

**Tropical Tuna and Billfish Fisheries   
Resource Assessment Group   
TTRAG 23**

**Meeting Minutes**

**26 & 27 March 2019**

**Hobart**

Contents

[Contents 2](#_Toc8739334)

[1 Preliminaries 4](#_Toc8739335)

[1.1 Welcome and Apologies 4](#_Toc8739336)

[1.2 Pecuniary interest declarations 4](#_Toc8739337)

[1.3 Adoption of Agenda 6](#_Toc8739338)

[1.4 Acceptance of minutes 6](#_Toc8739339)

[1.5 Actions arising 6](#_Toc8739340)

[1.6 Out of session correspondence 19](#_Toc8739341)

[2 Review of fishery performance 19](#_Toc8739342)

[2.1 Catchwatch report 19](#_Toc8739343)

[2.2 Current catches and effort in the domestic fishery 19](#_Toc8739344)

[2.3 International meetings update 20](#_Toc8739345)

[2.4 TTMAC and AFMA Commission update 20](#_Toc8739346)

[2.5 General update of the outcomes from the half-day economic and half-day logbook review workshops 21](#_Toc8739347)

[3 Harvest Strategy redevelopment 23](#_Toc8739348)

[3.1 Redevelopment status update 23](#_Toc8739349)

[3.2 Temporal changes in fishing methods 23](#_Toc8739350)

[3.3 Redevelopment of suite of Operating Models to test candidate harvest strategies (CSIRO) 25](#_Toc8739351)

[3.4 Initial thoughts on Harvest Control Rule structure and performance indicators (target/limit reference points, risk levels) (CSIRO) 27](#_Toc8739352)

[4 Fisheries Management Strategy 30](#_Toc8739353)

[4.1 FMS 30](#_Toc8739354)

[5 Research update 31](#_Toc8739355)

[5.1 Processes and deadline update 31](#_Toc8739356)

[5.2 Fisheries Oceanography Project Steering Committee update (CSIRO/AFMA) 31](#_Toc8739357)

[5.3 Update on the Genetics project – Dr Karen Evans 31](#_Toc8739358)

[5.4 Ageing of striped marlin 32](#_Toc8739359)

[5.5 Sea turtle analyses. 33](#_Toc8739360)

[5.6 Recreational fishing project update (Dr Julian Pepperell and CSIRO) 34](#_Toc8739361)

[6 Other business 35](#_Toc8739362)

[7 Date and venue for next meeting 35](#_Toc8739363)

[Appendix 1: Adopted Agenda 36](#_Toc8739364)

[Appendix 2: Actions arising from TTRAG 23 38](#_Toc8739365)

## 1 Preliminaries

* + 1. Welcome and Apologies

The Chair, Dr Cathy Dichmont, opened the TTRAG 23 meeting at 8:30am.

The following participants were in attendance at the meeting:

|  |  |  |
| --- | --- | --- |
| **Members** | | |
| Dr Cathy Dichmont | | Chair |
| Dr Don Bromhead | | AFMA member |
| Dr Robert Campbell | | Scientific member, CSIRO |
| Dr Rich Hillary | | Scientific member, CSIRO |
| Mr Pavo Walker | | Industry member (participating via teleconference) |
| Dr Julian Pepperell | | Recreational fishing member |
| Mr Gary Heilmann | | Industry member |
| Mr James Larcombe | | Scientific member, ABARES |
| Professor John Tisdell | | Scientific member (Economist) |
| Mr John Abbott | | Industry member |
| **Invited Participants** | | |
| Mr Paul Williams | | Industry invited participant |
| Mr David Ellis | | Industry invited participant |
| **Observers** | | |
| Dr Jason Hartog | CSIRO | |
| Dr Toby Patterson | CSIRO | |
| Dr Jessica Farley | CSIRO | |
| Dr Karen Evans | CSIRO | |
| **Executive Officer** | | |
| Ms Amelinda Byrne | | AFMA |

Apologies were received prior to the meeting from Mr Pavo Walker for his non-attendance at the meeting, but noting that he participated in a number of sessions via teleconference.

* + 1. Pecuniary interest declarations

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 then asked to leave the room while the remaining members discussed their individual claims.

The attendees declared their conflict of interests as follows:

|  |  |
| --- | --- |
| Member/  participant | Declared Interests |
| **Dr Cathy Dichmont (Chair)** | Has a consulting company, but has no pecuniary interests in the tuna fisheries.  *No conflict of interest declared.* |
| **Dr Don Bromhead** | Employee of AFMA, which includes a salary. Is the Manager of the tropical tuna fisheries. No pecuniary interest in tropical tuna fisheries.  *No conflict of interest declared.* |
| **Ms Amelinda Byrne** | Employee of AFMA, which includes a salary. Acting as the Executive Officer for the TTRAG 23, but has no pecuniary interest in Australian tropical tuna fisheries.  *No conflict of interest declared.* |
| **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. PI of the following research project: “*Data management, provision of fishery indicators and implementation of the harvest strategies for Australia's tropical tuna fisheries*”.  *No conflict of interest declared.* |
| **Mr David Ellis** | Has a consultancy company and is the CEO of the industry association, Tuna Australia.  *Declared an interest in agenda item 3.* |
| **Dr Jessica Farley** | 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.  *No conflict of interest declared.* |
| **Mr Gary Heilmann** | Industry member, director of a processing company, no longer holds ETBF boat or quota SFRs.  *Declared an interest in agenda item 3.* |
| **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.  *No conflict of interest declared.* |
| **Dr James Larcombe** | Employee of ABARES, involved in fisheries research, primarily through engagement with the Western Central Pacific Fisheries Commission. Has no pecuniary interest in the Australian Tropical Tuna Fisheries.  *No conflict of interest declared.* |
| **Dr Julian Pepperell** | Independent fisheries consultant and representative of the recreational fishing sector. Is currently undertaking research into game fishing. Is involved in projects including the monitoring of fish landed at game fishing tournaments and pop-up satellite tagging on juvenile Black Marlin.  *Declared an interest under agenda item 5.* |
| **Professor John Tisdell** | Has a consulting company and is a scientific member of the Great Australian Bight Resource Assessment Group (GABRAG). Has no pecuniary interest in tropical tuna fisheries.  *No conflict of interest declared.* |
| **Mr Pavo Walker** | Owns several ETBF boat SFRs, and ETBF quota SFRs for all species. Holds a Coral Sea permit and minor line permits.  *Declared an interest in Agenda item 3.*  Present through agenda item 3 on the afternoon of day 1 and day 2. |
| **Mr Paul Williams** | Director of a company that holds an ETBF boat SFR, ETBF quota SFRs, and holds a Commonwealth fish receiver’s permit.  *Declared an interest in Agenda item 3.* |

In all cases where a member or participant declared a conflict of interest, and left the room, the remaining members unanimously agreed they were permitted to participate in the item of discussion.

The expertise of the members and invited participants present and participating via teleconference was critical for full and comprehensive discussions, further noting that the role for the TTRAG was to provide advice and recommendations for final decisions.

* + 1. Adoption of Agenda

The agenda was endorsed by TTRAG and the final agenda is provided in Appendix 1.

It was noted however, that due to the location change, the original agenda was compressed to shorten the duration of the meeting. Due to the compressed agenda, some items were agreed will be briefly discussed, with a full update to be provided at TTRAG 24 in July 2019, in particular the Recreational fishing project (Dr Julian Pepperell and Dr Robert Campbell).

* + 1. Acceptance of minutes

TTRAG accepted the minutes of TTRAG 22 without amendment.

* + 1. Actions arising

The RAG discussed the action items arising following TTRAG 22 and ongoing action items from previous RAG meetings and commented on the progress on each item (Table 1).

A summary of actions arising from this meeting is included at Appendix 2.

