PZJA Torres Strait Finfish Fishery Resource Assessment Group

FFRAG Meeting 6

27-28 November 2019
Thursday Island

Draft Meeting Record

Note all meeting papers and records are available on the PZJA webpage:

https://www.pzja.gov.au/torres-strait-finfish-groups

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Australian Fisheries Management Authority

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Agenda Item 1 – Preliminaries

1.1 Preliminaries

The sixth full meeting of the PZJA Torres Strait Finfish Fishery Resource Assessment Group (FFRAG) was commenced at 8:45 am at the TSRA Boardroom, Torres Strait. FFRAG Chairperson, Mr David Brewer, welcomed participants and acknowledged the Traditional Owners of the land on which the meeting was held. Tom Roberts from Queensland Department of Agriculture and Fisheries (QDAF) and Traditional Inhabitant Industry Member, Kenny Bedford, were noted as apologies.

The RAG was advised that AFMA was recording the meeting for the purpose of ensuring an accurate record is produced. AFMA advised that the recording is kept secure and is deleted once the final meeting record is published.

The RAG Chairperson provided brief overview of the RAG terms of reference for providing advice to the PZJA (including the consensus model), roles and responsibilities of RAG members and procedures for declaring and managing conflicts of interest.

1.2 Adoption of agenda

The agenda (**Attachment A**) was adopted with one change recommended by members. The RAG agreed to consider Item 4 Management and Science (4.1 Western Line Closure review, 4.2 Vessel Monitoring Systems) ahead of Item 2 (Stock assessments and RBC Advice).

1.3 Declarations of interests

Table 1. Attendance and declarations of interest – Finfish RAG 6 meeting members

Name and position	Organisation	Declaration of interest
David Brewer, Independent Chair	Upwelling P/L (David Brewer Consultancy).	Director – Upwelling P/L (David Brewer Consulting). Honorary Fellow - CSIRO Chair - Torres Strait Finfish RAG Scientific member – Torres Strait Finfish Working Group Scientific member – Northern Prawn Fishery RAG Current consultancies with Quandamooka Yoolooburrabee Aboriginal Corporation, Redlands City Council. Co-investigator on Torres Strait non-commercial fish fishery project funded by TSSAC.
Andrew Trappett, RAG Acting AFMA member	Australian Fisheries Management Authority	Co-investigator on two TSSAC funded projects for Spanish mackerel stock assessment and biological data collection in a data services and industry liaison role.
Rocky Stephen, Industry Member	Kos and Abob Fisheries, Ugar Brother Bear Fisheries, Ugar Torres Strait Island Regional Council. Torres Strait Regional Authority	Councillor for Ugar, Chairperson of Kos and Abob Fisheries Ugar, Works with brother in a commercial fishing business on Ugar, Eastern cluster representative on the PZJA Finfish RAG & Working Group. Torres Strait Scientific Advisory Committee. Does not hold a TIB licence. TSRA Board member for Ugar

Tenny Elisala. Industry Member	Industry, Torres Strait Regional Authority	TSRA Ranger Dauan, TIB licence holder.
Paul Lowatta, Industry Member	Industry Member, Kulkalugal	Full time commercial fisher. Holds a Torres Strait Traditional Inhabitant Boat Licence. Traditonal land owner, Masig.
John Tabo Jr, Industry Member	Industry, Torres Strait Regional Authority Finfish Quota Management Committee.	Commercial coral trout fisher (TIB) Holds a Torres Strait Traditional Inhabitant Boat Licence. Member of the Torres Strait Regional Authority Finfish Quota Management Committee. Newly elected board member for MDW Fisheries Association on Mer Island.
Allison Runck, TSRA Member	Torres Strait Regional Authority	No pecuniary interests declared noting that TSRA holds access rights to Torres Strait Finfish Fishery and generates revenue on behalf of Traditional Inhabitants through seasonally leasing access. Co-investigator on fisheries monitoring project.
Tony Vass, Industry Member	Industry	No financial interests in the Torres Strait. Former mackerel fisher in Torres Strait 1990 to 2008, does not own or operate a licence in Torres Strait.
Michael O'Neill, Scientific Member	Queensland Department of Agriculture and Fisheries	Principal scientist for TSSAC recommended two-year project for Spanish mackerel stock assessment work. Member of PZJA Finfish RAG and Working Group.
Ashley Williams, Scientific Member	Australian Bureau of Agricultural and Resource Economics James Cook University	ABARES fishery scientist under Department of Agriculture and Water Resources. Involved in previous Torres Strait research, is lead author on the ABARES Fishery Status Reports for Torres Strait.
Rik Buckworth, Scientific Member	Sea Sense (Consultancy)	Independent Fisheries Scientist with Sea Sense Consultancy, adjunct at Charles Darwin University, ex NT Fisheries, AFMA Northern Prawn RAG, Principal investigator on a proposal seeking funding for TS Spanish mackerel assessment work. Chair of NT Research Advisory Committee for FRDC. Chair of Northern Territory Aquaculture Management Advisory Committee.
Selina Stoute	AFMA member	No interests. Manager of Andrew Trappett, co-investigator on two Torres Strait funded research projects.

Meeting Invited participants and declarations of interests registered.

