



Australian Government
Australian Fisheries Management Authority

Northern Prawn Fishery Resource Assessment Group (NPRAG)

30 April 2014

Minutes

Brisbane Riverview Hotel

ATTENDEES

Members

Ian Knuckey, Chair

Fiona Hill, Australian Fisheries Management Authority (AFMA)

Rik Buckworth, Commonwealth Scientific and Industrial Research Organisation (CSIRO)

Ian Boot, Industry

Michael O'Brien, Industry

Brodie Macdonald, AFMA, Executive Officer

Observers

Robert Curtotti, Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES)

Annie Jarrett, Northern Prawn Fishery Industry (NRFI)

Matt Barwick, NRFI

Trevor Hutton, CSIRO

Roy Deng, CSIRO

Sean Pascoe, CSIRO

Apologies

Rodrigo Bustamante, CSIRO

Malcolm Haddon, CSIRO

Norm Hall, Murdoch University

Tom Kompas, Australian National University (ANU)

Ron Earle, Industry

Agenda Item 1 - Preliminaries

1.1 Welcome and apologies

The Northern Prawn Fishery Resource Assessment Group (NPRAG) Chair, Ian Knuckey, opened the meeting at 9:05 am, welcoming all members and observers.

Apologies were received from Rodrigo Bustamante, Malcolm Haddon, Norm Hall, Tom Kompas and Ron Earle.

1.2 Declarations of interest

The chairman asked members to announce any declarations of interests in regards to the agenda items. Members declared their interests and these are outlined in Table 1.

Table 1. NPRAG declarations of interest

Member	Declared Interest
Ian Knuckey	Independent Chair of the NPRAG and scientific member on the NPF management advisory committee (NORMAC). No pecuniary interest.
Fiona Hill	AFMA employee and NPF manager. No pecuniary interest.
Rik Buckworth	CSIRO employee. Participates in projects related to the NPF that currently receive funding and will seek to receive funding in the future. Rik Buckworth excused himself while the remaining RAG members discussed his participation in the meeting and it was agreed that CSIRO staff involvement in the discussion was necessary but there was a need to consider the conflict when discussing research items.
Ian Boot	Managing Director of Austfish, a company which operates 4 NPF vessels. Currently only NPF broodstock permit holder. The RAG agreed that Mr Boot may be asked to leave the meeting if a recommendation is made regarding the NPF broodstock permit conditions.
Michael O'Brien	Industry representative. Employee of a company that owns statutory fishing rights (SFRs) in the NPF. The RAG agreed that all industry have lots to contribute to discussions and there was no need to exclude them from discussions.
Brodie Macdonald	AFMA employee and NPRAG EO. No pecuniary interest.
Observers	
Robert Curtotti	ABARES employee who undertakes government funded research on the NPF. The RAG agreed that ABARES undertake valuable work on the NPF and that there are no specific conflicts in terms of the agenda items.
Annie Jarrett	EO of NORMAC and CEO for NPF Industry Pty Ltd (NPFi). No pecuniary interest in relation to holding NPF SFRs. It was agreed that NPFi makes an important contribution to meetings and an important role in research.
Trevor Hutton	CSIRO employee. Participate in projects related to the NPF that currently receives funding and will seek to receive funding in the future. It was agreed that CSIRO staff involvement in the discussion was necessary and any conflicts would not bias discussions of the agenda items.
Roy Deng	CSIRO employee. Participate in projects related to the NPF that currently receives funding and will seek to receive funding in the future. It was agreed that CSIRO staff involvement in the discussion was necessary and any conflicts would not bias discussions of the agenda items.
Sean Pascoe	CSIRO employee. Participate in projects related to the NPF that currently



	receives funding and will seek to receive funding in the future. It was agreed that CSIRO staff involvement in the discussion was necessary and any conflicts would not bias discussions of the agenda items.
Matt Barwick	Project Officer for NPF Industry Pty Ltd (NPFI). No pecuniary interest in relation to holding NPF SFRs. It was agreed that NPFI makes an important contribution to meetings and an important role in research and the bycatch workplan.

1.3 Adoption of minutes from previous meetings

The RAG accepted the minutes from the 3 March meeting and the 21 March teleconferences as a true and accurate record of the meetings.

1.4 Actions arising from previous NPRAG meetings

The RAG discussed the action items listed in and updated progress.

