Australian Government
Australian Fisheries Management Authority

Southern and Eastern Scalefish and Shark Fishery Resource Assessment Group

(SESSFRAG)

Data Meeting

Meeting minutes

Date: 25-26 August 2020

via teleconference

Contents

Attendees

Members		Attendance
Dr Cathy Dichmont	SESSFRAG Chair	Preliminary session, Day 1, Day 2 & decisions from Day 1 items
Ms Fiona Hill	Australian Fisheries Management Authority (AFMA) Member	Preliminary session, Day 1, Day 2 & decisions from Day 1 items
Dr Sarah Jennings	Economics Member	Preliminary session, Day 1, Day 2 & decisions from Day 1 items
Mr Lance Lloyd	Great Australian Bight Resource Assessment Group (GABRAG) Chair	Preliminary session, Day 1, Day 2 & decisions from Day 1 items
Mr Sandy Morison	Shark Resource Assessment Group (SharkRAG) Chair	Preliminary session, Day 1, Day 2 & decisions from Day 1 items
Dr Michael Steer	South East Resource Assessment Group (SERAG) Chair	Preliminary session, Day 1, Day 2 & decisions from Day 1 items
Executive officer (EO)		
Ms Cate Coddington	AFMA	Preliminary session, Day 1, Day 2 & decisions from Day 1 items
Invited Participants		
Mr Simon Boag	Executive Officer, South East Trawl Fishing Industry Association (SETFIA) and Southern Shark Industry Alliance (SSIA)	Day 1 & Day 2
Dr Paul Burch	Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Day 1 & Day 2
Dr Jemery Day	CSIRO	Day 1 & Day 2
Dr Ian Knuckey	Fishwell Consulting	Day 1 & Day 2
Mr Kyne Krusic-Golub	Fish Ageing Services (FAS)	Day 1 & Day 2
Mr Neil MacDonald	Executive Officer, Great Australian Bight Industry Association (GABIA)	Day 1 & Day 2
Mr Andrew Penney	Pisces Australis	Day 1 & Day 2
Dr Miriana Sporcic	CSIRO	Day 1 & Day 2
Mr David Stone	Executive Officer, Sustainable Shark Fishing Association (SSFA)	Day 1 & Day 2
Dr Robin Thomson	CSIRO	Day 1 & Day 2
Dr Geoff Tuck	CSIRO	Day 1 & Day 2
Presenters / Observers		
Ms Franzis Althaus	CSIRO	Day 1 – from lunch
Dr Pia Bessell-Browne	CSIRO	Day 1 & Day 2
Mr Daniel Corrie	South East Trawl and Great Australian Bight Trawl Manager, AFMA	Preliminary session, Day 1 & Day 2
Ms Natalie Couchman	Gillnet Hook and Trap Manager, AFMA	Preliminary session, Day 1 & Day 2
Dr Roy Deng	CSIRO	Day 1 – from morning tea
Dr Tim Emery	Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES)	Day 1

Dr Ashley Fowler	NSW Department of Primary Industries (NSW DPI)	Day 1 from morning tea until 4.35pm / Day 2
Dr Karina Hall	NSW DPI	Day 1 from morning tea / Day 2 – until afternoon tea
Ms Heather Johnston	AFMA	Day 2
Dr Geoff Liggins	NSW DPI	Day 1 - from Agenda Item 10 Day 2
Dr Rich Little	CSIRO	Day 1 – from Agenda Item 9 until morning tea, from lunch until 4pm
Ms Kehani Manson	AFMA	Day 1 from afternoon tea Day 2
Mr Will Mure	Mures fishing	Day 2 from beginning until 1.50pm
Mr Tamre Sarhan	AFMA observer coordinator	Day 1 & Day 2
Dr Veronica Silberschneider	NSW DPI	Day 1 & Day 2
Dr Tony Smith	Contractor	Day 1 from afternoon tea until 5pm
Mr James Woodhams	ABARES	Day 1 Day 2 – until 2pm

Meeting outcomes by agenda item

Preliminary session (declarations of interests – member discussion[1])

1. The meeting commenced at 8.30am (Australian Eastern Daylight Time (AEDT)) with: Cathy Dichmont, Fiona Hill, Sarah Jennings, Lance Lloyd, Sandy Morison, Mike Steer, Daniel Corrie, Natalie Couchman and Cate Coddington.
2. The RAG discussed potential conflicts of interest and participation under specific agenda items, noting:
   a. members, invited participants and observers had already provided declarations of conflicts of interest as prescribed in *Fisheries Administration Paper 12* via email or phone, prior to the commencement of the meeting; and
   b. conflicts of interest are at **Attachment 1**, and the outcomes of the deliberations with specific agenda items are outlined in Table 1 below.
3. The remaining meeting attendees joined the teleconference as outlined in the attendees list on page 3.

Acknowledgement of Country

4. Cathy Dichmont (the Chair) made an acknowledgement of country.

1. Welcome & apologies

5. The Chair welcomed members, invited participants, presenters and observers to the meeting, and commenced proceedings.
6. The Chair stated that no apologies had been received.

2. Declarations of interest

7. The Chair outlined the outcomes from deliberations regarding conflicts of interest (Table 1) and noted that if any additional conflict of interests arise, that participants have a responsibility to raise them as soon as they are aware.
8. Where conflicts of interest exist (Table 1), it was agreed that recommendations would be considered by members without a declared interest at the end of each day after invited participants, presenters and observers had left the meeting.

Table 1 Participation in items where there are declared conflicts of interest

Agenda Item	Potential conflicts of interest	Participation in the discussion	Participation in the recommendation
8. Fish Ageing Services (FAS) end-of-financial year report	Nil – as there are no changes to financial interests.		
11. Discard rate estimates update	Industry	Present	Not present for any substantive decisions
12. Catch and discard report – state catches and discards	NSW DPI / Industry (all)	Present	Not present for any substantive decisions
13. Fishery independent data working group (FIDWG) update	Unlikely to be any – unless financial impacts are considered:	Present	Not present for any substantive decisions

[1] This item was discussed at a preliminary session to ensure the item could be discussed fully.

Agenda Item	Potential conflicts of interest	Participation in the discussion	Participation in the recommendation
	Industry / Ian Knuckey / Michael Steer / Researchers		
14. Catch per unit effort (CPUE) standardisation	Industry – particularly David Stone and Simon Boag	Present	Not present for any substantive decisions
16. School whiting – data and assessment review	Industry / NSW DPI	Present	Not present for any substantive decisions
17. Multi-year total allowable catch (MYTAC) analysis and data summary	Industry	Present	Not present for any substantive decisions
18. Recommended changes to Integrated Scientific Monitoring Program (ISMP) and SESSF data plans	All participants aside from SESSFRAG members	Present	Not present for any substantive decisions
19. Stock structure	NSW DPI, CSIRO and industry	Present	Not present for any substantive decisions
20. Draft Five-year Strategic research plan (2021-25)	Researchers / NSW DPI / Mike Steer (for small pelagics)	Present	Not present for any substantive decisions
21. Ecological Risk Assessments (ERA) triggers checklist	Industry: David Stone / Neil MacDonald	Present	Not present for any substantive decisions

3. Adoption of Agenda

9. The RAG adopted the agenda as drafted.

10. Two additional items were included under other business – the *East Gippsland seismic survey* and *companion species composition work plan*.

11. The agenda in the order as discussed at the meeting is at **Attachment 2**.

4. Minutes from previous meeting

12. The RAG endorsed the SESSFRAG Chairs' March 2020 meeting minutes as finalised on 25 June 2020. No major concerns or errors were identified.

5. Action items status

13. The RAG reviewed and commented on the status of the action items from previous meetings as detailed in **Attachment 3**.

14. A list of new action items established at this meeting are listed in **Attachment 4**.

15. The RAG noted that items relevant to SharkRAG would be discussed at their next meeting, as per **Attachment 3**, with a meeting planned in September 2020.

16. The RAG noted that some items, originally intended for this meeting, were deferred to the March SESSFRAG Chairs' meeting in 2021, as per **Attachment 3**.

17. The RAG's discussion regarding particular action items are outlined below.

Action Item #38 (Agenda Item 17 Data meeting 2019) Undertake out-of-session work on the monitoring and data collection scenario options and provide to SEMAC

18. The RAG agreed that this can be marked as redundant (see **Attachment 3**), noting that this work can be considered by the Fishery Independent Data Working Group (FIDWG) and that outcomes can be provided to South East Management Advisory Committee (SEMAC).

Action Items #1 & 2 (Agenda Item 5 Chairs' meeting 2020) Updating the SESSF harvest strategy framework to ensure that multispecies considerations and Tier 5 harvest control rules can be incorporated.

19. The RAG noted that:

    a. an industry member of the Tier 5 TAC setting working group needs to be appointed, and that Simon Boag may be the most appropriate member given the majority of Tier 5 species are relevant to the Commonwealth Trawl Sector (CTS);

    b. TACs have been set for Tier 5 species without a harvest control rule – the Commission have raised concerns about the lack of such a rule;

    c. a SESSF multi-species harvest strategy (MSHS) is being developed, as such, the current SESSF harvest strategy will not undergo a major review; and

    d. as an interim measure, the current SESSF harvest strategy framework will be updated to include a Tier 5 harvest control rule prior to the next Tier 5 TAC setting process.

Action Item #42 (Agenda Item 19 Data meeting 2019) AFMA to update the logbooks to include 'live' status of released school sharks

20. Logbooks will include the 'live' status of released school sharks by December 2020.

Action Item #10 (Agenda Item 7 Chairs' meeting 2020) CSIRO to provide an update to SESSFRAG on their work to automate the collection of fish lengths by EM

21. Geoff Tuck will provide an update at the Chairs' meeting in March 2021.

Action Item #12 (Agenda Item 8 Chairs' meeting 2020) DEWG to consider the use of a model-based system to estimate discards that would not have the assumption of data collection in accordance with annual observer plans

22. The Discard Estimation Working Group (DEWG) considered the use of a model-based approach to estimate discards – Paul Burch will continue to explore this approach.

Action Item #17 (Agenda Item 10 Chairs' meeting 2020) Ian Knuckey to provide the report from the gemfish study, which used stereo video cameras on the net to estimate abundance

23. Alternative methods for considering abundance will be included in the South East RAG (SERAG) second meeting in 2020 as part of the research agenda item.

Action Item #22 (Agenda Item 10 Chairs' meeting 2020) AFMA to ask CSIRO for written advice regarding the possibility of undertaking a companion analysis

24. Paul Burch provided an update on the potential to undertake a companion species analysis at Agenda Item 24: *other business*.

Action Item #24 (SharkRAG 4 2018) AFMA and SESSFRAG at its February 2019 meetings, investigate including baiting efficiency an additional field in logbooks for automatic longline vessels to be used for CPUE standardisation

25. The RAG agreed that the additional field does not need to be incorporated in the logbooks (refer to the minutes for Agenda item 14: *CPUE standardisation*).

Action Item 1: AFMA/Simon Boag

AFMA to liaise with Simon Boag regarding his involvement in the Tier 5 TAC setting working group.

6. Outcomes of out-of-session items

26. The RAG noted the following four items that were considered out-of-session since the Chairs' meeting in March 2020:

    a. Research priorities identified in the SESSF 2021-22 Research Statement were prioritised as part of finalising the 2020 Chairs' meeting minutes.

    b. A methodology to correct erroneous depth records was supported.

    c. Terms of reference (TOR) for the SESSF Fishery Independent Data Working Group (FIDWG) were adopted.

    d. The 2021 pink ling stock assessment was added as a research priority to the SESSF 2021-22 Research Statement.

27. The RAG endorsed the following outcomes from the out-of-session items:

    a. *Depth corrections* – The RAG supported CSIRO undertaking a correction for recent depth records using shot location and bathymetry data, for boats who are not correctly recording shot depth information. For future years, start position should be explored as a proxy for depth.

    b. *FIDWG TOR* – The TOR and membership were updated, noting:

        i. a seventh term of reference was added to 'consider cost-effectiveness of the various options throughout the process';

        ii. membership could evolve over time to ensure that expertise is included as needed;

        iii. David Peel declined involvement due to lack of capacity, and Beth Fulton and Andre Punt were invited to the first meeting to ensure that a broader expertise was included; and

        iv. the first meeting of this group considered the objectives and fishery data needs.

    c. *Pink Ling Stock Assessment* – The RAG recommended the pink ling stock assessment be included as a research priority in the *SESSF 2021-22 Research Statement* as essential, highly feasible and low cost.

7. Update from the RAGs, Economic Working Group and Marine Mammal Working Group

28. The RAG noted the following updates outlined below, provided by:

Lance Lloyd – Chair of the Great Australian Bight Resource Assessment Group (GABRAG)

29. While there had been no meeting of GABRAG since the last SESSFRAG meeting, research priorities had been considered out-of-session when finalising the GABT research plan. Generally, catches in the fishery have been stable, and there are ongoing concerns raised by industry about operational impacts of gulper shark closures.

Mike Steer – Chair of the South East Resource Assessment Group

30. SERAG have not met since the last SESSFRAG meeting. The next meeting is scheduled for the end of October 2020. Discussion will include methodology for estimating discards and issues arising from the extensive seismic survey that was undertaken in the fishery.

Sandy Morison – Chair of the Shark Resource Assessment Group

31. SharkRAG met via teleconference in May 2020 to develop a TOR and proposed workplan for a review of the 2019 school shark assessment[2]. The RAG also considered the review of the school shark rebuilding strategy.

32. Natalie Couchman added the following:

    a. The TOR for this review were agreed in July 2020. A panel of reviewers will be formed to undertake the review.

    b. The review of the school shark rebuilding strategy will be considered by SharkRAG in September 2020. Discussions will include the lack of a relative index of abundance provided by the close-kin mark recapture (CKMR) methodology.

Sarah Jennings – Member of the Economic Working Group

33. The last meeting of the EWG was 18 months ago. However, it is expected there will be a meeting soon now that the membership has been finalised.

Fiona Hill about the Marine Mammal Working Group (MMWG)

34. There had been no meeting of the MMWG since the last SESSFRAG meeting. Future meetings will be on an as needs basis.

8. Fish ageing services end of financial year report

35. The RAG noted the update provided by Kyne Krusic-Golub on the services provided under the current fish ageing project, including:

    a. 56 314 otolith and vertebrae samples were registered from 32 species (of these 18 494 were collected in 2019).

    b. 27 432 age estimates from 13 species were undertaken.

    c. Changes were made to the ageing plan in 2019-20 – gummy shark samples were prioritised over other Tier 1 species to provide age estimates for the next assessment.

    d. A fit-for-purpose database was created to include additional fields, as requested by CSIRO.

    e. Further samples will be completed within the month (824 orange roughy, 450 ling and 2916 gummy shark).

36. The RAG discussed:

    a. Most sampling targets are being met since improvements in sampling by the AFMA Integrated Scientific Monitoring Program (ISMP) and successful implementation of the Shark Industry Data Collection (SIDaC).

    b. Overcollection of samples incurs additional cost for archiving (or onboarding) and the additional otoliths will not be aged for use in stock assessments. While spatially and temporally representative sampling takes precedence, the over-collection of samples should be avoided.

[2] informed by close-kin mark recapture work: Thomson R, Bravington MV, Feutry, P, Gunasekera, R & Grewe, P 2019, *Close-kin mark recapture for school shark in the SESSF*, draft, CSIRO Marine and Atmospheric Research, Hobart.

37. The RAG endorsed the continuation of the age-error data migration into a single built-for-purpose database for Tier 1 assessed species only; noting that redfish and school whiting have already been migrated, and gummy shark will be next.

38. The RAG endorsed the use of the new ageing data as an input to the 2020 Tier 1 assessments, noting:

    a. Sampling improved in 2016 and 1,900 school whiting otoliths were added. The age composition of the otolith samples was similar in each of the past three years of sampling (2017 to 2019).

    b. 1,198 new redfish samples, collected between 2015 and 2019, were aged. Modal age progression was detected during the last two years (from two years old in 2018 to three years old in 2019) which could be evidence of a recent recruitment event.

    c. About 2,000 gummy shark samples collected by SIDaC between 2018 and 2020 have been selected for ageing, along with 1,000 historical samples collected between 2009 and 2011, and should be completed soon.

39. The RAG agreed to the proposed 2021 otolith and vertebrae ageing plan, noting:

    a. Kyne Krusic-Golub developed the plan in consultation with Paul Burch and Robin Thomson and could be subject to change;

    b. priority species for ageing for 2021 Tier 1 assessments are orange roughy (to be completed September/October 2020), blue grenadier, pink ling, jackass morwong, and silver warehou;

    c. while assessments for eastern gemfish and school shark are likely to be delayed until 2022, ageing should be completed to help monitor the stocks (breakout rules etc.), as budget and resources allow;

    d. while Tier 3 assessments are no longer conducted, samples for non-Tier 1 species should be retained to enable future ageing if required; and

    e. under the MSHS project, 'indicator species' such as leatherjackets and frostfish may be important, therefore the collection of otoliths for these may need to be considered.

40. The RAG noted reports of juvenile redfish being caught and the importance of reviewing mesh size requirements to allow redfish recruits to pass through the net and reduce their bycatch. This should be a focus of the Fisheries Research and Development Corporation (FRDC) project *Improving and promoting fish-trawl selectivity in the Commonwealth Trawl Sector (CTS) and Great Australian Bight Trawl Sector (GABTS) of the Southern and Eastern Shark and Scalefish Fishery (SESSF).*

41. The objectives of this project are:

    a. Review the available domestic and international literature and data, and consult with a project stakeholder committee (comprising representatives of the CTS, GABTS, NSW Professional Fishermen's Association (PFA) and AFMA) to prioritise modifications to be formally assessed for their utility in minimising bycatch, while maintaining target catches among trawls used in the CTS and GABTS.

    b. Based on the outcomes of the review, assess the utility of existing and new modifications to trawls for minimising bycatch, while maintaining target catches in the CTS and GABTS.

    c. By providing strong economic incentives through improved efficiencies, and via applied extension activities, encourage wide-scale voluntary adoption and ongoing exploration of appropriate best practice technologies that cumulatively reduce bycatches, while maintaining target catches in the CTS and GABTS.

Action Item 2: AFMA

AFMA (Dan Corrie) to speak with Matt Broadhurst to request that the FRDC trawl selectivity project include reducing catches of small redfish by improving selectivity as a focus. Include an item on the SESSFRAG Chairs' meeting agenda in March 2021.

Action Item 3: SESSFRAG

The RAG to discuss the implications of the MSHS project on the ageing plan and the inclusion of non-quota species, such as leatherjackets, at the Chairs' 2021 meeting.

