



Australian Government

Australian Fisheries Management Authority



Tropical Tuna and Billfish Fisheries

Research Assessment Group

(TTRAG)

MINUTES

TTRAG 7

24-25 JULY 2013

MOOLOOLABA

THE SEVENTH MEETING OF THE TROPICAL TUNA AND BILLFISH FISHERIES RESOURCE ASSESSMENT GROUP (TTRAG7)

Mooloolaba 24-25 July 2013

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List of Actions

	Action
1	AFMA to investigate if SBT catch can be included in ETBF Catchwatch reports and if previous SBT data can also be obtained.
3	AFMA to overlay Sea Surface Temperature (SST) maps with catch data for the last 12 months, to determine any trends/correlation.
4	A long-term analysis project of SST, other oceanographic factors and catch data to be made a research priority. This would be to use the current model for Southern Bluefin Tuna and re-adapt for Yellowfin Tuna. This could be done for bycatch species as well. In the mid-term, Robert Campbell to undertake a statistical analysis of the relationship between oceanography and fish distribution. AFMA to also investigate the potential for a collaborative study (with SPC and near neighbour countries like PNG, Solomon Islands, New Caledonia, Vanuatu and Fiji) that examines fine scale spatial and temporal CPUE and size data for additional information regarding mixing of tropical tuna species within and between the Australian and adjacent fishing zones.
5	In the mid-term, Robert Campbell to undertake a statistical analysis of the relationship between oceanography and fish distribution.
6	TTRAG EO to distribute WCPFC Striped Marlin paper to TTRAG members.
7	Robert Campbell to include the different gear types and fishing area in the effort summaries for Swordfish.
8	Robert Campbell to include international effort data and data per fleet in the summaries for the next TTRAG meeting (TTRAG 8).
9	Robert Campbell to investigate changes over time in the size distributions of the target species caught within the ETBF, and review the cut-off weights for the three size classes used in the ETBF harvest strategy, and report the results to the TTRAG meeting in March 2014.
10	Robert Campbell to display a time series for bycatch species on an annual basis in addition to the current quarterly basis.
11	Robert Campbell to provide a summary of the “Overview of tuna fisheries in the Western and Central Pacific Ocean” paper produced by the Scientific Committee at the TTRAG 8 meeting in August 2013.
12	Robert Campbell to investigate what data on hook type, branchline length and bubble length are available in the observer data
13	AFMA to investigate the possibility of obtaining hook type and bubble dropper length data through e-logs.

14	Robert Campbell to investigate the inclusion of the frontal index and bathymetry in the CPUE standardisation.
15	Don Bromhead to provide TTRAG industry members with a brief and simple explanation of model “fitting” and how to interpret some common model fit (diagnostic) plots at a future TTRAG meeting.
16	TTRAG to investigate the consequence of Striped Marlin as a byproduct species and the use of recreational fishing data as indices of abundance for Striped Marlin.
17	AFMA to liaise with scientific members and undertake full analysis of Escolar for review at March 2014 meeting.
18	TTRAG EO to distribute Juan C. Levesque paper on “Evolving fisheries: today’s bycatch is tomorrow’s target catch” to TTRAG.
19	TTRAG scientific members to initially compare all relevant indices relating to the nominal CPUE for Mahi Mahi. If these indices do not show a consistent trend investigate further.
20	TTRAG EO to distribute line-weighting trial report to TTRAG after it has been submitted to FRDC.
21	AFMA and the recreational fishing member to develop a paper listing any recreational research projects, with a particular focus on tagging studies and Mako Sharks. Don Bromhead to provide a brief verbal overview of any known relevant regional research projects (e.g. by SPC and member countries).
22	AFMA to investigate the possibility of a research paper webpage being developed for TTRAG on the AFMA website.
23	Any new research priorities should be added to the Annual Research Statement and the list is to be distributed to TTRAG members prior to the August 2013 meeting.
24	TTRAG EO to distribute TTRAG stock status advice document to TTRAG members prior to August meeting.
25	TTRAG EO to distribute FRDC media release to TTRAG.

1 Preliminaries

1.1 *Welcome and apologies and attendees*

1. The TTRAG Chair, Sandy Diamond opened the meeting.
2. Attendees

Members

Dr Sandra Diamond, Chair – University of Western Sydney
Steve Auld – AFMA
Dr Rob Campbell - CSIRO
Garry Heilmann - Industry
John Abbott - Industry
Angelo Maiorana - Industry
Dr Don Bromhead – Independent scientist
Dr Julian Pepperell – Recreational fishing scientist

