



Australian Government

Australian Fisheries Management Authority

Tropical Tuna and Billfish Fisheries Resource Assessment Group (TTRAG) 31

Minutes

9 - 10 March 2021

Mooloolaba/Video Conference

Contents

Contents	2
1 Preliminaries	3
1.1. Welcome and Apologies	3
1.2. Declaration of Interest	4
1.3. Adoption of Agenda.....	5
1.4. Adoption of Minutes	5
1.5. Actions Arising.....	5
1.6. Out of session Correspondence	14
2 AFMA Catchwatch	14
2.1. Current catches and effort in the domestic fishery – verbal updates from scientists, industry and recreational fishing members since last RAG Meeting (October 2020).....	14
2.2. AFMA catch watch reports (AFMA)	15
2.3. International meeting update.....	15
2.4. MAC and AFMA Commission outcomes	15
3 Striped Marlin Harvest Strategy	16
3.1. Striped Marlin Harvest Strategy update	16
4 Coral Sea Trial	19
4.1. Update on Coral Sea Zone hook limit trial	19
5 Research Update	20
5.1. Update on Tuna Australia projects	20
5.2. Fisheries Oceanography project	21
5.3. Genetics Project.....	21
5.4. Recreational fishing project	22
6 Other business.....	22
6.1. Future meeting planning.....	22
6.2. Recreational and sport fishing FADs	23
7 Next meeting	23

1 Preliminaries

1.1. Welcome and Apologies

1. The Chair, Dr Cathy Dichmont, welcomed members and opened the meeting at 9:00am with an acknowledgement of country.
2. In opening the meeting, AFMA informed the RAG of the recent passing of TTRAG economic member Mr David Mosby. The RAG expressed condolences and noted there is no intention to call for a new economic member until the current TTRAG membership appointment expires in June 2022.
3. The following participants were present at the meeting:

Present	
Dr Cathy Dichmont	Chair
Mr Josh Fielding	AFMA member
Dr Rich Hillary	Scientific member, CSIRO
Mr Gary Heilmann	Industry member
Dr Julian Pepperell	Recreational fishing member
Dr Ian Knuckey	Scientific member
Dr Rob Campbell*	Scientific member, CSIRO
Mr Pavo Walker	Industry Member
Observers	
Mr Phil Ravanello	Tuna Australia, Project Manager
Ms Ann Preece	CSIRO
Dr Ashley Williams	CSIRO
Mr Trent Timmiss	AFMA
Mr Jason Hartog**	CSIRO
Executive Officer	
Ms Natalie Rivero	TTRAG Executive Officer
Apologies (did not attend)	
Mr David Ellis	Industry representative invited participant, TTRAG and TTMAC
Dr James Larcombe	Scientific member, ABARES
Mr Paul Williams	Industry invited participant

* Joined the meeting during Agenda item 2.2

**Attended for Agenda item 5.2 only

4. Apologies were received from Mr David Ellis, Mr James Larcombe and Mr Paul Williams prior to the meeting.

1.2. Declaration of Interest

5. The Chair asked all participants present at the meeting to declare any conflict of interest with the agenda items. Each participant with a declared conflict of interest was asked to leave the teleconference while the remaining members discussed their individual claims.

Member/participant	Declared Interests
Dr Cathy Dichmont (Chair)	Has a consulting company, but has no pecuniary interests in the tuna fisheries. <i>No conflict of interest declared.</i>
Mr Josh Fielding	Employee of AFMA, which includes a salary. Is the Manager of the tropical tuna fisheries. No pecuniary interest in tropical tuna fisheries. <i>No conflict of interest declared.</i>
Ms Natalie Rivero	Employee of AFMA, which includes a salary. Is the Executive Officer for TTRAG, but has no pecuniary interest in Australian tropical tuna fisheries. <i>No conflict of interest declared.</i>
Mr Gary Heilmann	Industry member, director of a processing company, no longer holds ETBF boat or quota SFRs. <i>Declared an interest in Agenda items 3 and 6.2.</i>
Dr Rich Hillary	Employee of CSIRO, no pecuniary interest in Australian tropical tuna fisheries. Is the PI for the Management Strategy Evaluation (MSE) project for the tropical tuna and billfish species. <i>No conflict of interest declared.</i>
Dr Robert Campbell	No pecuniary interest in Australian tropical tuna fisheries. Former employee of CSIRO and previously engaged in research on the Eastern and Western Tuna and Billfish Fisheries as former PI of the following research project: " <i>Data management, provision of fishery indicators and implementation of the harvest strategies for Australia's tropical tuna fisheries</i> ". <i>No conflict of interest declared.</i>
Dr Ian Knuckey	Has a consulting company with interests in electronic reporting in the tuna fisheries, and is a member on several other AFMA Committees. Has previously worked on a project on FADs in Tasmania and work relating to the Commonwealth resource sharing framework. <i>No conflict of interest declared.</i>
Dr Julian Pepperell	Independent fisheries consultant and representative of the recreational fishing sector. Is currently undertaking research into gamefishing. Is involved in projects including the monitoring of fish landed at game fishing tournaments and pop-up satellite tagging on juvenile Black Marlin. <i>No conflict of interest declared.</i>
Mr Trent Timmiss	Employee of AFMA, which includes a salary. Is the Senior Manager of the Tuna and International section. No pecuniary interest in tropical tuna fisheries. <i>No conflict of interest declared.</i>
Mr Phil Ravello	Is currently the program manager of the industry association, Tuna Australia which includes a salary paid by industry. <i>Declared an interest in Agenda items 3, and 6.2.</i>

