PZJA Torres Strait Finfish Fishery Resource Assessment Group

FFRAG Meeting 7

8 October 2019
Video Conference

Final Meeting Record

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

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

Australian Government
Australian Fisheries Management Authority

Agenda Item 1 – Preliminaries

1.1 Preliminaries

The seventh meeting of the PZJA Torres Strait Finfish Fishery Resource Assessment Group (FFRAG) was commenced at 9:30 am via videoconference. FFRAG Chairperson, Mr David Brewer, welcomed participants and acknowledged the Quandamooka Traditional Owners of the land where the chair was located and acknowledged the other Traditional Owners of the land on which the meeting was held where all the members were located.

Traditional Inhabitant Industry Member for Mailulalgal - Paul Lowatta was noted as an apology.

AFMA sought consent from the RAG to record the meeting for the purpose of ensuring an accurate record. AFMA advised that the recording is kept secure and is deleted once the final meeting record is published. There were no objections to the meeting being recorded.

1.2 Adoption of agenda

The agenda (**Attachment A**) was adopted as circulated by AFMA.

The RAG noted that the key items for discussion were to provide guidance to the Spanish mackerel stock assessment team ahead of the November 2020 stock assessment by reviewing all available data, discuss select and endorse key data inputs and to also review research priorities for the near future.

1.2 Declarations of interests

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

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. Co-investigator on Torres Strait non-commercial fish fishery project funded by TSSAC with RAG member Kenny Bedford.
Rocky Stephen, Industry Member	Chair, 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.

Name and position	Organisation	Declaration of interest
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.
Kenny Bedford, Industry Member	Debe Mekik Le Consultancy	Runs a consultancy business which has delivered projects relevant to Torres Strait fisheries.
Keith Brightman, Acting TSRA Member in lieu of Mark Anderson	Torres Strait Regional Authority	No interests declared.
Tony Vass, Industry Member, Sunset	Industry, Sunset	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	CSIRO Australian Bureau of Agricultural and Resource Economics James Cook University	Recent move to CSIRO. Continued work with ABARES as a fishery scientist under Department of Agriculture and Water Resources. Involved in previous Torres Strait research.
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.
Tom Roberts*	QDAF member	Reef line fisheries manager Queensland East Coast.
Selina Stoute	AFMA member	No interests. Manager of Andrew Trappett who is a co-investigator on two Torres Strait funded research projects.
Andrew Trappett, RAG Executive Officer	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.

Meeting observers and declarations of interests registered.

Quinten Hirakawa	TSRA	TSRA project officer, TIB licence holder – commercial TRL fisher background. 25 years working with Queensland Boating and Fisheries Patrol (QDAF). Recent employment with TSRA Ranger Program and now with the TSRA Fisheries Team.
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).

Agenda Item 2 – Stock assessments

2.1 Review of data inputs to support the 2020 Spanish mackerel stock assessment

The FFRAG noted a presentation from the Spanish mackerel stock assessment project team Dr Michael O'Neill and Dr Rik Buckworth covering a range of data issues under four broad themes (**Table 2** below). The RAG noted an update on progress made to date and that a number of issues were complete, outstanding or being progressed as outlined in **Table 2** below. The RAG noted that RAG advice would be sought on each issue highlighted in blue.

Table 2. 2020 RAG list of assessment items with colour coded status updates. Black font – completed; Red font - outstanding; Blue font – new/review

Assessment item	Status
1. Total annual harvest tonnes	
Established time series of TIB harvests	✓
Standardise AFMA and DAF data scripts	✓
Revise annual fish weights in Sunset tonnages	
Review harvest estimates 1940-1988	
Keep or adjust the 100 t Taiwanese gillnet harvest 1979-1986	
Assess logbook over reporting of fish harvest (paper fish)	✓
2. Standardised catch rates	
Assess all boats and subsets of boats	✓
Include annual increase in fishing power from QLD East Coast	✓
Spatially classify harvests	✓
Re-examine the number of dories reported	
Categorise fishing skippers and dory drivers	
3. Biology	
Using Torres Strait data	✓
Select new age frequency data	
Select natural mortality rates	
4. Stock assessment model	
Demonstrated methods and model to the RAG	✓
Define the data treatments (analyses)	
Stock forecasts assuming constant harvests	✓
Set the method for calculating RBCs	
Design RBC decision tables	
Dissect the depletion levels up to 1989 and catch history	
Retrospective analyses	

Section 1 - Total Harvests

Revise average fish weights in Sunset tonnages

The project team sought advice from the RAG on whether to vary the current approach for assuming mean weight per fish in calculating harvest tonnages from daily fishing logbooks. The RAG noted that the model currently calculates total harvest from sunset logbooks by multiplying the number of fish reported in the logbook by a constant mean fish weight of 6.9 kg being applied to all years of catch data at present. The team proposed departing from this constant mean weight on the basis of newly available length frequency and ageing data which can now provide mean weight estimates for eleven years in the catch history (1974-75, 1978-79, 1983-84, 1998 to 2005 and 2019-20).

The RAG noted that there does not appear to be a great deal of range in the eleven different years where fish weights are now available, generally varying about one kilogram. The RAG noted an analysis showing that this new data rule would not have a significant change in the historical understanding of total harvest levels.

The RAG noted advice from Dr O'Neill on the representativeness of some of the newly available length and weight data. The RAG noted advice that the 1983-84 sampling data may have originated from a tagging study, meaning that it may, or may not, have had a different sampling methodology (e.g. might have been aiming to capture and release younger fish). The RAG noted that further investigation would occur to attempt to find the methods from this study. The RAG recommended that as a principle all available data should be incorporated into the model for now unless there was evidence to discard it as not representative.

To support the 2020 stock assessment the RAG recommended:
- **changing the constant assumed average fish weight data rule to apply a weighted-mean value to the years for which a mean fish weight was not available from catch sampling; and**
- **that the project team use total harvest values available from Catch Disposal Records (CDRs) from the 2018-19 season onwards noting these were verified weights in port.**

Review estimates of harvest tonnages 1940-1988

The RAG noted that prior to the introduction of the AFMA SM02 daily fishing logbook in 1989 that available catch and effort data for the fishery is patchy and for some sectors absent. The RAG noted the importance of developing an agreed catch history for the fishery based on the best available data, expert advice (including industry advice) and agreed assumptions. The RAG also noted that further improvements are likely over time as more information is gathered. **Attachment B** summarises advice provided by RAG industry members at the meeting on historic vessels known to be operating in certain years. To assist the RAG in cataloguing these data to support future assessments AFMA proposes that this summary becomes a live document across meetings and can be updated as further investigations are carried out.

The historical harvest estimates catch series (1940-1988) recommended by the RAG at the meeting is outlined in **Table 3** below. RAG advice on data for each fishing sector is described in the following sub-sections below.

Sunset sector historic harvests

The RAG noted a table of older sunset harvest estimates from the project team based on available data from *McPherson et al.* (1986) (**Table 3** below). The project team questioned the completeness of these older data and sought advice from the RAG. It was noted that the 1957 to 1962 data was reportedly from a single boat only and that the 1975-1979 data was reportedly from the Queensland Fish Board (along with some processor data) and may not be complete. The number of boats represented in these data and operating in the fishery during these two periods is not clear.