9. Integrated Scientific Monitoring Program (ISMP) report for quarters 1 & 2, 2020 (including COVID-19 impacts update)

42. The RAG noted and discussed the update provided by Tamre Sarhan on the collection of data for the first and second quarters of 2020.

    a. The first quarter was close to the best quarter for meeting the targets with a good distribution across the ISMP strata. Where targets were not met these generally resulted from changes to fishing plans, unplanned voyages to test seabird mitigation devices, or because the fish were not caught.

    b. The observer program was effectively suspended for the second quarter due to travel restrictions arising from the COVID-19 pandemic. Observers were deployed in high priority orange roughy and blue grenadier zones since 23 March 2020; no days were completed in GABTS.

    c. Despite the impacts of the COVID-19 pandemic, annual targets are close to being met, including length targets for most species.

    d. While observer days are now being completed in the GABTS, establishing a fully operational program is dependent on health advice and any travel restrictions that may prevent the deployment of observers on vessels.

    e. Some areas have 'zero targets' and should be coloured green in the report, for example east Tasmanian orange roughy during non-spawning months.

43. The RAG commended both the ISMP and SIDaC program, and the continued improvement in meeting sampling targets.

10. Shark Industry Data Collection (SIDaC) update

44. The RAG noted and discussed the update provided by Simon Boag concerning biological data collected for five target species in the SESSF through the SIDaC Program:

    a. Collection of samples as per the plan is proceeding well for all species except for school shark.

    b. There are issues in collecting school shark samples, which has implications for the CKMR assessment:

        i. Sample collection is pre-determined by trip.

        ii. Spatially representative sampling is important – coverage from the trawl fleet would provide samples from deeper water.

        iii. Samples need to be linked back to the fishing event.

iv. Management arrangements impact the ability to collect data – school shark are not targeted and there is often less quota available at the end of the season, which makes co-ordinating port-sampling for small amounts of landed school shark difficult.

v. It may be possible to sample school shark at the processors or for operators to collect samples at sea.

vi. SharkRAG will consider the collection of length data using electronic monitoring (EM at their September 2020 meeting.

Action Item 4: AFMA

AFMA to analyse gillnet and hook catch and effort data with a view to providing the SIDaC program guidance on which boats are more likely to catch school shark to facilitate sampling.

Action Item 5: AFMA/SIDaC

AFMA and the SIDaC program to report to SharkRAG at their September 2020 meeting regarding costs for collecting school shark length samples at sea as part of a crew-based program. In addition to the sampling requirements across the strata (method and location), the SIDaC program should consider:

- ensuring lengths are linked to any tissue samples, as lengths alone are not used in the assessment; and
- including sampling targets for the trawl fleet, particularly from deeper water.

Action Item 6: SharkRAG

SharkRAG to revisit the school shark data collection plan including the data needs and a gap analysis on the data currently being collected.

Action Item 7: AFMA

Subject to SharkRAG advice, the SESSF data plan and ISMP plan to be updated to include the collection of school shark lengths and vertebrae from otter board trawl boats in the CTS.

11. Discard rate estimates update – SESSF ISMP discard report (including information from the Discard Estimates Working Group (DEWG))

45. The RAG noted and discussed Paul Burch's presentation on the work undertaken by the DEWG to consider the best methods to estimate discards.

46. The RAG noted that observer discard records with 'zero' (N/A) have always been included and dealt with correctly in the estimation of discard proportions for Tier 1 assessments[3].

47. The RAG recommended[4]:

    a. a four-year weighted mean be used to allocate observer sea-days to ISMP strata from 2021, noting:

        i. the DEWG met on 23 August 2020 and supported moving to a four-year weighted mean; and

        ii. while it is not possible to predict future effort, based on any method, a high level of correlation exists, as such the method recommended is considered the best for determining observer effort.

[3] An error in the preparation of data was identified for estimating discarded catches in 2019. This error only impacted Tier 4 assessments as a different method is used to estimate discards, the correction has resulted in revised figures.
[4] These recommendations were made on Day one after participants other than SESSFRAG members and the EO had left.

b. the arithmetic mean (Method A) of Bergh et al. (2009)[5] continue to be used to estimate discarded catches for the ISMP Discard report (Deng et al. 2020[6]), noting:

   i. there is no evidence that the data has a lognormal distribution and hence no need to use a bias corrected geometric mean is appropriate;

   ii. the estimate of discards (using flathead as example) are consistent between geometric or arithmetic mean, however uncertainty is very high for some estimates when using the geometric mean;

   iii. the DEWG agreed there is no benefit to moving to geometric mean over arithmetic mean (Bergh approach); and

   iv. this method should continue to be used until a model-based approach is available for evaluation, as it may be better at accounting for spatial and temporal variability in sampling as sampling has declined recently and individual shots or trips can impact the discard time series significantly.

   With respect to a model-based approach, there is a high level of uncertainty for most species groups and it may be better to pool data over years for species that do not show cyclical patterns for discarding, rather than using a four-year weighted average using single-year estimates. Paul Burch will investigate this for flathead, redfish, blue grenadier, mirror dory, pink ling and deepwater sharks (noting that this is not an AFMA-funded project).

c. Use Method 1 (equation at Figure 1) to estimate discard proportions for Tier 1 assessments from 2020 onwards.

$$R_{p,f,y,z,s} = \frac{\sum_1^n D_{p,f,y,z,s,n}}{\left(\sum_1^n T_{p,f,y,z,s,n} + \sum_1^n D_{p,f,y,z,s,n}\right)}$$

Figure 1 Equation to estimate discard proportions for Tier 1 assessments[7]. Noting: Each observed fishing operation (n) records discard weight (D) and retained weight (T). The discard rate (R) was firstly calculated for a population (p), fleet (f), year (y), zone (z) and season (s, in LW this is usually quarter)

48. The RAG advised that observer discard estimates should be scaled to Catch Disposal Record (CDR) totals, noting observer estimates might be uncertain, but should not be considered biased.

49. The DEWG recommended that discard estimation be changed to use CDR rather than logbook estimates for scaling retained catch. The RAG noted skippers tend to under-report in their logbooks by about 20 per cent to manage concerns regarding quota evasion.

50. The RAG suggested it might be possible to scale across the fleet, noting CSIRO are best placed to decide how logbook and CDRs are used to estimate discards now that the assumptions and issues are understood.

[5] Bergh, M., Knuckey, I., Gaylard, J., Martens, K., and Koopman, M. (2009). *A revised sampling regime for the Southern and Eastern Scalefish and Shark Fishery – Final Report*.
[6] Deng, R, Burch, P, Thomson, R. (2020). *Integrated Scientific Monitoring Program for the Southern and Eastern Scalefish and Shark Fishery - discards for 2019* DRAFT. CSIRO Oceans and Atmosphere, Hobart. Prepared for the SESSFRAG Data Meeting, 25-26 August 2020.
[7] From Klaer, N. (2018) *Methods for estimating discard proportions for Tier 1 stocks*, unpublished document

51. ABARES compared logbook data for the first two years of EM implementation to the previous six years and found that logbook reporting of some discarded and threatened, endangered and protected (TEP) species in some fisheries increased following the implementation of EM[8]. Re-examining the data to gauge any further improvement would be valuable to determine if logbook data is adequate to provide discard estimates for EM fisheries.

52. Discard rates from the trawl sector are still estimated using onboard observer data and logbook information is not used.

53. The RAG noted and discussed the presentation provided by Roy Deng about the SESSF ISMP discard report.

    a. The following changes have been made when estimating discards in 2019 and 2020 and, while the time series are calculated, these have not been retrospectively applied to other related work yet.

       2019

       i. Strata – where the variance is undefined (those where only one shot is observed – were excluded from the calculation of discarded catch).

       ii. The hit rate (the proportion of shots that encounter the species) has replaced the mean proportion discarded in species-specific summaries presented in the report.

       iii. Histograms were used to assist in the identification of outliers of observed discarded catches for each species group.

       iv. The coefficient of variation (CV) has to be smaller than 100% for discarded and total catch to pass the validity test.

       2020

       v. Depth was determined using bathymetry data for vessels reporting invariant depths – this was approved by the RAG out of session.

       vi. Where observer data are marked as N/A, these are changed to zero.

       vii. Additional strata have been added for discard estimation for deepwater sharks (two strata around east and west Tasmania, boundary moved slightly to align with AFMA's management boundary) and orange roughy (five strata aligned with management boundaries), noting the deepwater shark strata need to be checked.

       viii. Squid, frostfishes, latchets and king dory have been added to the report.

    b. There are some associated uncertainties with the current discard estimates driven by:

       i. a lack of ISMP coverage in the GABTS every second year;

       ii. removal of observers from the Gillnet, Hook and Trap (GHAT) sector may mean SESSF-wide discard estimates are biased; and

       iii. current sampling intensity differs between the eastern and western part of the fishery.

[8] Emery, T, Noriega, R, Williams, A & Larcombe, J. (2018) *Changes in logbook reporting by commercial fishers following the implementation of electronic monitoring in Australian Commonwealth fisheries.* Marine Policy 104, pp. 135-145.

c. The issue of invariant depths in CatchLog data has been resolved and in future logbook depth will be used.

d. The discard time series should only be updated once, prior to undertaking the Tier 4 assessment.

e. Discard estimates are based on assumption that fisher behaviour does not change when observers are present: work was undertaken in the early 2000s on NSW vessels that analysed the bias in discards for changes resulting from observers. No bias was found as there were no significant differences between the onboard and onshore sizes of retained species.

Action Item 8: CSIRO

CSIRO to ensure the boundaries for the deepwater shark management zones are correct for reporting purposes.

Action Item 9: Paul Burch / David Stone

Paul to check with Malcolm Haddon on possible methods to estimate or account for changes in fisher behaviour when an observer is on board. David Stone may also be able to provide some thoughts on how to analyse the data to take into account any bias.

Action Item 10: NSW DPI

Geoff Liggins to send Paul Burch the research reports from the early 2000s regarding bias in discard estimates due to changes in fisher behaviour when observers are onboard.

Action Item 11: CSIRO

Updates to the ISMP discard report (refer to the summary table in the report (2)) to include:

- a separate table for Tier 1 species with details of the model estimate of discards to be included to enable comparison to observer estimates of discards,
- a pass or fail for all species; and
- footnote explaining observer coverage for school and gummy shark.

Action Item 12: Paul Burch

Paul Burch to provide the 'Discard Method Evaluation' report, an output from the Discard Estimation Working Group, to the SESSFRAG EO when finalised so that it may be distributed to the RAG.

Action Item 13: AFMA

AFMA to evaluate the benefits of undertaking another analysis of discard reporting for fisheries which have EM to determine if there are continuing improvements in reporting (as per the review that ABARES undertook).

Action Item 14: CSIRO / AFMA

CSIRO and AFMA to check the discard rate estimates for the following species from the 2019 discarded and total catch table (table 2 (on page 19 Deng et. al. 2020 report)) to ensure that this is completed prior to the SERAG meeting. Inform the RAG out of session:

Assessed in 2020 – school whiting, eastern redfish, gummy shark, mirror dory (east and west), John dory, and smooth oreo (non-Cascade)

Rebuilding species – school shark and eastern gemfish

Assessed in 2021 – blue grenadier, jackass morwong (east) and deepwater shark (east)

Other – orange roughy (GAB).

Action Item 15: AFMA

AFMA to investigate and compare logbook reported discards for school and gummy shark to (1) observers for trawl boats, and (2) EM for gillnet/hook boats.

12. Catch and discard report: application of Commonwealth discard rates to state catches; and, NSW reported catches

54. The RAG noted the presentation provided by Paul Burch and Franzis Althaus about the draft catch and discard report.

55. The RAG discussed and provided advice on the item regarding *revised NSW state catch series for 2008 – 2018*:

    a. Data is now being provided by NSW DPI group responsible for stock assessment: NSW previously provided only processed catch weights and data from the catch records team. This year's data includes:

        i. both processed and whole weight: The whole weight data is either higher or the same as the processed weight. For example, ocean jackets have increased as the previous value would have been headed and gutted weights with a conversion factor of approximately 1.5.

        ii. corrections that have been made by NSW for stock assessment processes; as a result, while generally weight data has increased or remained the same, for some species weight records have decreased.

    b. NSW DPI advised that due to a change in reporting part way through 2009, it would be better to disregard 2009 data in the series.

    c. SESSFRAG noted the importance of using the best available data in stock assessments.

    d. Most changes arising from the revised state catch series are small, and most are Tier 4 species – of which most TACs are undercaught. Species of note are:

        i. silver trevally (Tier 4) – the NSW weight is significantly higher and the NSW data for this species may need to be checked;

        ii. pink ling – while the adjustment to the catch will only have a small impacts on the eastern TAC, this will impact the Commonwealth catch restrictions in the east; and

        iii. ocean jackets – however, these do not have a stock assessment and a TAC is not set.

56. The RAG recommended[9] the revised NSW state catch series for 2008 – 2018 be used, noting:

    a. 2009 data to be excluded;

    b. silver trevally to be checked by NSW DPI; and

    c. there are implications for the MYTAC adjustments, particularly for pink ling, which needs to be updated on an annual basis with the reason for any differences understood.

57. The RAG discussed and provided advice on the item regarding *replacing 'N/A' in observer discarded catch estimates for 2016 – 2018 with zeroes to estimate discard proportions:*

    a. Including the zeros increases the number of species that pass the discard estimate validity test.

    b. Using zeros assumes that all shots have a chance of catching a species.

    c. For species like flathead and whiting, the 'hit rate' will account for shots in a strata that do not target that species i.e. targeting flathead in a whiting strata.

    d. There is small amount of additional observer data for 2018 that were not available in 2019.

    e. Corrections to the discard calculations were made in 2018 that scale the weight to all logbooks shots in a stratum, rather than those that just caught the species group.

58. The RAG recommended[10] that observer discarded catch estimates for 2016 – 2018, which have 'N/A', be replaced with zeroes to be used for estimating discard proportions[11].

59. The RAG discussed and provided advice on the item regarding *application of Commonwealth discard rates to state catches when gear types differ and the estimation of state discard rates and total catches where Commonwealth discard rates are not applied*:

    a. Discard rates are not just gear driven and can be impacted by management arrangements such as trip limits and quota, potentially to an even greater extent than gear type. For example, in the Commonwealth, the discarding of blue warehou is driven by a low TAC and the availability of quota, whereas blue warehou caught in Tasmania is more likely to be landed as there are not the same restrictions.

    b. NSW operators catch the majority of species using the same methods as Commonwealth operators. However, the gear types used by operators in other states can be quite different, for example, blue warehou are caught predominately using either trawl or gillnet by different states, likewise school whiting and flathead are caught using either Danish seine or otterboard trawl.

    c. Changes to processes of assigning discard rates to state catches needs to be considered and cannot be made arbitrarily.

    d. A working group, with representatives from the Commonwealth and relevant states, could consider discards by states for different methods. AFMA needs to:

        i. determine if a working group is needed; and

        ii. approach the states to obtain discarding rates by gear if available.

[9] This recommendation was made on Day one after participant other than SESSFRAG members and the EO had left.
[10] This recommendation was made on Day one after participant other than SESSFRAG members and the EO had left.
[11] Tier 1 assessments have not been impacted by the 'n/a' records.

60. The RAG recommended[12] that, in the short term, Commonwealth discard rates should be applied to state catches where Commonwealth and state gear types differ (status quo) until a working group develops a protocol that will provide a set of decision rules to estimate state discard rates and total catches. Noting:

    a. previously, Commonwealth discard rates were applied to state catches regardless of the gear used;

    b. CSIRO obtained details about state gear used to catch SESSF quota species;

    c. the motivation for discarding needs to be considered;

    d. exceptions to the status quo should be considered (for example blue warehou and pink ling); and

    e. individual RAGs need to consider this issue.

61. The RAG discussed and provided advice on the item regarding *whether the approach used to determine recreational catch weights for shark species be extended to other SESSF species as part of the 2021-22 Data Services Contract*:

    a. SEMAC asked that AFMA more explicitly account for recreational catch in TAC setting processes and that objective consideration should be given to whether this should be done for all SESSF species.

    b. James Woodhams outlined that the current national recreational survey was established to collect data on the social and economic values of recreational fishing. It will not collect catch and effort data for SESSF stocks accessed by recreational anglers. However, some of this information [catch and effort] is routinely collected by the states and territories in their surveys of recreational anglers.

    c. The Status of Australian Fish Stocks reports include estimates of recreational catches where available.

    d. As part of the CSIRO data services contract recreational catch information is summarised and a separate report for school shark, gummy shark and sawshark has been prepared. Extending those requirements to all species will require additional funding and time.

    e. The decision to include recreational catch estimates needs to consider the quantity recreational fishers take and if the amount that is taken remains constant over time. Analysis of the quantity that is taken or consistent catches could help to determine which species warrant further analysis.

    f. Recreational catch is likely to be a small proportion of the catch across the majority of assessed SESSF species (e.g. tiger flathead and redfish is only a couple of tonnes). However, silver trevally has a relatively high recreational catch. In addition, for species like pink ling (east), current recreational catches could affect the stock.

    g. CSIRO has collated the recreational catch data, however there are difficulties in converting fish numbers into weights (CSIRO require funding to undertake this additional conversion work). The collated information could help the RAG to identify the species that need to be done.

    h. To ensure that decisions about the use of recreational catch in assessments are based on sound criteria and addressed in a systematic way, state agencies should be approached to help to determine whether there are certain SESSF stocks that are substantially impacted by recreational fishing.

[12] This recommendation was made on Day one after participant other than SESSFRAG members and the EO had left.

i. The level of recreational fishing could be monitored at the data meeting each year, with a threshold for consideration.

j. A working group, outlined above, could also consider recreational catches given the state representatives.

62. The RAG recommended that[13] the approach used to determine recreational catch weights for shark species should be extended to other SESSF species (as part of the 2021-22 Data Services Contract), noting:

    a. CSIRO to request recreational fishing data from the states when requesting commercial fishing data, it is anticipated that they will provide it if it is available.

    b. If recreational catches are small, or remain constant over time, they do not need to be accounted for in assessments. However, if they are increasing consideration should be given to including them.

63. The RAG discussed and provided advice on the item regarding *adjustments of MYTACs given the NSW state catch series, corrected discard estimates, potential changes to the application of Commonwealth discard rates to state catches and potential changes in the proportion of the total catch taken by recreational fishers:*

    a. While the catch and discard series have been changed, it is unlikely that the changes will have much of an impact for most stocks.

    b. As MYTACs have break out rules, it is unnecessary to consider a revision to them unless the data changes trigger the rules.

    c. If the updated data has a less than 5 per cent impact on the TAC, there is no need to update the MYTAC.

    d. There needs to be a valid reason to change the *status quo*.

    e. Where the discard rate change might be substantial (e.g. for species like pink ling) it will be checked and discussed during Agenda item 17: *MYTAC analysis and data summary*.

64. The RAG recommended[14] that AFMA consider establishing a state discard and recreational working group, that includes state representatives, to consider:

    a. the application of Commonwealth discard rates to state catches and develop a set of decision rules to estimate state discard rates and total catches; and

    b. recreational catches and their potential use in SESSF stock assessments.

