



Australian Government

Australian Fisheries Management Authority



Tropical Tuna and Billfish Fisheries

Research Assessment Group

(TTRAG)

MINUTES

TTRAG 9

24-26 JUNE 2014

MOOLOOLABA

THE NINTH MEETING OF THE TROPICAL TUNA AND BILLFISH FISHERIES RESOURCE ASSESSMENT GROUP (TTRAG9)

Mooloolaba, 24-26 June 2014

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List of Actions

	Action	Responsibility	Status
1	AFMA to investigate if SBT catch can be included in ETBF Catchwatch reports and if previous SBT data can also be obtained.	AFMA	Ongoing, however there are difficulties with accounting for the difference between season dates and under/overcatch.
2	A long-term analysis project of SST, other oceanographic factors and catch data to be made a research priority. The purpose 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.	Dr Rob Campbell	Ongoing, but resourcing may be an issue and fishing behaviour has changed. There are two stages to this project; 1) long-term analysis, 2) short-term statistical analysis with real-time data for industry. This second stage is to assist industry in becoming more economically efficient in their operations. Project/action is dependent on funding approval. Dr Rob Campbell to update RAG when/if this is received.
3	Dr Robert Campbell to include international effort data and data per fleet in the summaries for the next TTRAG meeting (TTRAG 8).	Dr Rob Campbell	Ongoing, for Sept/Oct 2014 meeting.
4	Dr Robert Campbell to investigate what data on hook type, branchline length and bubble length are available in the observer data.	Dr Rob Campbell	Ongoing. The observer data is available, but a timeline still needs to be developed.
5	AFMA to investigate the possibility of obtaining hook type and bubble dropper length data through e-logs.	AFMA	Ongoing. This will be completed when more operators are using e-logs.

6	Dr Robert Campbell to investigate the inclusion of the frontal index and bathymetry in the CPUE standardisation.	Dr Rob Campbell	Ongoing. Bathymetry has been included for this year, but not the frontal index. The frontal index data is difficult to obtain.
7	Dr 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.	AFMA	Ongoing, AFMA to provide the RAG with this explanation as Dr Bromhead is no longer a TTRAG member.
8	TTRAG EO to distribute line-weighting trial report to TTRAG after it has been submitted to FRDC.	TTRAG EO	Ongoing, report has not yet been finalised.
9	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.	AFMA & Dr Julian Pepperell	Ongoing, for the Sept/Oct 2014 meeting.
10	Dr Ann Preece MSE project (Dr Rich Hillary is the primary investigator).	Dr Ann Preece/Dr Rich Hillary	Ongoing, due to be completed Sept/Oct 2014. Dr Rich Hillary to provide an update at the Sept/Oct TTRAG meeting.
11	Dr Sandra Diamond to distribute Danielle Ghosn report on the club-based tournament fishery to TTRAG members.	TTRAG Chair	Ongoing.
12	Dr Julian Pepperell to distribute his relevant student reports on recreational fishing to TTRAG members.	Dr Julian Pepperell	Ongoing.
13	TTRAG to request TTMAC to ask Dr Kevin Williams to expand his project on ETBF target species size monitoring to include data from the WTBF.	TTRAG	Ongoing.
14	TTRAG to develop a “wishlist” for additional data that could be included in logbooks.	TTRAG	Ongoing.
15	Dr Rob Campbell to create a new area off the south coast of NSW specifically	Dr Rob Campbell	Ongoing.

	for Striped Marlin to include in the CPUE standardisations.		
16	AFMA to provide Dr Rob Campbell with the locations of the SBT management zones and a list of all the shot numbers within the zones.	AFMA	Ongoing.

1 Preliminaries

1.1 *Welcome and apologies and attendees*

1. The TTRAG Chair opened the meeting at 10:15am.

2. Attendees

Members

Dr Sandra Diamond, Chair (University of Western Sydney)

Mr Steve Auld (AFMA)

Dr Rob Campbell (CSIRO)

Dr Cathy Dichmont (CSIRO)

Dr James Larcombe (ABARES)

Dr Julian Pepperell (Recreational fishing scientist)

Prof John Tisdell (Economist)

Mr Gary Heilmann (Industry)

Mr John Abbott (Industry)

Mr Pavo Walker (Industry)

Invited participants

Mr Paul Williams (Industry)

Executive Officer

Ms Stephanie Johnson (AFMA)

Observers

Dr Sean Tracey¹

Apologies

Dr Rich Hillary (CSIRO)

Mr Cathal Farrell (Industry)

¹ Attended for items discussed on 25 & 26 June 2014 only.

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.
 - 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.
 - 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”*.
 - Dr Cathy Dichmont, employee of CSIRO and a member of TTMAC, undertakes some research on tuna species, but has no pecuniary interest in Australian Tropical Tuna Fisheries. Has a declared interest in Agenda Item 5 – Research, has cost cutting projects that affect tuna fisheries. Is the CSIRO research representative on the northern hub that co-ordinates tropical fisheries research and proposals and is a member of the AFMA Research Council (ARC).
 - Dr James Larcombe, employee of ABARES, leads delegations to the WCPFC Scientific Committee and does Tropical Tuna research. Has no pecuniary interest in the Australian Tropical Tuna Fisheries.
 - Prof John Tisdell, employee at the University of Tasmania and is a scientific member of the Great Australian Bight Resource Assessment Group (GABRAG). Has a declared interest in Agenda Item 5 – Research.
 - Mr 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.
 - Ms 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.
 - Mr 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, Coral Sea fishery permit. Has a declared interest in Agenda Item 3 – Harvest Strategy and Agenda Item 4 – bycatch/byproduct issues.
 - Mr John Abbott, owns an ETBF boat SFR, and ETBF quota SFRs, and also holds a state licence receiver permit. Has a declared interest in Agenda Item 3 – Harvest Strategy and Agenda Item 4 – bycatch/byproduct issues.

