Australian Government

**Australian Fisheries Management Authority**

# Northern Prawn Fishery Resource Assessment Group (NPRAG) Meeting

## Meeting Minutes

## Date: 30-31 May 2019
## Venue: Brisbane Riverview Hotel

Australian Government

**Australian Fisheries Management Authority**

# Attendees

| Thursday 30 May 2019 | |
|---|---|
| **Name** | **Member type** |
| *Ian Knuckey* | *Chair* |
| *Phil Robson* | *Industry Member* |
| *David Brewer* | *Scientific Member* |
| *Rik Buckworth* | *Scientific Member* |
| *David Power* | *AFMA Member* |
| *Stephen Eves* | *Executive Officer - AFMA* |
| *Annie Jarrett* | *Invited Participant – NPFI* |
| *Adrianne Laird* | *Observer – NPFI* |
| *Anna Willock* | *Observer – AFMA Executive Manager Fisheries* |
| *Robert Curtotti* | *Observer  – ABARES* |
| *Gary Fry* | *Observer – CSIRO* |
| *Rob Kenyon* | *Observer – CSIRO* |
| *Judy Upston* | *Observer – CSIRO* |
| *Louise Cathro* | *Observer – AFMA* |
| *Liz Claridge* | *Observer – Department of Agriculture* |
| **Additional participants for climate change adaptation project** | |
| *Beth Fulton* | *Observer – CSIRO* |
| *Ian Butler* | *Observer – AFMA* |
| **Friday 31 May 2019** | |
| *Ian Knuckey* | *Chair* |
| *Phil Robson* | *Industry Member* |
| *David Brewer* | *Scientific Member* |
| *Rik Buckworth* | *Scientific Member* |
| *David Power* | *AFMA Member* |
| *Stephen Eves* | *Executive Officer - AFMA* |
| *Anna Willock* | *Observer – AFMA Executive Manager Fisheries* |
| *Annie Jarrett* | *Invited Participant – NPFI* |
| *Adrianne Laird* | *Observer – NPFI* |
| *Robert Curtotti* | *Observer  – ABARES* |
| *Gary Fry* | *Observer – CSIRO* |
| *Rob Kenyon* | *Observer – CSIRO* |
| *Judy Upston* | *Observer – CSIRO* |
| *Eva Plaganyi* | *Observer – CSIRO* |
| *Trevor Hutton* | *Observer – CSIRO* |
| *Toby Obermuller* | *Observer – CSIRO* |
| *Louise Cathro* | *Observer – AFMA* |
| *Liz Claridge* | *Observer – Department of Agriculture* |

| Additional participants for broodstock assessment discussion | |
|---|---|
| Matt West | Observer – APFA |
| Kim Hooper | Observer – APFA |
| Alistair Dick | Observer – APFA |
| John Moloney | Observer – Tassal |
| John Dexter | Observer – QDAF |

# 1   Preliminaries

## 1.1   Welcome and apologies

The Northern Prawn Fishery Resource Assessment Group (NPRAG) Chair, Ian Knuckey, opened the meeting at 8:30 am (EST) at the Riverview Hotel in Brisbane on 30 May 2019 with an Acknowledgement of Country. The Chair noted apologies from Economic Member Tom Kompas and Industry Member Ian Boot, who were unable to attend.

## 1.2   Adoption of Agenda

The Chair requested that the NPRAG consider the draft agenda (Attachment 1), identify any required amendments, and adopt the draft agenda for the meeting. Due to the availability of some participants, the agenda items were reordered to accommodate availability.

## 1.3   Declaration of interests

The Chair requested that NPRAG members consider the standing table of declared interests (Attachment 2) and individually declare whether the stated interests remain accurate, and if not, provide an update on those.

The Chair requested each individual/group to leave the room while their potential conflict as it related to the meeting's agenda items was discussed. It was noted that NPFI has a pecuniary interest in broodstock as it manages the vessel charter for broodstock collection vessels and the provision of broodstock to prawn farmers and would be asked to leave the meeting if any conflicts arose during the broodstock discussion. It was also noted that during the research agenda item (item 11) the CSIRO/research representatives have a conflict and would be asked to leave if recommendations on research priorities were to be made.

No other apparent conflicts of interest were identified that would prevent individuals participating in discussions but it was confirmed that if a particular conflict arose for any agenda item, the relevant party would be asked to leave the meeting at the appropriate time.

## 1.4   Minutes from previous meetings

It was noted that the minutes from the 1 November 2018, 21 February 2019 and 29 March 2019 (subject to confirming the 2018 fuel price) meetings were accepted out-of-session via email as a true and accurate record of the meeting.

# 2   Action items

The Executive Officer addressed the action items listed in Attachment 3 and updated the NPRAG on their progress.

Rob Kenyon advised that Andrew Broadley was involved in drafting a new National Environmental Science Program (NESP) report on northern rivers which may be of interest to the RAG. Participants requested that Rob circulate the report when it was published.

| **Action:**<br><br>- Rob Kenyon to circulate the Andrew Broadley NESP report when it becomes available. |
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# 3   Update reports

## 3.1   AFMA update

NPRAG noted an update provided by AFMA management including:

- Ecological Risk Assessment (ERA) – good progress has been made on the NPF ERA. CSIRO has completed the level 1 SICA on the banana and tiger prawn sub-fisheries. The draft species lists will be discussed and considered under agenda item 5. The ERA sub-committee will review the level 1 SICA before being circulated to the rest of the RAG for comment.
- Fisheries Management Strategy (FMS) – this is the management team's core body of work over the next year. With strong co-management arrangements in the NPF, the FMS will be a joint strategy developed between NPFI and AFMA with input and direction from NORMAC and NPRAG. Several components of the FMS will be addressed at this RAG.
- A proposal to list Narrow Sawfish as endangered has been submitted to the Threatened Species Scientific Committee (TSSC) for consideration at its June 2019 meeting. AFMA has provided the Department of the Environment and Energy with an overview of management actions already in place in the NPF to protect sawfish as well as the outcomes of past ERAs. It was questioned whether the Minister considers a nomination before a species is listed. AFMA confirmed that nominations that meet the EPBC Act criteria are considered by the TSSC at its July meeting. The Minister then considers a priority list prepared by the TSSC and decides on a final list of species that the committee will assess. It was also advised that the recovery plan for sawfish is being reviewed and all cumulative impacts will be considered. There may be a workshop later in the year to collaborate with all relevant stakeholders, including state departments, state fisheries and scientists, to ensure all relevant impacts on sawfish are being considered.
- Wildlife trade assessment – in December 2018, the NPF was reassessed under the provisions of Part 13 (protected species) and Part 13A (wildlife trade) of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) to retain export approval. It was determined that product taken in the fishery should be included in the list of exempt native specimens under Part 13A of the EPBC Act until 6 January 2024. The approval is dependent on three conditions made under Part 13 being met, including:
    - AFMA to ensure there is sufficient ongoing monitoring (electronic or human) to evaluate the nature and level of impacts of fishing on EPBC Act protected species
    - AFMA to ensure that interactions with species of sawfish and sea snakes are minimised by facilitating research and monitoring programs that contribute to:

- understanding the unique characteristics of sawfish and sea snake interactions with the fishing gear,
- understanding the population dynamics, including size and structure of sawfish species populations that occur within the fishing area, and
- implementing appropriate mitigation measures that aim to increase the survival of sawfish and sea snake species
  - AFMA to develop an education program or materials that improve the accurate identification of sawfish and sea snake species.
- Commonwealth marine parks – the North marine park came into effect in 2018. There is an overlap between some of the marine park zones and sites of the NPF recruitment and spawning surveys. Permits are required for future surveys to take place and it is uncertain if all the survey sites can continue to be sampled. AFMA is collaborating with Parks Australia to consider if there may be shared benefits from the data collected through the surveys. It was advised that under the previous marine park plans there was an area set aside for the NPF surveys to continue without impacting the marine park zones. It appears this detail was not included during the revision of the marine park zones. NPFI suggested that if data is collected that is of mutual benefit then perhaps Parks Australia could contribute some funding to the provision of the surveys. The Chair declared that he is a member of the North Marine Parks Committee and advised that he is attending a North Marine Park Committee meeting in two weeks and requested some information to take to the meeting. He advised that it would be useful to have a map showing the locations of the survey sites in reference to the marine park zones and also the impact the removal of the survey sites within the marine park zones would have on the survey outcomes. It was also advised that there were previously some benthic sites that were surveyed every ten years that fall within the marine park zones. NPFI agreed to provide historical information about the benthic survey sites to the Chair for consideration at the North Marine Parks Committee meeting.

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**Actions:**

- AFMA/CSIRO to provide NPRAG Chair with a map showing the locations of the NPF spawning and recruitment survey sites in reference to the marine park zones that he can take to the North marine park committee meeting in June 2019.
- CSIRO to advise what impact the removal of the survey sites within the marine park zones would have on the survey outcomes.
- NPFI to provide historical information about the NPF benthic survey sites to the Chair for consideration at the North marine parks committee meeting in June 2019.
- AFMA/CSIRO to collaborate with Parks Australia to identify if there are any areas of mutual benefit from the NPF survey data collection and if there are opportunities for co-funding.