Yen Loban	Industry, TSRA	TIB licence holder, TSRA Fisheries portfolio members, TSRA board member, Torres Strait Council, Traditional inhabitant Torres Strait
Trevor Hutton	CSIRO	CSIRO receives research funding. Principal investigator for TSSAC recommended project to develop a harvest strategy for

		the Torres Strait Finfish Fishery. AFMA Northern Prawn Fishery (NPF) RAG regular observer and Principle Investigator for the NPF stock assessment project. Through CSIRO is involved in the desktop study to assess Climate Change Impacts on Torres Strait (small allocation of time).

The Chairperson advised members and participants that, as provided in *PZJA Fisheries Management Paper No. 1 (FMP1)*, all members of the FFRAG must declare all real or potential conflicts of interest in the Torres Strait Finfish Fishery at the commencement of the meeting. Where it is determined that a direct conflict of interest exists, the FFRAG may allow the member to continue to participate in the discussions relating to the matter but not in any recommendations made by the group. The FFRAG may also determine that, having made their contribution to the discussions, the member should retire from the meeting for the remainder of discussions on that issue.

Each member declared their interest in the fishery as documented in **Table 1** (above).

In line with the AFMA standard for declaring conflicts of interest in Commonwealth MACs and RAGs to best protect the integrity of advice, members with grouped interests (industry, science, TSRA) were sequentially asked to leave the room to allow the remaining RAG members to:

- freely comment on the declared interests
- agree if the interests precluded the members from participating in any discussions and
- agree to any methods to treat the declared interest (e.g. the member provides preliminary input but leaves the room when any advice is formed).

Following open discussion by the RAG, the groups of members and participants were invited back into the room, briefed on the discussion and meeting expectations and reminded that, if they thought of any other areas of interests that they wished to have recorded, they could do so at any time.

Scientific members and invited participants

Scientific members and those involved with TSSAC funded research left the room (Rik Buckworth, David Brewer, Andrew Trappett, Trevor Hutton, Ashley Williams, Michael O'Neill and Allison Runck). The group considered their declared interests and agreed on no particular management of declared interest's noting that research priorities would not be recommended by this meeting.

Industry members

Industry members (Paul Lowatta, Tenny Elisala, John Tabo, Rocky Stephen, Tony Vass) left the room. The remaining group discussed that the fishers were an integral to providing advice on science and management of the fishery as the access to the finfish fisheries are 100 per cent owned by traditional inhabitants. The remaining members noted concern that industry interests (interests for an individual, a business or a single community) may impact, or be perceived to impact, the advice provided regarding RBCs. The RAG agreed that these fishers did need to be involved in the process and would be reminded to remain objective in their logic and advice being provided.

Government members

Government employees and those on the TSRA Quota Management Committee (Allison Runck, Andrew Trappett, Selina Stoute, Mark Anderson, Rocky Stephen, Yen Loban, John Tabo, Tenny Elisala) left the room. The Group discussed the declared interests of the members and participants that had left the room. The Group noted that the TSRA had declared their holdings of finfish entitlements and that the revenue generated from leasing these entitlements (Sunset Licences) and that this revenue was invested in the development of the fisheries in the region. The RAG noted that a low available RBC for Spanish mackerel may mean a potential impact on the level of entitlements available to Sunset Licences. The RAG suggested that members must remain objective in their advice and focus the discussion on technical and scientific issues.

Agenda Item 2 – Stock assessments and RBCs

2.1 Spanish mackerel stock assessment update and recommended biological catch

Advice summary

The PZJA Torres Strait Finfish Fishery Resource Assessment Group **RECOMMEND** either a 56 or 71 tonne Recommended Biological Catch for Spanish mackerel for the 2020-21 season.

The FFRAG noted an updated stock assessment performed under the project "Spanish mackerel stock assessment, with appraisal of environmental drivers" (AFMA project number 2019/0831). The Spanish mackerel stock assessment uses an annual age-structured model. The assessment uses all available catch-effort data and the fish age-frequency data from the 2000's. The present stock assessment update included an additional fishing year of catch data (2018-19).

The RAG noted the results of the updated stock assessment show:

a) Biomass has been estimated to be declining since 2009-10; i.e. the standardised catch rate of legal-sized Spanish mackerel (the abundance index), using logbook data from sunset fishing operations, has declined since 2009-10. Standardised catch rates are comparable to periods in the fishery were total catches were significantly higher, and did not substantially differ in 2018-19 to the last assessment using data up to 2017-18.

b) The estimated median 2018–19 biomass was 23 per cent (ranging between 14% to 37% (B_{14} and B_{37})) of unfished biomass (B_0) estimated in 1940–1941 and this value was close to the default *Commonwealth Harvest Strategy Policy*[1] limit reference point of 20 per cent of unfished biomass.

c) Recent fishing pressures are mostly not exceeding F_{MSY}. This means overfishing is unlikely to be occurring. The RAG assumption remains, therefore, that the biomass decline is likely associated with factors other than fishing pressure, such as broader environmental factors driving below average recruitment.