- Mr Paul Williams, director of a company that holds a ETBF boat SFR, ETBF quota SFRs, and holds a Commonwealth fish receiver’s permit. Has a declared interest in Agenda Item 3 – Harvest Strategy and Agenda Item 4 – bycatch/byproduct issues.
- Mr Pavo Walker, owns several ETBF boat SFRs, and ETBF quota SFRs for all species. Holds a Coral Sea permit and minorline permit. Has a declared interest in Agenda Item 3 – Harvest Strategy and Agenda Item 4 – bycatch/byproduct issues.
- 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. Is involved in projects monitoring fish landed at game fishing tournaments and pop-up satellite tagging on juvenile Striped Marlin. Has a declared interest in Agenda Item 5 – Research.

Members not present

- Mr Cathal Farrell, Manager of fish receiving business and holder of an ETBF boat SFR.
 - Dr Rich Hillary, employee of CSIRO, no pecuniary interest in Australian tropical tuna fisheries.
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 adopted by TTRAG.

1.4 Acceptance of minutes

7. TTRAG noted that the AFMA Commission expressed their appreciation of the detailed advice provided to them after TTRAG 8.
8. The minutes were accepted by TTRAG.

1.5 Actions arising/out-of-session developments

9. TTRAG discussed the action items arising from TTRAG 8 (Table 1), and commented on progress.

Table 1. Actions arising from TTRAG 8 and the status of these actions.

	Action	Responsibility	Status
1	AFMA to investigate if SBT catch can be included in ETBF Catchwatch reports and if previous SBT data can also be obtained.	AFMA	Ongoing, however there are difficulties with accounting for the difference between season dates and under/overcatch.
2	AFMA to investigate the possibility of overlaying Sea Surface Temperature (SST) maps with catch	AFMA	No longer necessary. Will be covered under the following action.

	data for the last 12 months, to determine any trends/correlation.		
3	<p>A long-term analysis project of SST, other oceanographic factors and catch data to be made a research priority. The purpose 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.</p> <p>In the mid-term, Dr 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.</p>	Dr Rob Campbell	<p>Ongoing, but resourcing may be an issue and fishing behaviour has changed. There are two stages to this project; 1) long-term analysis, 2) short-term statistical analysis with real-time data for industry. This second stage is to assist industry in becoming more economically efficient in their operations.</p> <p>Project/action is dependent on funding approval. Rob Campbell to update RAG when/if this is received.</p>
4	TTRAG EO to distribute WCPFC Striped Marlin paper to TTRAG members.	TTRAG EO	Completed, papers readily available on WCPFC website.
5	Dr Robert Campbell to include the different gear types and fishing area in the effort summaries for Swordfish.	Dr Rob Campbell	Completed and has been included in the data summaries for all species.
6	Dr Robert Campbell to include international effort data and data per fleet in the summaries for the next TTRAG meeting (TTRAG 10).	Dr Rob Campbell	Ongoing, for Sept/Oct 2014 meeting.
7	Dr Robert Campbell to investigate changes over time in the size distributions of the target species caught within the ETBF, and review	Dr Rob Campbell	Completed, will be discussed under Agenda Item 3.

	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.		
8	Dr Robert Campbell to display a time series for target species on an annual basis in addition to the current quarterly basis.	Dr Rob Campbell	Completed, will be discussed under Agenda Item 3.
9	Dr Robert Campbell to investigate what data on hook type, branchline length and bubble dropper length are available in the observer data.	Dr Rob Campbell	Ongoing. The observer data is available, but a timeline still needs to be developed.
10	AFMA to investigate the possibility of obtaining hook type and bubble dropper length data through e-logs.	AFMA	Ongoing. This will be completed when more operators are using e-logs.
11	Dr Robert Campbell to investigate the inclusion of the frontal index and bathymetry in the CPUE standardisation.	Dr Rob Campbell	Ongoing. Bathymetry has been included for this year, but not the frontal index. The frontal index data is difficult to obtain.
12	Dr 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.	AFMA	Ongoing, AFMA to provide the RAG with this explanation as Dr Bromhead is no longer a TTRAG member.
13	TTRAG to investigate the impacts of Striped Marlin as a byproduct species, and the use of recreational fishing data as indices of abundance. It was noted that there is currently very little commercial targeting of Striped Marlin.	TTRAG	No longer necessary. This is being investigated as part of a larger project being run by Dr Rob Campbell: “Developing innovative approaches to improve CPUE standardisation for Australia's multi-species pelagic longline fisheries”.
14	AFMA to liaise with scientific members and undertake full analysis of Escolar for review at June 2014 meeting.	AFMA	Completed. Dr Rob Campbell will develop a template to assess byproduct/bycatch species and will be discussed at the first TTRAG meeting in 2015.
15	TTRAG scientific members to initially compare all relevant indices relating to the nominal CPUE for Mahi Mahi.	Dr Rob Campbell	Completed. Dr Rob Campbell will develop a template to assess byproduct/bycatch species and will be discussed at the first

	If these indices do not show a consistent trend investigate further.		TTRAG meeting in 2015.
16	TTRAG EO to distribute line-weighting trial report to TTRAG after it has been submitted to FRDC.	TTRAG EO	Ongoing, report has not yet been finalised.
17	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. Dr Julian Pepperell to provide a brief verbal overview of any known relevant regional recreational research projects.	AFMA & recreational fishing member	Ongoing, for the Sept/Oct 2014 meeting.
18	AFMA to investigate the possibility of a research paper webpage being developed for TTRAG on the AFMA website.	AFMA	Not currently relevant. The new AFMA website is still under construction, not a possibility until website is completed.
19	Dr Ann Preece MSE project (Dr Rich Hillary is the primary investigator).	Dr Ann Preece/Dr Rich Hillary	Ongoing , due to be completed Sept/Oct 2014. Dr Rich Hillary to provide an update at the Sept/Oct TTRAG meeting.