Table 1. Status of actions arising from previous TTRAG meetings.

|  | **Action** | **Meeting raised** | **Responsibility** | **Status as of TTRAG 23** | **Discussion at TTRAG 23** |
| --- | --- | --- | --- | --- | --- |
| **1** | **Estimating Recreational Catch:** AFMA to contact NSW fisheries for the charter boat logbook data. Dr Julian Pepperell with contact Danielle Ghosn to see what recreational club data she can provide. | TTRAG 14 | AFMA/Dr Julian Pepperell | ONGOING: Dr Pepperell clarified that he had not received data from Dr Sam Williams but had discussions on the relevant data for potential use on the database. Drs Campbell and Pepperell to meet and discuss the data and provide an update at the next TTRAG meeting in March 2019. | Details on the project update discussed under agenda item 5.4. |
| **2** | **Quota zones:**   1. AFMA and CSIRO to prepare a paper that includes information from the harvest strategy, stock status information, the CSIRO MSE analysis and connectivity review assess sustainability issues in implementing inshore and offshore quota zones for swordfish. 2. AFMA suggested contacting John Annala from New Zealand Ministry of Primary Industries to see if New Zealand would be interested in supporting the swordfish project and investigate the potential of New Zealand providing some funding. 3. AFMA to follow up with Karen Evans of CSIRO to determine exactly how many swordfish samples would be required from each zone to satisfy an adequate sampling design, for each inshore, offshore and potential western New Zealand. David Ellis to also work with AFMA to assist in sourcing offshore samples and possible funding from the ETBF. | 1. TTRAG 15 2. TTRAG 19 3. TTRAG 19 | AFMA/CSIRO | 1. ONGOING: This project stalled due to a lack of required funds to undertake the field-based components. AFMA to discuss with FRDC about the flexibility in modes of funding this research. The upcoming project to redevelop the HS will inform consideration of whether a quota zones approach is appropriate. TTRAG22 agreed to collapse items 2, 10 and 11 into one action to assist in retaining the understanding and progress of the item. 2. ONGOING: This will remain as ongoing action to contact John Annala from MPI pending industry/AFMA getting FRDC funding for the project 3. ONGOING: Dr Evans to provide an update on this under agenda item 5. | Ongoing - TTRAG noted this was an ongoing discussion about whether to manage according to quota zones, which is mainly for the TTMAC decision, but could have implications for the harvest strategy which the RAG will need to consider. AFMA to discuss further with Tuna Australia. Addressing 2) and 3) is not needed until 1) is addressed |
| **3** | Dr Robert Campbell to follow up with Simon Hoyle if there is value and if it is practical to conduct the two-stage process for models not tested under Group-A | TTRAG 17 | Dr Robert Campbell | ONGOING: There has not been progression on this particular item, however Drs Robert Campbell, Shijie Zhou and Simon Hoyle have written a related paper which will soon be published. This is possibly for discussion at the TTRAG in July 2019. | Noted. |
| **4** | **Economic advice:**  1. The RAG sub-committee explore options available to the RAG for collecting economic information and prepare a paper for RAG and MAC consideration.  2. **\***AFMA will provide economic data from ABARES to include in the RBCC advice in future.  \*moved from action item 3 | TTRAG 18 | Tuna Australia, AFMA, ABARES, Professor Tisdell | ONGOING: This was discussed at the economics workshop run at AFMA in February 2019 and was discussed under Agenda Item 2.5. | The TTRAG noted this will be further discussed under agenda item 2.5, with the points in the actions addressed in the item. A scoping paper to be developed for September TTRAG on potential in season economic indicators and data sources and associated availability and costs. |
| **5** | AFMA to follow up on the exact date the trip limit for Mahi Mahi was removed and add it to the significant events spreadsheet | TTRAG 18 | AFMA | ONGOING: the AFMA team has searched through past documentations and was unable to find the date before this TTRAG meeting but will continue looking through records. However, this is not currently considered a high priority. | Noted by the TTRAG and will remain on the actions list to prompt follow up. An industry member noted that the limit was likely introduced at the same time as the OCS arrangements as a potential avenue for consideration. |
| **6** | Dr Julian Pepperell to update the recreational sector significant events and add to the document out of session | TTRAG 18 | Dr Julian Pepperell | ONGOING: | Dr Pepperell provided an update on the WA recreational sector. It was noted however, that the Annual General Meeting of the Game Fishers Association is currently reviewing the document but does not expect significant changes (Broome sailfish is an exception) and will be complete by July 2019 TTRAG. |
| **7** | **Harvest strategy redevelopment:**   1. AFMA to examine the cumulative impacts of the annual 10 per cent change threshold for the small fish CPUE trend under the Harvest Strategy Review. 2. AFMA to request Dr Rich Hillary provide depletion estimates from models excluding north-east catches, to be included on papers/advice to TTMAC and the AFMA Commission. 3. \*combine the actions relating to the harvest strategy so considerations previously listed as action items can be included in the overall redevelopment.   \*moved from action items 10 and 11. | 1. TTRAG 19 2. TTRAG 22 3. TTRAG 22 | AFMA | 1. ONGOING: This will be part of the wider discussions around the development of the new harvest strategy. TTRAG identified that actions related to the redevelopment of a harvest strategy should be collated as a group. 2. COMPLETE: This was provided to the AFMA Commission in November 2018. 3. COMPLETE. | 1. This was considered as part of the previous HS and the TTRAG this can be removed from the action list as the redevelopment has this aspect built into the project. 2. The TTRAG agreed this was complete. 3. The TTRAG agreed this was complete. |
| **8** | Dr Campbell to touch base with SPC staff to discuss the inclusion of NSW recreational tagging data in the SPC tagging database. | TTRAG 19 | Dr Robert Campbell | ONGOING: Dr Campbell will speak with SPC when he attends the pre-assessment workshop in early April 2019. | Noted. Dr Campbell noted that if SPC don’t have this data but the SPC want to include the tagging data, NSW is able to provide, depending on a service agreement. TTRAG agreed that this would be beneficial for NSW with SPC running analyses along the east coast. |
| **9** | AFMA to provide Dr Robert Campbell with a list of ETBF boats that have been in the fishery for an extended period and have recently changed their targeting practices for Swordfish. | TTRAG 20 | Dr Robert Campbell | COMPLETE: Dr Campbell to present the findings under agenda item 3. | Noted. |
| **10** | ABARES to contact the WCPFC SC regarding improving the management of the tissue bank. | TTRAG 20 | ABARES | ONGOING: ABARES, AFMA and CSIRO attended a stock structure workshop in Noumea in October and aimed to discuss the issues associated with the tissue bank and report back at TTRAG March meeting. | TTRAG requested this update from Karen Evans under Item 5.3. |
| **11** | **CPUE analyses:**   1. Dr Campbell to contact ABARES regarding their ‘clustering’ analyses work to determine if it may provide insights for improving the CPUE analyses (and vice versa). 2. Dr Campbell to work intersessionally with Dr Simon Nicol on these analysis work and update TTRAG at the March 2019 meeting. | TTRAG 21  TTRAG 22 | Dr Robert Campbell  CSIRO  ABARES | 1. ONGOING: ABARES presented an update of the metiers work under agenda item 5.5. 2. ONGOING: relates to the work conducted by ABARES and will continue throughout the progress of analysis of the clustering work. | 1. Noted by the TTRAG as complete. 2. The TTRAG noted that this work is ongoing. |
| **12** | **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/Dr Robert Campbell | ONGOING: this item was discussed under item 2.5. | TTRAG noted this will be further discussed under item 2.5, with the AFMA member informing the TTRAG that there has not been a field-by-field review of the logbooks as yet for identifying unnecessary fields but TTRAG and the data subgroup have reviewed what additional data is needed. Reviewing to identify unnecessary fields can be an option in the future under the FMS data strategy that the TTRAG can agree resources should be allocated to holding this review. |
| **13** | **Size monitoring project:** AFMA and Tuna Australia to work together to assess options for the ongoing collection of size data and report back to TTRAG22, including if required, developing a more detailed scope for the annual research statement. | TTRAG 21 | AFMA and Tuna Australia | ONGOING: AFMA is currently in the process of assessing applications for the continuation of the size monitoring project. | Noted by the TTRAG. |
| **14** | **Genetics project:** ABARES and Dr Campbell to also confirms whether samples from PNG have been collected. | TTRAG 21 | ABARES/Dr Robert Campbell | ONGOING: This will be clarified under item 5.3, genetics update, with the TTRAG believing this is likely referring to bigeye. | Complete - Dr Evans clarified origin of all species samples during item 5.3. |
| **15** | AFMA determine if Wez Norris is still willing to represent FFA on the Fisheries Oceanography project steering committee and then seek FFA endorsement. AFMA to informABARES and Dr Campbell information on which delegates to approach in relation to additional data provision at the upcoming SC meeting. | TTRAG 21 | AFMA  Dr Campbell and ABARES | COMPLETE: Mr. Wez Norris had agreed to participate through teleconference on the Oceanography Project Steering Committee meeting, held after TTRAG23 in Hobart. | TTRAG members questioned whether there should be a replacement for Mr Norris on the Steering Committee, given his new position as AFMA CEO. The TTRAG agreed to further discuss this during the Steering Committee, including potential replacement options. |
| **16** | AFMA to input TTRAGs suggestions on the ETBF and WTBF significant events spreadsheet and circulate out-of-session. | TTRAG 21 | AFMA | ONGOING: There has not been progression on this item since the September TTRAG. | The TTRAG agreed that this will be updated ahead of the July 2019 meeting and circulated ahead of the meeting for input. |
| **17** | **Fishery indicators:** Dr Campbell to send the AFMA data section a list of duplicate logbook entries as identified during the analysis. | TTRAG 22 | CSIRO | COMPLETE: Dr Campbell forwarded the data ahead of TTRAG 23. | Noted by the TTRAG as complete. |
| **18** | **Size data:** Dr Campbell to make the spatial plots series 5x5 by species proportion by quarterly to show seasonal signals for update at the March TTRAG meeting. | TTRAG 22 | CSIRO | COMPLETE: this will be done as a standing item for work presented at the September TTRAG meetings. | The TTRAG agreed this was complete and can be removed. |
| **19** | **Indicators and CPUE standardisation:**   1. Dr Campbell to remove the regional maps that are not relevant for the billfish and tuna species, and a brief explanation of the main proportion percentage in the regions, to make the regions used in each analysis easier for the TTRAG to interpret. 2. Dr Campbell to put legend in the map to clearly indicate which regions are for and develop a clear name to identify Region 5 “extension” (e.g. Tasman Region). 3. Dr Campbell to include the plots for Region 5 catch by fleet and the CPUE indices for the tropical tuna species. 4. Dr Campbell to include the catch data from the area of Region 5 extension to the indicators table. This will be noted by the longitudinal marker. | TTRAG 22 | CSIRO | ONGOING: this will be included in the SW-Pacific data presented to the TTRAG in September 2019. | It was agreed at TTRAG 23 that this item will be collapsed with others relating to the CPUE standardisation work (items 24, 27 and 28) and will all be included as part as the analysis by the September TTRAG meeting. |
| **20** | **CPUE standardisation:** Dr Campbell to analyse swordfish boats specifically to determine the factors affecting boats targeting swordfish. | TTRAG 22 | CSIRO | COMPLETE: Dr Campbell presented findings under agenda item 3.2. | TTRAG agreed this was complete. |
| **21** | **CPUE standardisation:** TTRAG requested that additional factors need to be taken into account in the swordfish standardisation and will be part of the data review in January. | TTRAG 22 | Tuna Australia  AFMA | COMPLETE: additional factors were discussed during the data review workshop held in February (rather than January) and will be outlined under agenda item 2.6. | TTRAG agreed this was complete. |
| **22** | **Research:** The AFMA member is to update the economic subgroup of the TTRAG on the FRDC funding and provide an overarching statement to the ARC on the reasons the RAG has decided not to pursue any projects. | TTRAG 22 | AFMA | COMPLETE: this was completed by the AFMA member in preparation for the ARC meeting in February 2019. | The TTRAG agreed this was complete. The AFMA member noted that the ARC is aware that the TTRAG agreed on no new research priorities while the HS redevelopment and genetics project are underway. |
| **23** | **TTRAG economic sub-group:** subgroup to meet ahead of March meeting with TTRAG economic member (or economic member proxy), ABARES, AFMA and Tuna Australia. This will also be combined with the meeting to explore options for the logbook update. | TTRAG 22 | AFMA | COMPLETE: economics workshop was held at AFMA in February 2019 and further discussed under agenda item 2.6. | The TTRAG agreed this was complete. |
| **24** | **Data strategy logbook review:** to identify whether there were further details that could be collected on logbooks to assist in the CPUE standardisations analyses by CSIRO. It was identified that an initial review be conducted with AFMA, Tuna Australia (as industry representative) and CSIRO to update on progress at the March 2019 meeting. | TTRAG 22 | AFMA  CSIRO  Tuna Australia | COMPLETE: the logbook workshop was held at AFMA in February 2019 further discussed under agenda item 2.6. | This was noted by the TTRAG as complete. |
| **25** | **Genetics project:** Dr Karen Evans to attend the March 2019 TTRAG meeting to provide a full update on progress to-date on the project. | TTRAG 22 | AFMA | COMPLETE: Dr Evans presented an update under agenda item 5.3. | TTRAG noted this as complete. |