Action Item 16: NSW DPI

Geoff Liggins to provide further clarification on catch figures for relevant species in the updated NSW catch dataset, in particular data for 2009 as well as for ocean jackets, silver trevally and pink ling.

Action Item 17: AFMA / CSIRO

AFMA and CSIRO to liaise with the states regarding estimates of discards for SESSF quota species and consider establishing a discard and recreational fishing working group to consider a set of decision rules, in particular:

- whether to apply Commonwealth discard rates to state catches when Commonwealth and state gear types or management controls differ;

[13] This recommendation was made on Day one after participant other than SESSFRAG members and the EO had left.
[14] This recommendation was made on Day one after participant other than SESSFRAG members and the EO had left.

- how to estimate state discard rates and total catches where Commonwealth discard rates are not applied because of differences in gear type or management controls; and
- whether the approach used to determine recreational catch weights for shark species should be extended to other SESSF species as part of the 2021-22 Data Services Contract.

Action Item 18: CSIRO

As part of the annual data request to the states, CSIRO to also request the latest available recreational data (numbers, conversion factors and weights). It is anticipated that, if the states hold the data, they should be able to provide it.

Action Item 19: AFMA

Consider whether it is worthwhile undertaking a desktop study to determine which important Commonwealth fish species are also targeted by recreational fishers.

Action Item 20: CSIRO

CSIRO to circulate to the SESSFRAG a more detailed recreational catch data spreadsheet and incorporate this into the final report.

13. Fishery independent data working group update

65. The RAG noted the update provided by Dan Corrie on the FIDWG:

    a. The objectives are high level and consistent with those from the previous FIS.

    b. The working group discussed all of the TORs, which is outlined in the attached meeting outcomes at **Attachment 5**.

    c. The working group started developing the options to gather independent data and identified the key commercial species. There is limited independent data currently collected for the key commercial species.

    d. FIS collected data has not been used as an input for assessment of bycatch species so far.

    e. Opportunities to collect fishery independent data using existing programs were identified, e.g. using commercial fleet as a sentinel fleet, CKMR, acoustics.

    f. The proposed next steps for the FIDWG are to:

        i. further develop methods for independent data collection and options for individual species (tables 1 and 2 on pages 11-13 in the FIDWG meeting outcomes);

        ii. consider the application of alternative approaches, including new and emerging methods for collecting independent data; and

        iii. provide feedback to the RAG on the preferred methods for collecting fishery independent data for selected species in the SESSF.

    g. Further details on the outcomes from the FIDWG are at **Attachment 5** (finalised since the SESSFRAG meeting).

66. The RAG discussed the outcomes of FIDWG and provided the following comments:

    a. Surveys that occur at multiple times over a year can lead to fish being missed or double counted as they move across the fishery – a research project could be undertaken to design an appropriate survey.

b. Cost-effectiveness needs to be considered; in particular, the cost of *status quo* – current monitoring arrangements – could be a useful baseline.

c. CPUE is relatively cost neutral, aside from work CSIRO does.

d. The FIS was not considered to provide a cost-effective source of fishery independent indices for input into stock assessments.

e. The Kapala surveys (which had 25 years between surveys) were useful for providing a time series of environmental information.

f. While it is important to concentrate on key commercial species, changes in the fishery and the relative value of species over time should not be ignored, including species such as gemfish, which used to be an important commercial species but is now heavily depleted.

14. CPUE standardisation: gillnet and auto longline[15]

Improving Gillnet CPUE

67. The RAG noted and discussed the presentation provided by Miriana Sporcic on the project *Improved gillnet CPUE standardisations in Australia's GHAT sector of the SESSF*. The aim of the project was to produce standardised CPUE series incorporating net length and mesh size for gillnet caught gummy shark, sawshark and elephant fish and, account for zero catches of those species.

a. Analysis was undertaken on data from 1999 to 2018 inclusive.

b. Three methods using catch per net length, were considered in the project; generalised linear models (GLMs), generalized additive models (GAMs) and Tweedie generalised linear models: analyses including zero shots (Tweedie GLMS).

GLMs

c. Investigation under a GLM found that the inclusion of mesh size in standardization analysis had the least effect on overall contribution to model fit; as such, it was omitted from subsequent analysis.

GAMs

d. Overall GAMs have very similar trajectories to GLMs.

Tweedie GLMs

e. This is a newer technique that enables the incorporation of zero catches.

f. Development of approaches that allow the incorporation of zero catch is a positive step. However, the filtering of the data should be considered.

General

g. If the three methods provide similar outcomes, the selection of a simpler model is sensible.

h. As gillnets are unlikely to have changed in terms of selectivity, the increase in length of the average gillnet is likely to have had a greater effect[16].

[15] The discussion of this item was split across the two days of the SESSFRAG meeting.

[16] Knuckey, I., Koopman, M. and Davis, M. (2010). *The effect of an increase in shark gillnet length on target species and bycatch in the SESSF*. Fishwell Consulting, 40pp

i. Australian sea lion (ASL) closures have had a significant impact on fisher behaviour, with some South Australian gillnetters moving from their main fishing grounds. While the data is comparable, closures have not been explicitly accounted for in the analyses and needs to be considered, as part of future work.

68. The RAG recommended[17] that:

a. catch per net length be used as the primary index this year onward rather than catch per shot. This aligns with international standards and conforms to knowledge that net length has changed over time;

b. SharkRAG discuss the new approaches especially those that investigate zero catches such as the Tweedie GLM;

c. CSIRO, as an aspirational goal, remove ASL closures from the net length analysis. This is likely to be quite complex; and

d. a plot of net length over time be provided to the SharkRAG for information.

Automatic longline – baiting efficiency

69. The RAG discussed the inclusion of baiting efficiency in logbooks to enable collection of data for automatic longline boats in the GHAT sector of the SESSF, including its utility in informing stock assessments.

70. The RAG advised that the collection of baiting efficiencies should be collected through the annual gear survey rather than logbooks due to the amount of work required to include it in logbooks as a field, noting:

a. There is currently no CPUE time series incorporating baiting efficiency.

b. Simon Boag explained that while baiting efficiency does change a lot shot to shot, it is unlikely to change much over the course of a year. Many factors can be involved, including how frozen the bait is.

c. Ian Knuckey explained that baiting efficiency could have an important effect, depending upon the type of bait a boat uses and can change yearly. However, it is possible to obtain the information from EM, for example longline boats can be fitted with a stern mounted camera.

Action Item 21: SharkRAG

SharkRAG to discuss the new approaches for estimating CPUE in the gillnet sector, in particular those that investigate zero catches such as the Tweedie GLM.

Action Item 22: CSIRO

That CSIRO (Miriana Sporcic) investigate removing closures, particularly those relating to sea lions, from the CPUE analysis using net length as part of future work.

Action Item 23: CSIRO

Provide a plot of annual gillnet length deployed in the GHAT over time to SharkRAG for their information.

Action Item 24: CSIRO

Miriana Sporcic to update the catch-per-net-length analysis for Gummy Shark (for each of the fleets) to include 2019 to be included in this year's Gummy Shark assessment.

[17]This recommendation was undertaken via email after the meeting between SESSFRAG members only.

Action Item 25: AFMA / CSIRO

Miriana Sporcic and Natalie Couchman to discuss historical management changes (e.g. ASL closures) that have been made in the gillnet sector which may influence CPUE, including whether these changes can be accounted for in the analysis, as this can change the overarching approach to CPUE standardisation.

15. Bycatch species groups – discard reporting

71. The RAG noted the update provided by Dan Corrie on a preliminary analysis on the reporting of quota discards to species level and bycatch species into eleven species groups:

    a. The level of reporting differs greatly between boats; there are still a number of boats not reporting discards.

    b. Of the discards that are reported, about 80 per cent of the discarded bycatch is being reported into the 11 groups, 98 per cent is being reported into some sort of group, with 2 per cent being reported at the species level.

    c. While reporting has improved, further improvement can be made, and AFMA is planning to undertake work to encourage better reporting.

72. The RAG discussed the potential implications of discard reporting by groups on ERA outcomes:

    a. While scaling up to total catch is problematic, ISMP information could be used to understand species composition.

    b. Species-level reporting was poor, and the move to group level reporting has generally improved reporting.

Action Item 26: AFMA

AFMA to provide an update at the SESSFRAG Chairs' meeting in 2021 on bycatch discard reporting by species groups in the trawl sector. The RAG to provide advice on whether the change in reporting requirements could affect Ecological Risk Assessments.

16. School whiting: data and assessment review[18]

73. The RAG noted the update provided by Tony Smith on, and thanked him for, the school whiting stock assessment review, and Dan Corrie on the MYTAC analysis:

    a. There is circumstantial evidence to support spatial structuring across the range of eastern school whiting, if not clear stock separation: including differences in CPUE trends by fleet and area. This evidence should not be ignored, as there could be spatial and jurisdictional consequences for the management of the resource.

    b. The FRDC funded project, *an updated understanding of eastern school whiting stock structure and improved stock assessment for cross-jurisdictional management*, being undertaken by Karina Hall will not be completed for a couple of years, which includes an analysis of genetic and otolith information.

    c. Previous stock assessments assumed a single stock over the full range of the species.

    d. NSW DPI have provided a revised NSW catch series and previously unused CPUE length and age data for the 2020 assessment and are happy to work on a jointly authored stock assessment.

[18] The discussion of this item was split across the two days of the SESSFRAG meeting.

e. The East Gippsland seismic survey changed the operating environment and has affected catches (*Multiple-Before After Control Impact (M-BACI) analysis of the effect of a 3D marine seismic survey on Danish Seine catch rates*). However, as the data that will go into the stock assessment update in 2020 pre-dates the seismic survey and as such, the seismic survey is not expected to impact this iteration of the assessment.

74. The RAG discussed the upcoming school whiting stock assessment review, in particular relating to the options relating to undertaking the stock assessment.

    a. The assessment should proceed this year, noting the following:

        i. The AFMA Commission requires an updated assessment, given the combined catches of both Commonwealth and NSW operators that are close to overcatching the recommended biological catch (RBC) from the 2017 assessment (and the 2019 updated assessment).

        ii. While the NSW TAC was high in the previous year, the NSW TAFC committee has substantially decreased the TAC this year. NSW catch in 2019 was 1 196 tonnes, will be lower in 2020 due to a drop in TAC by 300 tonnes.

        iii. NSW is developing a formal harvest strategy for school and stout whiting and is likely to consider shared catches and complementary management.

        iv. The new CPUE data from NSW will be investigated for use in this assessment.

        v. Catch rates in the impact zone of the seismic survey are significantly reduced[19].

    b. It may not be possible to undertake an assessment with separate stocks this year due to the limited time available.

    c. The outcomes of the FRDC stock structure project may provide a different outcome to the preliminary advice from the review undertaken by Tony Smith.

    d. There is insufficient conclusive evidence to provide an obvious location for stock separation. However, the RBC could be set on a single stock basis and, as a sensitivity, a two-stock model presented at SERAG 2, if time and resources allow this work to be completed.

    e. The stock could be split:

        i. by location – at the zone 10/20 boundary (although this would be through an area of high catch), at the NSW / Victoria border, or at Eden. Both the latter would require significant work to adapt the data; and

        ii. by method – Commonwealth Danish seine could be used to incorporate most of the catch for the Commonwealth fleet and, ergo, south of the NSW / Victoria border.

    f. Incorporation of the NSW data may create issues for an updated assessment. Undertaking a staged process would enable the ability to incorporate as much of the NSW data possible, and if there are impacts on the ability to undertake the stock assessment, then the new data could be removed and the default basecase adopted.

    g. There are generally similar CPUE trends where prawn and fish trawl overlap.

[19] Fishwell consulting (2020) *Preliminary M-BACI results – Phase 1*. FRDC

h. CSIRO will consider the NSW data prior to undertaking the assessment, including how to incorporate the new CPUE series.

75. The RAG recommended[20] that:

a. a school whiting stock assessment is undertaken this year, with a sensitivity exploring a stock split at the NSW/Victorian border presented at SERAG 2 – not to be used for RBC calculations at this time;

b. the structure of school whiting stock assessments will be considered following the outcomes of the FRDC funded project, *an updated understanding of eastern school whiting stock structure and improved stock assessment for cross-jurisdictional management*;

c. the potential impacts of the seismic survey are considered while setting a TAC this year – noting that the possible impacts of the survey will not be incorporated into the assessment as the data that will be used pre-dates the survey;

d. a five step process, as developed by the group tasked overnight[21], and modified as recommended, be followed for the school whiting stock assessment (see Box 1); and

e. to help the assessment team (lead Jemery Day) with the school whiting assessment as it progresses, a sub-committee was set up with Mike Steer as chair and Dan Corrie, Ian Knuckey, Karina Hall as members to link with Jemery.

Box 1: school whiting assessment- five-step process

1. Status quo assessment excluding NSW data (not preferred).
2. Include various NSW data sources (CPUE/Length/Age data) from Ocean trawl fleet (preferred)
    - If this results in poor fit, return to Step 1
    - If this results in reasonable fits to the model, move to Step 3.
3. Include CPUE/Length/Age data from NSW Prawn Trawl fleet
    - If this results in poor fits to the model, return to Step 2
    - If this results in reasonable fits to the model, move to Step 4.
4. Explore sensitivity of splitting assessment by location, splitting at the NSW/Victorian boundary. This sensitivity test will not be used for RBC calculations.
5. Run a series of projections with reduced Commonwealth catches to explore the potential ramifications of seismic impacts.

Action Item 27: AFMA

AFMA (Tamre Sarhan) to investigate the spike of 24cm school whiting and long 'tail' of large redfish in the length frequency distributions for 2019.

Action Item 28: AFMA

Dan Corrie to arrange a meeting between Jemery Day, John Garvey and Tamre Sarhan regarding changes in historical length frequencies for school whiting.

[20] This recommendation was undertaken on Day one after participants other than SESSFRAG members and the EO had left, and via email after the meeting between SESSFRAG members only.

[21] Undertaken after the meeting on 25 August 2020 – members of the group were Mike Steer, Jemery Day and Tony Smith.

Action Item 29: NSW DPI / CSIRO

Miriana Sporcic and Karina Hall to examine the school whiting CPUE standardisation for NSW fisheries, with a particular focus on adding standard diagnostics for the NSW standardised CPUE series.

Action Item 30: CSIRO

Establish a school whiting working group (to meet before SERAG 1 2020) to provide guidance to Jemery Day on how to treat NSW data in the stock assessment with the following membership: Mike Steer (Chair), Dan Corrie, Karina Hall, and Ian Knuckey.

17. MYTAC analysis and data summary

76. The RAG reviewed and discussed the fishery indicator data and provided advice on:

    a. actions required prior to the stock assessments taking place for those species identified at **Attachment 6** – Table 1; and

    b. further actions required during the MYTAC period for species highlighted under the MYTAC Analysis outlined at **Attachment 6** – Table 2.

77. Twenty-four of the 34 species were flagged for the RAG to discuss, twelve of which are scheduled for assessments in 2020. Seven species are subject to a rebuilding strategy and will be considered by either GABRAG, SharkRAG or SERAG later in 2020 and, three species are not due for stock assessment and have not triggered the breakout rules.

78. For the purpose of these minutes the discussion is separated into (a) species scheduled for assessment in 2020, and (b) species flagged as part of the decision tree support tool. Summary tables of the decision tree support tool outcomes are provided at **Attachment 6**.

79. The RAG noted that:

    a. fishery indicator data for species managed under rebuilding strategies which are not scheduled for a stock assessments in 2020 (**Attachment 6** – Table 3) will be considered formally by the individual RAGs as part of the annual review of rebuilding strategies; and

    b. species at **Attachment 6** – Table 4 were not highlighted by the MYTAC Analysis and fishery indicator data do not need to be considered.

80. The RAG recommended[22] that:

    a. all species to be assessed this year go ahead as scheduled;

    b. the silver trevally column about operational reasons be changed to 'unclear' given the comments (refer to **Attachment 6** – Table 1); and

    c. species triggered through the MYTAC analysis continue as per the MYTAC schedule, with the exception of:

        i. blue-eye trevalla – the slope Tier 4 assessment to be brought forward to 2020. The existing Tier 5 assessment for the seamount will not updated. SERAG should consider whether the reason for not applying a discount factor to the Tier 4 assessment is still appropriate; and

[22] This recommendation was undertaken via email after the meeting between SESSFRAG members only.

ii. orange roughy east – the extension of the MYTAC into fourth year was confirmed and the assessment is to be updated in 2021. Noting SERAG will consider natural mortality and review the available data at SERAG 1 (2020).

Action Item 31: Miriana Sporcic/SERAG

SERAG to consider the reference period for undertaking the John dory Tier 4 assessment – CDRs are available from 1998 onwards, whereas fishing for John dory commenced in 1986 according to logbook records. SERAG to discuss at the first meeting, if possible (depending on the outcome), enable the RBCs to be considered at the second meeting.

Species scheduled for assessment in 2020

Gummy shark

81. The RAG noted the following:

    a. Further work has been completed to improve the gillnet CPUE standardisations (using catch per metre (net length) instead of catch per shot) and the SIDaC program has collected additional biological samples.

    b. SIDaC length data has been added to the draft data summary, and while the age data is not available, CSIRO plans to include it in the 2020 assessment. This data is equivalent to onboard observer data as it is linked to the shot.

82. The RAG discussed the following:

    a. There has been a recent upturn in CPUE across the regions and gear types with the exception of South Australia.

    Data summary

    a. Length frequency distributions are consistent with historical data.

    b. Age data will be available for the 2020 Tier 1 assessment.

    c. While there is no onboard data, SIDAC length data is equivalent as it is tied to the shot.

    d. There were no onboard observers in 2019, as such; there is no discards weight data, although there has been considerable discard work under the Fishwell project *Analysis of Electronic Monitoring Data to Measure Length and Estimate Discard Weights in the Shark Gillnet Sector of the Southern and Eastern Scalefish Fishery*, which has shown that discards are quite low. CSIRO advised that they would undertake the work to incorporate the outputs of this project, noting that currently discards are added as a catch component and not modelled. CSIRO will need to make it clear to SharkRAG as to whether discards need to be deducted from or are incorporated into RBC.

83. The RAG recommended:

    a. seeking SharkRAG advice whether discards needs to be subtracted from the RBC for 2019; and

    b. continuing the current MYTAC and update the assessment in 2020.

Action Item 32: SharkRAG

SharkRAG to confirm whether discards are included in the Tier 1 gummy shark assessment and whether they are deducted from the RBC.

John dory

84. The RAG noted that John dory:

    a. is not targeted and the undercaught TAC is not a sustainability concern; and

    b. is scheduled to be assessed as a Tier 4 species for the first time in 2020 based on the RAG advice that assessments using catch rates are generally more conservative than the Tier 3 assessment used last time and should be adopted where there is conflicting data.