Person responsible	Description of ACTION item	Progress
13-14 September 2012 Meeting		
CSIRO	CSIRO to explore the influence of moon phases on the tiger prawn assessment model.	Agreed that this work is not currently a priority. Will be considered for future work.
AFMA/CSIRO	RAG EO to work with Rik Buckworth & FRDC to maintain a collection of stock assessment and RAG documents on the AFMA website.	Ongoing.
AFMA	AFMA to provide shapefiles of closures for inclusion in the digital marine atlas.	Complete.
30 April 2013 Meeting		
AFMA	AFMA to provide a written annual summary of observer monitoring from 2011-12 that provides methods, results and spatial distribution.	Ongoing. Delayed due to observer manager on extended leave. Request submitted.
AFMA	Fiona to enquire if shape files for all the closures in the NPF are able to be forwarded on to RAG members.	Pending updated management plan to change datum.
CSIRO and NPFI	Rik and Matt to investigate the large difference in the tiger prawn logbook data and landed data.	Ongoing.
AFMA	Fiona Hill to report back to the RAG on the implications of ERA/ERM framework capturing habitat and communities for existing closures.	Delayed pending the AFMA review of the ERA/ERM framework.
CSIRO	Rik to review the last 5 years of CPUE data for red-legged banana prawn as there may be an issue to explore regarding recent departure from a generally good time series fit of data .	To be addressed through the 2014 red-legged banana prawn assessment.
Chair	Ian Knuckey to write to Janet Bishop on behalf of the RAG thanking her for input into the Tiger Prawn assessment over many years.	Not yet completed.



CSIRO	Rik Buckworth to update the ratio of different sizes and estimated price at particular sizes for Tiger Prawns to use in the assessment.	Ongoing.
Tom Kompas and NPFI	Tom and Matt to investigate the increase in byproduct recorded and whether this is a once off event, noting the scampi is isolated and squid can be accounted for.	Ongoing. Comparison to be undertaken using information from 2013 fishing season.
22 November 2013 Teleconference		
CSIRO	CSIRO to prepare a TRF application to fund additional research and data collection to assist in setting an MEY trigger for white banana prawns.	Ongoing. Proposal to be submitted in June TRF round.
10 February 2014 Meeting		
AFMA	Fiona Hill to provide update to next RAG meeting on the progress of the review to the conflicts of interest process	No progress since last meeting.
CSIRO	CSIRO to prepare a proposal to assess the impacts of removing the spawner survey in 2016.	Ongoing.
AFMA	AFMA to prepare a comparison of vessel charter costs over the last five years of the integrated monitoring program.	Complete. Vessel charter information distributed to NPRAG.
21 March 2014 Teleconference		
NPFI	Matt Barwick to do a quick survey at the pre-season briefings to identify how many boats are using quad gear and fished in the JBG in 2013.	Complete. A survey of vessels revealed that there were boats that fished in the JBG that has changed to quad gear. This was confirmed by CSIRO under Item 4.

Agenda Item 2 – Implementation of a Maximum Economic Yield (MEY)-based catch trigger for the banana prawn fishery

The RAG noted the update from Ms Jarrett on the process for calculating the MEY trigger and collecting the information from the NPF Industry Pty Ltd (NPFI).

Ms Jarrett advised that NPFI Directors held a teleconference on Thursday 17th April, at which the process for providing industry input to the MEY banana prawn trigger was discussed. Based on the fuel prices reported (Cairns -\$0.93, mothership - \$1.20, Darwin - \$1.00) and using 70/30 weight, the average fuel price was agreed to be \$1.035 (exclusive of GST and rebate). The RAG noted that the spreadsheet had been amended by Dr Pascoe to allow the entry of the fuel cost in this form (see [Appendix 1](#)).

The majority of directors agreed that banana prawn production for 2014 is expected to be between 4000t and 4500t, which is considerably higher than the 2900t caught in 2013. It was also noted that mixed size and mixed quality prawns had been caught to date which is expected to lower prices relative to 2013. NPFI Directors subsequently agreed that the expected average beach price for white banana prawns for 2014 is estimated to be \$11.75.



The RAG noted that based on these inputs the MEY trigger was 330kg/boat/day but due to the 15% buffer (of 500kg/boat/day), the trigger was set at 425 kilograms/boat/day.