2 Review of fishery performance

No pecuniary interests were declared under this agenda item.

2.1 Current catches and effort in the domestic fishery – verbal updates since TTRAG 8 (August 2013) from industry, recreational fishing members and scientists

10. The AFMA member began discussions by providing members with a summary of the 20 June 2014 Catchwatch report. He advised members that the data in the report may be outdated by approximately three weeks due to the time needed for manual data entry from logbooks.
11. TTRAG noted that all the catch percentages for the target species are similar at the moment except for Bigeye Tuna. Industry members commented that the ETBF fleet is improving in the management of their quota and being more selective of what they target and when. They are also improving in fishing efficiency.
12. Industry members further stated that Striped Marlin is not being targeted; they are only caught incidentally, should they happen to be around. The AFMA member reminded TTRAG members that the Striped Marlin quota is only 351 tonnes, so operators are choosing not to target it.
13. TTRAG members noted that the current catches in the ETBF generally indicate a fairly average start to the fishing season. The industry member from the NSW coast region stated that it has

been a poor start to the season for those operators, with not a lot of fish around. The catch rates are not so reflective of abundance anymore, rather the economics of going fishing. The markets and price per kilogram are large influences on fishing catch rates and effort.

14. The AFMA member provided members with an update on international fisheries management. At the recent Indian Ocean Tuna Commission (IOTC) meeting, a number of proposals on shark management were presented (shark finning and high seas), but none were successfully supported. There is a distinct lack of data from the Indian Ocean region and this is making the development of conservation and management measures (CMMs) very difficult. A number of countries have very large tuna fishing fleets that travel a long distance from the shore. Implementing a logbook system and obtaining accurate data from these fleets is very hard.
15. A fishing closure off Somalia was implemented in 2011 for vessel protection, however there has been no benefit from this measure. Reports to the IOTC suggested that boats have been setting Fish Aggregating Devices (FADs) within the closure and taking the fish they attract when the FAD drifts outside of the closure. Somalia is now a member of the IOTC and the safety issues in the closure area have improved since the closure was implemented.
16. TTRAG members further noted the update provided for the Western and Central Pacific Fisheries Commission (WCPFC). Three major stock assessments are being undertaken this year; Yellowfin Tuna, Bigeye Tuna and Skipjack Tuna. The WCPFC Scientific Committee will consider these assessments at their meeting in August. A large amount of preparatory work has been done within the WCPFC on setting management objectives and developing a harvest strategy for the entire Western and Central Pacific Ocean (WCPO) fishery. The progress of this work has slowed over the past 12 months, but Australia is pushing to keep the momentum going.
17. A new CMM for tropical tuna was adopted at the last WCPFC meeting in December 2013, however it was very complicated and contained several clauses to enable countries to be non-compliant. There are no expectations that progress will be made on CMMs for Bigeye, Yellowfin and Albacore Tuna at this year's Commission meeting.
18. For the Western Tuna and Billfish Fishery (WTBF), there are only two boats currently operating. There has been a reasonable catch of Bigeye Tuna, but the fishery is fairly quiet in general. There has recently been some international interest in the WTBF, but the stringent entry rules make it difficult for overseas operators to come in. The local domestic market in Western Australia is also very small and there is minimal capacity for any additional boats in the fishery. The economics of fishing out of Western Australia also restrict the fishery growth as larger boats are needed to make decent catches and they have to travel long distances. Interstate market supply is also difficult as the transport cost is very high.
19. An industry member stated that it is very difficult to compete with imported seafood due to the high domestic operating costs and the high value of the Australian Dollar. This is the reason why Walker Seafoods is being assessed by the Marine Stewardship Council for sustainable seafood accreditation. The MSC audit of Walker Seafoods is not expected to be completed until March 2015. The MSC accreditation is not yet widely recognised in Australia, Woolworths is onboard, but not Coles as yet.
20. Industry members also informed the RAG that gassed fish has been imported and is being sold in supermarkets. "Gassing fish" is a carbon monoxide process that is used to give fish, such as tuna, a bright pink colour, giving the impression of freshness. It also makes imported fish last longer on the shelf. Generally, gassed fish is imported from Asian countries where fish catches may be unsustainable. The ETBF industry members expressed their concern over gassed fish in the domestic market and how they find it difficult to compete with.
21. An update from the recreational fishing sector was provided by the TTRAG recreational fishing member. The recreational effort is currently lower than usual off the NSW east coast. The

number of boats out of Port Stephens is the lowest on record and this is largely due to economics. In general, the recreational fishery has still recorded reasonable catches and the adult Black Marlin catches in September/October 2013 represented a good season. It is hoped that the decent catches of adult Black Marlin will give rise to good juvenile recruitment as this has not been very high for some years.

