misidentification. The ERSWG agreed to stay with its current species groupings.

41. The improvement in species identification by CCSBT fleets in the last five years was acknowledged, but it was noted that there is potential for more work to be done in this area.

42. It was suggested that a decision matrix or decision tree would be useful for providing guidance on which type of method should be used in analysing bycatch data in different circumstances.

43. ACAP stated that the approach in this paper is an effort to move towards providing parties and others with analysis methods to allow them to carry out their own analysis on their data (rather than ACAP collecting the data and

carrying out the analysis). It is ACAP's hope that RFMOs can provide bycatch information from their zones that are comparable. It was noted that the Common Oceans (ABNJ) Tuna Project will also support work to identify best practice methods for estimating BPUE and total number of birds caught.

44. Japan presented paper CCSBT-ERS/1703/26. Hourly CPUE pattern of target and non-target species were estimated by the data collected by longline observers in relation to the time of sun rise and sun set, to investigate the effect of time zone of longline gear setting on the catches of target and bycatch species. The catch rate of southern bluefin tuna peaked between -4 hours to +6 hours after sun rise. The catch rate of bigeye tunas and albacores peaked during daytime, catch rate of swordfish increased around sunset. Catch rate of non-target species peaked at a variety of times throughout the day. Bycatch rate of seabirds dramatically decreased in the night time compared to the catch rate in the day time including nautical dawn. These results indicated that efficient setting operation timing varied between target species and that night setting would be very effective for seabird mitigation.

45. It was noted that this is an important area to investigate and it was encouraging that there are plans to expand this research. In expanding this research, it was suggested that the effect of the stage in the lunar cycle on seabird bycatch rates also be evaluated.

46. Following a suggestion that Japan standardise for other factors potentially influencing catch rate before drawing conclusions about the effects of time of the day, it was explained that the relative time scale to sunrise/sunset were used in this study and this could adjust the effect of the season and area.

47. Japan presented CCSBT-ERS/1703/27. This paper examined the statistical characteristics of the occurrence of seabird bycatch in the longline fisheries using the data collected through the Japan's on-board observer program in the period of 1997 to 2015. Only data on the operations conducted south of 35S was utilised. The distribution of occurrence of seabird bycatch, both by operations as well as at the level of cruises, indicated a strong skewedness toward lower values with a long tail in the upper end. Around 10 percent of efforts with high seabird bycatch accounted for about half of the total bycatch. The variability in average bycatch rate among the cruises was considered to reflect a range of effectiveness of the mitigation measures that the fishers had applied. The analysis revealed a positive relationship between the BPUE and the amount of hooks observed. The authors considered the average seabird captured per operation, showed more consistency than the BPUE against the number of hooks observed, and is preferred as a standard indicator of bycatch rate.

48. Japan presented paper CCSBT-ERS/1703/28. Observer and log-book data of Japanese longliners that operated in the southwest during 2010 – 2015 in the southwest Pacific were analysed to provide basic information of seabird data analysis in this region. In the southwest Pacific, Japanese longliners bycaught seabirds in the Tasman Sea (areas 2 and 3) where they mainly targeted southern bluefin tuna. There is an apparent reverse trend of seasonal CPUE patterns were observed between seabirds and southern bluefin tunas, i.e., seabirds CPUE was higher in 1st quarter than 2nd quarter while southern bluefin tuna CPUE was higher in 2nd quarter. Japanese longliners also actively operated in the region north of New Zealand (areas 4 and 5) where they targeted on bigeye tuna, and

some seabirds were bycaught in area 5. In waters west of the date line (areas 1 – 6), seabird bycatch mainly occurred in the area south of 30S. On-board observers reported a high seabird bycatch ratio in the eastern area of New Zealand (areas 7 and 8) in 2014 and 2015, while the amounts of effort deployed in this area in 2014 and 2015 were less. These results should be considered in further analysis of seabird data.

49. It was noted that the bycatch of seabirds, particularly the shy group, Buller's and the wandering albatross group, increased in recent years. It was further noted that shifting of effort by observers into fishing areas and seasons where Japanese observation had not previously occurred, where the bycatch rate of seabirds is high, may be the cause for higher bycatch rates.

50. Japan explained that the analysis in CCSBT-ERS/1703/28 utilised much smaller area stratifications, therefore some of their bycatch rate can become higher than those observed in the CCSBT area level.

51. Japan acknowledged that evaluating the effectiveness of seabird mitigation measures is important.

52. It was noted that changes in seabird BPUE requires careful consideration as improved observer coverage may uncover high catch rates that had been previously undetected.

53. Japan briefly summarised papers CCSBT-ERS/1703/Info11, Info 12 and Info 13.

54. Paper CCSBT-ERS/1703/Info11 modelled the bycatch occurrence rate in response to the factors of year and season and examined longitudinal changes in the rate across years. It used operational data obtained by scientific observers from 1997 through 2015. As a preliminary analysis, differences in species composition of sea birds bycaught between northern and southern regions of waters south of 20^0S were examined through hierarchical cluster analysis. Bycatch species composition was changed at the boundary of 40^0 S, 35^0S and 40^0S, off Cape, in Indian Ocean and in the Tasman Sea, respectively. Presence/absence of seabird bycatch data by set was modelled with the generalised additive model (GAM). The data for the GAM analysis were split in two by a boundary dividing the data into northern and southern areas. The model showed estimated bycatch occurrence rate varied at relatively low levels in the northern area, while it varied at relatively high levels in the southern area. Bycatch occurrence rates in an east-west direction differed not only among year periods but also among seasons in both waters north and south of 35^0S. Longitudinal variation of bycatch occurrence rate among year and season was considered important to estimate total bycatch number.

55. Paper CCSBT-ERS/1703/Info12 analysed the factor affecting bycatch occurrence rate. Random forest was applied to the analyses. Four models were constructed examining effect of species group, season, year, environmental factors, distance from the colonies, a lunar phase, and catch of fish. The model was likely to be a statistically appropriate model because out of bags estimates of error rate is within an acceptable range though a little high. Dominant variables in common with the four analysed models were latitude, longitude, elapsed days from the first day of the year, number of observed hooks, species group, sea surface temperature in this study. Also year, cruise ID and lunar phase were dominant variables in common with two to three models. Those variables would have the

largest impact on bycatch occurrence rate. Thus, it was suggested that those variables should be considered in the comparison between CPCs and in the collaboration work.

56. It was noted that some seabird species breed every two to three years making them particularly susceptible to adult mortality and therefore this should be taken into account when incorporating the relevance of season into bycatch analysis. It was also noted that unlike fish, for which catchability remains relatively constant, the catchability of seabirds can be affected by a number of variables, which raises complications in analysis.

57. Paper CCSBT-ERS/1703/Info13 reviewed seabird bycatch data collected by on-board observers in the area south of 25S in the Atlantic and the Indian Ocean in recent years. Results revealed there is common tendency between the southern bluefin tuna catch pattern and seabird bycatch pattern. Seabird bycatch patterns are also suggested to be influenced by geographical area as well as environmental conditions. The results of this study also indicated that the recent increasing trend of the nominal CPUE of seabirds is biased by the recent increase of the observer data in the area with higher seabird CPUE. The authors indicated that these findings should be considered in the future catch and effort data analysis.

5.1.4 Assessment and advice on mitigation measures

58. Australia presented paper CCSBT-ERS/1703/10 that compared seabird conservation and management measures of IOTC, and WCPFC and ICCAT with best practice advice on seabird bycatch mitigation in pelagic longline fisheries developed by ACAP. These measures varied across tRFMOs in language and scope. The tRFMOs continue to apply two out of three mitigation measures including branch line weighting, bird scaring lines, and night setting.

59. A query was raised regarding the information inputs to ACAP advice. ACAP confirmed that ACAP advice is based on robust scientific analysis and tested against rigorous criteria. CCSBT-ERS/1703/10 provides links to the scientific information underpinning the updated ACAP advice. The ERSWG has been given access to this information on a confidential basis.