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## 3.2    Industry update

NPRAG noted an update from Industry on the 2019 banana prawn season. It was advised that the start of the season was the best start to a season that some companies had ever experienced. The most productive areas were in the Gulf of Carpentaria (GoC), adjacent to the catchments that received the highest rainfall at the start of the year. The highest catches were in areas near the Flinders, Nicholson and Norman rivers. In contrast, the Gilbert River did not provide as much productivity as was expected. Consistent catches were experienced at Weipa and near the Mitchell River, while catches near Melville Island/Port Essington areas have been slow. No boats started in the Fog Bay area this year because the boats that normally start near Fog Bay started in the GoC. Some companies discouraged boats heading to the Joseph Bonaparte Gulf (JBG) as Redleg Banana Prawns are generally harder to sell,

especially when the catches of White Banana Prawns are high. Overall the season has been productive with most companies experiencing high catches. The market for prawns is not as favourable as it has been in previous years. The current market can be characterised as a buyer's market, not a seller's market, with the supermarkets reluctant to commit to any large purchases. It was suggested the industry may have to work harder this year than previous years to move the high volume of prawns being caught.

The RAG noted a further update from NPFI on the results of: the October 2018 BRD trial; the current status of the BRD phase in for the 2019 tiger prawn season; the future bycatch strategy; and, the current status of the sawfish mitigation projects.

In October 2018, a scientific trial was undertaken on a single-cone, modified Kon's Covered Fisheyes bycatch reduction device (BRD). Results showed the device, subsequently named Tom's Fisheye, reduced bycatch by over 43 per cent with minimal prawn loss when positioned at 60 meshes from the codend drawstrings. As the device achieved the industry target of 30 per cent reduction, it was added to the list of approved BRDs in early 2019. During the 2019 tiger prawn season, operators are required to use one of the devices that reduce bycatch by 30 per cent in half of their nets. The approved devices include the Tom's Fisheye, Kon's Covered Fisheyes, FishEX 70 and the Popeye Fishbox at 70 meshes from the codend drawstring.

The NPF Bycatch Strategy was specifically aimed at reducing small bycatch. It is proposed that the focus of bycatch mitigation going forward should shift from only small bycatch to priority species – sawfish and sea snakes – while continuing to monitor new BRD performance and allow for approved modifications and/or development of devices and further testing if and when required. It is proposed that NPFI develop a new 2019-2022 Bycatch Strategy incorporating the above focus for consideration by NPFI in 2019.

NPFI is working with several research providers to improve management and mitigation of sawfish interactions in the NPF. Current projects include:

- Can sawfish bycatch within the NPF be mitigated using an electric field? - Flinders University, Charles Darwin University
- How does trawl gear configuration affect sawfish catches: mitigating interactions with sawfish in the NPF. - CSIRO
- Is the Northern Prawn Fishery interacting with a single population, or multiple populations of the Narrow Sawfish *Anoxypristis cuspidata*? - Charles Darwin University

The RAG was informed that 2018 was the most successful year to date for the Crew Member Observer (CMO) program with over 4200 shots monitored. A large number of the CMOs have returned in 2019 which enables the data collection to continually improve. It was suggested that the NPRAG Chair should write to the CMOs acknowledging their efforts and contribution to the fishery.

The RAG discussed the CMO program and the data collected. It was noted that a PhD student at JCU in Cairns, Michael Grant, is doing some work on sawfish including a population viability analysis. He indicates that one of the big information gaps for sawfish is age-at-maturity and length/age information. This information is hard to collect because it relies on the vertebrae of a sawfish to determine its age. There is a protocol for taking out the vertebrae of dead sawfish, which provides really valuable data to assess sawfish populations. Subsequently, it would be useful if there's a possibility that CMOs or Scientific Observers to collect this information. The RAG suggested this is something to consider along with the other projects on sawfish to ensure the research is aligned. It was further suggested that these proposals are useful to consider as part of the Bycatch Strategy and the Data and Monitoring Plan.

# 4 Harvest strategy and bycatch strategy reviews

AFMA presented an overview of the updated Commonwealth Harvest Strategy and Bycatch Strategy policies and the changes required to align the NPF management arrangements with these overarching policies. One of the key components of the new harvest strategy and bycatch strategy is for fisheries to be clear about how each species it interacts with is managed. The Commonwealth policies provide clear guidance that commercial and byproduct species will be managed under the Commonwealth Harvest Strategy policy and bycatch and protected species will be managed under the Commonwealth Bycatch strategy. Over the next year AFMA, together with NPFI and the RAG, will revise the NPF management arrangements and integrate them into a Fisheries Management Strategy (FMS). The RAG noted there is some flexibility in how each species is categorised as the role each species contributes to the fishery may change over time.

The RAG reviewed the ERA species lists for the NPF banana prawn and tiger prawn sub-fisheries. A proposed categorisation method was provided for the RAG to comment on which included:

- **Key commercial** - Species contributes more than 20 per cent of total retained catch or value (annual average over five years)
- **Byproduct** - Species contributes less than 20 per cent of the total retained catch or value (annual average over five years) but retained catch is greater than 1 tonne
- **Bycatch** – Species where retained catch (annual average retained and observed over five years) is less than 1 tonne, and all species that are discarded (excluding TEPs)
- **TEP** - Species are listed under the EPBC Act.

It was questioned why some species, such as Australian black tip shark, were categorised as byproduct when they are not permitted to be kept in the fishery. As some of the data to generate the species lists was obtained from AFMA Scientific Observers it was advised that there are a few reasons why species, such as Australian black tip shark, are retained including for research purposes.

The RAG recommended that only species typically retained as part of the NPF commercial catch should be categorised as key commercial or byproduct, otherwise species may be incorrectly categorised. There was further discussion regarding how the AFMA Scientific Observer data contributed to the categorisation of each species. It was clarified that Observer data was not extrapolated and represented the volume (number or weight) actually observed, mainly through the collection of the 10 kilogram sub-sample. Noting this, the RAG recommended the species lists be split by logbook data and all other data to make it clear how the data has been treated in compiling the lists. This should not affect the categorisation as only species retained commercially will be categorised as either key commercial or byproduct and all other species will be categorised as bycatch or TEPs.

It was questioned whether there were any species where the Observer data contributed to it being recorded as byproduct, for example squid. If so, the Observer data would need to be extrapolated to account for the total volume caught across the fishery. However, the RAG was informed this was not necessary because all retained catch is recorded in logbooks. The RAG noted that species

such as squid are recorded as species groups in the logbook and scientific observer data. Considering this, the RAG recommended the CSIRO survey data be used to split the squid group by the appropriate percentages into species. Furthermore, the RAG suggested that the species-split model used to split the tiger prawn species group is also able to be used to split tiger prawns caught in the banana prawn sub-fishery. It was also noted that 24 tonnes of various flying fish species were recorded as being caught — which seems incorrect. The RAG recommended that this be reviewed and corrected.

The RAG noted that the catch of Redleg Banana Prawns caught in the banana prawn sub-fishery seemed too high. The ERA lists the current average volume of 300 tonnes which is similar to the volume caught in the JBG. It was suggested that the high volume may be due to the banana prawns group being split with too much apportioned to Redleg Banana Prawns. This was noted as something to inform the CSIRO ERA team about.

It was noted that species are categorised differently between each sub-fishery based on how much each species contributes to the sub-fishery's total catch. A question was raised about how the catch in one sub-fishery is accounted for in the other sub-fishery's risk assessment. The ERA methodology assesses the relative risk each sub-fishery poses to the species being assessed. The external threats to each species are identified but the cumulative risk to a species from all threats (including the cumulative risk between each sub-fishery) is not assessed. However, there is an opportunity in the ERA process to note the external threats and reclassify a species in the final risk categorisation if the cumulative impact is considered substantial.

The values of the commercial species in the species value table were reviewed and it was pointed out that some of the data is confusing. Some species, including endeavour prawns, appear in the table multiple times depending on whether they are recorded to species level or as a species group. The RAG recommended the table be reviewed and each species/group be valued in only one manner (split by species preferred) so that each species only appears once in the table. The value of king prawns was also questioned and it was suggested that the king prawns should be kept as a species group and categorised as a byproduct. The RAG was informed that species groups cannot be assessed in the ERA, but for the purposes of categorisation, species groups could be used and then the species groups split when being assessed.

The RAG discussed the categorisation of Blue and Red Endeavour Prawns. Under the Commonwealth Harvest Strategy policy, either the fishery as a whole or individual species categorised as key commercial have to be managed to a maximum economic yield (MEY) target. Alternatively, species categorised as byproduct can have an appropriate target level set by the fishery (above the limit reference point – $B_{20}$). As the NPF has both Blue and Red Endeavour Prawns MSC certified, each species needs to be managed to a biomass of maximum sustainable yield ($B_{MSY}$) target. By categorising Blue and Red Endeavour Prawns as byproduct in the NPF ERA, both the MSC criteria and the Commonwealth Harvest Strategy policy criteria are met. The RAG recommended Blue and Red Endeavour Prawns remain categorised as byproduct species – they are treated as an economic byproduct in the current assessment anyway.