The Chair queried if there were any difficulties in collecting the data to inform the MEY trigger calculation. Ms Jarrett noted that the NPF Harvest Strategy requires the five NPFI directors to hold a teleconference in the fourth week of the banana prawn season to agree on fuel and prawn price inputs to the MEY banana prawn trigger. Ms Jarrett recommended that the harvest strategy be amended to allow some flexibility in timing of this teleconference (so long as the information is available by the end of the fourth week).

Dr Pascoe explained the process for calculating the fuel consumption rate. This is derived from figures for total fuel cost/day which were collected from survey data in 2013. The RAG noted that due to the way that this is derived, there is a lag in the capture of fuel use changes in the calculation (as this only reflects fuel use changes from the previous year).

Ms Jarrett also said that there may be a need to review the weighting of the fuel prices. Due to a change in mothership operations, more vessels have been purchasing fuel from Karumba than from the mothership. If the Karumba fuel price had been included in the 2014 calculation it may have changed the outcome. However, the RAG noted that given the level of the trigger without the buffer being applied (330kg/boat/day) that it was unlikely to affect the trigger level for this year.

The Chair noted that following minor changes implemented as a result the first application (more clarity about how the fuel price was calculated) the spreadsheet is intuitive and easy to understand. He also noted that the process for the RAG reviewing the calculation was useful and should continue to be done in future.

The RAG agreed that the performance of the interim trigger measure will be a focus of the next NPRAG meeting in September/October.

Agenda Item 3 – Draft results of tiger prawn assessment

Dr Buckworth presented the Tiger Prawn and Blue Endeavour Prawn stock assessment for 2014, and the Total Allowable Effort recommendation.

Dr Buckworth advised that since the last assessment various improvements had been made to the base case assessment following CSIRO's investigation into the model and recommendations to improve the model performance (Deng *et al.* 2014). These were supported by NPRAG in early 2014. Changes to the Base Case include:

- An alternative statistical method to analyse fishery independent survey length frequency information has been developed (Burridge *et al.* 2014) and applied;
- preclusion of the previous year's recruitment survey length frequency information;
- A RAG-agreed fishing pattern for the projections based on consideration of the average of the last two years' fishing patterns.; and
- Gamma functions replaced logistic functions as descriptions of fishing selectivity for recruitment survey data.

New sensitivity tests were also added, including: last year's model; variations to the amount of effort change permitted between years; variations to the lower effort threshold; alternative fishing power levels; model structures; and alternative intended fishing patterns.



Dr Buckworth advised that for the Base Case assessment, CSIRO had initially used a fishing pattern based on an average of the last two years' fishing patterns (as agreed by NPRAG in March 2014) for forward projection. However Dr Buckworth advised that the model did not converge appropriately with this fishing pattern. As a result, CSIRO replaced this effort pattern with the NPRAG 2013-specified effort pattern in the Base Case assessment. They agreed to look further in to the reasons for the difficulty the model had with the agreed fishing pattern.

Notwithstanding the challenges with the fishing effort pattern for forward projection, the RAG noted that the stock assessment component of the model was robust and indicated that both brown and grooved tiger prawns were at or close to MEY, which is a very positive indicator for the fishery. The detailed results of the model are provided in Table 1 below. The model also indicated that effort on brown tiger prawns was below that which would achieve MEY, and that effort on grooved tiger prawns was a bit above that at which MEY would be achieved. Based on these results, the RAG noted that grooved and brown tiger prawns are not overfished or subject to overfishing.

Table 1: 2014 Base Case Assessment Results

Name	Grooved	Brown	Endeavour
Steepness	0.374	0.321	0.372
Catch ₂₀₁₄	1014	958	519
Observed C ₂₀₁₃	1470	731	343
MSY	1754	1211	826
MEY	1307	1055	538
S _{MEY} /S _{MSY}	1.544	1.314	1.57
S ₂₀₁₃ /S _{MSY} (%)	173.5	139.6	87.8
S ₂₀₁₃ /S _{MEY} (%)	112.4	106.2	55.9
5-year mav(S ₂₀₀₉₋₂₀₁₃ /S _{MSY}) (%)	123	118	94
S ₂₀₂₀ /S _{MEY} (%)	99.6	98.3	82.3
Observed nominal E ₂₀₁₃	4176	1789	NA
Estimated nominal E ₂₀₁₄	3868	2777	NA
E _{MSY}	10451	3980	NA
E _{MEY}	3868	2777	NA
E _{MEY} /E _{MSY} (%)	37	69.8	NA
E ₂₀₁₃ /E _{MSY} (%)	40	44.9	NA
E ₂₀₁₃ /E _{MEY} (%)	108	64.4	NA
Standardised E ₂₀₁₃ /E _{MSY} (%)	39.4	43.7	NA
Standardised E ₂₀₁₃ /E _{MEY} (%)	106.4	62.7	NA

