



Australian Government

Australian Fisheries Management Authority

**Southern Squid Jig Fishery (SSJF)
Resource Assessment Group
(SquidRAG) Meeting 23**

Minutes

Date: 02 October 2018

10:30 am – 3:15 pm (AEST)

Attendees

Name	Membership
Lianos Triantafillos	Chair
Sally Weekes	AFMA member
Debbie Wisby	Industry member
Shijie Zhou	Scientific member
Robert Curtotti	Economic member
Terry Romaro	Industry invited participant
Matt Koopman	Invited participant, Fishwell Consulting
Natalie Rivero	Executive Officer, AFMA

Meeting Minutes

1 Preliminaries

1.1 Introduction and apologies

The Chair opened the meeting at 10:30 am AEDT and welcomed participants.

1.2 Adoption of Agenda

The agenda ([Attachment A](#)) was adopted with no other business identified.

1.3 Declaration of interests

The RAG reviewed the table of members' and invited participants' standing declarations as required in the *Fisheries Administration Paper 12*. The Chair asked participants to confirm interests recorded in the table provided.

Additional declarations were made as follows and the table updated ([Attachment B](#)):

- Ms Debbie Wisby: industry member of the South East Management Advisory Committee (SEMAC)
- Mr Terry Romaro: industry member of the Southern Bluefin Tuna Management Advisory Committee (SBTMAC), industry member of the Tropical Tuna Management Advisory Committee (TTMAC), alternate director of the Tuna Australia Industry Association.
- Mr Matt Koopman: employee of Fishwell consulting that has been engaged to conduct research of relevance to the Squid fishery. No other interest pecuniary or otherwise.

The SquidRAG noted the declarations of interest and no concerns were raised with respect to any of the declared interests made by members and invited participants.

1.4 Actions arising from previous meetings

The AFMA member advised the SquidRAG on the status of actions arising from the SquidRAG 22 teleconference held on 16 October 2017 ([Attachment C](#)). The two action items were noted as completed.

2 Updates

2.1 Managers update

The AFMA member provided the SquidRAG with an update including:

- The Commonwealth Harvest Strategy Policy (CHSP) and Commonwealth Bycatch Policy (CBP) are yet to be released by the Department of Agriculture and Water Resources (DAWR). Once the policies become available, the SquidRAG will begin the process of reviewing the Squid Harvest Strategy.
- Senator Richard Colbeck was appointed as the Assistant Minister of the Agriculture and Water Resources portfolio, replacing Senator Anne Ruston.
- The *ABARES Fishery Status Report 2018*, released on 28 September 2018, shows Gould's Squid is assessed as not overfished or subject to overfishing.
- The Southern Squid Jig Fishery (SSJF) will undergo an *Ecological Risk Assessment for the Effects of Fishing* (ERAF) assessment in 2019, under AFMA's revised Ecological Risk Management (ERM) framework.
- The AFMA Canberra office will be moving in December 2018 to new building near the Canberra airport.
- Dr Nick Rayns, Executive Manager Fisheries AFMA, will be retiring in late November and Dr James Findlay, CEO AFMA, is nearing the conclusion of his current term (early 2019).

2.2 Industry update

The industry member provided the SquidRAG with an update on industry matters within the SSJF. It was noted that:

- The 2018 season in the SSJF has been positive with good catches and catch rates across the fleet.
- Most of the catch is sold on the Melbourne market, where it is processed into tubes. The demand for this product on the domestic market leaves little opportunity to send product overseas.
- There has been an increase in interest in the fishery from new operators. Three to four purpose built squid boats with on-board refrigeration are looking to enter the fishery. These boats will be based in Victoria and plan to export their catch.
- There has been an increase in interest from overseas companies in squid caught and packaged in Australia. Currently, refrigeration and vessel holding capacity are limiting the fleet from capitalising on these export markets. Exporting product processed to the desired specifications would also require a significant investment into domestic infrastructure.

2.3 Economic Update

The economic member provided the SquidRAG with an update on economic matters in the fishery. It was noted that:

- The ABARES 2018 Fishery Status Report for ABARES is now available. Based on preliminary price information the Gross Value Production (GVP) for the SSJF in the 2017/18 financial year was indicated to be around \$2.24 million by ABARES. Although not estimated directly by ABARES, economic returns for the fishery are likely to have improved in 2017/18.

