

Meeting # 2 – February 2020

(Rescheduled December 2019 Meeting)

Final Minutes

Date: 6 February 2020

9:01am - 5:01pm (AEST)

Agenda Item 1 – Preliminaries

1.1 Welcome and Introductions

- The Chair welcomed members and invited participants to the meeting and made an Acknowledgement of Country statement; paying respect to the traditional owners of the land and waters in which we fish and study, the Mirning people, further recognising the Wurundjeri people as the traditional custodians of the land on which we meet and paying our respect to their Elders past, present and future.
- 2. There was an apology from Dr Ian Knuckey (scientific member) who was unable to attend the meeting.
- 3. Attendees (see list provided at <u>Attachment A</u>) introduced themselves and outlined their relevant background and experience.

1.2 Declarations of Interest

- 4. Attendees considered the agenda and discussed items where there were potential conflicts of interest.
- It was noted that industry members may have a conflict of interest for the following agenda items: GAB research priorities (Agenda Item 2), Orange Roughy Research Plan (Agenda Item 3), Tier 1 stock assessment Bight redfish (Agenda Item 6) and Tier 1 stock assessment deepwater flathead (Agenda Item 7).
- 6. Industry members left the room while the remaining members discussed their participation in these agenda items.
- 7. Recognising their knowledge and ability to contribute to the discussions, the remaining members agreed that it was appropriate for industry members to participate in the discussion, however, they would be asked to leave the room when recommendations were made.
- 8. A copy of the Declarations of Interest is provided at <u>Attachment B</u>.
- 9. Noting that Mr Moore is employed by the Australian Bureau of Agricultural and Resource Economics (ABARES), industry noted that they were uncomfortable having no independent scientist present, as Dr Knuckey was unable to attend; and requested that future meetings only be held when all scientific members were available.

10. The RAG agreed that it would be beneficial to have an alternate independent scientific member appointed to GABRAG, in the event that Dr Knuckey is unable to attend future meetings.

Action Item: 1

AFMA to consider appointing an additional independent scientific member to GABRAG.

1.3 Adoption of Agenda

11. The RAG adopted the agenda without change (Attachment A).

1.4 Action Items Review

12. The AFMA member provided the RAG with an update on the status of action items arising from previous GABRAG meetings. The following updates were discussed:

Professor Tisdell to work with AFMA and provide guidance on cost/benefit analysis for the Bycatch Research and Development Plan when developing the full project proposal.

This action item will be discussed as part of the GAB Research Priorities (Agenda Item 2).

The RAG agreed to remove this action item.

- The list of action items was updated after the meeting and is included at <u>Attachment C</u>. Items that were noted as completed (highlighted green) at the meeting will be removed from the list provided to the next GABRAG meeting in late 2020.
- 14. The list of action items arising from this meeting is included at Attachment D.

Agenda Item 2 – GAB Research Priorities

2.1 Review of the Five Year Strategic Research Plan 2016-2020

15. The RAG noted the SESSF Five Year Strategic Research Plan is due for review this year; and will be reviewed by SESSFRAG at their March 2020 meeting. The RAG agreed this item would not be discussed at this meeting.

2.2 GABT Research Priorities 2021-22

16. The RAG considered the following research priorities identified at GABRAG's November 2019 meeting:

Cost/benefit analysis for the Bycatch Research and Development Plan

- This priority is no longer relevant; industry have progressed this work and are currently involved in a market development project with Honey & Fox to investigate utilisation of undervalued, underutilised and bycatch species.
- Industry would like to see the extension of this project considered for funding, pending the outcomes of the initial stage and the report produced by Honey & Fox.

The impacts of environmental factors and resource (nutrients etc.) availability on GAB species

- This research is fundamental for gaining a greater understanding of the fishery dynamic in response to environmental change and industry would like to see environmental factors (nutrient availability, temperature at depth etc.) considered in stock assessments.
- Fishwell Consulting completed a desktop review for the Commonwealth Trawl Sector Fishery Independent Survey (CTS-FIS) which looked at inter-annual variation between biomass estimates and tried to find a correlation with changes in environmental factors.

Action Item 2

AFMA to circulate Fishwell's report for AFMA Project 2019/0816 Inter-annual variation in FIS abundance indices, to GABRAG members and to CSIRO

- Mr Moore also noted previous work within the SESSF that considered factors that potentially influence recruitment and abundance within the fishery.

Action Item 3

Mr Moore to circulate to the RAG, Fishwell's report relating to research undertaken in the SESSF investigating factors that influence recruitment and abundance.

- Integrated Marine Observing System (IMOS) is currently recording environmental parameters within the GAB. The RAG questioned whether this data could be used by AFMA/CSIRO for inclusion in future stock assessments.
- Industry suggested that the RAG invite IMOS to the next meeting to present on the data they collect and whether AFMA/CSIRO could utilise their data.

Action Item 4

AFMA to invite IMOS to the next GABRAG meeting (late 2020) to present on the environmental data they collect in the GAB, with a view to including the data in future stock assessments for Bight redfish and deepwater flathead.

- In 2019, an AFMA graduate team undertook a project relating to industry collected environmental data; primarily through the use of temperature/water loggers installed on trawl nets.
- Industry advised that they have temperature loggers installed on trawl doors and could record this information. However, e-log software would need to be updated to include a temperature field, and AFMA's database would need to be updated to receive and store the data.
- Industry are also interested in pursuing a project that investigates body condition (e.g. fat content) of fish and how this relates to gonad development. GABIA agreed that this could be coordinated under the co-management agreement and built into the data plan; with input from AFMA and CSIRO.

AFMA and GABIA to incorporate into their data plan, a project that investigates body condition (e.g. fat content) of fish and how this relates to gonad development.