Ms Ann Preece	Employee of CSIRO, no pecuniary interest in Australian tropical tuna fisheries. Is the PI for the Management Strategy Evaluation (MSE) project for the tropical tuna and billfish species. <i>No conflict of interest declared.</i>
Dr Ashley Williams	Employee of CSIRO, no pecuniary interest in Australian tropical tuna fisheries. Is the PI for the project on <i>Data Management, Assessment and implementation of Harvest Strategy for Australia's Tropical Tuna and Billfish Fisheries</i> . <i>No conflict of interest declared.</i>
Mr Pavo Walker	Owns several ETBF boat SFRs, and ETBF quota SFRs for all species. Holds a Coral Sea permit and minor line permit. <i>Declared an interest in Agenda items 3, 4 and 6.2.</i>

6. In all cases where a member or observer declared a conflict of interest, the participant left the room/teleconference. The remaining members unanimously agreed they were permitted to participate in the item of discussion, noting the expertise of the individuals and benefits of these members contributing to discussions.

1.3. Adoption of Agenda

7. The draft meeting agenda was circulated on 22 March 2021 and accepted by TTRAG, as detailed in Appendix 1.

1.4. Adoption of Minutes

8. The TTRAG noted that minor comments received out of session from attendees on the TTRAG 30 meeting minutes were incorporated into the draft at Attachment 1.4a.
9. The TTRAG adopted the TTRAG 30 minutes without further amendment.

1.5. Actions Arising

10. The RAG noted the status of action items from previous meetings (Table 1). The comments from the RAG on the actions arising can be found at (Table 1).
11. A summary of actions arising from this meeting is included at Appendix 2.

Table 1 Status of actions arising from previous TTRAG meetings (Items marked * to be discussed and review by TTRAG).

	Action	Meeting raised	Responsibility	Status at TTRAG31	Discussion at TTRAG 31
1	Estimating Recreational Catch: AFMA to contact NSW fisheries for the charter boat logbook data. Dr Julian Pepperell will contact Danielle Ghosn to see what recreational club data she can provide.	TTRAG 14	AFMA/Dr Julian Pepperell	ONGOING: Verbal update to be provided by Dr Julian Pepperell.	Complete. Addressed under Agenda item 5.4
2	ABARES to touch base with SPC staff to discuss the inclusion of NSW recreational tagging data in the SPC tagging database.	TTRAG 19	*ABARES*	ONGOING: At TTRAG 30, the status of this item was listed as <i>“Dr Campbell will provide background information to Dr Larcombe and Dr Pepperell will pass on relevant contact information (Phil Bolton and Brian Van der Wahl at NSW DPI)”</i> .	Remove as action item. Mr James Larcombe has been made aware of available data and can pass on information to SPC.

	Action	Meeting raised	Responsibility	Status at TTRAG31	Discussion at TTRAG 31
3	CPUE analyses: CSIRO to contact ABARES scientists regarding their 'clustering' analyses work to determine if it may provide insights for improving the CPUE analyses (and vice versa).	TTRAG 21 TTRAG 22	*CSIRO* ABARES	ONGOING: This work is still being progressed noting a change in staff working on it at ABARES.	Remove from action list. All action items in relation to CPUE analysis are to be added to a CPUE checklist and handed over to the incoming PI of the Data management for Tuna fisheries contract. ACTION ITEM: AFMA to consolidate the list of action items in relation to CPUE analysis and handover to the incoming PI of the Data management for Tuna fisheries contract for review. (Appendix 3)
4	FMS Data Strategy: AFMA to begin a logbook review with industry and Dr Campbell to determine if there should be any amendments in logbook data fields (including those discussed at TTRAG21). AFMA will report progress at the next TTRAG meeting.	TTRAG 21	AFMA/Industry/ *CSIRO*	FINALISED: New fields have been added to the e-logs.	Complete. Any new additions to logbooks that are identified will be added as new action items.

	Action	Meeting raised	Responsibility	Status at TTRAG31	Discussion at TTRAG 31
5	CSIRO will look to explore potential changes in fishing practices (particularly with the start of set location) associated with the introduction of Marine Parks, and determine potential implications for CPUE standardisations.	TTRAG 23	*CSIRO*	ONGOING: CSIRO to obtain the specific boundaries of the marine parks and then will pass onto whoever takes on the work.	Remove from action list. Add to CPUE checklist.

	Action	Meeting raised	Responsibility	Status at TTRAG31	Discussion at TTRAG 31
6	AFMA to determine how EM are recording heads that are brought up on board and report back to TTRAG with a short discussion paper including data collection options after consultation with AAP.	TTRAG 23	AFMA	ONGOING: At TTRAG 30, the AFMA member confirmed that EM footage is only retained for 6 months unless it is flagged for a compliance investigation or historical purposes.	<p>Remove action item</p> <p>This item was originally raised in relation to understanding the impact of shark/whale depredation. Industry explained that predation is common and the RAG discussed how it may impact the CPUE standardisations. The RAG noted that discarded Tuna is annotated in EM review however it is not recorded whether depredation has occurred on discarded fish. Depredation is recorded in logbooks, however, and it was agreed that a new action item should be added where AFMA produce a summary of what is recorded with respect to depredation for RAG discussion.</p> <p>ACTION ITEM: AFMA to produce a summary of what is recorded with respect to depredation for RAG for discussion.</p>