85. The RAG discussed the following:

    CPUE

    a. Recent catches are consistent with historical catch.

    b. Eastern CPUE shows a long-term decline – the series is reasonably flat since 2010 with a downturn in last two to three years.

    c. Catch at depth for 2017-2019 shows large catches at depths deeper than 150m.

    d. The CPUE series goes back to 1986, however CDR information in only available from 1998. Miriana Sporcic will provide options at SERAG 1 regarding reference periods, with RBCs provided to SERAG 2.

    Data summary

    e. The 2019 estimated discard rate was ten per cent – recent discard rates have ranged between one and ten per cent, with an average of four per cent.

    f. There were 185 observed shots, however only six discard length measurements are available.

    g. The majority of biological samples for ageing are collected in Lakes Entrance as no samples have been collected in NSW; sample collection has recently commenced at the Sydney Fish Markets.

    h. Many John dory are landed in NSW fisheries, the data from this source should be included in the assessment noting that the catch of these and silver trevally are very high and should be checked to ensure that estuarine john dory are not included.

86. The RAG recommended:

    a. undertaking two Tier 4 assessments in 2020, with discards and without discards; and

    b. including the NSW catch data in the 2020 Tier 4 assessment once the NSW catches of John dory have been checked.

Action Item 33: AFMA / CSIRO

AFMA/CSIRO to investigate the significant catches of John dory recorded at depths deeper than 150m, which have become evident since 2017.

Action Item 34: Paul Burch

Paul Burch to investigate the length frequency data and discard estimates for John dory prior to SERAG 1 with a particular focus on spikes in length frequencies in 2017-2019 and the high discard estimates for 2019 – the RAG noted the increase may be due to catches of small fish.

Action Item 35: NSW DPI

NSW DPI to check the state catches of silver trevally and john dory. SERAG noted the catches are high, and there may be some confusion with reported catches of estuarine John dory.

Mirror dory

87. The RAG noted that the most recent estimate of standardised CPUE, in 2019, is between the limit and target reference point for east and west.

88. The RAG discussed the following:

CPUE

a. Eastern – while there has been a slight increase in the recent CPUE this is still below the long-term average.

b. Western – while there has been a slight increase in recent years, the CPUE remains relatively flat since 2011.

Data summary

c. Eastern – discards are relatively high, many small fish in the length frequency data meaning that a young cohort coming through possibly explain the level of discarding.

d. Western – Tamre Sarhan suggested that some of the western discards came from the New Zealand factory freezer boat, which targets blue grenadier and not mirror dory.

e. Considering the low catches spread across three zones in the east, the discard data seems reliable with a large number of small fish being discarded.

89. The RAG recommended undertaking the 2020 Tier 4 stock assessment.

Action Item 36: AFMA

AFMA to provide Paul Burch with list of freezer / factory vessels active in the SESSF by year.

Ocean perch

90. The RAG noted:

a. the most recent estimate of standardised CPUE, in 2017, is above the target reference point for both inshore and offshore ocean perch; and

b. catches of inshore ocean perch are low while discards are typically high leading to uncertainty in the Tier 4 assessment.

91. The RAG discussed the information presented in the reports:

a. Port length data of ocean perch does not have depth information and therefore inshore or offshore ocean perch cannot be delineated. However, this is not an issue as these data are not used in the assessment.

b. Modifications to depth records have influenced catch records and CPUE for inshore and offshore ocean perch.

CPUE

c. Both offshore and inshore ocean perch passed validity tests for discards.

d. There has been a CPUE upturn in recent years and is well above the long-term average for offshore ocean perch.

Data summary

e. There have been consistent high discard rates of inshore ocean perch; as such, a Tier 4 assessment will not be used to inform the TAC.

f. The discard rate for offshore ocean perch has increased this year.

92. The RAG recommended a Tier 4 assessment be undertaken in 2020 for offshore ocean perch only, inshore ocean perch discards create too much uncertainty for an assessment.

Oreo smooth (other)

93. The RAG noted the following:

a. TAC is being set based on a weight-of-evidence approach, which includes outputs such as catch data and the 2019 SAFE assessment. This assessment estimated fishing mortality was below the level that would be expected to maintain the stock at maximum sustainable yield (MSY).

b. Given the increase to the orange roughy TAC in the Pedra Branca area for the 2020-21 season, SEMAC was concerned that oreo smooth could become a choke species[23]. Advice at SEMAC was that operators avoid fishing Pedra Branca if they do not have oreo smooth quota available and discard landings.

94. The RAG discussed the following:

a. There is a low risk, due to the fact that CPUE has remained unchanged.

Data summary

b. Catches were very high in 1990s and have since declined.

c. Discards are small and there is no length or port data.

d. While there is only one record of discarded oreo, this should be accurate as oreo are caught in areas of orange roughy with onboard observers.

95. The RAG recommended continuing with usual TAC setting process – a single year TAC for the 2021-22 season.

Oreo basket

96. The RAG noted:

a. the most recent estimate of standardised CPUE is between the target and the limit reference point, but is very close to the target;

b. while mixed oreos can be targeted they are not an economic driver in the fishery, they are a potential candidate for a lower target reference point; and

c. while spikey oreo has always been included in the Tier 4 assessment, this species was only added to the discards estimates in 2019.

[23] This lead to an increase in the TAC for the 2020-21 season.

97. The RAG discussed the following:

    a. The CPUE has been consistent for last 5 years.

98. The RAG recommended:

    a. continuing with assessment in 2021; and

    b. revising the discard series to include spikey oreos to create a consistent dataset.

Redfish

99. The RAG noted the following:

    a. The most recent assessment in 2017 estimated the stock to be below the limit reference point at eight per cent of unfished biomass.

    b. The collection of age and length information for redfish is improving. However, given the low catch levels, CPUE may not be indexing abundance.

    c. The bycatch TAC is reviewed under the 2016 rebuilding strategy annually.

100. The RAG discussed the following:

CPUE

    a. Catches are low again in 2019 with only 25 t landed; most catch is from zone 10.

    b. Slight upturn in the CPUE trend in recent years but long-term the CPUE is generally declining.

Data summary

    c. There was a high level of discarding in 2019, particularly of very small fish.

    d. There was a cohort of young fish observed in 2015 and 2016, this cohort is not showing up in the length frequencies and may be being obscured by younger age-classes in 2018 and 2019.

    e. Need to ensure the most recent cohorts are protected to enable the population to recover. Gear modifications could be considered, for example, the use of diamond mesh rather than square mesh may help.

    f. While the combined Commonwealth landings and discards, plus the NSW catch exceeds the bycatch TAC – the 50 t bycatch TAC only relates to Commonwealth catches, not discards or state catches.

    g. The rebuilding strategy for redfish will be reviewed in 2020, as such, an updated assessment would help inform the development of a target for rebuilding the stock.

    h. There is a regulatory requirement to monitor rebuilding species. The Threatened Species Scientific Committee (TSSC) is considering redfish for listing this year and will want to see an updated assessment. Even if the outcome is uncertain, an updated estimate will be useful to monitor outcomes against the rebuilding strategy.

    i. The basecase assessment will include separate selectivity functions (as per last time), and sensitives will be run to explore different selectivity and discard functions by zone for the port length data.

    j. Smaller fish are recorded in zone 10 than in zone 20, as there is a preference for smaller fish at the Sydney Fish Market.

k. There were difficulties undertaking the last assessment, as such there is the potential for structural changes to the Tier 1 assessment. A base case could be presented at the SERAG 1 meeting and alternate models at SERAG 2.

101. The RAG recommended undertaking the assessment in 2020 as planned.

Action Item 37: SERAG

As part of the redfish 2020 Tier 1 assessment, SERAG to discuss and provide advice about the difference in length frequencies between redfish samples collected in port and onboard – port based length frequencies in 2017 and 2019 include a disproportionate quantity of small fish.

Action Item 38: CSIRO

As part of the redfish 2020 Tier 1 assessment, CSIRO to run sensitivities to explore different selectivity and discard functions by zone to account for the small fish recorded in port-based length frequencies.

Ribaldo

102. The RAG noted that:

a. only data from trawl is used in the assessment;

b. industry members of SERAG previously explained that due to closures a large proportion of the stock was unavailable and caused the TAC to be undercaught; and

c. most recent estimate of standardised CPUE, in 2017, was above the Target Reference Point.

103. The RAG discussed the following:

CPUE

a. There has been a slight increase in trawl catch, which is the largest since 2014.

b. Auto longline CPUE trend has been flat and below the long-term average.

c. The Tier 4 assessment includes both Commonwealth and NSW catch data.

Data summary

a. The 2019 discard estimate currently fails the validity test.

b. Length frequency distributions are consistent over years.

104. The RAG recommended continuing with 2020 Tier 4 assessment using trawl CPUE.

Royal red prawn

105. The RAG noted:

a. the most recent estimate of standardised CPUE (2017) is above the target reference point;

b. only two operators target royal red prawn and are avoiding a productive area where a vessel sank approximately 2.5 years ago; and

c. royal red prawn fishing grounds off Sydney are in areas of core habitat for Harrisson's and southern dogfish and much of the fishing grounds have been closed under the Upper Slope Dogfish Management Strategy.

106. The RAG discussed the following:

a. There has been an increase in the CPUE in recent years, despite the sunken vessel and closures.

Data summary

b. There has been a shift to catch in shallower depths to about 300 m; this may be due to an issue with reporting i.e. metres vs fathoms.

c. Discards failed the validity test, which is likely due to a strata issue. However, they are not used in the assessment.

107. The RAG recommended continuing with the 2020 Tier 4 assessment.

Action Item 39: AFMA

AFMA to check logbook depth records, including the metric (metres or fathoms) that has been used for royal red prawn to clarify the spike in catch at shallower depths – prior to SERAG 1.

Action Item 40: AFMA / CSIRO

Tamre Sarhan to check the recent ISMP discard data for royal red prawns as it is unlikely the discard rate is so high.

Paul Burch to confirm why royal red prawn failed the discard estimate validity test. This is a low priority, as the discard data will not affect the assessment.

Sawshark

108. The RAG noted that:

a. the recent average standardised CPUE-based proxy for biomass was above the target reference point in the 2017 assessment; and

b. sawshark is not targeted (secondary commercial species/byproduct); with the primary reason being the market price.

109. The RAG discussed the following:

a. Total catch is similar to last year.

b. CPUE is increasing towards the long-term average and will be used for the Tier 4 assessment; the assessment will also include discard estimates, and state catches.

c. There is a lack of availability of port or length data, however there is some data from trawlers and Danish seine, and gillnet boats in 2017 and 2018.

110. The RAG recommended updating the 2020 Tier 4 assessment.

School whiting

111. The data for school whiting was discussed at Agenda item 16 – *school whiting: data and assessment review*.

Silver trevally

112. The RAG noted that:

a. the most recent estimate of standardised CPUE, in 2017 was between the Target Reference and Limit Reference Points;

b. silver trevally is assessed by NSW as 'transitional depleting' using a weight-of-evidence approach, including declining CPUE from NSW boats; and

c. NSW stock assessment scientists will be engaged during the Commonwealth Tier 4 stock assessment.

113. The RAG discussed:

a. Commonwealth catches have been low for the last six years, with less than 15 per cent of the Commonwealth TAC caught since 2013. While it is unclear whether the TAC is undercaught due to declines in abundance or operational reasons; industry have suggested that silver trevally are not targeted.

b. There is a large reduction in catch for 2019, which is the smallest in the time series.

c. While there is a steep decline in CPUE for zones 10 and 20, it consistent with long-term trend.

d. Only onboard length measurements are available and every fish that was landed was measured.

114. The RAG recommended undertaking the 2020 Tier 4 assessment, ensuring ongoing engagement with NSW.

Action Item 41: Tamre Sarhan

Tamre Sarhan to check the logbooks with the CDRs for silver trevally as the 2019 catch at depth records are inconsistent with previous years and could be due to misreporting or misidentification.

Species identified through the MYTAC decision support tool

Alfonsino

115. Flagged because the TAC is one per cent caught and is in the 6th year of a 3-year MYTAC.

116. The RAG noted that the last assessment in 2013 indicated it was not greatly impacted by fishing, and that future assessments would be subject to periodic review as little new data is available due to a lack of fishing.

117. The RAG recommended continuing the MYTAC and review assessment needs if catches increase.

Bight redfish

118. Flagged because of concerns raised about the availability of Bight redfish during the FIS.

119. The RAG noted that:

a. GAB industry data is not in the AFMA database yet so it has not been included in the Data Summary. However it was considered when conducting the 2019 stock assessment; and

b. GABRAG have requested that fishery indicators be reviewed annually.

120. The RAG agreed to defer the review of data for Bight redfish to GABRAG.

Blue eye trevalla

121. Flagged because the stock biomass, from the most recent estimate of standardised CPUE in 2018, for the slope stock was between the target and limit reference points and is not available for the seamount stock.

122. The RAG noted that SEMAC, in recognising uncertainty in the Tier 4 stock assessment and industry concerns around low catch rates up to January 2020, has asked the RAG to consider the fishery indicator data and the following options:

a. an alternative approach to assessing the slope stock in 2021 and applying a precautionary reduction to the TAC for the 2021-22 SESSF season; or

b. bring the assessment forward to 2020, if the Tier 4 assessment is to be applied again, the application of a 15 per cent discount factor should be considered.

123. The RAG discussed the issues of the uncertainty in the stock assessment and the industry concerns:

a. Recent catches are down for all fishing methods aside from auto longline.

b. There has been a 50 per cent reduction in CTS catches mainly from zone 40; GABTS catches have increased.

c. Retained length frequencies in 2018 show much larger fish than other years.

d. Will Mure outlined while their boat has had the same gear and skipper since 2004 the last 12 months have seen a concerning drop in catches across the fishing grounds; this decline will not be detected in the 2019 CPUE.

e. It is possible that the boats that have caught blue eye trevalla in the auto longline sector are now targeting this species. While the SIDaC program collects samples from the sector, discards are not sampled.

f. Orca depredation has been a consistent issue since the 1970s – a discount factor has not been applied for this reason.

   i. It is possible that orca depredation has become more of an issue since catches have declined resulting in the depredation of a larger proportion of the catch. However, while originally there was a hot spot where depredation occurred there it seems that they are now in other areas and they may be a bigger problem that previously considered.

   ii. Industry are reporting reduced catch rates even on days where there are no signs of orcas.

   iii. Orca depredation is accounted for in the Heard Island and McDonald Islands Fishery (HIMI) as it is a data rich fishery with s high level of observer coverage providing a reliable estimate of depredation.

g. Two options are available to take into account the uncertainty:

   i. bring the assessment forward to 2020, which would not include the last 6 months data, (the period of poor catches); or

   ii. apply a precautionary decrease to the TAC, which would be an ad hoc approach to applying a discount factor, and no information with which to quantify a value.

h. The discount factor was not applied for the last Tier 4 assessment as the TAC was considered precautionary as neither closures nor orca depredation were taken into account. While a discount factor could be applied retrospectively, the reason that it was not used previously still holds.

i. While the trigger is being met for this species, arbitrarily reducing the TAC or applying a discount factor is not appropriate.

124. The RAG recommended:

a. updating the Slope Tier 4 assessment in 2020. Do not update the Seamount Tier 5 (catches are well below the triggers);

b. that SERAG discuss the application of a discount factor, noting the discussion regarding orca depredation; and

c. providing the Tier 4 data inputs for the slope stock at SERAG 1 for consideration. Following that, a RBC is to be provided at SERAG 2.

Blue Grenadier

125. Flagged because TAC is over 50 per cent caught.

126. The RAG noted that:

a. SEMAC recommended a breakout rule that fishery indicator data should be reviewed if more than 50 per cent of the TAC is caught in a given season, with a particular focus on wet-boat CPUE and recent recruitment; and

b. there was one factory freezer vessel fishing the spawning aggregation in 2019.

127. The RAG discussed:

a. the CPUE increased in 2019 and is above the long-term average;

b. that there is no age data available as ageing has not been undertaken for the last half of 2017, nor for 2018 or 2019;

c. moving the assessment forward as the TAC is likely to be 90 per cent caught in 2020 by factory vessels. However, if moved forward only 2019 data would be available and the assessment would be based on a year when the TAC was 58 per cent caught. Given the changes to fishing patterns, data from 2020 needs to be included;

d. there is nothing in the wetboat CPUE that indicates there is an issue, however, the model indicates that the wetboat CPUE is a poor indicator of stock status; and

e. the use of acoustic data collected by the factory vessels – at the meeting in March 2020 the RAG agreed that analysis of the acoustic data would not be undertaken at this stage and it has not been budgeted.

128. The RAG recommended ensuring the assessment is undertaken in 2021 as scheduled.

Action Item 42: AFMA

Dan Corrie to update SEMAC regarding the SESSFRAG's analysis of blue grenadier wetboat CPUE (it does not indicate an issue with the stock status – noting it is considered poor indicator of stock status).

Deepwater flathead

129. The RAG agreed to refer the review of data for deepwater flathead to GABRAG.

Deepwater shark east

130. Flagged as the standardised CPUE is between the target and limit reference points and the TAC is 89 per cent caught.

131. The RAG noted:

a. the deepwater shark ISMP strata has been modified to be consistent with the quota zones in the fishery;

b. while observer coverage has improved, there are still very few length samples (no time series) and no valid discard estimate; and

c. the assessment is scheduled as a Tier 5 next year; it was assessed as a Tier 4 in 2018.

132. The RAG discussed the following:

a. Species identification issues – as there are large discrepancies between logbook catch and CDRs. SERAG asked AFMA to look into the issue to determine how deepwater shark are being reported.

b. While CPUE has decreased in 2019 from 2018, the long-term CPUE has been steady.

c. The annual effort over time plot compared to CPUE does not show anything surprising, the annual effort has decreased from 4-5 000 hours to between 1-2 000 hours.

d. CPUE is not a reliable indicator of abundance.

133. The RAG recommended maintaining the MYTAC and assessing as a Tier 5 in 2021, and ensuring the SERAG action regarding species identification is resolved.

Deepwater shark – west

134. Flagged as the TAC is only 36 per cent caught and it is uncertain whether this is for operational reasons only.

135. The RAG discussed the following:

a. Since last assessment last two CPUE points have remained high, four-year average has increased since the last assessment.

b. In 2019, the onboard sample size increased over time with no change in the distribution of lengths and no valid discard rate is available.

136. The RAG recommended maintaining the MYTAC and assessing as a Tier 5 in 2021.

Flathead

137. Flagged as stock biomass is between the target and limit reference points and the TAC is 80 per cent caught.

138. The RAG noted that this is in the second year of a MYTAC.

139. The RAG discussed the following:

CPUE

a. Zone 10 and 20 Trawl CPUE has increased and is at long term average.

b. Zone 30 CPUE has remained stable taking uncertainty into account.

c. Zone 20 and 60 Danish seine CPUE has declined in the last two years.

d. Depth modifications have impacted one of the three CPUE series in the assessment.

