Australian Government
Australian Fisheries Management Authority

Northern Prawn Fishery Resource Assessment Group (NPRAG) Meeting

Meeting Minutes

Date: 12 May 2021 09:00 to 17:30
13 May 2021 08:30 to 15:30 (AEST)

Venue: Brisbane Riverview Hotel

Attendees

Wednesday 12 May 2021	
Name	**Member type**
Ian Knuckey	*Chair*
Tom Kompas (dialled in)	*Economic Member*
David Brewer	*Scientific Member*
Rik Buckworth	*Scientific Member*
Éva Plagányi	*Scientific Member*
Phil Robson	*Industry Member*
Ian Boot	*Industry Member*
Bryan van Wyk	*Industry Member*
Darci Wallis	*AFMA Member*
Stephen Eves	*Executive Officer – AFMA*
Annie Jarrett	*Invited Participant – NPFI*
Adrianne Laird	*Observer – NPFI*
Trevor Hutton	*Observer – CSIRO*
Rob Kenyon	*Observer – CSIRO*
Roy Deng	*Observer – CSIRO*
Laura Blamey	*Observer – CSIRO*
Tonya Van Der Velde	*Observer – CSIRO*
Sean Pascoe (dialled in – left at 12.30 pm)	*Observer – CSIRO*
Robert Curtotti (dialled in)	*Observer – ABARES*
Ian Butler (dialled in)	*Observer – ABARES*
Michael Dylewski (dialled in)	*Observer – ABARES*
Miriana Sporcic (dialled in for ERA item)	*Observer – CSIRO*
Thursday 13 May 2021	
Ian Knuckey	*Chair*
Tom Kompas (dialled in)	*Economic Member*
David Brewer	*Scientific Member*
Rik Buckworth	*Scientific Member*
Éva Plagányi	*Scientific Member*
Phil Robson	*Industry Member*
Ian Boot	*Industry Member*
Bryan van Wyk	*Industry Member*
Darci Wallis	*AFMA Member*
Stephen Eves	*Executive Officer – AFMA*
Annie Jarrett (left at 12.30 pm)	*Invited Participant – NPFI*
Adrianne Laird	*Observer – NPFI*
Trevor Hutton	*Observer – CSIRO*
Rob Kenyon	*Observer – CSIRO*
Roy Deng	*Observer – CSIRO*
Laura Blamey	*Observer – CSIRO*
Tonya Van Der Velde	*Observer – CSIRO*
Judy Upston (dialled in from 12.30 pm)	*Observer – CSIRO*
Robert Curtotti (dialled in)	*Observer – ABARES*
Ian Butler (dialled in)	*Observer – ABARES*

1 Preliminaries

1.1 Welcome and apologies

The Northern Prawn Fishery Resource Assessment Group (NPRAG) Chair, Ian Knuckey, opened the meeting at 09:00 am (AEST) on 12 May 2021 with an Acknowledgement of Country. As member appointments were recently finalised, the Chair welcomed all returning members and new members Éva Plagányi (Scientific Member) and Bryan van Wyk (Industry Member).

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. The Agenda was adopted with two additional items added under 'Other business'.

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.

Annie Jarrett advised that, further to interests already declared, she is also a member on the FRDC Board selection committee. Ian Knuckey advised that his son is no longer working on an NPF vessel and his previous declaration in this regard can be removed.

It was noted that the only participants with a specific potential conflict of interest in any item of business on the agenda was CSIRO participants' interest under agenda item 10 (research). It was agreed that CSIRO participants would be asked to step out of the meeting if a RAG recommendation was to be made. No other conflicts were apparent but the RAG agreed that should a conflict with any individual or group arise, they would be asked to leave the meeting for the relevant discussion.

1.4 Minutes from previous meetings

It was noted that the minutes from the 03 and 08 February 2021 teleconference were accepted out--of--session via email as a true and accurate record of the meeting.

2 Update reports

2.1 Industry update

The RAG noted an update on the 2021 banana prawn season. It was advised catches contained a higher percentage of smaller prawns compared with previous years, fuel prices have been steadily rising, and prawn prices have been reasonable. Overall, banana prawn catches weren't as good as industry expectations based on the high level of rainfall in various Gulf of Carpentaria catchments.

Concern was raised that there are some areas of the fishery where the Brown Tiger Prawn stock isn't as productive as it could be. The current NPF stock assessment considers the stock as a whole, but doesn't account for more localised trends. It was noted that current research projects, including the species split project and the MICE project, will provide information to enable the concern to be further assessed. It was suggested, as an initial step, that the problem be better defined in terms of specific area, time, and species. NPFI was asked to define the problem and advise the RAG on the broader industry view. Additionally, CSIRO was asked to use existing data, including the independent survey data, to undertake a preliminary assessment to understand the extent of the problem.

An update on bycatch reduction device (BRD) implementation, broodstock collection, and the 2020 crew member observer (CMO) program was provided. It was noted that NPFI developed and implemented an industry Code of Conduct for the use of BRDs in the 2020 banana prawn season. The Code required NPF operators targeting tiger prawns to use an approved BRD that has been shown to reduce bycatch by at least 30%. This requirement was only necessary for half of a vessel's nets in operation. For the 2021 banana prawn season, NPFI updated the Code of Conduct, which requires that NPF operators targeting tiger prawns in the first fishing season are to use an approved BRD that has been shown to reduce bycatch by at least 30 per cent in all nets in operation. It was also noted that twelve CMOs collected data during the 2020 fishing seasons, three in the banana prawn season and nine in the tiger prawn season. The CMOs monitored 3,298 shots for protected and at-risk species, exceeding the annual target of 2,350 shots.

2.2 AFMA management update

The RAG noted an update from AFMA management including:

- At its 75th meeting in November 2020, the AFMA Commission endorsed the recommended harvest control rule (HCR) for Redleg Banana Prawns, which closes the Joseph Bonaparte Gulf (JBG) in the first NPF season each year.
- At its 76th meeting in March 2021, the AFMA Commission supported the recommendations for managing broodstock collection including a strong focus on data collection and monitoring for *P. monodon* through current arrangements, maintaining the co-management arrangements with NPFI for *P. monodon* for the 2021 fishing season including a 9,000 individual prawn supply limit, and annual monitoring of total catch (5-year running average) against the two different model estimates of MSY to assess possible risk to stock sustainability until at least another assessment is undertaken.
- Development of the NPF fishery management strategy (FMS) has been progressing through work on updating the harvest strategy, data plan and finalisation of the bycatch strategy. The research plan component is complete and will reflect the existing strategic research priorities along with annual updates. NPFI is leading the development of the bycatch strategy, with some final updates from NORMAC being incorporated before this is finalised.
- In line with NPRAG advice, a small working group developed a revised draft Redleg Banana Prawn harvest strategy, including the closure of the JBG for the first season, for NPRAG consideration under agenda item 5. Further updates will be considered for byproduct species, including squid and scampi, along with updates to bring the harvest strategy in line with the 2018 Commonwealth Harvest Strategy Policy. For squid, the current wording around the trigger is not clear and proposed amendments would clarify the precautionary trigger at the tonne level. For Scampi, AFMA and NPFI have been tasked by the RAG to review the current arrangements and catch data to determine if the catch triggers are still appropriate. This work will be undertaken during 2021.
- An internal review of the NPF data strategy has recently been undertaken, with some of the required updates made to the draft data strategy. There are also a number of RAG action items related to data which will be incorporated into the data plan.
- On 30 April 2020, AFMA, NPFI, CSIRO and the Department of Agriculture, Water and the Environment (DAWE) met to discuss progress on developing a sawfish Close Kin Mark Recapture (CKMR) project. CSIRO coordinated a project proposal during late 2020, with NPRAG feedback at its November 2020 meeting. This project was submitted to the FRDC for potential funding, however, FRDC has not yet made a decision. The NESP research hub is nearing the end of its current funding with additional funding secured from DAWE to support some key aspects of sawfish research. A component of this funding ($40K) will be used to support ongoing sawfish sampling (through to June 2022).