60. ACAP presented an update on their best practice mitigation advice (CCSBT-ERS/1703/17). In determining best practice mitigation, fishing technologies are assessed against a suite of criteria. As well as criteria requiring evidence of reduction in seabird mortality, other criteria consider matters such as practicality, cost effectiveness and any effect on target species catch rate. The most recent review was conducted in May 2016, and CCSBT-ERS/1703/17 presents a distillation of that review for the consideration of the ERS.

61. In the document, ACAP confirmed that the simultaneous use of weighted branch lines, bird scaring lines and night setting remains the best practice approach to mitigate seabird bycatch in pelagic longline fisheries. Among these three measures, changes to previous advice apply only to the recommended minimum standards for line weighting regimes. These have now been updated to the following configurations:

    - 40 g or greater attached within 0.5 m of the hook; or
    - 60 g or greater attached within 1 m of the hook; or

- 80 g or greater attached within 2 m of the hook.

62. In the document, in addition, ACAP endorsed the inclusion of hook-shielding devices in the list of best practice mitigation measures. These devices encase the point and barb of baited hooks until a prescribed depth or immersion time has been reached. This prescribed depth or immersion time is set to correspond to a depth beyond the diving range of most seabirds, thus preventing seabirds gaining access to the hook and becoming hooked during line setting. The devices also provide additional weight, applied at the hook, on setting. Two such devices were assessed as meeting the required performance criteria, and both devices met the new minimum standards for line weighting. These devices represent an alternative, stand-alone, best practice mitigation option.

63. It was noted that in regard to the request by the Extended Commission to examine seabird mitigation measures, if mitigation measures were found to be inadequate, ACAP best practice should be taken into account in determining the appropriate remedy.

64. A Concern was raised about the effectiveness of seabird mitigation measures in varying seasons, areas, conditions at sea, and their effect on the catch rate of target species. ACAP confirmed that effect on the catch rate of target species was a criteria against which best practice mitigation advice was tested. It was suggested that mitigation research be carried out specifically in SBT fisheries, taking into account varying areas, seasons, gear type, etc.

65. Birdlife presented CCSBT-ERS/1703/Info06, which provided the results of a 2011 analysis of the distribution of albatrosses and giant-petrels using data from the Global Procellariiform Tracking Database (www.seabirdtracking.org). For the purpose of this analysis, the CCSBT area was defined as the 5x5 degree squares where SBT had been caught in the previous 5 year period. Of the five tRFMOs, the CCSBT had the highest overlap with albatross and petrel distribution, amounting to over 50% of total breeding and non-breeding distribution, which identifies the importance of CCSBT fisheries in relation to albatross. An update to this analysis is planned in 2017, which will make use of additional tracking data now available.

66. The question was raised as to whether the group considered the seabird mitigation measures to be adequate in addressing seabird bycatch. Some Members suggested that further research of mitigation measures was required before answering this question. The Chair reminded the group that it was worth keeping in mind the precautionary approach with regard to seabird bycatch and that complete information was not necessary in providing advice on this issue. It was also noted that other tRFMOs may not yet have had an opportunity to consider implementation of the recent advice from ACAP.

67. Relating the subject of this agenda, it was reported that the analysis of CCSBT-ERS/1703/27 suggested a relatively consistent risk of seabird bycatch throughout the area south of 35S regardless the year. The analysis also indicated that the majority of fishers succeeded in keeping the seabird bycatch rate to 0.12 birds per 1000 hooks or less.

68. Despite the recognition of improvements in mitigation measures, no Members stated satisfaction with the status quo, which implied that it is not adequately meeting the needs of this Commission. It was noted that CCSBT-ERS/1703/05

and in discussions during the meeting that no indication has been provided that seabird bycatch rate has decreased over the last few years. Therefore, there is a basis that more work should be done to reduce bycatch. Three key points were highlighted in moving forward with this work: 1) appropriate and effective education and outreach – collaborative work between seabird scientists and fishers; 2) effective monitoring, control and surveillance; and 3) effective regulations. In regard to education and outreach, Japan's work in this area was acknowledged.

69. New Zealand presented paper CCSBT-ERS/1703/13, which provided a list of potential methods to apply in defining high risk areas using the waters around New Zealand as an example. While these options are shown at a fine spatial scale (0.2 degrees cells), the authors consider that for CCSBT, 5 degree cells would be more appropriate given data availability and complexity in managing at a finer resolution. Three methodological approaches ("methods") each applied to three sets of seabird species ("species sets") were presented and discussed, recognising the strengths and weaknesses of each approach. The three methods, are based on: 1) density of seabirds as a proxy for risk of capture; 2) spatially located predictions of seabird fatalities and; 3) sum of risk ratio. The number of seabird species are limited in order to make the resulting high risk areas relevant to the species most at risk, either overall or in terms of the risk from pelagic longlining.

70. The document indicated that the considerable drawback to Method 1 (combined seabird density) is that all seabirds are considered to be equally likely to be captured when present in an area, and all captures are considered equally impactful on the species. This means that some species included may be at risk from other fishing methods and may misrepresent risk from Surface Longline (SLL). Additionally, large areas not relevant to seabirds that face a sustainability risk specifically from SLL could be defined as high risk areas.

71. The document noted that Method 2, using spatially located predictions of seabird fatalities, narrows the areas of risk to areas of overlap between seabird populations, SLL effort, and observed captures. Following this method, high risk areas would be defined where seabirds are caught in high numbers by SLL fishing.

72. The document noted that Method 3, uses the sum of the risk ratio, limits the areas of risk to areas of high overlap of Annual Potential Fatalities (APF) and seabird populations already defined as species at risk by a quantitative risk assessment. Method 3 is the most specific and sophisticated option proposed, as this option limits high risk areas to places where the most at-risk seabirds are at most risk from SLL fishing. The choice of species set does not substantially change the areas of highest risk ratio. This is because most of the cumulative risk (total risk across all species) comes from these same at-risk species.

73. In determining high risk areas, the Chair asked whether the objective was in characterising high risk areas on bird distribution or in terms of SBT fishing activities, which would require fishing effort to be incorporated into the criteria. It was noted that the bird distribution of increased temporal resolution, e.g. monthly, would be useful for planning the operational tactics effecting in avoiding potential risk of seabird bycatch.

74. New Zealand asked the group to agree on a preferred method and offered to conduct the analysis using that method. Result from that analysis will be reported back to the Extended Scientific Committee (ESC) and the Extended Commission (EC) as an initial step in addressing the request from Commissioners that ERSWG identify high risk areas. The group agreed that this analysis should not prejudice further discussion surrounding the definition of high risk areas or the potential application of remedies. With that shared understanding, the group agreed to support New Zealand in applying option 3A, using the sum of the risk ratios for all species included, as the preferred method.

75. New Zealand thanked the group for their endorsement and will present the results as soon as they become available.

76. Section 5.1.4 was summarised in relation to the requests of the EC to the ERSWG. CCSBT 23 directed the ERSWG, at its 2017 meeting, to specifically:

- **examine seabird bycatch mitigation measures currently in place in the 'spatially-based' RFMOs; and**
  - The meeting noted that there is a degree of inconsistency among the current requirements of the 'spatially-based' tuna RFMOs. Branchline weighting and night setting currently substantially coincide, while there is variability in the specification of bird scaring lines. These tRFMOs are currently considering updated ACAP advice concerning line weighting and new information on hook shielding.
  - The meeting supported the activity planned by Birdlife International under the Common Ocean (ABNJ) Tuna Project to conduct a joint assessment with national scientists of the effectiveness of seabird mitigation in tuna RFMOs.
- **the best available information on the distribution and population status of seabirds; and**
  - The meeting noted that the status of ACAP listed species has changed little but will be updated this year. The meeting also noted that distribution maps are also to be revised but expect that overlap with fishing for SBT will still represent a large proportion of many species' distribution in both breeding and non-breeding periods.
- **provide advice to ESC22 and EC24 on whether these mitigation measures should be strengthened; and**
  - The meeting noted the preliminary risk assessment for 26 ACAP listed species and its attribution of a large proportion of the estimated Annual Potential Fatalities of these seabird species to SBT fisheries. The meeting confirmed that the level of interaction between seabirds and SBT fisheries has remained at a high level and is still a significant level of concern.
  - This suggests that mitigation measures and their implementation should be further promoted.
- **if they should be strengthened, how they should be strengthened.**
  - The meeting noted ACAP's updated advice on what constitutes best practice mitigation measures for seabirds. It provides a practical guide for examining new technology and future improvement of mitigation measures. The meeting also agreed that suggested improvements could also be made to the implementation of current seabird mitigation requirements (such as

through education and outreach, and verification that fishing vessels are applying the requirements according to specifications). The meeting encouraged the continued research by Members to develop and improve mitigation practices for seabirds.