Data Summary

a. Sampling is representative throughout 2019, except for December.

b. The length frequencies look good, noting that they are skewed to smaller fish, this could either be more recruitment or fewer old fish.

c. All catch is from waters shallower than 150 metres.

d. While total catches are down, there is nothing of concern in the CPUE or biological data.

e. There are industry reports that the catches off Lakes Entrance are low and a large proportion of the catch are small fish, and it is likely that the CPUE will be impacted by the seismic survey in this region. Catches in NSW and Portland are very good.

140. The RAG recommended maintaining the MYTAC.

Jackass morwong

141. Flagged as the TAC was 23 per cent caught and eastern biomass is between the limit and target reference point.

142. The RAG discussed the following:

a. There is a progression of the cohorts from 2018 to 2019.

b. Discards have increased from 9.6 per cent in 2018 to 32.2 per cent in 2019 in the east.

c. Zones 10 and 20 CPUE has been stable since 2015 with a slight decrease since the last assessment.

d. Zones 40 and 50 (west) the CPUE average since 2015 has been relatively stable.

143. The RAG recommended continuing with the MYTAC and updating the assessment in 2021.

Action Item 43: AFMA

AFMA to clarify whether model estimated discards for jackass morwong should be deducted from RBC instead of weighted average.

Orange roughy east

144. Flagged as it is in third year of a 3-year MYTAC, the biomass is between the limit and target reference point and 69 per cent of the TAC has been caught.

145. The RAG noted the following:

a. The RAG agreed to delay the assessment until 2021 to enable further consideration of natural mortality.

b. Acoustic survey abundance estimates (2013, 2016 and 2019) support the model predicted increases in biomass estimates.

c. SERAG will discuss natural mortality estimates for 2021 assessment later this year.

d. There is a good spread of collected lengths with older fish represented in the length frequencies.

146. The RAG discussed missing length data between 2007 – 2012 when there were many industry surveys – this data was not collected by AFMA but needs to be incorporated into the AFMA database. Additionally, the otoliths are archived from those trips and can be aged if needed.

147. The RAG recommended extending the MYTAC into a 4th year and update assessment in 2021, noting that natural mortality will be a focus.

Action Item 44: Ian Knuckey / AFMA

Ian Knuckey to provide the 2007-2012 length data from the industry survey on orange roughy (east) data to John Garvey for incorporating into the database.

Pink Ling

148. Flagged as the eastern biomass is between the limit and target reference points and the TAC is 65 per cent caught, of which half came from the east.

149. The RAG noted that the:

a. stock status in the east is not well estimated; it varies across the model runs and is heavily dependent on values that are adopted for natural mortality and the CPUE series that is used;

b. CPUE series that has been adopted for the assessment is considered conservative, as it does not account for the management arrangements that restrict catches;

c. TAC is set globally (east and west) but assessed separately as an eastern and western stock; and

d. eastern catch constraint was set at 428 t with 414 t caught during the 2019-20 fishing season.

150. The RAG discussed the following:

CPUE

a. East – continues to increase, however this is uncertain and the series in CSIRO report is not the same as the series used in assessment, which is more conservative.

b. West – while the 2018 and 2019 estimates of CPUE have decreased from the four-year average, it has increased since the last assessment.

Data summary

c. There are no obvious concerns in the data.

d. The 2016 discard estimate has increased in 2019 to 8.8 per cent (44.8t) from 2.8 percent (13.3t) in 2018.

151. The RAG recommended continuing with the MYTAC and assessing in 2021.

Action Item 45: AFMA

Tamre Sarhan to investigate instances in 2016 of unusually high pink ling discard levels (as identified by CSIRO) as these may have been incorrectly coded.

Silver warehou

152. Flagged as the biomass is between the limit and target reference point and the TAC is 68 per cent caught.

153. The RAG noted that:

a. the 2018 assessment estimated the stock to be close to the limit reference point in 2018 increasing to an estimated biomass in 2019 of 31 per cent initial biomass (B_0);

b. in 2018, SERAG recommended using a low recruitment scenario (the average of the last five years) for the purposes of setting the TAC; and

c. there are industry reports of improved recent catch rates off the east coast from St Helens head to Ulladulla.

154. The RAG discussed the following:

a. The CPUE in both the east and west are showing similar trends and have increased since the last assessment.

Data summary

b. There is a good sample size for the length frequency distribution, with a noted absence of large fish from on board coverage; they are present in port samples in 2019. While it seems that there is good sampling there may be issues with its representativeness. This needs to be looked into to avoid the issue arising next year for the assessment.

c. Otoliths have not been aged; this cannot be brought forward.

d. Sampling is largely representative throughout 2019 and across the zones.

e. Discard rate has increased from 16.7 per cent in 2018 (78.8t) to 31.2 per cent in 2010, (151.3t).

f. State catches remain low at 0.1 t.

155. The RAG recommended continuing with the current MYTAC and updating assessment in 2021.

Action Item 46: CSIRO
In preparation for the 2021 silver warehou assessment, Paul Burch to check the difference between 2019 on board and port length frequencies, noting an absence of larger fish in the on board length frequencies.

18. Recommended changes to ISMP and SESSF data plans

156. The RAG discussed the outcomes of the MYTAC Analysis and Data Summary review:

a. Currently, the plan only contains sampling targets for 2021, and the targets are adequate. It does not clearly articulate what is needed for bycatch species and ecosystem impacts.

b. In developing the ISMP and SESSF data plans, the following needs to be considered:

   i. that sampling is representative, particularly if the sampling targets are reduced. Currently only the total number is available, further information is needed regarding spread of samples spatially and temporally;
   ii. the best value for money. Noting that it may be better to over-sample every few years than under-sample every year;
   iii. the cost of collecting and onboarding biological samples;
   iv. whether the information being collected is needed, for example Tier 4 assessments do not require ageing information, but would if the species is moved to a Tier 1 assessment; and
   v. about 3000 school shark vertebrae samples are needed in total between 2019 and 2023 inclusive.

c. FAS have documented the number of samples they hold and can circulate the information. During the last two years both ISMP and the SIDaC program have been able to streamline their processes. If this continues for the next year, then there will be a three-year snapshot.

d. Andre Punt is developing a paper to inform sampling frequency and size requirements.

e. It may be possible to stagger the sampling in line with the assessment scheduling. A matrix that includes an assessment schedule of Tier 4 species, including information about life histories (for example fast and slow growing species), would support a plan to stagger sampling across years.

f. Age samples for relatively unfished stocks could help with the estimation of natural mortality.

157. The RAG recommended[24] that the ISMP sampling targets and frequency should go to a sub-committee that will develop recommendations for out-of-session consideration by the RAG.

a. Membership: Chair: Mike Steer; members: Dan Corrie, Simon Boag, Tamre Sarhan, Kyne Krusic-Golub, Paul Burch (noting that conflicts of interest will need to be managed).

b. Finalisation by the RAG is needed before the end of January 2021 for decisions to be made before the ISMP and FAS activity year commences.

Action Item 47: AFMA / 2021 ISMP plan working group

A working group to be established to develop recommendations on ISMP sampling targets and frequency for out-of-session consideration by the SESSFRAG. Membership of the group to include: Mike Steer (Chair), Dan Corrie, Simon Boag, Tamre Sarhan, Kyne Krusic-Golub, and Paul Burch. Conflicts of interest will need to be managed.

Advice from the SESSFRAG is required before the ISMP plan for 2021 will be finalised at the end of January 2021. A matrix of assessment schedule is needed for Tier 4 species, including their life history strategy (whether they are fast or slow growing). The RAG advice is to collect all samples in the appropriate year and spread across appropriate areas.

Action Item 48: AFMA / Robin Thomson

AFMA to work with Robin Thomson to include the collection of school shark samples from deeper water in the 2021 ISMP plan – consider whether these are collected from trawl boats (see also action item 5).

19. SESSF species stock structure

158. The RAG noted:

a. the information provided by Pia Bessell-Browne on the desktop stock structure review[25] for blue warehou, jackass morwong and pink ling, which used the available literature and fishery independent data to investigate and summarise differences in:

   i. previous research into stock structure, including genetics, otolith microchemistry and mixing;
   ii. evidence used to split stocks in stock assessments;
   iii. catches and discards;
   iv. length frequency and age frequency distributions; and
   v. CPUE.

b. the summary of differences found in the study for three species as outlined in Table 2; and

c. SERAG will discuss the report at their meeting later in the year.

[24] This recommendation was undertaken via email after the meeting between SESSFRAG members only.

[25] Bessell-Browne P, Day J, Sporcic M and Appleyard S (2020). *SESSF species stock structure review: Jackass Morwong, Pink Ling and Blue Warehou*. Technical report presented at SESSFRAG Data Meeting, Hobart, 26 August 2020. 74p.

Table 2: Summary of differences outlined for Blue Warehou, Jackass Morwong and Pink Ling

Characteristics	Common name			General comments
	Blue Warehou	Jackass Morwong	Pink Ling	
Genetics	Differences between east and west, although non-significant	No genetic differences between east and west	No genetic differences between east and west	To date, there have been limited genetic studies on all three species with any studies undertaken 18-26 years ago. Updated diversity, gene flow and connectivity studies using contemporary genomic techniques could shed additional light on the stock structure of these species.
Otolith microchemistry	Differences in both microchemistry and shape	No difference - although may have been insufficient sampling (east and west of Tasmania) to determine differences	Unknown, no investigations	Determining whether differences are apparent in pink ling and jackass morwong would prove useful in determining stock structure in southern Australia, and particularly differences in the east and west.
Evidence of mixing	Limited information on mixing, but a highly mobile schooling species	Limited movement of adults, offshore pelagic larval phase in the east possibly impacted by changes in the EAC	Unknown larval dispersal, largely sedentary as adults (and hence potentially vulnerable to localised depletion).	Studies investigating mixing between the east and west have been limited for all three species. Traditionally mixing has been determined through investigations into parasites to determine if exchange is occurring between populations; such investigations may provide insight into mixing for three species.
Biological parameters – (growth and morphology)	Different growth curves and morphology	Limited information	Limited information	
Length frequency	No difference between east and west	Larger in west than east	Larger in west than east	Differences in length and age distributions are apparent for all three species. These may be confounded by different fishing practice and habitat availability in the east and the west, especially with the limited availability of shallower trawlable grounds in the west, and the tendency for older and larger fish to be found in deeper habitat.
Age frequency	Older in west than east	Older in west than east	Older in west than east	
Discards	Similar trends between east and west	Sporadic and variable	Higher in east than west since 2003	
CPUE	Similar overall trends between east and west	Similar overall trends between east and west	Similar overall trends between east and west	Relatively minor differences between the east and west CPUE series for all three species.

159. The RAG discussed[26] the apparent trends found for the three species outlined in the report. Several comments were made about additional interpretation, these included:

a. The stocks were originally split because of supporting evidence, there needs to be strong evidence to combine them again.

b. The approach of the review was weight-of-evidence, it did not draw conclusions nor was it to provide management advice.

c. Biological information exists that show differences between east and west pink ling including estimating growth curves. Model fits and growth curves in integrated assessments support that there are sufficient differences to manage separate stocks.

d. A metric that objectively characterises similarity between CPUE series in different regions may be useful.

e. Tony Smith's school whiting stock assessment review (see Agenda item 16) summary includes information on items to consider for splitting stocks.

f. Otolith microchemistry studies used in the review had techniques that were in the early stages of development, as such these studies would be unlikely to provide useable information of stock structure.

g. There may be a physical barrier around the south of Tasmania, as there is in the Bass Strait. This could be determined by considering pink ling catches south of Tasmania.

h. Consider other management arrangements that may affect fisher behaviour and therefore have an impact on the characteristics that may be found. For example:

   i. Operators often trawl deeper in the west, where blue warehou are larger.

   ii. size distribution may be impacted by different discarding practices.

Action Item 49: CSIRO / SERAG

CSIRO to incorporate the SESSFRAG's feedback regarding the stock structure report and present an updated report to SERAG for advice in 2020.

20. Draft five year strategic research plan (2021-25)

160. The RAG agreed[27] that a special meeting be held that will consider the strategic research priorities to assist development of a SESSF five-year strategic research plan for the years 2021-25.

Action Item 50: AFMA / SESSFRAG

AFMA to arrange a meeting of the SESSFRAG before the end of 2020 to consider the next SESSF five year strategic research plan for the years 2021-25.

21. ERA triggers checklist

161. The RAG noted that the only changes to the ERA triggers checklist since the committee considered this at the Data meeting in 2019 are minor edits and the addition of a trigger relating to changes in

[26] Comment made by SESSFRAG member via email following the meeting: Several comments were made about additional interpretation and adding the assessment reasons for separation e.g. assessment coherence
[27] This recommendation was undertaken via email after the meeting between SESSFRAG members only.

bycatch spatial distribution to identify potential changes in encounterability when spatial distribution or depth range changes are identified for any species.

162. The RAG recommended adopting the updated annual ERA checklist (Table 3) noting that strengths and weaknesses may become evident over time and can be adapted to suit.

Table 3: Annual checklist of risk related triggers.

Indicators	Guiding questions	Responses
New information on the fishery	*Has new information been obtained indicating a significant change in the productivity characteristics of the fishery?*	
Susceptibility		**Yes / No**
Primary indicators with triggers		
Overlap **Annual fishing effort**	Has annual or seasonal fishing effort (number of operations) increased or decreased by more than 20% from average annual effort over the last ERA period?	
Overlap **Annual fished area**	Has fished area (number of 0.1° fished blocks) changed outside the 90% confidence intervals around effort since the last ERA period.	
Secondary indicators without triggers		
Encounterability **Fished depth range**	Has there been a substantial change in the depth range fished, outside depths fished since the last ERA period.	
Encounterability **Species distribution**	Has there been an apparent change in the spatial distribution (geographic or depth) for any species that may affect encounterability with fishing gear?	
Selectivity: **Gear changes**	Has a new gear-type been introduced, or has there been, or anticipated to be, significant changes to gear configuration that substantially changes gear selectivity?	
Post capture mortality	Has new information been obtained indicating estimates of post-capture mortality used in the previous ERAs were different?	
Mitigation measures	Have new or improved mitigation measures been implemented that either reduce the capture or post-capture mortality of important bycatch species?	
Mitigation implementation	Has there been a change in the use of mitigation measures, resulting in a decrease or an increase in captures and post capture mortality of important bycatch species?	
Productivity		**Yes / No**
New information on species biology	Has new information been obtained that may indicate a significant change in productivity characteristics of important bycatch species?	
Other Indicators		**Yes / No**
Other indicators of change in risk	Have there been changes in any other risk indicator that may indicate the need to consider updating the ERA?	
	If so, what indicators:	
Conclusions		**Yes / No**
Overall ERA update required	Do changes in the above indicators warrant consideration of updating the ERA for the entire fishery?	
Individual species risk score update required	Do changes in the above indicators warrant consideration of updating of ERA risk scores for individual species?	
	If 'Yes', list the species:	

22. Reviewing biological parameters – project overview

163. The RAG noted:

a. Jemery Day's update on the project *revisiting biological parameters and information used in the assessment of Commonwealth fisheries: a reality check and work plan for future proofing* (FRDC 2019-010), which has started and has the objectives to:

i. identify the provenance of biological information used in current assessments (including age, appropriateness of methods used);
ii. assess the implications and risks associated with using dated and borrowed information in assessments;
iii. identify methods (including novel approaches) that might be applied to update priority biological parameters; and
iv. articulate a work plan including appropriate sampling regimes required for updating priority biological parameters.

b. that several SESSFRAG members will be approached to provide input on the project.

Action Item 51: Jemery Day / SESSFRAG EO
Jemery Day to provide the presentation giving an overview of the project 'reviewing biological parameters' to the EO for circulation to the SESSFRAG meeting attendees.

23. Dates for the Chairs' 2021 meeting

164. The RAG agreed to hold the SESSFRAG Chairs 2021 meeting on 16-18 March 2021 in Canberra, subject to COVID-19 circumstances.

24. Other business

Companion species composition work plan

165. The RAG noted the presentation by Paul Burch:

a. A metier is an aggregation of characteristics that define the catches; they are usually spatial and relate to the target species. For example, the slope trawl metier for pink ling corresponds to a fleet in the pink ling assessment and the grenadier assessment.

b. Following an AFMA commission request, a companion species analysis was undertaken based on a metier approach using data from 2012-17.

i. The metiers for 2016 and 2017 were used to estimate catch of rebuilding species for each unit of target species. That is: 1 t of pink ling caught by the East Slope Trawl metier catches 1 kg of blue warehou, 16 kg of gemfish and 1 kg of redfish: this was scaled to the current TACs to estimate the potential catches.
ii. While the metiers were considered by SERAG in December 2019, there was insufficient time to consider the targeting analysis.
iii. SERAG asked for the metier approach to be compared with the Klaer and Smith method, raised concern that the metier approach did not incorporate the data from 2018, did not consider the targeting analysis and discussed species composition summaries.

c. The additional work as asked for by SERAG exceeds the available time and budget, and as such, CSIRO are seeking advice on the next steps.

166. The RAG discussed:

a. the metier analysis and its potential use in a multi-species harvest strategy approach.

i. If the MSHS is operationalised, a metier analysis may need to be undertaken every few years.
ii. A metiers approach could be used as the basis for a companion species analysis.
iii. Incorporating current data for metier analysis is important as metiers change over time.

b. the comparison of the metier approach with the work Klaer and Smith had undertaken previously.

i. While there has not been a comparison between the two approaches, they used very similar data and have a similar output, although the Klaer and Smith method may also have incorporated price information.
ii. Metier analyses are a standard approach for understanding species interactions in multi-species fisheries.
iii. There is not the budget nor time available to undertake a comparison of the two methods as part of this year's Data Services contract.

167. The RAG recommended[28] repeating the metier analysis using the current 2014-19 data and undertake targeting analyses for rebuilding species.

Impact of a 3D marine seismic survey on catch rates

168. The RAG noted the East Gippsland seismic survey and its potential impact that it could have on catch rates.

169. The RAG recommended[29] discussing this item at the March 2021 meeting when preliminary 2020 data would be available.

Action Item 52: SESSFRAG

An item to be included on the agenda for the SESSRAG Chairs' meeting in 2021 to discuss the impact of seismic surveys – preliminary data from the Fishwell Multiple-Before After Control Impact (M-BACI) analysis should be available.

Action Item 53: CSIRO

In preparation for the SERAG meeting scheduled for November 2020, CSIRO to repeat the metier analysis undertaken in 2019 with the current 2014-19 data and undertake a targeting analysis for rebuilding species. The school shark targeting analysis should include consideration of the 20 percent retention rule for school shark – refer to the previous analysis by Malcolm Haddon.

Attachments

1) Declared conflicts of interest
2) Final adopted agenda
3) Status of previous Action Items
4) Action Items arising from the meeting
5) FIDWG meeting outcomes
6) MYTAC species and species being assessed

[28] This recommendation was undertaken via email after the meeting between SESSFRAG members only.