- The Sawfish and River Sharks Multispecies Recovery Plan is due to be reviewed in 2021. Narrow sawfish will be included for the first time as it is now listed as a migratory species. The narrow sawfish is now recommended for assessment for listing as a threatened species. This process is on the same timeline of assessment as the up-listing of the Largetooth/Freshwater Sawfish *Pristis pristis.* The proposal to up the status of *Pristis pristis* to endangered has been approved for assessment by the Minister responsible for the EPBC Act. The statutory timeframe in which the assessment must be completed is 30 October 2022.
- The Australian government has recently announced a $20 million package over the next four years for AFMA to modernise its data management infrastructure and processes, and enhance and expand the use of electronic monitoring in Commonwealth fisheries. The E-fish and data transformation program will modernise AFMA's IT infrastructure and systems that underpin and support the collection and integration of the fisheries data with related data collected by other government agencies, for example the Australian Maritime Safety Authority and the Bureau of Meteorology. The investment in the Electronic Monitoring program seeks to expand and enhance the collection and use of fine-scale data for evidence-based decision making and risk assessment. AFMA will work closely with NPFI, NPRAG and NORMAC over the next four years to establish the key program objectives for the NPF and its implementation.

2.3 CSIRO update

NPRAG noted that changes to the publishing of NPF stock assessment reports would be implemented this year. Previously, the biennial tiger prawn assessment and the annual Redleg Banana Prawn assessment have been reported to AFMA in milestone reports. The milestone reports were then collated into a publicly available final report, which was published every three years. From this year, a publicly available annual report will be produced for the tiger prawn assessment and for the Redleg Banana Prawn assessment.

Actions:

- NPFI to define the Brown Tiger Prawn problem in terms of area, time and species, and report back to the RAG on the broader industry view. The problem will be included on the agenda for the November 2021 NPRAG meeting.
- CSIRO to use existing spatial data, to undertake a preliminary assessment of the localised issues with Brown Tiger Prawn raised by an industry member.

3 Tiger prawn assessment / banana prawn MEY trigger

3.1 Tiger prawn assessment

A summary of the NPF tiger prawn catch and effort data and the fishery independent survey data was noted. In 2020, the Grooved Tiger Prawn catch and the Brown Tiger Prawn catch decreased about 18.8% and 55% respectively, the tiger prawn species-combined catch decreased about 34.5%, while corresponding total nominal effort decreased by 5.7% compared with 2019. Similarly, the Blue Endeavour Prawn catch and the Red Endeavour Prawn catch decreased by 54.2% and 15.0% respectively. The nominal effort targeting Grooved Tiger Prawns increased by about 15.4%, but that targeting Brown Tiger Prawns decreased 40% from 2019 to 2020.

It was advised that a statistical analysis of the NPF fishery independent survey data provided guidance on how to undertake the survey in years when some survey sites are impacted by cyclones. The most robust approach is to complete accessible transects in full and skip transects

impacted by cyclone activity. Data from previous years' surveys can be used to supplement the skipped transects. It is also important to survey every site possible each year, as the long-term data from each site is used to supplement survey sites in years when data can't be collected due to cyclones.

3.2 Banana prawn MEY trigger

NPRAG noted the banana prawn MEY catch trigger calculations for 2020 and retrospectively reviewed the industry-estimated fuel price and prawn price compared to the actual price data achieved during the year. The industry-estimated fuel price of $0.55/litre and the prawn price of $13.00/kg were very close to the actual 2020 data, which were $0.54/litre and $13.03/kg respectively. The 2020 MEY trigger was calculated to be 168 kg/boat/day, but as it was outside the 15 per cent buffer, the 425 kg/boat/day value was applied. The RAG noted the industry-estimated prices were again close to the actual prices.

It was suggested that the current fleet-level fuel use figure (L/day) used to calculate the MEY trigger may need to be revised. The figure is a static variable that was estimated by NPRAG a number of years ago. Fuel use may fluctuate each year depending on fishing conditions and it may be more appropriate for industry to estimate a fuel use figure each year, similar to how prawn and fuel price is estimated. It was noted, however, that when catches are poor the fleet spends more time searching and when catches are good the auxiliary engines are used more to process the catch. So in reality, the fluctuations in fuel use between years may not be as variable as might be expected.

It was advised that the economic data collected in 2020 indicated the fishery would have run at a loss if the byproduct species (i.e. squid, scampi, bugs, scallops) weren't accounted for. This is unusual given the fuel cost was 30 per cent lower on the previous year. There were some additional costs that were reported in the economic survey that haven't been reported previously, which may have contributed to the unusual result. It was also noted that some companies have made some large capital investments in the fishery recently, and as capital investments are only included in the data for one year, it can skew the data and the indicative profitability of the industry. In addition, crew share of profits in 2020 may have slightly increased (due to offset poor catches). It was noted that, as the data collected is averaged across the fishery, there is a distribution in profits/losses and some operators would still have made a profit while others would have made a loss.

3.3 February 2020 recruitment survey results

CSIRO presented on the results of the February 2020 NPF recruitment survey. NPRAG noted:

- the survey indices for Grooved Tiger Prawns haven't been particularly positive for the last six years
- the survey indices for Brown Tiger Prawns indicated a pulse in 2016 and 2019 but have been trending down since 2019, with the 2021 index being the second lowest on record
- Blue Endeavour Prawns have been trending just below the average for the last few years
- the regional index for banana prawns around Weipa was relatively high, average around Karumba, and below average around Mornington
- the regional index for Grooved Tiger Prawns around Groote Eylandt was the second lowest on record
- there doesn't appear to be any noticeable trend for Brown/Grooved Tiger Prawns and Blue Endeavour Prawns around the Vanderlin region

- the indices for Brown Tiger Prawns around the Mornington region has been trending down since 2019 to a very low level in 2021, and the recruitment of Grooved Tiger Prawns in the region has decreased
- the index for the Karumba region was shown for the first time to highlight moderate to high abundances of brown tiger prawns in the western portion (Sweers to 'Middle Ground') of the region from 2012 to 2019, reducing to near zero in 2021 (comparable levels to 2003 to 2006)
- the spawning survey indices indicates Brown and Grooved Tiger Prawns have been trending down the last few years
- the regional coverage of each survey site has been consistent over the 19 years of the monitoring program.

4 Ecological Risk Assessment (ERA)

NPRAG noted that the NPF ERA is nearing finalisation and that the additional work it had requested has been completed. Three species experts were engaged to provide additional information for the squid, cuttlefish, champagne lobster and sea snake species. Additional information has also been provided for the Holothurian species group and further analysis undertaken to estimate likely catch of each species. NPRAG considered the additional advice and made the following comments and recommendations:

- No assumptions should be made about the effect of BRDs on sea snakes without any specific data, as interaction rates can fluctuate for numerous reasons including from improved escapement to a decrease in population.
- The expert advice to reduce the potential risk of the Turtle-headed sea snake (*Emydocephalus annulatus*) to low is justified given the species is not likely to be at risk from current trawl effort due to limited species distribution overlap with the fishery.
- The expert advice to reduce the potential risk of Horned sea snake (*Acalyptophis peronii*), Stokes' sea snake (*Astrotia stokesii*), Spectacled sea snake (*Disteira kingii*), Olive-headed sea snake (*Disteira major*), and Yellow-bellied sea snake (*Pelamis platurus*) to medium is justified given the data from the NPF long-term bycatch monitoring project indicates a flat catch trend for each species.
- Expert advice was used to downgrade the availability (species distribution spatial overlap with the fishery) score (S1) for each of the potential high-risk squid and cuttlefish species to one. However, no distribution data is available for the squid and cuttlefish species of interest. The ERA process relies on distribution data to derive an availability score. In the absence of distribution information, another accepted technique is to use depth information for each species and clip it to the boundary of the fishery. Although, using this technique may overestimate the availability score for each of the species. The RAG supported this approach and agreed CSIRO should use this method to calculate the availability score for this species.
- The expert advice to add two more squid species, *Uroteuthis* (*Photololigo*) sp.1 and *U.* (*Photololigo*) sp. 2, may result in two additional high-risk species, but is justified given updated taxonomic information, and each species may be downgraded during the residual risk process if adequate information is available. The RAG suggested that their risk be reduced to medium, consistent with the expert advice that these species are not at risk in the NPF based on current effort levels if they remained at high risk after the updated PSA scores.