5.1.5 Seabird species identification

77. ACAP provided a summary of two recently developed guides in CCSBT-ERS/1703/18. One is a seabird identification guide to assist observers in the identification of seabirds and the second is a hook removal guide to assist in the handling of bycaught individuals that are hauled alive to increase their chance of survival upon release. It was outlined that identification to species level can be achieved in several ways by (1) improving the capacities of on-board observers, (2) developing and providing tools (e.g. guides) to assist with identification, or (3) retaining carcasses, obtaining biological samples, or taking photographs for later processing and identification.

78. ACAP indicated that the seabird identification guide not only provides a key to aid identification to species level, but also includes appropriate information on juvenile birds. Additionally the guide includes protocols for taking photographs and collecting feather samples for DNA analysis when on-board identification may not be possible. This guide is made available in electronic format, which may be printed, and has been translated into several languages.

79. ACAP encouraged feedback on the utility of the guide at any stage so that ongoing improvements can be made. It was also highlighted that ACAP and BirdLife are supporting the strengthening of observer programmes, including the implementation of on-board training, training national scientists and supporting the collection and curation of samples and photographic material that can subsequently be used by land-based researchers.

80. In relation to the EC request that advice be provided on improving methods of seabird identification, it was noted that feather collection is an effective method for species identification. Japan commented that they collected DNA samples via pectoral muscle, whilst New Zealand carries out necropsies on some birds including providing age and set data.

5.2 Sharks

5.2.1 Information on stock status

81. New Zealand presented paper CCSBT-ERS/1703/14, which is an updated version of a paper presented at ERSWG 11 by New Zealand, and is available as CCSBT-ERS/1703/BGD01. The current study updates several abundance indicators for blue, porbeagle, and mako sharks, the main shark species caught in New Zealand's tuna longline fishery. Distribution indicators for all three species were extended by two years, and standardised catch per unit effort (CPUE) indices for porbeagle sharks were extended by two years. The distribution indicators were consistent for all three species in showing either increasing trends throughout the period 2005–2015, or an increasing trend followed by stabilisation at a constant level. CPUE indices for porbeagle shark from the Japanese charter tuna longline fishery in southern New Zealand (the Japanese charter fleet South fishery)

showed a strong increase in the last two years, whereas in northern New Zealand the indices for domestic and Japanese charter vessels combined (the North fishery) were relatively flat. The longer time series of the Japanese charter fleet for South observer indices showed little change since the early 2000s apart from a small increase since 2013. A large peak in 1998–2000 was anomalous and cannot currently be explained, but it is independently corroborated by a peak in reported commercial landings during 1998–2000. The North fishery observer data suggest that porbeagle abundance declined to low levels during the early 2000s but has since increased substantially, although since 2008, the indices have been variable without any clear trend. When taken as a group, the indicators suggest that the porbeagle population around New Zealand has been stable or increasing during the last decade.

82. New Zealand was questioned as to whether the foreign charter vessel fleet no longer fishing in New Zealand's EEZ would likely have an impact on the abundance of these three species, and whether this report had implications for shark stock abundance outside of the New Zealand EEZ. New Zealand responded that there were other studies that showed different and even conflicting trends outside of the New Zealand EEZ, and that it is unknown whether trends shown in this paper are evidence of changes in the larger stock, or are only evidence of local availability of the stock.

83. The Chair asked New Zealand to elaborate on the methodology, especially regarding the description of the New Zealand surface longline fleet as targeting bigeye tuna and swordfish as well as southern bluefin tuna. New Zealand explained that the effort in the Japanese charter fleet South fishery is exclusively targeting southern bluefin tuna, whereas the effort in the North fishery sometimes targets swordfish or bigeye, depending on the time of year.

84. The Chair also asked whether the paper suggests that the targeting of sharks has changed over the time period included in the study. New Zealand responded that there are no (or very few) fisheries in New Zealand that target these three species. Changes to the market for shark meat, as well as the domestic shark finning ban in New Zealand mean that most sharks that are caught in the surface longline fishery are released or discarded, although there is still some processing of mako shark.

85. WCPFC presented paper CCSBT-ERS/1703/20. This paper, funded by the Common Oceans (ABNJ) Tuna Project, consisted of three types of products from the ongoing southern hemisphere porbeagle shark stock status assessment. The first was a progress report on production of indicators from all national participants and a preview of the assessment methodology prepared by WCPFC's consultant, the New Zealand National Institute of Water and Atmospheric Research (NIWA). The second was a series of flyers produced by WCPFC and NIWA to periodically inform stakeholders of progress in a newsletter-type format. The third and final product was a published report on the stock status indicators for the Japanese longline fisheries throughout the southern ocean which was prepared by the National Research Institute of Far Seas Fisheries (Japan) and NIWA (with funding support provided by New Zealand). WCPFC and the ABNJ Tuna Project sincerely appreciate this voluntary, substantial and highly useful contribution to the assessment.

86. It was noted by the presenters that all indicator analyses are complete or nearly complete. The next step will be to use these indicators and other data in a stock status assessment process. The approach to this assessment is described in the progress report. The WCPFC noted that this had been a productive and useful collaboration.

87. The presenters were questioned as to whether the report considered porbeagle to be one stock, or if they had split it into sub-stocks. The presenters responded that, given the wide distribution of porbeagle sharks around the southern hemisphere, the variation of fishing effort levels, and indices that suggest different stock trends in different areas over the same period of time, the researchers decided to divide the southern hemisphere into five areas containing five sub-stocks of porbeagle. This division is described in the progress report.

88. The presenters were asked to summarise their methodological approach. The presenters explained that this report took a "hybrid" approach, with indicator-based analysis being completed for all five sub-stocks, a quantitative risk assessment being completed for three of the five sub-stocks (and extendable by inference to the other two) and a traditional stock assessment for one sub-stock being completed for comparison.

89. The ERSWG was asked for feedback as to which elements of this research might be most useful to the ERSWG or CCSBT.

90. The Chair asked that the final report be circulated to CCSBT Members when it is made available to WCPFC SC 13. It was also agreed that it would be useful if the researchers were able to separate out SBT effort from all other effort in order to assess the impacts of the SBT fishery specifically on porbeagle stock abundance.

91. The Chair then called for any comments or questions on CCSBT-ERS/1703/Info15, which provided an update of the status of sharks and rays from CMS-Sharks.

92. The ERSWG discussed various options for determining shark (and other) species that should be considered "CCSBT relevant." The Chair noted that creating a list of relevant species, or having a list of criteria to determine whether a species is relevant, would assist the CCSBT in responding to queries from other tRFMOs and other external groups.

93. Several Members were supportive of asking all Members to report on historical catches of shark species listed as "CCSBT relevant" in CCSBT-ERS/1703/Info15 in SBT fisheries. This would help ERSWG to assess whether those shark species were correctly labelled as being "CCSBT relevant." Japan expressed concern that the data should only be made available internally, in order to avoid misinterpretation.

94. Australia suggested that it might be helpful to consider criteria developed by WCPFC for determining "key shark species." It was agreed that these criteria could be a starting point for developing CCSBT-specific criteria for what makes a species relevant.