- There were higher catch rates and prices which are reflected in a higher GVP. Increasing fuel prices may offset some of the gains made in economic returns.
- One reason for the higher prices were the low catches in the Argentine Squid fishery. When catches are low in this fishery, it normally results in higher prices for squid on international markets and this has a positive impact on domestic prices. On average, about 20,000 tonnes of squid is imported into Australia per year.
- The import price for processed product has been steadily increasing, rising from \$4.40/kg in the 2014-15 financial year to \$7.80/kg for the 2017-18 financial year price.
- Domestically, the Sydney market price for the 2017-18 financial year was around \$2.80, which is a slight increase in comparison to the last few years. It was noted that the product at this price is likely to be from the trawl sector. Industry members indicated that the price for squid this year was around \$3.30 per kg.

3 Business

3.1 Total Allowable Effort (TAE)

The AFMA member presented the paper “*Total Allowable Effort (TAE) for the 2019 Season*” and asked the RAG to recommend the TAE for the 2019 SSJF fishing season which starts 1 January 2019.

The SquidRAG considered the catch and effort data for the SSJF, SET, and GABT and noted:

- No catch and effort triggers set in the Arrow Squid Harvest Strategy were reached in the current (2018) season.
- Catch (as at September 2018) for the SSJF is 810 tonnes, well below the intermediate trigger level of 3000 tonnes. Trawl catch is 734 tonnes, well below the intermediate trawl catch trigger of 2000 tonne. The combined jig and trawl catch is around 1,544 tonnes, well below the combined intermediate catch trigger of 4000 tonnes.
- The 30 vessel effort trigger limit in the SSJF has also not been exceeded with 9 vessels active in 2018.

The following key points were raised in discussing the 2019 TAE:

- While catch in the 2018 season is higher than previous years, there are still no sustainability concerns as catch remains well below the Harvest Strategy triggers and catch rates for the SSJF where the highest they have been for many years.
- With respect to by-catch in the fishery, jigging is considered a low risk fishing method. On a side note, despite it being considered a low risk, better recording of by-catch is needed by operators and it should be prioritised as part of the forthcoming SSJF Data Strategy (see Agenda item 3.3).
- The current economic conditions of the fishery have improve over the last few years and there are no management rules that are impeding the economic returns from the fishery.

The RAG recommended that:

The 2019 TAE be set at 550 squid jig machines, as per the 2018 season. With 4900 SFR in the SSJF, this means 8.909 SFR’s are required for each jig machine. The SquidRAG agreed while there is latent effort in the fishery, this level maintains a degree of balance between sustainability

and maintaining the capacity of the fleet to allow it to respond quickly to an increase in squid abundance, availability and / or changes in markets.

3.2 Presentation of the Fishwell project on Locating and targeting of Squid

Dr Matt Koopman, Fishwell consulting, presented the results of the project *“Improving the location and targeting of economically viable aggregations of squid available to the squid jigging method and the fleet’s ability to catch squid”*.

The SquidRAG noted the presentation which described:

- That the project outcomes have arisen through workshops, a literature review and analysis of available catch and effort data in southeast Australia.
- The correlations between environmental variables, gear characteristics, catch and effort, by region and over time, were explored to gain an understanding of the factors driving squid abundance.
- That squid are a “boom and bust” species and their availability is thought to be greatly influenced by environmental variables such as Sea Surface Temperature (SST), salinity, Chlorophyll-a, upwelling, wind and currents.
- The spatial distribution of Squid catches are predominantly located in southeast Australia. The historical catch data from Japanese fleets in the 1980s were shown to be located in the eastern and southern Bass Strait.
- An executive summary of the project report including the key outcomes can be found at [Attachment D](#).

Key points raised by the SquidRAG during the presentation were:

- That industry would benefit from a “Fishermen friendly” summary of the report that communicates the key findings of the project.

Action item: A “Fishermen Friendly” summary of the key findings of the project to be circulated to industry.

- That logistic constraints have historically limited the where the fleet can fish and its ability to catch Squid. The main factors limiting where the fleet can fish include fuel costs and proximity to shore to get fresh product to freight quickly. Larger boats with freezing capacity would not be subject to these limitations and could better utilise the resource.
- With respect to the spatial distribution of catch, industry would like the historical spatial catch data from foreign fishing fleets made available to provide insight into possible alternate fishing locations when traditional fishing grounds stop being feasible.
- Current data and information in the fishery is sparse, spatially and temporally limited and inconsistent. This makes it difficult to understand the movement of cohorts in the SSJF, a feature of international squid fisheries. There is also a lack of ageing studies available to gain a thorough understand stock structure.