Executive Officer

Stephanie Johnson - AFMA

Invited participant

Paul Williams – Industry

Observers

Steve Hall - AFMA

Apologies

Rich Hillary - CSIRO

Dr Cathy Dichmont – CSIRO

Dr James Larcombe - ABARES

1.2 *Pecuniary interest declarations*

3. TTRAG discussed the declaration of pecuniary interest and how TTRAG will deal with potential conflicts of interest.
4. The attendees were asked to state their pecuniary interests.
 - a. Dr Sandra Diamond, employee of the University of Western Sydney. Has no pecuniary interest (financial or research) in tuna fisheries. Currently has a PhD student involved in game fishing tournament research.
 - b. Dr Robert Campbell, employee of CSIRO, no pecuniary interest in Australian tropical tuna fisheries. Is actively engaged in research on the Eastern and Western Tuna and Billfish Fisheries and has a declared interest in Agenda Item 5 – Research. PI of the following research project: *“Data management, provision of fishery indicators and implementation of the harvest strategies for Australia's tropical tuna fisheries”*.
 - c. Dr Don Bromhead, independent fisheries consultant. Is paid a sitting fee for participating in TTRAG and is currently a consultant to the Secretariat of the Pacific Community (SPC). Has no pecuniary interest in Australian tropical tuna fisheries.
 - d. Dr Julian Pepperell, independent fisheries consultant and representative of the recreational fishing sector. Is currently undertaking research into game fishing and has an application for research with Western Australia fisheries. Has a declared interest in billfish and Agenda Item 5.1 – status of tuna and billfish research projects. Has no pecuniary interest in Australian tropical tuna fisheries and is not paid sitting fee for attending TTRAG meetings.

- e. Steve Auld, employee of AFMA, which includes a salary. Is the Manager of the tropical tuna fisheries, but has no pecuniary interest in Australian tropical tuna fisheries. Has a declared interest/involvement in all agenda items.
 - f. Stephanie Johnson, Employee of AFMA, which includes a salary. Is a Management Officer for the tropical tuna fisheries. No pecuniary interest in tropical tuna fisheries.
 - g. Gary Heilmann, director of several companies that hold 4 ETBF boat SFRs and quota SFRs (less than 5% of quota species except for Albacore Tuna which is greater than 5% of the total ETBF quota), fish receiver's permit, SESSF boat SFR, Coral Sea fishery permit. Has a declared interest in Agenda Item 3 – Harvest Strategy, Agenda Item 4 – Bycatch/byproduct issues and Agenda Item 6 – 2013/14 RBCC and TACC setting process/timetable.
 - h. John Abbott, owns an ETBF boat SFR, and ETBF quota SFRs, and also holds a state licence. Has a declared interest in Agenda Item 3 – Harvest Strategy, Agenda Item 4 – Bycatch/byproduct issues and Agenda Item 6 – 2013/14 RBCC and TACC setting process/timetable.
 - i. Angelo Maiorana, holds a longline ETBF boat SFR, 9 minorline ETBF boat SFRs, and leases in all ETBF quota SFRs. Also holds a Commonwealth fish receiver's permit and a SESSF boat SFR including quota SFRs. Currently has a CSIRO contract for the AMOS research project. Has a declared interest in Agenda Item 3 – Harvest Strategy, Agenda Item 4 – Bycatch/byproduct issues and Agenda Item 6 – 2013/14 RBCC and TACC setting process/timetable.
 - j. Paul Williams, holds a ETBF boat SFR, ETBF quota SFRs, trawl boat SFR and holds a Commonwealth fish receiver's permit. Has a declared interest in Agenda Item 3 – Harvest Strategy, Agenda Item 4 – Bycatch/byproduct issues and Agenda Item 6 – 2013/14 RBCC and TACC setting process/timetable.
5. At the beginning of each agenda item, TTRAG members with a stated conflict of interest were asked to leave the room and the remaining members discussed their individual claims. In all cases, all members were agreed to be permitted to participate in the item discussion.

1.3 Adoption of agenda

6. The agenda was accepted with minor scheduling changes where items 3.3 and 3.4 were reversed.
7. The agenda was adopted by TTRAG.

1.4 Acceptance of minutes

8. The minutes from TTRAG 6 were adjusted slightly to add in the clarification of wording; lower 25, 50 and upper 25 percentiles, in paragraph 41.
9. TTRAG agreed to the minutes of the TTRAG 6 meeting held on the 18-20 March 2013.

1.5 Actions arising/out-of-session developments

10. TTRAG discussed the action items arising from TTRAG 6 (Table 1).

Table 1. Actions arising from TTRAG 6 and the status of these actions.

	Action	Status
1	Rob Campbell to provide bubble plots that show which factors in each year contribute most to changes in the standardisation of the CPUE.	Completed by Robert Campbell and these will be presented under the relevant agenda item.
2	Rob Campbell to investigate changing the season categories for species to determine the best season classes and present the results to the RAG.	Completed. The investigation results will be presented when required, prior to the beginning of the quota year on 1 March 2014.
3	Rob Campbell to do the CPUE standardisation combining Broadbill Swordfish areas 7 & 8 in one run and compared to a run with the data from area 8 removed. To be done in terms of all of the data including the size data.	Completed and will report on this under the relevant agenda item.
4	Rob Campbell to investigate the use of sea current direction in the CPUE standardisation to determine if it is a significant factor.	Completed and will report on this under the relevant agenda item.
5	Rob Campbell to investigate the amount of data on branchline length from logbooks.	Completed and will report on this under the relevant agenda item.
6	Rob Campbell to further investigate the discard trends for potential use of observer discard data in the HS	Completed and will report on this under the relevant agenda item.
7	Rob Campbell, for Striped Marlin and Broadbill Swordfish, to convert the output of the stock assessments to standardised catch rates and present it back to the next RAG meeting in the July.	Completed and will report on this under the relevant agenda item.
8	MAC to consider if 10% change met rule should be changed.	To be delayed until after TTRAG 8. Need to see the outcomes of the Harvest Strategy.
9	CSIRO, to investigate how many times the Harvest Strategy went below B20 under the currently used targets. (Note; this work can	Ongoing. This is part of a larger MSE project being run by Ann Preece. The results for Striped Marlin should be