95. It was noted that one of the five principles in the WCPFC "key shark species" criteria is whether the catch of the species occurs regularly in the fishery, which supports the usefulness of assessing historical catch levels.

96. It was also noted that one of the five principles relates to whether sufficient data on catch levels of the species are available, or could be made available. It was agreed that this principle might be applicable in any CCSBT criteria.

97. The meeting agreed that Members would be requested to provide information about the shark species caught in their fishing operations to the Secretariat (see the workplan) (i.e. in shots in which SBT was targeted or caught by CCSBT authorised vessels).

5.2.2 Ecological risk assessment

98. No papers were submitted or presented on this agenda item.

99. Japan noted that, in the past, several other tRFMOs have conducted risk assessments on shark species. It was proposed that these assessments might be useful to consider in developing any criteria for determining "CCSBT relevant" species.

5.2.3 Estimates of ERS mortality and associated uncertainty

100. No papers were submitted or presented on this agenda item.

101. WCPFC referenced CCSBT-ERS/1703/05 and noted that shark data submitted under the data exchange is divided into dead, live, and unknown life status. It was noted that it would be helpful in determining what percentage of the mortalities were "unwanted" if mortalities were divided into dead (retained) and dead (not retained). The Chair noted that this subject can be revisited under agenda item 6.

102. The WCPFC also informed the ERSWG that they will be undertaking an extensive longline tagging study looking at post release mortality. This study will help to understand the likelihood of sharks surviving when they are released alive after an interaction with a longline fishery.

5.2.4 Approaches to reduce mortality on sharks

103. The WCPFC presented CCSBT-ERS/1703/21. This paper provided a brief overview of techniques and strategies that can serve to minimise unwanted interactions with sharks in longline fisheries, including fisheries for southern bluefin tuna. Mitigation is a complex subject and the conclusions drawn in this or any overview paper from available studies may not be representative of performance across all fisheries. Nevertheless, in order to provide a framework for understanding the range of available options, this paper summarised ways of modifying fishing behaviour (setting hooks deeper, reducing soak time, and fleet communication to avoid hotspots); ways of modifying fishing gear (using circle hooks, using nylon (not wire) branchlines, and using fish (not squid bait); applying repellents or deterrents (electrical or magnetic, olfactory or chemical, and artificial bait); and options for safe handling (cutting sharks free in water or removing gear from sharks). Promising options were identified although in each case it will be necessary to further consider the mitigation's effectiveness for the fishery in question as well as the acceptability to fishers in terms of impacts to target species catches, crew safety, operational costs and environmental effects.

104. It was noted and agreed that there were currently no specific concerns about shark bycatch in SBT fisheries that warranted additional mitigation requirements. Japan expressed its concern that the ERSWG is not placing enough emphasis on stock assessments to determine whether sharks need to be protected, and is instead skipping ahead to determining how to avoid catching sharks. The Chair reminded the ERSWG that this study had been requested by the Secretariat following the request from the EC and may be of use in the future in SBT fisheries.

105. New Zealand sought clarification on what was meant by "environmental effects" as described in Table 1 of this paper. It was noted that it is often a challenge for fisheries managers to make decisions about prioritising the positive and negative effects of a mitigation gear or method. (e.g. if a certain gear were to decrease the likelihood of shark bycatch, but increase the likelihood of seabird bycatch.) New Zealand asked that "environmental effects" be better defined in future studies of this nature, and possibly broadened to include the effects of the mitigation on other bycatch species. The author noted that there have not been many studies of the trade-offs between mitigating shark and seabird bycatch, however, there was some literature on the trade-offs between mitigating shark and marine turtle bycatch.

5.3 Other ERS

106. No papers were submitted or presented for this agenda item. The ERSWG had no comments relevant to this agenda item.

5.4 Trophic interactions

107. Three documents of CCSBT-ERS/1703/23, 24 and BGD03 were explained in a combined presentation.

108. CCSBT-ERS/1703/BGD03 showed that the diet of juvenile (predominantly age 1) SBT (N = 720), caught from 11 years of recruitment monitoring surveys off southern Western Australia during summer. The diet consisted overwhelmingly of teleosts (97.4% by volume). Pilchard *Sardinops sagax* (27.4%V), blue mackerel *Scomber australasicus* (16.7%V), and jack mackerel *Trachurus declivis* (14.2%V). Pilchards were more abundant in coastal waters and jack mackerel were more frequently encountered in fish caught closer to the shelf-edge. This suggests the importance of sampling over a wide area where SBT are distributed.

109. CCSBT-ERS/1703/23 was presented for the stomach contents study of SBT in open-ocean habitats of temperate waters in the southern hemisphere. Samples were collected from longline vessels over 15 years (N=4649) by scientific observers. Of the prey, 51% by weight were cephalopods and 46% were teleosts. The dominance of cephalopods differs from the pattern for juveniles in previous studies in their coastal habitat, where most of the prey are teleosts. By weight, important preys were ommastrephid (18%), lycoteuthid (12%), and argonautid (1%) cephalopods and nomeid (8%, mainly *Cubiceps caeruleus*), paralepidid (7%), bramid (6%), and alepisaurid (6%) teleosts. The prey composition was relatively consistent among tuna sizes, sea surface temperatures, and years;

changes in prey composition were due largely to differences in the cephalopod prey.

110. CCSBT-ERS/1703/24 reviewed studies on the stomach contents of SBT. Extensive data were collected for age 1 fish in the southwestern Australia and for fish more than age 4 in the offshore feeding ground. Several areas where no or little amount of data have been collected were specified. Because pilchards frequently occurred in the stomachs of SBT in coastal areas, its stock level changed largely in the past, and actively utilised for farming of SBT, it was considered that CCSBT should monitor the stock status of pilchards in Australian coastal waters. Other prey items were non-commercial target species for which there is a scarcity of information on distribution and abundance. Other approaches, including stable isotope analysis, using archival tag data, experiments for captive fish, and these studies on other large pelagic fish distributed with SBT, were suggested. The author stressed that CCSBT has advantages to study feeding ecology and ecosystems that the scientific observer programs have developed for biological sampling and that farming technique of SBT which allows experimental studies has established.

111. It was noted that the objective of these papers is to better understand the prey of southern bluefin tuna, which may explain biological aspects of SBT. Monitoring of these prey species was suggested in order to understand stock dynamics.

112. New Zealand and Australia suggested other relevant studies, including studies on stomach contents collected by New Zealand scientific observers, stock assessments of prey species in Australia, and ecosystem modelling. Australia introduced supplementing taxonomic studies of stomach contents with genetic analysis of stomach contents using meta-barcoding techniques. Two papers of relevance are:

- Berry, O., Bulman, C., Bunce, M., Coghlan, M., Murray, D.C. and Ward, R,D, (2015). Comparison of morphological and DNA metabarcoding analyses of diets in exploited marine fishes. Mar Ecol Prog Ser 540:167-181; and
- Gleeson, D., Furlan, E. Vourey, E., Bunce, M., Stat, M., Allain, V. and Nicol, S. (2015). Application of molecular technologies to monitor the ecosystem of the WCPO. WCPFC-SC11-2015/EB-IP-04. Western and Central Pacific Fisheries Commission Scientific Committee, Eleventh Regular Session. Pohnpei, Federated States of Micronesia, 5-13 August 2015.

113. It was agreed that this area of study would benefit from future collaboration by Members.

Agenda Item 6. ERS Data

6.1 ERSWG Data Exchange

114. The Secretariat presented paper CCSBT-ERS/1703/05 which contained summaries of data from 2016 ERSWG data exchange. The data were provided by Australia, Japan, Korea, New Zealand, South Africa, and Taiwan.

115. The Secretariat noted that while most Members provided data at the species level, one Member provided it at the highest taxonomic level allowed by the template, and the lowest common denominator taxonomy was then adopted for the

summaries. Since various FAO codes, English names and scientific names were reported, the Secretariat recommended that these be standardised in future.