- The advice to change the species classification of some species from bycatch to byproduct was noted but it was agreed to retain the current classification as each species in the fishery was categorised based on a RAG-agreed approach through the ERA process.
- The Red Champagne Lobster (*Linuparus trigonus*) has been split into two species (*Linuparus sordidus* and *L. meridionalis*) based on expert advice and additional information has been provided to update some of the missing productivity and susceptibility attributes. With the updated information, the risk scores for both champagne lobster species are assessed as a medium potential risk. The RAG supported these changes based on the expert advice.
- Advice was received to consider implementing a minimum legal size of 7.5 cm carapace length of champagne lobsters and a prohibition on taking berried females. This was currently considered unnecessary given the relatively small catch, limited time and limited area of the scampi sub-fishery where they are caught. However, it was agreed to analyse catch data further, including collecting some grade data.
- After an extrapolation of the AFMA Scientific Observer data for the two potential high-risk Holothurian species, the total catch is still relatively small. In addition, some expert advice suggests the species group data is unlikely to be Black Teatfish (as observers would be able to identify this species) or that all the catches would be from one species. Due to the sporadic distribution of sea cucumbers, it is likely that the catches reported under the Holothurian species group are multiple species. It was therefore supported to reduce the potential risk ratings of Black Teatfish and Golden Sandfish to medium through the residual risk process due to low interaction/capture.

Actions:

- CSIRO to consider the expert advice and RAG comments and update the draft ERA's in line with the residual risk guidelines
- CSIRO to use depth information for each of the potential high-risk squid and cuttlefish species and clip it to the boundary of the fishery to determine an availability score (S1)
- AFMA/NPFI to provide NPRAG with an analysis of the champagne lobster data, including grading data.

5 Sawfish

NPRAG noted an update on the latest NPF-related sawfish information. Improvements have been observed in logbook reporting with an increasing trend in the number of skippers reporting sawfish. In recent years, emphasis has been put on reporting and species identification of sawfish. In 2021, skippers who were not reporting TEPs or sawfish in either of the 2020 fishing seasons were directly contacted in March to emphasise their legislative requirement to report TEP species. The overall number of reported sawfish interactions has substantially increased and is likely due to an increased level of reporting. Skippers were also reminded throughout both seasons to report sawfish to species level. The education campaign, together with a change in the electronic logbook design, has resulted in a noticeable improvement in species-level reporting. The 2021 data to date indicates that the number of unidentified sawfish reports have decreased substantially and the majority of sawfish interactions have been reported to species level.

NPFI is continuing to work with several research providers to improve management and mitigation of sawfish interactions in the NPF. The project "Assessing the impacts of trawl gear on sawfishes in the Northern Prawn Fishery with the aim to identify and test mitigation measures ensuring the long-term sustainability of Sawfish populations in northern Australia" is a 3-year project funded by FRDC and is a continuation of the previous project funded by Parks Australia. Video cameras will

be deployed during the fishing seasons and footage analysed to investigate sawfish behaviour when they encounter the TED. CMO sawfish photos from 2010 onwards will be analysed and data remodelled by CSIRO Data61 to incorporate 2019, 2020 and 2021 data to further investigate if there is an effect of TED orientation. Over the three years, potential mitigation measures that are developed will be tested to determine if they are effective at reducing sawfish interactions.

The project “Is the Northern Prawn Fishery interacting with a single population, or multiple populations of the Narrow Sawfish *Anoxypristis cuspidata*?” is nearing completion with the final report for this project currently being written up with a draft expected soon.

The “Sawfish bycatch sampling” project is a multi-funded project to continue tissue sampling of sawfish each season to enable the collection of sufficient samples for Close-Kin Mark Recapture (CKMR) research. In 2020, CSIRO and NPFI put together the new sawfish tissue sampling kits with 40 sent to the ports prior to the start of the season. All were distributed to skippers and CMOs (sampling is part of the CMO duties) and broodstock operators. 142 samples were collected in 2020 with over 80% of those collected by CMOs and skippers. Kits were restocked and redistributed to vessels in March this year. The Department of Agriculture, Water and the Environment has granted additional funding for the kits to ensure the sampling continues until mid-2022.

6 Redleg Banana Prawn stock assessment

6.1 Stock assessment results

CSIRO presented on the results of the Redleg Banana Prawn stock assessment. It was noted that:

- The environmental indicators for 2021 comprised a southern oscillation index (SOI) of +16.5 (La Niña) and the January/February rainfall of 302.3 mm (less than median). This places the sub-fishery in the neutral zone with a low to average catch per unit effort (CPUE) predicted for the 2021 fishing season.
- In 2020, effort for the sub-fishery was 211 boat days, 195 of which were in the Joseph Bonaparte Gulf (JBG). A total of 144.5 tons was caught, with 133.4 tons caught in the JBG, which equates to an overall CPUE of 0.59.
- The spawning biomass in 2020 was estimated to be above the limit reference point (LRP) but below the target reference point (TRP).
- The modelled total allowable effort (TAE) for 2021 is 160 boat days and a catch of 173 tons, but the confidence intervals are wide indicating a high level of uncertainty with the stock. With the first season closure now in place, it is expected the certainty will improve as the fishing pattern will be more consistent each year.

Management of the TAE was discussed, as the current input controls don’t maintain fishing effort within the modelled TAE for the sub-fishery. It was noted that highly variable stocks, such as Redleg Banana Prawns, do fluctuate considerably from year to year. It was also advised that operators will leave the JBG if they experience poor catches. With the first season closure now in place, there is a range of controls that are likely to increase the stock biomass over the next few years. Historical data indicates that the biomass was generally above the TRP when the first season was closed previously (2007-2010), so there is a good basis to monitor the effect of the current first season closure over the next few years. However, it was noted that all the current information indicates there is potential concern with the stock biomass, which should be closely monitored.

6.2 Stock assessment revision project

CSIRO presented an update on the Redleg Banana Prawn stock assessment revision project. It was noted the stock assessment is being revised to modernise the model, recognise recent changes in the sub-fishery (i.e. the first season closure), and to account for any further changes to the harvest strategy.

The generic hockey stick diagram in the current harvest strategy was discussed as it doesn't accurately reflect how the Redleg Banana Prawn stock is currently managed. The 'standard' hockey stick rule has been problematic in the past because of challenges such as changing intra-annual fishing patterns, large uncertainty in the assessment (as it relies solely on CPUE data) and differences between the recommended TAE and actual annual effort. For such a highly variable stock, it is usual for declining fishing effort to begin at a stock depletion level lower than B_{MEY} (as the stock is expected to fluctuate around B_{MEY}). The current assessment has been using B_{MSY} as the point at which fishing effort is recommended to begin to reduce and the fishing effort is halved when the LRP is breached. In future assessments, a hockey stick rule can be maintained as it's a transparent way to demonstrate how the fishing effort level is calculated. Alternatively, the hockey stick rule can be removed and the assessment will estimate a new target fishing effort level each year. Although, with this approach there becomes increasing uncertainty as the stock falls below the LRP. Consequently, a fixed low fishing effort level at low stock levels (rather than a linearly decreasing trend) was recommended. The RAG considered each option and agreed that the current hockey stick rule is the preferred approach as it is transparent, aligns with the Commonwealth Harvest Strategy Policy and is considered best practice.

Following agreement to maintain the hockey stick rule, the RAG considered how to manage effort to align with the assessment generated TAE. It was advised that, given the limited data available to run the assessment model, a better approach may be to focus on managing CPUE rather than the TAE. Due to the dynamics of the fishery, operators are unlikely to continue fishing in the JBG if catch rates are poor. If catch rates are good, operators will continue fishing, which is acceptable given this may indicate an above average recruitment. The concern is if a precautionary TAE is set and operators continue fishing even though catch rates are poor. It was suggested that providing industry with a CPUE per boat/day that represents the TAE would allow operators to monitor their catch rates and stop fishing if catches were low. Understanding that the likelihood the sub-fishery may close the following year if operators continue to fish beyond the recommended CPUE may be an incentive for operators to fish within the recommended TAE. The RAG agreed this was a pragmatic approach that would also allow the effect of the first-season closure to be monitored.