Action item 1: QDAF to investigate whether older licensing data might be available to understand vessels and years active during the pre-1989 phase of the TSFF.

Action item 2: AFMA to request access to the logbooks of Mr Snowy Whitaker, *AFV Trader Horn* from the Townsville Maritime Museum where they are reportedly catalogued.

Action item 3: The RAG noted that the project team would consult with the author of the study that summarised these data, Geoff McPherson, out of session, that might lead to an adjustment of the figures based on advice received. Stock assessment team are to report the findings of this discussion back to the RAG.

The RAG did not recommend any changes to the historic sunset sector catches for the 2020 stock assessment noting that the project team would be seeking further advice from retired scientist Geoff McPherson out of session.

'TIB' sector historic harvests

RAG Traditional inhabitant industry members recommended that the catch history should be amended to reflect a zero catch for the 'TIB' islander commercial catches prior to 1975, noting that island infrastructure did not exist prior to this time to support islander commercial fishing. Industry also advised that any active Traditional Inhabitant fishers prior to 1975 were likely working on non-indigenous boats.

Industry members were satisfied with the TIB harvest data and suggested for the project team to conduct further checking of older island freezer data to make sure it was reflected in the more recent harvests time series after 1989.

On the basis of the advice from the Traditional Inhabitant industry members, the RAG recommended the table of catches be amended to reflect zero tonnes of harvest from the TIB sector prior to 1975 as an input to the 2020 stock assessment model. The RAG supported the assumption of 3 t harvest to be input into the model per year for TIB sector from 1975 to 1988.

Traditional fishing

The RAG noted advice from Traditional Inhabitant industry members that the assumed figures for subsistence catch of Spanish mackerel appeared to be too high at 10 t per year. It was considered that, prior to the growth of the TIB commercial fishing sector, catches of Spanish mackerel for subsistence purposes were likely to be rarer or incidental while taking other species. Industry members advised that once more TIB fishers were out targeting mackerel for commercial purposes from the 1970s, catches of the species for subsistence would have also increased.

The RAG accepted this advice as the best available information and agreed to recommend that the traditional harvest of mackerel be revised from 10 t down to 2 t prior to 1975 as an input to the 2020 stock assessment model.

Recreational harvests

The RAG noted the 2 t estimate for recreational catches is based on modern QDAF led survey techniques and is applied consistently across all years as an input into the model. The RAG had no basis to deviate from this approach.

The RAG therefore recommended maintaining a 2 t recreational take of Spanish mackerel for all years in the 2020 stock assessment model.

Options for connecting the older historical catch data with the modern logbook time series.

The project team presented the RAG with four options (logistic, polynomial, log-linear and weighted mean) available to fit the assumed total harvests in the model to the pre-1989 data points of harvest estimates available from older sources (1957-1962 data from a single boat and 1975-1979 data from the Queensland Fish Board and some processors).

RAG scientific members advised that the log-linear and weighted-mean models should be disregarded as these approaches placed too much emphasis on the older uncertain points (1957-1962 and 1975-1979) in the time series.

Based on this advice the RAG recommended that both the logistic and polynomial approaches should be used as inputs to the 2020 stock assessment as they appeared to fit the available data historic data points well.

Table 3. *Summary of RAG advice on harvest estimates 1940 to 1988 to support the 2020 stock assessment. Yellow highlighted cells represent changes made from the 2019 assessment based on RAG advice.*

Year	Label	'TIB'	Traditional	Sunset	Recreational	Charter	PNG	Total
1940	1940-41	0	2	0	0	0	0	2
1957	1957-59	0	2	34	2	0	0	38
1959	1959-60	0	2	52	2	0	0	56
1960	1960-62	0	2	40	2	0	0	44
1962	1962-75	0	2	70	2	0	0	74
1975	1975-76	3	2	68	2	0	0	75
1976	1976-77	3	2	81	2	0	0	88
1977	1977-79	3	2	69	2	0	0	76
1979	1979-89	3	2	57	2	0	0	64

Taiwanese Illegal, Unregulated, Unreported (IUU) harvests

The RAG noted that part of the historical catch series is the assumed harvest from Taiwanese drift-gillnet vessels reportedly operating across northern Australian from the late 70's, 80's and into the early 90's, with incidents, pursuits and apprehensions occurring through this time period. The RAG recalled a decision made in the 2019 assessment to inflate the time series of total harvests by 100 t for the years 1979 to 1989 to include this estimate of mortality on the stock in the model.

The RAG noted a presentation from Rik Buckworth (**Attachment D**) summarising known reports and information to support the inclusion of these data. The team sought RAG views on, continuing to account for possible IUU catches and if so, on the likely duration and magnitude of these harvests.

The RAG agreed:
- there was a sufficient weight of evidence to show that IUU fishing of Spanish mackerel did occur. This was chiefly based on the *1992 Joint Advisory Council* advice of an apprehension of a drift net boat with a large quantify of catch in its hold and reported take of mackerel in March 1992 and reports from *McPherson 1986.*

- that the IUU catches should be accounted for in the stock assessment. If IUU catches are not accounted for, the stock assessment may overestimate the current biomass estimate through time which could then lead to over-harvesting.

- for the time series of harvests from Taiwanese IUU to be extended from 1986 to 1992-93 and to taper the catch down to zero by this point (i.e. extending harvest into 1990, 1991, 1992 reducing to zero tonnes to blend into the existing time series by 1993). Tapering was agreed based on the assumption that IUU fishing decreased as the presence of Australian fishing boats on the fishing grounds increased.

Section 2 – Standardised catch rates

Review of the number of dories reported in logbooks

The RAG noted that the stock assessment is run a number of times with different parameters (model runs) to examine how the model responds and to gauge for possible uncertainty in data which is put into the model. One issue being examined in the stock assessment update in 2020 is the available data on the number of dories used by a primary boat.

In the 2019 assessment some model runs included the dory number data while others excluded it. The RAG was asked to review the data on dory numbers and provide advice on how it should be treated in the next assessment noting uncertainties associated with some of these data.

The RAG noted that from 1989 to 2003 the reported number of dories were low, with data suggesting that a lot of boats reported 'zero' dories. The RAG queried whether the earlier year reports were 'null' values with no reporting conducted or whether they were actually reported by the operations as 'zeros' meaning the boats actually did not have any dories. The RAG noted industry reports that dories were common through the recent history of the fishery (e.g. Tony Vass was fishing from 1990 to 2007).

The RAG considered that, in general, this data-set was unreliable and might be due to older logbooks (e.g. Queensland State 'LN' Daily Fishing Logbook and AFMA SM01 and SM02 which were used prior to the introduction of the present TSF01 logbook in 2003) used to collect catch and effort data may not have had a designated space for recording the number of dories fished.

RAG technical members advised that while the number of dories fished was likely to be an influential factor, the standardisation does take account of vessel effects, which would go some way to accounting for this variation within operations and between seasons.