116. The Secretariat advised that the main data issues within the summaries were: the unknown life status of a large proportion of sharks in some years; significant numbers of unidentified species, particularly albatross; and some Members' effort not fitting into the pre-defined categories for mitigation measures used.

117. The meeting agreed that based on these data, there was no evidence that bycatch rates have been reduced, but it was not possible to draw conclusions as to why this was the case. More detailed analysis was required to get more reliable estimates of ERS mortalities and understand the reasons for the high catch rates.

118. Members noted that the total number of mortalities summary statistics represent summaries of the Members' or Secretariat's simple extrapolation of observed mortalities to totals. This approach could result in large errors and the results should be treated with caution. Table 1 of the ERSWG Annual Report Template was revised to accommodate this (see **Attachment 4**). Members can provide total mortalities as a simple scaling of observer data, or if they use a more sophisticated method then they should provide details of the method in the body of the national report. The template has also been modified to separate retained mortalities from discarded mortalities, principally to identify shark mortalities that were commercial catch and did not need to be mitigated. The ERSWG data exchange template will be modified in the same manner as the Annual Report but the changes will not be implemented until the 2018 data exchange.

119. The meeting agreed that in future meetings it would be useful to have this information presented earlier in the agenda, as it was considered to be informative for other discussions.

6.2 CCSBT fishing effort data

120. The Secretariat presented paper CCSBT-ERS/1703/06, which addressed the recommendation in the ERSWG 11 workplan that the Secretariat prepare a description of the availability and resolution of SBT fishing effort data including the assumptions used in raising that data and options for improving the quality of such effort data.

121. The Secretariat advised that the effort dataset that was the most appropriate and practical for ERS purposes was the ERSWG data exchange data, and presented ways in which the quality of the data could be improved. This could be achieved by increasing the time series, and increasing both the spatial and temporal resolutions.

122. The meeting discussed the issue of whether effort reported to the CCSBT was also reported to other tRFMOs, following a question from Birdlife International on how CCSBT effort would be integrated with effort data from other tRFMOs to obtain global tuna effort distribution. Members generally thought this to be the case, but the Secretariat will follow-up with each Member to confirm this and will report the findings to Birdlife International.

6.3 Observer data

123. Australia provided paper CCSBT-ERS/1703/Info03. This study, which was previously presented to WCPFC, aims to share Australia's experience with electronic monitoring (EM) implementation in Australia's Pacific longline fishery. Specifically, the objectives of this paper are to:

    - Describe the EM system used in the Australian Eastern Tuna and Billfish Fishery (ETBF).
    - Characterise the early performance of the EM system during its first eight months of operation.

124. The study focuses on the reporting and accurate estimation of retained catch and discards across the full suite of target, by-product, bycatch and wildlife species categories. First, the design objectives and operating principles of the EM system are described. Second, the paper provides a brief summary of results from a trial of EM in Australia's ETBF previously reported in Piasente et al. (2012). Finally, the paper presents some analysis of the initial eight months of the systems operation (July 2015–Feb 2016). This includes a comparison of catches derived from EM with the same catches derived from logbooks and an examination of the changes in the nature of logbook catch and discard reporting following the introduction of EM.

125. Australia also provided paper CCSBT-ERS/1703/Info04 which is the report from the second meeting of the WCPFC E-reporting and E-monitoring Working Group. The report provides a summary of the working group meeting, including papers presented and outcomes.

126. There was a query about the need to consider ERS data collected with electronic monitoring and the implications of that as the use of electronic monitoring systems is increasing. There was also a suggestion that, given the use of electronic monitoring, it may be prudent to review the observer standards to ensure that electronic monitoring is adequately captured and that some of the other tRFMOs already have done some work on this that could be used as a starting point.

127. Australia explained that their electronic monitoring system has the main objective of improving the logbook data, and that an improvement in the logbook data has been demonstrated. Australia further noted that while a random 10% of the footage per trip is reviewed, any interactions with protected species are also reviewed to confirm the identification of the species and ensure that the incident was reported correctly in the logbooks. Some vessels also return biological samples to improve data on interactions with protected species.

128. It was noted that there are a range of ways that data could be provided. It was therefore agreed that the Secretariat would liaise with Members providing ERS data to collect metadata on the source of the data being provided.

6.3.1 Life status codes for seabirds and sharks

129. WCPFC presented paper CCSBT-ERS/1703/22. This paper provided a review of coding systems used by observers to classify the condition of sharks and seabirds interacting with longline fisheries. As for most observer data, the ultimate use of

the information is generally understood but not precisely specified, and thus it is difficult to judge whether collected data will be fit for future purposes. It is also necessary to make some assumptions about observer training and on-board time budgeting when designing data collection programmes. With these issues in mind, four tuna regional fisheries management organisations' requirements for observer-collected shark and seabird condition data were reviewed, several recent advances in understanding how interactions relate to mortality were discussed, and a number of conclusions were drawn.

130. It was noted that the CCSBT codes of condition in the observer standards was not at the level currently used in the other tRFMOs. The meeting considered changing the CCSBT codes to align more closely with the other tRFMOs, noting the codes are not all exactly the same among the tRFMOs.

131. It was noted that for seabirds the Australian system records injured birds or birds that have retained hooks as deaths since they are most likely to die after release and this was important to consider. The importance of recording whether seabirds were captured on the set or the haul was also noted.

132. ACAP noted protocols for better documenting live bird captures are available as Annex 3 of the report of the seventh meeting of ACAP's Seabird Bycatch Working Group.

133. It was also noted that there are more complexities with seabirds than with sharks so that the two may need to be considered separately and use different codes.

134. The meeting could not agree on any changes to the condition codes currently in the observer standards.

6.3.2 Guidance for observers on seabird related tasks

135. No papers were submitted or presented on this agenda item.

136. For information, ACAP noted that protocols for the SPRFMO[8] have been developed for counting seabirds in demersal longline fisheries but should be applicable to pelagic longline fisheries. The protocols are available from:

> Ramm, K., Clements, K. and Debski, I. (2015). Seabird interactions around fishing vessels and associated data collection protocols. Third Meeting of the Scientific Committee of the South Pacific Regional Fisheries Management Organisation. Port Vila, Vanuatu, 28 September – 3 October 2015. SC-03-25.

6.4 Oceanographic conditions that characterise SBT fishing grounds

137. No papers were submitted or presented on this agenda item. The ERSWG had no comments relevant to this agenda item.

[8] South Pacific Regional Fisheries Management Organisation

Agenda Item 7. Education and public relations activities

138. Birdlife tabled its paper CCSBT-ERS/1703/Info 07 on seabird bycatch education videos for the information of participants.

139. Japan Tuna presented its current approaches to promote more effective treatment on reducing seabird by-catch, which includes the strength of education and enhancement on fishers. Japan Tuna has been trying to develop some additional mitigation measures to reduce seabird by-catch more effective and convenient. Its current effort is encouraging their fisherman to have a further study "More effective utilisation on the current mitigation measures" with hosting workshop etc. Additional examination involving Flying Falcon, Laser Beam (WWF Smart Gear), LRAD and Water gun etc. is planned for development as part of mitigation measures.

140. Members thanked Japan for their efforts. It was noted that some of the methods being investigated by industry to mitigate seabird bycatch may in fact harm seabirds and should therefore be tested to ensure that is not an issue. It was also noted that it would be useful for the Japanese industry to participate in the ACAP process as it may be helpful in developing mitigation methods.

Agenda Item 8. Compliance information

8.1 Monitoring usage of bycatch mitigation measures

141. The Chair advised that the ERSWG is invited to comment on the usefulness of the information from the Compliance Committee on "Monitoring usage of bycatch mitigation measures" and to provide suggestions for improvement.

142. In relation to this, the Secretariat presented paper CCSBT-ERS/1703/07 on the information collected by the compliance committee in response to the request from ERSWG 11 for such information. The Chair thanked the Compliance Committee for responding to the ERSWG's request.

143. The meeting agreed that the information provided by the Compliance Committee was useful and informative, as it indicates that Members currently vary in terms of the systems they use to monitor use of mitigation measures by their fleets. However, that the information from the different Members varied in detail, and in general more detail was required.