* + 1. Out of session correspondence

The TTRAG noted the out of session correspondence between the TTRAG 22 and TTRAG 23 meeting described in Agenda item 1.5 with no further correspondence added to the list. Due to the compressed final agenda, this was taken as read prior to the meeting with no questions asked by members.

* 1. Review of fishery performance
     1. Catchwatch report

The Catchwatch report was briefly presented to the TTRAG by the AFMA member, with most of the content taken as read (due to the compressed meeting agenda) but noting a couple of key statistics. Specifically, that CDR reported catches of Swordfish, Bigeye Tuna and Striped Marlin in 2018 were among the lowest levels recorded historically. Albacore tuna and Bigeye tuna have been relatively low in the early months of the 2019 season when compared to other seasons. Swordfish catch levels might be explained by the decrease in TAC in 2018.

* + 1. Current catches and effort in the domestic fishery

The TTRAG industry members (including recreational members) provided updates of the current catches and efforts in the fishery since the last TTRAG meeting in September.

Discussion began after looking through the Catchwatch report and how the fishery began in 2019 compared to other years. Industry noted that the report is reminiscent of earlier seasons (particularly the 2003 season) as there is a slower rate of catches of swordfish on the shelf and boats were venturing further out. Industry members noted the slower catch rates this season in the northern parts of the fishery that could be due to a number of reasons. The first being that this is the first 12-month season starting in January, and some boats may be reluctant to head further south due to the marine parks around Lord Howe this early in the season, and the second being that bad weather causing delays. Industry also compared these occurrences to counterparts in New Zealand as boats are starting to see a lot of Southern Bluefin Tuna (and some Northern Bluefin Tuna) but not as many other species as usual. However, there has not been any noticeable differences in oceanographic conditions that is likely to have caused this pattern.

South coast operators noted there has been a good market from Sydney and below with a majority of the boats not going out as far to get good catch rates. The industry representative noted that SBT quota availability for the east coast longline sector may be similar to the previous year, which is important given the change to targeting SBT in the ETBF. An industry representative also noted that there was increased caution around fishing practices and the change in usual targeting areas, particularly around Lord Howe since the introduction of the Marine Park management plan in July 2018. Dr Campbell indicated that he could explore the potential inclusion of factors relating to changes in fishing practices, as a result of the changes Marine Park areas, in the catch rate standardisations.

**ACTION ITEM 1 –** Dr Campbell 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.

The recreational member informed the TTRAG that the peak period for game fishing in northern Queensland is usually through October and November with last year being the best in a number of years. Previously, monitoring in this fishery with tags was recorded very well, however the last few years have not recorded as many tags and have moved to monitoring these over social media. The second largest Black Marlin caught was landed unexpectedly off Lady Musgrave Island and weighing 650kgs, indicating that this might be a spawning area or an expansion of the spawning area on the edge of the Great Barrier Reef.

He noted that there have been some oceanographic conditions that may be affecting Blue and Black Marlin catches on the mid-NSW coast, however catches were very high on the far south NSW coast. No data were received from one of the major tournaments off the northern coast due to the cyclone in early February. From southern Queensland, no yellowfin tuna catches have yet been caught on the shelf, but from offshore fishing there have been some instances of ocean (non-shelf associated) yellowfin. Very few swordfish have been caught by the recreational fishery this year, with a combination of bad weather, declining interest or the instances of larger swordfish not being as abundant in their usual territorial areas.

In Western Australia, the Broome sailfish tournament had a very good season (with usual tag numbers being around 500-600) but there has been a decision not to tag during tournaments any more, due to the possible increase of predation of tagged fish by sharks. This is anecdotal information, but due to the length of time of the tagging process, the aim is to decrease the stress on the animal and increase the post-release survivability of the sailfish. The Chair noted that there is discussion in all fisheries about shark predation.

An industry invited participant noted that the Convention on Migratory Species (CMS) is discussing the inclusion of further species (including shark) that will be included in the CITES listing, which relates to ongoing discussion on managing shark predation in the Fishery.

The scientific member noted that the SPC pre-assessment workshops will be held in Noumea (April 2019) the week following the TTRAG, in preparation for the striped marlin assessment later this year. TTRAG agreed to discuss areas for input into the assessment that can be addressed during the pre-assessment workshop, like the spatial structures for the previous swordfish assessment.