Based on this advice, the RAG recommended not including the factor of number of dories in the 2020 stock assessment until further fact finding and investigation on the older data could be conducted.

Fishing power

The RAG reviewed the inclusion of the 'Fishing Power' effect (FP) on the time series of catch rates. The RAG noted that FP was the steady increase of the ability of an operation to catch fish based on improvements in gear and technology, such as echo sounders and Global Positioning Systems (GPS). The RAG noted that the previous 2019 assessment model runs both included and excluded FP as a factor. The project team was seeking RAG advice about whether to include FP, exclude FP, or present model runs with both options.

The RAG noted that the FP in the Torres Strait model was a calculation carried over from the Queensland East Coast stock assessment and, if applied yearly, would mean about a 23 per cent increase in FP from 1989 to present (0.955 to 1.187). The RAG noted advice from industry that prior to 1989 no one had GPS units, but by the mid 90's this technology was common across the fleet; meaning that FP has indeed been changing across the time series.

Based on this advice the RAG recommended that, for the 2020 stock assessment, fishing power should be included as a factor in the model in all model runs i.e. no model runs will be performed excluding FP.

Traditional Inhabitant Boat sector catch rates

For information only, the RAG noted that the upcoming assessment would present the first two points on the CPUE series. The RAG members commended the TIB industry for collecting this voluntary catch and effort data and welcomed the intention to further build this series over time.

The RAG noted that the TIB data points appeared to be in contradiction to the sunset catch rate series with the 2019-20 season catch rate lower than 2018-19. However, it was noted that 2018-19 may have been an outlier with very good catch rates and weather and that 2019-20 season had generally poor weather coupled with community freezers not being in operation.

Section 3 – Biology

Select fish age-frequency data

The RAG noted that the 2019 assessment only had fish ageing and length frequency data from QDAF led biological sampling from the years 2000 to 2005. The project team advised that RAG that a range of older fish ageing data (11 years in total) was now available from older research projects for possible inclusion as inputs to the 2020 stock assessment, based on RAG views on the usefulness of these new data.

The team advised that a potential issue with these data is that, for each year of sampling, data may have come from a different research project and may have different sampling methods, and may or may not be fully representative of the fishing effort. For example, the 1983-84 data were reportedly from a project that was attempting to target fish for tagging projects and might have been aiming to capture younger, smaller, stronger fish that would live for years and possibly be recaptured in future.

The RAG recommended that, on principle, all available ageing data should be incorporated into the model for now, unless there was evidence to discard it as being not representative. The RAG noted that future work may revisit these samples and that further information on the methods for these research projects that collected the data, may become apparent. But the RAG was comfortable using the data for now, noting that it does not appear to change drastically from year to year.

Finfish RAG recommended that all eleven years of available fish age and length data (Figure 1 below) should be included as inputs into the 2020 stock assessment.
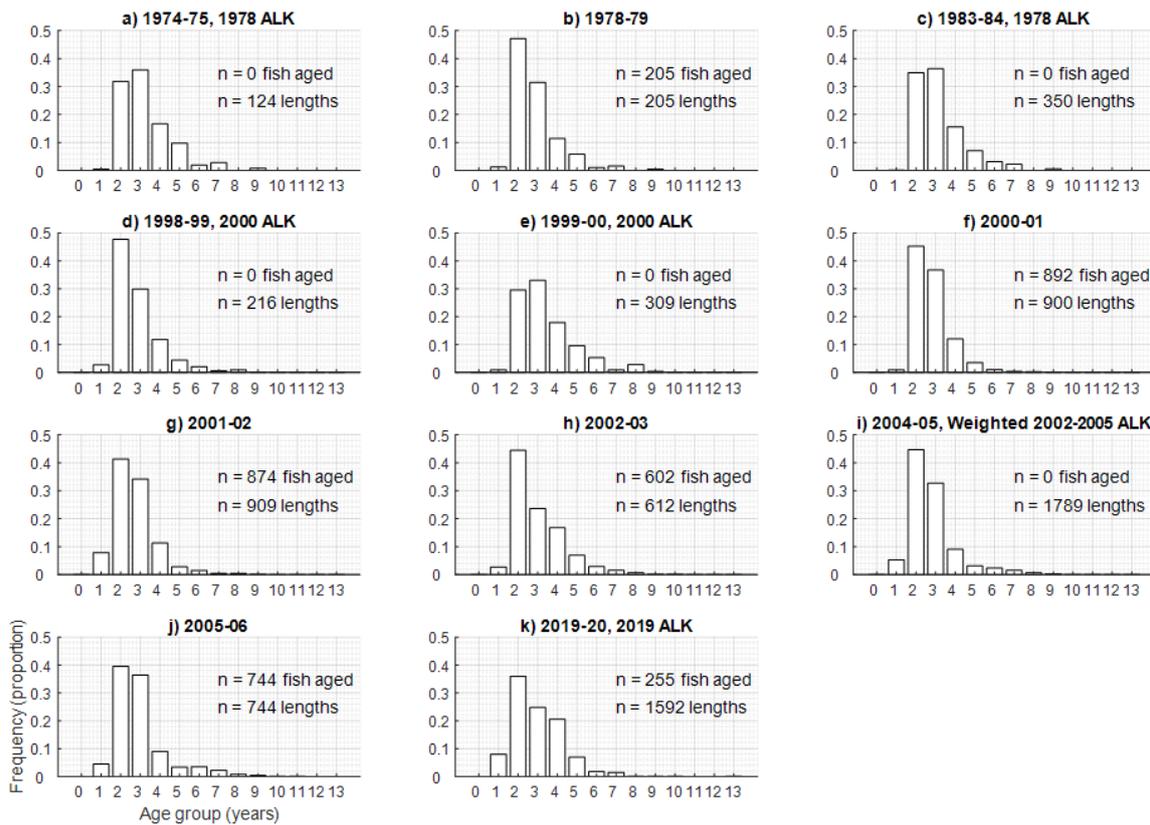
Figure 1. Age and length data for Torres Strait Spanish mackerel recommended by Finfish RAG for inclusion in the 2020 stock assessment.

Natural mortality rate

Prior to the 2019-20 round of biological sampling the oldest fish from Torres Strait ageing data (from 2000 to 2005 sampling rounds) was known to be 12 years old. The RAG noted that, with updated sampling information from 2019, it was now known that the oldest fish measured from Torres Strait was 13.5 years and that this data could be used to inform estimates of natural mortality rate of the stock (M). The RAG noted that an analysis could be performed (the *Then et al.* methodology[1]) to give an indication of what a value for natural mortality might feasibly be based on information from hundreds of different fish species. Applying this methodology to the Torres Strait Spanish mackerel stock resulted in an estimation of M=0.45.

Some consideration was given by the RAG to the range of M values of 0.25, 0.35 and 0.45 as an alternative. But these were not recommended by the RAG as it was considered that 0.25 was likely too low of an estimate for M (based on not having any older fish in the age-sampling data, oldest fish of 13.5 years, not 20 years like the Queensland East Coast sampling data) and would likely result in an overly conservative population estimate.