Investigate how well CPUE is indexing stock biomass in the GAB, including consideration of additional parameters to be included in CPUE standardisations and stock assessments.

- This could include how targeted vs. incidental catch is identified, economic/market effects, environmental factors, and catch of other key commercial species.
- This should not be included in the annual research statement, but should instead be a discussion with CSIRO to include additional information in the next stock assessments for Bight redfish and deepwater flathead.

Action Item 6

CSIRO to consider including additional information within future stock assessments for Bight redfish and deepwater flathead; including environmental factors, economic/market information and catch of other key commercial species.

- 17. The Chair asked the RAG whether there were any other research priorities that needed to be considered.
- 18. The Economic Member suggested investigating the impact of operating costs, such as fuel prices, as a risk factor in commercial success. The RAG discussed the following:
 - A study which examines when an industry becomes unviable due to rising costs in one variable; likely leading to a demand for government intervention through subsidies etc.

- Some argue that the survival of the GAB fishing fleet is dependent upon fuel prices. If diesel costs continue to rise, operators will no longer be able to afford vessel operation costs.
- The only option to combat high fuel prices is to modernise the fleet to include battery storage or gas.
- It is essential to identify the fuel price point at which the fishery can no longer operate.
- Industry emphasised that the only way the GAB fleet could be modernised to deal with increasing fuel prices is to convince the Government that there is a national benefit in modernising the fleet. Modernisation would help improve efficiency and ultimately reduce the carbon footprint of the fishery.

AFMA and the Economic Member to develop a research priority - The effect of operational costs on the Great Australian Bight Trawl Fishery Dynamics. Issues should include increasing fuel prices and the cost associated with modernising the GAB fishing fleet.

Recommendation 1

The RAG recommended that the following research priorities be included in the GAB 2021-22 annual research statement:

- The impacts of environmental factors and resources (nutrients etc.) availability on GAB species dynamics.
- The effect of operational costs on the Great Australian Bight Trawl Fishery Dynamics.

Agenda Item 3 – Orange Roughy

19. The AFMA Member provided the following overview of orange roughy management arrangements in the Great Australian Bight Trawl (GABT) sector:

Orange Roughy Rebuilding Strategy 2014 (the Rebuilding Strategy)

- The Commonwealth Fisheries Harvest Strategy Policy 2018 (HSP) requires a rebuilding strategy to be in place for all species assessed as being below their biomass limit reference point (rebuilding species).
- The Rebuilding Strategy, first implemented as the Orange Roughy Conservation Program in 2007, was last reviewed in 2014 and is subject to a five-year review.

- The Rebuilding Strategy is designed to prevent targeted fishing of orange roughy to promote rebuilding of the stock. In the GABT, this is primarily achieved through a series of deepwater closures, placed over historical orange roughy grounds.
- An incidental catch limit (bycatch TAC) has been in place for orange roughy since the implementation of the Rebuilding Strategy. In recent years, this has been set at 50 t and applied to orange roughy caught in the Albany and Esperance quota zones.

GABT Orange Roughy Research Plan (the Research Plan)

- Industry are able to apply for scientific permits, issued under the Research Plan, allowing them to fish within orange roughy closures to collect data.
- The Research Plan was developed by AFMA and GABIA to meet the requirements of the Rebuilding Strategy, to ensure robust scientific information is collected to allow for an assessment of the status of the stocks; with the ultimate aim of determining sustainable harvest levels for commercial fishing.

1.1 Orange Roughy Research Plan

- 20. The RAG revised the amendments proposed for the GABT Orange Roughy Research Plan 2016-2020 (the Research Plan) as recommended at the previous GABRAG meeting in November 2019:
 - Shot information requirements to be amended to include only standard data collected in daily fishing logbooks.
 - Crew to record length frequency measurements from two (2) bins per shot where possible.
 - Introduction of a 5 tonne trigger limit for when biological samples, other than lengths, are to be collected and AFMA are to be notified for port-collection purposes.
 - All extractive biological samples, including otoliths, gonad staging and fin clips (stock discrimination), are to be extracted from the same individuals.
 - Removal of the bycatch section from the Research Plan as this data is reported in logbooks and will be addressed in the *Great Australian Bight Trawl Fishery Boat Operating Procedures Manual.*
 - Opportunistic acoustic surveys are to be conducted if the vessels' acoustic system has the capacity to record information.
 - Maintain the 200 t research catch allowance, but remove the 50 t catch limit per zone.
- 21. The RAG agreed on the above amendments to the Research Plan and supported them being presented to GABMAC at their next meeting (February 2020).
- 22. The RAG discussed the following:

- It is currently unclear whether scientific permits only allow for fishing within the orange roughy research zones, or whether the research catch allowance can be utilised outside of the closures.
- The RAG agreed that scientific permits should allow for orange roughy fishing across the entirety of the GAB fishery; not just within the orange roughy research zones.

GABMAC to provide advice on whether the orange roughy 200 t research catch allowance is restricted to the orange roughy research zones or whether it can be utilised within the entirety of the GAB fishery.

Recommendation 2

GABRAG recommended that the orange roughy research catch allowance be set at 200 t.