* + 1. International meetings update

Due to the compression of the final agenda, this section was circulated ahead of the meeting and taken as read rather than for the usual presentation by the AFMA member to the TTRAG. The AFMA member circulated the key outcomes from the Forum Fisheries Agency (FFA) Management Options Consultation (MOC) in Honiara in November 2018 and the WCPFC Commission meeting in Hawaii, December 2018.

No questions were received from the TTRAG however, the TTRAG noted that the South Pacific Albacore TRP discussions were substantial and of high-significance, and that further discussions are needed in subsequent WCPFC Commission meetings to further progress the Albacore Tuna harvest strategy and resolve allocation. A scientific member noted that it was important to have harvest strategy options decided (e.g. time frames to TRP etc) so that SPC can progress the development of the harvest strategy for this species.

* + 1. TTMAC and AFMA Commission update

Due to the compression of the final agenda, this section was circulated ahead of the meeting and taken as read rather than for the usual presentation by the AFMA member to the TTRAG. The update provided key discussions from the last TTMAC meeting in October 2018, and the AFMA Commissions meetings, which occurred in November 2018 and February 2019, since the last TTRAG meeting in September.

The main components of these were that the November 2018 meeting saw the AFMA Commission adopt the ETBF TACCs recommended by TTMAC at its October 2018 meeting for a period of two years. This will allow TTRAG and TTMAC to devote more time to development of a revised harvest strategy. TTMAC recommended that over/under catch levels be set at 10% and the Determined Amounts as 2t for both the ETBF and WTBF. TTMAC also recommended the AFMA Commission accept the revised risk assessment and risk rating for Dusky Shark, as recommended by TTRAG22, thus finalising the last outstanding item from the ETBF ERA.

The AFMA Commission discussed the draft ETBF Fisheries Management Strategy and gave it a positive review. The Commission was happy with its current form and content but asked that a 2-3 page web summary be developed alongside the FMS to highlight the key strategy components. The Commission requested to see the final ETBF FMS for endorsement following TTRAG (March) and TTMAC’s (April) final review and recommendation.

TTRAG requested clarification regarding who was in attendance at the Commission meeting from AFMA and for clarification on how the TTRAG and the Commission interact. The AFMA member indicated that the Tuna and International Fisheries Senior Manager attended parts of the meeting relevant to the ETBF, and the AFMA member provided the Commission a presentation on the current version of the FMS.

* + 1. General update of the outcomes from the half-day economic and half-day logbook review workshops

The AFMA member provided an update to the TTRAG on the main outcomes of the two half-day workshops. He noted that one of the key priorities of these meetings was to spend time discussing the economics data and issues, with the second half of the day looking at logbook and EM collection needs in the fishery for issues not yet fully addressed by the TTRAG.

***Update from the economics workshop***

The AFMA member noted that part of the purpose of the economics workshop was to review AFMAs legislative objectives to consider economic returns to the Australian community, in light of the release of the new Commonwealth Harvest Strategy Policy released late 2018.

A key discussion at the workshop centred on whether AFMA can pursue Fishery-wide MEY in the ETBF. This is based on previous discussions in the development of the draft ETBF Fisheries Management Strategy, which indicated that determining a Fishery-wide MEY was not feasible for the ETBF. The workshop participants agreed that pursuing a full bio-economic Fishery-wide MEY was highly constrained relative to the intention outlined in the Harvest Strategy Policy. This is because domestic harvest strategies can not be applied to the three tropical tuna species, which are currently monitored domestically by a suite of indicators, with the two billfish species having the domestic harvest strategy redeveloped. However, the workshop participants agreed that pursuing economic indicators was a valuable exercise to assist AFMA in making fisheries management decisions. TTRAG agreed with this conclusion.

The TTRAG economic member noted that the information provided by ABARES Fishery Indicators reports has not been fully able to provide economic data to help explain what is occurring in the Fishery in recent years, but pursuing this type of data could provide valuable information to TTRAG when biological factors are not solely responsible for changes in fishing practices. The industry representative noted that bait and fuel were significant factors to be aware of and that these factors were discussed at the workshop. The economics member noted that the annual Status Report provided by ABARES was invaluable given it reflected economics on a macro-economic level, and having economic information month-by-month could further assist the RAG in its deliberations. The ABARES Report however, is retrospective, which can be valuable for the AFMA Commission, but having this analysis in real-time might also be valuable for industry in making business decisions. Industry noted that it is important to include international markets as a factor, with this being more difficult as they generally pay premium, not just the market price and these trends are difficult to predict.

The AFMA member informed the TTRAG that one of the actions from the workshop was for the AFMA economics team to work with the ABARES economics team to provide TTRAG with a list on the economic indicators already collected, where other indicators can be sourced, and any associated costs to assist TTRAG in undertaking a step-wise review of the feasibility and cost effectiveness of developing in-season indicators.

**ACTION ITEM 2 –** AFMA to coordinate and lead development of a discussion paper that provides an initial list of potential economic in-season indicators, including identifying those that are already collected, where other indicators can be sourced, and any associated costs to assist TTRAG in undertaking a step-wise review of the feasibility and cost effectiveness of developing in-season indicators. This to be completed by the September TTRAG meeting.

Discussion compared the economics data used in the NPF, where they rely heavily on economic data, and whether the same is appropriate for the ETBF. However, these data can often not be as accurate as needed. Industry noted that the same data for the ETBF would not be used to predict bio-economic trends, therefore any extra collection of economic data would be another cost to industry and would need to ensure that these data would actually be used for management purposes, rather than as a data collection process. The TTRAG agreed that gaining the ‘buy-in’ from industry on the annual economics surveys has been difficult, and ABARES has worked hard over the years to work with industry for engagement. The TTRAG agreed the Economic Indicators Report provided by ABARES was of high quality and it met the purpose it was designed for, but discussions have now moved further from the original criteria.

The TTRAG agreed with the outcomes from the sub-group and the progress to be made and presented by the September meeting.

***Logbook and data workshop***

The AFMA member noted that the workshop focussed on data captured (or any gaps) from EM and logbooks, with a focus was on gaps that could potentially affect the CPUE standardisation. One key data gap identified as potentially affecting the CPUE standardisation is the removal of bait, but also catch from the line by sharks, toothed whales or other species. It was noted that depredated tuna that comes up with just a head, are brought on board and mostly in view of EM and will be recorded by the boat as a discard.

Industry were concerned that recording the amount of heads only caught will result in further quota deduction, however, it was clarified that while this data is vital to the CPUE standardisation, as it is discarded it is not currently deducted from the quota. It is unclear how Archipelago Asia Pacific (AAP – AFMAs EM services provider) record the occurrences of heads that are brought up on-board. It was noted that this is also an issue faced by other Commonwealth Fisheries, particularly in the SESSF, and a coordinated approach by AFMA on managing this issue would be appropriate.

**ACTION ITEM 3 –** 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.

The AFMA member also noted that the sub-group discussed at length the changes in fishing practices (i.e. the number of hooks per basket), particularly those impacting on fishing depths and how current proxies may no longer reflect fishing depth due to changes in fishing practices (with this further discussed through item 3.2). The sub-group discussed the need for the TTRAG to consider pursuing a research priority to identify different fishing strategies with depth monitoring devices as this is a key uncertainty that could affect the CPUE standardisation. TTRAG also noted that hook-type is also currently not recorded on the logbook.

**ACTION ITEM 4 –** TTRAG to consider whether a research priority is required to address the uncertainty around changes in fishing practices, particularly for monitoring fishing depth.

1. Harvest Strategy redevelopment
   1. Redevelopment status update

The AFMA member provided the TTRAG with a brief introduction on the ETBF harvest strategy and the reasons for its redevelopment. He also noted the progress-to-date by the scientific member with discussions over the following meetings important to the progress the harvest strategy’s redevelopment.

* 1. Temporal changes in fishing methods

The scientific member, Dr Robert Campbell, gave an update on the temporal changes to fishing methods, as identified in the previous TTRAG meeting for update at this meeting. These analyses were prompted by previous TTRAG discussions that raised uncertainties around whether the standardised CPUE analyses were fully capturing changes in fishing practices that industry have indicated have occurred in the traditional “swordfish sector” over time. There is a belief among some industry members that declines in standardised CPUE are not reflective of trends in abundance.