The reference levels for the Redleg Banana Prawn stock were discussed to consider whether any changes were necessary. The current target (B_{MEY}) reference level is a proxy and was agreed to around 2010 when it was advised the catch rates for the preceding ten years were at a profitable level. For the most recent assessment, the target reference level corresponds to $0.55B_{1980}$. The corresponding B_{MSY} level is then computed from the proxy B_{MEY} using the default value of 1.2 B_{MSY}. The RAG also discussed whether when needing an estimate of the carrying capacity of the stock, rather than basing it on the 1980 biomass level as is currently done, it might be preferable to use instead an average of the first five or ten years (K_{ave}) to account for the variability in the stock. The RAG questioned whether any changes should be made to the current reference levels considering the first season closure just came into effect. It considered that it may be preferable to wait a few years until the economics and stock benefits of only fishing in the second season are observed and reconsidering what the appropriate reference levels should be at this time. It was also noted that the results of a dynamic biomass level project (FRDC 2019-036) will be available in a few years and will provide guidance when the sub-fishery reference levels are reconsidered. The RAG noted the current reference levels are more precautionary than that required to meet the objectives of the

Commonwealth Harvest Strategy Policy, and agreed to maintain the current reference levels until it reviewed them again in a few years.

Preliminary results of an analysis on the minimum number of days needed to reliably run the assessment were presented. A specific number is yet to be determined, but the RAG noted the analysis is ongoing and the result will be an important component of the revised harvest strategy.

It was advised that the process for generating a fishing power estimate required each year for the Redleg Banana Prawn stock assessment is being reassessed. It may be possible to align the detailed fishing power analyses with those conducted for tiger prawns, for which an assessment is only done every second year. The Redleg Banana Prawn fishing power model builds on that for tiger prawns and the additional work required to generate an annual Redleg Banana Prawn fishing power estimate may not be justified. An analysis of the potential error if an extrapolated draft fishing power estimate is used every second year as input to the stock assessment and then replaced with a more detailed update every second year was presented. Using an extrapolated draft fishing power estimate introduces bias, but the overall impact on the stock assessment was minimal for the most recent year. However the degree of bias in fishing power depends on both the year and the trajectory of fishing power, which is step-wise in nature. It was noted the RAG will be informed when further analyses are undertaken to determine the best approach.

NPRAG agreed:

- The current hockey stick rule is the preferred approach as it is transparent, aligns with the Commonwealth Harvest Strategy Policy and is considered best practice.
- To provide a CPUE per boat/day that represents the TAE as a guide and in the meantime allow the effect of the first-season closure to be observed.
- To maintain the current stock assessment reference levels until it undertook a review in a few years.

Actions:
- CSIRO to provide industry with a Redleg Banana Prawn CPUE (per boat per day) converted TAE to allow operators to self-manage against their catch rates in-season.

7 Redleg Banana Prawn Harvest Strategy

NPRAG noted that following the AFMA Commission's decision to implement a first season closure in the Redleg Banana Prawn sub-fishery, a review of the NPF Harvest Strategy is needed. An update is required to incorporate the new harvest control rule and adjust the mechanics of the harvest strategy to ensure it aligns with the requirements of the Commonwealth Harvest Strategy Policy. A draft revised harvest strategy was provided for RAG review and the following points were discussed:

- The operational objective, according to the Commonwealth Harvest Strategy Policy, should be to maximise maximum economic yield (MEY) for the fishery as a whole. In a multi-species fishery, this means that some stocks may be fished below their individual B_{MEY} to achieve the overall MEY for the fishery. However, because the Redleg Banana Prawn sub-fishery is Marine Stewardship Council (MSC) certified, the stock is required to fluctuate around B_{MSY}. The stock could be below B_{MSY} and still meet the requirements of the Commonwealth Harvest Strategy Policy but would not meet the requirements of MSC certification. NPRAG agreed that maximising MEY for the Redleg Banana Prawn sub-fishery is therefore the operational objective in order to meet the more conservative requirements of MSC certification.

- Clarification was provided that the Redleg Banana Prawn stock is considered to be all Redleg Banana Prawns caught in the area of the NPF (JBG, Coburg/Melville, Fog Bay), however, for assessment purposes the stock in the JBG is assessed as an indicator of the overall stock levels given most of the catch derives from the JBG.
- The draft harvest strategy indicates the stock assessment results will only be used in "data sufficient years". It was questioned whether it would be better to run the assessment model every year, even in years with limited data, as an analysis indicates that, historically, years with low data still align with the overall stock trend and appear to be representative of stock status. However, it was advised that there is a point where the data is so limited that it can't be reliably used to estimate the stock status and it is better to not use an estimate at all than rely on a highly uncertain result. In addition, analysis of years with limited data was performed retrospectively and using limited data for projection purposes may not be as simple. Industry has previously suggested that there are situations where limited CPUE data are highly unreliable, such as if operators fish in the JBG at the wrong time or if operators aren't experienced in fishing the JBG area.
- The details of the proposed decision rules were discussed and examples provided of how the decision rules would apply in various scenarios. The RAG agreed the decision rules were robust and captured the dynamics of the fishery well, and suggested that the harvest strategy contain example applications of the rules.
- As the first season closure is an important component of the harvest strategy, it was suggested that a description of the closure as a primary management tool be included in the first paragraph of the strategy along with commentary on the management strategy evaluation (MSE) that has been undertaken.
- Because part of the Redleg Banana Prawn stock is caught outside of the JBG, options for ensuring the whole stock is covered by the harvest strategy were discussed. The assumption in the assessment model is that the stock caught in the JBG (90% of total NPF Redleg Banana Prawn catch) is representative of the wider NPF Redleg Banana Prawn stock. It was agreed that the part of the stock caught in Fog Bay and Coburg/Melville should be monitored each year to ensure the JBG area continues to be representative of the stock as a whole. The RAG agreed to include a paragraph in the harvest strategy that demonstrates it will monitor the portion of the stock caught in the Fog Bay and Coburg/Melville areas each year to ensure the stock assessment continues to be representative of the wider NPF Redleg Banana Prawn stock.

The RAG agreed for the working group to revise the draft Redleg Banana Prawn Harvest Strategy to include the recommendations discussed, including the revised 'hockey stick' diagram discussed the previous day. It would then consider the revised draft before providing to NPFI for industry consideration.

The RAG noted concerns by NPFI that the agreement by NPFI to close the JBG in the first half had been taken in isolation to subsequent discussions on proposed amendments to the Redleg Banana Prawn Harvest Strategy. It was noted that an extensive industry consultative process would be required to facilitate consideration and finalisation of the Strategy.

Actions:

- Working group to revise the draft Redleg Banana Prawn Harvest Strategy for RAG review out-of-session before providing to NPFI for industry consideration.

8 Environment update

The latest environmental information relevant to the NPF was discussed. It was noted that environmental drivers of productivity developed through the MICE project such as sea level height, El Niño–Southern Oscillation (ENSO) and rainfall can be included in a short report for the RAG to monitor each year. There are also a number of other projects currently underway that can contribute information to the report. The RAG agreed an environmental report card would be useful and suggested CSIRO provide a draft example for its November 2021 meeting.

Actions:

- CSIRO to provide a draft example environmental report card for RAG review at its November 2021 meeting.

9 MSC

NPRAG reviewed the Marine Stewardship Council (MSC) certification client action plan to assist NPF Industry in keeping it on track for meeting the agreed actions within the proposed timeframes. It was noted that further work is needed to ensure the conditions on Red Endeavour Prawns are met. Progress toward completing the actions and meeting the conditions was discussed and it was agreed NPFI, AFMA and CSIRO would draft changes to the NPF Harvest Strategy based on the information that is currently available.

NPRAG was informed the dates for each action in the MSC client action plan had been extended due to challenges related to the COVID19 pandemic. It was suggested that the dates in the plan be updated for the RAG so the updated timeframes are clear.

Actions:

- NPFI, AFMA and CSIRO to draft changes to the NPF Harvest Strategy to incorporate currently available information for Red Endeavour Prawns.

10 Research

10.1 Annual research statement

The development of the 2022-2023 NPF Annual Research Statement was discussed. It was noted the annual research priorities reflect the longer-term priorities set out in the NPF five-year Research Plan and in developing research priorities and assessing research proposals the 'Framework for delivering cost effective fisheries research for AFMA' was considered.

The RAG noted that during its November 2015 meeting, a range of potential research projects were identified to improve the NPF stock assessments. Each project was prioritised according to its immediate need and benefit to the fishery (to achieving fishery objectives). It was agreed to regularly review the potential research options with regard to changing conditions in the NPF and a commitment was made to continually update, reprioritise and review potential funding options when possible.