3.2 Bycatch TAC Recommendation

- 23. In considering it's advice for an orange roughy bycatch TAC for the Albany and Esperance quota zones, the RAG noted the following:
 - The incidental bycatch TAC for orange roughy in the Albany & Esperance Quota Zones have been set at 50 t since the 2009-10 fishing season. All catches taken within these zones must be covered by quota.
 - There are five additional GAB orange roughy management zones: far west, west, central west, central east and east. Each of these zones have a 10 t catch trigger limit, however are not subject to quota.
 - Orange roughy catch in the GABT has remained below the incidental bycatch TAC, with no catch recorded since the 2008-09 season (with the exception of 0.1 t recorded in 2015-16).
 - AFMA produced a map of the Albany and Esperance quota zones using the coordinates outlined in the *Southern and Eastern Scalefish and Shark Fishery Management Plan 2003.*
 - The RAG noted that the quota zones appear to overlap with orange roughy closures, and it is unclear how the bycatch TAC would apply if operators cannot fish in these areas; except for when a scientific permit has been granted, in which case the research TAC applies.

AFMA to clarify how the Albany and Esperance bycatch TAC can be utilised; noting the quota zones overlap with orange roughy closures. Include an overview of how these management arrangements were implemented (previous RAG/MAC meetings).

Recommendation 3

GABRAG recommended maintaining the Albany & Esperance bycatch TAC at 50 t for the 2020-21 fishing season.

Agenda Item 4 – Gemfish Stock Structure

4.1 Overview of latest genetics research

- 24. Mr Andy Moore (ABARES) presented an overview of the FRDC project (2013/014) Research to underpin a better understanding of Western Gemfish stocks in the Great Australian Bight:
 - The project commenced when western gemfish was being assessed at GABRAG as a Tier 1 assessment in 2011, and stark differences were noted between east and west gemfish catches over time.
 - Eastern gemfish stocks are known to migrate north along the east coast of Australia and spawn in winter.
 - Previous research by Paxton & Colgan (1993) *Biochemical genetics and stock assessment of common Gemfish and Ocean Perch* (FRDC 1991/35) provided some insight to gemfish stock structure, but was constrained at the time by available techniques.
 - This new research included modern molecular markers (mitochondrial DNA, microsatellites, single nucleotide polymorphisms (SNPs) as well as gonad staging and length frequency sampling.
 - The research revealed evidence of genetically different populations between the east and west (no gene flow), with a mixing (overlap) of the two stocks in western Bass Strait through to Portland.
 - The eastern stock is the same as those in New Zealand.
 - Although no gene flow was found between east and west, individuals from each were found in the other population. So questions arose about whether the stocks were hybrids or migrants. Subsequent analysis revealed no hybridisation and these individuals are not sharing genes between either population.
 - This research found that western gemfish migrate west and spawn in the GAB during summer. Both eastern and western gemfish migrate towards opposite ends of

their distributions and spawn six months apart, which is likely to be the major contributor to the genetic differentiation seen.

- The genetic differentiation between east and west is likely large enough to warrant separate species designation, though some work needs to be done to describe this difference.
- Initial tests to determine the effective population size (*Ne*) (the number of individuals contributing to the next generation effective genetic contributors) of gemfish revealed substantially smaller (*Ne*) in the east than expected for a population of this kind (i.e. a population in the thousands or tens of thousands).
- The effective population size calculations revealed an (*Ne*) that is an order of magnitude smaller in the east than the west (6,406 contributors in west and 613 in east). The expectation was that the eastern population is demographically larger than the western population, which has been supported by additional research. There is clear evidence for a small (Ne).
- 25. Summary of key research findings:
 - No gene flow between east and west stocks but an overlap zone
 - There are no hybrids and migrants are not breeding
 - Spawning is separated in space and time
 - There is compelling evidence for low effective population size in the east.
- 26. The RAG discussed:
 - There is a potential for this work to shed some light on why the eastern gemfish stock is not recovering.
 - Further analysis of the overlap zone (zones 40 and 50) is needed to understand the implications for management and stock assessments. Zone 50 is assessed only as western gemfish, and any gemfish caught in this area are deducted from western gemfish quota holdings. There are also fish in zone 50 affectively unaccounted for under the eastern gemfish assessment.
 - CSIRO advised that some of the catch from zone 50 should be considered as biomass removed from the eastern stock to account for the stock overlap within this zone.

Agenda Item 5 – GABT Ecological Risk Assessment (ERA)

- 27. Dr Sporcic (CSIRO) provided an update for the GABT Otter board trawl ERA:
 - ERAs were completed in 2018 for multiple sectors within the SESSF, including the GABT (bSAFE).
 - Following the identification of a spatial input error from an external provider, CSIRO re-ran the assessments in 2019; which resulted in a change to the risk score for a number of species under the bSAFE approach.
 - Another approach to quantify effort in the ERA was also investigated. Rather than applying effort homogenously, effort was applied heterogeneously to account for intensity. This approach (bSAFE-i) is considered to be more appropriate for the SESSF where effort tends to be concentrated in certain areas.
 - SESSFRAG considered this approach at its August 2019 data meeting and agreed it was an appropriate way forward, however, noted potential issues with how swept area is calculated because only the width to the trawl doors is considered, and not the net wings and sweeps.
 - SESSFRAG suggested deferring a review of the swept area factor to the next assessment, and recommended GABRAG finalise the results of the most recent ERA assessments.
 - In the updated GABT bSAFE-i assessment, only a single species, *Nototodarus gouldi* (Gould's squid), ranked as a potentially high risk species.
 - Approximately 122.9 t of Gould's squid was retained (Source: Commonwealth Logbook records) over the 2012-16 assessment period. A further 85.6 t of squids (unidentified to species) was retained and 14.3 t discarded over the 2012-16 assessment period.
- 28. The RAG questioned the validity of the findings, noting Gould's squid have a short lifespan and are targeted in the Southern Squid Fishery. Catches in the GABT are also well below the relevant triggers in the Southern Squid Jig Harvest Strategy.
- 29. Dr Sporcic explained that the Productivity and Susceptibility Assessment (PSA) methodology is categorical and based on a variety of attributes including life history parameters and susceptibility. Results are conservative, and Gould's squid is potentially at high risk.
- 30. The AFMA member advised the RAG that although the species is flagged as potentially high risk, other factors will be considered when implementing management

arrangements, including the limitations of the assessment methodology and total catch across other fisheries.