[29] This recommendation was undertaken via email after the meeting between SESSFRAG members only.

Attachment 1 – Declared Conflicts of Interest

Participant	Declared interest
Members	
Dr Cathy Dichmont (Chair)	Director of Cathy Dichmont Consulting. Contracted by various state and Commonwealth agencies to undertake various reviews and consultancies not related to SESSF. No pecuniary interest in the SESSF.
Ms Fiona Hill	Employed by AFMA, Senior Manager of Demersal and Midwater Fisheries. No interest, pecuniary or otherwise.
Dr Sarah Jennings	Economics coordinator, FRDC Human Dimensions Research Subprogram Adjunct Senior Researcher, TSBE and casual employee IMAS University of Tasmania. Economics member of SERAG Economic member of SEMAC Member of AFMA EWG Independent economics consultant No pecuniary or other interest in the SESSF.
Mr Lance Lloyd	GABRAG Chair Member of GABMAC Board Member, AwF – Aquaculture without Frontiers (Australia) Director; Lloyd Environmental Pty Ltd. Research Fellow; Federation University Australia No pecuniary interest.
Mr Sandy Morison	Director of Morison Aquatic Sciences Chair of SharkRAG Contracted by government departments, non-government agencies and companies for a range of fishery related matters including research and for MSC assessments of AFMA managed and other Australian and international fisheries. No pecuniary or other interest in the SESSF.
Dr Michael Steer	A/g Research Director SARDI (Aquatic Sciences) Chair of SERAG Member of SEMAC No pecuniary interest in the SESSF.
Executive Officer	
Ms Cate Coddington	Employed by AFMA, Executive Officer of SESSFRAG. No interest, pecuniary or otherwise.
Invited Participants	
Mr Simon Boag	Executive Officer South East Trawl Fishing Industry Association (SETFIA) EO on SSIA EO on SPFIA Non-beneficiary Director of two fishing companies in the SESSF one of which is a significant quota owner. Industry member on both SERAG and SEMAC. SSIA is engaged by AFMA to collect shark industry biological data

Participant	Declared interest
	PI on the fishery independent survey SETFIA is the PI on the orange roughy east AOS SETFIA is engaged to undertake a variety of tasks under the co-management arrangement with AFMA
Dr Paul Burch	Employed by CSIRO, assessment scientist. Acquiring funding for research purposes. PI on data services contract.
Dr Jemery Day	CSIRO, assessment scientist. Acquiring funding for research purposes Scientific member of the Sub-Antarctic Resource Assessment Group (SARAG) PI – SESSF species stock structure review Interests in promoting good science.
Dr Ian Knuckey	**Positions:** Director – Fishwell Consulting Pty Ltd Director – Olrac Australia (Electronic logbooks) Deputy Chair – Victorian Marine and Coastal Council Chair – Northern Prawn Fishery Resource Assessment Group Chair – Tropical Rock Lobster Resource Assessment Group Chair – Victorian Rock Lobster and Giant Crab Assessment Group Chair – Victorian Central Zone Abalone Fisheries Resource Advisory Group Chair – Gulf of St Vincent's Prawn Fishery MAC Research Scientific Committee Scientific Member – Northern Prawn Management Advisory Committee Scientific Member – SESSF Shark Resource Assessment Group Scientific Member – SESSF Great Australian Bight Resource Assessment Group Scientific Member – Gulf of St Vincent Prawn Fishery Management Advisory Committee Scientific Member – Tropical Tuna Resource Assessment Group **Current projects:** AFMA 2020/0807 – Bass Strait Scallop Fishery Survey – 2020-22 Australia Bay – Information to support Wildlife Trade Operation for the Queensland Gulf of Carpentaria Developmental Fin Fish Trawl Fishery FRDC 2019/129 – Potential transition of shark gillnet boats to longline fishing in Bass Strait - ecological, cross-sectoral, and economic implications FRDC 2019/072 – A survey to detect change in Danish Seine catch rates of Flathead and School Whiting resulting from CGG seismic exploration. FRDC 2019/027 – Improving and promoting fish-trawl selectivity in the SESSF and GABTS FRDC 2018/021 – Development and evaluation of SESSF multi-species harvest strategies FRDC 2017/069 – Indigenous Capacity Building FRDC 2017/014 – Informing structural reform of South Australia's Marine Scalefish Fishery FRDC 2016/116 – 5-year RD&E Plan for NT fisheries and aquaculture NT Fisheries – Design and implementation of a tropical snapper trawl survey PEMSEA – Developing EAFM Plan of Red Snapper for Arafura and Timor Seas Region Sea Cucumber Ass. – Design and implementation of a sea cucumber dive survey Sea Cucumber Ass. – Information to support non-detrimental finding of fisheries for black teatfish and white teatfish Tas. Abalone – Scientific Advisor for Tasmanian Abalone Council Ltd Traffic Project – Shark Product Traceability
Mr Kyne Krusic-Golub	Director at Fish Ageing Services

Participant	Declared interest
	Fish Ageing Services is contracted to undertake fish ageing for the SESSF. Kyne Krusic-Golub has no pecuniary interest within the fishery other than the potential for obtaining future funding for research or service provision.
Mr Neil MacDonald	Executive officer of the Great Australian Bight Industry Association Executive officer of Surveyed Charter Boat Owners and Operators Association South Australia Executive officer of 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 South Australian Rock Lobster Advisory Council Director NMAC(SA) P/L Chair CGG SAC Gippsland MSS
Mr Andrew Penney	Director of Pisces Australis Pty Ltd, an Australian registered marine and coastal research and management consultancy based in Canberra. As such, I have an interest in any opportunities in this regard. Currently principal investigator on two FRDC Projects: 2017-180: Design and implementation of an Australian National Bycatch Report: Phase 1 – Scoping; 2019-036 Implementation of dynamic reference points and harvest strategies to account for environmentally-driven changes in productivity in Australian fisheries. Scientific Member of AFMA Tropical Rock Lobster RAG and Small Pelagic Fishery Scientific Panel Member of the AFMA ERA Technical Working Group. No shareholding and hold no positions relating to any other companies, including any fishing companies or industry associations
Dr Miriana Sporcic	Employed by CSIRO, Assessment scientist. Acquiring funding for research purposes
Mr David Stone	Executive Officer for Sustainable Shark Fishing Association. Declared interests in representing hook and gillnet industry member interests. Declared interest in RBCs
Dr Robin Thomson	Employed by CSIRO, Assessment scientist. Acquiring funding for research purposes PI on close kin project for school shark. PI on blue-eye trevalla close kin scoping project
Dr Geoff Tuck	Employed by CSIRO. Involved in Stock assessments. Interest in obtaining funding for future research. Principle investigator on the SESSF stock assessment project.
Presenters / Observers	
Ms Franzis Althaus	Employed by CSIRO, Scientist / data manager. Acquiring funding for research purposes
Dr Pia Bessell-Browne	Employed by CSIRO, Assessment scientist. Acquiring funding for research purposes
Mr Dan Corrie	Employed by AFMA, South East Trawl, GABT, Scallop and Squid Manager. No interests, pecuniary or otherwise.
Ms Natalie Couchman	Employed by AFMA, Gillnet, Hook and Trap, High Seas and Norfolk Is Manager. No interest, pecuniary or otherwise.
Dr Roy Deng	Employed by CSIRO, Assessment scientist. Acquiring funding for research purposes
Dr Tim Emery	Employed by ABARES. No interest, pecuniary or otherwise.
Dr Ashley Fowler	Cross-jurisdictional research and management interests for DPI NSW, no pecuniary interests.
Dr Karina Hall	Cross-jurisdictional research and management interests for DPI NSW, no pecuniary interests.

Participant	Declared interest
Ms Heather Johnston	Employed by AFMA, Senior Management Officer – Demersal and Midwater Fisheries. No interests, pecuniary or otherwise.
Dr Geoff Liggins	Cross-jurisdictional research and management interests for DPI NSW, no pecuniary interests.
Dr Rich Little	Employed by CSIRO, assessment scientist. Acquiring funding for research purposes. Member of the Total Allowable Fishing Committee for NSW, conflicts with all items with state fisheries and in particular involved with setting the TAC for school whiting[30].
Ms Kehani Manson	Employed by AFMA, Management Support Officer – Demersal and Midwater Fisheries. No interests, pecuniary or otherwise.
Mr Will Mure	Sole Director of Mures Fishing P/L Commonwealth fish receiver permit Tasmania Fish Processing licence Scalefish hook boat SFR SEQ Quota Holding Permits Auto longline Fishing Permit High Seas permit Blue eye trevalla SFRs
Mr Tamre Sarhan	Employed by AFMA, Observer Coordinator. No interest, pecuniary or otherwise.
Dr Veronica Silberschneider	Cross-jurisdictional research and management interests for DPI NSW, no pecuniary interests.
Dr Tony Smith	I am an Honorary Fellow (unpaid) with CSIRO, an Adjunct Professor (unpaid) with University of Tasmania, and I undertake occasional paid consulting work in fisheries scientific review as a sole trader (no business name). My review of the School Whiting assessment is being paid for by AFMA. I have no other paid work with any Commonwealth fisheries and neither myself nor any relatives have any financial interest in any commercial fisheries.
Mr James Woodhams	Employed by ABARES. No interest, pecuniary or otherwise.

[30] This conflict was raised during Day 1 via email.

Attachment 2 – Agenda in Order of Discussion

Agenda item	*Purpose*
Day one - Preliminary session (members only)	***8:30am – 9:00am***
Declarations of interest – member discussion	
Day one	***9:00am – 5:30pm***
Acknowledgement of country	
1. Welcome and apologies	For information
2. Declarations of interest	For action
3. Adoption of Agenda	For action
4. Minutes from previous meeting	For endorsement
5. Action Items status	For information
6. Outcomes of out of session items a. Research prioritisation b. Depth corrections c. FIS working group ToRs d. Pink ling stock assessment	For endorsement
7. Update from the RAGs, EWG and MMWG (verbal update)	For information
8. Fish aging services end of financial year report	For advice
9. ISMP reports for quarters 1 & 2 2020 (including COVID impacts update)	For information
10. SIDaC update	For information
Morning tea	10.15 – 10.30am
11. Discard rate estimates update – Information from the DEWG	For advice
Lunch	12.20 – 1pm
11. Discard rate estimates update – SESSF ISMP discard report cont.	For advice
12. Catch and discard report a. Application of Commonwealth discard rates to state catches (different gear types) b. NSW reported catches – processed vs whole weight	For recommendation
Afternoon tea	3 – 3.05pm
12. Catch and discard report cont. a. Application of Commonwealth discard rates to state catches (different gear types) b. NSW reported catches – processed vs whole weight	For recommendation
13. Fishery independent data working group update	For information / recommendation
16. School whiting: data and assessment review…	For advice
14. CPUE standardisation: Gillnet…	For recommendation
Decisions from Day One items– **members and EO only**	5.15 – 5.30pm

Agenda item	*Purpose*
Day Two	***8.30am to 5.30pm***
16. School whiting: data and assessment review continued	For advice
14. CPUE standardisation: Gillnet continued and Autolongline	For recommendation
17. MYTAC analysis and data summary	For recommendation
Lunch	12.40 – 1.00pm
17. MYTAC analysis and data summary continued	For recommendation
Afternoon tea	3.10 – 3.15pm
17. MYTAC analysis and data summary continued	For recommendation
24. Other business: Companion species composition work plan	For advice
18. Recommended changes to ISMP and SESSF data plans	For recommendation
15. Bycatch species groups – discard reporting	For noting
19. SESSF species stock structure	For discussion
20. Draft Five Year Strategic Research Plan (2021-25)	For advice
21. ERA triggers checklist	For recommendation
22. Reviewing Biological Parameters – project overview	For information
23. Dates for the Chairs' 2021 meeting	For decision
24. Other business: East Gippsland seismic survey	For advice
After the meeting	
Decisions from Day Two items for member consideration	via email

Attachment 3 – Status of Previous Action Items

Complete/Redundant	Underway	Need SESSF RAG advice	Not yet started

No.	Ag. Itm / Mtg Date	Action Item	Agency / Person	Timeframe	Progress as of SESSFRAG Data meeting 2020
1	4 SESSFRAG Chairs' 2019	AFMA to consider adding data from NSW, Dr Haddon and Victoria and provide a revised blue-eye trevalla history report to SESSFRAG in August 2019.	AFMA	SESSFRAG Data meeting 2020	Pending – AFMA has considered this and information will be incorporated into the blue-eye trevalla history report in time for consideration for the next stock assessment once it is obtained from Dr Haddon, NSW and Vic.
4	4 SESSFRAG Chairs' 2019	AFMA to obtain and include in its database the following data sets: • Great Australian Bight (GAB) and South East Trawl Fishery Independent Surveys • crew collected data (incl. GABT and the GHAT) • historic blue warehou industry collected data	AFMA	As soon as practicable	Underway FIS collected data – Complete – added into the database. Crew collected data – Complete – all data up to June 2019 has been entered into the database. Crew collected data for the GAB is still recorded on paper and sent to AFMA for entering. This is done in batches and is dependent on staff resourcing. AFMA/GABIA are investigating options for collecting this information electronically. SIDaC data is now in the database. Blue warehou data – Underway - AFMA to follow up.
10	9 SESSFRAG Chairs' 2019	Include the Fishery Management Strategy as an agenda item at the next SESSFRAG meeting	AFMA	SESSFRAG data meeting 2019	Redundant – Drafting of an FMS has been postponed, however AFMA will continue to update and develop relevant documents, such as bycatch workplans and data plans, and present them to the relevant RAG/MAC as required.
11	10 SESSFRAG Chairs' 2019	NSW DPI to provide their *Multi-criteria Decision Matrix* for prioritising research and monitoring needs to AFMA. AFMA and NSW DPI to discuss further and provide an update to the SESSFRAG 2020 Chairs' Meeting.	Dr Hall – NSW DPI / Mr Day – AFMA	SESSFRAG Chairs' meeting 2020	Underway – NSW DPI provided the draft species prioritisation for NSW fisheries resource assessment to AFMA on 3 April 2019. When it is finalised, it will be provided to SESSFRAG for discussion at the next meeting.
21	15 SESSFRAG Chairs' 2019	AFMA and CSIRO to develop a detailed project proposal for a comparison of GHAT EM and observer data for submission to the ARC / ABARES.	AFMA and CSIRO	September 2019	Underway – SharkRAG to consider this item at their September 2020 meeting. There is very limited overlap between observers and EM data so the feasibility of project should be re-considered. The scope could be revised to look at available data sources and collection techniques (EM and industry). Note: at its meeting in July 2020, SEMAC suggested during the

					development of a GHAT data plan, that the data needs are examined and available tools for data collection are identified.
26	15 SESSFRAG Chairs' 2019	Data exclusion to investigate the effect of biennial sampling to be undertaken during the next gummy shark assessment to determine the impact of biennial data collection by removing every second year of length and age data.	CSIRO – Dr Thomson	During the gummy shark assessment in 2020	Pending – awaiting assessment. Next gummy shark assessment scheduled for consideration by SharkRAG in September-October 2020.
2	4 SESSFRAG Data 2019	Include an agenda item on CPUE standardisation at the Chairs' meeting 2020, include a presentation from Malcolm Haddon, noting that much of his work has already been implemented. Presentation to focus on clear guidelines on what can be implemented rather than instigate further CPUE analysis.	AFMA	SESSFRAG Chairs' meeting 2020	Redundant – an agenda item was included in the original agenda for the 2020 Data meeting. However, Dr Haddon has declined. Dr Haddon has provided the abstract of the study at Attachment A for SESSFRAG's information.
4	6 SESSFRAG Data 2019	AFMA to seek advice from the Economic Working Group (EWG) about which KPIs are being adopted and what data are to be collected and presented. Following this, add an information item to the 2020 SESSFRAG Chairs' meeting agenda regarding economic KPIs.	AFMA / Sarah Jennings	SESSFRAG Chairs' meeting 2020	Pending – EWG members are now appointed. The KPIs will be considered by the EWG at the next appropriate meeting. It is expected that a paper will be provided to the SESSFRAG Chairs' meeting in 2021.
5	7 SESSFRAG Data 2019	The bSAFE2 results and updated methodology to be taken to the individual SESSF resource assessment groups for consideration	SERAG / SharkRAG / GABRAG	Next relevant RAG meeting	Underway Complete – SERAG and GABRAG have considered the results for Danish seine and trawl methods. Pending – SharkRAG to consider this item at their September 2020 meeting.
8	8 SESSFRAG Data 2019	AFMA to further develop the questions in the annual ERA trigger checklist to ensure they are not overly restrictive and inform discussion about the need to undertake a reassessment of the ERA. The updated checklist to be provided to the 2020 SESSFRAG Chairs' meeting	AFMA	SESSFRAG Chairs' meeting 2020	Complete – refer to Agenda item 21 *ERA triggers checklist*.
12	12 SESSFRAG Data 2019	AFMA to work with the e-log providers to enable the skipper to identify the e-log shot number and provide it to the SIDaC port-sampler.	AFMA	As soon as practicable	Complete – automatic reports have been set up to provide this data to the SIDaC Program Manager.
13	12 SESSFRAG Data 2019	Seek advice from SERAG/SharkRAG to update the SIDaC data collection plan to include: • tissue samples of blue eye trevalla for CSIRO close-kin work along with otoliths for ageing by FAS (SERAG).	AFMA / SSIA	October 2019 SERAG meeting / November 2019 SharkRAG	Underway SERAG item – Complete – included in the SESSF Data Plan. SharkRAG items – Pending – SharkRAG to consider these items at their September/October 2020 meeting. AFMA has had initial discussions with CSIRO and the SIDaC Program

		• the collection of total and partial lengths of school and gummy shark particularly any school sharks larger than 160cm total length (100cm partial length). Gummy shark over 160 TL and 100cm PAR are also important (SharkRAG) • collection of gummy and school shark samples from automatic longline vessels (SharkRAG).		meeting	Manager concerning the collection of tissue samples of blue eye trevalla for future close-kin work. Funding for the collection of these samples will need to be sought should it proceed. The collection of otoliths for blue eye trevalla is currently funded under the SIDaC Program. Dual length measurements for large school and gummy sharks were collected alongside a recent trial of automatic longline gear in the Bass Strait (FRDC project 2019-129). The collection of measurements was for the purpose of establishing conversion factors and not for the purpose of the FRDC project. AFMA and CSIRO to determine whether further measurements are needed. It will be discussed at the upcoming SharkRAG meeting.
15	13 SESSFRAG Data 2019	Include squid, latchet and ocean jacket, as well as frostfish and king dory, in future SESSF catch and discard for TAC purposes reports.	CSIRO	Before the next catch and discard report	Complete – The additional species have included in the Catch and ISMP Discard reports.
16	13 SESSFRAG Data 2019	Dan Corrie and CSIRO to consider the need for including species catch composition information in future catch and discard reports or as a separate report, noting potential requirements under the MSHS approach.	AFMA / CSIRO	Prior the SESSFRAG Chairs' meeting 2020	Complete – There is time allocated under the data services contract to undertake a kind of companion species / catch composition analysis. Paul Burch provided options to SESSFRAG during Agenda item 11 *Discard rate estimates update*.
17	13 SESSFRAG Data 2019	To ensure logbook data used to estimate deepwater shark discard rates are appropriate: • Paul Burch and Roy Deng to double check the deepwater shark discard rate estimates and CVs. • Shijie Zhou to ensure the deepwater shark strata definitions are correct.	CSIRO	As soon as practicable / prior to the deepwater shark assessment	Complete – Deepwater shark strata have been updated to align with the fishery zones as defined in the SESSF Management Plan. Deepwater shark discard estimates have been reviewed as part of the 2020 discard report (Agenda item 12 *Catch and discard report*).
18	13 SESSFRAG Data 2019	Establish a discard estimate working group to consider improvements to the current discard calculation method —an agenda item to be included on the SERAG (October) and then SESSFRAG (March). The working group to: • consider more stringent criteria, including CVs, for determining when a discard rate is accepted/rejected. Consider rejecting estimates when three or less shots are observed in a stratum	Robin Thomson, Ian Knuckey, George Day, Mike Steer, Paul Burch and Roy Deng (Dan Corrie)	SERAG (October 2019) SESSFRAG (March 2020)	Complete – Paul Burch provided an update during Agenda Item 11 *Discard rate estimates update*.