The list of identified research projects to improve the NPF stock assessments was reviewed and it was noted that the 'Banana/tiger economics' project has been completed internally by CSIRO and a report will be provided for the RAG at its November 2021 meeting. It was also advised the 'Evaluating a spatial assessment for the NPF tiger prawns' project will be updated following

consultation at CSIRO's annual NPF team workshop. Data from the MICE project that's currently underway will also provide useful information for a spatial assessment project. It was suggested to reconsider this project next year after the information from CSIRO's team workshop and the MICE project is available. The 'Banana MEY trigger' project was not considered a priority at this stage.

A potential area of research put forward for RAG consideration was the effects of environmental change on the fishery. Understanding and monitoring environmental indicators as a way to anticipate any potential changes to stock dynamics, especially in regards to tiger prawns, will be an increasingly important area of research in the near future. Some research has recently been conducted on environmental indicators and banana prawns. It was suggested the current research exploring the physical impacts of climate change on fisheries is useful, but a gap in the research is the impact of climate change on fishery regions, in terms of imports, exports and food security. As countries are impacted by climate change, it may result in substantial trade opportunities for the NPF. The Economic Member suggested there are opportunities as well as costs associated with the impacts from climate change and advised he will provide the RAG with some analyses already undertaken on trade distortions. It was further added that the COVID-19 pandemic can be used as a surrogate for what can happen to supply chains from extreme external shocks. Similar extreme shocks are predicted to occur more frequently under a changing climate and industries that can make their supply chains more resilient before the shocks occur will be better placed to capitalise on changing conditions.

It was questioned whether updated biological information was available for NPF species. It was advised that updated biological information is not available and has more than likely changed since originally collected and should therefore be a research priority. The RAG noted that the NPF at-sea monitoring program and the species split project have collected data that could be used to update the biological information of some species.

A large portion of the potential research areas discussed relate to the impacts from a changing climate. It was suggested that it would be useful to organise a focussed workshop to try and prioritise R&D related to all of the concerns related to fishery impacts from environmental change. The RAG agreed that the top research priority was a project to host such a workshop. It was further advised that recent Australian Government announcements indicate there is financial assistance to help industries remain profitable during environmental change.

The final area of research identified as a priority is ongoing research to reduce interactions with sawfish and sea snakes. NPFI has previously received Marine Park grant funding to better understand interactions through the use of cameras in trawl nets. Additional funding opportunities have recently been announced and the RAG agreed that reducing interactions with sawfish and sea snakes remains a priority. The priority is to be included in the NPF Annual Research Statement with funding to be sought through the new round of marine parks grants.

10.2 Species split project update

CSIRO provided an update on the species split project which included a summary of samples collected during each season since the 2019 tiger prawn season. NPRAG noted some graphs representing a summary of species distribution and suggested that the number of samples (n) for each sex should be displayed, the carapace length might also be converted to prawns per pound (as this is what the industry is familiar with), and graphs with all sample years on the same plot would be useful to compare changes in each region each year. It was advised that these suggestions will be considered when producing graphs for future RAG presentations. NPRAG also requested a summary of the 2021 banana prawn season sampling effort (i.e. whether sufficient samples were collected) when available shortly after the season ends.

10.3 Northern waters / mangrove dieback update

NPRAG noted an update on the dieback of coastal mangroves in the Gulf of Carpentaria that occurred in 2015-16. CSIRO staff have been monitoring a tract of mangroves adjacent to the Karumba Airport since 2017 and have made a photographic record of the reestablishment of the mangroves. The site was visited again in March 2021 and the mangrove recovery has continued. The seedling-generated forest regrowth has continued in the form of young trees of mainly *Avicennia marina* continuing to increase in height and 'width'. Most of the forest's dead original trees have fallen and floated away.

An update on recent Northern waters developments was noted. The Etheridge Shire Council has developed a Detailed Base Case for a 323,500 ML dam on the Gilbert River to support irrigated agriculture downstream between Georgetown and Croydon. The dam wall will cross the Gilbert River approximately 3.5 km downstream of the Carnes Road crossing and stand approximately 31 metres. The dam can store approximately 323,500 ML water and has an inundation area of 5,847 ha. The land which will be inundated is currently used for cattle grazing. The water will be delivered to customers up to 60 km downstream (north-west) of the dam and up to 70 km west of Georgetown where soil suitable for irrigated agriculture is available. In 2020, several detailed scoping documents were prepared for Etheridge Shire by Jacobs Australia Pty Limited, South Brisbane.

It was also noted that in March 2021, CSIRO wrote a response to the Productivity Commission's National Water Reform 2020 (NWR 2020) draft report. The thrust of the CSIRO submission was that the NWR 2020 did not address the challenge of future agricultural and water resource development in Australia's tropical river catchments, despite these catchments currently being scoped for the development of irrigated agriculture.

Actions:

- CSIRO to provide NPRAG with a summary of the 2021 banana prawn season species split sampling effort shortly after the season ends.

11 MICE project update

CSIRO presented on the progress of the models of intermediate complexity for ecosystem assessments (MICE) project. It was noted that the key components of the project include:

- 8 major spatial areas assessed
- Sub-structure to consider at least freshwater, estuary and offshore dynamics operating differently
- Time step = 1 week, except for a few species where it is monthly (e.g. mud crabs)
- Species included are common banana prawns, Brown and Grooved Tiger Prawns, barramundi, mud crabs (male and female separate), Largetooth and Narrow Sawfish
- Dynamics of species linked with environmental drivers such as flow
- Some technical interactions included
- Coupled with economic models

Preliminary results indicate that all of the 6 major rivers (i.e. including Embley, which influences Region 1, and Roper River, which influences Region 7) are influential with the relative role and contributions of each varying by region and by year. The combined portfolio of rivers thus acts to 'stabilise' or maintain the banana prawn population across the entire Gulf of Carpentaria, and

reducing flows from one or more rivers will have non-linear effects on banana prawns and other marine species which this project is trying to quantify. Different river systems are important in different years and a combination of these flow anomalies across the different systems ultimately determines the system productivity and catch that is available to be caught.

Preliminary results for other species, including mud crabs, were also presented to demonstrate how the model can be applied. The next steps in the project were noted and it was advised a workshop will be organised for the middle of the year to consult with stakeholders on preliminary results and obtain feedback.

12 Review of new research and NPF related journal papers published by CSIRO

NPRAG noted the list of many NPF related research papers recently published by CSIRO and one collaboratively with Griffith University. It was advised that interested RAG participants could request a copy of any of the published papers by contacting CSIRO.

13 Action items

NPRAG considered the list of action items and the status of each item was updated to reflect progress.

14 Other business

14.1 NPF Bycatch Strategy

NPRAG noted that the NPF Management Advisory Committee (NORMAC) had considered the draft NPF Bycatch Strategy 2020-2024 and provided comment. The Environment/Conservation Member had proposed some updates that were now included in the Strategy. NPRAG reviewed the updated draft Strategy and supported the changes made. The RAG noted that whilst industry innovation to reduce small bycatch would continue to be encouraged, sawfish and sea snakes are the high priorities to be addressed under this Strategy.

14.2 High-risk species data collection

NPRAG was asked to consider whether Crew Member Observers (CMOs) were required to continue to collect data on some species assessed as potential high risk (Brown and Yellow Mantis Shrimps) through the previous ERA. The data collected by CMOs has been used in the current draft ERA to reduce the risk from high to medium following residual risk analysis based on low interaction/capture. NPRAG suggested that a large dataset has now been collected and recommended CMOs discontinue collecting data on mantis shrimps and focus on collecting other important data starting in the 2021 tiger prawn season.

The Chair closed the meeting at 15:30 (AEDT) on 13 May 2021.