	only be undertaken as part of a larger MSE study. The proposed STM MSE could provide some guidance for this species.)	available in the next few months.
10	Rob Campbell to produce graphs on the proportion of catch at all connectivity scenarios (Region 5, and/or South Pacific and/or South West Pacific, WCPO) for the AFMA commission advice.	Ongoing. Robert Campbell is waiting for data from the Secretariat of the Pacific Community (SPC). To be completed by TTRAG as the graphs will be included in the RBCC advice for the AFMA Commission.
11	Rob Campbell to produce updated figures on the stock status for the AFMA commission advice.	Completed and will be reviewed under Agenda Item 6.
12	AFMA to provide advice to the TTRAG about any new Whole of Government position from DAFF or AFMA on the WCPFC.	This is ongoing, as no advice on this has yet been received from DAFF.

2 Review of fishery performance

2.1 *Current catches and effort in the domestic fishery – verbal updates since TTRAG 6 (March 2013) from industry, recreational fishing members and scientists*

11. TTRAG noted that 21% of the TACC for Bigeye Tuna has been caught so far.

ACTION – AFMA to investigate if SBT catch can be included in ETBF Catchwatch reports and if previous SBT data can also be obtained.

12. The AFMA member queried the Yellowfin Tuna catch of 16% of the TACC and stated that it appeared to be a bit low.

13. TTRAG industry members gave an update on the catch situation on the water, stating that no boats are catching Yellowfin Tuna or Bigeye Tuna and that the Swordfish catches are also down. Industry indicated that it is still a bit early in the year to be catching Swordfish though. They voiced further concern that the ocean currents have been very unusual this year and that SBT availability is very high.

14. TTRAG noted that the ocean water temperatures have continued to remain colder which has stabilised the availability of Bigeye Tuna. If the temperatures had increased, more Yellowfin Tuna would be available.

15. Concern was expressed by a scientific member that there is still minimal information on target species movements and that it would be useful to increase knowledge of this and of stock dynamics for standardisations.

ACTION – AFMA to overlay Sea Surface Temperature (SST) and ocean current maps with catch data for the last 12 months. This information will be used to complement discussions around scientific and industry summaries of recent fishery trends.

ACTION – A long-term analysis project of SST, other oceanographic factors and catch data to be made a research priority. This would be to use the current model for Southern Bluefin Tuna and re-adapt for Yellowfin Tuna. This could be done for bycatch species as well. In the mid-term, Robert Campbell to undertake a statistical analysis of the relationship between oceanography and fish distribution. AFMA to research the relationship between fish locations and determine the potential reasons for these distributions. This should be done in collaboration with other countries.

16. Julian Pepperell gave TTRAG a recreational fishing update. Catches of adult Black Marlin have been average for this season. This year, juvenile Black Marlin have been seen in large abundances along the coast towards Hervey Bay and the Sunshine Coast, however there has not been an appearance of juvenile Black Marlin in the previous few years. Game fishers have captured well in excess of 500 juveniles and this would suggest a high recruitment rate this season. Black Marlin appearances in NSW waters have been more sporadic, but the fishing has been poor due to bad weather. There have been good numbers of Mako Sharks off Sydney and it has been common for recreational fishers to catch 4-6 each tournament. Biological samples are taken from those caught before they are released. Blue Marlin has also had a high occurrence this season, which is unusual. Not many Yellowfin Tuna have been seen and are only caught every now and then. Catches of other shark species have also been low. In Western Australia, catches of Sailfish have been high this season, with most being taken off Broome. Southern Bluefin Tuna (SBT) catches have also been very high and everyone has been targeting them. This has resulted in the highest number tagged in the last four seasons. These are mostly school SBT but the larger fish are beginning to be seen now. The recreational sector understands the importance of recording SBT and gaining an accurate estimate. Victoria has maintained reliable estimates for the last few recreational fishing seasons. The Victorian catches of SBT are estimated (from the Victorian DPI website) to be approximately 270 tonnes (conservative). The Striped Marlin season has been fairly typical, with tournament catches very low. The WCPFC stock assessment theme for Striped Marlin in 2012 was recreational fishing and this may be important to investigate.
17. TTRAG industry members discussed the level of recreational catch and commented that this should be monitored more effectively. The recreational member indicated that boat ramp surveys have been occurring in NSW and Victoria (in addition to the diary surveys), but it is very difficult to gain broad-scale coverage due to the large number of boat ramps, particularly in NSW. The AFMA member stated that DAFF is leading the discussion on resource sharing with the recreational sector, but was unsure of where progress was at.
18. TTRAG noted that there is currently a large amount of research being undertaken on recreational catch of Mako Sharks and a few Marlin species, particularly Black Marlin.
19. It was also noted by TTRAG that WA now requires a boat licence for recreational fishing.

ACTION – TTRAG EO to distribute WCPFC Striped Marlin paper to TTRAG members.