		• resolve whether a model-based approach should be used to estimate discard rates into the future given the lower observer coverage across the fishery.			
19	13 SESSFRAG Data 2019	CSIRO to include total tonnage of discards in the discard distribution maps in future discard reports.	CSIRO	Prior to the SESSFRAG Data meeting 2020	Complete – included in the 2020 discard report.
20	14 SESSFRAG Data 2019	AFMA to confer with Ian Knuckey and Robin Thomson to determine the sampling regime for discard lengths to support future discard estimates and, if further advice is needed, seek SharkRAG advice.	AFMA	Prior to the November 2019 SharkRAG meeting	Redundant – A meeting was held on 31 July 2020 with relevant stakeholders to discuss progression of this action. SharkRAG to consider outcomes of that meeting concerning this item at their September 2020 meeting. Marked redundant as this action is encapsulated in action item 9 from the Chairs' 2020 meeting.
23	15 SESSFRAG Data 2019	Ensure that length and age information from the GAB Danish vessel is collected (ISMP and crew collected) to ensure that Danish seine can be treated as a separate fleet in future deepwater flathead stock assessments (noting this method accounts for about 10 per cent of the catch and has been increasing).	AFMA / GABRAG	As soon as practicable	Redundant – GABRAG discussed at their January meeting and created an action; that AFMA and GABIA would speak to the operator about collecting the information in the future. Vessel ownership has recently changed hands and GABIA will contact the new owner.
26	15 SESSFRAG Data 2019	For tier 5 species – including deepwater shark west – an annual effort over time plot to be included in the report enable the fishing trend to be considered. The effort plot is to be compared with a plot of CPUE in the CPUE standardisation report.	CSIRO	for the 2020 SESSFRAG data meeting	Complete –included in the CPUE reports.
30	15 SESSFRAG Data 2019	AFMA to write to Natalie Moltschaniwskyj at NSW DPI regarding involvement in the Tier 4 stock assessment for silver trevally. It is likely that Ash Fowler (NSW DPI) will also be interested in being involved.	AFMA	November 2019	Complete – Ashley Fowler and Karina Hall have attended the SESSFRAG meeting and are attending and SERAG meetings. NSW will be consulted as part of the 2020 tier 4 silver trevally assessment; however, the NSW and Commonwealth assessments will be conducted independently.
33	15 SESSFRAG Data 2019	SERAG and SharkRAG to consider the data for the remaining rebuilding species that were not discussed during the SESSFRAG data meeting.	SERAG / SharkRAG	October & December 2019 SERAG meetings / November 2019	Underway Complete – SERAG considered the data for blue warehou and redfish at their meetings in October and December 2019. Pending – SharkRAG will consider the relevant data at their September 2020 meeting. The new stock assessment methodology

				SharkRAG meeting	(close kin mark recapture) for school shark does not provide a biomass reference point and therefore does not align with the SESSF Harvest Strategy. The rebuilding strategy is currently undergoing a review and will consider more broadly how an estimate of abundance, provided by the new methodology, will be incorporated into the harvest strategy.
38	17 SESSFRAG Data 2019	AFMA to undertake out-of-session work on the monitoring and data collection scenario options and provide to SEMAC, ensuring; • consultation with SESSFRAG prior to providing to the SEMAC • Consideration of the relative advantages and disadvantages of monitoring and data collection methods • Refinement of the *relative advantages and disadvantages of monitoring and data collection methods* table to capture the collective benefits across methods and a matrix of supplementary and complementary factors. • potential creation of a Venn diagram to illustrate the connections between the methods.	AFMA / SESSFRAG / SEMAC	February 2020 SEMAC meeting	Redundant – this has been marked as redundant, noting that this work can be discussed through the Fishery Independent Data Working Group and that comment will be provided back to SEMAC to ensure that further work is not needed The table outlining relative advantages and disadvantages has now been included in the SESSF Data Plan as a guide to the various monitoring and data collection options available to the fishery.
39	17 SESSFRAG Data 2019	AFMA to investigate the potential of achieving cost saving from activities including: extending the scheduling of certain assessments, sharing costs of assessments with other jurisdictions, implementing the CSIRO tables within the Data warehouse, lessening cost recovery from industry and changing the scheduling of observers.	AFMA	SESSFRAG Chairs' meeting 2020	Complete / Ongoing – AFMA considers cost effectiveness as part of ongoing processes, including reviews of the ISMP plan, scheduling of assessments at SESSFRAG Chairs meetings, improvements to data systems (agency data capture & e-fish projects), and annual review of fishery budgets.
40	18 SESSFRAG Data 2019	SESSFRAG to discuss chapters from *incorporating the effect of marine spatial closure in risk assessments and fisheries stock assessments* not covered by the presentation at SESSFRAG Data meeting 2019, including Miriana Sporcic to present the chapter about the *simulation study on the effect of CPUE resource standardisation with and without marine closures*.	SESSFRAG / Miriana Sporcic	SESSFRAG Chairs' meeting 2020	Not yet started – deferred to SESSFRAG Chairs' meeting 2021.
42	19 SESSFRAG Data 2019	AFMA to update the logbooks to include 'live' status of released school sharks	AFMA	As soon as practicable	Underway – Life status of discarded school shark can be recorded in the new Agency Data Collection (ADC) platform. It will also be available in new paper format logbooks currently under development.

					Regarding e-logs, Catch log are in the process of implementing and making it available (there are already boats using the ADC system for line and gillnet methods). However, OLRAC, the other provider, is yet to enable this in their software. It is expected that both providers will be using the new platform for all fishing methods by 1 December 2020.
1	5 SESSFRAG Chairs' 2020	Ensure the SESSF Harvest Strategy Framework is updated to enable multispecies considerations rather just single species considerations where appropriate. Changes to the framework should ensure that the overarching high-level goal is to produce B_{MEY} for a fishery level goal and not be a full review of the framework, noting that the multi-species harvest strategy project is already undertaking this process.	Sarah Jennings, Ian Knuckey, Fiona Hill	By the SEMAC TAC setting meeting in 2021	Not yet started – will be updated as part of the 2021 TAC setting process.
2	5 SESSFRAG Chairs' 2020	Establish a 'Tier 5 TAC setting working group' prior to SERAG 1 to develop harvest control rules for converting Tier 5 assessment outcomes into TACs, noting Tier 5 methods may be broader than those currently specified, and these methods may need different harvest control rules.	AFMA (Dan Corrie, Fiona Hill, Natalie Couchman), CSIRO (Geoff Tuck, Miriana Sporcic and Malcolm Haddon) and Industry (TBD)	Prior to the TAC setting process of tier 5 species	Not yet started – will be completed prior to the TAC setting process for Tier 5 species.
3	6 SESSFRAG Chairs' 2020	Paul Burch to compare the effect of both including and not including 'N/A's (no record of discarding) in the discard estimation methodology to determine the bias, and provide a summary in the next annual discard report, including the period to which the analysis applies.	Paul Burch	SESSFRAG Data meeting 2020	Complete – see Agenda item 11 - *Discard rate estimates update.*
4	6 SESSFRAG Chairs' 2020	Paul Burch to clarify whether 'N/A's are included in the method to estimate discards in Tier 1 assessments, and provide advice to SESSFRAG on the impact 'N/A's might have.	Paul Burch	SESSFRAG Data meeting 2020	
5	6 SESSFRAG Chairs' 2020	Determine whether assuming that there is 'no error in reporting of retained catch in logbooks' is a significant issue for estimating discards, and undertake a Chi-squared test (comparing actual vs predicted) to determine	Paul Burch / Discard Estimate Working	SESSFRAG Data meeting 2020	

		the most appropriate approach for allocating observer coverage in the SESSF; most recent year, five-year average, four-year weighted mean.	Group		
6	6 SESSFRAG Chairs' 2020	Paul Burch to provide an overview of discard estimates at the SESSFRAG 2020 Data meeting, with a particular focus on species with high discard rates, and species where state catches are influential (such as blue warehou).	Paul Burch	SESSFRAG Data meeting 2020	
7	6 SESSFRAG Chairs' 2020	Paul Burch and David Stone to discuss how operators changing fishing methods are detected and then accounted for by changes in observer allocation.	Paul Burch and David Stone	As soon as practicable	Complete – Paul Burch clarified – This item related to changes in fisher behaviour when observers are on board, and how this may influence estimates of discards. Paul discussed this with David – the methodology assumes that fisher behaviour does not change with or without observers on board. While evidence exists to the contrary, it is very difficult to quantify and is a known flaw in the methodology that cannot be addressed in the short term.
8	7 SESSFRAG Chairs' 2020	Natalie Couchman to discuss with the SIDaC program, the collection of dual length measurements for school and gummy sharks that are longer than 160cm total length, to enable new conversion factors to be established for these larger sharks.	AFMA	As soon as practicable	Underway – relates to action item 13 from SESSFRAG Data 2019. Refer to update provided under that action item.
9	7 SESSFRAG Chairs' 2020	Natalie Couchman to discuss with CSIRO on how to progress the approach of using electronic monitoring (EM) for the collection of length frequency data for sharks – discuss out of session if urgent or at the next RAG.	AFMA	As soon as practicable	Underway – relates to action item 20 from SESSFRAG Data 2019. A meeting was held on 31 July 2020 with relevant stakeholders to discuss progression of this action. SharkRAG to consider outcomes of this meeting concerning this item at their September 2020 meeting.
10	7 SESSFRAG Chairs' 2020	CSIRO to provide an update to SESSFRAG on their work to automate the collection of fish lengths by EM.	CSIRO	As soon as practicable	Pending – Geoff Tuck will provide an update at SESSFRAG Chairs' meeting in 2021. Note: related to Action Item 9 possible planning of automation work.
11	8 SESSFRAG Chairs' 2020	Tamre Sarhan to investigate the internal inconsistency in the data for silver warehou (west) that is in the size range.	AFMA	As soon as practicable	Complete – Discarded western silver warehou were large fish because they were sampled on the Blue Grenadier (GRN) factory vessel: all fish other than GRN were discarded during that trip, regardless of size. Noting not all factory vessels discard all catch.
12	8 SESSFRAG Chairs' 2020	DEWG to consider the use of a model-based system to estimate discards that would not have the assumption of data collection in accordance with annual observer plans.	Discard Estimate Working	SESSFRAG Data meeting 2020	Complete – was addressed as part of Agenda item 11 - *Discard rate estimates update.* Note: A model-based approach will likely be less sensitive when some strata are over and under sampled than the current design

			Group		based survey. However, actually testing this is not trivial and is beyond the scope of the CSIRO funded project to estimate discarded catches for a selection of SESSF stocks. Additionally, even if a model-based approach is used, it is still recommended that the sampling plan is met, as this would likely provide the best information on discards. A model-based approach will be more robust to any over/under-sampling of strata.
13	9 SESSFRAG Chairs' 2020	SESSFRAG to establish a SESSF FIS working group to consider cost-effective alternatives to collecting fishery independent data. The first meeting of the working group should establish the data requirements for ongoing data collection programs, and propose possible solutions to SESSFRAG at the August SESSFRAG Data meeting 2020. SESSFRAG members to determine the membership, terms of reference and objectives of the group prior to the working group meeting.	SESSFRAG members (bar SERAG Chair – Mike Steer)	SESSFRAG Data meeting 2020	Underway – a working group has been established. An update was provided at Agenda item 13 *fishery independent data working group update*.
14	9 SESSFRAG Chairs' 2020	SESSFRAG Chair to write to Brett McCallum, Chair of the ARC, outlining the RAG's approach to providing advice on cost-effective alternatives to collecting fishery independent data (see action item 13).	Cathy Dichmont (and AFMA)	As soon as practicable	Complete – letter sent to the ARC Chair on 3 July 2020.
15	9 SESSFRAG Chairs' 2020	GABRAG to establish a GABFIS technical working group to consider: • the outcomes from the GABFIS and its utility for Tier 1 assessments • possible changes to survey design to account for any temporal shifts in availability. Information to be provided to SESSFRAG at the SESSFRAG Chairs meeting 2021.	GABRAG	Prior to the next GABFIS process	Pending – GABRAG will discuss this issue at their meeting in October 2020.
16	10 SESSFRAG Chairs' 2020	AFMA to clarify whether the FRDC close-kin proposal (2020-21 financial year) includes rebuilding species.	Dan Corrie and Robin Thomson	As soon as practicable	Complete – the FRDC close-kin proposal did not include the rebuilding species. Note: A separate priority research scope covering the rebuilding species was submitted to FRDC.
17	10 SESSFRAG Chairs' 2020	Ian Knuckey to provide the report from the gemfish study, which used stereo video cameras on the net to estimate abundance to the executive officer who will then distribute to SESSFRAG.	Ian Knuckey	As soon as practicable	Complete

18	10 SESSFRAG Chairs' 2020	AFMA to propose the priority and feasibility of new research identified in the SESSF 2021-22 research plan and provide to SESSFRAG for consideration out-of-session.	SESSFRAG	As soon as practicable	Complete – outcomes of the out-of-session item were incorporated into the 2020 SESSFRAG Chairs' minutes.
19	10 SESSFRAG Chairs' 2020	Check with Dr Tim Ryan whether the acoustic data collected by factory freezer vessels on the winter blue grenadier aggregation in 2019 can be calibrated to complement the existing index of abundance, or whether it would constitute a new relative index of abundance.	AFMA / CSIRO	As soon as practicable	Complete – This will require funding and will be considered as part of the 22/23 SESSF research plan.
20	10 SESSFRAG Chairs' 2020	AFMA to contact Matt Brodhurst of NSW DPI to explore the possibilities of incorporating the project *shark mitigation options for GAB board trawlers to prevent capture of deepwater sharks* into the broader bycatch project he is leading (FRDC 2019-027).	AFMA	As soon as practicable	Complete – Subject to the review of domestic and international approaches, this can be included as part of the FRDC project. Funding is available if there is still an interest from industry. Matt Brodhurst will liaise with GABIA as part of the project.
21	10 SESSFRAG Chairs' 2020	The CAPAM Natural Mortality (M) workshop in Seattle has been delayed until 2021, as such SERAG to seek advice from relevant experts on the use of M for orange roughy prior to the orange roughy eastern Tier 1 assessment, scheduled for 2021. Include an agenda item on the SERAG #1 meeting for 2020 to discuss M, and consider the best approach to the assessment, particularly if the CAPAM workshop does not proceed.	SERAG	SERAG meeting #1	Underway – referred to SERAG agenda. SESSFRAG will be provided with an update the 2021 Chairs' meeting.
22	10 SESSFRAG Chairs' 2020	AFMA to ask CSIRO for written advice regarding the possibility of undertaking a companion analysis between redfish and tiger flathead to provide a basis for redfish CPUE standardisation.	AFMA / CSIRO	As soon as practicable	Complete – Paul Burch provided an update on the potential to undertake a companion species analysis under other business.

No.	Agenda Item / Meeting Date	Action Item	Agency / Person	Timeframe	Progress as of SESSF RAG Meeting August 2020
24	SharkRAG 4 2018	AFMA and SESSFRAG at its February 2019 meetings, investigate including baiting efficiency an additional field in logbooks for automatic longline vessels to be used for CPUE standardisation	AFMA and SESSFRAG	February 2019	Complete – It is not necessary to include this as an additional field in the logbooks as there are more efficient means to include this information in assessments.