- Predicting where and when to fish with a degree of certainty is not possible from the results of this project. However, the project has been successful in identifying indicators that are positively and negatively correlated with higher catch per unit effort (CPUE).
- Catch rates were observed to increase in November/December in all sectors except for the SSJF. This was traditionally due to no market at that time of year however, in recent years this has changed. Industry explained that predominantly Squid fishers switch to targeting Scallops at that time of the year which may account for the reduction in CPUE at this time.
- That there may be potential links between tuna and squid abundance and whether catches between the two species in each fishery align. It was suggested that future work looking at spatial overlap may be valuable.
- There was limited information available on gear specifications in the SSJF. It was noted that newer gear will increase gear efficiency by optimising fishing depth automatically and the ability to optimise light attenuation, both of which will increase the catchability of squid.

The scientific member suggested a few changes to future data analysis. These included the use of a Generalized Additive Model (GAM) instead of a Generalized Linear Model (GLM), the use of latitude and longitude to describe the position of fishing activity instead of principle components, and combining the data for each sector into a single model using gear type as a variable to gain more robust index of abundance.

Lastly, it was suggested that it would be useful if the conclusions of the project are corroborated with this season's data to ground truth the findings in the report. It was agreed that the SquidRAG would provide any comments they had on the report out of session before the report is made publically available.

Action item: SquidRAG to provide any comments on the project report out of session prior to it being made publically available.

Action item: AFMA to liaise with Fishwell Consulting regarding the feasibility of corroborating this seasons (2018) data with the findings outlined in the report.

3.3 Data Strategy for the SSJF

AFMA presented this item seeking advice from SquidRAG regarding the development of a data strategy for the SSJF.

The SquidRAG noted:

- An independent review of AFMA's Ecological Risk Management (ERM) framework recommended that AFMA develop a Fishery Management Strategy (FMS) for each fishery. The FMS is intended to consolidate within a single document, AFMA's operational approach to pursuing its legislative and policy objectives.

- As part of the FMS for the SSJF, a data strategy must be developed for the fishery that will provide a clear plan for the ongoing data collection needed to support evidence-based management decisions in the fishery.

As a starting point, the SquidRAG had a preliminary discussion regarding the data needs of the fishery, whether those needs are currently being met, and any challenges that may arise in developing a data strategy for the fishery.

The SquidRAG discussed the information currently collected in logbooks noting:

- That only the latitude and longitude of the start of the drift is recorded in the Squid Jig Daily Log. In discussing the outcomes of the recent research project, it was concluded that either the widest extent possible of the drift, or the end location of the drift would provide a more useful measure of fishing location. Improved spatial information will allow for a better measure of effort in the fishery and improve our ability to correlate catch/CPUE with environmental variables.
- With respect to recording effort, currently the logbook only requires fishers record the number of hours fished and total number of lures over an entire fishing trip. It was agreed that more detailed information should be captured (e.g. on a drift by drift basis, number of machines operating for each hour, number of hooks on each drift etc)
- The average depth of seabed is recorded however either the depth of deepest hook on each drift or the average depth of all hooks jigged on each drift would be better.
- Bycatch is not often reported in logbooks. SquidRAG suggested that fishers should be made aware to more accurately report by-catch interactions, particularly as this information will be required for future Ecological Risk Assessments in the fishery.
- the implementation of e-logs may resolve a number of the issues discussed above, however, depending on the timeframe to implement e-logs, changes to paper logs in the meantime may be required.

The next steps in refining data collection were discussed and it was agreed that AFMA would produce a draft data strategy for the SquidRAG to consider at its next meeting that includes the suggestions made by the SquidRAG throughout discussion that also indicates the best option for actioning the changes.

Action item 23.4: A draft data strategy for the SSJF to be developed by AFMA that incorporates suggestions made by the SquidRAG with respect to data collection in the fishery.

3.4 Strategic Research Plan

AFMA presented this item seeking input from SquidRAG regarding the development of the five year strategic research plan for the fishery. Due to time constraints, a more fulsome discussion of this item was deferred until the next meeting. SquidRAG did flag, however, that once the revised Commonwealth Fisheries Harvest Strategy Policy is released, the SSJF harvest strategy should be reviewed. To support this review, an updated depletion analysis should be undertaken which could be used to inform the settings for trigger levels. The SquidRAG noted that any such review should aim to keep the costs to a minimum.

Other business and close of meeting

No other business was raised and it was agreed the next meeting be held in October 2019.

The Chair thanked SquidRAG for their contributions and closed the meeting at 3:15 pm.