To guide advice on a 2020–21 RBC, the FFRAG recommended applying a constant harvest rate of either F 40 or F 48 (i.e. harvest rates that build the stock to either B 40 or B 48) based on current 2018-19 exploitable biomass. Previous FFRAG advice for the 2019-20 season was based on applying a Maximum Sustainable Yield (F MSY) harvest rate based on the current exploitable biomass. The decision to use F 40 or F 48, rather than F MSY was based on the need for precaution as the estimated level of biomass approaches the limit reference point.

Based on the outcomes of the stock assessment and applying a constant harvest rate of either F40 or F48 in a depressed recruitment scenario, the FFRAG recommended an RBC of either 56 tonnes (F48) or 71 tonnes (F40) for the 2020-21 season. These catch levels represent the application of the constant harvest rate to the median value of current biomass estimated from 35 model-scenarios.

[1] *Commonwealth Fisheries Harvest Strategy Policy and Guidelines 2018*, https://www.agriculture.gov.au/fisheries/domestic/harvest_strategy_policy

Noting there is no agreed harvest strategy in place for the Finfish Fishery, the FFRAG considered fish-population projections for a range of harvest control rules to evaluate risks to the stock. The RAG agreed to consider how many years in a model run the stock would drop the stock below the limit reference point (B20) during a 12 year-time period (three times the average age of sexual maturity). Two future alternatives were considered: an assumption of either average recruitment or depressed recruitment in the future 12-year projection period (**Table 1**).

The FFRAG noted that the stock assessment model has estimated that below average recruitment is likely to have been occurring in recent seasons and the FFRAG recommended that it would be prudent to consider projections with lower than average recruitment. Taking this approach was considered an appropriate risk-management strategy given the potential consequences of over-estimating future recruitment given the proximity of the stock to the limit reference point (**Table 2).** It was noted that if the stock falls below the limit reference point the *Commonwealth Harvest Strategy Policy* is to cease all commercial fishing.

When considering reduced estimates of recruitment (20 per cent lower than the model predicted average recruitment values) the FFRAG noted that the percentage of time that projections of the 35 model scenario runs fell below the limit reference point was 7 per cent (F 40 approach) and 11 per cent (F 48 approach) of the 12-year projection period. The FFRAG considered that this level of risk to the stock was acceptable from these two approaches and is in line with the *Commonwealth Harvest Strategy Policy*. The FFRAG noted that the 11 percent value is unlikely to be statistically different from 10 percent cut off given the limited exploratory model runs undertaken (during the meeting). Hockey-stick harvest control-rule scenarios were also examined (scenarios 4-6, **Table 1**), but not recommended in this advice, noting the dramatic reductions in RBCs and their likely associated social and economic impacts. The FFRAG also noted that, with the application of new data in future assessments, such reductions in RBC may be unnecessary.

Table 1: Average and reduced summary recruitment statistics from 35 analyses with 12-year projections.

	Name of Approach	Harvest Control Rule Type	% runs below B20 over 12 years **Assume average recruitment**	% runs below B20 over 12 years **Assume reduced recruitment**	2020-21 RBC
1	Constant F MSY	2	7%	15%	91
2	Constant F 40	2	6%	11%	71
3	Constant F 48	2	5%	7%	56
4	Hockey F MSY	3	0	0	15
5	Hockey F 40	3	0	0	11
6	Hockey F 48	3	0	0	6

Non-commercial catch estimates.
The FFRAG confirmed 2019-20 advice on best estimates for catches taken outside of the commercial fishery and supported the use of the values shown in **Table 3** for decision making in 2020-21.

Table 2: Risk assessment of natural occurrence of recruitment scenarios (normal or depressed) vs. assumed response taken by management.

		Management Response	
		Assume average recruitment	Assume depressed recruitment
Scenarios	Average recruitment	Prudent response: assumption was correct and did actually occur.	Precautionary response: Assumed depressed recruitment, but average R is occurring. Results in no impact on stock - we are acting to 'bank fish'.
	Depressed recruitment	Non-precautionary response: Nature has depressed recruitment, assumed normal recruitment. Stock status will get worse.	Prudent response: planning for this event when it has occurred.

Table 3: Summary of available information on catches outside of the commercial Spanish mackerel fishery**.**

Source of catches	**Expected catch (t)**	**Comments**
Subsistence catch (kai kai) by traditional inhabitants	10	Based on data from *Busilacchi 2013* this includes total of catch estimates for Mer, Masig and Erub Islands. The FWG agreed in July 2016 that the catch figures from the *Busilacchi 2008* research are the best estimates of traditional take of finfish. While originally reported by CSIRO as 12 t this was further refined to 5.155 t. The RAG recommended that an estimate of 10 t be used for decision making noting data was only from three islands, the number of TIB fishing endorsements has increased and effort creep may be occurring. NOTING that anecdotal information presented at the FFRAG by TIB industry members infers this number generally may have gone down.
Recreational	2	RAG advised that based on the available evidence from QDAF recreational survey results recreational catches are likely to be minimal.

		Changed now - based on QDAF survey (2013) which included Torres Strait.
Charter	Likely to be minimal	Available QLD logbook records show Charter boat line catches are low. Logbook records for the period between 1995 and 2014 report a total of 19.58 tonnes of mixed species taken from Torres Strait waters. RAG has advised based on the available evidence from QDAF logbook data from charter catches are likely to be minimal.
PNG catch sharing	0	PNG-NFA declined to enter into catch sharing arrangements under the Treaty for 2019-20 fishing season (advice pending for 2020-21 season).