Signed (Chairperson):

Date: 27 June 2021

Attachment 1

Northern Prawn Fishery Resource Assessment Group Agenda

Brisbane Riverview Hotel – Ascot room
12 May 2021 (9.00 am start)
13 May 2021 (8.30 am start)

Day 1 – Wednesday 12 May 2021 (9:00 am to 5:30 pm (AEST))				
Item	**Responsibility**	**Paper**	**Indicative Timing**	**Expected outcome**
1. Introduction / Meeting Management • Welcome • Adoption of agenda • Declaration of interests • Minutes from previous meetings	Chair	Yes	15 mins 9.00-9.15	
2. Update reports • Industry ○ BRD implementation ○ Sawfish ○ Broodstock ○ CMO program • AFMA ○ Commission decision on broodstock collection • CSIRO ○ Format of reporting each year for each assessment – proposed changes	Industry / AFMA / CSIRO	Yes	60 mins 9.15-10.15	NPRAG to note the various update reports.
3. Tiger prawn assessment/ banana prawn MEY trigger • Update from monitoring surveys	CSIRO	Yes	50 mins 10.15-10.40/break /11.00-11.25	NPRAG to note survey results for tiger (brown/ grooved) and endeavour prawns; latest data from the

and review of stock status • Update to economic survey (latest results) and request for Redleg Banana Prawn price data • Report on banana prawn MEY trigger				economic survey; industry MEY estimates and review/provide advice on the 2021 estimates.
Morning tea – 10.40 am to 11.00 am				
4. ERA • Final NPF banana prawn and tiger prawn ERAs	CSIRO / AFMA	Yes	75 mins 11.25-12.40	NPRAG to review and endorse final ERA report.
Lunch – 12.40 pm to 13.30 pm				
5. Sawfish • Update on interaction trends	NPFI / AFMA	Yes	20 mins 13.30-13.50	NPRAG to note latest data on sawfish interactions.
6. Redleg Banana Prawn • 2020 stock assessment research project update	CSIRO	Yes	205 mins 13.50-15.25/break/15.40-17.30	NPRAG to note the results of the 2020 Redleg Banana Prawn assessment and 2021 TAE; progress update on assessment project.
Afternoon tea – 15.25 pm to 15.40 pm				
Day 2 – Thursday 13 May 2021 (8:30 am to 5:00 pm (AEST))				
7. Redleg Banana Prawn Harvest Strategy (HS) review	CSIRO	Yes	90 mins 08.30-10.00	NPRAG to review and comment on proposed changes to Redleg Banana Prawn HS.
8. Environment update	CSIRO/All	Yes	10 mins 10.00-10.10	NPRAG to note latest environmental information relevant to the NPF.
9. MSC • Review the NPF MSC client action plan	NPFI	Yes	35 mins 10.10-10.45	NPRAG to review the MSC client action plan to ensure the NPF is on track to meet the agreed actions

				of the plan within proposed timeframes, and provide advice on any further work required.
Morning tea – 10.45 am to 11.00 am				
10. Research • Priorities for stock assessment improvements • Annual research plan • Northern waters / mangrove dieback • Species split, bycatch, endeavour prawn projects update		Yes	85 mins 11.00-12.25/lunch/ 13.15-13.20	NPRAG to review/ provide advice on proposed stock assessment improvement projects; prioritise research to be included in the 2022-23 NPF annual research plan; note updates on northern waters developments, mangrove dieback, and the species split, bycatch and endeavour prawn projects.
Lunch – 12.25 pm to 13.15 pm				
11. MICE project update	CSIRO	Yes	55 mins 13.20-14.15	NPRAG to provide extensive feedback on FRDC water development MICE project.
12. Review of new research topics and list of journal papers published on NPF by CSIRO listed	CSIRO	Yes	5 mins 14.15-14.20	NPRAG to note published papers shared by CSIRO.
13. Action items	All	Yes	35 mins 14.20-14.55	NPRAG to note progress on action items from previous meetings and provide feedback and comments where appropriate.
14. Other business	All	No	30 mins 14.55-15.25	NPRAG to consider any other items of business.

Attachment 2

NPRAG Declared Conflicts of Interest

Participant	Membership	Interest Declared
Ian Knuckey	Chair	Director - Fishwell Consulting Pty Ltd Director - Olrac Australia - a company associated with electronic logbooks. Scientific member - NORMAC Member - North Marine Parks Advisory Committee Chair - Tropical Rock Lobster RAG Chair - Victorian Rock Lobster RAG Scientific member - SESSF shark RAG Scientific member - GABRAG Works with Indigenous communities in capacity building activities Chair - South Australia's Gulf of St Vincent prawn fishery's research committee Scientific member - South Australia's Gulf of St Vincent prawn fishery's management advisory committee Current consultancy with NT Fisheries designing a snapper species survey Various research interests in other Commonwealth and State fisheries.
Rik Buckworth	Scientific Member	Scientific Member - Torres Strait Finfish RAG Director - Aquatic Remote Biopsy Pty Ltd Director - Sea Sense Australia Pty Ltd Adjunct Professor - Charles Darwin University Appointed as a CSIRO Fellow in 2020 Current consultancy contract with NPFI to review Red Endeavour Prawns Chair of the NT Aquarium Fishery Management Advisory Committee Various consultancy work with NT Fisheries Current consultancy contract with AFMA and QDAF for a project in the Torres Strait 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.
David Brewer	Scientific Member	Director - Upwelling P/L (David Brewer Consulting) Honorary Fellow - CSIRO Scientific member - NPRAG

		Scientific member - Torres Strait Fin Fish Working Group Chair - Torres Strait Fin Fish RAG Current consultancy work with AFMA, Torres Strait and the Quandamooka Yoolooburrabee Aboriginal Corporation, Moreton Bay.
Éva Plagányi	Scientific Member - 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.
Tom Kompas	Economic Member – University of Melbourne	Research provider. Has in the past and may in future seek and receive funding for research in the fishery.
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.
Ian Boot	Industry Member	Managing Director of Austfish, a company which operates NPF vessels. Has a commercial interest in the fishery. NPF broodstock permit holder. Participates in scampi fishing.
Bryan van Wyk	Industry Member	Employee of Austral Fisheries, no pecuniary interest in the fishery.
Darci Wallis	AFMA Member	AFMA employee, no pecuniary interest in the fishery.
Stephen Eves	Executive Officer (AFMA)	AFMA employee, no pecuniary interest in the fishery.
Annie Jarrett	Observer - NPFI	CEO- NPFI Member of the MSC Stakeholder Council Chair - Australian Council of Prawn Fisheries (ACPF) Member of the FRDC selection panel Some research items are of relevance to NPFI.
Adrianne Laird	Observer - NPFI	Employed as a contractor by NPFI. Some research items are of relevance to NPFI.
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.
Roy Deng	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.

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.
Ian Butler	Observer - ABARES	Economics research provider. No current pecuniary interest in fishery. Potential to seek and receive funding for research in the fishery in future.
Michael Dylewski	Observer - ABARES	Economics research provider. No current pecuniary interest in fishery. Potential to seek and receive funding for research in the fishery in future.
Laura Blamey	Observer - CSIRO	Research provider. Has in the past and may in future seek and receive funding for research in the fishery.
Tonya Van Der Velde	Observer - CSIRO	Research provider. Has in the past and may in future seek and receive funding for research in the fishery.
Miriana Sporcic	Observer - CSIRO	Research provider. Has in the past and may in future seek and receive funding for research in the fishery.
Sean Pascoe	Observer - CSIRO	Research provider. Has in the past and may in future seek and receive funding for research in the fishery.

NPRAG Action items

Item	Person responsible	Description of action item	Progress
	18 May 2016 Meeting		
	Rik Buckworth/CSIRO	Upload research reports relevant to the NPF to the GovTEAMS site.	**Complete** – CSIRO has compiled a bibliography. NPF stakeholders can request papers from CSIRO. AFMA will explore placing a link to the bibliography on its website.
	17-18 November 2016 Meeting		
	CSIRO	Review/update the assessment inputs to consider the influence of price elasticity.	**Complete** – Tom Kompas and CSIRO to draft a project proposal that considers the influence of price elasticity for RAG consideration.
	NPRAG Chair	Send a thank you letter to the crews involved in the operational testing of the BRD.	**Complete**
	23-24 May 2018 Meeting		
	AFMA/NPFI	AFMA and NPFI to investigate the objective for collecting species abundance counts and whether this data should continue to be collected.	**Ongoing** – AFMA observers collected data on bird warp strikes during 2019 and reported zero interactions. AFMA to consider the wildlife data collection protocols for the future. Will be considered as part of the NPF data plan.