3 Harvest Strategy

3.1 Fisheries data summaries

20. Robert Campbell gave a presentation summarising catch and effort data in the ETBF for the 2012 calendar year.
21. TTRAG discussed the effort trends in the fishery for Swordfish since the late 1990s. The TTRAG industry members gave some insight into the changes in fishing strategies over time, such as the changes in bait from pilchards to squid and the differences in strategies depending on the species being targeted.

ACTION – Robert Campbell to include the different gear types and fishing area in the effort summaries for Swordfish.

22. TTRAG noted that the ETBF moved to the use of circle hooks in 2006 and the current hook average is approximately 1500 per shot.
23. It was noted by TTRAG that Escolar has historically been recorded as Rudderfish or Black Oilfish, which has led to some confusion in the data for this species. The data for both Rudderfish and Black Oilfish has been included in the data for Escolar.
24. TTRAG also noted that logbook weights for all species are generally underestimated by operators.
25. TTRAG discussed the apparent seasonality in effort for the target species. The industry members stated that the tuna species are caught earlier in the season, during June and July, and Swordfish is caught from late July onwards. They also stated that Striped Marlin is generally not targeted, but are caught off Mooloolaba in late November after they have spawned.
26. TTRAG further noted that 2003 was a year of peak effort in the ETBF, but since then fishing effort has contracted back closer to the Australian coastline and away from New Zealand. It was noted that this contraction has meant that the most eastern area which is no longer fished can no longer be included within the CPUE standardisation. TTRAG also noted that there is a considerable amount of effort by foreign fleets in the international waters between Australia and New Zealand.

ACTION – Robert Campbell to include international effort data and data per fleet in the summaries for the next TTRAG meeting (TTRAG 8).

27. The data for Swordfish was further discussed by TTRAG and concern was expressed at the appearance of a slight decline in the number of large fish. It was suggested that this is likely to be due to less large swordfish being caught on circle hooks after they were introduced into the fishery in 2006. TTRAG was also informed that the cut-off weights for each size class are based on data collected between July 1997 and June 2008 and that it may be time to review these cut-off weights in light of changes in the fishery and the data collected since that time.

ACTION – Robert Campbell to investigate changes over time in the size distributions of the target species caught within the ETBF, and review the cut-off weights for the three size classes used in the ETBF harvest strategy, and report the results to the TTRAG meeting in March 2014.

28. Bycatch size-sampling data was discussed by TTRAG and a suggestion was made by the recreational fishing member that the time-series of mean weights for these species should also be presented on an annual basis (instead of just quarterly as is presently done) .

ACTION – Robert Campbell to display the time series of mean weights for bycatch species on an annual basis in addition to the current quarterly basis.

29. TTRAG noted that for each Scientific Committee meeting for the WCPFC that SPC produce- a summary paper on the current status of the tuna fisheries within the Western and Central Pacific Ocean.

ACTION – Robert Campbell to provide a summary of the “Overview of tuna fisheries in the Western and Central Pacific Ocean” paper produced by the Scientific Committee at the TTRAG 8 meeting in August 2013.

30. TTRAG industry members raised the concern that hook type, branchline length and bubble length weren't included in the standardisation. Robert Campbell stated that this data cannot be included in the standardisation as the data is not available within the AFMA database despite some data having being collected in the past. The AFMA member suggested that it may be possible to collect this data through the use of electronic logbooks (e-logs) in the future. It was also suggested that some data may be available from observer data, especially when vessels changed to circle hooks. Clarification of terms was provided by industry members with bubble length referring to the mainline distance between floats, and bubble dropper length indicating the distance from the bubble and where the line clips onto the mainline.

ACTION – Robert Campbell to investigate what data on hook type, branchline length and bubble length are available in the observer data.

ACTION – AFMA to investigate the possibility of obtaining hook type and bubble dropper length data through e-logs.

31. TTRAG industry members stated that up until 2005, operators did not substantially change their gear setup. After this year however, deep-setting was taken up in the fishery and in more recent years operators may change their gear configurations frequently, perhaps on a shot-by-shot basis.
32. TTRAG discussed the apparent outliers in the logbook effort data. It was concluded that 80 kilometres of longline would be the biggest seen in the fishery, but would not generally be used because of the difficulty of carrying that gear weight. In reference to the number of hooks, the maximum cut-off was agreed at 50 hooks per kilometre. The minimum agreed distance between bubbles was 20 metres.

3.2 CPUE standardisations

33. Robert Campbell presented the standardised CPUE indices for Swordfish and Striped Marlin specifically, as only these species will have Recommended Biological Commercial Catch values determined using the ETBF harvest strategy.
34. A TTRAG scientific member voiced concern that in most cases the size data collected does not include the vessel name and so cannot be linked back to a specific trip. This varies between species but it is possible there is some trip effect on the data.
35. Industry members stated that in 70% of sets, they do not catch any Striped Marlin.
36. Robert Campbell clarified that the wind speed data was only complete until mid-2012, which is why it was not included in the current analysis which required data to the end of 2012. It was hoped that this data would be available next year.
37. TTRAG industry members indicated a potential correlation between Bigeye Tuna and Ray's Bream as where there are large congregations of Ray's Bream, large numbers of Bigeye Tuna tend to be caught.
38. TTRAG scientific members stated that the frontal index is important to consider in the CPUE standardisation for both Striped Marlin and Broadbill Swordfish. It was also suggested that cloud cover may have some impact, but it was noted that this data is very difficult to define.