Background - analysis and considerations

Recruitment estimates

The FFRAG noted that Spanish mackerel, like most fish stocks, are known to have natural variation in recruitment. The current model was estimating (note – recruitment itself is not being measured, only estimated) below average recruitment in recent seasons (**Figure 1**) to explain lower biomass estimates despite no overfishing occurring.

FFRAG noted that the upward trend in recent years on the modelled recruitment deviation plot is an artefact of the model automatically attempting to realign recruitment with the long-term average and that the last few values on this series have more uncertainty in the model (**Figure 1**).

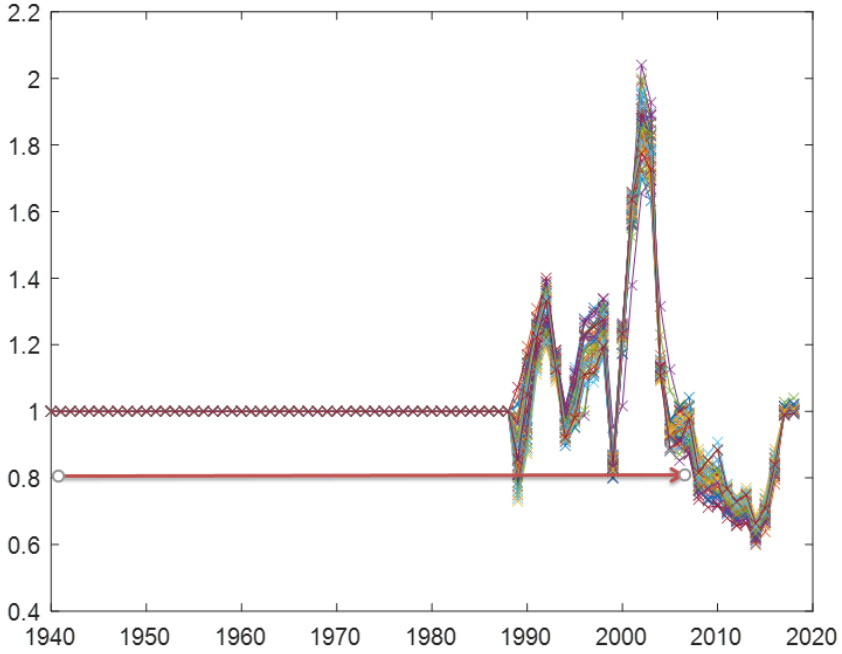

Figure 1. *Model estimated deviations in stock recruitment from the long-term average (1) over time. Red arrow indicates a 20 per cent level of depressed recruitment which was adopted as a value by the RAG for consideration of risks to the stock from continued depressed recruitment occurring.*

Alternative model testing

FFRAG noted concerns raised that the Catch Per Unit Effort series (mainly driven from sunset Daily Fishing Logbook data) might not be a reflection of the stock abundance over time. To address this the stock assessment team performed a simple analysis using catch data alone (i.e. no effort component) which was put into a basic alternative model called *CatchMSY* (**Figure 2** below).

FFRAG noted that this alternative analysis was a useful exercise as it shows that the model range of outputs did agree with the CPUE standardisation and concur with the apparent decline in the stock from around 2005.