144. The meeting agreed to request the Compliance Committee to consider ways to effectively monitor seabird mitigation measures. It was suggested that modifications to CCSBT's Resolution for a CCSBT Scheme for Minimum Standards for Inspection in Port and CCSBT's transhipment Resolution to provide for the collection of appropriate information was one option. This could include the examination of fishing gear for evidence of tori lines and tori poles, the presence of line weights, and the inspection of log books for evidence of night setting.

145. It was also suggested that the four Members that collect data on mitigation as part of their port inspection process, should work together to describe to the Compliance Committee the type of data that can be collected.

8.2 Minimum Performance Requirements (MPRs)

146. The Secretariat presented paper CCSBT-ERS/1703/08 on the draft revised Minimum Performance Requirements for measures relating to ecologically related species. This paper provided the ERSWG with an opportunity to consider the Secretariat's proposed revisions and additions before they are presented to the Compliance Committee for its review in October 2017.

147. The meeting did not consider it necessary for the Minimum Performance Requirements to require that a timeframe and process be specified for achieving the 10 percent observer coverage target. It was considered that this would be adequately covered through the Compliance Committee's annual evaluation of national reports and that the Compliance Committee could specify any necessary remedial action.

148. The ERSWG did not recommend any other changes to the Minimum Performance Requirements and left these for consideration by the Compliance Committee.

Agenda Item 9. Future work program

149. The ERSWG developed the following workplan. Tasks of an ongoing or administrative nature are not shown unless they are new for 2017.

Activity	Approximate Period	Resource
Determine the extent to which CCSBT effort data is reported to other tRFMOs and advise Birdlife of the outcome to assist with the production of a global tuna fisheries effort map that will be needed for the planned Common Ocean ABNJ Tuna Project to conduct a joint assessment with national scientists of the effectiveness of seabird mitigation in tuna RFMOs.	May 2017	Secretariat
Secretariat to liaise with Members to obtain meta data on the nature of the source of information for the ERS Data exchanged. In particular whether the data is sourced from observers, electronic monitoring (EM), log books with random EM verification, or a different source. The metadata is to be stored on the database and included in summaries of the data provided to the ERSWG.	July 2017	Secretariat and Members
Progress an analysis to identify potential high risk areas, using method 3A from CCSBT-ERS/1703/12.	October 2017	New Zealand
Undertake a second iteration of the seabird Ecological Risk Assessment, including additional data from CCSBT Members and tuna RFMOs and including other fishing methods operating within the southern hemisphere.	Late 2017	New Zealand lead with collaboration from other Members and Secretariat
Actively contribute to and participate in the project planned by Birdlife International under the Common Ocean ABNJ Tuna Project to conduct a joint assessment with national scientists of the effectiveness of seabird mitigation in tuna RFMOs.	2017 to 2019	Members

Activity	Approximate Period	Resource
Continue work on trophic relationships with SBT.	2017 to ERSWG 13	Japan lead, collaboration from interested Members
Conduct collaborative analyses to identify the reasons for large differences in bycatch rates between fleets.	Before ERSWG 13	New Zealand lead with collaboration from all Members
Develop a draft multi-year strategy for consideration by ERSWG 13 in relation to seabirds that identifies research, monitoring needs, and actions to reduce uncertainty and associated risks.	Before ERSWG 13	Australia lead with collaboration from all Members
For future ERSWG meetings, place the Secretariat's summary report of the Data Exchange under the agenda item for Annual Reports as this is considered to be useful information for later agenda items and it should be considered at an early time in the meeting.	When drafting the Provisional ERSWG 13 Agenda	Secretariat and Chair
Provide details to the Secretariat on which of the 12 "CCSBT Relevant" sharks species in Table 2 of paper CSBT-ERS/1703/Info15 have been caught by the Member's SBT fishery (i.e. in shots in which SBT was targeted or caught by CCSBT authorised vessels). Members may choose whether to provide presence/absence information or catch quantities. It is suggested that data be provided per year for at least the last 3 years. The Secretariat will compile this information for presentation to ERSWG 13.	3 months before ERSWG 13 (for the information provided to the Secretariat)	All Members and Secretariat
Review the CCSBT's progress against the modified SMMTG recommendations in Attachment 4 of the Report of ERSWG 11.	Before ERSWG 13	Secretariat with assistance from Members
Secretariat to analyse Members' reports to the ERSWG Data Exchange and produce a simple summary of shark species that have been reported by Members as being caught.	Before ERSWG 13	Secretariat
Review the final report of Porbeagle assessment from the shark component of the Common Oceans (ABNJ) Tuna Project.	ERSWG 13	ERSWG 13

150. The ERSWG commenced consideration of a multi-year seabird strategy to identify research, monitoring needs, and actions for reducing uncertainty and associated risks. The meeting was not able to complete the strategy in the time available, so development of the strategy has been incorporated into the ERSWG's workplan. The ERSWG noted that it would be valuable for this strategy to recall the modified SMMTG recommendations from Attachment 4 of the Report of ERSWG 11.

Agenda Item 10. Other business

151. There was no other business.

Agenda Item 11. Referral of ERS matters for consideration by CCSBT subsidiary bodies

152. The ERSWG requests the Compliance Committee to consider how to effectively monitor seabird mitigation measures through mechanisms such as port

inspections and transhipment observers. This could include the examination of fishing gear for evidence of tori lines and tori poles, the presence of line weights, and the inspection of log books for evidence of night setting.

153. The ERSWG requests the ESC to perform a review of the Scientific Observer Program Standards. The review should consider the incorporation of electronic monitoring, and consider harmonising the life status codes used by observers with the codes used by scientific observers for other tRFMOs. The ERSWG noted that for these aspects to be considered by the ESC, a Member would need to provide a specific proposal to the ESC.

Agenda Item 12. Recommendations and advice to the Extended Commission

154. The ERSWG provides the following recommendations and advice to the EC.

Seabirds

155. Ecological risk assessment (from agenda item 5.1.2):

- The meeting supported the offer from New Zealand to undertake a second iteration of its assessment of the risk from commercial surface longline fisheries in the southern hemisphere to ACAP seabird species (incorporating additional data for tRFMOs and including other fishing methods operating within the southern hemisphere).

156. Assessment and advice on mitigation measures (from agenda item 5.1.4):

- The meeting noted that the most recent scientific advice from ACAP on what constitutes best practice mitigation measures is the simultaneous use of weighted branch lines (with updated weighting configurations noted in paragraph 62), night setting (i.e. setting after nautical twilight and before nautical dawn) and bird streamer lines. In addition, hook-shielding devices have been included in the list as stand-alone alternative best practice mitigation measures, where these devices encase the point and barb of baited hooks until they are beyond the diving range of most seabirds.
- A summary of the ERSWG's response to the requests of the EC are (with the requests of the EC in bold type):
  - **examine seabird bycatch mitigation measures currently in place in the 'spatially-based' RFMOs; and**
    - The meeting NOTED that there is a degree of inconsistency among the current requirements of the 'spatially-based' tuna RFMOs. Branchline weighting and night setting currently substantially coincide, while there is variability in the specification of bird scaring lines. These tRFMOs are currently considering updated ACAP advice concerning line weighting and new information on hook shielding.
    - The meeting SUPPORTED the activity planned by Birdlife International under the Common Ocean (ABNJ) Tuna Project to conduct a joint assessment with national scientists of the effectiveness of seabird mitigation in tuna RFMOs.
  - **the best available information on the distribution and population status of seabirds; and**

- The meeting NOTED that the status of ACAP listed species has changed little but will be updated this year. The meeting also NOTED that distribution maps are also to be revised but expect that overlap with fishing for SBT will still represent a large proportion of many species' distribution in both breeding and non-breeding periods.