ACTION – Robert Campbell to investigate the inclusion of the frontal index in the CPUE standardisation.

39. Striped Marlin displayed the highest proportion of large class discards, but TTRAG noted that this may have been influenced by the high release rate of Striped Marlin in the Coral Sea. Industry members explained that the Coral Sea ETBF operator has an agreement with the recreational fishing sector, to release all Striped Marlin caught. For this reason the Coral Sea region is not included in the analysis of CPUE for Striped Marlin.

40. TTRAG industry members also suggested that the ocean bathymetry may have an impact on the model for some species (e.g. swordfish), as they use the sea floor contours to help target fish.

ACTION – Robert Campbell to investigate the inclusion of bathymetry in the CPUE standardisation.

41. The industry members stated that they target areas of baitfish aggregation and suggested this should be considered in the standardisation. It was noted, however, that there is currently no data on baitfish which can be used in the analyses.
42. TTRAG noted that the increased trend in the proportion of prime-sized Swordfish in the total catch may be a reflection of a decline in the proportion of fish in the small size class.
43. The TTRAG industry members confirmed that they consider the current standardisation to be representative of what is currently occurring in the fishery.
44. Robert Campbell displayed the relative influence of fishing practices effects graphs and received comments relating to the number of observations behind each graph. These observations will be included and plotted for the equivalent meeting in 2014.
45. TTRAG noted the apparent positive influence of hooks per float and hooks per kilometre on the model and concluded that the bubble factor displayed the greatest impact on the result. Robert Campbell agreed to include hooks per kilometre, or the saturation effect in the standardisation for next year and will consider more interactions over the next 12 months.
46. It was further noted by TTRAG that the introduction of quota has led to changes in the targeting practices for some vessels in the fishery and this can influence the CPUE of the range of species targeted.

3.3 Swordfish Target Reference Point

47. Robert Campbell presented the latest stock assessment, CPUE and depletion estimates for Swordfish. It was clarified that the term 'adult fish' refers to spawning fish, and 'mature fish' are those with spawning potential.
48. There are currently two stock assessment models being used; one uses the Hawaiian growth relation while the other uses the Australian growth relation. The Western and Central Pacific Fisheries Commission Scientific Committee (SC), has not yet made a decision on which model they will use for their stock estimates. Once a decision has been made (at SC9), the same model will be used by TTRAG.
49. TTRAG noted that the data presented was based on the results of the Hawaiian growth model, which is the illustrative base case in the stock assessment.

50. The AFMA member suggested that the recorded CPUE at the beginning of the Australian tuna fishery (1997) could be used as a proxy for B_0 , from which the target and limit reference points (B_{48} and B_{20} respectively) could be set. However in 1997, there was already an indication of depletion (due to the historical Japanese catch) and it was further suggested that the CPUE value in 1997 would be better taken as a percentage of the depletion rate in 1997.
51. Concern was expressed by a TTRAG industry member that it is important to clarify what the biomass depletion data used to estimate the reference point actually pertained to. The scientific members confirmed that the biomass depletion data used was for the entire stock, not just the Australian area of influence. The Australian catch in 1997 was 87% of all Swordfish caught in this region.
52. Robert Campbell agreed that it would be more appropriate to use biomass depletion data for the Australian region (western model region) but that this was not available for the meeting. He also stated that the reference case model accounted for a small amount of movement between the Australian and Pacific regions.
53. The actual level of depletion of the spawning stock by 1997 (from the stock assessment) is 90.8% of B_0 (based on the 2013 stock assessment for swordfish across the entire stock using the Hawaiian growth model).
54. TTRAG noted that the methods used for Swordfish and Striped Marlin need to be consistent in determining the target reference point.
55. TTRAG noted that, as a decision has yet to be made by the SC on which growth model will be used, the sensitivities around the Australian model also needs to be compared and considered.
56. It was suggested by a scientific member, that the average biomass depletion level for the 1997-2001 data period could be related to the average CPUE over this same period. The depletion levels over this period could be considered to be more robust and more justifiable, as this time period had been used previously. However, the average of the first five years fishing in the fishery is not considered to be related to B_0 at the start of the fishery.
57. Concern was raised by a scientific member that the catches in the north-east corner of the South Pacific region (French Polynesia, Kiribati etc) are recent (post 2000). Prior to this, the majority of the catch taken from this stock has been by Australia, New Zealand and Japan. Given that the depletion plots are representative of the whole South Pacific region, any depletion for the Australian area is going to be higher, or more depleted. In terms of B_{48} , only the Australian area should be considered, not the whole region.