Based on this advice the RAG recommended that the 2020 assessment model conduct model runs reusing the Natural Mortality (M) value of 0.3 from the 2019 stock assessment (which was considered as a good logical lower value estimate), 0.45 as a higher range

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[1] Then, A. Y., Hoenig, J. M., Hall, N. G., and Hewitt, D. A. 2015. Evaluating the predictive performance of empirical estimators of natural mortality rate using information on over 200 fish species. Ices Journal of Marine Science, 72: 82-92.

estimate (based on the *Then et al.* methodology) and also recommended using an M of .375 as a mid-point model run. RAG recommended M values of 0.3, 0.375, 0.45 be used in the 2020 assessment[2].

Section 4 – The stock assessment model

Based on the RAG's advice on each data issue above, the RAG noted and agreed that eight separate model runs would be undertaken in coming stock assessment. The factors for each of the eight model runs is described in **Table 4** below.

The RAG noted that the project team would be meeting with retired Torres Strait Spanish mackerel scientist Geoff McPherson out of session during the week of 12-16 October 2020. This meeting would investigate and advise the team on whether to add an additional set of model runs with any adjusted figures (*McPherson actual catch history data* or *McPherson adjusted catch history data*) based on Mr McPhersons' advice.

Should these model runs be conducted, the RAG noted that **Table 4** would be expanded to 15 model runs to encompass this extra factor for consideration (an additional six runs might be performed as per runs 1-6 below but with adjusted historic catch data rather than actual).

Table 4. Analyses / model runs agreed by the RAG for the 2020 assessment.

Label	Fish weights	Catch rate series	Natural mortality rate (M)	Harvest pre-1989	Ageing data	Start year for data
1	Weighted average	No tenders and fishing power included	0.3	Historic catches actual + polynomial model + IUU tapered	All years	1940
2	Weighted average	No tenders and fishing power included	0.375	Historic catches actual + polynomial model + IUU tapered	All years	1940
3	Weighted average	No tenders and fishing power included	0.45	Historic catches actual + polynomial model + IUU tapered	All years	1940
4	Weighted average	No tenders and fishing power included	0.3	Historic catches actual + logistic model + IUU tapered	All years	1940
5	Weighted average	No tenders and fishing power included	0.375	Historic catches actual + logistic model + IUU tapered	All years	1940
6	Weighted average	No tenders and fishing power included	0.45	Historic catches actual + logistic model + IUU tapered	All years	1940
7	Weighted average	No tenders and fishing power included	0.3	n/a	All years	1989

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[2] Note that following FFRAG 7 the project team attempted to get the model to run using the RAG suggested M values of 0.3, 0.375, 0.45. As the model had issues running with the upper 0.45 value members were advised out of session that the values of 0.3, 0.35 and 0.4 would be used as an alternative. See **Attachment E** for the values used as inputs into the assessment.

| 8 | Weighted average | No tenders and fishing power included | 0.375 | n/a | All years | 1989 |
| 9 | Weighted average | No tenders and fishing power included | 0.45 | n/a | All years | 1989 |

Method for calculating RBCs

The RAG noted that a time lag existed between the point for which catch data was available, the running of the stock assessment and the setting of a sustainable catch limit for the next season in advance of this time (**Figure 2** below). RAG advice was sought on maintaining the current approach or adopting a different method that forecast the RBC in the fishing season. The RAG noted that there is no single policy approach and that a number of important assumptions need to be agreed for the later approach. They include assumptions on the level of recruitment and catch expected in the future years.
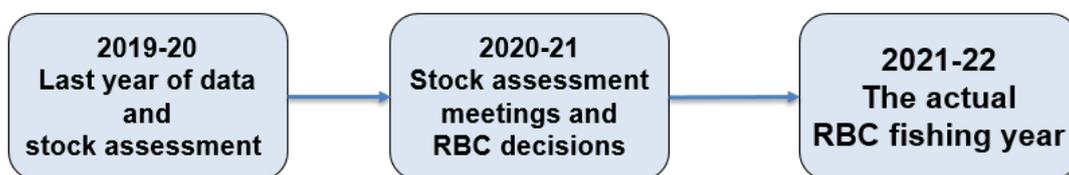

Figure 2. *Illustration of the 12 month lag between available information and setting of a sustainable catch level.*

Members noted that in the Southern Eastern Scalefish and Shark Fishery (SESSF) that the method for calculating RBCs varied. But for key species, where appropriate, a forecast was made of what the likely mortality would be in the intervening year and this was used to adjust the RBC accordingly. It was also noted that many SESSF species were managed under multi-year TACs and did not have assessments run every year.

The RAG recommended that forecasting should be developed and adopted as a best practice method for the TSFF. The RAG noted that, as an option, it could be assumed for Spanish mackerel that the entire sunset sector available TAC would likely be caught in the intervening year and a running average value of harvests could be used for the likely TIB sector catches (noting a higher value is put aside to support expansion of fishing effort).

Action item 4: AFMA to arrange an out-of-session meeting with the SESSF RAG chair and the Spanish mackerel stock assessment project team to discuss and report back to the RAG on options for setting an RBC using a forecasting method.

RBC decision tables

The RAG noted the approach used in the 2019 assessment, where a range of target reference point fishing mortalities were considered in recommending an RBC (F MSY, F 40, F 48, F 60), with the median value of all agreed model runs being used to select the RBC. It was also noted that the risk in setting an RBC was considered in terms of the number of model runs that would drop the stock below the default limit reference point of B20 (20 per cent of unfished biomass) over 12 years and 20 years (being three and five times respectively the average age of full maturity, 4 years). In 2019 the RAG also considered runs with a mean level of recruitment or a depressed level of recruitment. The RAG recommended continuing this same approach for the 2020 assessment to maintain consistency.

Agenda Item 3 – Research priorities

The RAG noted the agenda paper and an overview from AFMA on previous RAG discussions on TSFF research priorities. AFMA advised that projects funded during 2020-21 for the TSFF were: the Spanish mackerel stock assessment, biological sampling program (mackerel round two and trout round one) and scoping options for collecting non-commercial catch data, but that no research funding was committed for the TSFF past the present financial year.

The RAG noted and reviewed the previously identified research priorities outlined in the agenda paper (**Table 5** below).

The RAG noted that this advice would support TSSAC discussion at their 4 November 2020 meeting. AFMA advised the RAG that they would draft scopes to match the four RAG identified priority research needs to go to TSSAC. TSSAC will be tasked with reviewing the RAG advice and endorsing the draft scopes to be released in the December 2020 public call for research for funding for 2021-22 financial year.

Table 5. Summary of FFRAG 7 research priorities discussion.