Signed (Chairperson):

Date:

Attachments

Attachment A: SquidRAG 23 Final agenda

Attachment B: SquidRAG 23 Declared conflicts of interest

Attachment C: SquidRAG 22 Action Items

Attachment D: Executive Summary of the project report "*Improving the location and targeting of economically viable aggregations of squid available to the squid jigging method and the fleet's ability to catch squid*".

Southern Squid Jig Fishery Resource Assessment Group

Squid Resource Assessment Group (SquidRAG) 23

Tuesday 2 October 2018

10:15am – 3:00 pm (Australian Eastern Standard Time)

Holiday Inn Melbourne Airport |
10- 14 Centre Road, Melbourne Airport
Front Desk: 03 9933 5111

Draft Agenda

Chair Lianos Triantafillos

Participants Sally Weekes, AFMA
Debbie Wisby, Industry member
Shijie Zhou, Scientific member
Robert Curtotti, Economic member

Invited participant Terry Romaro, Industry invited participant

Observer Matt Koopman, Fishwell Consulting

Executive Officer Natalie Rivero, AFMA

ITEM			
1	Preliminaries		20 minutes
1.1	Welcome and apologies	Chair	
1.2	Acceptance of agenda	Chair	
1.3	Declarations of interest	All	Action
1.4	Actions arising from previous meetings	Chair	
2	Updates		30 minutes
2.1	Managers update	Sally Weekes	
2.2	Industry update	Industry	
2.3	Economic update	Robert Curtotti	
3	Business		3 Hours
3.1	Total Allowable Effort (TAE)	Sally Weekes	45 minutes
3.2	Outcomes of the project - <i>locating and targeting of squid</i> by Fishwell Consulting	Matt Koopman	60 minutes
3.3	Data Strategy for SSJF	All	30 minutes
3.4	Strategic Research Plan	All	45 minutes
4	Other business and close of meeting		10 minutes
4.1	Next meeting	Chair	

**SquidRAG Declaration of Interests of members, invited participants and observers (Agenda item 1.3)**

Last updated: October 2018

Participant	Membership	Interest declared
Lianos Triantafillos	Chair	No interests declared, pecuniary or otherwise. Involved in broad research projects though none specifically squid related.
Debbie Wisby	Industry Member	Commercial squid fisher. Industry member of SEMAC. Financial interest in the fishery declared.
Shijie Zhou	Scientific Member	Assessment scientist that submits fishery research proposals. No interests declared, pecuniary or otherwise.
Robert Curtotti	Economics Member	No interests declared, pecuniary or otherwise.
Sally Weekes	AFMA Member	No interests declared, pecuniary or otherwise.
Natalie Rivero	Executive Officer	No interests declared, pecuniary or otherwise.
Terry Romaro	Invited participant	Director of a company that owns Eastern Tuna and Billfish Fishery (ETBF) boat statutory fishing rights (SFRs), minorline SFRs, ETBF longline SFRs, Western Tuna and Billfish Fishery (WTBF) boat SFRs, WTBF longline SFRs, Coral Sea Trawl permit, Western Skipjack Tuna Fishery (WSTF) purse seine permit, Small Pelagic Fishery (SPF) purse seine, mid-water trawl SFRs, and SPF quota SFRs. Shareholder of a company that owns shares in a proposal to fish with foreign longliners in the WTBF. Industry member on Southern Bluefin Tuna (SBT) MAC and industry representative at the Commission for the Conservation of SBT (CCSBT). Invited participant for SquidRAG and squid concession holder. Alternate on the Board of Tuna Australia.
Matt Koopman	Invited participant	Employee of Fishwell consulting that has been engaged to conduct research of relevance to the Squid Fishery. No other interest pecuniary or otherwise.

Southern Squid Jig Fishery Resource Assessment Group

Actions arising from last SquidRAG meeting (Agenda item 1.4)

Actions arising from SquidRAG 22:

Action No.	Action required	Responsibility	Completion status	Further comments
22.1	AFMA to make the AFMA Policy team aware of the lack of opportunity to identify as having indigenous heritage through any Committee membership application process as the policies are reviewed.	Sally Weekes	Completed	
22.2	SquidRAG to consider holding a face to face meeting in the middle of 2018 to discuss future research priorities for the SSJF.	Sally Weekes	Completed. Face to face held 02 October 2018.	

Executive Summary: “Improving the location and targeting of economically viable aggregations of squid available to the squid jigging method and the fleet’s ability to catch squid” Matt Koopman, Ian Knuckey and Madeleine Cahill.