It was advised that in the last 15 years, fishing patterns for NPF tiger prawns have changed. A fishing pattern known as 'line fishing' has become more widely used which is better for targeting tiger prawns but is less effective at catching endeavour prawns. Consequently, the volume of endeavour prawns has decreased. The RAG noted this advice and recommended that it be considered further, especially in regards to any influence it may have on the fishing power analysis.

The RAG was asked to confirm the depth range for each of the sub-fisheries. The RAG considered that the deeper depth of 300 metres is for targeted Scampi fishing and should not be included in

the tiger prawn or banana prawn sub-fishery. It was confirmed the core depth range for the tiger prawn sub-fishery is 15 to 45 metres, and for the banana prawn sub-fishery is 9 to 60 metres, noting that over 90 per cent of fishing effort occurs in the 9 to 38 metre depth range. The RAG recommended that Scampi be removed from the prawn ERAs as it is not caught as part of the banana prawn sub-fishery but is targeted separately. All associated data with the Scampi data should also be removed and assessed separately.

For the purpose of the ERA, the RAG supported the proposed species categorisations with one change to ensure that all king prawns species are considered as byproduct species and not bycatch. The revised species values table and catch tables will be provided to the RAG out of session along with the draft Level 2 ERA report when it is available.

**NPF harvest strategy**

The RAG discussed the scope for reviewing the NPF harvest strategy and bycatch strategies. It was noted that the majority of the work will involve updating the strategies based on the outcomes of the Redleg Banana Prawn MSE project, reviewing how Red and Blue Endeavour Prawns will be managed, reviewing catch-reporting decision rules, and how byproduct species, including scampi, squid, scallops, bugs and Black Tiger Prawns, are managed. It was advised that these byproduct species are now addressed under the Commonwealth Harvest Strategy Policy when previously they were addressed under the Bycatch Policy. As such, updates are required to ensure the species are managed in accordance with the Commonwealth Harvest Strategy Policy.

AFMA noted that under the Commonwealth Harvest Strategy Policy, there doesn't need to be a target for byproduct species but there does need to be performance indicators and the goal is to ensure that they remain above the limit reference point at least 90 per cent of the time. The policy recognises that there isn't always sufficient data to do a high-level assessment, but a tiered framework provides guidance on the type of assessment(s) that could be appropriate. In most cases, performance indicators need to be based on available data and the NPF trigger rules used for bugs, squid and scampi will likely need stronger justification based on tracking abundance.

The RAG recommended taking an approach similar to the Black Tiger Prawn assessment, where all the available data on each of the species is compiled and then the data can be reviewed to determine what level of assessment is feasible. Scampi has reached a trigger limit in the current harvest strategy and some further assessment is needed to determine if the current catch limit is appropriate. It was suggested that it would also be useful to identify under which tier each species is currently assessed and what level of information is needed to move a species to a higher tier, if appropriate.

**NPF bycatch strategy**

AFMA presented a template that will be used to guide the development of the NPF bycatch strategy. The RAG noted that AFMA and NPFI will collaboratively revise the strategy, with input from the MAC and RAG, which will be incorporated into the FMS. The new strategy will have two components including a bycatch component and a habitats and ecological communities component. It was advised that Roland Pitcher from CSIRO has undertaken some extensive research on the impacts of trawling on benthic communities. It would be valuable to capture this information in the bycatch strategy or FMS.

The RAG noted that one of the requirements of the Commonwealth Bycatch Policy is a greater emphasis on performance criteria and measurable indicators for bycatch species. This includes TEPs and actions to address TEP interactions will need to be included in the bycatch strategy. The RAG

recommended that the bycatch strategy include a separate section on general bycatch and TEPs to ensure specific needs can be addressed.

The timing of the new strategy was discussed and it was agreed that AFMA/NPFI would have a draft strategy prepared by the November 2019 RAG meeting with the aim of finalising the strategy by May 2020. A suggestion was made that the fishery has done a lot of work to reduce bycatch during its history and it would be good to capture some of this history in the new strategy.

The RAG discussed the importance of indicators under the Commonwealth Bycatch Policy and considered some potential indicators for monitoring priority species such as sawfish and sea snakes. It was suggested that CSIRO's ongoing bycatch monitoring project provides some good information and data that could be used to develop indicators for priority species.

The RAG discussed the value in measuring the reduction in total bycatch, especially after the introduction of new BRDs, to demonstrate the overall reduction in bycatch and the effectiveness of bycatch reduction measures throughout the history of the fishery. It was advised that the CMOs estimate the total bycatch two nights a week and the Scientific Observers do an eyeball estimate of most shots during observer trips. It was suggested that the eyeball estimate could be further improved if it was occasionally validated. The RAG recommended that a method for validating the eyeball estimate of CMOs and Scientific Observers be explored.

The RAG reviewed the AFMA bycatch strategy template and provided some comments to ensure the strategy better aligns with the Commonwealth policy. The RAG recommended updating the template to include 'reasonable and practical' in the strategy objectives, i.e. maximise the potential for live release and post-release survival where 'reasonable and practical'. The RAG also recommended that 'reasonable and practical' should be added to the strategy wherever the objectives indicate that bycatch is to be minimised.

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**Actions:**

ERA species list review
- AFMA/CSIRO to split the ERA species lists by logbook data and all other data sources (e.g. observers) to help clarify the species splits.
- CSIRO/AFMA to consider splitting the logbook recorded squid species group in the ERA by the percentages recorded by CSIRO survey data.
- CSIRO/AFMA to use the species split model to split the tiger prawns recorded in the banana prawn sub-fishery.
- CSIRO/AFMA to double check the catch of Redleg Banana Prawns in the banana prawn sub-fishery.
- CSIRO/AFMA/ABARES to review the ERA species value table and split the species using the species split model so that each species only appears once in the table.
- CSIRO/AFMA to categorise all king prawns as a byproduct species group.


Harvest strategy
- AFMA to compile all available data on each byproduct species to enable the RAG to assess what level of assessment is feasible and review if current harvest strategy triggers are appropriate.


Bycatch Strategy
- AFMA/NPFI to prepare a draft of the NPF bycatch strategy by the November 2019 RAG meeting.
- AFMA/NPFI to split general bycatch and TEPs into sub-sections under the NPF bycatch strategy.
- AFMA/NPFI to include an overview of historical initiatives and bycatch reductions in the new bycatch strategy.

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- AFMA to explore options for validating the CMO and Scientific Observer eyeball estimates of total bycatch.
- AFMA to update bycatch strategy template to align with the policy by including the words 'reasonable and practical' when the objective is to minimise bycatch or maximise post-release survival.

# 5  Tiger prawn assessment (non-assessment year)

The RAG noted a summary from CSIRO on the NPF Tiger Prawn catch and effort data and the recent fishery independent survey data, and the results of the 2018 fishing power analysis.

**Tiger prawn assessment**

The RAG noted that compared with 2017, the Grooved Tiger Prawn catch and the Brown Tiger Prawn catch increased by approximately 51.5 per cent and 2.8 per cent respectively. The tiger prawn species-combined catch increased by approximately 35.5 per cent while corresponding total effort increased by only 12.2 per cent. Similarly, the Blue Endeavour Prawn catch and the Red Endeavour Prawn catch increased by 29.2 per cent and 29.8 per cent, respectively. The nominal effort targeting Grooved Tiger Prawns increased by about 25.9 per cent, but effort targeting Brown Tiger Prawns decreased 22 per cent.

**Fishing power**

The RAG noted that in 2018 approximately 96 per cent of the fleet towed quad rig when targeting tiger prawns, up from 90 per cent in 2013, 77 per cent in 2012, and from 40 per cent in 2009. Fleet-wide, the average swept area performance in 2018 was estimated to be 28 hectares per hour (increased by 2% compared to 2017), the largest in the history of the fishery. Greater average swept area performance in the last seven years may be explained, in part, by more boats towing quad rig (most using Bison boards), as well as the uptake by some fishers of a greater headline length allowance (approximately 8%) for the second season of 2011.

Overall, the relative fishing power increased by 4-7 per cent in 2018 relative to 2017. In addition to a small increase in average swept area performance, there was an increase (~ 3%) in engine power between 2017 and 2018. It was also noted that there was an increase in controlled pitch propellers in 2017 and 2018 (33% of fleet in 2018 c.f. 28% in 2016). Other gear inputs into the fishing power model were comparable, on average, over the period. There were also marked changes in the spatial pattern of fishing, with more effort in Coburg-Melville and North Groote, and less effort in South Groote.

# 6  NPF monitoring plan

The RAG noted that a data and monitoring plan is being developed as part of the FMS. The purpose of the data and monitoring plan is to provide a review and plan for ongoing data collection needed to support evidence-based fishery management decisions in the NPF. The key steps that need to be considered by NPRAG in developing the data and monitoring plan are:

- Defining drivers of data needs for the NPF
- Developing objectives for the NPF data and monitoring plan
- Documenting existing NPF data collection and monitoring sources

- Reviewing and aligning data collection against data needs for harvest strategy and bycatch strategy/ecological risk management
  - Documenting and defining fishery indicators
  - Identifying data gaps
  - Reviewing accuracy and timeliness of data
- Documenting data management, storage and access provisions
- Developing an action plan to address data gaps and improve data management.