31. The RAG noted the assumptions of the assessment methodology and supported the outcomes of the GABT ERA.

Recommendation 4

GABRAG accepted the results of the GABT ERA and recommended that AFMA and CSIRO now proceed with finalising this assessment.

Agenda Item 6 – Tier 1 Bight redfish stock assessment

- The Bight redfish base case assessment was presented to GABRAG 1 in November
 2019. Dr Sporcic provided a brief overview of the assessment outcomes:
 - The last Tier 1 assessment was in 2016, with the base case estimating a spawning stock biomass of 62 per cent of virgin stock biomass (62%B₀).
 - The 2019 preliminary base case estimates a spawning stock biomass of 64%B₀.
 - Exploration of the initial ageing error matrix highlighted issues relating to both the size of the data set and the influence of a small number of old fish on the results.
 - An updated ageing error matrix resolved these issues and also reduced a spike in the last recruitment estimate (2003). This updated ageing error matrix was presented as a sensitivity and was accepted as the agreed base case.
 - There are poor model fits to the Commercial CPUE index and FIS abundance series, but reasonable fits to length and conditional age-at-length data.

Refer to the species summaries at <u>Attachment E</u> for an overview of the assessment, including comments from GABRAG.

- 33. The 2020/21 Recommended Biological Catch (RBC) under the 20:35:41 harvest control rule is 1,024 t. The average RBC over the three year period 2020/21 2022/23 is 963 t. The long term RBC is 912 t.
- 34. The RAG discussed the following:
 - While the CPUE and FIS points may be influenced by availability, the Scientific Member urged caution; noting a similar instance for the eastern redfish stock; where the model and stock indicators suggested the stock was sustainable, and was later assessed to be overfished. There was no suggestion that the Bight redfish stock is in an overfished state, simply that the model may not be tracking the biomass correctly.

- There was some concern that the current FIS is not accurately indexing Bight redfish abundance, and the decrease in biomass estimates may be influenced by availability.
- The RAG recommended the FIS design be reviewed by SESSFRAG and then again by GABRAG in 2020; to ensure it provides a useful index for deepwater flathead and Bight redfish.

AFMA to include an agenda item for the 2020 GABRAG meeting, to consider a review of the GABFIS design; to ensure it provides a useful index of abundance for Bight redfish and deepwater flathead.

GABRAG members to develop a list of considerations regarding GABFIS design and provide these to Dr Knuckey, with a view to presenting these at GABRAG in 2020.

- The length of the MYTAC should consider scheduling of future Tier 1 stock assessments and Fishery Independent Surveys (FIS), to ensure they are in different financial years; to minimise annual financial pressures on industry.
- The RAG were comfortable recommending either a 3 or 5 year RBC under the proviso that fisheries indicators are monitored annually to ensure the key inputs to the Tier 1 assessment (CPUE, age/length frequencies) do not change.
- Final RBCs:
- 2020 **1,024 t**
- 2021 **961 t**
- 2022 905 t
- 2023 856 t
- 2024 **813 t**

Recommendation 5

GABRAG recommended that up to a 5 year RBC, using either the single year RBCs or the average across the chosen period, be set for Bight redfish.

Agenda Item 7 – Tier 1 deepwater flathead stock assessment

- 35. The deepwater flathead base case assessment was presented to GABRAG 1 in November 2019. Dr Tuck provided an overview of the outcomes:
 - The last assessment was in 2016 with the base case estimating a 2016/17 spawning stock biomass of $45\%B_0$.

- The 2019 preliminary base case estimates a 2020/21 spawning stock biomass of 45%B₀.
- The 2019 assessment provided reasonable fits to all data sources. However, the model does not fit well to the last two FIS biomass estimates.
- The RAG agreed that no changes were required to the base case.
- An additional sensitivity, where GABFIS survey points were interpolated, was requested.
 - Including interpolated values since 2010 for the GABFIS, for years in which there was no FIS, led to a slight decline in the recent spawning biomass series. This is not too surprising, as the model is attempting to fit to a greater number of GABFIS points that show a declining relative abundance trend. While the fit to the recent GABFIS abundance may have improved, the fit to the earlier GABFIS abundance points has degraded. These results show that annual FIS points can have a strong influence on results, but it needs to be recognised that the imputed signal (from the linearly interpolated points) provided a strong and consistent signal of a declining relative biomass trend, which may not have eventuated in reality given uncertainties associated with FIS surveys.

Refer to the species summaries at <u>Attachment E</u> for an assessment summary, including GABRAG's comments from GABRAG 1 November 2019.

- The 2020/21 RBC under the 20:35:41 harvest control rule is 1,253 t. The average RBC over the three-year period 2020/21 2022/23 is 1,238 t. The longer term RBC is 1,218 t.
- 37. The RAG were comfortable recommending up to a four year RBC under the proviso that fisheries indicators are monitored annually to ensure the key inputs to the Tier 1 assessment (CPUE, age/length frequencies) do not change.
- 38. Final RBCs:
- 2020 1,253 t
- 2021 1,238 t
- 2022 1,224 t
- 2023 **1,214** t
- 2024 1,211 t

Recommendation 6

GABRAG recommended that up to a four year RBC, using either the single year RBCs or the average across the chosen period, be set for deepwater flathead.