22. The NSW recreational fishery is where the majority of tournaments occur. This year only about 320 Striped Marlin have been tagged compared to previous years where approximately 1,500 individuals have been tagged. The greater occurrence of bad weather may be a contributor to the lower numbers of Striped Marlin tagged.
23. TTRAG members noted that the average size of recreational boats seems to be increasing, meaning that people are travelling out further to catch Blue Marlin and the larger Yellowfin Tuna.
24. An industry member suggested that there might be a relationship between the occurrence of Yellowfin Tuna and Striped Marlin. The commercial operators stated that their Yellowfin catches have been low and so have their Striped Marlin catches. The Yellowfin Tuna were reported to be running much closer to the coast this year and recreational fishers have been taking smaller ones on the continental shelf. Both industry and recreational members commented that they have seen large numbers of juvenile Yellowfin Tuna recently.
25. In Western Australia, recreational fishers mainly target billfish species and rarely take Yellowfin Tuna. The recreational fishing member informed the RAG that there has been a very large run of juvenile Black Marlin recently off the Western Australian coast and 60 recreational boats have tagged 600 Black Marlin. He estimated that there has been a post-release survival rate of over 90%.
26. The RAG noted that the recreational fishing effort for SBT this season is very high. There have been long queues at boat ramps and people are travelling out further. Often fuel costs are being split between several people on the boat, so it is more affordable. There appears to be very large numbers of SBT being caught recreationally, however the recreational fishing member stated that these catches are being monitored and very good records of landings are kept by Clubs. Generally, recreational catches of SBT are kept, not released.
27. TTRAG further noted that Mako Sharks are occasionally caught as a bycatch of recreational fishing and these catches mainly take place off the southern coast of NSW.
28. The recreational tournament data kept on tuna and billfish species is reasonably accurate. Logbooks are also filled out by some people, but it is likely that this information is less accurate. The species data that is collected through the recreational tagging program can be very useful and this can be related to historic and environmental trends.
29. RAG members noted that a report on the club-based tournament fishery by Danielle Ghosn is nearing completion and it looks at more species than just Striped Marlin.

ACTION: Dr Sandra Diamond to distribute Danielle Ghosn report on the club-based tournament fishery to TTRAG members.

ACTION: Dr Julian Pepperell to distribute his relevant student reports on recreational fishing to TTRAG members.

30. An update on the WTBF catch and effort was postponed until the next TTRAG meeting, but members were asked to note that WTBF information is “Commercial-in-Confidence” due to the very small number of boats in the fishery and privacy.

ACTION: TTRAG to request TTMAC to ask Dr Kevin Williams to expand his project on ETBF target species size monitoring to include data from the WTBF.

31. TTRAG noted that a recreational survey is underway for NSW, but it is expected that a national survey will be undertaken during the 2014/15 financial year.

3 Harvest Strategy

The following members declared their interest under Harvest Strategy items:

Mr Paul Williams: agenda items 3.1, 3.2, 3.3

Mr Gary Heilmann: agenda items 3.1, 3.2, 3.3

Mr John Abbott: agenda items 3.1, 3.2, 3.3

Mr Pavo Walker: agenda items 3.1, 3.2, 3.3

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Mr Williams left the room. The remaining members of TTRAG agreed that Mr Williams should be allowed to return for all discussions and recommendations made under Agenda item 3.

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Mr Heilmann left the room. The remaining members of TTRAG agreed that Mr Heilmann should be allowed to return for all discussions and recommendations made under Agenda item 3.

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Mr Abbott left the room. The remaining members of TTRAG agreed that Mr Abbott should be allowed to return for all discussions and recommendations made under Agenda item 3.

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Mr Walker left the room. The remaining members of TTRAG agreed that Mr Walker should be allowed to return for all discussions and recommendations made under Agenda item 3.

3.1 Fisheries data summaries

32. Dr Rob Campbell presented the information on this agenda item. RAG members noted that there has been a major technical change in fishing effort over the last 3-4 years and more hooks per shot are now being set than previously. The existing boats are also fishing more days per year. In the past, operators would fish specific species in certain areas and generally went out a lot further from the coast. Now, most species are caught across the entire fishery and operators tend to fish closer inshore. These changes reflect the increase in economic efficiency of ETBF operators as well as improved fishing technologies.
33. Industry members informed the RAG that there is currently a high proportion of boats that are fishing 180-190 days per year. Home port location also affects fishing trend. Queensland-based operators generally fish all year round, while New South Wales operators are more restricted by weather conditions and therefore, only operate when the fish are there and the weather is good.

34. In comparing sets vs hooks over time, there was a high peak in the percentage of sets with <1100 hooks in 2003. There was also a spike in the 500-600 hook sets in 2013 and members noted that this is likely to be a representation of Southern Bluefin Tuna (SBT) targeting. Sets with less than 200 hooks were excluded from the analysis.
35. TTRAG members further noted that the inclusion of shots targeting SBT may be influencing the data as a higher percentage of these shots are observed and they are all typically within the 500-600 hooks per shot range or less. There were also a greater number of shots targeting SBT in 2013 due to the higher amount of quota available. There was agreement that SBT shots should also be excluded from analysis.
36. For the species targeted data, there is an inaccuracy as operators generally target multiple species per shot. This index cannot be used in CPUE standardisations due to duplication.
37. TTRAG noted that there have been changes in fishing strategies within the ETBF over time. For example, operators previously targeted Swordfish more heavily up until the species was under a trip limit. After this, there was a definite shift to targeting Albacore and this is evident in the CPUE data. There has also been a shift to the use of larger boats and more of these began fishing out wider. This trend is likely a reflection of the introduction of satellite navigation. The number of boats in the fishery has declined by approximately 25% from 2001.
38. TTRAG members requested that the mean weight comparison data for each target species be presented across an annual time series in future, in addition to the current graphs displaying the data by month. Members agreed that this would make it simpler to examine seasonal trends.
39. Industry members informed TTRAG that tuna fishing has historically been best in winter, but the patterns of species and of fishing have changed over time. Catches of Yellowfin Tuna used to peak around September/October of every second year. However, these peaks in catch have not occurred for about the last 5 years. Industry members now generally target Yellowfin Tuna if they are around, but if not, they will target Broadbill Swordfish.
40. One particular industry member stated that he owns approximately 25% of the Swordfish quota in the fishery and intends to catch that quota using 3 boats. Determining the number of boats that are catching what percentage of the quota could be useful for fishery data analysis. Quota and fish prices are major drivers of effort, and the economics of fishing are influencing operator behaviour more than previously.
41. TTRAG members noted that with ETBF operators now fishing more economically, quota price and fuel costs etc. may need to be included in the CPUE standardisation. The ETBF harvest strategy could also be revised to take into account more economic factors as well as biological.
42. In referring to the size classes for Swordfish, the AFMA member stated that the Small size class catches have been decreasing since 2009 and a similar trend has been seen in Yellowfin Tuna as well. This trend in Swordfish catch is likely to be caused by the increase in discarding of small Swordfish due to the introduction of quota, and could be significantly impacting the CPUE data. There may also be impacts on the Harvest Strategy as this will assume there has been a decrease in recruitment.
43. TTRAG noted that the observer data should be analysed before confirming the cause of the decreasing catch of small-size Swordfish. For Yellowfin Tuna, industry members suggested that the likely cause of the decline in the catch of small-size fish is avoidance as the small Yellowfin do not add much value to the overall catch and operators aim to make the most of their quota holdings.