58. It was noted by TTRAG that while there may be some sensitivities that need to be considered within the model, a depletion estimate of 90.8% was adopted for the year 1997 based on the reference case model.
59. TTRAG also noted that there is still uncertainty over growth and if the Australian model is ultimately adopted, the depletion would be higher and this would need to be considered.
60. For this year, TTRAG agreed to use the level of depletion ($\%B_0$) of the stock during 1997 from the reference model used in the stock assessment and relate this depletion level to the standardised CPUE of prime-sized fish in the ETBF during that year. Using the standardised CPUE of prime-sized fish during each year, the associated level of depletion of the stock could then be determined for each year of the reference period (1997 and 2001). The means ($CPUE_{ref}, \%B_{0,ref}$) of both the standardised CPUE and the associated biomass depletion could then be determined over the five-year reference period and the catch rate corresponding to the MEY proxy of $48\%B_0$ could then be calculated. A corresponding CPUE ($CPUE_{20\%B_0}$ corresponding to $20\%B_0$) was also determined and recommended as an appropriate Limit CPUE consistent with the Commonwealth Harvest Strategy Policy. However, it was noted that this would need to be reviewed for next year once the SC has made their decision on which growth model they will use.
61. Scientific members and the AFMA member noted that depletion based reference points are generally considered to be more robust and less subject to uncertainties associated with MSY based reference points. Noting that: 1) depletion based reference points are used in other AFMA fisheries and are being seriously considered for use at the regional scale (WCPFC); 2) the use of depletion based reference points are allowed under the Harvest Strategy Policy, and; 3) MSY estimates for both Swordfish and Striped Marlin are noted in the respective stock assessments as being highly uncertain, the TTRAG agreed that they have more confidence in the use of depletion based estimates for setting target and limit reference points (for both species).
62. A new CPUE graph was presented by Robert Campbell which displayed the Prime-size CPUE, Target-new, Target-old and Limit reference point trendlines overlaid. Industry members and the AFMA member indicated that these trends were an accurate representation of what is currently occurring in the fishery.

3.4 Striped Marlin Target Reference Point

63. Robert Campbell presented the 5-year rolling biomass data, CPUE and depletion estimates for Striped Marlin.
64. Striped Marlin displayed a similar downward trend to Swordfish. A peak in catch in 2001 also corresponded to a peak in the recreational tagging catch in the same year. A number of reasons for this trend were discussed including increased targeting in both fisheries, availability (La Nina years) and higher stock abundance

65. TTRAG noted that currently in the ETBF, Striped Marlin is predominantly a byproduct species. Industry members stated that they believe that there is limited targeted fishing for Striped Marlin in the ETBF, mainly due to low prices. Targeting may occur towards the end of the quota year if an operator has some remaining unused quota. Industry members stated that Striped Marlin is becoming a limiting species in the ETBF, because all quota is consumed from non-targeted byproduct catches and has resulted in changes to fisher behaviour to avoid catching Striped Marlin. Understanding changes in fisher behaviour may be useful for the CPUE standardisation.
66. Industry members stated that Striped Marlin availability seems to be strongly linked to the availability of baitfish.
67. TTRAG noted that Area 1 (Coral Sea) is not included in the assessment (CPUE standardisation) as there is no commercial Striped Marlin catch landed from this area due to an agreement with the recreational fishing sector. Area 7 (towards New Zealand) is also not included in the assessment as it is no longer fished.
68. Industry suggested that as Striped Marlin is not a largely targeted species, the data collected may be quite different to the data if Striped Marlin was heavily targeted, and this should be taken into account in any assessments. The recreational fishing member stated that Striped Marlin is targeted by this sector.
69. TTRAG discussed the catch of Striped Marlin and the factors that influence this. TTRAG noted from the CPUE model outputs that currents appeared to have a large influence on the species, but Sea Surface Temperature (SST) did not. This was considered unusual and may indicate confounding between spatial and environmental factors. Industry members were interested in better understanding model fitting and the diagnostic plots of model fit.
- ACTION – Don Bromhead to provide TTRAG industry members with a brief and simple explanation of model “fitting” and how to interpret some common model fit (diagnostic) plots at a future TTRAG meeting.**
70. TTRAG noted that Australia and New Zealand take the majority of the Striped Marlin catch in Region 5.
71. Industry indicated that the Striped Marlin caught off Mooloolaba are usually very light-weight due to their return from spawning. They also informed TTRAG that generally it is the larger individuals that are retained and the smaller ones are released. This may influence the data in the Prime-size category.
- ACTION – TTRAG to investigate the implications of the non-targeting of Striped Marlin on the assessment, and the possible use of recreational fishing data as indices of abundance.**
72. The scientific members noted that the relative depletion of the component of the Striped Marlin stock in the Australian fishery region by the Japanese fleet (in particular) prior to the 1997-2001 reference period, may have been higher than relative depletion levels of the

entire south west Pacific stock. This is due to the concentration of Striped Marlin catches in the Australian fishery region prior to the mid-1990s. However, the target reference point in the Harvest Strategy is derived from a depletion index for the whole stock, an issue that might be looked at further in future. Swordfish and Striped Marlin also have very different depletion histories. However, it was agreed by TTRAG that the methods used must be consistent between species and with the Harvest Strategy requirements.

73. TTRAG agreed to use the same reference point method for Striped Marlin as for Swordfish.
74. TTRAG discussed a range of options regarding the year or year range that should be used to relate model based depletion time series to the local longline standardised CPUE time series for both swordfish and striped marlin. It was agreed that in the short term, 1997 (the start year of the original reference period 1997-2001) would be used.
75. TTRAG noted that this would be reviewed in future, once additional information from the regional stock assessment model was provided by SPC. That additional information would include depletion time series for the model region relevant to the Australian fishery for swordfish (rather than the entire fishery depletion time series currently used).