Agenda Item 7 – Other business

- 39. The Chair asked members whether there was any other business.
- 40. The RAG discussed the following:
 - The current and potential future impacts of the Coronavirus outbreak in China on Australia's seafood industry. Industry advised the RAG that impacts are already being felt by Australian fishermen; particularly crayfish fishermen who have had to return catch to the water.
 - It is currently unclear whether the Coronavirus will have an impact on the viability of the GAB fishery.

Agenda Item 8 – Meeting Close

- 41. The Chair noted that the Executive Officer will contact members to organise the dates for the 2020 GABRAG meeting.
- 42. The Chair thanked all attendees for their input into discussions.
- 43. The meeting was closed at 5:01pm.

Signed (Chairperson):

Date: 6th March 2020

<u>Agenda</u>

Thursday 6 February 2020

Time (AEST): 09:00

Mantra Tullamarine, Melbourne Airport

Chair: Mr Lance Lloyd

Members				
Name	Membership			
Mr Lance Lloyd	Chair			
Mr Anthony Moore	Scientific Member			
Ms Marcia Valente	Industry Member			
Mr Neil MacDonald	Industry Member			
Mr Jim Raptis	Industry Member			
Dr Robert Gale	Economic Member			
Mr Daniel Corrie	AFMA Member			
Ms Kehani Manson	Executive Officer			
	Apologies			
Dr Ian Knuckey	Scientific Member			

	Invited Participants
Name	Affiliation
Dr Miriana Sporcic	CSIRO
Dr Geoff Tuck	CSIRO

Time	Item	Lead presenter
09:00	 Preliminaries 1.1 Acknowledgement of country, introductions and apologies 1.2 Declarations of interest 1.3 Adoption of agenda 1.4 Action items review 	Chair (30 mins)
09:30	 2. GAB Research Priorities Review the Five Year Strategic Research Plan 2016-2020 Identify research priorities for 2021-22 GABT Market Development Project Update 	Daniel Corrie & Neil MacDonald (1 hour)
10:30	Morning Tea	
10:45	 3. Orange Roughy Research Plan 3.1 Proposed updates to plan (follow up from GABRAG 1) 3.2 Research allowance 2020-21 3.3 Bycatch TAC recommendation for 2020-21 (Albany & Esperance) 	Daniel Corrie (1 hour)
11:45	 Gemfish Stock Structure Overview of latest genetic research 	Andy Moore (1 hour)
12:45	Lunch	
13:15	5. GABT Ecological Risk Assessment	Miriana Sporcic & Daniel Corrie (45 mins)
14:00	 6. Tier 1 Bight Redfish Stock Assessment Updates from base case presentation Final stock assessment Discussion RBC recommendation 	Miriana Sporcic (1 hour)
15:00	Atternoon Tea	
15:15	 7. Tier 1 Deepwater Flathead Stock Assessment Updates from base case presentation Final stock assessment Discussion RBC recommendation 	Geoff Tuck (1 hour)
16:15	8. Other Business	Chair (15 mins)
16:30	Adjourn	

Attachment B – Declarations of Interest

Member	Declared Interest
Mr Lance Lloyd	 GABRAG Chair Member of GABMAC and SESSFRAG Board Member, AwF – Aquaculture without Frontiers (Australia) Director – Lloyd Environment Pty Ltd. Research Fellow – Federation University Australia No pecuniary interest
Mr Andy Moore	 GABRAG Scientific Member Employed by ABARES – interest in sources of funding for research purposes, involved in the Gemfish stock structure project and the Western gemfish Tier 1 assessment; running the national recreational fishing survey and the national survey of SBT recreational catch Senior Research Fellow – University of Queensland No personal pecuniary interest
Ms Marcia Valente	Consultant for Silver Phoenix Holdings who hold two GAB SFRs
Mr Neil MacDonald	 Director NMAC (SA) P/L Executive Officer of the Great Australian Bight Industry Association (GABIA) Executive Officer of Surveyed Charter Boat Owners and Operators Association South Australia Executive Officer Southern Fishermen's Association Executive Officer of Saint Vincent Gulf Prawn Boat Owner's Association Executive Officer of Marine Scale Net Fishers Association Committee support services South Australian Rock Lobster Management Advisory Committee & Research Sub-Committee Chair – CGG Gippsland MSS Scientific Advisory Committee
Mr Jim Raptis	 GABRAG Industry Member Operates two boats in the GABT Fishery and owns four GAB SFRs as well as quota in the Southern and Eastern Scalefish and Shark Fishery
Dr Robert Gale	 Director – Next Level Sustainability Environment Institute of Australian and New Zealand (paid membership) Committee for Waste Reduction (Cairns) (paid membership) Adjunct Professor – James Cook University Independent reviewer of the 2018 SA State of the Environment Report for the SA Environmental Protection Authority
Mr Daniel Corrie	Employed by AFMA. Manager of Southern Trawl, Scallop and Squid Fisheries. No pecuniary or other interest in the SESSF.
Ms Kehani Manson	Employed by AFMA. Executive Officer of GABRAG. No interest, pecuniary or otherwise.



Invited Participant	Declared Interest
Dr Miriana Sporcic	CSIRO, Assessment scientist, Acquiring funding for research purposes
Dr Geoff Tuck	CSIRO. Involved in stock assessments. Interest in obtaining funding for future research. Principle investigator on the SESSF stock assessment project.

Attachment C – List of all GABRAG items (updated)

Complete/Redundant Underway Yet to start Need SESSFRAG advice	
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Table 1 Action item summary

Agenda Item	No.	Action Item	Agency/Person Responsible	Timeframe	Progress
4/ Nov 2017	14	Prof Tisdell to work with AFMA and provide guidance on cost/benefit analysis for the Bycatch Research and Development Plan when developing the full project proposal.	AFMA and John Tisdell	As soon as practicable	This will be discussed at GABRAG 2 (Dec 2019) under the research action item.