After considering the fleet wide trends presented by Dr Campbell first, industry made an initial statement that fishing practices have been very dynamic, especially when considering outside factors that affect the fishery. The AFMA member noted the long-term declines in standardised CPUE for Swordfish and asked industry over what time period did they think the changes in fishing strategies (away from targeting swordfish) may have been occurring. The discussion came back to this question a number of times, noting both recent (past 12 months), medium term (4-5 years) and longer-term changes (10+ years) such as the shift to circle hooks and fishing strategy associated with targeting species other than swordfish, but that fishing strategies were increasingly dynamic, shifting month to month and year to year. Industry commented that the change in targeting practices was a result of several factors over recent years, including fluctuations in bait prices and changes in gear configurations. The RAG discussed the likely reasons for these changes as swordfish quota was filled, with industry noting that it reflected what they were *avoiding,* not just what was *targeted*.

The TTRAG noted two influencing factors of Dr Campbell’s analysis that relate to “targeting”, these being the area fished and changes in these through time (for example, away from traditional swordfish grounds), and the gear set up used. Industry members again expressed concerns that the same data fields may be used in the analysis, but the nuances affecting a change in the fishing practice affecting the standardisation may not be accurately picked up. For example, the small fishing location changes that can occur depending on the side of a front/eddy boats are on during a set and subsequent implications. Industry also noted that bait is one of the most significant influences that affects swordfish catches and that they believe there is a lack of understanding of the relationship between hook density and catch. An industry member noted that there is a difference in the way swordfish is caught, because while tuna species school, swordfish are solitary species with known territorial areas and are caught at greater distances between them on the line. Scientific members believed changes in hook density is accounted for.

The RAG commented that the monthly plots provide seasonal signals that you may miss when using quarterly or annual plots. However monthly plots hide the annual signals and so these two kinds of plots have different purposes. It was agreed that both (monthly and annual) were needed. The annual plots could be extended significantly back in time to show longer time trends in gear usage to pick up changes in fishing strategies associated with a switch to quota and, before the introduction of quota, circle hooks.

The TTRAG discussion also identified that changes in fishing practices may have ultimately impacted on hook soak time (the amount of time each baited hook spends in the water) and, collectively across a longline set, total “hook hours in the water”. Industry noted that while there is increasing number of hooks per set, each hook spent less time in the water due to shorter turn around time. TTRAG agreed that this should be explored further, noting that a calculation of soak time could use the logged times associated with the first and last hooks set, and the first and last hooks hauled.

The TTRAG discussion then focussed on the analyses of individual vessels fishing practices for vessels that have historically targeted swordfish.

An industry member noted there has been changes specifically to target different species, particularly recently during the first quarter to target albacore on deep sets in the morning and then moving to shallow afternoon sets on the same trip closer to the new moon. There has been a change in practices for economic reasons, for example where squid bait prices have become uneconomical.

On the south coast, there has been similar changes, however, there is more live bait used. Some operators are also shooting around 1400 hooks during the day to target yellowfin

TTRAG then discussed at length the strong need to collect further gear information on logbooks (e-logs) that can inform model-based proxies of fishing depths, noting that the main proxy field currently used (hooks per basket) may no longer be informative due to changes in fishing practices that impact depth of fishing. In particular, the collection of information on dropper (float line) length, vessel log speed and line setting speed were identified as a priority for inclusion in e-logs going forward. In addition, the collection of information on hook fishing depth using time depth recorders (TDRs) is needed in order to build understanding and profiles of the fishing depths associated with different fishing strategies (which could be identified by collecting data on the above new fields). This could be done through focussed research or the provision of TDRs across the fleet and is a concept that should be further explored by TTRAG. Dr Campbell noted that work by Yoshahara (1951) found that if you have measures of gear configuration, line set speed and vessel speed, you can estimate the depth of the hooks, and noted he would send this study around to TTRAG, along with previous ETBF work on TDRs that was conducted 15 years ago.

Overall the TTRAG discussion noted the usefulness of looking at trends in individual vessel level fishing methods as reported in logbooks and that there is clear evidence of changes in fishing practices over time by vessels, but that the degree and type of changes are also very vessel specific (i.e. vary between vessels)

TTRAG noted that the period examined (4 years) and data aggregation timescale (monthly) would be usefully reworked to extend to at least 10 years and an annual data aggregation timescale. It was noted that the monthly timescale was very informative regarding seasonal trends in gear setting methods but that it would be difficult to interpret longer time-series (e.g. 10 years) in that format.

**ACTION ITEM 5 –** 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 and branch line lengths.

**ACTION ITEM 6 –** Dr Campbell to distribute PDF of previous ETBF TDR study and Yoshahara 1951 study.

**ACTION ITEM 7** – 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.

**ACTION ITEM 8** – Dr Campbell to investigate potential trends in fishing location changes (fleet and vessel specific) and to extend the fleet and vessel specific fishing method factor trends back to at least 10 years and aggregated at an annual level.

**ACTION ITEM 9** – Dr Campbell to explore the potential estimation of “hook hours fished” for use in CPUE standardisation

* 1. Redevelopment of suite of Operating Models to test candidate harvest strategies (CSIRO)

The scientific member presented the TTRAG on the redevelopment of Operating Models to test the candidate harvest strategies. Dr Hillary introduced the paper and informed the TTRAG that this discussion will be important to motivate discussion and crystallise thinking on decisions around the redevelopment of the harvest strategy for swordfish and striped marlin.

In response to an industry member question, Dr Hillary noted that whether the TACCs are set annually or for multiyear periods is an issue for further discussion. There was also some concerns that part of the initial reasons to redevelop the harvest strategy was uncertainty regarding the connectivity of swordfish within the wider region.. Dr Hillary noted that the project would refine the suite of default Operating Models (OMs) and take into consideration other regional catches, particularly if Australia is not the majority of the total catch. However, the OM used in the harvest strategy can suggest the large amount of recent catches in this area potentially removed. This is unable to be done through WCPFC assessments. The TTRAG requested the SPC provide a revised assessment with the northern section of Region 2 removed in its most recent assessment, and this was completed. The TTRAG agreed with previous discussions that the northern section should be removed in the harvest strategy redevelopment, based on several sources of information. However, mixing between the regions will still be considered.

***Revising the suite of Operating Models (OMs) we intend to use to test the candidate harvest***

***Strategies***

Dr Hillary reminded the TTRAG of the reasons for the delineations between the Regions used in the analysis. He explained that the mixing between east and west movement is not as pronounced as north and south movements for swordfish. The delineations are important to the development of OMs used in the harvest strategy, and the CSIRO led genetics project will hopefully provide insight into the movements of swordfish between regions to feed into the harvest strategy.

The scientific member gave the TTRAG a brief overview of how OMs fit into the evaluation of harvest strategies and provide feedback along the process. Initially there is a data collection and provision period, which feeds into a ‘stock-assessment’ from which indicators of fishing performance are obtained. The results of this assessment are then input into a Harvest Control Rule and used to determine a management measure (or RBCC). The final stage is the implementation report (which includes accounting for uncertainties and data errors, such as those seen from creating an RBCC that is usually not met by the ETBF) and how this will be fed back into the OM to go through the cycle again. This is the MSE process framework. The discussion through this session was to determine the information to put into the OM, and to decide what fishery and biological data to feed into the harvest strategy and start the process. The benefits of this process are the ability to test different hypotheses, and determining an outcome on different data as more is known about the stock by inputing this into the OM, for example, migration rates. This is what occurs in SBT harvest strategies as SBT has multiple OMs.

The TTRAG discussed the possible influence of foreign fleets in the WCPO on catch rates in the ETBF especially if there are higher catch rates than reported. Dr Hillary informed the group that SPC analyses have a specific role, and that is to include all catches and information from all fleets in the WCPO. The ETBF harvest strategy aims to simplify this assessment to focus on key influences that affect the ETBF. In determining unknown influences (such as IUU catch rates that can affect the ETBF), the TTRAG agreed that there should be an OM that reflects zero IUU catches as a base case, with an alternative OM that includes IUU catch. However, the effect of IUU catches will be included as a ‘performance measure’ on how this may or may not impact industry.

***What kind of (potentially species-dependent) harvest strategy structures are we going to explore for both broadbill swordfish and striped marlin***

Dr Hillary informed the group of the alternative and proposed Operating Model. As there is a fair bit of information becoming available from tagging data, CSIRO will reanalyse these data in addition to previous work to determine the rates of transfer within the regions, whether there are seasonal signals and migration between regions. Dr Hillary emphasised that the original migration rates previously estimated by CSIRO have been used by the SPC in their MULTIFAN assessments, and an effort will be made to update these migration rates with the new tagging information, rather than creating a new assessment. The original tagging data indicated there is mixing between the two regions of approximately 11%, but the new tagging data suggests the likely mixing rates are less than this. The TTRAG can expect candidate harvest strategies by the March 2020 meeting, with options on OMs (including migration models and stock structure) by the September 2019 TTRAG meeting. The TTRAG discussed developing OMs that reflected the ‘us’ and ‘them’ factors, spatially, migration and stock structures, and fleet-wise (including an OM for IUU catch).