4 Bycatch/byproduct issues

4.1 Review of major bycatch/byproduct species

76. TTRAG noted the data presented on the top 5 bycatch species within the ETBF (excluding shark species); Escolar, Long-nosed Lancetfish, Snake Mackerel, Dolphinfish and Opah (Southern Moonfish).
77. The AFMA member stated that the other main bycatch species also need to be regularly considered by TTRAG.

Escolar

78. The data collected since 2002 showed a steady decline and TTRAG noted the need for further investigation.
79. TTRAG also noted that during seasons where SBT zones have been in place, observer coverage is higher in the ETBF, which may be the cause of the elevated numbers of Escolar caught in those years.
80. Robert Campbell displayed logbook data on Escolar. He indicated that Escolar has also been recorded as Rudderfish and Black Oilfish, so these data were also included in the analysis. The standardisation displayed an increasing trend, but CPUE decline sharply in 2010 and 2011. TTRAG members expressed concern at this result.
81. A TTRAG industry member suggested that there may be some correlation between Escolar and Bigeye Tuna catches, as Bigeye Tuna displayed a decrease in 2007 and 2008. Industry also informed TTRAG that the Sydney Fish Market no longer accepts Escolar and will not export it. TTRAG noted that this may have influenced the catch of Escolar.

82. TTRAG noted further suggestions by industry members that Escolar may be influenced by seasonal changes as they migrate from colder to tropical areas to spawn.

83. TTRAG agreed to investigate Escolar catches further and for the logbook CPUE data to be standardised using species-specific area effects.

ACTION – AFMA to liaise with scientific members and undertake full analysis of Escolar for review at March 2014 meeting.

ACTION – TTRAG EO to distribute Juan C. Levesque paper on “Evolving fisheries: today’s bycatch is tomorrow’s target catch” to TTRAG.

Lancetfish

84. TTRAG agreed that as the CPUE had not been standardised, any trends in the data presented for Lancetfish could not yet be identified or commented upon.

Mahi Mahi

85. The data presented a large peak in CPUE in 2010. However, TTRAG noted that this peak was likely due to the big Yellowfin Tuna season in 2010-2011.

86. TTRAG also noted that there is a large recreational catch of Mahi Mahi and the recreational tagging data needs to be considered along with logbook and observer data for this species.

87. TTRAG noted that Mahi Mahi is a fast-growing species.

88. TTRAG agreed that as the CPUE had not been standardised, any trends in the data presented for Mahi Mahi could not yet be identified or commented upon.

ACTION – TTRAG scientific members to initially compare all relevant indices relating to the nominal CPUE for Mahi Mahi. If these indices do not show a consistent trend investigate further.

Snake Mackerel

89. TTRAG agreed that as the CPUE had not been standardised, any trends in the data presented for Snake Mackerel could not yet be identified or commented upon.

Opah

90. TTRAG noted that Opah is assessed to be of medium risk because of their productivity characteristics and their susceptibility to fishing.

91. TTRAG agreed that as the CPUE had not been standardised, any trends in the data presented for Opah could not yet be identified or commented upon.

Sharks

92. Extra information relating to shark species was presented by Robert Campbell. TTRAG noted that there has been no apparent trend in the data for Shortfin Mako Sharks since 1997, but the total catch is generally underreported in logbooks. Observer data can be used to get a better estimate.

ACTION – TTRAG EO to distribute Robert Campbell’s papers on Mako Sharks and Blue Sharks to TTRAG.

5 Research

5.1 Status of tuna and billfish research projects

93. TTRAG considered the current projects being undertaken (Table 2).

Table 2. Current research projects in the Australian Tuna and Billfish Fisheries

Project Title	Status
Data management, provision of fishery indicators and implementation of the harvest strategies for Australia’s tropical tuna fisheries.	Being undertaken by Robert Campbell. Currently in the final year and is due to end in September 2014.
Eastern Tuna and Billfish Fishery size monitoring program 2013-2015.	This project is ongoing.
Improved line weighting method for tuna longline fishing using live-baiting to mitigate sea bird bycatch and improve worker safety.	Being undertaken by Nigel Aberly (AFMA) and is nearing the final stages of write-up. The final report to FRDC is due in September 2013.
Development of an approach to harvest strategy management of internationally managed multi-species fisheries	Being undertaken by Ann Preece. Commenced July 2013

ACTION – TTRAG EO to distribute line-weighting trial report to TTRAG after it has been submitted to FRDC.

94. TTRAG noted the current tagging study being undertaken by the recreational sector for gamefish tournament monitoring.

95. TTRAG further noted the series of current studies on post-release survival of Mako Sharks in the recreational fishing industry in Victoria and South Australia. Satellite tags are being used to collect this data.

96. An industry member informed TTRAG of an ongoing seabird mitigation project using underwater bait-setters.

ACTION – AFMA and the recreational fishing member to develop a paper listing any recreational research projects, with a particular focus on tagging studies and Mako Sharks.

97. TTRAG noted that more detailed information on the current relevant projects being undertaken can be found on the FRDC website.

ACTION – AFMA to investigate the possibility of a research paper webpage being developed for TTRAG on the AFME website.