Need	RAG comment	Essential / Desirable and Ranking
Biological sampling (Spanish mackerel and coral trout)	• RAG support for ongoing biological sampling for Spanish mackerel as an **essential** research need. • Need for a time series to be established to understand changes in the Spanish mackerel population, particularly recruitment deviation. • Important for the program to also collect Spanish mackerel genetic samples to support future research. • Sampling for coral trout remains **desirable** noting likely high present biomass. However, the RAG did note that it would be cost effective with economies of scale existing with the concurrent mackerel program and to build the supply of information to support a generally data poor fishery.	**ESSENTIAL for Spanish mackerel** **DESIRABLE for coral trout** **Ranked as the number 1 priority for research funding.**
Spanish mackerel stock assessment	Remains a strong research need to fund a Spanish mackerel stock assessment in the near future due to: • Declining CPUE evident since 2010 suggesting the stock abundance is in decline. • Recent assessments indicate the stock is near the limit reference point. • Uncertainty associated with stock status. • Need to set appropriate sustainable catch limits to keep the stock building away from the limit reference point – the assessment is the only empirical method to gauge the status of the stock and set an RBC. • Previous RAG advice to continue annual assessments until stock at or near 40 per cent of unfished biomass. • Conservative multi-year TAC could be set in absence of yearly assessments but would mean potential lost economic opportunities. Testing has not been undertaken to support multi-year TACs.	**ESSENTIAL** **Ranked as the number 2 priority for research funding**.
Harvest strategy development	• Remains an essential research need in the fishery with a project required to continue development of a Strategy for the TSFF. • Commonwealth best practice is to manage a fishery under a strategy to gain long term efficiencies and focus science, monitoring and management.	**ESSENTIAL** **Ranked as the number 3 priority for research funding.**

	• Project could focus on mackerel first, rather than both mackerel and trout, if funding was limited.	
Alternative index of abundance for Spanish ackerel – scoping study	• Novel Close Kin Mark Recapture (CKMR) genetic technique could be developed through a scoping study for Torres Strait Spanish mackerel. • CKMR Index developed over time can calculate absolute stock abundance independent of the daily fishing logbook CPUE. • It was noted that a scoping study for CKMR could report on whether the method would work biologically, the number of samples that would be required over time (based on the population model) and how the technique might provide other insights such as connectivity with adjacent stocks. • RAG supports a project being formed to scope and develop advice on an alternative index of abundance noting the present level of the stock and amount of available data to support science and management and the issues with CPUE data presently being addressed by the RAG and stock assessment team.	**ESSENTIAL** **Ranked as the number 4 priority for research funding.**
Environmental drivers that may be affecting the Spanish mackerelassessment	• Seen as a key scientific issue for Torres Spanish mackerel assessment, but also across northern Australia (not just limited to Torres Strait). • Strong need to know why Spanish mackerel CPUE varies up or down over time and what factors underlie trends in the data. • May require ongoing analyses post the 2020-21 funded examination. • Has interaction with the climate change project. RAG to monitor outcomes of this project and provide future advice on what a project may look like to address this need.	**ESSENTIAL** but not recommended as a near future priority.
Coral trout stock assessment development	• Previous RAG advice noted priority data work to be carried out to further develop the 2019 preliminary coral trout assessment and address the range of uncertainties identified. • The additional data priorities are: 1) analysing the identified 1994-95 CSIRO survey data, 2) examining improved TIB catch and effort data, 3) incorporating underwater visual survey data if conducted.	**DESIRABLE** – not recommended for funding at this time.
Spanish mackerel stock structure and ecology	The RAG noted that this item was of lower priority at this stage and was not discussed in detail.	Lower priority
Shark depredation	The RAG noted that this item was of lower priority at this stage and was not discussed in detail.	Lower priority
Otolith morphology	The RAG noted that this item was of lower priority at this stage and was not discussed in detail.	Lower priority
Ratio of B MSY to B MEY	The RAG noted that this item was of lower priority at this stage and was not discussed in detail.	Lower priority

Points discussed:

Biological sampling

The RAG recommended that TSSAC support funding to continue the program to sample Spanish mackerel and coral trout. The RAG considered that this is a high priority monitoring need for

Spanish mackerel as the stock rebuilds to a higher biomass over time towards its target reference point. The RAG confirmed the need for a time series to be able to track the strength of recruitment into the fishery, changes in the population and to inform and improve the accuracy of the stock assessment. The RAG noted that the program would provide benefits for other assessment parameters such as reproduction and will also collect valuable genetic samples to support future research. It was noted that each year of sampling confirms and consolidates the existing knowledge. The RAG noted that it would be important to maintain and continue to build on the buy-in and good will within industry to capitalise on the good results from the first round in 2020 and into future rounds.

The RAG noted that with the present indication of high coral trout biomass from the 2019 preliminary stock assessment, sampling remained desirable. However, the RAG did note that it would be cost effective to continue sampling for coral trout with sunk costs committed into the program and likely economies of scale alongside the concurrent mackerel sampling program. The RAG also noted that trout fishery is similar to the Spanish mackerel fishery with few boats catching and supplying CPUE data, meaning that it is relatively data-poor.

As such the RAG recommended to TSSAC that funding for the biological sampling program be maintained as an *essential* research need for Spanish mackerel and a desirable research need for coral trout. The RAG advised that, in terms of ranking, they would place biological sampling above the stock assessment for Spanish mackerel should funding for both not be available.

Mackerel stock assessment

The RAG noted that there is a strong research need to perform annual assessments to check the response of the stock, noting the uncertain stock status, declines since the 2010 season and the outputs of the most recent assessment suggesting that the stock is near the default limit reference point of 20 per cent of unfished biomass (B20). At their RAG 6 meeting (November 2019) the RAG recommended that stock assessments should be performed annually until the stock had recovered to a point at or near 40 per cent of unfished biomass (B40).

The RAG noted that the stock assessment was the only available empirical method to set a sustainable catch limit to build the stock and keep it away from the limit reference point (B20) and as such is an *essential* research need for the fishery.

AFMA advised that in funding the 2019 and 2020 stock assessments and noting the uncertainties in the available CPUE data, TSSAC wrote to the project team to ask for a commitment to investigate underlying reasons for the declining CPUE, including examining whether environmental variables might be affecting the catch rates or recruitment. The project team advised that due to unforeseen challenges this work has not been progressed as far as expected. The project team advised that an update will be provided at the FFRAG 8 meeting.

The RAG noted that although it is an *essential* research need, if the stock assessment could not be funded for some reason, a low and conservative TAC could feasibly be set over multiple seasons. However, this would forgo economic opportunities for the TIB sector to grow with primary vessels as more infrastructure comes online in the near future and to be able to lease out all available catch within the sustainable limit not used by TIB fishers.

Harvest strategy development

The RAG noted the previously funded project "*Developing Harvest Strategies for the Torres Strait Finfish Fishery*" had concluded in 2019. It was noted that FFRAG 5 had reviewed the status of components developed from this work and had identified gaps to be further progressed, including finalising development of indicators of stock status, testing decision rules, operationalising the 'banking' of fish advice from stakeholders and integrating monitoring/data needs into the assessment with regards to setting TACs.

The RAG supported the formation of a second project as an *essential* research need for the fishery to complete this development. It was noted that an option for the project might be for the project to first focus on Spanish mackerel rather than coral trout. The RAG were supportive of a project being formed as an *essential* need for the fishery noting it was lower priority than biological sampling or stock assessment work for Spanish mackerel.