The 2013 total nominal effort for brown and grooved tiger prawns, the total effort, effort change and gear change as required under the NPF Harvest Strategy is outlined in Table 2 below. The assessment (Base Case with 2013 effort pattern) predicted 2014 effort levels to achieve MEY of 3868 boat days for grooved tiger prawns and 2777 boat days for brown tiger prawns (a total of 6645 boat days). The optimal total effort estimated in the various sensitivity tests ranged from 5902 to 7128 boat days.

Table 2: Nominal effort for 2013, and predicted effort for 2014 (based on 2013 RAG agreed effort pattern).

Year	2013 nominal	2014 model
Grooved tiger prawn nominal effort	4176	3868
Brown tiger prawn nominal effort	1789	2777



Total nominal effort	5965	6645
Effort change from 2013		680 (or 11.4%)
Gear change		49%

The RAG noted that it is possible that the predicted effort levels for brown tiger prawns is overestimated given the effort pattern used in the model is not the expected effort pattern for 2014. This was supported by Industry members, who believe that due to the good banana season, there will be less effort on tigers in the first season because 1) the fleet will still be targeting banana prawns and 2) the price being received for tiger prawns is currently poor. The Chair noted that there is not enough effort early in the season to reach the MEY target for the tiger prawn fishery, and recommended that the RAG consider options to increase effort on tiger prawns to better achieve MEY. The options available under the Harvest Strategy include recommending an increase to gear unit values or season length. The RAG agreed that given the uncertainties with the predictive capability of the model, it would not recommend any changes to the current headrope length or season length.

The RAG noted that fishing power increased by 6-7 % in 2013, relative to 2012. In 2013 about 90% of the fleet used quad gear when targeting tiger prawns, up from 77% in 2012. The average swept area performance also increased to 25 hectares per hour (an increase of 4% from 2012) which is the largest recorded in the history of the fishery. The RAG noted that the increase in swept area and fishing power was a result of decisions to increase headrope length in recent years.

In summary the RAG noted that grooved and brown tiger prawns and blue-endeavour prawns are not overfished or subject to overfishing. The predicted effort to reach MEY for grooved tigers is lower than 2013, but brown tigers could take more effort in 2014. The RAG recommended that given the uncertainties about the predictive performance of the tiger prawn model, it is unable to make a recommendation to change effort or season length for 2014.

Action: CSIRO to prepare advice for NPRAG on further investigation into why the 2 year average effort pattern could not be run for 2014.

Agenda Item 4 – Final results of red-legged banana prawn assessment

The RAG noted the update from Dr Buckworth on the assessment of the Joseph Bonaparte Gulf (JBG) Red-legged Banana Prawn fishery and total allowable effort recommendations for 2014.

Dr Buckworth advised that effort in 2013 was 358 boat days, an increase of 140% over the 2012 total of 149 boat days. Catches increased 93% from 194t in 2012 to 375t in 2013. Fishing effort was concentrated in the second quarter particularly, and third quarter with only one day of effort in the last quarter. Mr Boot advised that this was consistent with fishing behaviour observed elsewhere in the fishery with the switch to targeting tigers across the Top End.

The RAG noted that as discussed at the March teleconference, relative fishing power in the JBG increased by 12% in 2013 relative to 2012. Dr Buckworth advised that the increase in fishing power is consistent with the number of vessels operating in the JBG increasing from nine in 2012 to 27 in 2013 and the fact that 26 of these vessels used quad gear. Dr Buckworth also advised that the average swept area increased 10% relative to 2012 to the largest in the history of the fishery (27.5 hectares/hour).