It was pointed out that AFMA's data collection and quality control process needs to be more clearly defined and could be improved through additional checks and automation. The current process for correcting data relies on CSIRO or NPFI contacting AFMA on an ad-hoc basis and informing of data errors. With the way data is collected, through e-logs, VMS, observer data, and seasonal landing returns, the process of cross-checking data could be automated. AFMA advised it would investigate if data quality and rectifying data errors can be automated. It was advised there is currently an AFMA project underway to review how data is captured which is a good opportunity to provide input to the project and improve data management. It was suggested that global trends can sometimes influence a fishery's direction and the data needs can change depending on external drivers. The data and monitoring plan requires some flexibility to be able to respond to external influences that arise over time. An overarching point was made that the current template doesn't contain any information about the social or indigenous values of the fishery. It was recommended that this is an area of growing importance and something that should be included in the plan together with data on habitats and communities, market access and animal welfare.

The RAG reviewed the objectives of the NPF data and monitoring plan. The language used was considered high level and not specific enough. The RAG recommended reviewing the objectives to ensure they're meaningful for the fishery and specific enough to make it clear exactly what the fishery is trying to achieve through the plan. AFMA reported that a data and monitoring plan has already been drafted for another fishery, the Eastern Tuna and Billfish Fishery (ETBF), which may be useful for the RAG to review to provide further clarification on the final format of the document. The RAG recommended that a copy of the ETBF data and monitoring plan be circulated to the RAG for reference.

AFMA will work with NPFI to refine the objectives further and commence the data review process to ensure that data collection aligns with the data needs in the fishery. This will include consideration of the timeliness and accuracy of data collection and AFMA will consult further with the RAG as this work progresses.

**Actions:**

- AFMA to investigate if data quality checks and rectifying data errors can be automated.
- AFMA to consider including updating drivers of data needs to ensure they include habitat and communities, social licence/values and acceptability, market access, animal welfare and indigenous interests.
- AFMA to circulate a copy of the ETBF data and monitoring plan to the NPRAG.
- AFMA and NPFI to refine objectives and continue development of the data and monitoring plan in consultation with the RAG.

# 7   Climate change adaptation project

Beth Fulton (CSIRO) presented on the preliminary results of the project 'Adaptation of Commonwealth Fisheries to Climate Change' and the impact pathways relevant to the NPF. The area of the NPF is predicted to be significantly influenced by environmental changes over the next few decades with potential declines in the abundance of commercially important prawn species. The project assessed how these environmental changes might impact the fishery's operations and which of these environmental changes would have the greatest impact. By using a risk assessment approach, impact pathways were modelled to determine what might happen to various components of the fishery and what management responses are currently in place to respond to the modelled impacts. The areas where a high impact is predicted and the current management arrangements aren't flexible to respond to the impact were highlighted. The project allows the fishery to consider what management changes may enable the NPF to be prepared before the environmental changes start to occur.

The RAG provided feedback to CSIRO to further improve the project. Specific recommendations included:

- Remove the section on physical drivers because there will potentially be a strong negative response from some industry members by referring to climate change. Frame the question in a way that asks 'if this thing happens, how will you respond'.
- The project highlights the importance of having indicators and monitoring. As there are numerous predicted changes, it would be useful to monitor the key drivers of those changes and have indicators in place that generate a management response. It would be useful if there are ways to collect and monitor relevant data at a relatively low cost to inform management decisions, for example through IMOS or other industries such as the energy industry.
- It would be useful to know which of the impact pathways will have the largest impact but can also be controlled through management actions. By prioritising what management can actually influence and what will have the largest impact, management actions can then be effectively targeted toward the priority impact pathways.
- It was suggested that all the rules for adjustment are already in place in the fishery, regardless of the impact of climate change.
- There is too much information included for Industry to clearly understand the objectives and outcomes of the project. In order to receive the most valuable feedback from operators, the information needs to be broken down into simpler, more specific questions such as 'if this changes in the fishery how will you respond'.
- It was suggested that the RAG should regularly discuss predicted changes and their impact on the fishery so that the fishery is continually considering potential risks and how the fishery can respond. A long-term NPF management framework would be valuable and is something that is becoming more widely adopted across other jurisdictions and industries, such as the Queensland and NSW governments. The RAG recommended a standing agenda item once a year to consider potential risks and management responses. A fishery report card that contains environmental information relevant to the NPF would be a useful tool for the RAG to review as part of its discussion.
- Remove irrelevant species from the project such as trevally and mud bugs and concentrate on the species of interest, i.e. banana and tiger prawns.
- NPFI supported the project and suggested that everything discussed is already being actioned through the revised harvest strategy and the indicators report.

The RAG noted that a survey would be sent to industry seeking overall feedback on the project's approach and reasoning and to collect social, behavioural and economic information that would help inform the predicted impact pathways. The purpose of the survey is to validate the risks that have been assumed in the project. The industry would also be asked to provide recommendations on further management options to mitigate risk. The survey data will be used to help finalise the suggested intervention points and priority actions. It was suggested that the project focuses on the fishery trending negatively, but there should also be a component of what happens if stocks respond positively to environmental changes. The questions could be phrased in terms of how to keep the fishery profitable during uncertain times. The RAG suggested that CSIRO and NPFI should collaborate on an appropriate set of survey questions and target who the survey should be sent to.

The RAG noted that there is a project meeting in July 2019. Some of the RAG participants will also be at the project meeting and it was requested that an update on the project be provided at this meeting following responses from the industry survey being collated.

**Actions:**

- NPRAG to consider risks of environmental change and potential management responses at its annual May meeting.
- CSIRO to consider providing a fishery report card that contains environmental information relevant to the NPF for the RAG to review at its annual May meeting (after qualitative review of available and relative data and assessing cost of doing so).
- CSIRO/NPFI to review the adaptation project survey (economic and social data) and finalise language to ensure it is clear and tailored to industry.

# 8    Broodstock assessment discussion / Sawfish bycatch

The Chair welcomed John Moloney (Tassal), Matt West (APFA), Kim Hooper (APFA), Alistair Dick (APFA) and John Dexter (QDAF) and informed that some participants had potential conflicts of interest, but as the RAG was not making any recommendations on broodstock catch levels at this meeting, there shouldn't be a reason for anyone to be excluded from the discussion. If a specific conflict arose, the relevant participants would be asked to leave the meeting. The RAG noted that the sawfish bycatch agenda item would be incorporated into the broodstock discussion due members and observers being interested in the overlap between targeted broodstock fishing and high levels of sawfish bycatch. The objectives of the discussion were to assess the available data on *Penaeus monodon* and determine what type of stock assessment is viable, and also provide advice on research priorities and data needs to support ongoing monitoring of sawfish interactions.

**Broodstock assessment approach**

AFMA presented an overview of the available data and the types of analysis of the *P. monodon* stock that can be undertaken and AFMA's legislative objectives in relation to managing the stock. It was noted that the stock is managed as a byproduct species under the NPF management plan which requires the stock to be assessed and managed above a limit reference point. There is a tiered system of assessment that guides the type of assessment that can be undertaken with the data available. The tiered system can also guide what additional data would be needed to undertake a higher level of assessment.

Data sources

The key data sets held by AFMA and CSIRO include commercial logbook data from across the NPF (1970- present), targeted broodstock logbook data (2005-present) and the CSIRO pre-season independent survey (2002-present). These datasets were presented to the RAG for discussion to consider which ones have potential to be used as an indicator of abundance through standardised Catch Per Unit Effort (CPUE). Observer and CMO data are also available and could assist with potential CPUE standardisation.

The RAG discussed potential additional data sources that hadn't already been considered. There were a couple of additional sources that were identified that may contain some information on *P. monodon* including:

- survey data from a number of bycatch cruises undertaken in the GoC during the 1990s
- CSIRO holds data from surveys undertaken by the Northern Territory government during the 1980s in the Melville/Port Essington area
- surveys undertaken during the 1980s by Rik Buckworth near Groote Eylandt and surveys by Ian Sommers in the western GoC
- there is some data from the original species split project
- there was prawn sampling undertaken by the F.V *Jacqueline-D* during the 80s and 90s in Albatross Bay.

The RAG recommended that CSIRO interrogate these additional data sources to determine if any can be used to contribute to the *P. monodon* assessment.

In terms of the different data sources, the RAG noted that the CSIRO survey was probably the least useful as a potential indicator of abundance as it does not cover key fishing grounds for *P. monodon* off the Tiwi Islands. Although it does provide some useful information on spawning and recruitment within the Gulf of Carpentaria. Standardised CPUE based on targeted broodstock fishing data was considered to have the most potential as a longer term indicator of abundance. However, there are issues with data collected from 2005-2016 as it lacks consistent reports of discarded catch. The data reporting has improved since 2016 with discards reported in addition to retained catch.