Alternative index of abundance for Mackerel – close kin mark recapture

The RAG noted that the novel Close Kin Mark Recapture genetic technique could be developed through a scoping study for Torres Strait Spanish mackerel and an index developed over time to provide calculations of absolute stock abundance independent of the daily fishing logbook CPUE data that drives our assessment of stock biomass.

It was noted that a scoping study could report on whether the method would work biologically and could use the existing model to scope the number of samples that would be required over time (based on initial analysis of the population model, this might be in the range of 2500 to 5000 samples collected over a series of years). The scoping study might also suggest how the technique might provide other insights such as connectivity with adjacent stocks.

The RAG recommended a scoping study project should be formed as an *essential* need to develop an alternative index of Spanish mackerel stock abundance noting:

- the present level of the stock;
- amount of available data to support science and management; and
- issues with CPUE data presently being addressed by the RAG and the stock assessment team.

Environmental drivers

The RAG noted that a key scientific need for the fishery has been to understand the factors underlying the declining CPUE trend for Spanish mackerel and that the working hypothesis of the RAG has been that environmental drivers influence population trends (based on advice from industry about changes in water salinity and turbidity at Bramble Cay potentially linked to Fly River outflow or drought in PNG). The RAG noted that this is an issue for the Torres Strait Spanish mackerel assessment, but also is reportedly impacting mackerel catch rates across the northern of Australia.

The RAG noted that the November 2020 Spanish mackerel stock assessment was scheduled to provide investigation into this issue and that the outcomes of this reporting and stock assessment would inform the future consideration by the RAG.

The RAG noted that this was an *essential* research need for the fishery but that further consideration would need to be given to what the objectives and scope of a future project might be. The RAG also considered that the outcomes of the CSIRO led *Torres Strait Climate Change* project may also provide insight. The RAG recommended that a watching brief be placed on the outputs of this project and be presented to the RAG where possible. Based on these considerations the RAG did not recommend this as a priority for funding by TSSAC at this time.

Coral trout stock assessment

The RAG noted that a preliminary coral trout stock assessment had been presented to the PZJA advisory committees (FFRAG and FFWG) in March 2019. The RAG noted that the next full assessment was suggested by the RAG to occur in a few years' time to allow extra catch and effort data to be collected and for work to occur on three issues identified with the preliminary assessment (analyse the 1994-95 CSIRO fish survey data, analyse additional TIB catch and effort data, analyse new underwater visual survey data if conducted in the meantime).

Noting the likely stock status of coral trout, the RAG agreed that progressing the coral trout stock remained a *desirable* research need.

Agenda Item 4 – Other business

4.1 Other business

No other items of business were nominated for discussion.

4.2 Next meeting and meeting close

The RAG noted that FFRAG 8 is scheduled for 4-5 November 2020 as a face-to-face meeting in Cairns, pending any changes to COVID 19 related travel restrictions. The RAG supported having this meeting face-to-face as a preference and requested that AFMA invite project lead Jo Langstreth to attend to provide an update on the Torres Strait Biological Sampling Program.

The RAG noted that the TSSAC meeting would likely be held via teleconference late on the afternoon of the 4 November 2020. Noting that some FFRAG members also serve on TSSAC committee (Rocky Stephen, Selina Stoute, TSRA member), AFMA proposed for the FFRAG meeting to close at 3pm on that day.

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 17:30 hrs.

Attachments

Attachment A: Meeting agenda as adopted
Attachment B: List of actions and recommendations arising FFRAG 7
Attachment C: Overview of industry reports on boats known to be operating in the TSSMF prior to 1989 and historic events that may influence the catch-rate series.
Attachment D: Presentation on information on historic IUU impacts on Torres Strait Spanish mackerel.
Attachment E: Summary table of analyses to be performed in 2020 Torres Strait Spanish Mackerel Stock Assessment

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**7th MEETING OF THE PZJA TORRES STRAIT
FINFISH RESOURCE ASSESSMENT GROUP**

8 October 2020 (9:00 am – 3:00 pm)

Videoconference

DRAFT AGENDA

The meeting will open at 9:00am on Thursday 8 October 2020 and will be a video conference meeting convened through Microsoft Teams. A link to access the meeting will be within an email from FFRAG Executive Officer, Andrew Trappett.

AGENDA ITEM 1   PRELIMINARIES

1.1   Acknowledgement of Traditional Owners, welcome and apologies

The Chair will welcome FFRAG members and any observers to the FFRAG 7 meeting.

1.2   Adoption of agenda

The FFRAG is to consider and adopt the draft agenda.

1.3   Declarations of interest

FFRAG members must declare any real or potential conflicts of interests to the group and determine whether a member may or may not be present during discussion of or decisions made on the matter which is the subject of the conflict.

AGENDA ITEM 2   STOCK ASSESSMENTS

2.1   Review of data inputs to support the 2020 Spanish mackerel stock assessment

FFRAG are asked to provide advice to support members of the Spanish mackerel stock assessment team by discussing, selecting and endorsing a range of key data that will become inputs to be used in the 2020 stock assessment updated to be presented to the FFRAG on 4-5 November 2020.

AGENDA ITEM 3   RESEARCH

3.1   Finfish Fishery research priorities

FFRAG are asked to discuss and provide advice on research priorities for the next funding cycle and to provide input to a strategic research plan for a five year research plan. This advice will support the PZJA Torres Strait Scientific Advisory Group meeting in October 2020.

AGENDA ITEM 4   OTHER BUSINESS

4.1   Other Business

The FFRAG is invited to nominate any other business for discussion.

4.2   Date and venue for next meeting

The FFRAG will review dates and venues for FFRAG 8 (4-5 November 2020) and be advised of upcoming meetings of the FFWG (25-26 November 2020) and PZJA meeting to decide next season sustainable catch limits (January 2021). It is likely that all PZJA advisory group meetings will be video conference meetings in 2020 due to COVID protocols.

CLOSE OF MEETING

Attachment B: List of actions arising at FFRAG 7

Action item 1: QDAF to investigate whether older licensing data might be available to understand vessels and years active during the pre-1989 phase of the TSFF.

Action item 2: AFMA to request access to the logbooks of Mr Snowy Whitaker, *AFV Trader Horn* from the Townsville Maritime Museum where they are reportedly catalogued.

Action item 3: The RAG noted that the project team would consult out-of-session with the author of the study that summarised these data, Geoff McPherson. This might lead to an adjustment of the figures based on advice received. Stock assessment team are to report the findings of this discussion back to the RAG.

Action item 4: AFMA to arrange an out-of-session meeting with the SESSF RAG chair and the Spanish mackerel stock assessment project team to discuss options for setting an RBC using a forecasting method and report back to the RAG.

Attachment C: Summary of Torres Strait Spanish mackerel fishery commercial fishing history

Figure1. Table of FFRAG reports and studies to understand major changes in the TSSMF over time. Events are colour coded according to the key below.