The RAG noted that fishery was estimated to be close to B_{MEY} and significantly above B_{MSY} and thus not overfished. With effort substantially below that at F_{MEY} , overfishing is not occurring.

The RAG noted that the base case model recommended effort for 2014 is 622 boat days (90% confidence interval [351,734] with a corresponding catch of 499 t [318,668])

Agenda Item 5 - Progress in implementing elements of the modified individual transferrable effort (ITE) system in the NPF

The RAG noted that AFMA Management is aiming to provide advice to the Commission on the implementation of the remaining elements of the modified ITE system.

The RAG noted that the Harvest Strategy amendment had been endorsed by the AFMA Commission in late March 2014 to include the framework for calculating the MEY based trigger for white banana prawns.

The next element of the recommendation to be addressed relates to the ability to capture fishing power changes in the tiger prawn assessment. The RAG noted that this is already undertaken through the assessment and that the annual gear survey had been amended to include questions about innovation or possible future changes so this could be highlighted to scientists and accounted for in the fishing power calculations. However the RAG noted Mr Barwick had not received any responses to these questions since they have been included in the gear survey. It was unclear if this reflected no innovations or simply a lack of response to the question. The RAG agreed that the gear survey should be amended to ensure that right questions are being asked to ensure all relevant information on innovation and potential gear changes is captured and fed into the fishing power assessments. Ms Jarrett also suggested that the Harvest Strategy should be amended to capture the current process for assessing fishing power in the NPF. The RAG agreed that this would satisfy this element of the modified ITE proposal.

On the final element of the modified ITE system (autonomous adjustment), the RAG noted that a NORMAC working group will be formed over the next few months to discuss mechanisms to facilitate autonomous adjustment, including those outlined in the NPFI rules based ITE proposal.

Agenda Item 6 – Industry report

The RAG noted the update provided by Mr O'Brien and Mr Boot that, based on catches in the first four weeks, the fleet could be expected to catch between 4000t and 4500t of white banana prawns for the season. It was said that there were mixed grades and large quantities of small prawns, which meant that the price is expected to be down on those seen in 2013.

Mr O'Brien reiterated that changes to mothership operations are having a negative impact on the fishery as significantly less product is being unloaded to the mothership and instead being unloaded in Karumba. This also means that fuel is being purchased from Karumba instead of the mothership. The RAG noted that continued mothership operation this was a significant future risk for the fishery highlighted in the strategic planning.



Agenda Item 7 - Review of broodstock permit conditions

The RAG noted that AFMA has received a request for the broodstock catch limit to be increased from 800 to 2400 *Penaeus monodon* per permit to better reflect the demand for broodstock from aquaculture farms.

The RAG also noted that AFMA has also received a request to increase the maximum allowable headrope length from 16 fathoms to 24 fathoms to better align with the nets used in other, state-based prawn trawl fisheries. It has been suggested that aligning the net sizes will result in savings for industry on both material and time taken to change the nets over and also lead to efficiency in catching product.

The RAG noted an update from Ian Boot who is currently the only holder of an NPF broodstock collection permit. Acknowledging his conflict of interest, the RAG requested that Mr Boot present the information he had on this subject. Mr Boot said that they are currently unable to fill demand from prawn farms and that this is driving the need to increase the numbers permitted under the permit. Mr Boot said that the fishing grounds for *P. monodon* are mostly north of the main NPF fishing grounds and that interactions with other NPF species (namely tigers and red-endeavours) are low.

Dr Buckworth advised that *P. monodon* have a wide distribution within Australia and internationally, and as such the risk of localised depletion is low. The RAG also noted that given the estimated catch weight of retained species is less than one tonne, that there are unlikely to be sustainability concerns for *P. monodon*. However the RAG noted that there is a need to account for all mortalities caused by broodstock collection, of both *P. monodon* and discarded species.

The Chair suggested as given the permits enforce a cap on the total catch, that there should be no problem with relaxing the net length restriction. However, Ms Jarrett noted that the net size restriction was intended to minimise the bycatch of NPF species by broodstock collectors.

In summary, the RAG noted that.