44. The data analyses for Swordfish also displayed a decline in the mean weight of the upper 95th percentile. The RAG noted that this could be a reflection of the introduction of circle hooks and this further contributes to the need for a review of the size classes for all target species.
45. TTRAG reviewed the logbook and observer data plots for the 2011/12 discard levels. After the introduction of quota, the level of discarding increased. Yellowfin Tuna in particular, displayed a high post-quota discard percentage in quarter 3 (20%) of the observer data. However, 2011/12 was an unusually high abundance year for Yellowfin Tuna and this may have influenced the discard levels for this species.
46. TTRAG noted and discussed the time series plots for the top 4 bycatch species in the ETBF during 2013—Mahi Mahi, Rudderfish (a.k.a. Escolar and Oilfish), Wahoo and Mako Sharks. Several environmental variables were used in standardising the bycatch data including; mixed layer depth, southern oscillation, bathymetry and moon phase.
47. TTRAG further noted that in regard to Sea Surface Temperature (SST), warmer years tend to give greater Yellowfin Tuna catches, but cooler years are better for Bigeye Tuna, Escolar and Ray's Bream. It was emphasised that a lack of catch data for a certain species is not necessarily an indication of a decrease in abundance. SST may have a larger influence on stock size than previously thought.

3.2 CPUE standardisations

48. TTRAG noted that Dr Sean Tracey of the University of Tasmania attended discussions from this agenda item onwards. He informed members that there is a new recreational fishery for Broadbill Swordfish being investigated off south-east Australia, mainly off Tasmania. No commercial longline fishing operators currently travel down to this area to target Swordfish, but the area is within the boundaries of the ETBF. At the moment, charter fishing operators are fishing in this area and the recreational industry are interested in carrying out studies using tag and release, to determine whether this is a separate Swordfish stock or if they swim north to join the large main stock in the south-western Pacific Ocean. However, there are some concerns with the post-release survival of Swordfish, as they generally do not have a high recovery rate post-tagging.
49. The AFMA member stated that he would keep in contact with Dr Tracey to monitor the development of the recreational fishery for Swordfish.
50. Dr Rob Campbell provided the data and information on the CPUE standardisations and summarised each target species individually.
51. The same size class cut-off limits as for previous years were used for all target species in these analyses, however there may be a need to review these limits to obtain more accurate results.
52. TTRAG noted that the mainline length, distance between float (bubble length), current direction, bathymetry and moon phase indices were all included in the analysis for this year. No random effects were included.
53. Different discard rates were used for each species, however there was limited discard information for Striped Marlin so a similar rate to Swordfish was used.

Yellowfin Tuna

54. TTRAG noted that the prime-size fish for Yellowfin Tuna appear to be declining, but there has been a strong increasing trend in the large-size fish. Industry members confirmed this trend.

The small-size fish also appear to be declining sharply. These trends may be a representation of the movement of a cohort through the size classes, but could also be due to a change in fishing behaviour by operators. Since the implementation of quota, industry operators are avoiding the smaller fish to better maximise the use of their quota holdings. There is also no market demand for smaller fish, with the preference now strongly for the larger, high quality fish.

55. Members further noted that much of the Yellowfin Tuna catch was taken off Queensland, but effort is representative of the whole ETBF. NSW operators largely target SBT during the winter months, but their hooks are still being included in the Yellowfin analysis. It was agreed that the plots for Yellowfin should be reviewed and the data standardised for the ETBF SBT effort.
56. The highest catch rates of Yellowfin Tuna generally occur when setting in the morning (4:00am – 8:00am) and when the hooks are less dense. For example, one operator stated that he is now setting approximately 1,100 hooks over a longer distance compared to approximately 3,000 hooks as he had set previously. These gear and behaviour modifications are leading to greater efficiency by operators and the fishing is more targeted. Mahi Mahi and Albacore Tuna catches have also increased due to these changes.
57. The environmental factor that appeared to have had the greatest effect on the CPUE standardisation was moon phase, however this does not have a large impact on catches of Yellowfin Tuna. There is an issue with the large amount of observations recorded though, as all effects inevitably become significant.

Bigeye Tuna

58. There has been a decline in the number of prime-size fish for Bigeye Tuna, but an increase in both the small and large-size fish. There appears to be a large amount of inter-annual variability in all size classes for this species, but this is generally a reflection of the movement of cohorts through the classes.
59. An industry member stated that operators previously would target aggregations of Bigeye Tuna, but this is generally not happening any longer. Bigeye Tuna are also often caught in conjunction with Escolar and Ray's bream, but industry are not seeing so many of these anymore either.
60. It was suggested by a scientific member that an extra day should be added to the next TTRAG meeting so the entire tuna assessment can be looked at in detail. He stated that it is important for the RAG to understand the assessment model and the changes that have been made for this year.
61. The AFMA member highlighted that the data collected from the Coral Sea are of the ETBF is generally representative of handline effort and the longline shots that are made only contain approximately 500 hooks. Much of the Coral Sea Bigeye Tuna catch is of small fish. These factors could potentially be affecting the model results, particularly if shots with less than 200 hooks are being excluded from the analysis. The size distributions may also be impacted by the Coral Sea fishing operations.
62. The current direction (north-south) and current speed variables are having a reasonably large influence on the model as well as bathymetry. There also appears to be a fairly strong influence from the number of vessels (monthly).