Overall TTRAG agreed to the following options to be explored in developing the **Swordfish** operating models:

* **Migration hypotheses** – TTRAG agreed there needed to be a full reappraisal and exploration of the existing tagging data (and associated models), including any new data that can be accessed, to construct a more detailed and nuanced set of options (compared to previous MSE) for the migration hypotheses used in the MSE work
* **Stock structure** - Explore the range of plausible (given current understanding) stock structure hypotheses within the operating models themselves (noting that this could or will be updated given outcomes of the genetics stock structure project as it aims to collect more samples for this species)
* **Fishery structure**: agreement to include ETBF as a standalone fleet in Region 1 (combining region 1N, 1C and 1S) and with possibility of a region 2 ETBF presence, and define other fleets with useable CPUE series, and group other fleets (including IUU)

The scientific member clarified that when including the catch of ‘other’ fleets in the models, this will be the exclusion of the catch with the correct age-classes, rather than considering effort relationships. The TTRAG also discussed the possibility of developing an OM that would consider the potential use of quota for offshore and on-shore catch, depending on the stock structures. It was emphasised that this is for a TTMAC discussion but there is an opportunity for TTRAG to have this option included in the Operating Model. The chair indicated that this had not been approved by the Commission and given time limitations in the current meeting that this could be raised by TTMAC as a request to TTRAG in future.

***Striped Marlin***

The WCPFC will re-run the assessment for striped marlin in 2019, with the last assessment completed 7 years ago. The assessment for striped marlin has less issues identified when compared to swordfish in the sense that it was not spatially disaggregated in the last assessment. The TTRAG discussed the migration rates of striped marlin and agreed that there should be the same delineation for striped marlin as swordfish. SPC scientists have confirmed that the new assessment will focus on a single regional area, with a spatially disaggregated fleet, but there could be an opportunity to include a multi-area structure.

Overall for the **Striped Marlin** operating models, TTRAG agreed that CSIRO should:

* Work with SPC in both the upcoming Pre-Assessment Workshop and when Dr Hillary visits SPC later this month to update the assessment model structure (growth, natural mortality, regional structure and migration assumptions and inputs)
* Use the updated assessment as the basis for conditioning the revised OMs
  1. Initial thoughts on Harvest Control Rule structure and performance indicators (target/limit reference points, risk levels) (CSIRO)

The scientific member introduced the paper to the TTRAG on CSIRO’s initial thoughts on key elements of the harvest strategy redevelopment. The scientific member provided a brief overview of previous discussions amongst the TTRAG, in particular areas that had been discussed as unsuitable in the harvest strategy. One of the key areas of this was the Harvest Control Rule (HCR) and how the process then determines an RBCC.

The scientific member also noted how the TTRAG had been unsatisfied with the complexity and functioning of the previous harvest strategy’s decision tree and provided an overview of how the harvest strategies could work once they are determined including how the RBCCs might be determined.

Over the course of the TTRAG discussion of **Swordfish** candidate harvest strategies:

* It was agreed that the initial harvest control rule(s) would be based on standardised CPUE indices as in the past, but CSIRO noted it is open to exploring other options if requested by TTRAG (or TTMAC).
* CSIRO proposed and explained the following primary harvest control rule:



* There was general agreement that this initial proposed target/limit harvest control rule (HCR) was sufficiently flexible and clear in terms of:
  + what it did, and
  + what kind of parameters it needs to work.
* TTRAG requested some exploratory work to demonstrate how different HCR parameter combinations work on the historical data, including that differing HCR slopes (above and below the buffer zone) will not prevent the harvest strategy ending up within the target (buffer) zone
* TTRAG noted that there are three size based CPUE indices (recruits, sub-adults, and adults or potentially combinations thereof) options to consider including within the harvest control rules of the harvest strategy. TTRAG requested exploration of two main CPUE index options being:
  + sub-adults only, and
  + sub-adult and adult combined index
* TTRAG also request that CSIRO explore options for including a recruitment term or index additional to the main CPUE based HCR but not, at this stage, mandating that a recruitment term must be included in any candidate HCR. Harvest Strategy performance should be the driver on its inclusion or otherwise.

Some industry members prefer the sub-adults and adults classes because the smaller swordfish are not targeted by industry and may not appear in catches due to the type of gear used (i.e., bigger hook sizes), but conceded that running an analysis on the smaller sizes will be a useful indicator on the health of the fishery.

For striped marlin candidate harvest strategies, the TTRAG agreed that irrespective of alternative growth models explored in the OMs, TTRAG was of the view that it will still only make sense to have a single CPUE index (all sizes combined) used in any candidate harvest strategies. TTRAG agreed CSIRO should explore the same general target/limit HCR for striped marlin (see diagram above) but with no additional terms (e.g. recruitment index) given the single CPUE input index.

The scientific member provided the TTRAG with an overview of how the HCR works, including how the RBCC responds depending on the input boundaries determined by the TTRAG. The TTRAG agreed that the HCR should be tested using a number of different parameters and sought clarity on how the HCR would determine an adjustment in the RBCC. Further questions were received on whether other variables will be inputted that will affect the outputs.

TTRAG noted that there will be some HS operational constraints to explore for both species that may be very similar. TTRAG agreed to the exploration of the following:

* Frequency of RBCC decisions: CSIRO to explore 1, 2 and 3 year ‘blocks’
* Maximum and minimum percentage changes in RBCC: explore a range of options (e.g. 5%,10% and 15% maximum change) and include outcomes in the MSE performance summaries
* Settings for over-under provisions with multi-year TACs: CSIRO can explore some options but would benefit from input from AFMA/TTMAC on permissible levels.

TTRAG also discussed meta-rules and exceptional circumstances, noting that these are explicitly **not** included in the MSE work; they are the codified set of rules for:

* The predetermined trigger levels that will identify when something outside the range of MSE testing has occurred (e.g. change in the level of non-ETBF catch in Region 1)
* What to do when this happens and the general process for dealing with this outcome. CSIRO indicated it would supply TTRAG/TTMAC with CCSBTs meta-rules and exceptional circumstances provisions as an example of how these can work
* A meta-rule to define when a harvest strategy review occurs (i.e. after *x* number of years something is done to review how the harvest strategy is performing). This will require future input from TTRAG and TTMAC.

TTRAG discussed that the analysis will have key performance measures for a limit reference point (LRP) and can also include a number of variables and include everything you know (or include everything we know so far) and that it might also be valuable to run models when there is minimal information available, and then compare the results.

There was a conversation amongst the group on whether the HCR could be tested retrospectively to determine whether the tool can determine outcomes seen in the fishery in the past. There is difficulty using this method of testing, because there is a risk of being stuck re-evaluating past decisions, rather than looking to move the fishery forward. The scientific member also noted that the HCR will likely provide the same results as the analysis will still be dependent on the same CPUE data. The scientific member confirmed that the same model is used in the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) and the small pelagic fishery, so the model has been extensively tested through other fisheries.

The TTRAG agreed that the redevelopment of the harvest strategy should be a standing agenda items in future meetings

1. Fisheries Management Strategy
   1. FMS

Due to the compression of the agenda, discussions on the Fisheries Management Strategy occurred in the afternoon of day 1 and the morning of day 2.

The AFMA member presented the TTRAG on the final draft of the Fisheries Management Strategy (FMS) for the group to endorse for final progression to the TTMAC at its next meeting.

The AFMA member went through each highlighted point so that RAG could discuss any issues and seek clarity and provide advice for improvements or corrections. The most substantial areas of discussion in the TTRAG on areas of the FMS are listed below.

The AFMA member noted advice from November 2018 AFMA Commission meeting, at which the Commission requested the development of a 2-3 page summary document to succinctly explain major strategic and future actions based elements of the FMS.

As the previous FMS viewed by the TTRAG was drafted before the revised Commonwealth Harvest Strategy Policy (Nov. 2018) (HSP) and Guidelines and Commonwealth Fisheries Bycatch Policy (Nov. 2018) and Guidelines were released, the FMS was amended to ensure consistency with the new Policies and Guidelines.