	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.	**Complete -** the ERA working group has reported key results back to the RAG and the ERA is in its final stage of completion.
	1 November 2018 Meeting		
	AFMA	AFMA to look into New Zealand's protocols for counting bird abundance	**Ongoing -** Will be considered as part of the NPF data plan.
	AFMA	AFMA to check the observer protocols to ensure the collection of the 10 kg subsample is in accordance with the method outlined by *Heales* et al.	**Ongoing -** Will be considered as part of the NPF data plan.
	David Brewer/Gary Fry	David Brewer and Gary Fry to provide comments/feedback to AFMA on the current observer manual and annual observer report	**Complete**
	21 February 2019		
	AFMA	Organise for a field to be added into e-logs so broodstock individuals can be recorded directly to the AFMA database	**Complete** – AFMA database and e-logs are being updated. New reporting procedures will be in place before the start of the 2021 banana prawn season.
	AFMA	Ensure there is a way in the e-logs to record and distinguish between a broodstock trip and a regular NPF fishing trip	**Complete** – AFMA database and e-logs are being updated. New reporting procedures will be in place before the start of the 2021 banana prawn season.
	AFMA/NPFI	Develop a sawfish mitigation plan for consideration by RAG and MAC before the	**Complete** – a move-on provision was introduced as a

		end of March. In developing the plan, investigate research options to assess post release survival of sawfish and consider closures in high interaction areas, move-on provisions and ensure near-real time reporting of sawfish interactions from the vessels	broodstock collection permit condition during 2019.
	AFMA	Increase observer coverage on broodstock fishing trips and ensure that coverage is representative	**Complete** – the target observer coverage for broodstock operators is 20%. During 2020, observers were unable to undertake trips in the banana prawn season due to COVID-19 related logistical constraints, although the target coverage was achieved during the tiger prawn season.
	APFA	Provide a 5-year projection on the total number of *P. monodon* broodstock animals to be sourced from the NPF annually	**Complete** – In February 2021, APFA advised that its previous advice on the immediate and longer-term outlook for prawn aquaculture industry broodstock supply needs remains at 12,000 increasing to 20,000 animals over the next 5 years.
	AFMA/CSIRO	Ensure all catch data (including discards) from broodstock fishing operations are included in the NPF stock assessment	**Complete** – to discuss under agenda item 4.
	AFMA	Conduct a SAFE assessment for the NPF including fishing for broodstock collection (within 6 months)	**Complete** – stock assessment undertaken instead.

	AFMA/NPRAG	Investigate options for further assessment of *P. monodon* stocks to provide information on the sustainable harvest of *P. monodon* from the NPF over the longer term	**Complete** – stock assessment project undertaken.
	NPFI	Review the size structure of the scampi catch using grading data from scampi operators	**Ongoing** – initial analysis will be presented during November 2021 meeting.
	NPRAG/NPFI	Collaborate out-of-session to help develop a project proposal for the marine parks grant opportunity	**Complete**
	AFMA/Phil Robson	Analyse the historical catch and effort data, by season, around Bountiful and Mornington Islands and present the analysis to the RAG at its May 2019 meeting for its consideration	**Ongoing –** will be presented during 2021
	30-31 May 2019 Meeting		
	Rob Kenyon	Circulate the Andrew Broadley NESP report when it becomes available	**Complete** – Rob circulated report via email on 13 May 2021.
	NPRAG Chair	Write to the CMOs acknowledging their efforts and contribution to the fishery	**Complete**
	AFMA	Investigate if data quality checks and rectifying data errors can be automated	**Ongoing -** Will be considered as part of the NPF data plan.
	AFMA	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	**Ongoing -** Will be considered as part of the NPF data plan.
	AFMA/NPFI	Refine objectives and continue development of the	**Ongoing -** Will be considered as part of the NPF data plan.

		data and monitoring plan in consultation with the RAG	
	ERA species list review		
	AFMA/CSIRO	Split the ERA species lists by logbook data and all other data sources (e.g. observers) to help clarify the species splits	**Ongoing** – will check final version of ERA
	CSIRO/AFMA	Consider splitting the logbook recorded squid species group in the ERA by the percentages recorded by CSIRO survey data	**Ongoing** – will check final version of ERA
	CSIRO/AFMA	Use the species split model to split the tiger prawns recorded in the banana prawn sub-fishery	**Ongoing** – will check final version of ERA
	CSIRO/AFMA	Double check the catch of Redleg Banana Prawns in the banana prawn sub-fishery	**Ongoing** – will check final version of ERA
	CSIRO/AFMA/ABARES	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	**Ongoing** – will check final version of ERA
	CSIRO/AFMA	Categorise all king prawns as a byproduct species group	**Ongoing** – will check final version of ERA
	Harvest Strategy review		
	AFMA	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	**Ongoing** – will review the data for byproduct species that require further assessment following the finalisation of the ERA.
	Bycatch Strategy review		

	AFMA/NPFI	Prepare a draft of the NPF bycatch strategy by the November 2019 RAG meeting	**Complete** – draft presented at May 2020 meeting. NPRAG provided additional comments OOS in late 2020.
	AFMA/NPFI	Split general bycatch and TEPs into sub-sections under the NPF bycatch strategy	**Complete** – has been separated in draft bycatch strategy.
	AFMA/NPFI	Include an overview of historical initiatives and bycatch reductions in the new bycatch strategy	**Complete** – included in draft bycatch strategy.
	AFMA	Explore options for validating the CMO and Scientific Observer eyeball estimates of total bycatch	**Ongoing** – Will be considered as part of the NPF data plan.
	AFMA	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	**Complete** – words considered as part of the bycatch strategy development.
	P. monodon assessment		
	CSIRO	Include prawn discards (from targeted broodstock fishing) in the next tiger prawn stock assessment as a sensitivity test.	**Complete** – CSIRO presented data at the May 2021 meeting that demonstrated the data is too variable and would add 'noise' to the model if included. With the introduction of new e-log reporting procedures, the data may be useful when a few more years of data is available.
	APFA	Provide weight data on individual prawns to determine the average weight of each *P. monodon* collected for broodstock purposes	**Complete** – NPFI email on 29/03/2019 advising the APFA SOP requires broodstock animals of this size or larger: sexually mature *P. monodon* sizes are roughly considered to

			be 70 grams (or 205 mm tip of rostrum to tip of telson) for males and 100 grams or (220 mm) for female.
	29 August 2019 Teleconference		
	AFMA/NPFI	Develop terms of reference for the NPF harvest strategy review for scampi and other byproduct species in light of the revised HSP	**Complete** – The RAG agreed to take a stepped approach to managing the potential risk to byproduct species. The initial step is to consult relevant taxonomic experts to address any data gaps and following this, consider another approach, such as an e-SAFE assessment, for the species that remain at high risk.
	7-8 November 2019 Meeting		
	NPFI	Provide RAG with results of the analysis of the quantity of tiger prawns caught in the first half (as a proportion of the yearly tiger prawn catch) to determine a trigger value for review of BRD use in the first season	**Complete –** analysis provided to RAG at its Nov/Dec 2020 meeting.
	CSIRO	Explore options to provide an update on *P. monodon* stock assessment results before March 2020 and the preliminary report by May 2020	**Complete**
	Dave Brewer / Gary Fry	Review the AFMA Scientific Observer report and suggest a process for determining the temporal and spatial observer needs of the fishery, taking into consideration the scientific report that originally established the program	**Ongoing -** Will be considered as part of the NPF data plan.