Note: All items marked green (complete) will be removed from the list of action items that is prepared for the next meeting (GABRAG 1 2020)

Attachment D – Action Items Arising from GABRAG February 2020

Action Item	Agend a Item Ref	Description	Responsi bility	Timeframe
1	1.2	AFMA to consider appointing an additional independent scientific member to GABRAG.	AFMA	As soon as practicable
2	2.2	AFMA to circulate Fishwell's report for AFMA Project 2019/0816 Inter-annual variation in FIS abundance indices to CSIRO and GABRAG members.		As soon as practicable
3	2.2	Mr Moore to circulate to the RAG, the report relating to research undertaken in the SESSF investigating factors that influence recruitment and abundance.	Mr Moore	As soon as practicable
4	2.2	AFMA to invite IMOS to the next GABRAG meeting (late 2020) to present on the environmental data they collect in the GAB, with a view to including the data in future stock assessments for Bight redfish and deepwater flathead.	AFMA	Before next GABRAG meeting (late 2020)
5	2.2	AFMA and GABIA to incorporate into their data plan, a project that investigates body condition (e.g. fat content) of fish and how this relates to gonad development.	AFMA & GABIA	As soon as practicable
6	2.2	CSIRO to consider including additional information within future stock assessments for Bight redfish and deepwater flathead; including environmental factors, economic/market information and catch of other key commercial species.	CSIRO	Prior to next Bight redfish and deepwater flathead assessments
7	2.2	AFMA and the Economic Member to develop a research priority – the effect of operational costs on the Great Australian Bight Trawl Fishery Dynamics. Issues should include increasing fuel prices and the cost associated with modernising the GAB fishing fleet.	AFMA & Dr Robert Gale	As soon as practicable
8	3.1	GABMAC to provide advice on whether the 200 t research catch allowance is restricted to the orange roughy research zones of whether it can be utilised within the entirety of the GAB fishery.	GABMAC	Prior to allocating scientific permits under the Orange Roughy Research Plan

9	3.2	AFMA to clarify how the Albany and Esperance bycatch TAC can be utilised; noting the quota zones overlap with orange roughy closures. Include an overview of how these management arrangements were implemented (previous RAG/MAC meetings).	AFMA	As soon as practicable
10	6	AFMA to include an agenda item for the 2020 GABRAG meeting, to consider a review of the GABFIS design; to ensure it provides a useful index of abundance for Bight redfish and deepwater flathead GABRAG members to develop a list of considerations regarding GABFIS design and provide these to Dr Knuckov, with a view to presenting these at GABRAG in 2020.	AFMA	

	Recommendations
1	 The RAG recommended that the following research priorities be included in the GAB 2021-22 annual research statement: The impacts of environmental factors and resource (nutrients etc.) availability on GAB species dynamics The effect of operational costs on the Great Australian Bight Trawl Fishery Dynamics
2	GABRAG recommended that the orange roughy research catch allowance be set at 200 t.
3	GABRAG recommended maintaining the Albany & Esperance bycatch TAC at 50 t for the 2020-21 fishing season.
4	GABRAG accepted the results of the GABT ERA and recommended that AFMA and CSIRO now proceed with finalising the assessment.
5	GABRAG recommended that up to a five year RBC, using either the single year RBCs or the average across the chosen period, be set for Bight redfish.
6	GABRAG recommended that up to a four year RBC, using either the single year RBCs or the average across the chosen period, be set for deepwater flathead.



Attachment E – GABT Species Summaries

Bight Redfish (Centroberyx gerrardi)



Common names: Nannygai, redfish, red snapper, king snapper, golden snapper.

Tier 1 - assessed by GABRAG in 2019

Summary						
Stock Structure	Assessed as a single stock.					
		Current	Target		Limit	
Stock status		2019: 64% B _o	41% B _o		20% B _o	
against reference points and trend	gainst reference points and trend Modelling suggests a slow decline in abundance consistent with the fish-de a developing fishery to near the target in 2009, with a steady increase to a estimated biomass of 64%B ₀ at the start of 2020. Depletion of the stock oc more rapidly in the mid-2000s when substantial fishing effort occurred, bu stock has never fallen below the maximum economic yield (MEY) biomass The current biomass is higher than the target biomass.				with the fish-down of ly increase to an of the stock occurred rt occurred, but the (MEY) biomass target.	
ABARES most	Biomass Fishing Mortality		ortality			
(2019)		Not overfished		Not subject to ov		overfishing
GVP Figures	GVP % Fishery GV		y GVP			
(2016-17 season)	\$1.43 million 14.2% (GABTS)		ABTS)			
Is a MYTAC in place this season?	Yes			Have b been t	reakout rules riggered?	No