A substantial revision of the Commercial Species section (Section 3) that was required as a result of the Commission’s decision to cease the use of the ETBF Harvest Strategy for Swordfish and Striped Marlin in 2018 and use an indicators-based approach to setting TACCs until a revised harvest strategy is developed. The TTRAG agreed with the new FMS text explaining the redevelopment of the harvest strategy.

The TTRAG suggested there was a need to insert a statement in the paper to outline the developing nature of the FMS that it should be considered a living document, and updated with the changing needs of the Fishery, in addition to the more substantive 5-year review and update.

In outlining the performance indicators on accountability in the FMS (table 26), the TTRAG noted the difficulty in determining the performance measures to be quantified, particularly when outlining the short, medium and long-term outcomes as performance indicators. The TTRAG noted however that AFMA have clear guidelines in the Fisheries Management Paper (FMP 1) and Fisheries Administration Paper (FAP 12) on what the roles and responsibilities for the MAC and RAG processes. These Papers govern how AFMA administers the advice given from the MAC and RAGs, and the decisions that come from these advisory groups and that this should be expressed clearly in the FMS.

The TTRAG acknowledged that there is already a statement on the functions of these advisory groups, but it should be expressed within the performance criteria and objectives area. The TTRAG expressed that inputting this information on the roles of the MAC and RAGs to the performance criteria table format will be difficult to achieve, but is important to capture this process. TTRAG suggested this could be captured through factors such as the distribution of minutes, which shows process (including the capture of conflicts of interest) and views of affected parties have been recorded.

TTRAG then discussed performance indicators in relation to bycatch species. The TTRAG noted that there has been a lot of work in relation to bycatch mitigation over recent years, and this should be better articulated within the performance indicators. Throughout the performance indicators section, the TTRAG commented that articulating performance indicators, particularly long-term indicators, was a difficult task however, AFMA should look to develop these further. It was also suggested that organisations such as the Marine Stewardship Council (MSC) may have existing indicators that may be useful in communicating the particular milestones on how the fishery is performing.

The TTRAG provided minor edits throughout the document and AFMA noted the opportunity to provide out-of-session feedback remained. TTRAG was comfortable with the progression of the FMS to TTMAC and the AFMA Commission.

1. Research update

5.1 Processes and deadline update

The AFMA member briefly went through the paper, with questions received on the contribution to two AFMA Research Committee funding items for the 2019/2020 financial years.

These items were:

* Developing Economic Indicators to track economic performance of AFMA’s fisheries
* Integration of additional ERA/ERM methods found to be appropriate in the international context into AFMA’s ERA/ERM process.

**ACTION ITEM 10 –** AFMA ETBF management team to request clarification from AFMA Research Section regarding the origin and need for the recently added economic indicators and ERA projects in the tropical tuna research budget paper and circulate these results out of session.

* 1. Fisheries Oceanography Project Steering Committee update (CSIRO/AFMA)

The TTRAG noted that the Oceanography Project steering committee was to take place after the TTRAG meeting.

5.3 Update on the Genetics project – Dr Karen Evans

Dr Karen Evans provided the TTRAG with a brief update on the ETBF Genetics Project, noting the full results will be presented to the RAG at its July 2019 meeting.

Dr Evans reminded the TTRAG on the project, which is to map connectivity of the principal target species in the ETBF with stocks in the Western Central Pacific Ocean. She informed the TTRAG that the project was in its last stages, with the final results expected by the July TTRAG meeting. She went on to further explain that she attended a stock structure workshop at the end of 2018 in Noumea to update the broader region and garner further support in the final stages of the project.

Dr Evans explained that the project had used many samples that were already collected in the the Western Central Pacific tissue bank with further samples collected specifically for this project. She provided the TTRAG with a table that showed the distribution of the samples collected and explained that swordfish and striped marlin tissue samples were still proving to be quite difficult to attain. Early in 2019, a processor in New Zealand was identified as able to send samples for analysis. However, Dr Evans noted that attaining samples from the broader region outside of New Zealand was still proving quite difficult. However, recent contact with a contractor is looking to fill the data gap and may provide Dr Evans with regional samples of striped marlin and swordfish. A second year of swordfish samples is unlikely to be collected by the time the report is due to finish, but will need discussion between AFMA and CSIRO to determine timelines in the project.

Industry asked whether CSIRO can get samples from the north corner of Region 2, which has been an area of discussion for the harvest strategy, with Dr Evans indicating it may be possible in future.

Dr Evans provided the group with a description on how the samples are analysed, and how the sample quality is determined, including consideration of cross-contamination and degradation of samples caused by handling or lengthy exposure to sunlight (amongst other factors).

In terms of ETBF sampling, the analysis run has been very good, but less quality from regional samples. So even through there is a decent number of samples available, those of a workable quality capable of running an adequate analysis on a ‘SNIP’, is a relatively low number. The preliminary interpretation of results is that the data for albacore tuna does not support the hypothesis that there are multiple stocks present in the area encompassed by the ETBF, New Zealand and New Caledonia. The result does not rule out any stock structure, but there would need to be further samples added to the analysis to categorically eliminate that possibility.

CSIRO are now running yellowfin and bigeye samples through the quality control process to properly analyse the samples, with preliminary results expected in the coming weeks. New Zealand swordfish sampling is currently underway after a delay to first season sample, with an intent (pending funding arrangement clarifications) to sample the second season samples in autumn of 2020. The second year of striped marlin sampling is almost complete (noting this is outside the project timeline but will present findings to TTRAG once samples are analysed). Dr Evans informed the TTRAG that the final report from this project is due for presentation at the WCPFC scientific committee later in the year, with the full preliminary results to be presented to the TTRAG in July 2019.

Dr Evans informed the TTRAG on the process to access the WCPFC tissue bank, including the requirements to provide reports and the feedback with the benefits to the research community. Efforts are currently underway to further improve the tissue bank for future research needs. The TTRAG thanks Dr Evans for her update and looked forward to the preliminary results at the July 2019 TTRAG.

* 1. Ageing of striped marlin

While not originally an agenda item, the TTRAG agreed that it would be valuable to have an update on the work on the ageing of striped marlin conducted by CSIRO. Accordingly, Dr Jessica Farley provided the group with a brief presentation on the results so far, which will also be presented at the SPC pre-assessment workshop in the weeks following the TTRAG.

Dr Farley showed the group the otolith analysis on the growth curve of striped marlin, which shows a faster curve than previously anticipated. The TTRAG discussed that the faster growth of striped marlin will have implications for the redevelopment of the harvest strategy. She explained that weight won’t necessarily be an indicator for age and is largely dependent on otoliths. The analysis also shows that determining daily aging through otolith rings is quite accurate for younger fish, but become less reliable as the fish matures. The recreational member noted that the smaller samples are harder to source, and a lot of work has been put in recently to source the smaller samples.

The TTRAG were then shown the growth curves from spine analysis, with yearly increments validated using processes called ‘marginal increments’, which is counted to determine an age. However, some issues may appear with the accuracy of using this method as the fish grows, the increments in the spine samples become harder to distinguish as they are absorbed and may no longer point to yearly segments.

Dr Farley then went through results of the otolith growth curve for swordfish when combined with the curve of spine samples. Many showed the count as fairly consistent, but as some of the spines are reabsorbed, higher age numbers were apparent in the otolith samples than was appearing through spine samples. She noted that the growth curves when combining the spine and otolith samples were fairly consistent until age 7, when the increments were more noticeable in otoliths. For males however, the divergence occurred earlier at about age 4 when after this age otoliths would need to be analysed, rather than spine samples.

There was discussion amongst the TTRAG that longevity between some of the samples was different, for example those otolith samples that were showing ages of 11, when the paired spines were showing 3 years of growth. Dr Farley noted that a lot of work is still to be done in terms of accurately assessing the ages when combining the otolith and spine samples, and this might include radiocarbon dating. She informed the group that there had been some work with radiocarbon dating in the United States on blue marlin samples, with the method determining the levels of carbon in the samples that can distinguish between spawning areas and ages.

* 1. Sea turtle analyses.

***Metiers analyses in ETBF***

The scientific member from ABARES introduced the item for the metier analysis with an introduction of the turtle clustering work by colleagues at ABARES. The term ‘metier’, which is widely used in the SESSF, means cluster or grouping together and is used to analyse how certain fishing operations can be classified together based on their fishing gear and methods and the species taken, analyses that are useful in understanding complex multispecies fisheries.