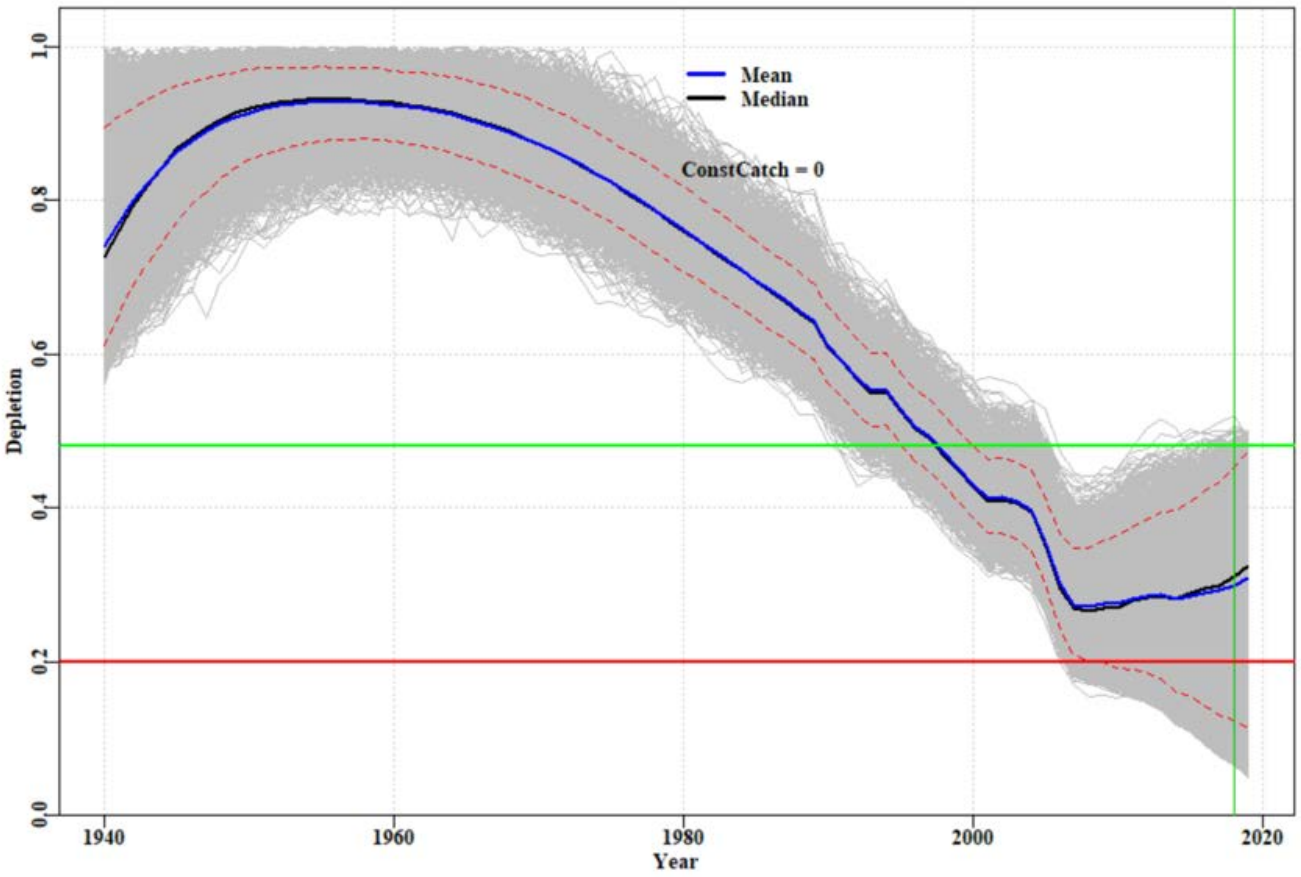

Figure 2*: CatchMSY Biomass model outputs*.

Inclusion of "paper fish" in the model

FFRAG noted previous concerns raised on the impacts of several high CPUE points flagged as possible "paper fish" (potential over-reporting of catch prior to the government funded 2007 buyout of TVH licences) and that these points may be falsely inflating catch rates over this period and influencing the outcomes of the stock assessment model. The stock assessment team performed an additional model run and deliberately lowered the values of the apparent years of 'paper-fish' around the 2005 season, with these values reduced down to a catch-rate level comparable with previous years in the catch series.

The RAG noted that reducing the values of these points had little effect on the outcomes of the model, with the estimated level of biomass being the same as the base case model at 23 per cent of unfished biomass (range 14 to 36 % rather than 14 to 37 %) and that reducing these values

might make the model more conservative (estimating a smaller population size) and would act to adjust the RBC downwards by a few tonnes.

FFRAG concluded that, as an issue, paper fish was not substantially influential on the model outcomes and scientific efforts should be placed on other areas in future assessments. The stock assessment team advised that paper fish could be left in the model for future analysis (in 2020) as a post-analysis sensitivity approach rather than including as part of the core assessment model runs. FFRAG supported this approach to leave these data in the model and that there would need to be a clear justification to remove or alter these values.

Inclusion of early logbook data (1988) in assessments

FFRAG noted a concern raised about the effect of including older logbook data from the model time series, given known uncertainty associated with the number of tenders reported in these data and that earlier analyses had not analysed this earlier available data.

The stock assessment team helped clarify for the FFRAG that the older 1988 logbook data includes 261 days of boat data (January to June 1988, not representing a full fishing year of data) and that these was not used in the second stock assessment report[2] but was included in the 2018 and 2019 assessment updates. FFRAG science members advised a preference not to discount any data if available for consideration. It was noted that uncertainty does exist in the earlier points in our time series due to the number of tenders recorded being variable and it had been noted in previous assessments data prior to 1989 was considered unreliable. It was also noted that the current funded stock assessment project would be investigating dory driver names in 2020.

The RAG noted that removing 1988 data did have an effect on the outcomes of the model, with a slightly increased median estimated level of biomass of 26 per cent (range between 14-48 biomass estimates). The stock assessment team advised that 1988 data could be left in the model for future analysis (in 2020) as a post-analysis sensitivity approach rather than including as part of the core assessment model runs.

Industry members supported the recommended approach to use all available older logbook reported values in the assessment unless there is a clear reason to leave it out. It was advised this is a matter of messaging for communities "*no data is being left out, no stone is being unturned*" and that the RAG is doing everything that it can to examine the state of the resource.

Shark depredation effect on CPUE

FFRAG noted industry advice that shark depredation (shark taking hooked mackerel before they are retrieved to the boat) has reportedly been high during certain fishing seasons. Science members advised that factoring shark depredation rates into the model might result in a better understanding of the status of the stock if it could be measured and shown to be occurring at significant levels. Science members advised that guidance would be required to help this future examination, but without data to inform the model, the magnitude of this effect it would be hard represent; e.g. when did it start, strength of effect, when did it get relatively/absolutely better or worse. FFRAG noted that an FRDC study was in progress in a Western Australian fishery (demersal line sector, not Spanish mackerel specifically) and that the outcomes of this research

[2] O'Neill, MF, and Tobin, A. 2016, Torres Strait Spanish mackerel stock assessment II, 2015. Torres Strait AFMA Project Number: RR2014/0823, Department of Agriculture and Fisheries, Queensland Government.

may inform future work on understanding and incorporating this effect into the Torres Strait Spanish mackerel stock assessment.