	Action	Meeting raised	Responsibility	Status at TTRAG31	Discussion at TTRAG 31
7	<p>Understanding of fishing depths</p> <p>TTRAG to consider whether a research priority is required to address the uncertainty around changes in fishing practices, particularly for monitoring fishing depth.</p> <ol style="list-style-type: none"> 1- AFMA to seek to include the following data fields into future ETBF e-logs - Vessel log speed (important distinction from vessel speed), Shooter speed, and bubble dropper length.* 2- TTRAG to consider development of TDR based research and/or data collection in the ETBF to better understand and account for (in CPUE analyses) the relationship between fishing strategies (including vessel log speed, shooter speed and dropper lengths etc) and fishing depth.** <p>*moved from item 18</p> <p>**moved from item 20</p>	TTRAG 23	AFMA	<p>ONGOING:</p> <ol style="list-style-type: none"> 1. AFMA has added the new fields to the e-logs and they are in the process of being rolled out. 2. Not yet actioned. 	<ol style="list-style-type: none"> 1. Complete 2. Remove from action list. <p>Add to CPUE checklist.</p>

	Action	Meeting raised	Responsibility	Status at TTRAG31	Discussion at TTRAG 31
8	<p>AFMA to examine VMS data to check and verify sets reported on logbooks as having mainline lengths greater than 100km.</p> <p>TTRAG to consider frequency distributions of values for all factors used in CPUE standardisations and provide advice regarding the removal of outliers.</p>	TTRAG 24	AFMA/ TTRAG/*CSIRO*	ONGOING: Not yet actioned. These items were combined from previous action items 13 and 14.	<p>Remove from action list.</p> <p>Add to CPUE checklist</p>
9	AFMA to review the background basis for differing CDR conversion factors used by CSIRO and AFMA.	TTRAG 24	AFMA	ONGOING: Not yet actioned.	It was noted this item was originally proposed to align the conversion factors presented in data summaries by CSIRO with those used by AFMA for quota decrement. The RAG agreed to use the AFMA conversion factors in future data summaries presented to the RAG.
10	Dr Preece to provide TTRAG members with an update of the MSE scenarios and settings to be explored in the preliminary MSE analyses at the October meeting.	TTRAG 29	CSIRO (Dr Preece)	ONGOING: Dr Preece provide an update at TTRAG31	Complete.

	Action	Meeting raised	Responsibility	Status at TTRAG31	Discussion at TTRAG 31
11	AFMA to revise the WTBF Indicators template to include subregional IOTC information, recreational fishery information, summary statements and historic catch trends for foreign fishing in the EEZ.	TTRAG 29	AFMA	ONGOING: AFMA will look to incorporate TTRAG's suggestions in future WTBF indicators papers.	Noted.
12	<p>In relation to new logbook fields:</p> <ul style="list-style-type: none"> a. AFMA to implement agreed new data fields in logbooks relating to fishing depths, line weighting and hooks (size and type). b. AFMA to determine why vessel shooting speed field was not available in data provided to CSIRO by AFMA. c. TTRAG to give further consideration to additional potential fields, specifically, those required by WCPFC logbooks and ROP, fields relevant to collecting data on depredation, and shape of mainline set. d. AFMA to explore the possibility of collecting "hook number" information for protected species interactions via electronic monitoring 	TTRAG 29	AFMA/TTRAG	<p>ONGOING:</p> <ul style="list-style-type: none"> a) New fields have been added to the e-logs and are in the process of being rolled out. b) Vessel shooting speed is included in Logbook effort tables provided to CSIRO c) Not yet actioned. d) Not yet actioned. 	<ul style="list-style-type: none"> a) Complete b) Remove from action list. Add to CPUE checklist c) Remove from action list. Add to CPUE checklist d) Noted

	Action	Meeting raised	Responsibility	Status at TTRAG31	Discussion at TTRAG 31
13	<p>In relation to the ETBF data dictionary:</p> <ul style="list-style-type: none"> a. CSIRO to provide AFMA with a copy of the CSIRO Tuna Legacy Data as described in the Data Dictionary. b. AFMA (Natalie Rivero) to provide more details for the ADC line tables to CSIRO (Dr Campbell) 	TTRAG 29	AFMA/*CSIRO*	ONGOING: At TTRAG 30, the RAG noted the item will be progressed out of session and it was agreed to remove Dr Campbell's name from this item and note any further work on this item will be between AFMA and CSIRO.	Noted.

1.6. Out of session Correspondence

12. The TTRAG noted the out of session correspondence between the TTRAG 29 and TTRAG 30 meetings as provided in the written update by AFMA.

2 AFMA Catchwatch

2.1. Current catches and effort in the domestic fishery – verbal updates from scientists, industry and recreational fishing members since last RAG Meeting (October 2020)