63. The overall trend for Bigeye Tuna is a declining and the average catch for the last 5 years is below the average for the 5 years previous to that. These results are consistent with the broader stock issues in the Western and Central Pacific Ocean (WCPO). The recruitment trends being seen in the ETBF are also likely being impacted by the greater WCPO fishing operations.

Albacore Tuna

64. The Albacore Tuna size class models displayed slight increases in the prime and large-size fish, but a decline in the number of small-size fish. However, there is a bias away from the smaller fish, i.e. industry operators are mainly targeting the larger size fish to maximise the value of their quota holdings. The change in the nominal CPUE has accounted reasonably well for this fishing behaviour change.
65. Industry members indicated that the tuna species standardisations appear to be working well, but there could still be a little more fine-tuning. In general, the models are very useful and are indicative of what operators are seeing on the water.
66. Dr Campbell stated that he would still try to include wind speed and other environmental variables into the model and there is currently a large amount of data available on environmental variables from the National Oceanic and Atmospheric Administration (NOAA) in the United States. Wind speed in particular, is thought to greatly impact gear and operations and may have a large influence on the model. The impacts from wind speed are also more spatial; in Queensland, the seas and overall weather are generally calmer and operators are able to fish nearly all year round. However in NSW, the weather can be more unpredictable and operators are often restricted in the times they are able to go fishing.
67. It was suggested by some members that certain environmental variables could be included in logbooks, however logbooks are particularly costly to change and members would need to be very sure of the potential benefit of the additional data before requesting any alterations to the current logbooks.

ACTION: TTRAG to develop a “wishlist” for additional data that could be included in logbooks.

Broadbill Swordfish

68. The model for Swordfish displayed much less inter-annual variability than the tuna species, but this is likely due to the greater longevity of this species. There was a slight increase in the prime-size fish, with the small-size declining slightly and the large-size remaining relatively stable. It was noted that the decline in the small-size fish may have been due to the 2013 implementation of mandatory circle hooks for shallow sets as well as a move in fishing operations to be further offshore. However, the small-size fish have been showing a declining trend since 2010. TTRAG members were unsure why this trend is occurring. Generally this could be an indication of a lack of recruitment, but this may not necessarily be the case. It may also be a reflection of the change in discarding behaviour, with higher numbers of small-size fish being discarded. Industry operators first began using circle hooks for shallow sets in 2006-2007.
69. TTRAG members noted that almost all industry operators now use circle hooks when targeting Swordfish. Circle hooks do not catch so many of the larger Swordfish, but also give a higher live

on line count of the tuna species. The post-release survival of Swordfish and other species is generally better when caught with the circle hooks.

70. A number of TTRAG scientific members suggested that the size class cut-offs for Swordfish should be reviewed and may not currently be a true index of age. The declining trend in the small-size fish invoked some concern among members, but if the size class cut-offs are to be changed, the reasoning needs to be clear and justified. Members agreed that further investigation of the drivers behind the decline in small-size fish needs to be undertaken first. It is possible that the cause of the decline could be due to a reporting issue or discarding biases.
71. For clarity, Dr Campbell restated the main issues for further investigation to be:
 - i. Has there been a change in discarding practices for all species since the implementation of quota that has affected the numbers of small-size fish?
 - ii. Has the introduction of circle hooks in the ETBF influenced (decreased) the number of very large Swordfish being caught?
72. Of the environmental indices for Swordfish, the north-south current had a large influence on the analysis as well as current speed.

Striped Marlin

73. TTRAG noted that there has been a long-term decline in the catch of Striped Marlin since the late 1990s. Industry members stated that they rarely catch the small-size Striped Marlin (<53kg) and they did not think that the current size class cut-offs are correct.
74. For the current size classes, there has been a slight increase in the large-size fish and a slight decline in the small-size. The prime-size fish appear relatively stable. The fishing effort on the shelf off the south coast of NSW has declined dramatically, but it is here that the bigger Striped Marlin are generally caught.
75. Several industry members stated that they rarely target Striped Marlin anymore however they are still being caught in larger numbers further north. The recreational fishing member also stated that the recreational fishery has also witnesses a decline in the occurrence of Striped Marlin over that last two years. This could be a reflection of a general decadal trend or something more serious. There is likely to be impacts on the stock from international fishing effort.
76. TTRAG noted that Striped Marlin is a very fast growing species and can reach 30kg in their first year. Their approximate maximum lifespan is 8 years, but they can grow to be around 200kg.
77. In the standardisation, the environmental and gear indices did not display a large influence so the differences in the size classes may be due to a non-targeting effect.
78. An industry member questioned the point at which the harvest strategy becomes redundant for this species, i.e. the boat critical mass. This was unable to be answered, however the CPUE standardisation can still be run successfully with only a small number of boats. This is not yet an issue for Striped Marlin, but the analysis can be very different when there are only a small number of players owning the majority of the quota.
79. Other industry members stated that they are focussing more now on economics when going fishing, particularly when to target different species rather than trying to maximise the CPUE.