Papua New Guinea drought impacts on Torres Strait water quality and Spanish mackerel abundance

FFRAG noted a presentation from industry member Tony Vass examining possible effects of PNG droughts on catch rates from his vessel. The FFRAG noted that 1997 reportedly had the worst drought in history in PNG and that 2017 had also seen a large drought occur. Both of these years were followed by lagged low catches as per the example catch figure presented by Mr Vass from his vessels operations during these season.

The FFRAG noted older advice from the sunset fishing industry that droughts in PNG seemed to impact water quality and catches at Bramble Cay. Industry have previous advised AFMA that it is possible that outflow of nutrients and sediments from the Fly River may be impacting the area of Bramble Cay. FFRAG science members advised that it was possible that PNG droughts might impact the productivity and available food for mackerel larvae and/or juveniles based on outflows from the Fly River. FFRAG noted that the current funded stock assessment project was investigating this factor, among other environmental variables, for possible inclusion into the stock assessment in 2020.

What happens if the sunset sector do not fish and there are fishing seasons without sunset logbook data?

FFRAG noted advice from the stock assessment team that not having any data from the sunset sector would be challenging to model in future assessments. The stock assessment team advised that, for the 2020 stock assessment, additional data points including ageing data, a second and third year of TIB catch data and some TIB sector voluntary effort data will be available, allowing some analysis of overlap with sunset sector data. It was advised that, in the short term, more uncertainty would result from losing all/parts of the sunset information, but would be manageable in the longer term with the TIB data set building over time and will help improve the assessment in the longer term.

Non-commercial catch estimates.
The RAG noted no new data was available to alter the tabled estimates of catches outside the commercial fishery (Table 1, page 44 of the meeting material):

- QDAF advised that there was no new information to revise recreational or charter catch;
- There was no new subsistence catch information, noting a scoping study in progress; and
- There was no information available from PNG-NFA to suggest a change to the catch-sharing arrangement.

2.2 Coral trout RBC for 2020-21 season

FFRAG **RECOMMEND** maintaining the current Total Allowable Catch for coral trout for the 2020-21 fishing season. However, instead of setting the TAC at the current 134.9 tonnes, for simplicity, the RAG recommended the TAC be set at **135 tonnes**.

In making this recommendation the RAG noted:

- the results of the preliminary stock assessment presented for the previous fishing season (2018-19), which indicated that the stock biomass is likely to be high (the preliminary stock assessment estimated biomass to be around 80 percent (B80) of estimated virgin biomass, with all of the model estimates of spawning biomass being above B65);

- continued low levels of reported catches (less than 20 tonnes (17.3 t) was reportedly taken in 2018-19 fishing season by TVH and TIB combined); and

- there is no new information to justify (or guide) a changed management approach.

Noting the low reported catches, the FFRAG did not consider it a priority at this time to develop estimates of catches taken outside the Fishery and for the TAC to be reduced accordingly. However, the RAG did recommend that this work commence in 2020.

Action arising: AFMA to develop a work plan for the FFRAG to advise on best estimates of coral trout catches taken outside the commercial Torres Strait Finfish Fishery (traditional take - kai-kai, recreational, charter sector).

Agenda Item 3 – Harvest Strategy

In the interests of the available time and to allow focusing on drafting and agreeing the RBC meeting record in session, the FFRAG agreed to defer discussion on the harvest strategy to the next Finfish RAG meeting to take into account the analysis presented at the current meeting for Spanish mackerel.

Agenda Item 4 – Management and Science

4.1 Western line closure review

FFRAG noted the general outcomes of public consultation on the proposal to remove the 'Western Line Closure' and then considered specific concerns raised by communities. FFRAG advice against each of these concerns is detailed in **Table 4** below.

The RAG noted advice from Traditional Inhabitant Industry Members that:

- many communities were not aware of the closure and for others it has been a long-standing issue to have the closure removed; and
- while some communities raised concerns with the removal of the Western Line Closure, others are very eager to have it removed as a means to provide an important and much needed economic opportunity.

As general advice, the FFRAG noted that the key to understanding the true impacts (or risks to the stock) from removing the closure would be to understand the extent of fishing likely to occur if the closure was removed. The RAG advised that there is a clear need to consider what the increase in reef-line fishing effort in the western Torres Strait might look like in the long term; i.e. how will fishing mortality on the stock change, how many TIB dinghies might fish, how many TIB primary-tender operations might access the fishery and considering what such scenarios may mean in terms of risk to the stock.