Standardised CPUE from the NPF commercial logbook data may be useful as a potential indicator of abundance but this would need to be investigated, and careful consideration as to which factors to include in the analysis, including spatial effects. The RAG noted that catches of *P. monodon* are concentrated in a few key areas and regional catch rate analysis for these areas using commercial data could be considered.

Assessment options

In total three assessment options were proposed for consideration by the RAG, including a Tier 4 CPUE assessment or equivalent, catch curve analysis (Tier 5) and an e-SAFE assessment (Tier 6-7).

A Tier 4 CPUE assessment was considered the highest level assessment that may be possible. There may be sufficient data from targeted broodstock trips to undertake a standardised CPUE analysis. This data can be used for an initial analysis to understand the catch rate time series of *P. monodon*, with the CPUE analysis being regionally based. It was suggested that CSIRO analyse the *P. monodon* data by standardising CPUE to account for spatial effects within a project. It was also suggested that additional standardisations be applied to targeted broodstock fishing to account for the length of trawl time, given the shorter trawl times for targeted broodstock fishing.

The data and CPUE standardisation will then inform whether a Tier 4 assessment can be conducted.

The RAG was asked to provide guidance on what additional data would be useful to contribute to further assessment of *P. monodon*. Additional data suggestions included hours trawled (validated by VMS), shot times and depth. It was suggested that with the lack of data and relatively low abundance of *P. monodon*, a risk approach to assessment may be more appropriate. The animals may be too rare to be able to conduct the preferred Tier 4 assessment.

Other options if a Tier 4 assessment can't be conducted include a catch-curve analysis (length converted catch-curve analysis). The RAG recommended exploring whether a catch-curve analysis could be conducted in addition to a Tier 4 assessment. It was pointed out that to undertake a catch-curve analysis that length data would be needed and the RAG recommended that Scientific Observers should collect length data on all *P. monodon* caught during targeted broodstock trips from this point on. It was also suggested that good temporal and spatial data is also needed to give a reliable catch-curve. The most efficient way to collect this data would be if crews record this data on *P. monodon* on every trip for every prawn as well.

The final potential assessment approach is to use the ERA method to conduct an e-SAFE assessment on *P. monodon*. This is a risk based assessment methodology that can consider historical as well projected future catch to give an estimated risk weighting (high, medium low) with different harvest levels. It was questioned whether the e-SAFE methodology can be applied regionally as one assessment of the whole fishery is unlikely to provide reliable results due to the spatially targeted nature of broodstock fishing. It was advised that the scope of the ERA can be determined which would enable each region to be spatially assessed.

The RAG recommended scoping and costing the three assessment options including a Tier 4 assessment (CPUE analysis), length converted catch-curve analysis and e-SAFE. Once the assessment options are costed and the methods confirmed, the RAG can assess what the preferred assessment approach is and decide who can undertake the assessment. The RAG recommended that the scoping documents be prepared before 15 July 2019 with the aim of having the project outcomes completed by the November 2019 RAG meeting.

Discards of commercial species

There was discussion about the level of discards of *P. monodon* and other NPF target species during targeted broodstock fishing. The RAG questioned what impact the high level of discards had on the commercial NPF prawn stocks. CSIRO advised that prawn discards could be included in the next tiger prawn stock assessment as a sensitivity test. The RAG supported this inclusion.

Average weight of *P. monodon* to be used for assessments

The average weight of each individual prawn collected for broodstock was discussed as there have been various figures used in the past ranging from 100 g to 200 g per prawn (*P. monodon*). In the information presented to this RAG, AFMA has assumed a weight of 150 g per prawn (*P. monodon*). The APFA confirmed that a figure of 150 g per prawn was fairly accurate for *P. monodon* broodstock. It was questioned whether prawn farmers have data on the weight of prawns they collect so that the average weight of individual broodstock prawns could be determined more precisely. The APFA confirmed prawn farmers do collect weight data and would be able to provide the data to determine average weight.

**Sawfish bycatch**

The RAG considered recent data on sawfish bycatch, noting that sawfish interactions were rated by the NPF as the highest risk to the fishery and mitigating interactions was the foremost priority. It was noted that sawfish interactions in 2018 were considerably higher for broodstock trips than for regular NPF fishing trips. The number of sawfish interactions compared with the number of broodstock caught was questioned as it was suggested that sawfish interactions may increase as broodstock numbers decrease when fishers experience difficulty finding *P. monodon* and therefore fish harder. The RAG suggested this is something that can be explored.

The importance of accurate data collection and species identification was emphasised. There is currently a good level of observer coverage on both NPF regular fishing trips (18 % coverage combined with scientific and crew member observer) and targeted broodstock fishing trips (20% target), but the data collection when observers aren't on-board isn't as reliable and could be improved with some independent verification. The regular NPF fishing trips are covered by crew member observers (CMOs) who take photographs of all sawfish to assist with species identification. Methods for incorporating independent verification on targeted broodstock fishing trips were discussed with options suggested including e-monitoring or a crew member observer (CMO) program on the targeted broodstock trips similar to the NPF CMO program.

An overview of the sawfish research currently underway and proposed research was noted both from within the fishery and research being conducted by other institutions. The RAG discussed potential research that could address some of the data gaps. It was pointed out that significant information gaps for sawfish include understanding post-release survival and population abundance. The RAG discussed options for improving these information gaps including through tag-recapture studies and close-kin genetic projects.

A research proposal by CSIRO on close-kin mark recapture was presented to the RAG. AFMA advised it would also circulate the proposal to APFA for information. It was advised that the duration of the project and the number of samples needed depends on what the preliminary results show. If the preliminary results indicate that many of the individuals sampled are close kin then it is more likely the population is small. The value of the close-kin genetics approach is that it gives an indication of total abundance and over time, total mortality (natural mortality plus fishing mortality). The value of close-kin mark recapture increases with the more samples collected over time. Concern was raised with the number of samples that can be collected in the NPF due to crew tiring of collecting samples year-on-year. It was suggested that another source of valuable samples could be collected from the Queensland in-shore gillnet fishery. John Dexter (QDAF) agreed he could follow up to facilitate a conversation with the relevant team within the Queensland Department of Agriculture and Fisheries.

The RAG assessed the research priorities for sawfish and what can be done to address some of the information gaps. Improving understanding of post-release survival was considered a high priority and the RAG recommended that a sampling protocol should be explored to collect genetic samples from all sawfish caught across all jurisdictions and fisheries. AFMA advised that sampling protocols were already available and it would coordinate with other jurisdictions to expand the sampling to other fisheries. The RAG noted that there is already a project with Charles Darwin University (CDU) where sawfish samples are being collected as part of a population analysis project. It was recommended that the sampling regime be expanded to other jurisdictions and fisheries. There was also a suggestion that CSIRO/NPFI collaborate with CDU to ensure the sampling protocols are managed to allow samples to be used for both the population analysis and close-kin genetic projects. The RAG also recommended CSIRO prepare a project proposal with costings for the close-kin genetic work. The RAG discussed how to improve understanding of post-

release survival as the close-kin project would not provide any information for some time. It was suggested that a tagging project or an analysis of stress hormone levels might enable information on post-release survival to be collected quicker. The RAG recommended that a project proposal for a tagging study be prepared that could be conducted alongside the genetic sampling project, as sawfish can be easily tagged at the same time a sample is being collected.

It was questioned whether photos are being taken of all sawfish caught during targeted broodstock fishing trips. The RAG were advised that there are some boats that target broodstock using a NPF licence and photos of sawfish aren't currently captured on these boats. The RAG recommended that photos of sawfish should be collected on all targeted broodstock trips to help with species identification.

The timing of the projects was discussed because information on sawfish is the fishery's top priority and getting information expediently is necessary. The APFA was also interested in the timing of the projects because it is waiting for an answer as to whether the number of *P. monodon* permitted to be collected under broodstock permit can be increased. This number is partly reliant on information about sawfish and APFA is concerned the information will not be available in a timely manner. The RAG agreed to have the project proposals prepared in the next few weeks and a teleconference will be organised in the coming months to discuss the proposals, priorities and funding.

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**Actions:**

*P. monodon* assessment

- CSIRO to prepare a report reviewing the feasibility and anticipated costs for assessing the *P. monodon* sock using a Tier 4 assessment (CPUE analysis), length converted catch-curve analysis and e-SAFE. In preparing the report, the following points will be considered:
  - o Analyse data from the additional sources identified to assess whether any data on *P. monodon* can be used in an assessment; and
  - o Conduct CPUE standardising for *P. monodon* accounting for spatial effects

- CSIRO to include prawn discards in the next tiger prawn stock assessment as a sensitivity test.
- APFA to provide weight data on individual prawns to determine the average weight of each *P. monodon* collected for broodstock purposes.
- AFMA to explore whether the Scientific Observers can measure the length of all *P. monodon* caught during targeted broodstock trips.
- NPFI/Tassal to explore whether the crews on board broodstock trips can record the length of all P. monodon caught.