Management	Research projects	Stock assessments	Foreign fishing	Key history e.g boats active	Biological sampling

Date	Event	Source
1942	Start of commercial fishing for Spanish mackerel, reportedly to supply Torres Strait Army Hospitals augment food supply during WW2. Army Fishing Unit (although mackerel catches were likely occurring for local consumption prior to WW2)	McPherson 1986 in Haines et. al summary of 1985 Port Moresby seminar
1945-1957	Skipper Snowy Whitaker was known to have a vessel prior to the Trader Horn after WW2. This might have been *AFV Saint Hillaire* or *AFV Sawfish.*	McPherson pers. comm. AFMA interview Oct 2020.
1957 to 1962	*AFV Winston* reportedly the major mackerel catching boat from 57-62 and the only Torres Strait fleet boat of a size and seaworthiness to fish at Bramble Cay. AFV Winston reportedly fished two dories for all years active. (*Geoff McPherson holds logbook data for AFV Winston and is reviewing*)	McPherson pers. comm. AFMA interview Oct 2020.
1957 to ~1969	*AFV Trader Horn* active in TSFF from 1957 working Spanish mackerel until it refitted as a prawn trawler in the late 60's. Once this vessel moved to prawn other mackerel boats entered the Torres Strait (skipper Snowy Whitaker was protective of his fishing marks and market).	Kenny Bedford report at FFRAG 7, McPherson pers. comm. AFMA interview Oct 2020.
1970s to 1980's	Four boats reported to be commonly working from Ugar at two sites with occasional fishing at Bramble Cay. One primary boat reportedly had 7-8 dories linked.	Rocky Stephen interview with father Daniel Stephen report given to FFRAG 7.
1974	Torres Strait Fisheries Survey including mackerel, Aboriginal and Torres Strait Island Commission engaged in the survey. (Need further details was this aboard AFV Winston as reported by McPherson?)	Begg et al. 2006
1975-1979	Catch data available from this time period from the Queensland Fish Board (or North Queensland Fish Board).	McPherson 1986
1974-1986	Taiwanese gillnet fishery operated in Australian EEZ from NW Shelf to north of Gulf of Carpentaria, 8-16km driftnets targeting shark, tuna and mackerel.	FRDC Report 1990 Analysis of Taiwanese Gill-net Data
1976-1993	Taiwanese gillnet fishery in operation in the adjacent Gulf of Papua under PNG licences. Mainly targeting sharks but known that up to 10% of catch was bony fishes from earlier years where catch reports are available. (Need to confirm date PNG licences stopped).	Chapau & Opnai, 1986 "*The Taiwanese Gillnet Fishery in the Gulf of Papua*" in Haines et. al summary of 1985 Port Moresby seminar.
1977-1982	TSSMF Research conducted aboard *AFV Winston*, scientist John Carlton (QLD Fisheries) and skipper Jack Jarret. Same vessel and procedures each year meaning this study is likely a good insight into the fishing at this time in history.	McPherson pers. comm. AFMA interview Oct 2020.
1979, November	Australian Fishing Zone (AFZ) [3]declared as the NT gillnet fishery develops in late 70s. This declaration limited the impact of Taiwanese	FRDC Report 1990 Analysis of Taiwanese Gill-net Data

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[3] https://www.agriculture.gov.au/fisheries/domestic/zone

	gillnet fishery. Taiwanese catch dropped from 25,000t of all species p.a. to 10,000 t for all species p.a. post 1979.	
Late 70s, early 80s	Thursday Island local Tony Tardent worked as a deckhand on AFV TRADER HORN.	Kenny Bedford report to FFRAG 7.
1984/1985	*AFV Winston* was sold by the Jarret family after fishing Torres Strait for X time period.	McPherson pers. comm. AFMA interview Oct 2020.
1985	Torres Strait Treaty established and Torres Strait Fisheries Act. Establishment of Torres Strait Protected Zone Joint Authority (PZJA) to regulate all fisheries in Torres Strait. Transferable licences issued to non-traditional inhabitants who could demonstrate history and commitment to fishing in Torres Strait. Licences subject to strict vessel replacement regulations related to vessel size. Vessels restricted to less than 20 m in length. Traditional inhabitants could obtain the commercial fishing license from PZJA. Ban on netting of Spanish mackerel. Minimum legal size of 45 cm TL for Spanish mackerel.	Begg et al. 2006
1985	Genetic variation and population structure of Torres Strait Spanish Mackerel.	Shaklee et al. 1985
1986	Aust. Govt. limits length of gillnets to 2.5km to lower risk to dolphins (*Signed Wellington Treaty?*) this makes the legal Taiwanese gillnet fishery uneconomical and it generally ceases soon after.	FRDC Report 1990 Analysis of Taiwanese Gill-net Data
1988	AFMA SM01 daily fishing logbook introduced – compulsory for non-islander and PNG fishers, replaces Queensland LF03 logbook	Begg et al. 2006
1990	AFMA SM02 daily fishing logbook introduced	Begg et al. 2006
1990	Skipper Tony Vass (FFRAG member) begins fishing Torres Strait mackerel until 2007 buyout.	
1992	IUU incident with two Taiwanese vessels *FFV Sheng Fu* and *FFV Hwa Si,* apprehended. One running aground at Turu Cay, ghost nets retrieved up to 10miles in length.	AFMA 2020 advice to Spanish mackerel project team.
1998	Minimum size limit of 45cm TL introduced for Torres Strait for all mackerel species. Fishing methods restricted to trolling, hand-lining and drop-lining.	Begg et al. 2006
1999	Management transferred from QDAF to PZJA with AFMA engaged. . Traditional inhabitants required to hold a current Torres Strait Traditional Inhabitant Fishing Boat Licence (TIB) or Torres Strait Fishing Boat Licence for commercial fishing in TSPZ. Fishery expanded to include spotted, school, shark and grey mackerel in addition to Spanish mackerel.	Begg at al. 2006
2001 and 2002	Investment warnings issued by Aust. Govt. ahead of TSFF structural adjustment (6 Nov 2001 and 15 Feb 2002).	AFMA
2003	Voluntary islander docket book (TDB01) introduced 2003, in use until mandatory Torres Strait Fish Receiver System (AFMA CDRs) started in December 2017.	AFMA
2004	AFMA led (John Marrington) voluntary industry length frequency and sexing program provides 1789 samples (length and sexing only, no ageing data performed). Sampling methodology is available.	AFMA 2004 Torres Strait Mackerel Fishery Mackerel/Linefish Logbook Supplementary Information

2004	Minimum legal size increased to 75 cm TL for Spanish mackerel. Minimum legal size increased to 60 cm TL for spotted mackerel. Minimum legal size increased to 50 cm TL for school, shark and grey mackerel.	AFMA
2005	PZJA decision on total ban of gillnetting in the Torres Strait for commercial purposes.	AFMA
2006	Begg et al. First Stock assessment of Torres Strait Spanish mackerel.	Begg et al. 2006
2007	Structural adjustment and buyout - fishery access becomes 100 per owned by Traditional Inhabitants	
2013	*Torres Strait Finfish Management Plan 2013* implemented.	
2016	Assessment update for Torres Strait Spanish mackerel fishery.	O'Neill 2016
2017 (1 July 2017)	Vessel monitoring systems introduced in Torres Strait primary tender operation vessels. (TIB and TVH - no VMS on tenders or sole operating dinghies)	
2017 (1 Dec 2017)	TDB02 Catch Disposal Records become mandatory for all Torres Strait commercial catch (TIB and TVH-sunset sectors)	
2017 (Nov 2017)	PZJA Torres Strait Finfish Resource Assessment Group formed and inaugural meeting to progress Harvest Strategy	
2019	2019-20 Torres Strait Biological Sampling Program run	QDAF project lead, Jo Langstreth.