Assessment Summary			
Tier Level	Tier 1		
Stock indicator trends	Model fits a decline in abundance, consistent with the fishdown of a developing fishery, with a modelled increase in biomass since 2010 to 2020.		
Key model technical assumptions/ parameters	Single stock in zone 80 Two sex model One fleet: trawl (separated for different sources of length data – ISMP, Industry, GAB-FIS) Selectivity allowed to vary between GAB-FIS and trawl fleet Discards minimal (ignored) M estimated at 0.1017 (well estimated, range 0.093-0.11) Recruitment estimated 1960 to 2003		
Changes to model structure/assumptions	Recruitment was only estimated to 2003, whereas the last assessment estimated recruitment to 2005. It was suggested the previous assessment estimated recruitment too far – fish aren't being 'selected' until about 15 years of age.		
Significant changes to data inputs	 Update software SS-V3.24U (to SS-V3.30.14.05 Apply new features in SS to allow better tuning of length and age and automatically tune abundance indices Retune translated model, using current model tuning protocols (revised since 2015) Adjust catch with revisions to 2014/15 catch history – replace estimated catch data used in the last assessment with actual catch Final year 2018, add catch to 2018/19 Add FIS indices for 2017/18 Update length frequency data to 2018/19 Add updated age error matrix, age at length data to 2017/18 and GAB-FIS age at length data Add FIS age-at-length data from 2008 Final year for recruitment estimation changed to 2003 Retune using latest tuning protocols including Francis weighting on lengths and ages 		
RAG Comments on assessment	At their December 2018 meeting, the RAG noted that overall catches of Bight redfish had decreased since 2016. The decrease in 2015 was attributed to the seismic survey that was also conducted that year. However, catches have remained low up to 2018. The length frequency measurements of Bight redfish have decreased from modal length = 30-35cm in previous years to modal length =29cm in 2018 The RAG recommended that the RBC for Bight redfish for the 2019-20 season be cut to 600 t, and recommended that the stock assessment for Bight redfish be moved forward from 2020 to 2019, noting that:		

 The 2015 and 2018 FIS surveys showed a decrease in the relative biomass.
- The depth distribution of Bight redfish appeared to have shifted; with movement inshore apparent.
 There had been a significant change to the catch composition in the GAB. In 2005, Bight redfish and deepwater flathead accounted for approximately half of the total composition.
 The FIS length frequency measurements of Bight redfish have decreased from modal length = 30-35cm in previous years to modal length =29cm in 2018.
2019 Tier 1 Assessment
Model fits to commercial CPUE are poor. The model was not adequately able to fit the decline in the initial part of the CPUE series (i.e. 1987 to 1994). The interannual variation in CPUE over time is unexpected for such a long-lived species. This variation may be driven by availability, rather than changes in biomass. The market value of Bight redfish could also influence CPUE if targeting is not occurring.
Seven out of the last 10 recruitment is above average. Eighteen sensitivities were explored:
 Increasing and decreasing <i>M</i> – results are very sensitive to the assumed value for natural mortality (<i>M</i>). The estimated current depletion level can be as low as 39% SSB₀ when <i>M</i> is 0.075. Exclude the CPUE series – results were quite sensitive when the CPUE index is excluded (i.e. using GAB-FIS as the only abundance index). Extend the recruitment deviations to 2005 – It was somewhat sensitive to extending recruitment deviation estimates for an additional two years (i.e. up until 2005). However, this sensitivity produces unrealistically high recruitments in the last two years, with little age and length data to inform them. Adding additional interpolated FIS abundance indices – made very little difference to the estimates of spawning biomass or to the fits to the abundance indices. For all other standard sensitivities, there is limited variability in current depletion, ranging between 58% and 68% SSB₀.
The projected 2020-21 spawning stock biomass is estimated to be 64%B ₀ ,
RBCs: 2020 – 1024 t 2021 – 961 t 2022 – 905 t 2023 – 856 t 2024 – 813 t Three year average – 963 t Five year average – 912 t
Model estimated discards are negligible and not included in the RBC.
GABRAG recommended that up to a 5 year RBC, using either the single year RBCs or the average across the chosen period, be set for Bight redfish.



Catch and TAC							
Assessment Year	2013	2014	2015	2016	2017	2018	2019
Tier / MYTAC	MYTAC	MYTAC	Tier 1	MYTAC	MYTAC	MYTAC	Tier 1
Stock Status	Not assessed	Not assessed	62%	Not assessed	Not assessed	Not assessed	64%
SESSF Season	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
RBC (retained)	Rollover	Rollover	797	797	797	600	
Agreed TAC	2358	2358	800	800	800	600	
TAC after unders/overs	2593	2593	1034	879	879		
% TAC caught	8%	7%	28%	35%	25%	20% (as at 24/02/2020)	



RAG Recommendations						
Recommended Biological Catch (2019-20)	2020-21 =	Undercatch: Overcatch:	10% 10%			
		Discount Factor:	0%			
Is a MYTAC recommended for future seasons? Indicate whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a rollover of catch)	Yes. Up to a 5 year MYTAC is recommended. (Final recommendation to be made by GABMAC). For TAC calculations: no discards or state catch to be deducted (M. Haddon confirmed that these sources of mortality don't contribute to RBC outcome) from TAC calculation summary.					
Probability of RBC (or other levels of catch) causing a decline below limit reference under proposed management Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).	RBC recommendation = unlikely. Alternative Catch Scenarios: N/A					
Research Catch Allowance	N/A					
Implications for companion species / TEPs / multi-species fisheries	GABRAG has noted concerns regard in recent years, with catches being deepwater flathead.	ling the lower catches taken as bycatch whe	s of Bight redfish n targeting			



Obsolete common names: deep sea flathead, trawl flathead.

Tier 1 assessed by GABRAG in 2019, species summary updated in 2019.

Summary							
Stock Structure	Assessed as a single stock.						
		Current	Target		Limit		
		2019: 45% B ₀	43% B ₀		20% B ₀		
	The s	stock remains above	e the targ	et.			
ABARES most recent		Biomass				Fishing	Mortality
assessment (2017)		Not overfished			Not	subject	to overfishing
GVP Figures		GVP				% Fish	ery GVP
(2016-17 season)		\$5.86 million				58.4%	(GABTS)
Is a MYTAC in place this season?	Yes. 2019/20 is the final year of the MYTAC.		Have breakout rules been triggered?			No	
Assessment Summary							
Tier Level	Tier 1						
Stock indicator trends	While remaining above target, estimated spawning biomass suggests a gradual decline toward the target since 2012-13.						
	The spread of ages in recent age data indicates the stock is responding to reduction in fishing effort.					s responding to a	
	Single stock model; data from zone 80						
Key model technical	Two sex model						
assumptions/ parameters	One fleet: trawl (separated for different sources of length data, ISMP, Industry, GABFIS)						
Selectivity allowed to vary between GABFIS and trawl fleet					t		