Sawfish

- AFMA to compare sawfish interactions with number of broodstock caught and provide analysis to APFA. AFMA to coordinate with other jurisdictions and fisheries to expand the sawfish genetic sampling regime.
- CSIRO/NPFI to collaborate with Charles Darwin University to ensure the sampling protocols are managed to allow samples to be used for both the population analysis and close-kin genetic projects.
- CSIRO to prepare a project proposal with costings for the close-kin genetic work.
- AFMA/CSIRO to coordinate the development of a project proposal to undertake a sawfish post-release survival project.
- AFMA to organise a NPRAG teleconference in July/August 2019 to discuss the sawfish project proposals.

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# 9    Scientific observers

The RAG reviewed the Scientific Observer data collection protocols and discussed improvements that could be made. It was pointed out that the current method of collecting the target prawn sample to determine species split may need to be modified to align more closely with methods established by previous species split research projects whereby prawns are separated into species groups and then sampled (ungraded, from the small hopper), so that samples from the two different sources can be directly compared (with standardised sampling units). There were concerns that the current sampling regime involves collecting the first 100 prawns each shot but the number of prawns in each species group (i.e. tiger prawn group and endeavour prawn group) varied from shot to shot. This method leads to the sample size of each species group changing each shot and although the numbers of tiger prawns may be adequate for inclusion in the future species split analysis it will increase variability from shot-to-shot which will make modelling difficult. Furthermore, there is no direct comparison with the research survey (as the basic sampling units differ). Also, the numbers of endeavour prawns are likely to be inadequate. This would result in the scientific observer data not being used in future endeavour prawn species split analysis. Alternative methods may be to sample a certain number of each species group, for example, (1) collecting 50 tiger prawns and 50 endeavour prawns or (2) after the 100 random prawns measured, if either the tiger or endeavour group does not contain at least nominally 30 prawns, an additional sample of that group be measured until 30 is reached. It was pointed out that a problem with the methods is that (1) doesn't give you an indication of the overall target species composition (across all prawn groups caught in a shot) and neither method is directly comparable to the species split research survey (the reference set). The RAG suggested that different methods can provide different answers and it is important to focus on what the main objective of the sampling regime is. If the question is only about what the species split composition is then it will lead to different sampling protocols than if the overall commercial prawn species composition (across species groups) is important. The RAG was hesitant to change the current protocol as it is a simple method and has been established through discussions with the Scientific Observers over the last year. An option proposed was to conduct another sampling regime on top of the current sampling regime for a few shots each trip and then compare the results from the two sampling methods to indicate if they produce different results. The RAG agreed this may be a way forward, as long as any proposed sampling methods were practical and achievable by the Scientific Observers without compromising other sampling priorities.

The RAG also suggested that some additional words be added to the protocols to ensure sensitive species are returned to the water immediately and that the eyeball estimate of the total catch should be validated occasionally to improve credibility of the estimate.

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**Action:**

- AFMA/CSIRO to develop a Scientific Observer data collection method that can be used to test if the current prawn sampling method is sufficiently comparable to the established method used in the species split research project, the results of which are used for estimating species proportions in the commercial tiger or endeavour catches.

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# 10 JBG Redleg Banana Prawn sub-fishery

The RAG noted a presentation from CSIRO on the 2018 Redleg Banana Prawn assessment and provided feedback to improve the assessment model and management of the Redleg Banana Prawn sub-fishery. The RAG was interested to hear that there are a number of factors that determine whether boats will make the effort to head to the Joseph Bonaparte Gulf (JBG) to fish for Redleg Banana Prawns. Of particular interest was feedback from industry that fishing pressure in the JBG may be higher in years when there is interest in other prawns in the same region, such as endeavour prawns, as the steam time to the JBG is reduced. The demand for Redleg Banana Prawns may also drive how much fishing pressure is applied to the stock. The domestic market for Redleg Banana Prawns was slower in 2018 than in previous years due to the shelf life being shorter for Redleg Banana Prawns compared to other prawn species. The supermarkets, being a major buyer of prawns, have demanded less of the Redleg Banana Prawns which has reduced the overall demand, leading to less incentive to fish for them. These interconnected drivers of fishing behaviour make it difficult to accurately run the assessment model and make informed management decisions.

The RAG also noted that the fishing method for Redleg Banana Prawns has changed recently, similar to tiger prawns, where 'line trawling' is the preferred method in contrast to general trawling. This was noted as a potential driver for increased fishing power that hadn't been accounted for in the assessment model and CSIRO was interested to explore the situation further. It was suggested that the VMS tracks of boats could be analysed over the last ten years (prior six years being the time period when the fishing pattern appeared to change) to see if the fishing pattern has changed. It was also suggested that CSIRO could add a sensitivity to the next assessment to see what influence an increase in fishing power would have on the assessment model outputs.

CSIRO presented to the RAG on the progress of the Redleg Banana Prawn harvest strategy management strategy evaluation (MSE) project. The RAG noted the proposed outcomes from the project and suggested that a target reference point of maximum sustainable yield (MSY) be added in as it is a requirement to be met by the revised NPF harvest strategy. The reference point of MSY is essential, together with the other reference points already included in the project, for the fishery to achieve its objectives.

> **Action:**
>
> - CSIRO to include MSY as a target reference point in the Redleg Banana Prawn MSE project.

# 11 Research

**Assessment related research projects**

The RAG discussed the potential research projects to improve the NPF stock assessment and prioritised the projects to be funded in the fishery's annual research plan. The RAG noted the status of the projects which included:

| Project | Status |
|---|---|
| Banana prawn MEY trigger | not currently funded |
| Revised Redleg Banana Prawn assessment | not currently funded, can be undertaken when MSE has been completed |

| Project | Status |
|---|---|
| Banana/tiger prawn economics | not currently funded |
| Data weighting in the tiger prawn assessment | funded through the three year assessment |
| Including new scientific observer data in NPF assessments | partly covered by the species split project |
| Evaluating a spatial assessment for the NPF tiger prawns | not currently funded |
| Fishing power revision | funded, project has commenced |
| Species split | funded, project has commenced |

The RAG agreed the highest priority project was the revised Redleg Banana Prawn assessment, which could be undertaken in July 2020 following the results of the MSE project. The RAG also suggested that another project be added to the list which would involve the assessment of Red Endeavour Prawns depending on which MSC assessment category the NPF would be assessed under. The RAG considered this the second highest priority followed by the spatial assessment of the tiger prawn sub-fishery.

**NPF five year strategic research plan**

The RAG reviewed the research needs identified through the strategic planning workshop held earlier in the year and recommended projects that could address the fishery's research priorities:

| R&D need | Project |
|---|---|
| Provide skippers with key fishery data in a simple, readable format before the fishery opens. | Industry to consider |
| Undertake research to better understand the sustainability and profitability of the tiger prawn fishery including spatial research, understanding the economics of specific areas and the influence of fishing for tiger prawns during the banana prawn season. | CSIRO to consider conducting sensitivity test and refer to previous research undertaken in 2006 when tiger prawn fishing was banned in first season. |
| Research the spatial structure of tiger prawns and update the stock assessment model to determine if the inclusion of more defined spatial data improves the assessment. | Considered as part of stock assessment improvement projects. Third priority behind Redleg Banana Prawn and Red Endeavour Prawn projects.<br><br>In the interim do a review of available data by spatial area to identify if there are any trends in particular regions. |
| Continue to improve understanding of the impacts of altered flow regimes on prawns in the Gulf of Carpentaria. | Research already undertaken or funded, e.g. NAWRA results, NPF MICE model. |
| Support a professional NPF representative to work in conjunction with agencies concerned with the terrestrial environment to understand the impact of land based developments and environmental issues on the fishery. | Industry to consider |

| R&D need | Project |
|---|---|
| Continue research to identify the potential impact of climate change on the fishery and options to adjust to changes. | Consider outcomes from climate change adaptation project and how to integrate into RAG discussions – MICE model could be useful tool. CSIRO's indicators summary report to be regularly presented to RAG (after consideration of key data and cost of doing so). |
| Collaborate with relevant stakeholders to undertake research on sawfish including population dynamics, improved data through species identification in logbooks and investigations into ways to reduce interactions and improve escapement. | Projects proposed during the sawfish discussion will address this priority. Build conversation with other jurisdictions (QDAF, NT, WA) to consider sharing information and resources and the effects of cumulative impacts. |
| Explore ways to use bycatch more productively and add value to the total catch. | Industry to consider |
| Continue to explore ways to test the effectiveness of BRDs at reducing unwanted catch. E.g. modelling, flume tank testing. | Industry to consider |
| Explore techniques for synthesising and analysing large data sets that may reveal patterns, trends or associations and provide useful fishery information. | Industry to consider |
| Research ways to strengthen supply chain resilience including aspects related to quality, traceability, temperature monitoring and electronic communication. | A lot of work already happening in this area including:<br><br>• Austral Fisheries exploring block chain technology<br>• ACPF and APFA involved in a joint project on trace metals technology that will result in a database of all fisheries in Australia allowing the origin of every product to be determined<br>• WWF is working with Woolworths on a traceability project.<br><br>RAG agreed that a NPF project doesn't need to be initiated at this stage but it will continue to monitor and engage in supply chain developments as they evolve. |
| Maintain up to date information and high quality data to ensure the NPF continues to meet the MSC criteria. | Industry to consider |
| Continue to explore methods of reducing fuel use in the fishery. | Industry to consider |
| Explore ways to attract and retain crew by researching how other industries approach the issue. | Industry to consider |
| Explore the benefits of on-board cameras and the value they could add to the fishery, e.g. improved confidence in bycatch and TEP data, cost effective efficient data collection, targeted training. | Industry to consider |

**NPF annual research statement**

The RAG discussed the research priorities to include in the 2020-2021 NPF annual research statement. It was agreed the highest priority is the sawfish research recommended under the sawfish agenda item. The revised Redleg Banana Prawn assessment was also considered a priority. It was mentioned that there is concern with the increasing level of seismic testing and its effect on the fishery, particularly in the JBG region. CSIRO is undertaking a preliminary literature review to understand the risks further, but seismic testing may be a high risk to the fishery and something for the RAG to be aware of. NPFI informed it is in collaboration with the oil and gas industry to explore joint projects assessing the impact of seismic testing on tropical prawns. Other areas of research identified to include in the annual statement included the research proposed to assess *P. monodon* and the review of byproduct species as part of the NPF harvest strategy.