13. Industry members and invited participants provided an update on recent fishing activity with the RAG noting:
- Access to the main Swordfish market in Boston on the east coast of the US has been cut off due to the impact on air freight logistics/increased freight costs arising from the ongoing Covid-19 pandemic. Operators have switched their fishing practices by targeting different species such as Albacore and Southern Bluefin Tuna.
 - Domestic supply and demand issues have presented challenges due to restaurant closures and last minute changes to events. Providing product to supermarket chains has been difficult as they demand consistency and steady quantity of product that can't be guaranteed from a fishery such as the ETBF.
 - Product entering processing facilities in Mooloolaba has been variable in quantity and quality. Although there is demand for product in the US, the limited and expensive options for air freight have made it extremely difficult even with government subsidies.
 - Fishing in the Southern part of the fishery has been quiet with a few boats travelling North to fish off Coffs Harbour before returning south due to poor weather. Southern operators have also shifted fishing practices mostly fishing to service domestic markets.
14. The recreational fishing member provided an update on recent fishing activity with the RAG noting:
- That prior to the RAG meeting in October 2020 the majority of tournaments had been cancelled, however with restrictions easing they have started up again with good numbers of participants.
 - The Cairns heavy tackle Black Marlin season suffered heavily from the impacts of Covid-19, however, the boats that did fish saw the fish turn up on cue. There have also been reports of very large Mako sharks caught and a lot of small Black Marlin turning up down the NSW coast.
 - The Striped Marlin fishery that usually occurs in Feb/March on the NSW central coast didn't really happen in 2020, however, this year off Ulladulla and Jervis Bay they've had a better than average season.
 - There have been a number of interesting recaptures of tagged fish including; a Yellowfin Tuna tagged off Port Hacking in NSW recaptured after four years in Papua New Guinea weighing 61kg; A 5kg Albacore tagged off Merimbula in NSW recaptured at 21kg by a New

Caledonian longline vessel off Noumea; and the first ever Striped Marlin tagged in Australia on the Gold Coast at 100kg recaptured after 17 months in New Zealand at 103kg.

15. The Scientific member provided an update with the RAG noting:

- That CSIRO have filled the vacancy created by Dr Robert Campbell's but appointment has been delayed by visa processing waiting times.
- The new PI for the Data management for Tropical Tuna project is Dr Ashley Williams.
- Dr Robert Campbell has been contracted to ABARES to continue his work on the Scientific Committee of the Western Central Pacific Fisheries Commission (WCPFC).

2.2. AFMA catch watch reports (AFMA)

16. The RAG was presented with the fishery catch data paper provided by AFMA noting:

- The 2020 season had very low catches of Swordfish, Striped Marlin and Bigeye Tuna.
- The total number of hooks in 2020 was similar to recent years (around 8 million hooks).
- Albacore catch was highest since the 2006/07 period when it peaked.
- Yellowfin Tuna catches were slightly better than an average year.

2.3. International meeting update

17. The RAG was provided with an update from AFMA on recent international meetings.

- The Western and Central Pacific Fisheries Commission (WCPFC) and Indian Ocean Tuna Commission (IOTC) decided not to implement any new management measures throughout 2020 due to impacts of Covid-19, however in 2021 the Commissions will be progressing a number of issues (likely through virtual meetings).
- The WCPFC met on 7-15 December 2020 where no significant change to the Tropical Tuna Conservation Management Measure (CMM) was made, but a process aimed at revising the measure throughout 2021 was agreed. Two week-long workshops will be held in 2021; one to be held in April 2021 and another one to be held in June/July 2021, with the aim of having a draft revised Tropical Tuna CMM for discussion at WCPFC18 in December.
- Issues such as purse seine effort on the high seas, fishing days associated with FAD effort, Bigeye Tuna catch, and a continued push for Albacore management will also be at the forefront of discussions in WCPFC. It was noted that there is potential over the coming years that Australia's 2500t ETBF TACC for Albacore may see pressure to be reduced in light of ongoing Albacore management discussions.
- IOTC is currently meeting to discuss measures for reducing Yellowfin catches and the Technical Committee on Allocation Criteria (TCAC) will meet from 22 - 25 March to discuss the scope, regime and principles under which allocation for a number of species including Yellowfin Tuna, Bigeye Tuna, Albacore and Swordfish could be made in the IOTC. This is the first of three TCAC meetings to be held throughout 2021.

2.4. MAC and AFMA Commission outcomes

18. The RAG was provided with an update from the TTMAC 24 meeting held on 26 October 2020 and the AFMA Commission meeting in November 2020. The RAG noted that:

- The key item for both the TTMAC and AFMA Commission meeting were discussions on the ETBF and WTBF TACCs for the 2021 season. The TTMAC and AFMA Commission agreed to implement TACCs consistent with the RBCC advice provided by TTRAG.
- It was noted that the WTBF TACCs were set for a single year only and will be set on a yearly basis while allocation discussions take place in the IOTC.
- The Commission considered a proposal by Tuna Australia to vary the undercatch allowance for Swordfish which was not supported for the ETBF 2020 fishing season.
- The Commission agreed to develop a policy position setting out AFMA's understanding of its "Maximising Net Economic Return" objective to better inform efforts to develop economic indicators and better account for the objective in decision making.