- **provide advice to ESC22 and EC24 on whether these mitigation measures should be strengthened; and**
  - The meeting NOTED the preliminary risk assessment for 26 ACAP listed species and its attribution of a large proportion of the estimated Annual Potential Fatalities of these seabird species to SBT fisheries. The meeting confirmed that the level of interaction between seabirds and SBT fisheries has remained at a high level and is still a significant level of concern.
  - This suggests that mitigation measures and their implementation should be further promoted.
- **if they should be strengthened, how they should be strengthened.**
  - The meeting NOTED ACAP's updated advice on what constitutes best practice mitigation measures for seabirds. It provides a practical guide for examining new technology and future improvement of mitigation measures. The meeting also AGREED that suggested improvements could also be made to the implementation of current seabird mitigation requirements (such as through education and outreach, and verification that fishing vessels are applying the requirements according to specifications). The meeting ENCOURAGED the continued research by Members to develop and improve mitigation practices for seabirds.

157. Seabird species identification (from agenda item 5.1.5):

- Methods to improve seabird identification were discussed including through the distribution and use of new ACAP identification guides (as described in CCSBT-ERS/1703/18), and through activities by various groups that provide on-board training of observers, train national scientists and support the collection and curation of samples and photographic material that can subsequently be used by land-based researchers.

Sharks

158. Information on stock status (from agenda item 5.2.1)

- Paper CCSBT-ERS/1703/20 was presented and discussed (see paragraphs 89-92). The ERSWG noted that this work was ongoing and requested that the final report be distributed to its members. The ERSWG also suggested that it would be useful if the impact of fishing for SBT on porbeagle stock abundance could be separately estimated.

159. Ecological risk assessment (from agenda item 5.2.2)

- ERSWG members agreed to report on recent catches of the 12 shark species listed as "CCSBT relevant" in CCSBT-ERS/1703/Info15. This would help ERSWG to assess whether those shark species were correctly labelled as being "CCSBT relevant."

- It was proposed that risk assessments undertaken by other RFMOs might also be useful to consider in developing criteria for determining "CCSBT relevant" species.
- The Secretariat will examine shark catches reported by Members in the ERSWG data exchange and provide ERSWG 13 with a summary of shark species that have been reported by Members as being caught.

160. Approaches to reduce mortality on sharks (from agenda item 5.2.4)

- The ERSWG considered paper CCSBT-ERS/1703/21. The meeting agreed that there were currently no specific concerns about shark bycatch in SBT fisheries that warranted additional mitigation requirements at this stage.

Trophic interactions

161. Trophic interactions (from agenda item 5.4)

- Three documents were submitted and discussed, other relevant studies were identified, and the benefits of future collaboration by members was noted.

Agenda Item 13. Conclusion

13.1 Adoption of meeting report

162. The report was adopted.

13.2. Recommendation of timing of next meeting

163. The meeting was not able to agree on the timing of the next full ERSWG meeting. Some Members preferred to have the next meeting in two years' time due to other meeting commitments and seabird work planned in association with the Common Oceans (ABNJ) Tuna Project. Others preferred a meeting in 2018.

164. Some Members suggested holding a smaller, technical meeting before the next full ERSWG meeting. This would enable technical work (such as risk assessments and methods for estimating total mortalities) to be conducted, which would allow the ERSWG to be more confident in the results presented to it. If a small technical meeting was held in 2018 then the next full ERSWG meeting could be held two years from ERSWG 12. This proposal was not agreed by all Members.

13.3. Close of meeting

165. The meeting closed at 4:46 pm, 24 March 2017.

List of Attachments

Attachment

1. List of Participants
2. Agenda
3. List of Documents
4. Reporting form for estimation of total mortality of ERS in CCSBT fisheries

Attachment 1

List of Participants
The 12th meeting of Ecologically Related Species Working Group

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Attachment 2

Agenda
Twelfth meeting of the Ecologically Related Species Working Group
21 - 24 March 2017
Wellington, New Zealand

1. Opening
   - 1.1 Adoption of the Agenda
   - 1.2 Adoption of Document List
   - 1.3 Appointment of Rapporteurs

2. Annual reports
   - 2.1 Members
   - 2.2 Cooperating Non-Members

3. Reports of meetings and/or outcomes of other organisations relevant to the ERS Working Group

4. Review of progress with the work program from ERSWG 11

5. Information and advice on ERS
   - 5.1 Seabirds
     - 5.1.1 Information on stock status
     - 5.1.2 Ecological risk assessment
     - 5.1.3 Estimates of ERS mortality and associated uncertainty
     - 5.1.4 Assessment and advice on mitigation measures
     - 5.1.5 Seabird species identification
   - 5.2 Sharks
     - 5.2.1 Information on stock status
     - 5.2.2 Ecological risk assessment
     - 5.2.3 Estimates of ERS mortality and associated uncertainty
     - 5.2.4 Approaches to reduce mortality on sharks
   - 5.3 Other ERS
   - 5.4 Trophic interactions
     - 5.4.1 Review of available data on SBT prey for both wild and farming SBT
     - 5.4.2 Discuss information on pelagic food webs

6. ERS Data
   - 6.1 ERSWG Data Exchange
   - 6.2 CCSBT fishing effort data
   - 6.3 Observer data
     - 6.3.1 Life status codes for seabirds and sharks
     - 6.3.2 Guidance for observers on seabird related tasks
   - 6.4 Oceanographic conditions that characterise SBT fishing grounds

7. Education and public relations activities

8. Compliance information
   - 8.1 Monitoring usage of bycatch mitigation measures
   - 8.2 Minimum Performance Requirements (MPRs)

9. Future work program

10. Other business

11. Referral of ERS matters for consideration by CCSBT subsidiary bodies

12. Recommendations and advice to the Extended Commission

13. Conclusion
    - 13.1. Adoption of meeting report
    - 13.2. Recommendation of timing of next meeting
    - 13.3. Close of meeting

Attachment 3

List of Documents
Twelfth Meeting of the Ecologically Related Species Working Group

(CCSBT-ERS/1703/)

1. Provisional Agenda
2. List of Participants
3. List of Documents
4. (Secretariat) Relevant Tuna RFMO Measures Concerning Incidental Catches of Ecologically Related Species (Rev.1) (ERSWG Agenda Item 5.1.4, 5.2, 5.3)
5. (Secretariat) Summaries from the 2016 ERSWG Data Exchange (ERSWG Agenda Item 6.1)
6. (Secretariat) Description of the availability and resolution of SBT fishing effort data including the assumptions used in raising that data and options for improving the quality of such effort data (ERSWG Agenda Item 6.2)
7. (Secretariat) Information from the Compliance Committee on the Types of Information Collected on Bycatch Mitigation Measures under Members' Compliance Programs (ERSWG Agenda Item 8.1)
8. (Secretariat) Draft Revised Minimum Performance Requirements (MPRs): For Science Measures and Measures Relating to ERS (ERSWG Agenda Item 8.2)
9. (ERSWG Chair) ERSWG Chair's Report on the Joint Meeting of Tuna RFMOs on the Implementation of the Ecosystem Based Approach to Fisheries Management (ERSWG Agenda Item 3)
10. (Australia) Comparing seabird conservation and management measures (ERSWG Agenda Item 5.1.4)
12. (New Zealand) Assessing the risk of commercial surface longline fisheries in the southern hemisphere to ACAP seabird species (ERSWG Agenda Item 5.1.2)
13. (New Zealand) Defining "high risk areas" in southern Bluefin tuna fisheries (ERSWG Agenda Item 5.1.4)
14. (New Zealand) Updated abundance indicators for New Zealand blue, porbeagle and shortfin mako sharks (Rev.1) (ERSWG Agenda Item 5.2.1)
15. (ACAP and Birdlife International) An Update on the Status and Trends of ACAP-Listed Albatrosses and Petrels in the CCSBT Area (ERSWG Agenda Item 5.1.1)
16. (ACAP) The Development of ACAP Seabird Bycatch Indicators, Data Needs, Methodological Approaches and Reporting Requirements (ERSWG Agenda Item 5.1.3)