	AFMA	Consider including the observer program targets in the annual observer report and a summary of how the program is tracking in relation to the targets	**Ongoing -** Will be considered as part of the NPF data plan.
	NPFI	Consider the NPF byproduct species and determine aspirations for each species to inform what level of assessment is required and what the data gaps are	**Ongoing** – The RAG agreed to take a stepped approach to managing the potential risk to byproduct species. The initial step is to consult relevant taxonomic experts to address any data gaps and following this, consider another approach, such as an e-SAFE assessment, for the species that remain at high risk.
	AFMA	Explore options to maintain accessibility and usability of the various components of the FMS	**Ongoing –** Will be considered as part of the FMS development.
	AFMA	Explore the feasibility of changing the NPF logbook reporting requirement to a shot-by-shot report	**Ongoing** – was discussed at the Nov/Dec 2020 meeting and will be further explored during 2021.
	NPFI	Work with individual skippers to improve sawfish data reported in the NPF logbooks	**Complete** – NPFI worked with operators during the 2020 and 2021 pre-season surveys. AFMA sent a letter to operators in August 2020. Improvements in reporting evident in 2020 and 2021 to-date. NPFI will continue to work with operators to improve TEP reporting.
	ERA sub-group	Review the draft ERA and identify species that need further enquiry and liaise with	**Complete –** experts have been engaged to provide expert input.

		experts to try and fill any data gaps	
	AFMA	Revise the NPF Harvest Strategy for squid to clarify that there is a review point at an annual catch of 300t and an annual limit of 500t	**Ongoing** – to be considered as part of the harvest strategy review.
	AFMA / CSIRO	Review data for all byproduct species (i.e. mudbugs and scallops) to inform the development of sustainable catch triggers in the NPF Harvest Strategy	**Ongoing** – to be considered as part of the harvest strategy review.
	ERA sub-group / CSIRO	Include commentary in the ERA to clarify the different nature of scampi fishing (including the associated catch of red champagne lobster)	**Ongoing** – will be included within the final ERA
	CSIRO	Develop a full project proposal for the close-kin mark recapture research, with each component costed, for RAG review before being submitted to FRDC.	**Complete** – proposal submitted to FRDC round that closed in January 2021.
	AFMA	Liaise with Queensland and Northern Territory Fisheries to coordinate collaborative support for the project and sample collection	**Complete** – DAWE has made available some funding to support some key aspects of sawfish research. A component ($40K) of this will be used to support ongoing sawfish sampling (through till June 2022). Archiving and first QC checks on the CMO/NPFI collected samples will be undertaken during May 2021. CSIRO is still waiting to hear whether FRDC supports its CKMR proposal.

	AFMA	Scampi review project to assess the 'species identification problem'	**Ongoing** – will be considered as part of a scampi review project.
	11 March 2020 Meeting		
	CSIRO	Provide the RAG with explanatory paragraphs on the MSE proposed harvest control rules 2,3 and 4, that outline each rule, what they achieve, the differences between each rule and the logistical considerations	**Complete** – Commission approved the recommended HCR at its November meeting.
	CSIRO	Keep harvest control rule 1 for comparative purposes, but remove harvest control rules 1 and 5 from further sensitivity testing.	**Complete**
	CSIRO	Present a paper at the May 2020 meeting outlining the issues with the current banana prawn MEY calculation and potential solutions.	**Complete** – CSIRO provided presentation at the 06 August 2020 meeting.
	20-21 May 2020 Meeting		
	AFMA/NPFI/CSIRO	Discuss some of the *P. monodon* data issues and improvements that can be made to the stock assessment project	**Complete** – improvements identified at the Nov/Dec meeting.
	AFMA/NPFI	Inform CSIRO of the likelihood of targeted broodstock shots where all individuals are retained and zero discarded, and also where all individuals are discarded and zero retained	**Complete**
	Gary Fry	Provide the *P. monodon* stock assessment team with information regarding the survivability of discarded *P. monodon*	**Complete –** preliminary survivability data from CSIRO research trips used in stock assessment and a sensitivity test of 100% mortality also included.

	AFMA/NPFI/CSIRO	Consult broodstock operators to validate some of the results from the CPUE standardisation, e.g. catch rates are lowest at dusk	**Complete –** operators consulted in 2020 teleconference.
	AFMA/NPFI	Clarify whether reported catches of 1 kg are rounded, i.e. are catches less than 1 kg not reported or rounded to 1 kg	**Complete –** industry provided advice - small volumes can be collected over multiple shots and recorded when a 1 kg box is filled.
	CSIRO *P. monodon* stock assessment team	Assess whether CPUE indices can be determined for sub-areas based on known stock high catch areas	**Complete –** sensitivity tests included in stock assessment.
	Industry/CSIRO/AFMA	Meet in the next few weeks to discuss the CPUE standardisation progress, inform of the spatial dynamics of the stock and consider the table of variables used to develop the *P. monodon* CPUE standardisation to inform if any important variables were not included.	**Complete**
	Tom Kompas/CSIRO	Explore the stock assessment model sensitivity test of a significant drop in fuel price and report back to the RAG in November 2020.	**Complete** – CSIRO presented summary of the sensitivity test at the May 2021 meeting.
	CSIRO	Add text to the Final Redleg Banana Prawn MSE report to clarify differences between OM model (monthly) and original stock assessment model (quarterly)(so that the differences in biomass trajectories shown in results are not misleading)	**Complete**
	NPFI/NORMAC	Consider the outputs from the MSE and recommend a future harvest strategy option for the Redleg Banana Prawn sub-fishery	**Complete**

	CSIRO	Present MSE results to Industry in the next two months (and a recommendation to be made by November 2020 NPRAG meeting)	**Complete**
	30 November & 02 December 2020 Meeting		
	Tonya van der Velde	Check if the CSIRO aquaculture data is useful to incorporate into the *P. monodon* stock assessment	**Complete** – pre-2017 aquaculture data is not suitable for use in the stock assessment, as trips were organised to catch a few broodstock for experiments and survey work was not undertaken.
	CSIRO	Undertake a sensitivity test to include a survival rate of zero in the *P.monodon* stock assessment	**Complete**
	AFMA	Consult taxonomic experts to address data gaps for the squid species, sea snake species, and Red Champagne Lobster, assessed as potential high risk through the ERA process	**Complete** – experts engaged to provide advice.
	CSIRO	Confirm catches of Black Teatfish and Golden Sandfish and reduce potential risk rating if catches are only minor	**Complete** – catches reported by AFMA Scientific Observers. Data needs to be scaled to estimate total catch. Will be discussed under agenda item 3.
	CSIRO/AFMA/NPFI	Develop a draft Redleg Banana Prawn harvest strategy for RAG consideration at its March 2021 meeting	**Complete** – draft Redleg Banana Prawn harvest strategy provided for RAG consideration at its May 2021 meeting.
	NPRAG	Provide comment on the CSIRO statement that explains the objectives and outcomes of the MSE	**Complete**

		research for Redleg Banana Prawns	
	AFMA	Consult taxonomic experts to address any data gaps for the byproduct species assessed as potential high risk through the ERA process	**Complete** – experts engaged to provide advice.
	NPFI	Send a Microsoft Word version of the draft NPF Bycatch Strategy to NPRAG members for comment out-of-session.	**Complete** – sent on 02/12/2020
	CSIRO/AFMA/NPFI	Revise the Red Endeavour Prawn research proposal so the analysis of the Maxim data is costed separately to the other objectives	**Complete** – proposal provided for NPRAG consideration at its 03 & 08 February 2021 meeting.
	CSIRO	Distribute a list of the most useful water extraction scenarios to include in the MICE model to the RAG for comment out-of-session.	**Complete** – Rob K. sent proposed scenarios on 29/01/2021.
	CSIRO	Provide a written proposal outlining the cost implications and reason as to why the extension to the species split project is necessary for the RAGs consideration out-of-session.	**Complete** – proposal provided for NPRAG consideration at its 03 & 08 February 2021 meeting.
	AFMA/NPFI	Discuss any additional costs and develop some options for implementing finer scale reporting in the banana prawn sector and provide advice back to NPRAG.	**Ongoing** – further advice will be provided to the RAG in the 2nd half of 2021.
	03 & 08 February 2021 Meeting		
	AFMA	Confirm the type of *P. monodon* data collected by Scientific Observers.	**Complete** – For standard NPF trips, *P. monodon* are collected as part of the 100 prawn species-split sample (100 prawns collected as they fall onto belt, separated into species, then total

			species weight, length and sex is recorded for each species within the sample). For broodstock trips, length, weight, sex and life status of all discarded *P. monodon* is recorded. Numbers and sex of all retained live *P. monodon* is recorded. The minimum weight requirements for retained male/female *P. monodon* is recorded each trip (i.e. all males under 100g and all females under 150g were discarded).
	NPRAG	Provide CSIRO with any final comments on the *P. monodon* assessment report out-of-session by COB 10/02/2021.	**Complete**
	CSIRO	Update the endeavour prawn assessment proposal to ensure a critical milestone is included after objectives one and two to allow the RAG to review the results before the stock assessment work proceeds.	**Complete** – updated proposal considered and approved by the RAG and ARC in February 2021.
	CSIRO	Provide Industry with further clarification on some outstanding questions regarding the species split project expenditure and proposed costings out-of-session.	**Complete** – CSIRO provided some additional information to the RAG, project supported by the RAG and ARC in February 2021.