Table 4. FFRAG advice regarding concerns raised during public comment on the Western Line Closure review**.**

The potential for increased fishing pressure on coral trout to negatively affect the abundance (availability) of Tropical Rock Lobster (TRL, kaiar) stocks. Some stakeholders have observed and believe there is a positive relationship between coral trout and TRL abundance (more coral

trout = more TRL). It was noted that a different view was held by some who believed coral trout compete with or eat TRL. As a result if coral trout numbers in an area are reduced, TRL numbers will increase.	
FFRAG advice	Given the complexity of trophic interactions (many and varied, for example, direct and indirect impacts on (i) competition for food, (ii) habitat and (iii) predatory-prey interactions), it is extremely difficult to predict and assess potential impacts that fishing one species may have on another. There are studies (to be circulated to FFRAG members) from the Great Barrier Reef and other areas also suggest there are ecological relationships between coral trout and other fish groups including herbivorous fish. Herbivorous fish in turn impact habitats (algae levels) which in turn can impact the abundance on animals that rely on certain habitats (e.g. high algae levels can impact the settlement of shellfish/molluscs which can then be a food source for other animals. To quantify these interactions and then assess possible fishing impacts there are at least two options: • Long-term depletion experiments (remove coral trout and monitor TRL numbers). Around 5-10 years of experimentation and observation would be required but may still yield uncertain results; • Ecosystem modelling. An ecosystem model could be used to provide general guidance on possible impacts i.e. hypothesis testing. This information would be generalised. The RAG also noted the suggestion that if inner western communities had opposition to removing the closure due to risks to the TRL stocks the closure might be lifted for Gudumalulgal communities only, noting that Top-Western Communities are very supportive of lifting the closure to pursue economic opportunities.
If the Closure is removed, what impact would it have on the TAC (up or down?)	
FFRAG advice	Coral trout within the Torres Strait is currently assumed to form a single stock. Accordingly, the TAC represents a Total Allowable Catch for the stock irrespective of whether or not the Western Line Closure is in place or not. Removal of the Western Line Closure would not warrant a change to the TAC for the purposes of managing risks to the level of the stock.
Fishing effort may be redistributed across the Fishery. Aside from possible increases in effort in new areas, effort may increase in the eastern part of the Fishery as more fishers take an interest in the Fishery.	
FFRAG advice	As detailed above, the RAG advised that the risk from fishing at the stock level, irrespective of where those catches are taken, is not expected to change if the TAC remains the same or continues to be set on the assumption of a single stock. The RAG did consider that there is risk of localised depletion for reef-associated species such as coral trout. Coral trout have been found to have high site fidelity (meaning

	they don't move far as adults) and monitoring would be required to understand fine scale fishing effort in areas of the fishery over time if understanding localised depletion was a management priority. Science members noted that Vessel Monitoring Systems (VMS) might be a powerful fisheries management tool to help understand this issue.
Increased commercial fishing pressure on finfish stocks in the area of Western Line Closure will negatively impact the availability of fish for local kai-kai.	
FFRAG advice	The RAG noted advice from scientific members that different users of fish stocks (e.g. TIB commercial, sunset, traditional kai-kai fishing) generally have different fishing power. Operators with higher fishing power are generally known to take fish from an area first. It is plausible therefore that if the closure is lifted commercial operators (assuming they are more efficient) may affect kai-kai fishing catch rates overtime. It was suggested that management measures could be introduced to minimise the impacts of commercial fishing on traditional fishing (beyond mainlining a high biomass) if that was a management priority (eg spatial closures).

The FFRAG considered that, aside from the status quo with the closure in place, a number of scientific options could potentially be considered to aid understanding the impacts of lifting the closure including:

1. Ecological research while the closure remains in place with the outcomes from research to inform a decision on opening/maintaining closure.
    - RAG noted the above advice that ecological research is challenging, and that research into understanding the impacts occurring takes a long time and will be challenging to yield a meaningful result and to understand risks to the stock.
2. Ecological research with the closure lifted (research occurring alongside commercial fishing operations could inform maintaining the open area of the fishery)
    - RAG noted similar advice as per point 1 above.
3. Closure could be lifted with no research occurring, fishery-dependent data only could be collected for analysis.
    - RAG noted that understanding the risk to the stock would be very challenging as fishery dependent data alone (i.e. logbooks and fish receiver system data) may not be powerful enough.
    - While effort (number of boats entering the fishery) and catch can be monitored, the risks to TRL from trout harvests and the impacts on catch rates for the subsistence users of the stock (from increased commercial take of trout) would not likely be able to be understood from these available data. This is in part due to the difficulties in identifying and measuring the interaction between species, especially noting the variation in TRL abundance year to year.
    - RAG noted mitigation of risk could be achieved by establishing relevant data needs and monitoring requirements to meet these needs. But a relevant management response would need to be developed should monitoring show risk to the stocks was changing; i.e. a policy would be required to describe what levels of catch, changes in effort/participation would cause management to respond.

4. An adaptive management approach, where a representative area of the fishery is opened with the response of the area (effort and catch rates) monitored over time.
    - The RAG noted that the benefits of this approach are that potential ecological impacts from this fishing will only apply to a limited area but noted general advice that discerning ecological impacts (e.g. TRL and coral trout interactions) from catch and effort data would be challenging.