The member showed the TTRAG that the ETBF had 8 clear clusters identified throughout the analysis, with patterns showing changes in the 8 years of available data from the fishery. The factors included hooks per basket, moon phase, set time etc. The graph identifying SBT catches showed prevalently in the clustering work, likely due to the high caches in the ETBF over the past season. The spatial distribution analysis also showed distinct distribution patterns between some fishing operation clusters, particularly between clusters associated with yellowfin and swordfish catches.

The scientific member then presented an example of seabird interactions that have been used in the clustering analysis. He worked through the examples to show that there was one specific cluster that had seabird interaction rates often higher than the TAP trigger rates. TTRAG discussed whether this approach was any more useful than just querying individual boat interaction rates directly from the databases but acknowledged that clustering analysis can provide an extra level of information that might assist fisheries managers to understand whether certain gear types are more likely to interact with certain species. There is also the potential to use clusters when running CPUE analyses, to potentially remove some of the noise associated with the standardisation (i.e. the clustering may have a similar effect to standardisation).

***Sea turtles in the ETBF***

The scientific members from ABARES presented some preliminary analyses of ETBF sea turtle interactions. Since the introduction of EM, interactions with sea turtles have been reported and verified. The purpose of this analysis was to identify the fishing gear configurations more likely to interact with turtles, and how this can potentially lead to improved management responses. Similar to the explanation presented on the clustering analysis, the scientific member explained that the exploration of interaction data has been used in the clustering analysis, with ‘hotspot analyses’ run in each cluster.

The scientific member showed the TTRAG a map of the spatial distribution of the turtle interactions in the ETBF. He then overlayed the data with the IPUE analysis (interaction per unit effort) however, some areas were showing high interaction levels but low effort and could likely be explained as an area where a small number of sets were deployed. The preliminary analysis of the hotspot areas shows the area more likely from the mid to low QLD coast, which matched the likely abundance of the animal.

The presentation then moved to swordfish clusters, which showed that 70% of the interaction rate with turtles was likely when boats were targeting swordfish. Industry questioned whether there were seasonal analysis done on the turtle interaction rates (as there were in the metier analysis) however, this work is still in its early stages, but the group agreed that it would be valuable to see the seasonal affects. It would also be valuable to identify the species analysis, particularly for the Leatherback turtles as the most vulnerable, to determine whether there were clear patterns emerging. There is very preliminary analysis by species already completed by ABARES, with the scientific member showing the TTRAG an analysis on Green turtle interactions.

Overall, there are some areas showing a slightly higher interaction rate, but no clear ‘hotspots’ yet identified. International studies through WCPFC observer data suggest that different gear factors are a significant factor in turtle interaction rates and should be included in the work by ABARES, particularly on hook size and bait species (with lower interactions on fish bait) and soak time.

TTRAG thanked ABARES and noted the importance of the analyses to providing information on this issue going forward and looked forward to hearing about the analyses as they progress.

* 1. Recreational fishing project update (Dr Julian Pepperell and CSIRO)

Due to the compressed nature of the agenda, Dr Pepperell and Dr Campbell provided a short update on the current status of the project, with a full presentation deferred to the July 2019 TTRAG meeting.

Dr Pepperell introduced the item by informing the TTRAG that tagging data for yellowfin has been fairly consistent for a number of years. However, since about 2008, data collection has become more difficult for individual fish due to the introduction of electronic processes for point scoring in recreational clubs. He explained to the TTRAG that the deadline for the final report is due by September,. He noted that the raw data has largely been processed earlier this year with Dr Campbell, with most of the data expected to be analysed in time for the July TTRAG meeting.

Dr Campbell provided the group with a reminder on the reasons why the TTRAG felt this project would assist understanding the fishery. He reminded the group that in 2015, the commercial sector had one of the biggest yellowfin tuna catch years on record, but the recreational sector had the reverse, with very low numbers of catch. He noted that tagging data for recreational caught yellowfin tuna correlated with environmental parameters by month, showed no real ‘smoking-gun’ of significant environmental events to explain the poor recreational catches in 2015.

He noted that there is a measurable distinction between how catch is recorded through commercial fishing and recreational fishing. Particularly in the longline fishery where effort data is available, but is not readily available in the recreational sector. Nevertheless, Dr Campbell worked through several examples illustrating how to determine a simple catch per unit effort in the recreational sector, based on days spent fishing and the numbers of fish caught.

The TTRAG was also informed that the catch rates were closely correlated in the inshore fishery, as both commercial and recreational sectors were operating in closer proximity and therefore reacting to the same underlying biomass in the area. Dr Pepperell noted that one area that was not closely examined at this stage was the size distribution of recreational fish of major modes in small fish, whereas the commercial sector still had these fish appearing. Recreational catches dropped off accordingly, and they intend to further analyse size data to determine if there is a seasonal signal.

The TTRAG thanked Dr Pepperell and Dr Campbell for their update and looked forward to the full results presented at the July meeting.

1. Other business

No other items were put forward by the TTRAG for discussion under this agenda item.

7 Date and venue for next meeting

The dates proposed for the following meetings in 2019 are as follows:

* July TTRAG – Tuesday 17 and 18 July 2019.

There was some discussion to reschedule the September meeting due to absences of a number of key participants. This is likely to result in a late august or late September meeting. Further discussions will be held out-of-session with the TTRAG Chair and AFMA to confirm these details.

All of the meetings were agreed to be held in Mooloolaba, Queensland.

The Chair thanked all participants and observers for their contributions and closed the meeting at 3:45pm.

Appendix 1: Adopted Agenda

**CSIRO, Castray Esplanade (Battery Point), Hobart**

**26 – 27 March 2019**

**Commencing 8:30am**

**Please Note –** Items marked with **\*\*** will be taken as read, with time for questions only. This is to assist the meeting cover all items within the shortened timeframe

**Tuesday 26 March 2019**

1. **Preliminaries**
   1. Welcome and apologies
   2. Pecuniary interest declarations
   3. Adoption of agenda
   4. Acceptance of minutes
   5. Actions arising/out-of-session developments
   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 (September 2018)

2.2. AFMA catch watch reports (AFMA)

2.3. International meeting updates (AFMA) **\*\***

2.4. MAC/AFMA Commission outcomes (AFMA) **\*\***

2.5 General Update of the outcomes from the half-day economic sub-group and half-day logbook review workshops (AFMA)

1. **Harvest Strategy Redevelopment** 
   1. Redevelopment status update (AFMA)
   2. Temporal changes in fishing methods (CSIRO)
   3. Re-development of suite of Operating Models to test candidate harvest strategies (CSIRO)
   4. Initial thoughts on Harvest Control Rule structures and performance indicators (target/limit reference points, risk levels) (CSIRO)

**Wednesday 27 March 2019**

1. **Fishery Management Strategy (FMS)**
   1. Overview of the FMS (AFMA)
   2. Commercial species (AFMA)
   3. Bycatch species (AFMA)
   4. Data Strategy (AFMA)
   5. Research (AFMA)
   6. Summary of key RAG advice on development of the FMS (AFMA)
2. **Research update**

5.1 Processes and deadline update (AFMA)

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)

5.5 Update on the turtle interactions analyses (ABARES)

1. **Other Business**
2. **Next Meeting**

## Appendix 2: Actions arising from TTRAG 23

|  |  |  |
| --- | --- | --- |
|  | Action | Responsibility |
| **1** | Dr Campbell 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. | CSIRO |
| **2** | AFMA to coordinate and lead development of a discussion paper that provides an initial list of potential economic in-season indicators, including identifying those that are already collected, where other indicators can be sourced, and any associated costs to assist TTRAG in undertaking a step-wise review of the feasibility and cost effectiveness of developing in-season indicators. This to be completed by the September TTRAG meeting. | AFMA/TTRAG |
| **3** | 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. | AFMA |
| **4** | TTRAG to consider whether a research priority is required to address the uncertainty around changes in fishing practices, particularly for monitoring fishing depth. | AFMA |
| **5** | 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. . | AFMA |
| **6** | Dr Campbell to distribute PDF of previous ETBF TDR study and Yoshahara 1951 study. | CSIRO |
| **7** | 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 |
| **8** | Dr Campbell to investigate potential trends in fishing location changes (fleet and vessel specific) and to extend the fleet and vessel specific fishing method factor trends back to at least 10 years and aggregated at an annual level. | CSIRO |
| **9** | Dr Campbell to explore the potential estimation of “hook hours fished” for use in CPUE standardisation | CSIRO |
| **10** | AFMA ETBF management team to request clarification from AFMA Research Section regarding the origin and need for the recently added economic indicators and ERA projects in the tropical tuna research budget paper and circulate these results out of session. | AFMA |