3 Striped Marlin Harvest Strategy

3.1. Striped Marlin Harvest Strategy update

19. CSIRO presented the outcomes of the Striped Marlin Harvest Strategy Management Strategy Evaluation (MSE) work. The MSE work was conducted to evaluate the performance of candidate harvest strategies for Striped Marlin under a range of uncertainties.
20. The RAG was presented with the following key points in relation to the reference set of operating models:
 - The operating models were selected from 300 plausible models in the SWPO stock assessment.
 - The 2019 SWPO stock assessment for Striped Marlin indicates that the spawning stock is currently at 0.196 (0.1- 0.34, 80%PI) of unfished biomass levels, and concludes that the stock is likely overfished and is close to being subject to overfishing.
 - For the grid of operating models, key factors were selected that influence stock assessment results: 3 values of steepness, 3 values of natural mortality, 2 varying CPUE series (Japanese longline in Area 2 and Australian longline) with 10 replicates of each.
 - Operating model projections (detailed further below) simulate 2017-2040 TACC setting via a Harvest Strategy (HS).
 - Operating model structure is divided into two areas: ETBF and non-ETBF area (SWPO).
21. The RAG noted the following in relation to the harvest strategy, projection scenarios and MSE results:
 - The 'new' HS uses a Harvest Control Rule (HCR) that specifies a 'target', 'threshold' and 'buffer zone' as was recently adopted as the Swordfish HS in the ETBF.
 - The HCR, uses one CPUE series (with all size classes of Striped Marlin) as input data, a reference level (the average CPUE for 2012 – 2015), a buffer zone around the reference level, and a threshold (that is half the reference level). The target and buffer zone used are the same as that used in the Swordfish HS.
 - Six HS candidates that vary in several parameters were tested; these were:

Candidate HS

- HS1 - same settings as the swordfish HS adopted in 2020
 - average CPUE from the 3 most recent years of data
 - maximum TAC change is 10%
 - TAC is set annually

Variations from HS1:

- HS2 - average CPUE over most recent 2 years
- HS4 - average CPUE over most recent 4 years
- HS3 - 3 years TAC, maximum TAC change 27%
- HS5 - buffer zone 10% above and below target
- HS6 - buffer zone 20% above and below the target.

- Each HS was tested using the reference set of operating models with four projection scenarios, these were:

Reference set and projection scenarios

Proj1 - reference set of OMs x 10 replicates and following settings:

- 2 areas, ETBF area and non-ETBF area
 - Migration 20%/quarter (both directions)
 - Non-ETBF effort is fixed at current levels
 - Additional error in CPUE, recruitment, catch implementation
 - Selectivity in ETBF is Australian LL, non-ETBF is Japanese LL2
-
- Proj2 - migration of 1% / q.
 - Proj3 - higher autocorrelation in recruitment.
 - Proj4 - higher effort in the non-ETBF area (doubles over the first 5 years of projections and stays at that level).

22. The resulting summary statistics for each HS and projection scenario tested is summarised in the table below showing the spawning stock biomass in 2035 relative to B0, the CPUE in 2035 and the TAC in 2035 assuming each HS and projection had been utilised between 2017 and 2035.

Table 1 Summary statistics, median and 80th percentile range, for the HS and projection scenario combinations described above.

HS	Proj	Change from HS1, Proj1	SSB2035/SSB0	CPUE 2035	TAC 2035
HS1	proj1		0.30 (0.17, 0.50)	1.27 (0.36,3.16)	392 (200, 832)
HS1	proj2	Migration 1%	0.33 (0.16, 0.45)	1.29 (0.52, 2.50)	527 (293, 979)
HS3	proj1	3yr TAC, 27% max TAC change	0.31 (0.18, 0.51)	1.32 (0.44, 3.23)	364 (188, 667)
HS1	proj3	Higher recruitment autocorrelation	0.27 (0.11, 0.45)	1.03 (0.41, 2.15)	456 (212, 976)
HS2	proj1	Recent CPUE ave 2 yrs	0.30 (0.18, 0.50)	1.32 (0.38, 3.24)	397 (183, 777)
HS4	proj1	Recent CPUE ave 4 yrs	0.30 (0.17, 0.50)	1.22 (0.32, 3.15)	431 (181, 992)
HS5	proj1	10% bufferzone 0.8, 0.97,	0.30 (0.16, 0.48)	1.17 (0.27, 3.08)	495 (223, 982)
HS6	proj1	20% bufferzone 0.71, 1.07	0.29 (0.16, 0.49)	1.17 (0.26, 3.07)	501 (243, 982)
HS1	proj4	non-etbf effort X2 over 5 yrs	0.25 (0.11, 0.36)	1.11 (0.47,2.02)	363 (224, 704)

23. Key points from the RAG's discussion were that:

- The stock assessment for Striped Marlin, which is the starting point for the projections, is highly uncertain.
- The CPUE and resulting TACC for the year 2035 was chosen to compare and evaluate the performance of the different HS projections tested. The RAG discussed whether the choice of a singular year was appropriate and agreed that given the high variability in the projections, evaluating the average of a range of years (e.g. 2033-2037) may provide better insight into the performance of each candidate HS.
- The reference set of OMs, on average, assume the current TACC (351t) is fully caught. It was noted that the fishery generally under catches the TACC rather than over catches. The RAG discussed whether future testing should consider setting catch levels to ~70% of the current TACC to reflect the actual catch rates in the fishery.
- The AFMA observer noted that if catch levels in the fishery where to remain consistent, there would be a 10% annual increase in the TACC under HS1 resulting from the harvest control rule.

How the Limit Reference Point (LRP) and Target Reference Point (TRP) are reported against was discussed.

- It was noted that the WCPFC Swordfish and Striped Marlin stock assessments have reported against dynamic depletion based reference points (e.g. $SB_y/SB_{y,F=0}$) rather than the depletion relative to the initial spawning biomass (SB_y/SB_0). The MSE results presented to the RAG reported spawning biomass depletion in 2035 relative to the initial spawning biomass (e.g. SB_{2035}/SB_0) in the summary statistics for each HS projection.
- Further discussion clarified that both SB statistics are presented in the WCPFC stock assessment papers, and the unfished (F=0) statistics are calculated using a different run of the assessment models which can't be used as the starting point for

the MSE operating models. Therefore, $SB_{F=0}$ statistics won't be reported in the MSE work.