Executive Summary

Sources of variation in catches and catch rates of Gould’s squid (*Nototodarus gouldi*) were examined in fisheries off southeast Australia. Fisheries included trawl fisheries: Commonwealth trawl sector (CTS), the Great Australian Bight trawl sector (GABTS), Danish Seine (DS). These fisheries targeted species other than squid but caught squid as a by-product. Dedicated squid fisheries included the historical squid fishery (HistSJ: an exploratory fishery involving mainly Japanese vessels in the 1980s), the Tasmanian squid jig fishery (TasSJ, a state-managed component of the Tasmanian scale fishery) and, the main focus of this study, the Southern Squid Jig Fishery (SSJF).

A literature review included evaluation of environmental factors and their influence on squid fisheries more generally. The review also considered the influence of technology (i.e. technical innovations) on squid jigging, the method used to catch squid in the SSJF. Insights on factors affecting squid catches were also derived from an Industry workshop including participants from various squid fisheries. These insights assisted in the development of hypotheses for factors affecting catch rates of squid particularly for the SSJF: an aim was to improve targeting and catch efficiency for the SSJF. Environmental factors evaluated and modelled for Australian squid fisheries included: sea surface temperature (SST), ocean colour (Chl a), coastal oceanography (currents), sea level, barometric pressure, and moon phase. Broader scale oceanographic events driven by the southern oscillation index (SOI) were also examined and modelled against catch rates of squid. Of the fisheries examined, the CTS had the most comprehensive data set. Examination of the SSJF was compromised by a limited time series and the spatial concentration of effort in one location: Western Victoria.

Peak catches and catch rates of squid occurred at the same time of the year for all fisheries (summer months). This suggests that the factors driving abundance and / or availability of Gould’s Squid are consistent or linked between fishing areas. However, since records have been taken, the timing of peak catches has become earlier in the year (February, March) particularly off Western Victoria.

The SSJF operates off the continental shelf in waters ranging in depth from 60 to 105 m. There is no evident pattern of interannual change in depth of fishing for the SSJF although squid are caught in greater depths from the CTS. Catch rates of squid in the trawl fisheries were highest during the waning gibbous and full moon, but lowest during those moon phases in the squid jig fisheries. This is likely due to an increase in availability of squid to trawl methods caused by reduced diel vertical migration during those moon phases. Catch rates for the squid jig fisheries (which only operate at night) are highest around the new moon. This, and clear, calm sea conditions are more likely to yield higher catches and catch rates for the SSJF.

Catch rates of squid for trawl fisheries varied with depth and with time of day most likely as a function of surface feeding migration characteristics. The concentration of fishing by the SSJF off Western Victoria (Portland) focused attention on environmental factors specific to the region: the Leeuwin current, the Bonney upwelling, and related factors which affect primary productivity and the availability/abundance of prey for Gould’s squid. Peaks and troughs in catch and catch rates in the trawl sector occurred at the same time possibly because of variation

in the strength of the Leeuwin Current. However, there was no apparent influence of the Bonney upwelling on catch or catch rates of squid in either trawl fisheries or the SSJF. Similarly, there was no apparent relationship of sea surface temperature or of chlorophyll a concentration on catches or catch rates of squid. Nonetheless, modelling with lagged data (- 1 year) for Western Victoria showed correlation of peak catch rates in the SSJF with current strength (or sea level at Portland), SST and chlorophyll a.

No clear, or obviously important source of variation were identified which could potentially improve targeting in the Southern Squid Jig Fishery. This is most likely due to confounding variables affecting squid distribution and abundance. Factors which influence growth and survival of squid (e.g. SST, currents) may be confounded with factors which influence prey abundance (e.g. primary/secondary productivity). Under conditions of chlorophyll a/high productivity e.g. with the Bonney upwelling, waters are more turbid. This limits the effectiveness of surface lights on SSJF vessels used to attract and catch squid. Evidence from industry participants suggest that squid accumulate at thermal or nutrient fronts, attacking prey in turbid waters from clear water. Thus, taking a more focused spatial approach, variation in coastal oceanographic productivity associated with the Bonney upwelling and the abundance of prey species (particularly krill) is an important driver of squid population abundance. Accordingly, seasonal catches are optimal during summer when oceanic processes favour squid accumulation off Western Victoria. Changes in the frequency and intensity of upwelling due to, for example, ENSO events and climate change will influence squid abundance. More specifically, advances in technology associated with jigging and squid/prey attraction appear promising. Targeting squid around the new moon, in clear water, with lights (including blue wavelengths) and automated jigging machines (to account for sea state and squid depth) reflect our findings both for the SSJF and for squid jig fisheries more generally. Adoption and development of such technology improve catch rates in the SSJF.