**Northern waters / mangrove dieback update**

The RAG noted an update from CSIRO on northern waters developments. Rob Kenyon advised that a final report he drafted has recently been submitted to FRDC (FRDC 2016-047: Addressing knowledge Gaps for studies of the effect of water resource development on the future of the NPF). A key point from the report relates to the importance of early season flows on prawn recruitment. Surveys were undertaken in the GoC in two consecutive years. One of the years was a dry year with little early season rainfall whereas the other year was a wet year with considerable early season flows. The contrast between years was noticeable with over 95 per cent of prawns remaining in the upper tributaries during the dry year compared to the wet year where around 80 per cent of the prawns were found in the upper tributaries with the other 20 per cent migrating into the lower reaches of the rivers. The consequence of remaining in the upper tributaries is that there is likely large density-dependent mortality and higher predation rates. This research supports earlier predictions that the early season flows are an important environmental cue for prawns to migrate to the lower reaches of the estuaries where there's less density dependent mortality, less predation, presumably higher survival and, consequently, increased recruitment to the fishery. The rivers have a positive conditioning aspect from the influx of the early fresh water flows. The paper from Andrew Broadley mentioned earlier also highlights the importance of the maintenance of low level flows for prawn recruitment.

It was noted that there hasn't been any reported recent activity regarding the mangrove dieback, but Norm Duke has recently published a paper regarding the interactions between mangroves and saltmarsh during wet and dry years.

# 12  Other business

**NPF recruitment/spawning survey indices**

The RAG noted that at its November 2018 meeting, concern was raised with the results from the NPF spawning survey, especially the low levels for Brown Tiger Prawns. Although the Brown Tiger Prawns had trended up in the 2019 recruitment survey there was still some concern with the low level of abundance the survey indices may be indicating, possibly driven by recent environmental anomalies. It was suggested that fishing power has increased considerably since the fleet was reduced to 52 boats and there is potentially further improvements that could be made to the management of stocks to ensure continued high abundance of commercial species. One improvement could be to analyse different areas of the fishery to identify any areas of localised depletion. The RAG suggested that the spatial analysis project that was discussed under the research agenda item may help to identify and improve stock abundance in more localised regions of the fishery. As this project was considered the third priority project, the RAG recommended that

in the interim a spatial analysis of the current fishery data can be undertaken to assess if there are any regional trends.

**ABARES economic survey**

The RAG noted that the ABARES economic survey would be undertaken in the next few weeks. Industry was asked to inform its skippers that the survey was being conducted and support the collection of the economic data.

The Chair closed the meeting at 4:30 pm (EST) on 31 May 2019.

**Signed Ian Knuckey (Chairperson):**

**Date:  12/07/2019**

# Attachment 1

## Draft Annotated Agenda

## Northern Prawn Fishery Resource Assessment Group (NPRAG) meeting

### 30-31 May 2019 8.30 am (Eastern Standard Time)

| Item | Responsibility | Paper |
|---|---|---|
| 1. Introduction / Meeting Management<br>• Welcome<br>• Adoption of agenda<br>• Declaration of interests<br>• Minutes from previous meetings | Chair | Yes |
| 2. Action Items<br><br>*Outcomes: RAG to note progress on action items from previous meetings and provide feedback and comments where appropriate.* | AFMA | Yes |
| 3. Update Reports<br>• Industry<br>   o Bycatch strategy update<br>   o BRD trials<br>   o Sawfish mitigation<br>• AFMA<br>   o Ecological risk assessment (ERA)<br>   o Fisheries Management Strategy (FMS)<br>   o Proposed listing of narrow sawfish<br>   o Wildlife trade assessment<br><br>*Outcomes: The RAG notes the various update reports.* | NPFI/AFMA | Yes |
| 4. Sawfish bycatch<br>• Update on interactions trends<br>• Management and mitigation<br><br>*Outcomes: RAG to review trends in sawfish bycatch and provide recommendations on further management and research priorities.* | AFMA | Yes |
| 5. Harvest strategy and bycatch strategy reviews<br>• Scope and timeline for harvest strategy and bycatch strategy updates<br>• Species classification<br>• Scampi trigger review | AFMA | Yes |

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|---|---|---|
| *Outcomes: RAG to provide advice on scope, timeline and process to for reviewing and updating the NPF harvest strategy and bycatch strategy.* | | |
| 6. Tiger Prawn Assessment (non-assessment year)<br>• Catch and effort data<br>• Survey data (Rob Kenyon)<br>• Economic data<br><br>*Outcomes: RAG to note the information provided on the 2018 tiger prawn fishery including catch and effort data, economic data collected and survey data.* | CSIRO | Yes |
| 7. Climate change adaptation project<br>• Impact pathways for the NPF<br><br>*Outcomes: The RAG contribute to further developing and refining impact pathways for the NPF.* | CSIRO | Yes |
| 8. Scientific observers<br>• Discuss the data collected by scientific observers<br>• Review the 2018 data collection protocols<br><br>*Outcomes: The RAG discusses the data collected by scientific observers and if it meets the fishery's needs.* | AFMA | Yes |
| 9. NPF monitoring plan<br>• Drivers of data and information needs for the NPF<br>• Objectives for the NPF data and monitoring plan<br><br>*Outcomes: The RAG to advise on drivers of data and information needs for the NPF and objectives for the NPF data and monitoring plan.* | AFMA | Yes |
| 10. JBG Redleg Banana Prawn sub-fishery<br>• Results from 2018 assessment<br>• Update on the review of the Redleg Banana Prawn MSE<br><br>*Outcomes: The RAG note the results from the 2018 Redleg Banana Prawn assessment and note progress on the Redleg Banana Prawn MSE project.* | AFMA/CSIRO | Yes |
| 11. Research<br>• Research priorities for stock assessment improvements<br>• MSC client action plan | CSIRO/AFMA/NPFI | Yes |

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|---|---|---|
| • Annual research plan/5 year plan<br>• Fishing power analysis<br>• Northern waters developments (+ mangrove dieback update)<br><br>*Outcomes: The RAG reviews the assessment related research projects and their priority; the RAG review the MSC client action plan and assess if the NPF is on track; the RAG develop the NPF annual research plan and comment on the five year plan; the RAG note an update on the fishing power analysis project and northern waters developments.* | | |
| 12. Other business<br>• NPF survey indices | RAG | |

# NPRAG Declared Conflicts of Interest

| Participant | Membership | Interest Declared |
|---|---|---|
| Ian Knuckey | Chair | *Director - Fishwell Consulting Pty Ltd*<br>*Director - Olrac Australia – a company associated with electronic logbooks.*<br>*Scientific member – NORMAC*<br>*Member – North Marine Parks Advisory Committee*<br>*Chair - Tropical Rock Lobster RAG*<br>*Chair - Victorian Rock Lobster RAG*<br>*Scientific member - SESSF shark RAG*<br>*Scientific member – GABRAG*<br>*Works with Indigenous communities in capacity building activities*<br>*Chair - South Australia's Gulf of St Vincent prawn fishery's research committee*<br>*Scientific member - South Australia's Gulf of St Vincent prawn fishery's management advisory committee*<br>*Various research interests in other Commonwealth and State fisheries.* |
| Rik Buckworth | Scientific Member | *Scientific Member - South East RAG*<br>*Scientific Member - Torres Strait Finfish RAG*<br>*Chair - NT Research Advisory Committee (FRDC)*<br>*Director - Aquatic Remote Biopsy Pty Ltd*<br>*Director - Sea Sense Australia Pty Ltd*<br>*University Professional Fellow – Charles Darwin University*<br>*Current consultancy contract with NPFI to review Red Endeavour prawns*<br>*Current consultancy contract with the Anindilyakwa Land Council in a project evaluating the opportunities for development of aquaculture in the Groote Eylandt Archipelago.*<br>*Researcher involved particularly in stock assessment research in NPF. Has in the past and may in future seek and receive funding for research in the fishery.* |