- It would be useful to include statistics on how often the Limit Reference Point (LRP) is breached as well as statistics on the inter-annual catch variability.
- The target reference point used in the HCR is the average CPUE in 2012 -2015 with a limit reference point of half the CPUE target level. Given that the projection results indicated that the spawning biomass is over shooting the target it was noted that CPUE is likely not a good proxy for trends in the underlying spawning biomass.
- It was discussed that perhaps the best way to measure the performance (given we are starting from a point that is at the LRP) is to evaluate candidate harvest control rules by assessing which scenarios prevent rebuilding as defined by causing biomass to fall below its current level. AFMA will seek advice from ABARES and the Department of Agriculture, Water and Environment as how this approach aligns with the Harvest Strategy Policy.
- The RAG agreed to inform TTMAC of the proposed way forward in which TTRAG has suggested several additional projections and statistics be developed in order to assess whether a candidate HS for Striped Marlin can be adopted. Therefore, TTRAG will not be in a position to implement a HS in 2021. It is intended that TTRAG will discuss the outcomes of the further work at their July meeting and provide another update to TTMAC in time for their meeting later in the year.

24. Summary of TTRAG's request for next iteration of Striped Marlin HS MSE:

- Include summary statistics on how often the LRP is breached and the inter-annual variability in catch.
- Evaluate the performance of each projection over the average of a range of years (e.g. 2033-2037), in addition to using the 2035 reference year
- Additional projections for HS1, showing the performance metrics listed above, where:
 - ETBF catch is set to zero (this was chosen to see how the stock recovers under the best scenario the fishery can achieve)
 - Where the current TACC (351t) remains unchanged (a projection of the status quo)
 - A static catch of 250t, 300t, $\pm 10\%$ (to compare different constant catch scenarios)
 - And similar to what was produced for Swordfish, model the ratio in actual catch vs. TACC over a period (e.g. last 7 years) and use it as the basis for adding implementation error into the MSE.

ACTION: CSIRO to produce the next iteration of Striped Marlin projections for TTRAG's July meeting

4 Coral Sea Trial

4.1. Update on Coral Sea Zone hook limit trial

25. The RAG noted that since the last TTRAG meeting, a small working group consisting of industry, scientists, managers and several recreational members of either TTRAG or TTMAC met to discuss the conditions of the Coral Sea Zone (CSZ) hook trial.

26. The working group formed the following conditions for a two year trial in the CSZ:

- Limit the trial to a maximum of 1,200 hooks set per day.

- If shooting more than 500 hooks, only one set can be conducted per day.
- Fishing under the proposed hook limit would occur over a two year trial period east of 148°E. Fishing west of 148°E will be restricted to certain months.
- The first year of the trial in the area west of 148°E would occur between the months of March to August in 2021. With a review of the data arising from year one to inform the time period for 2022.
- A two-tier marlin catch limit will apply during the trial. If the first tier is reached, this will trigger AFMA convening the working group (within two weeks of the breach) to review available data. If the second tier is reached, the trial will be terminated.
- The following catch limits will be applied:

	Blue Marlin	Black Marlin
First Tier	34	65
Second Tier	45	86

- All boats operating in the trial must comply with the ETBF e-monitoring requirements. AFMA will continue to monitor e-monitoring audit rates for reporting accuracy.
- Life status and size data (less than or greater than 20kg) will be collected during the trial, facilitated through the new e-log software and verified through e-monitoring.

27. The RAG noted that the main operator that was interested in utilising the increase in hooks has informed AFMA that recent changes to ownership within their company will mean they are operating only one vessel for the foreseeable future. With changes to proposed effort in the CSZ, the RAG noted that the trial will not operate as originally expected and will therefore be reassessed at the first check point later in 2021.

5 Research Update

5.1 Update on Tuna Australia projects

28. The RAG was provided with a verbal update on Tuna Australia projects noting that:

- Tuna Australia have submitted a final report to Parks Australia for the MSC certification project which was finalised in August 2020. The fishery is now MSC certified, and the majority of ETBF processors have now been audited under the MSC chain of custody certification scheme.
- The gear drift project is now finalised. While it was logistically difficult to complete, the project was able to demonstrate that fishing can occur quite close to closure areas as there is good control of drifting fishing gear.
- The ETBF size monitoring project is continuing with the next data processing milestone in April 2021. New processors in the fishery have been approached to boost the number of samples collected and overall the program has been very successful exceeding the 90% sampling KPI. There have been changes to landing facilities used in the fishery with some operators now conducting split landings between Nelson Bay and Coffs Harbour processors. Tuna Australia is now receiving data from Nelson Bay landings to ensure there is no data gap arising from this new development.
- There has been a project approved for funding by the FRDC to explore Work Health Safety (WHS) aspects of bycatch mitigation in the fishery. This project will seek to address

'flybacks', including alternate line weighting regimes to prevent it from occurring, development of physical barriers and modification of existing WHS options (lumo leads, sliding weights) to make them more user friendly. Other project initiatives include the standardisation of tori line design and assessing the WHS efficacy of side setting as an alternative to stern setting.

- A second project proposal being considered by FRDC will look at reviewing current mitigations for a range of TEP species (seabirds, turtles, sharks and toothed whales) and reinvigorating known, and testing, new and novel mitigation designs in the fishery.