80. The RAG noted that the SBT management zones are not taken into account in the standardisation, which may be having an effect on the catch data. For example, operators may catch Swordfish occasionally when they are actually targeting SBT. These SBT shots are likely recorded as Swordfish shots and this then impacts the catch rates of Swordfish. A trend in a bycatch species is generally shown as a trend in the target species. This is a complex issue and still needs to be worked out.
81. The economics of fishing need to be accounted for in the standardisation as the species targeted per trip depends on which is economically viable at that time. Currently, the assessment only accounts for variations in gear type and this does not necessarily change with the target species.
82. In regard to the SBT management zones, this would be considered to be an area effect. If removed from the analyses, anything else caught in the zones is likely a bycatch (byproduct) of fishing. The AFMA member notified the RAG that the SBT management zones are in place from May to November annually and can be shifted weekly depending on the Sea Surface Temperature (SST) and currents.
83. The industry members informed TTRAG that the south-coast shelf area is the main location for catching Striped Marlin, particularly off Ulladulla and Bermagui. This should be included as a new/separate area in the standardisation specifically for Striped Marlin.

ACTION: Dr Rob Campbell to create a new area off the south coast of NSW specifically for Striped Marlin to include in the CPUE standardisations.

84. Industry members expressed concern that there continues to be a decline in the Striped Marlin CPUE even with further reductions in the TACC. This could be an indication that the harvest strategy is no longer effective for this species.
85. TTRAG noted that any changes to the input data for the standardisations will need to be reviewed at the equivalent TTRAG meeting in 2015 as the standardisations have already been completed for this year.

General discussion

86. TTRAG continued with general discussion of the size distributions. There was some concern expressed by members around bias and how it is accounted for within the Swordfish standardisation. One industry member suggested excluding all fish less than 20kg and greater than 100kg, and then calculating the 25th and 75th percentiles of the remaining data, and the scientific members agreed that this could be a possible solution.
87. Swordfish tends to have the broadest size range of all the target species, but it is likely that the decline in the large-size fish is due to the implementation of circle hooks. When quota was first introduced in the ETBF, there was only a small amount of Swordfish quota available and operators tended to discard the lower quality fish.
88. TTRAG members noted that observer data for discards is available and will be considered before the next TTRAG meeting. In terms of the standardisation, any changes or additions will not be incorporated for this year, they will be considered for next year's standardisation.

89. It was further noted by the RAG that it may be more useful for the Swordfish data to be presented by year rather than quarter. This way, the historical shift in Swordfish weight and the transition from J hooks to circle hooks might be better represented.
90. Dr Sean Tracey from the University of Tasmania provided information on Swordfish from a recreational fishing perspective. The RAG agreed that recreational data should be included in the standardisations where possible. Dr Tracey also explained that there has been talk in the recreational fishing community regarding a national recreational fishing licence for the larger gamefish species such as Swordfish, however this is not yet a reality.
91. TTRAG also noted that a Swordfish recreational fishing research project looking at a possible stock off the east coast of Tasmania, may still be within the scope of the RAG consideration, as the CPUE index should account for all forms of fishing mortality. However, a project such as this would need to be driven by the Tasmanian government and would need to go through ComFRAB.
92. Dr Tracey stated that a few tags could be used to determine whether it is an independent resident population of Swordfish or part of the larger south-west pacific stock. TTRAG agreed to postpone further discussion on this topic until further data has been obtained.
93. The RAG discussed the SBT management zones currently in place in the ETBF. It was noted that these zones need to be included in the CPUE standardisation. Operator behaviour within the zones is very different to other times during the season in the same area and is directly linked to the availability of quota. The SBT management zones were introduced in 2005 and are reviewed and changed weekly. While there is likely to be some effect of the SBT zones on the data, this may not necessarily be the case. However, it is important that this is investigated for future standardisations. Shots inside and outside of the zones should be considered and the trends should be compared with SBT quota availability.

ACTION: AFMA to provide Dr Rob Campbell with the locations of the SBT management zones and a list of all the shot numbers within the zones.

94. TTRAG noted that the SBT management zones information should be considered for all ETBF quota species.
95. TTRAG members agreed that an additional meeting in March 2015 should be held to enable discussion of potential indices and changes to the CPUE standardisation before it is run.
96. All TTRAG members also expressed their appreciation for the amount of time and effort Dr Campbell had put into completing the standardisations.

3.3 ATBF Harvest Strategy Framework

97. TTRAG agreed that due to the time required for purposeful discussion of the harvest strategy, it should be postponed until the next TTRAG meeting.
98. The AFMA member agreed to revise the current harvest strategy document for discussion by the RAG at the next meeting. The intention of this discussion is to incorporate provisions for byproduct and bycatch species into the harvest strategy.

4 Bycatch/byproduct issues

The following members declared their interest under the bycatch/byproduct issues items:

Mr Paul Williams: agenda items 4.1

Mr Gary Heilmann: agenda items 4.1

Mr John Abbott: agenda items 4.1

Mr Pavo Walker: agenda items 4.1

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Mr Williams left the room. The remaining members of TTRAG agreed that Mr Williams should be allowed to return for all discussions and recommendations made under Agenda item 4.

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Mr Heilmann left the room. The remaining members of TTRAG agreed that Mr Heilmann should be allowed to return for all discussions and recommendations made under Agenda item 4.

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Mr Abbott left the room. The remaining members of TTRAG agreed that Mr Abbott should be allowed to return for all discussions and recommendations made under Agenda item 4.

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Mr Walker left the room. The remaining members of TTRAG agreed that Mr Walker should be allowed to return for all discussions and recommendations made under Agenda item 4.

4.1 Review of major byproduct/bycatch species

99. The AFMA member provided a summary and information on the main byproduct/bycatch species in the ETBF. He explained that the data presented is the raw data and is just to provide a preliminary indication of species health. Only observer data has been used to formulate the CPUE graphs.
100. TTRAG noted that the following species have been included in the analysis and all were listed as low/medium risk in the most recent Ecological Risk Assessment (ERA). All species listed below are commonly caught as byproduct in the ETBF.
 - Escolar, Oilfish & Rudderfish
 - Lancetfish
 - Mahi Mahi
 - Snake Mackerel
 - Ray's Bream
 - Opah
101. Dr Rob Campbell presented standardised CPUE data for Escolar. This species displayed a declining trend and RAG members agreed that further investigation of this species is required. Both logbook and observer data should be analysed.