	Discard minimal (not included)			
	Natural Mortality (M) estimated at 0.263			
	Recruitment estimated 1980 to 2013 (previously 2011)			
	Update software from SS-V3.24Z to SS-V3.30.14.05			
Changes to model structure/assumptions	 Apply new features in SS to allow better tuning of length and age and automatically tune abundance indices Retune translated model, using current model tuning protocols (revised since 2015) Final year 2018, add catch to 2018/19 Add FIS indices for 2017/18 Update CPUE to April 2019 Update length frequency data to 2018/19 Add updated age error matrix, age at length data to 2017/18 and GAB-FIS age at length data Final year for recruitment estimation changed to 2013 Retune using latest tuning protocols including Francis weighting on lengths and ages 			
Significant changes to data inputs	The model structure remains the same as the previous assessment, and there were no major changes to the data inputs.			
RAG Comments on data	Crew-collected length data is not available from the Danish seine vessel. This information is important and should be collected. GABIA will pursue this. Data updated to 2018/19. Danish seine catches are included in the base case assessment as part of the trawl catch. A sensitivity was conducted to include a separate Danish seine fleet, with catches, age and length data from the Danish seine vessel. This increased the estimates of biomass over time. However, there is not enough length data for this to be considered as a new base case, and the changes in biomass needed further exploration. The RAG suggested more data is required before Danish seine can be included as a separate fleet in the base case assessment, and should remain a sensitivity. The RAG had previously noted that it would be useful to undertake a meta-analysis to better understand the value for natural mortality (M) in the assessment. The 2019 assessment shows a likelihood profile suggesting a plausible range between 0.233 and 0.3, and the model estimates M at 0.263.			
RAG Comments on assessment	2019 Assessment Bridging analysis: Adding catch, CPUE and FIS indices made very little difference to the estimate of biomass. Adding age and length data to 2018 resulted in a lower estimate of biomass trend over time. There is a divergence in the estimate of biomass from about 2012 when age data was added, which is likely driven by the influence of age estimates on recruitment. The updated tuning protocol returns the SSB trajectory to near target levels. The fits to trawl CPUE are much better from 2003 compared to earlier in the time series, where the model couldn't fit to the large increase in commercial CPUE in the early 1990's.			

Model fits to ages and lengths are good, and both are improved once tuned. Fits to CPUE are good, whereas the fits to the FIS estimates are poor for the last 2 survey points.
The FIS and commercial CPUE data shows a recent decrease in catch rates, however the age and length data are more positive. The model does not fit the most recent FIS or CPUE points, which is likely due to a conflict in the data with ages and lengths.
Catches of deepwater flathead have decreased since 2012; the last two years catches are the lowest since 1999. The decrease in 2014 was attributed to the seismic survey that was also conducted that year.
Industry noted that catch rates in October and November 2019 are the best they've seen in a long time, and reflect catches in 2016.
Recruitment deviations show poor recruitment for the period 2008-2011, however recruitments in 2012 and 2013 have recovered to just below, and above average recruitment, respectively.
Industry have observed that deepwater flathead appear to be shifting to shallower depths. There appears to have been a temporal shift in the spawning season for deepwater flathead.
While it is based on the estimate of 2018 biomass, likelihood profile suggests biomass is not well determined, with a broad range of SSB ₂₀₁₈ , (2250-5000 t) with the most likely value 3350 t.
Various sensitivities were explored however there was minimal variation from the base case.
RBCs
2020-21 – 1,253 t 2021-22 – 1,238 t 2022-23 – 1,224 t 2023-24 – 1,214 t 2024-25 – 1,211 t Three year average – 1238 t Long-term 1218 t
The RAG were comfortable recommending up to a four year RBC under the proviso that fisheries indicators are monitored annually to ensure the key inputs to the Tier 1 assessment (CPUE, age/length frequencies) do not change.



Catch and TAC							
Assessment Year	2013	2014	2015	2016	2017	2018	2019
Tier / MYTAC	MYTAC	MYTAC	MYTAC	Tier 1	MYTAC	MYTAC	Tier 1
Stock Status	45%	Not assessed	Not assessed	45%	Not assessed	Not assessed	45%
SESSF Season	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
RBC (retained)	1146	1112	1112	1128	1128	1128	
Agreed TAC	1150	1150	1150	1128	1128	1128	
TAC after unders/overs	1264	1265	1256	1241	1241	1241	
% TAC caught	52%	50%	54%	44%	43%	44% (as at 24/02/2020)	



	RAG Recommendations					
Recommended Biological Catch (2020/21)	2020-21 – 1,253 t 2021-22 – 1,238 t 2022-23 – 1,224 t 2023-24 – 1,214 t 2024-25 – 1,211 t Three year average – 1238 t Long-term 1218 t	Undercatch: 10% Overcatch: 10% Discount Factor: 0%				
Is a MYTAC recommended for future seasons?	Yes.					
Indicate whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a rollover of catch)	The RAG recommended up to a four year RBC. Period of MYTAC to be determined by GABMAC.					
Probability of RBC (or other						
levels of catch) causing a decline						
below limit reference under	RBC recommendation = <10% - v	ery unlikely to cause a decline below				
proposed management	B _{LIM}					
Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).	Alternative Catch Scenarios: N/A					
Research Catch Allowance	0 t					
Implications for companion species / TEPs / multi-species fisheries	The RAG noted that deepwater flathead effort contributes to catches of other commercial species in the GAB.					