5.2. Fisheries Oceanography project

29. The RAG was provided with an update on the Fisheries Oceanography Project and the most recent Project steering committee meeting. It was noted that:

- The project's steering committee met on 13 October 2020 and the RAG were circulated the minutes and actions from that meeting alongside the project update handout.
- Following the steering committee meeting, the project team met with members of SPC in November 2020 to set goals for the project and ground-truth assumptions made in the time series. The meeting was productive and regular discussions are taking place as the work is finalised.
- The project team presented at the board meeting for Tuna Australia and while Covid-19 has made face-to-face meetings difficult the project team intends to continue communicating findings from the project.
- Investigations into using different size classes has taken place to identify if varying size classes produced different results. Early indications are that they don't, at least not for the habitat models, and the outcomes of exploring size classes will form part of the project's final outcomes.
- The project team have requested FRDC for an extension to the project to allow further time to write up the findings of the project. The work completed to date (such as the regression tree models and models developed specifically for the ETBF) has been summarised in the documents circulated to the RAG prior to the meeting.

30. The RAG discussed the figures of modelled probability of 'good catch' under changing oceanographic variables. It was agreed that the description on how the figure is interpreted should be made clearer.

31. A question was raised as to whether the outcomes of the project have been able to provide insight into episodic events such as large pulses of Yellowfin Tuna entering the fishery. It was explained that the project team are intending to explore big events in the time series but there is no definitive answer as of yet.

32. It was suggested that the project team contact the theme conveners for the WCPFC Scientific Committee to request that a discussion on the project's outcomes are added to a meeting agenda. It was further noted that presenting at the upcoming World Fisheries Conference would be beneficial to reaching a broad audience because the Conference will be streamed online.

33. The RAG thanked Mr Jason Hartog for the presentation.

5.3. Genetics Project

34. The RAG was provided with a verbal update from CSIRO on the Genetics project noting that:

- Dr Karen Evans has provided several presentations to TTRAG on the project in recent years and the project has undergone external reviews which are now being considered.
- The project received internal funding to analyse additional Swordfish samples from more locations (such as New Zealand and the Cook Islands) and the intention is to finalise those samples in the coming months.
- AFMA and CSIRO will be in contact to schedule a final presentation to the RAG on the outcomes of the project.

5.4. Recreational fishing project

35. The RAG was provided with a presentation from Dr Julian Pepperell on the outcomes of the research project investigating the disjunct between commercial and recreational catches of Yellowfin Tuna off south-eastern Australia.

36. The RAG noted the following from the presentation:

- The project was driven by the need to understand the relative availability of Yellowfin Tuna between the commercial and recreational sectors.
- The objectives of the project were to analyse catches and catch per unit effort of Yellowfin Tuna for both sectors, and analyse possible correlations in the availability of fish and prevailing oceanographic conditions.
- Data were sourced from Game fishing annual reports, the NSW DPI Gamefish Tagging Program, NZ recreational catch records, NZ tag records, the NSW Gamefish Tournament Monitoring Program, catch and effort data from the commercial longline fishery as well as Oceanographic and Environmental data sources.
- The project found that recreational catches and catch rates of Yellowfin Tuna over the past 12 years have been well below average and have been extremely low for the past four years. During the same time, the commercial catches and catch rates have been relatively stable. There were also trends of possible environmental effects over various time periods observed however there was no clear long-term relationship between any particular environmental variable and recreational catch rates. The project did find a negative correlation between recreational CPUE and SESSF trawl activity off Central/Southern NSW which would be useful to investigate further.

37. The RAG discussed the project's outcomes and more broadly the issue of species that have shown general trends of decline despite efforts to reduce fishing pressure. It was noted that Dr Rich Little from CSIRO is in the process of drafting a research proposal focused on south-east Australia and there may be benefit in seeing if there are findings from this project that may inform the future work being considered.

38. The RAG thanked Dr Pepperell for the presentation.

6 Other business

6.1. Future meeting planning

39. The RAG noted that the intention of this agenda item was to discuss what is expected from the upcoming July meeting and note anything that should be considered in preparing the CPUE standardisations in light of the impacts Covid-19 had on fishing activity.

40. It was noted that changes to fishing practices (e.g. switching of bait to target different species, varying the number of hooks set and reduced effort on certain key fishing grounds) may be captured well in the CPUE standardisations for species such as Swordfish but not as well for Yellowfin Tuna or Bigeye Tuna that have less distinct gear/area characteristics associated with their targeting.
41. It was suggested that a small data sub-group, consisting of AFMA, CSIRO and Dr Robert Campbell, meet prior to the July RAG meeting and look at preliminary data summaries to see if there is anything that causes concern and may significantly affect the CPUE standardisations. It was noted that size monitoring program data will be provided to CSIRO in early April and CSIRO is expected to receive data from AFMA at the same time.
42. It was agreed that a meeting with key participants in early June would allow time for a preliminary data summary to be prepared and time for any follow up work required before to the CPUE standardisations are presented at the July RAG meeting.

ACTION ITEM: AFMA to organise a small data sub-group consisting of AFMA, CSIRO and Dr Robert Campbell. The data sub-group to meet prior to the July RAG meeting and look at preliminary data summaries and identify any issues that may arise in the CPUE standardisations.