| Participant | Membership | Interest Declared |
|---|---|---|
| *David Brewer* | *Scientific Member* | *Director – Upwelling P/L (David Brewer Consulting)*<br>*Honorary Fellow – CSIRO*<br>*Scientific member – NPFRAG*<br>*Scientific member – Torres Strait Fin Fish Working Group*<br>*Chair - Torres Strait Fin Fish RAG*<br>*Editorial committee - Moreton Bay and Catchments 2019* |
| *Phil Robson* | *Industry Member* | *Employee of A Raptis and Sons, responsible for managing NPF vessels & an NT demersal fish trawler. Has provided charter for scientific surveys in NPF (none of which are in JBG) in the past and may in future.* |
| *David Power* | *AFMA Member* | *AFMA employee, no pecuniary interest in the fishery.* |
| *Stephen Eves* | *Executive Officer (AFMA)* | *AFMA employee, no pecuniary interest in the fishery.* |
| *Anna Willock* | *Observer - AFMA* | *AFMA Executive Manager Fisheries, no pecuniary interest in the fishery.* |
| *Louise Cathro* | *Observer - AFMA* | *AFMA employee, no pecuniary interest in the fishery.* |
| *Annie Jarrett* | *Observer - NPFI* | *CEO- NPFI*<br>*Member of the MSC Stakeholder Council*<br>*Chair - Australian Council of Prawn Fisheries (ACPF).*<br>*Some research items are of relevance to NPFI.* |
| *Adrianne Laird* | *Observer - NPFI* | *Employed as a contractor by NPFI.*<br>*Some research items are of relevance to NPFI.* |
| *Gary Fry* | *Observer - CSIRO* | *Research provider involved particularly in the NPF bycatch monitoring program. Has in the past and may in future seek and receive funding for research in the fishery.* |
| *Rob Kenyon* | *Observer - CSIRO* | *Research provider. Has in the past and may in future seek and receive funding for research in the fishery.* |
| *Trevor Hutton* | *Observer - CSIRO* | *Research provider involved particularly in stock assessment research in NPF. Has in the past and may in future seek and receive funding for research in the fishery.* |
| *Eva Plaganyi* | *Observer - CSIRO* | *Research provider involved particularly in stock assessment research in NPF. Has in the past and may in future seek and receive funding for research in the fishery.* |

| Participant | Membership | Interest Declared |
|---|---|---|
| *Toby Obermuller* | *Observer - CSIRO* | *Research provider. Has in the past and may in future seek and receive funding for research in the fishery.* |
| *Judy Upston* | *Observer - CSIRO* | *Research provider. Has in the past and may in future seek and receive funding for research in the fishery.* |
| *Robert Curtotti* | *Observer - ABARES* | *Economics research provider. No current pecuniary interest in fishery. Potential to seek and receive funding for research in the fishery in future.* |
| *Liz Claridge* | *Observer - DoA* | *Department of Agriculture employee, no pecuniary interest in the fishery.* |

# NPRAG Action items

| Item | Person responsible | Description of action item | Progress |
|------|-------------------|----------------------------|----------|
| | **18 May 2016 Meeting** | | |
| 1 | Rik Buckworth/CSIRO | Upload research reports relevant to the NPF to the GovTEAMS site. | **Ongoing** – CSIRO has a student compiling a bibliography that will be available to NPF stakeholders |
| 2 | NPRAG | Reassess the research priorities at the next face-to-face meeting to establish a schedule of improvements to be made to the stock assessment. | **Ongoing** – to be discussed at May RAG each year |
| 3 | CSIRO | Update on the mangrove die-off. | **Ongoing** – to be discussed at each meeting |
| | **17-18 November 2016 Meeting** | | |
| 4 | CSIRO | Review/update the assessment inputs to consider the influence of price elasticity. | **Ongoing** – Tom Kompas to follow up and investigate whether this can be done and coordinate with the AFMA working group to ensure resources looking into price elasticity are not being doubled up. Tom to discuss at the July 2018 working group meeting |
| 5 | NPRAG Chair | Send a thank you letter to the crews involved in the operational testing of the BRD. | **Ongoing** – letters with Chair for signing, to be kept on file until mid-2018 |
| | **11 May 2017 Meeting** | | |
| 6 | CSIRO | Present economic spreadsheet with the inputs | **Ongoing** – present at May meeting each year |

| | | into the MEY trigger at annual November RAG meeting. | |
|---|---|---|---|
| 7 | CSIRO/Tom Kompas | Present data on how the industry price estimates compare with the survey results at the November NPRAG meeting each year. | **Ongoing** – present at March teleconference meeting each year |
| | | **23-24 May 2018 Meeting** | |
| 8 | AFMA | AFMA to ensure the Scientific Observer photos of TEPs and at-risk species are being sent to Gary Fry for analysis. | **Complete** – Scientific Observers to send photos to Stephen Eves and AFMA Observer manager at the end of each trip. Photos will be provided to Gary Fry annually |
| 9 | AFMA/CSIRO | AFMA to work with CSIRO and Scientific Observers to update the scientific data collection protocols. | **Ongoing** – to be discussed at May RAG meeting each year |
| 10 | AFMA/NPFI | AFMA and NPFI to investigate the objective for collecting species abundance counts and whether this data should continue to be collected. | **Ongoing** |
| 11 | AFMA | AFMA to review the bug collection data to determine if it still needs to be collected. | **Complete** – Scientific Observer data collection protocols updated to require a sample of 30 individual bugs to be collected |
| 12 | David Brewer, David Power, Steve Eves, Adrianne Laird | David Brewer, David Power, Steve Eves, Adrianne Laird and a representative from the CSIRO ERA team to form a working group to engage in the ERA process and report key results back to the RAG. | **Ongoing** |
| | | **1 November 2018 Meeting** | |
| 13 | NPFI | NPFI to discuss with the MSC Conformity Assessment Body (CAB) the | **Complete** - the CAB is unable to provide advice on the research |

| | | issues and proposed options for the fishery in order to receive some guidance on where the fishery should focus its research. | needs as this would represent a conflict of their role as Independent assessors. All the CAB can do is identify the Gaps against the scoring requirements. |
|---|---|---|---|
| 14 | Ian Knuckey | Ian Knuckey to draft a Chairs report for NORMAC and the Commission with assistance from Rob Kenyon and Eva Plaganyi to capture the detail of the Northern waters developments | **Complete** |
| 15 | Rob Kenyon | Rob Kenyon to consult with NAWRA researchers to seek to provide the RAG with a summary of key results of the NAWRA side project report that details the impact of loss of late dry season flows (and other low-level flows) on banana prawn catch. Rob Kenyon to provide a copy of the report to the NPRAG when it is released | **Ongoing** – Rob Kenyon to keep RAG informed on the progress of the report. Report not available yet and unlikely to be finalised any time soon. |
| 16 | AFMA | AFMA to update the observer protocol for counting birds to include the monitoring of potential warp strikes | **Complete** |
| 17 | AFMA | AFMA to look into New Zealand's protocols for counting bird abundance | **Ongoing** |
| 18 | AFMA | AFMA to update the observer protocol for collecting bugs to include the collection of a 30 individual subsample of bugs of all sizes | **Complete** |
| 19 | AFMA | AFMA to check the observer protocols to ensure the collection of the 10 kg subsample is in accordance | **Ongoing** |

| | | with the method outlined by *Heales* et al. | |
|---|---|---|---|
| 20 | AFMA | AFMA to include the method for collecting the eyeball estimate of the total catch in the observer protocols | **Complete** |
| 21 | AFMA | On page 99 of the meeting documents, dot point 4, remove the word 'group' – Identify species 'group' should be 'identify species' | **Complete** |
| 22 | AFMA | AFMA to ensure the observer data is collected in the correct unit of measurement | **Complete** |
| 23 | AFMA | AFMA to re-check the data within the 2017 annual observer report | **Ongoing** |
| 24 | AFMA | AFMA to consider dividing up annual observer report by season and including the target number of days per season and target lengths | **Ongoing** |
| 25 | David Brewer/Gary Fry | David Brewer and Gary Fry to provide comments/feedback to AFMA on the current observer manual and annual observer report | **Ongoing** |
| 26 | AFMA | The RAG to inform Biosecurity Qld that it is supportive of staying involved in the biosecurity response, it is interested in plans to mitigate the impact, it has concerns of the impact on the NPF and is interested in supporting/assisting as required. | **Complete** – AFMA and NPFI involved in rapid response team discussions |
| 27 | NPRAG | The RAG to critically analyse the NPF survey indices data at the beginning of 2019 when made available | **Complete** – added to agenda under other business |
| | **29 March 2019 teleconference** | | |

| 28 | AFMA/NPFI | AFMA/NPFI to organise a workshop alongside the May 2019 RAG meeting, inviting aquaculture industry representatives to participate, to discuss the available *P. monodon* data and options to undertake a stock assessment | **Complete** |
|----|-----------|-----------|----------|
| 29 | RAG | RAG members to search for all sources of information on *P. monodon* and send anything found to AFMA for collation | **Complete** – to be discussed during broodstock assessment workshop |
| 30 | AFMA | AFMA to collaborate with CSIRO and the aquaculture industry to seek any data they hold and are willing to provide | **Complete** – to be discussed during broodstock assessment workshop |