17. (ACAP) Current ACAP Advice for Reducing the Impact of Pelagic Longline Fishing Operations on Seabirds (ERSWG Agenda Item 5.1.4)
18. (ACAP and BirdLife International) Summary of Tools and Guidelines Available to Assist Observers in the Identification of Seabird Species and Handling of Bycaught Individuals (ERSWG Agenda Item 5.1.5)
19. (BirdLife International) BirdLife International Report to ERSWG12 (ERSWG Agenda Item 3)
20. (WCPFC) Update on the Southern Hemisphere Porbeagle Shark (*Lamna nasus*) Stock Status Assessment (ERSWG Agenda Item 5.2.1)
21. (WCPFC) Minimizing Unwanted Shark Interactions and Mortalities in CCSBT Fisheries (ERSWG Agenda Item 5.2.4)
22. (WCPFC) A Review of Observer Codes for Recording the Condition of Sharks and Seabirds (ERSWG Agenda Item 6.3.1)
23. (Japan) Open-ocean foraging ecology of southern bluefin tuna *Thunnus maccoyii* based on stomach contents (ERSWG Agenda Item 5.4)
24. (Japan) Review of studies on feeding ecology of southern bluefin tuna *Thunnus maccoyii*: future study areas in CCSBT (ERSWG Agenda Item 5.4)
26. (Japan) New aspects of catch rates: Estimating catch and bycatch rate in fish and seabirds at each setting time from sunrise and sunset (Rev.1) (ERSWG Agenda Item 5.1.3)
27. (Japan) Statistical consideration on sea-bird mitigation measure evaluation (ERSWG Agenda Item 5.1.3, 5.1.4)
28. (Japan) Seabird bycatch of Japanese longliners in the Southwest Pacific during 2010 – 2015 (Rev.1) (ERSWG Agenda Item 5.1.3)

(CCSBT-ERS/1703/BGD)

1. (New Zealand) Indicator based analysis of the status of New Zealand blue, mako and porbeagle sharks (*Previously* **CCSBT-ERS/1503/21**) (ERSWG Agenda Item 5.2.1)
2. (Japan) Report of Japanese scientific observer activities for southern bluefin tuna fishery in 2014 and 2015 (*Previously* **CCSBT-ESC/1609/20**) (ERSWG Agenda Item 2.1)
3. (Japan) Diet of young southern bluefin tuna *Thunnus maccoyii* in the southwestern coastal waters of Australia in summer (*Previously* **CCSBT-ERS/1203/26**) (ERSWG Agenda Item 5.4)

(CCSBT-ERS/1703/Annual Report-）

Australia	Australian country report: Ecologically related species in the Australian Southern Bluefin Tuna Fishery 2013-14 to 2014-15
Fishing Entity of Taiwan	Ecologically Related Species in the Taiwanese Southern Bluefin Tuna Fishery 2014-2015 (Rev.1)
Indonesia	2017 Annual Report to the Ecologically Related Species Working Group (ERSWG)
Japan	National Report of Japan: Overview of Researches on Ecologically Related Species in Japanese SBT Longline Fishery, 2014-2015 (Rev.1)
New Zealand	Ecologically related species in the New Zealand southern bluefin tuna longline fishery (Rev.1)
Republic of Korea	2017 Annual Report to the Ecologically Related Species Working Group (ERSWG) (Rev.1)
South Africa	South Africa's Annual Report to the Ecologically Related Species Working Group (ERSWG) of the Commission for the Conservation of Southern Bluefin Tuna

(CCSBT- ERS/1703/Info)

1. (Secretariat) Update on the status of IOTC seabird work (Rev.1) (ERSWG Agenda Item 3)
2. (Secretariat) Update on the status of ICCAT seabird work (ERSWG Agenda Item 3)
3. (Australia) Catch reporting under E-monitoring in the Australian Pacific longline fishery (ERSWG Agenda Item 6.3, 8.1)
4. (Australia) Summary report for the second e-reporting and e-monitoring intersessional working group meeting (ERSWG Agenda Item 6.3, 8.1)
5. (Taiwan) Distribution of seabirds bycatch of Taiwanese longline fleets in Southern Ocean between 2010-2016 (ERSWG Agenda Item 5.1.1)
6. (BirdLife International) Albatross and giant-petrel distribution across the world's tuna and swordfish fisheries: albatross tracking analysis produced for the 2011 Joint Tuna RFMO meeting (ERSWG Agenda Item 5.1.4)
7. (BirdLife International) BirdLife/ISSF seabird bycatch education videos (ERSWG Agenda Item 7)
8. (New Zealand) Tori line designs for small longline vessels (ERSWG Agenda Item 5.1.4)

9. (Japan) Report of the 2016 Inter-sessional meeting of the sub-committee in ecosystems, ICCAT (ERSWG Agenda Item 3, 5.1.4)
10. (Japan) Report of the 12th Session of the IOTC Working Party on Ecosystems and Bycatch (ERSWG Agenda Item 3, 5.1.4)
11. (Japan) Modeling of bycatch occurrence rate of seabirds for Japanese longline fishery operated in southern hemisphere (ICCAT/SCRS/2016/163) (ERSWG Agenda Item 5.1.3)
12. (Japan) Examination of factors affecting seabird bycatch occurrence rate in southern hemisphere in Japanese longline fishery with using random forest (ICCAT/SCRS/2016/162) (ERSWG Agenda Item 5.1.3)
13. (Japan) Information of seabirds bycatch in area south of 25S latitude in 2010 from 2015 (Rev.1) (ICCAT/SCRS/2016/164) (ERSWG Agenda Item 5.1.3)
14. (Secretariat) Report from Tuna RFMO Expert Working Group on Harmonisation of Longline Bycatch Data Collected by Tuna RFMO (ERSWG Agenda Item 3)
15. (Secretariat) Update on the status of Sharks and Rays under CMS-Sharks (ERSWG Agenda Item 5.2.1)

(CCSBT-ERS/1703/Rep)

1. Report of the Twenty Third Annual Meeting of the Commission (October 2016)
2. Report of the Twenty Second Annual Meeting of the Commission (October 2015)
3. Report of the Twentieth Meeting of the Scientific Committee (September 2015)
4. Report of the Eleventh Meeting of the Ecologically Related Species Working Group (August 2015)
5. Report of the Effectiveness of Seabird Mitigation Measures Technical Group (November 2014)
6. Report of the Twenty First Annual Meeting of the Commission (October 2014)
7. Report of the Twentieth Annual Meeting of the Commission (October 2013)
8. Report of the Tenth Meeting of the Ecologically Related Species Working Group (August 2013)
9. Report of the Ninth Meeting of the Ecologically Related Species Working Group (March 2012)

Attachment 4

Table 1: Reporting form for estimation of total mortality of ERS in CCSBT fisheries

Country _____ Year (calendar year) _____

	Total & Observed Effort[1]				Observed Captures						Estimate	Proportion of observed effort with specific mitigation measures				
Stratum (*CCSBT Statistical Areas or finer scale)*	Total Effort[2]	Total Observed Effort[2]	Observer Coverage[3]	Species[4]	Captures (*number*)	Capture Rate[5]	Fate (*numbers*)			Mortality Rate[5]	Estimated total mortalities[6] (*number*)	TP + NS[7]	TP + WB[7]	NS + WB[7]	TP + WB + NS[7]	Others[8]
							Retained (dead)	Discarded (dead)	Released (live)							
TOTAL																

[1] Values in these shaded cells will be repeated for all species within a strata.
[2] For longline provide number of hooks, for purse seine provide number of sets.
[3] For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.
[4] Use FAO's 3 alpha species codes.
[5] For longline provide as captures per thousand hooks, for purse seine provide as captures per set.
[6] Total mortalities should be estimated using either a simple ratio or another approach such as modeling. If using an approach other than a simple ratio, the method used to estimate total mortalities should be described in detail within the report and 95% confidence intervals should be provided if possible.
[7] TP = tori poles, NS = night setting, WB = weighted branchline.
[8] Add extra columns for other categories of mitigation measures, including use of no mitigation measures, if required.