6.2. Recreational and sport fishing FADs

43. The RAG noted the verbal update from Mr Phil Ravello, Tuna Australia Project Manager, on recreational and sports fishing FADs. The RAG noted that:
- Tuna Australia were approached with a proposal from Queensland fisheries in early 2020 that outlined their interest in deploying a number of sub-surface FADs in waters of 200 – 1500m in depth within Commonwealth waters adjacent to the southeast Queensland coast.
 - In response to the proposal, Tuna Australia responded by outlining a number of issues with the proposal and highlighted the significant impact the FADs would have if placed in direct line of tuna fishing longline gear.
 - While still in consultation with Queensland fisheries on the issue, Tuna Australia received a post-dated letter from Queensland fisheries, informing them that the FADs had already been installed.
44. The RAG noted that increased effort in the recreational fishery on ETBF target species may be something to monitor as well as changes to areas fished that may arise from avoidance of areas where FADs are located. It was further noted that obtaining the exact locations of where the FADs are located for considerations in future CPUE standardisations would be useful. AFMA noted that the locations of the FADs are available and Queensland Fisheries have indicated they would be willing to share data collected on FAD usage.

ACTION: AFMA to provide CSIRO with the locations of recreational fishing FADs off the southeast Queensland coast for consideration in future CPUE standardisations.

7 Next meeting

45. At the TTRAG 30 meeting in October 2020, TTRAG agreed to set placeholders for all meetings throughout 2021. The next tentative meeting dates scheduled are:
- TTRAG 32, 13 – 15 July 2021

- TTRAG 33, 14 -16 September 2021

46. The Chair closed the meeting at 10:00 am on day two and thanked members for their attendance and contributions.

APPENDIX 1: TTRAG 31 AGENDA

Tropical Tuna Resource Assessment Group

TTRAG 31

Venue- Mantra Mooloolaba Beach
Tuesday 9 March – Wednesday 10 March 2021
Time- 10:00am start (QLD time)

1. Preliminaries

- 1.1 Welcome and apologies
- 1.2 Pecuniary interest declarations
- 1.3 Adoption of agenda
- 1.4 Acceptance of minutes
- 1.5 Actions arising/out-of-session developments
- 1.6 Out of session correspondence

2. Review of Fishery Performance

- 2.1 Current catches and effort in the domestic fishery – verbal updates from scientists, industry and recreational fishing members since last RAG Meeting (October 2020)
- 2.2. AFMA catch watch reports (AFMA)
- 2.3. International meeting updates (AFMA)
- 2.4. MAC/AFMA Commission outcomes (AFMA)

3. Striped Marlin Harvest Strategy

- 3.1 Update on Striped Marlin harvest strategy (CSIRO)

4. Coral Sea Zone trial

- 4.1 Update on Coral Sea Zone trial (AFMA)

5. Research update

- 5.1 Update on Tuna Australia projects (Phil Ravenello)
- 5.2 Fisheries Oceanography Project Steering Committee update (CSIRO/AFMA)
- 5.3 Genetics project (CSIRO - Dr Karen Evans)
- 5.4 Recreational fishing project (Dr Julian Pepperell and CSIRO)

6. Other Business

- 6.1 Future meeting planning (AFMA)
- 6.2 Recreational and Sports fishing FADs (CFA/Tuna Australia)

7. Next Meeting

APPENDIX 2: ACTIONS ARISING FROM TTRAG 31

	Action	Responsibility
1	AFMA to consolidate the list of action items in relation to CPUE analysis and handover to the incoming PI of the Data management for Tuna fisheries contract for review	AFMA
2	AFMA to prepare a summary of what is recorded with respect to Shark/Whale depredation in logbooks and present findings to the RAG for discussion.	AFMA
3	CSIRO to produce the next iteration of Striped Marlin projections for TTRAG's July meeting	CSIRO
4	AFMA to organise a small data sub-group consisting of AFMA, CSIRO and Dr Robert Campbell. The data sub-group to meet prior to the July RAG meeting and look preliminary data summaries and identify any issues that may arise in the CPUE standardisations.	AFMA
5	AFMA to provide CSIRO with the locations of recreational fishing FADs off the southeast Queensland coast for consideration in future CPUE standardisations.	AFMA

APPENDIX 3: CPUE RELATED ACTION ITEMS

Item	Meeting raised	Status at TTRAG 31
CPUE analyses: CSIRO to contact ABARES scientists regarding their 'clustering' analyses work to determine if it may provide insights for improving the CPUE analyses (and vice versa).	TTRAG 21 TTRAG 22	ONGOING: This work is still being progressed noting a change in staff working on it at ABARES.
CSIRO will look to explore potential changes in fishing practices (particularly with the start of set location) associated with the introduction of Marine Parks, and determine potential implications for CPUE standardisations.	TTRAG 23	ONGOING: CSIRO to obtain the specific boundaries of the marine parks and then will pass onto whoever takes on the work
TTRAG to consider development of TDR based research and/or data collection in the ETBF to better understand and account for (in CPUE analyses) the relationship between fishing strategies (including vessel log speed, shooter speed and dropper lengths etc) and fishing depth.	TTRAG 23	Not yet actioned.
AFMA to examine VMS data to check and verify sets reported on logbooks as having mainline lengths greater than 100km. TTRAG to consider frequency distributions of values for all factors used in CPUE standardisations and provide advice regarding the removal of outliers	TTRAG 24	Not yet actioned.
TTRAG to give further consideration to additional potential fields, specifically, those required by WCPFC logbooks and ROP, fields relevant to collecting data on depredation, and shape of mainline set.	TTRAG 29	Not yet actioned.
AFMA to provide CSIRO with the locations of recreational fishing FADs off the southeast Queensland coast for consideration in future CPUE standardisations	TTRAG 31	New action.