102. It was further agreed by TTRAG that all byproduct/bycatch species discussed should be investigated further and Dr Campbell will develop a template and present the standardised data at the first TTRAG meeting in 2015.
103. TTRAG noted that the review of the ERA methodology is still being conducted by CSIRO and AFMA and there is unlikely to be another review of fisheries until the end of 2015.
104. It was suggested that the RAG should also consider trends in shark catch as well. While there is a large amount of research being done internationally on shark species, it is important for the RAG to monitor all species caught. The AFMA member stated that he would provide updates to the RAG on progress made at the international Commissions on sharks and will also review the observer reports.
105. A standard agenda items on “wildlife interactions” should be included in future TTRAG meetings as appropriate.

5 Research

The following members declared their interest under the research agenda items:

Dr Cathy Dichmont: agenda items 5.1, 5.2, 5.3

Dr Rob Campbell: agenda items 5.1, 5.2, 5.3

Dr Julian Pepperell: agenda items 5.1, 5.2, 5.3

Prof John Tisdell: agenda items 5.1, 5.2, 5.3

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Dr Dichmont left the room. The remaining members of TTRAG agreed that Dr Dichmont should be allowed to return for all discussions and recommendations made under Agenda item 5.

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Dr Campbell left the room. The remaining members of TTRAG agreed that Dr Campbell should be allowed to return for all discussions and recommendations made under Agenda item 5.

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Dr Pepperell left the room. The remaining members of TTRAG agreed that Dr Pepperell should be allowed to return for all discussions and recommendations made under Agenda item 5.

In line with the requirements as a RAG industry member who has declared interests under an agenda item, Prof Tisdell left the room. The remaining members of TTRAG agreed that Prof Tisdell should be allowed to return for all discussions and recommendations made under Agenda item 5.

5.1 Status of tuna and billfish research projects

106. TTRAG discussed the current research projects underway for the ETBF/WTBF.

Project Title	Status
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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.	Funding approved and project is underway.
Ann Preece MSE project – Rich Hillary the Primary investigator.	Status unknown, an update is required from Dr Rich Hillary. This update should be provided at the next TTRAG meeting.
Determination of SWO growth and maturity relevant to the southwest Pacific stock (Dr Jess Farley).	Begins in July 2014
Developing innovative approaches to improve CPUE standardisation for Australia's multi-species pelagic longline fisheries (Dr Rob Campbell).	Begins in July 2014

107. TTRAG noted that research budgets in the States and Territories have been reduced for the next financial year. There have also been some cuts to Commonwealth research funding.
108. Some suggestions were made for recreational fishing research, however the AFMA member agreed to liaise with Dr Pepperell regarding these.

5.2 Annual Research Statement

109. TTRAG noted that the Annual Research Statement needs to be updated each year and the Statement for the 2015/16 financial year (AFMA funding) was discussed.
110. The following projects were agreed and listed in order of priority:
- 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.
 - Develop a spatial and temporal model to estimate economic returns to the Australian Tuna and Billfish Fisheries. The model will include key economic drivers, such as fish prices, the cost of fuel and quota allocations, as well as biological conditions and constraints. The modelling outputs will assist TTRAG and TTMAC identify and develop appropriate management options and strategies in order to maximise the economic efficiency of the fishery within sustainable limits.
 - Expansion of the ETBF size monitoring programme to include data from the WTBF.
 - Alternative methods to mitigate seabird bycatch in pelagic longline fisheries: Hook Pod trials.
111. The following projects were listed on the previous Annual Research Statement (2014/15) and have received provisional approval for funding with the likelihood that these will be confirmed in the next few weeks:

- Data management, standardisation of CPUE and size data, development of fishery indicators, application of the ETBF harvest strategy, and provision of stock assessment advice to TTRAG.
 - Determination of SWO growth and maturity relevant to the southwest Pacific stock.
112. TTRAG agreed to support a recreational fishing related project once a formal proposal is presented, however it was agreed that this would not be included in the priority list for the 2015/16 financial year.

5.3 Research outcomes 2013

113. TTRAG noted the research outcomes information for 2013 and that no tropical tuna projects were funded in 2013.

6 RBCC & TACC setting

No pecuniary interests were declared under this agenda item as the information provided was for information only.

114. TTRAG noted that the focus of the next meeting would be to provide RAG advice and recommend RBCCs for the ETBF and WTBF target species, for the 2015/16 fishing season.

7 Other business

No pecuniary interests were declared under this agenda item.

115. TTRAG discussed the trends in discards over the last few years, but concluded that a few more years of data are needed to be more certain.
116. TTRAG also discussed the impending development and implementation of electronic monitoring (e-monitoring) in the ETBF and WTBF. The AFMA member explained that the same information will be collected through e-monitoring as what is collected now through the observer program, except for length/weight frequencies. However, weight frequencies will be collected through onshore size monitoring.
117. RAG members noted that further consideration needs to be given to how the RAG will review the data once e-monitoring is in place.
118. An industry member, Mr Heilmann, agreed to put together a list of the major changes in the ETBF and when they happened, to enable the RAG to review the impacts of these changes on fishing behaviour, catch, gear etc.
119. TTRAG members agreed to discuss the sampling design in relation to e-monitoring at a future TTRAG meeting.

8 Next meeting

120. TTRAG agreed to hold the next meeting in Mooloolaba on 30 September to 1 October 2014. These dates are tentative pending confirmation out of session.