4.2 Use of Vessel Monitoring Systems on tenders to support Finfish Fishery data needs

FFRAG discussed and provided advice on the potential scientific benefits from collecting Vessel Monitoring System (VMS) data from tenders operating in conjunction with primary boats, to address data needs in the Fishery, compared to other options.

AFMA advised that there had not been a decision to introduce VMS on tenders, but that advice was being sought on the potential role of VMS in assisting with data needs in the Fishery. Introducing VMS on tenders requires the consideration of a wider range matters such as implementation cost-benefits across all licence holders.

The FFRAG scientific members advised VMS would likely have the following benefits in addressing data needs including:

- Better understanding the level of fishing mortality (F) more accurately through knowing the intensity of fishing mortality in finer-scale areas. VMS tender data can help scientists understand 'hot spots' of fishing effort in the fishery and track how these hot spots change over time in response to potential range contraction or potential localised depletion.
- Improving the Catch Per Unit Effort index of fish abundance: VMS will help stakeholders better understand the effort component of fishing; e.g. on a fishing day, how many locations were fished, with exact time of day, with start and finish at each location, and the exact hours fished per dory, per session. Science members noted that the daily fishing logbook yields currently has limited detailed effort and spatial data for analysis.
- Addressing the potential hyper-stability issue: An issue with fishery-dependent data, where catch rates appear stable over a longer term when the level of the stock may be eroding unnoticed.
- Providing fine-scale location data where samples have been obtained for biological research (length-frequency measures and frames collected for ageing work).
- Support development of one single CPUE index for analysis in future, instead of four model runs we are using now (tenders in or out, fishing power in or out), and will likely provide more certainty in future allowing finer scale spatial stratifications.

FFRAG advised that these benefits would be realised only if VMS and catch data was recorded from both the primary vessel and dories; i.e. daily fishing logbooks would need to capture catch per dory with the effort component alone potentially collected by VMS.

FFRAG also noted that the value of tender VMS data is dependent on the fishing behaviour of vessels and the frequency of the VMS reporting. For example, Spanish mackerel sunset licence fishers often work across a small area of reefs in the Bramble Cay area while the coral trout vessel tenders may travel further from the primary vessel.

Science member Dr Michael O'Neill advised that the QDAF-managed east coast scallop trawl has been using VMS data in their stock assessment by using *Track-Mapper* software (specific to trawl and prawn methods). This software was tailor made by QDAF, which acts to marry logbook

catches with VMS fine-scale detail maps to understand where fishing has occurred and produce heat-maps of fishing effort. It was advised that it would likely be a research question about whether track-mapper software can be adapted to other fishing maps.

Compliance benefits

Industry members are supportive of the implementation of VMS on tenders on sunset licence vessels to additionally support compliance of sunset fishers with the 10 nm radial closures in place around Erub, Mer, Ugar and Masig.

Alternative options

In considering cost-effective alternative options, such as having tender drivers fill out amended paper logbooks with time travelling and time at each reef, the RAG considered that it would be challenging for fishers to complete paperwork in tenders and may yield unreliable data. The RAG also considered a suggestion that simpler GPS units could be fitted to sunset sector dories with an end of season retrieval and data dump. But the RAG noted this option would lose the compliance benefit from real time reporting.

Agenda Item 5 – RAG Updates

5.1 Finfish Fishery RAG member updates

Industry members presented, provided the following updates on developments in the Torres Strait Finfish Fishery:

- Weather is improving which will support TIB fishing at Ugar after 6 months of high winds. Fishers are presently taking good size mackerel catches. Community fishers are catching good-sized mackerel now. Fishers from Darnley are reporting the same and have been fishing waters towards Ugar in recent weeks.
- Murray Island trout fishers have been affected by the disappearance of sardines from the waters surrounding the island, meaning fishers are unable to collect their bait. Due to this a few operations targeting coral trout have switched to working beche-de-mer. Fishers are keen for the new community freezer to open for business.
- Fishers on Masig have recently started commercial fishing for coral trout and mackerel with a range of sizes of mackerel reported. Some concern was raised by the Kulkalgal Industry Member that a previous area of the fishery that used to yield good catch rates of coral trout (around 2002) was yielding few trout now.
- The sunset industry member detailed some issues affecting the fleet of sunset licence holders in this present season; with one boat absent from the fleet so far, one boat knocked out for a few months due to a breakdown, and another sunset boat is finishing up their mackerel allocation shortly and will switch to targeting their trout allocation soon but was down to two dories for the rest of the season rather than their normal three. The FFRAG noted that the East Coast Spanish mackerel fishery had only caught 30 per cent of their available quota this season. It was also reported that demand for coral trout was down with the market flooded with product.

Agenda Item 6 – Other business

6.1 Other business

No other items of business were nominated for discussion.

6.2 Next meeting and meeting close

The key outcomes of RBC advice for Spanish mackerel and coral trout were agreed by the FFRAG and Chair in session prior to the close of the meeting.

The RAG noted that FFRAG 7 is scheduled for early September 2020 in Cairns. In closing the meeting, the FFRAG Chair thanked all of the participants for their input with a lot of good productive discussion and contributions to a strong, evidence-based process for forming RBC advice.

Meeting closed at 17:00 hrs.

Attachments

Attachment A: Meeting Agenda as Adopted