- 1. There is unlikely to be a risk of localised depletion to *P. monodon* stocks in the NPF area.*
- 2. Relaxing the net length restriction does not pose a sustainability concern for *P. monodon*, although it could impact other NPF species;*
- 3. Better data collection should be introduced for broodstock permits, collecting information on both retained catch and discards; and*
- 4. Noting the sustainability and data issues above, the decision to amend the broodstock permit conditions is a matter for NORMAC and AFMA Management.*

Because the RAG did not feel it was the appropriate forum to make a formal recommendation on the broodstock permit conditions, Mr Boot was not asked to leave the discussions, despite his potential conflict of interest.

Agenda Item 8 – Bycatch and Discard Workplan

The RAG noted that AFMA and NPFI have revised the NPF Bycatch and Discard Workplan for 2014 – 2016.



The Chair noted the need to ensure projects are achievable in the timeframes. Accordingly the RAG agreed that the projects involving sea trials should be carefully designed with a well thought out experimental design and realistic and achievable milestones within the life of the workplan.

The RAG noted that some funding for the projects may be available through the AFMA bycatch program which is now partly cost recovered. It was agreed that once the amendments have been made the workplan will now be provided to NORMAC but that it will also be re-distributed to NPRAG for comment.

ACTION: AFMA to distribute updated bycatch and discard workplan to RAG members for individual comment.

Agenda Item 9 – Research Planning

The RAG noted that CSIRO were looking to develop project proposals to undertake the following research:

- An assessment of individual boat MEY performance
- Stock assessment for white banana prawns

The RAG noted that the assessment of individual boat MEY performance could improve the performance of the MEY trigger but may not be able to be implemented at fleet level. However, the RAG agreed that the performance of the trigger needs to be evaluated first before any recommendations on future research are made.

The RAG noted that the stock assessment for white banana prawns looks to expand on techniques used in the banana prawn management strategy evaluation to develop a sustainability assessment for white banana prawns. The RAG agreed that at this time this is not a priority for the fishery.

In summary, the RAG agreed that the development of both projects should be put on hold until the strategic research plan for the fishery is finalised in July-August.

Next meeting

It was agreed that the next RAG meeting will be held in September-October.



Appendix 1 – MEY trigger calculation for white banana prawns

Calculation of MEY trigger						
Rule: if the catch rate falls below the trigger rate in the two-week reference period, then the fishery will close at the end of the week following the reference period						
Item	Amount		fuel use (l/day)	fuel price (\$/l)	Unit	Comment
Fuel cost	\$2,461.91		2378.6609	1.035	\$ per boat per day	Industry members will provide Annie with a fuel price figure based combination of fuel prices taken from Darwin, Cairns and the mothership at the end of week 4. The final price will be averaged out using an allocation of 70/30 port/mothership and will be net of gst & rebate. Annie to provide to RAG.
Capital cost with depreciation	\$1,485.00				\$ per boat per day	From previous year's economic survey. This is the figure that Tom provides, inclusive of depreciation. It may be possible instead to provide capital cost directly without depreciation at C6
Depreciation	23%					
Capital cost without depreciation	\$1,143.45				\$ per boat per day	See comment above
Gear cost	\$237.00				\$ per boat per day	From previous year's NPFI economic survey
Total repairs and maintenance (R&M)	\$1,380.45				\$ per boat per day	
Proportion of variable costs in R&M		13.4%				13.4% as agreed at the last RAG (15% recommended rate based on cost modelling)
Total variable R&M costs	\$184.98				\$ per boat per day	
Marketing costs	\$1.03				\$ per kg	From previous year's NPFI economic survey
Price	\$11.75				\$ per kg	The 5 industry NORMAC members (minimum of 3 if not all available) will have a phone hook up at the end of week four to determine the 'beach price' which will be given to Annie to provide to the RAG. The definition of 'beach price' will be - 'gross price for sale of product to cold store less freight and unloading charges'
Crew share of catch revenue	23%					Agreed by RAG
MEY catch rate	330				kg per boat per day	This is the rate at which marginal revenue equals marginal costs
Scale factor	1					No scaling factor to be applied in 2014
Trigger catch rate	330				kg per boat per day	This is the estimated trigger rate over the two-week reference period when catch rate is at MEY one week later.
Buffer	15%					This is the buffer to protect against large changes from the original 500 kg/day trigger
Restricted trigger rate	425					This is the trigger rate restricted to the buffer either side of 500 kg per day
KEY						
Green cells need values to be input						
Yellow cells should not need to be changed						