Illegal Unreported and Unregulated (IUU) fishing in Torres Strait

- Taiwanese driftnetters from late 1970s into the 1990s
  - Australian Fishing Zone: 1976-86; Gulf of Papua:1976-1993
- Evidence is not quantitative –we don't know the exact numbers!
  - Anecdotal
  - Circumstantial
  - Confidential enforcement information

McPherson (1986)
Circumstantial evidence of Taiwanese fishing impact

- 20-30% of the Bramble Cay catch with gillnet damage – not known how many were actually caught by the Taiwanese or died from net damage
- few large/ older fish
- P-NG-licensed Taiwanese fishery in the Gulf of Papua adjacent to the Protected Zone
- Suggested the that gillnet fishery "may be having a noticeable impact on the Protected Zone troll fishery and the Gulf of Papua gillnet fishery should also be addressed"

> There is circumstantial evidence to suggest an outside influence on the S. commerson fishery within the Torres Strait Protected Zone. A substantial decline in numbers of S. commerson landed per man per day (Figure 2) was evident following the 1980 season. In July 1981 a Taiwanese gillnet fishing vessel was reported to Australian surveillance authorities as having fished within three miles of Bramble Cay. Since that time Australian fishing vessels have reported (to the author) Taiwanese gillnet vessels operating in the general proximity of Bramble Cay.

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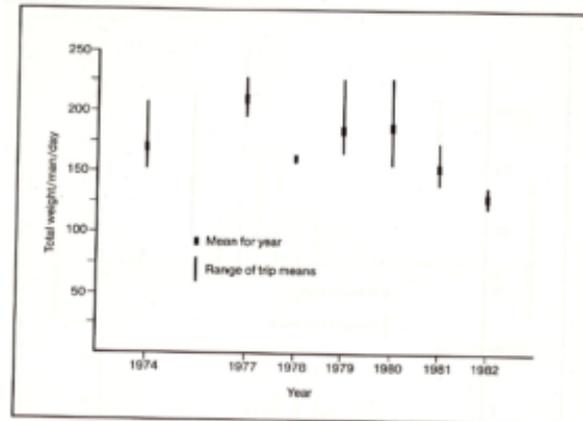# Decline in catch rate for one TS vessel (McPherson 1986)

Figure 1. Total live weight of S. commerson per man per day on an annual basis (August- December) for one vessel.

Anecdotal evidence

- Further suggestions of IUU fishing in the Protected Zone with many apparent sightings. McPherson (Pers. Comm.) that many sightings were not pursued.

Apprehension information from AFMA

Advice to Spanish mackerel project team on IUU catch of Spanish mackerel
AFMA October 2020

Source: *Brief for Australian Delegation to the Fourth Meeting of the Joint Advisory Council (JAC) on the Implementation of the Torres Strait Treaty Port Moresby 26-27 November 1992*

- 1992 incident
  - 6th or 7th May 1992: an Indonesian licensed Taiwanese gill netter ran aground at Turu Cay.
  - 120 t of catch of all species was reported to be in the hold of this grounded vessel.
  - Crew transferred themselves to a second Taiwanese gill netter licenced to PNG.
  - Total catch of mackerel by both these vessels in a period of two months was reported to be around twice the total annual mackerel catch for the TSPZ Spanish mackerel fishery.
  - Coastwatch detected drift nets in PNG waters after the grounding which were attributed to this vessel/vessels. Combined total length of these drift nets estimated to be 10 miles.
  - Three drift nets (around 5 miles long) were ghost-fishing for some time and were recovered and destroyed later.

Apprehension information from AFMA - cont

Other IUU incidents

- The issue of an IUU vessel sighted fishing near Bramble Cay in 1989 was reportedly raised in Australian Parliament afterwards.

- Previous instances of Taiwanese gillnetters operating close to the TSPZ have attracted strong protest from fishery stakeholders (traditional inhabitants, commercial fishers, Greenpeace).

- Issue reportedly raised through Treaty consultative forums prior to 1992 incident.

Attachment E: Out of Session Advice to FFRAG members on model runs to be used in the 2020 Stock Assessment (sent via email correspondence from the RAG EO, 23 October 2020).

- The project team has tried to get the assessment model to work with the RAG recommended natural mortality values of **0.3 lower, 0.375 median run, 0.45 upper value**. The upper value appears to crash the model and won't fit the CPUE series. As such it is proposed to change the parameters to: keep **0.3** as a lower point, adjust the mid-point value down from 0.375 to **0.35** and to drop the upper value from 0.45 down to **0.4** (for which the model will work). Let us know if you have any comments on this slight change in approach. Table is updated below (highlighted yellow).
- The project team has been trying to examine the suggestion of including model runs with catch data from 1989 onwards only, from the point forward from when we have more certain CPUE data. The model appears to work well with just catch data from 1989 onwards. It also seems to work well with all years of ageing data included (pre and post 1989). We are proposing to have model runs 7, z8, 9 maintain age frequency data from all years (so will include 1974-75, 1978-79, 1983-84 ageing data) which are from pre-1989. If you recall, our concerns lie with the reliability of catch data. As such we want to make clear that the final column is 'start year for <u>catch</u> data' noting that all model runs in the Ageing Data column will include pre and post 1989 ageing data.

Analyses / model runs agreed by the RAG for the 2020 assessment.

Label	Fish weights	Catch rate series	Natural mortality rate (M)	Harvest pre-1989	Ageing data	Start year for catch data
1	Weighted average	No tenders and fishing power included	0.3	Historic catches actual + polynomial model + IUU tapered	All years	1940
2	Weighted average	No tenders and fishing power included	0.35 (was 0.375)	Historic catches actual + polynomial model + IUU tapered	All years	1940
3	Weighted average	No tenders and fishing power included	0.4 (was 0.45)	Historic catches actual + polynomial model + IUU tapered	All years	1940
4	Weighted average	No tenders and fishing power included	0.3	Historic catches actual + logistic model + IUU tapered	All years	1940

5	Weighted average	No tenders and fishing power included	==0.35 (was 0.375)==	Historic catches actual + logistic model + IUU tapered	All years	1940
6	Weighted average	No tenders and fishing power included	==0.4 (was 0.45)==	Historic catches actual + logistic model + IUU tapered	All years	1940
7	Weighted average	No tenders and fishing power included	0.3	n/a	All years	1989
8	Weighted average	No tenders and fishing power included	==0.35 (was 0.375)==	n/a	All years	1989
==9==	==Weighted average==	==No tenders and fishing power included==	==0.4 (was 0.45)==	==n/a==	==All years==	==1989==