98. TTRAG agreed to create a summary table for research.

5.2 Annual Research Statement

99. TTRAG noted that an Annual Research Statement is required to be developed for 2014-15. The statement is to be finalised at the August 2013 meeting.

100. There are currently 5 high priority project identified in the Annual Research Statement. Their progress is identified in Table 3.

Table 3. Annual Research Statement high priority projects for 2013-14 project and their status.

Project	Status
Determination of the spatial dynamics and movement rates of the principal target species within the ETBF and connectivity with the broader WCPO – beyond tagging. This may include but is not limited to: Stable isotope analysis, otolith micro-chemistry or novel genetic techniques.	
Identification, application and appraisal of novel statistical techniques for use in the CPUE standardisation.	Robert Campbell has submitted an Expression of Interest to FRDC.
Investigate factors impacting on Eastern Tuna and Billfish Fishery species stock biomasses and include them in the Catch Per Unit Effort (CPUE) standardisation. These may include but is not limited to: oceanographic, environmental and fishing operation factors.	Ongoing
Investigate low cost harvest strategy and assessment approaches for data poor (byproduct or bycatch) species in tropical tuna fisheries.	This project has not yet been undertaken but it should be retained in the priority list for 2014-15.
Review of the operation of the tropical tuna harvest strategy to account for any impacts of the introduction of Marine Protected Areas.	ABARES are already conducting this project.

A long-term analysis project of SST, other oceanographic factors and catch data to be made a research priority. This would be to use the current model for Southern Bluefin Tuna and re-adapt for Yellowfin Tuna. This could be done for bycatch species as well.

New suggested priority

ACTION – Any new research priorities should be added to the Annual Research Statement and the list is to be distributed to TTRAG members prior to the August 2013 meeting.

5.3 ComFRAB outcomes, July 2013

101. The AFMA member gave TTRAG informal feedback from ComFRAB. It was identified that Robert Campbell's project; "Identification, application and appraisal of novel statistical techniques for use in the CPUE standardisation" is a high priority and Robert has been asked to supply a more comprehensive Expression of Interest proposal.

5.4 AFMA/ComFRAB research processes/timeframes

102. Robert Campbell outlined the timeline for research, for TTRAG information.
103. The AFMA member will review the milestones of the current projects.

6 2013/14 RBCC and TACC setting process/timetable

104. TTRAG noted the advice from the AFMA Commission that TTRAG should not recommend RBCCs for tropical tuna, considering Australia's relatively low catch level within the region adjacent to eastern Australia. The Commission also advised TTRAG to develop a workplan for the RBCC and TACC setting process. The Commission will continue to seek RBCCs for Striped Marlin and Swordfish.
105. TTRAG noted that AFMA is developing a Standard Operating Procedure for involving DAFF and ABARES earlier within the TACC setting process in future years. The AFMA Commission will seek additional advice from DAFF and ABARES on the TACCs in an international fisheries context.
106. It is expected that TTRAG supply the AFMA Commission with summarised information on the current and historical catches in Region 5, additional information on other fleet catches in the regions and the status of the stocks. There is a template to assist with the compilation of this data.

107. TTRAG noted that any information must be accepted and discussed by the WCPFC SC and it is important to take into consideration that any assessments/data submitted to the SC are 12 months old.
108. The AFMA member reiterated to TTRAG that the RAG only recommends RBCCs and provides stock status advice to the Commission. It does not recommend a TACC; this is provided by the Management Advisory Committee (MAC). TTRAG also noted that all recommendations are also passed to the MAC for their comment as well as being submitted to the AFMA Commission.
109. TTRAG noted that RBCCs will only be recommended for Broadbill Swordfish and Striped Marlin this year, and only stock status advice will be provided for Albacore Tuna, Bigeye Tuna and Yellowfin Tuna.
110. It was further noted by TTRAG that the stock status advice for the coming fishing season had already been drafted in the previous TTRAG meeting (TTRAG 6). This document just needs to be updated and finalised at the August TTRAG meeting (TTRAG 8).

ACTION – TTRAG EO to distribute TTRAG stock status advice document to TTRAG members prior to August meeting.

7 Other business

111. A TTRAG industry member voiced concern regarding the sustainable seafood mobile phone application, developed by the Australian Marine Conservation Society. No ETBF target species have been listed as sustainable in the application and concern was raised that this information is misleading to the general public. This information suggests that the general public do not realise that there is management of all Australian fisheries. The AFMA member informed TTRAG that FRDC had produced a media release recently, which explained that all Australian fisheries are sustainable.

ACTION – TTRAG EO to distribute FRDC media release to TTRAG.

112. TTRAG noted that if electronic Catch Disposal Records (e-CDRs) are introduced into the fishery, it may be possible to link fish sold back to the producer or the source of capture. This information may then be useful in increasing the knowledge and awareness of the general public of the sustainability of Australia's seafood. A similar e-CDR system has recently been successful in the UAS, but issues arose when attempting to track/source information on fish fillets.

8 Date and venue for next meeting

113. TTRAG 8 will be held in Mooloolaba on 27 – 28 August 2013. The meeting will produce RBCCs for Broadbill Swordfish and Striped Marlin and provide advice on the status of the tropical tuna resources based on a range of fishery indicators.

The Chair closed the meeting.

DRAFT