Attachment 4 – Action Items arising from the meeting

No.	Agenda Item / Meeting Date	Action Item	Agency / Person	Timeframe
1	5 SESSFRAG Data 2020	AFMA to liaise with Simon Boag regarding his involvement in the Tier 5 TAC setting working group.	AFMA/Simon Boag	As soon as practicable
2	8 SESSFRAG Data 2020	AFMA (Dan Corrie) to speak with Matt Broadhurst to request that the FRDC trawl selectivity project include reducing catches of small redfish by improving selectivity as a focus. Include an item on the SESSFRAG Chairs' meeting agenda in March 2021.	AFMA	Chairs' meeting 2021
3	8 SESSFRAG Data 2020	The RAG to discuss the implications of the MSHS project on the ageing plan and the inclusion of non-quota species, such as leatherjackets, at the Chairs' 2021 meeting.	SESSFRAG	Chairs' meeting 2021
4	10 SESSFRAG Data 2020	AFMA to analyse gillnet and hook catch and effort data with a view to providing the SIDaC program guidance on which boats are more likely to catch school shark to facilitate sampling.	AFMA	As soon as practicable
5	10 SESSFRAG Data 2020	AFMA and the SIDaC program to report to SharkRAG at their September 2020 meeting regarding costs for collecting school shark length samples at sea as part of a crew-based program. In addition to the sampling requirements across the strata (method and location), the SIDaC program should consider: • ensuring lengths are linked to the tissue samples, as lengths alone are not used in the assessment; and • including sampling targets for the trawl fleet, particularly from deeper water.	SIDaC	September 2020
6	10 SESSFRAG Data 2020	SharkRAG to revisit the school shark data collection plan including the data needs and a gap analysis on the data currently being collected.	SharkRAG	As soon as practicable

No.	Agenda Item / Meeting Date	Action Item	Agency / Person	Timeframe
7	10 SESSFRAG Data 2020	Subject to SharkRAG advice, the SESSF data plan and ISMP plan to be updated to include the collection of school shark lengths and vertebrae from otter board trawl boats in the CTS.	AFMA	January 2021
8	11 SESSFRAG Data 2020	CSIRO to ensure the boundaries for the deepwater shark management zones are correct for reporting purposes.	CSIRO	As soon as practicable
9	11 SESSFRAG Data 2020	Paul to check with Malcolm Haddon on possible methods to estimate or account for changes in fisher behaviour when an observer is on board. David Stone may also be able to provide some thoughts on how to analyse the data to take into account any bias.	Paul Burch / David Stone	As soon as practicable
10	11 SESSFRAG Data 2020	Geoff Liggins to send Paul Burch the research reports from the early 2000s regarding bias in discard estimates due to changes in fisher behaviour when observers are onboard.	NSW DPI	As soon as practicable
11	11 SESSFRAG Data 2020	Updates to the ISMP discard report (refer to the summary table in the report (2)) to include: • a separate table for Tier 1 species with model estimate of discards to enable comparison to observer estimates of discards, • a pass or fail for all species; and • footnote explaining observer coverage for school and gummy shark.	CSIRO	SERAG 1 2020
12	11 SESSFRAG Data 2020	Paul Burch to provide the 'Discard Method Evaluation' report, an output from the Discard Estimation Working Group, to the SESSFRAG EO when finalised so that it may be distributed to SESSFRAG.	Paul Burch	As soon as practicable
13	11 SESSFRAG Data 2020	AFMA to evaluate the benefits of undertaking another analysis of discard reporting for fisheries which have EM to determine if there are continuing improvements in reporting (as per the review that ABARES undertook).	AFMA	As soon as practicable
14	11	CSIRO and AFMA to check the discard rate estimates for the following species from the 2019 discarded and total catch table (table 2 (on page 19 Deng et. al.	CSIRO / AFMA	SERAG 1 2020

No.	Agenda Item / Meeting Date	Action Item	Agency / Person	Timeframe
	SESSFRAG Data 2020	2020 report)) to ensure that this is completed prior to the SERAG meeting. Inform SESSFRAG out of session: Assessed in 2020 – school whiting, eastern redfish, gummy shark, mirror dory (east and west), John dory, and Smooth oreo (non-Cascade) Rebuilding species – school shark and eastern gemfish. Assessed in 2021 – blue grenadier, jackass morwong (east) and deepwater shark (east) Other – orange roughy (GAB)		
15	11 SESSFRAG Data 2020	AFMA to investigate and compare logbook reported discards for school and gummy shark to (1) observers for trawl boats, and (2) EM for gillnet/hook boats.	AFMA	As soon as practicable
16	12 SESSFRAG Data 2020	Geoff Liggins to provide further clarification on catch figures for relevant species in the updated NSW catch dataset, in particular data for 2009 as well as for ocean jackets, silver trevally and pink ling.	NSW DPI	SERAG 1
17	12 SESSFRAG Data 2020	AFMA and CSIRO to liaise with the states regarding estimates of discards for SESSF quota species and consider establishing a discard and recreational fishing working group to consider a set of decision rules, in particular: • whether to apply Commonwealth discard rates to state catches when Commonwealth and state gear types or management controls differ; • how to estimate state discard rates and total catches where Commonwealth discard rates are not applied because of differences in gear type or management controls; and • whether the approach used to determine recreational catch weights for shark species should be extended to other SESSF species as part of the 2021-22 Data Services Contract.	AFMA / CSIRO	As soon as practicable
18	12 SESSFRAG Data 2020	As part of the annual data request to the states, CSIRO to also request the latest available recreational data (numbers, conversion factors and weights). It is anticipated that, if the states hold the data, they should be able to provide it.	CSIRO	As soon as practicable

No.	Agenda Item / Meeting Date	Action Item	Agency / Person	Timeframe
19	12 SESSFRAG Data 2020	Consider whether it is worthwhile undertaking a desktop study to determine which important Commonwealth fish species are also targeted by recreational fishers.	AFMA	As soon as practicable
20	12 SESSFRAG Data 2020	CSIRO to circulate to the SESSFRAG a more detailed recreational catch data spreadsheet and incorporate this into the final report.	CSIRO	As soon as practicable
21	14 SESSFRAG Data 2020	SharkRAG to discuss the new approaches for estimating CPUE in the gillnet sector, in particular those that investigate zero catches such as the Tweedie GLM.	SharkRAG	SharkRAG September meeting 2020
22	14 SESSFRAG Data 2020	That CSIRO (Miriana Sporcic) investigate removing closures, particularly those relating to sea lions, from the CPUE analysis using net length as part of future work.	CSIRO	As soon as practicable
23	14 SESSFRAG Data 2020	Provide a plot of annual gillnet length deployed in the GHAT over time to SharkRAG for their information.	CSIRO	SharkRAG September meeting 2020
24	14 SESSFRAG Data 2020	Miriana Sporcic to update the catch-per-net-length analysis for gummy shark (for each of the fleets) to include 2019 to be included in this year's gummy shark assessment.		
25	14 SESSFRAG Data 2020	Miriana Sporcic and Natalie Couchman to discuss historical management changes (e.g. ASL closures) that have been made in the gillnet sector which may influence CPUE, including whether these changes can be accounted for in the analysis, as this can change the overarching approach to CPUE standardisation.	AFMA / CSIRO	As soon as practicable
26	15 SESSFRAG Data 2020	AFMA to provide an update at the SESSFRAG Chairs' meeting in 2021 on bycatch discard reporting by species groups in the trawl sector. The RAG to provide advice on whether the change in reporting requirements could affect Ecological Risk Assessments.	AFMA	Chairs' meeting 2021

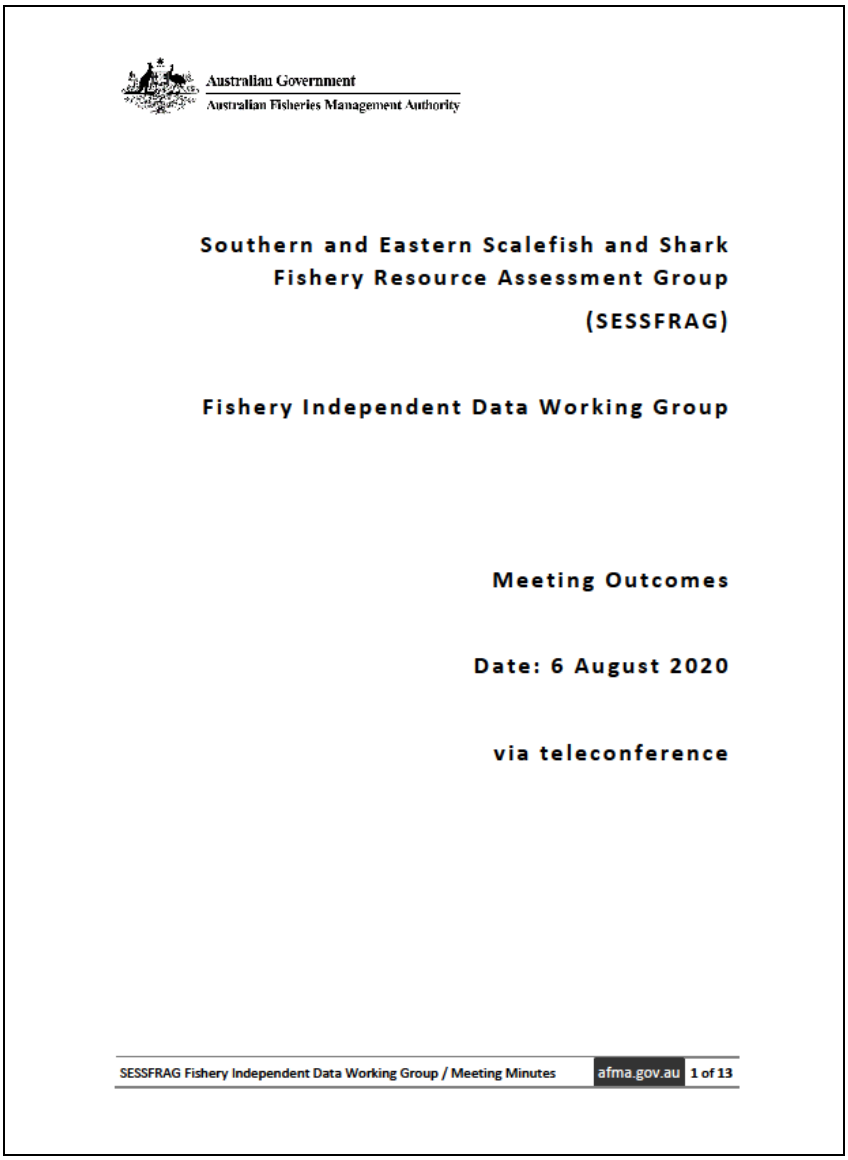
No.	Agenda Item / Meeting Date	Action Item	Agency / Person	Timeframe
27	16 SESSFRAG Data 2020	AFMA (Tamre Sarhan) to investigate the spike of 24cm school whiting and long 'tail' of large redfish in the length frequency distributions for 2019.	AFMA	SERAG 1 2020
28	16 SESSFRAG Data 2020	Dan Corrie to arrange a meeting between Jemery Day, John Garvey and Tamre Sarhan regarding changes in historical length frequencies for school whiting.	AFMA	SERAG 1 2020
29	16 SESSFRAG Data 2020	Miriana Sporcic and Karina Hall to examine the school whiting CPUE standardisation for NSW fisheries, with a particular focus on adding standard diagnostics for the NSW standardised CPUE series.	NSW DPI / CSIRO	As soon as practicable
30	16 SESSFRAG Data 2020	Establish a school whiting working group (to meet before SERAG 1 2020) to provide guidance to Jemery Day on how to treat NSW data in the stock assessment with the following membership: Mike Steer (Chair), Dan Corrie, Karina Hall, and Ian Knuckey.	CSIRO	SERAG 1 2020
31	17 SESSFRAG Data 2020	SERAG to consider the reference period for undertaking the John dory Tier 4 assessment – CDRs are available from 1998 onwards, whereas fishing for John dory commenced in 1986 according to logbook records. SERAG to discuss at the first meeting, if possible (depending on the outcome), enable the RBCs to be considered at the second meeting.	Miriana Sporcic/SERAG	SERAG 1 2020
32	17 SESSFRAG Data 2020	SharkRAG to confirm whether discards are included in the Tier 1 gummy shark assessment and whether they are deducted from the RBC.	SharkRAG	SharkRAG September meeting 2020
33	17 SESSFRAG Data 2020	AFMA/CSIRO to investigate the significant catches of John dory recorded at depths deeper than 150m, which have become evident since 2017.	AFMA / CSIRO	SERAG 1 2020
34	17 SESSFRAG Data 2020	Paul Burch to investigate the length frequency data and discard estimates for John dory prior to SERAG 1 with a particular focus on spikes in length frequencies in 2017-2019 and the high discard estimates for 2019 – the RAG noted the increase may be due to catches of small fish.	Paul Burch	SERAG 1 2020

No.	Agenda Item / Meeting Date	Action Item	Agency / Person	Timeframe
35	17 SESSFRAG Data 2020	NSW DPI to check the state catches of silver trevally and john dory. SERAG noted the catches are high, and there may be some confusion with reported catches of estuarine John dory.	NSW DPI	SERAG 1 2020
36	17 SESSFRAG Data 2020	AFMA to provide Paul Burch with list of freezer / factory vessels active in the SESSF by year.	AFMA	SERAG 1 2020
37	17 SESSFRAG Data 2020	As part of the redfish 2020 Tier 1 assessment, SERAG to discuss and provide advice about the difference in length frequencies between redfish samples collected in port and onboard – port based length frequencies in 2017 and 2019 include a disproportionate quantity of small fish.	SERAG	As soon as practicable
38	17 SESSFRAG Data 2020	As part of the redfish 2020 Tier 1 assessment, CSIRO to run sensitivities to explore different selectivity and discard functions by zone to account for the small fish recorded in port-based length frequencies.	CSIRO	SERAG 1 2020
39	17 SESSFRAG Data 2020	AFMA to check logbook depth records, including the metric (metres or fathoms) that has been used for royal red prawn to clarify the spike in catch at shallower depths – prior to SERAG 1.	AFMA	SERAG 1 2020
40	17 SESSFRAG Data 2020	Tamre Sarhan to check the recent ISMP discard data for royal red prawns as it is unlikely the discard rate is so high. Paul Burch to confirm why royal red prawn failed the discard estimate validity test. This is a low priority, as the discard data will not affect the assessment.	AFMA / CSIRO	SERAG 1 2020
41	17 SESSFRAG Data 2020	Tamre Sarhan to check the logbooks with the CDRs for silver trevally as the 2019 catch at depth records are inconsistent with previous years and could be due to misreporting or misidentification.	Tamre Sarhan	SERAG 1 2020
42	17 SESSFRAG Data 2020	Dan Corrie to update SEMAC regarding the SESSFRAG's analysis of blue grenadier wetboat CPUE (it does not indicate an issue with the stock status – noting it is considered poor indicator of stock status).	AFMA	SEMAC November meeting 2020

No.	Agenda Item / Meeting Date	Action Item	Agency / Person	Timeframe
43	17 SESSFRAG Data 2020	AFMA to clarify whether model estimated discards for jackass morwong should be deducted from RBC instead of weighted average.	AFMA	Prior to the jackass morwong assessment in 2021
44	17 SESSFRAG Data 2020	Ian Knuckey to provide the 2007-2012 length data from the industry survey on orange roughy (east) data to John Garvey for incorporating into the database.	Ian Knuckey / AFMA	As soon as practicable
45	17 SESSFRAG Data 2020	Tamre Sarhan to investigate instances in 2016 of unusually high pink ling discard levels (as identified by CSIRO) as these may have been incorrectly coded.	AFMA	As soon as practicable
46	17 SESSFRAG Data 2020	In preparation for the 2021 silver warehou assessment, Paul Burch to check the difference between 2019 on board and port length frequencies, noting an absence of larger fish in the on board length frequencies.	CSIRO	As soon as practicable
47	18 SESSFRAG Data 2020	A working group to be established to develop recommendations on ISMP sampling targets and frequency for out-of-session consideration by the SESSFRAG. Membership of the group to include: Mike Steer (Chair), Dan Corrie, Simon Boag, Tamre Sarhan, Kyne Krusic-Golub, and Paul Burch. Conflicts of interest will need to be managed. Advice from the SESSFRAG is required before the ISMP plan for 2021 will be finalised at the end of January 2021. A matrix of assessment schedule is needed for Tier 4 species, including their life history strategy (whether they are fast or slow growing). The RAG advice is to collect all samples in the appropriate year and spread across appropriate areas.	AFMA / 2021 ISMP plan working group	January 2021
48	18 SESSFRAG Data 2020	AFMA to work with Robin Thomson to include the collection of school shark samples from deeper water in the 2021 ISMP plan – consider whether these are collected from trawl boats (see also action item 5).	AFMA / Robin Thomson	January 2021
49	19 SESSFRAG Data 2020	CSIRO to incorporate the SESSFRAG's feedback regarding the stock structure report, and present an updated report to SERAG for advice in 2020.	CSIRO / SERAG	SERAG 2 2020

No.	Agenda Item / Meeting Date	Action Item	Agency / Person	Timeframe
50	20 SESSFRAG Data 2020	AFMA to arrange a meeting of the SESSFRAG before the end of 2020 to consider the next SESSF five year strategic research plan for the years 2021-25.	AFMA / SESSFRAG	December 2020
51	22 SESSFRAG Data 2020	Jemery Day to provide the presentation giving an overview of the project 'reviewing biological parameters' to the EO for circulation to the SESSFRAG meeting attendees.	Jemery Day / SESSFRAG EO	As soon as practicable
52	24 SESSFRAG Data 2020	An item to be included on the agenda for the SESSRAG Chairs' meeting in 2021 to discuss the impact of seismic surveys – preliminary data from the Fishwell Multiple-Before After Control Impact (M-BACI) analysis should be available.	SESSFRAG	Chairs' meeting 2021
53	24 SESSFRAG Data 2020	In preparation for the SERAG meeting scheduled for November 2020, CSIRO to repeat the metier analysis undertaken in 2019 with the current 2014-19 data and undertake a targeting analysis for rebuilding species. The school shark targeting analysis should include consideration of the 20 percent retention rule for school shark – refer to the previous analysis by Malcolm Haddon.	CSIRO	SERAG 2 2020

Attachment 5 – FIDWG meeting outcomes



Australian Government
Australian Fisheries Management Authority

Southern and Eastern Scalefish and Shark Fishery Resource Assessment Group (SESSFRAG)

Fishery Independent Data Working Group

Meeting Outcomes

Date: 6 August 2020

via teleconference

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Australian Government
Australian Fisheries Management Authority

Southern and Eastern Scalefish and Shark Fishery Resource Assessment Group (SESSFRAG)

Fishery Independent Data Working Group

Meeting Outcomes

Date: 6 August 2020

via teleconference

Attendees

Members	
James Woodhams	ABARES, scientific member on SERAG
Miriana Sporcic	CSIRO, assessment scientist & invited participant to SERAG
Jemery Day	CSIRO, assessment scientist, scientific member on SARAG & invited participant to SERAG
Robin Thomson	CSIRO, assessment scientist & scientific member on SharkRAG
Philippe Ziegler	Australian Antarctic Division, senior research scientist (stock assessment), scientific member on SARAG
Simon Boag	SETFIA, SSIA, SPFIA, SERAG industry member, SEMAC Industry Member, STAG Chair
Dan Corrie	AFMA trawl manager, member on SERAG
Andre Punt	University of Washington – Aquatic and Fishery Sciences / CSIRO, quantitative scientific data analysis advice for fisheries management
Beth Fulton	CSIRO, ecosystem modeller including climate change

Meeting outcomes

The meeting commenced at 9:30am (Australian Eastern Daylight Time (AEDT).

1. Working Group Membership

The Fishery Independent Data Working Group (the Working Group) membership may evolve over time to ensure that the required expertise is available, including for data and survey needs related to climate change.

2. Background

At its February 2020 meeting, the AFMA Research Committee (ARC) considered research priorities for the Southern and Eastern Scalefish and Shark Fishery (SESSF). The ARC did not support continuing the SESSF Fishery Independent Survey (FIS), in its current form, noting it was not cost-effectively delivering outcomes to support stock assessments or management of the fishery.

Recognising the need for a practical and cost-effective approach to collecting fishery independent data for key species in the SESSF, the ARC asked the SESSF Resource Assessment Group (SESSFRAG) to consider the following with regards to collecting fishery-independent data:

- Work with stock assessment scientists to understand the required coefficient of variation of any independent data to be useful as in index in Tier one stock assessments;
- Investigate options to use the current commercial fishing boats in surveys, including standardisation for gear, with this information to inform the current rigid element of the FIS;
- Consider opportunities for future projects and surveys to monitor climate change impacts in concert with previous FIS community structure work.

At its March 2020 Chairs meeting, the SESSFRAG recommended establishing a working group, and in addition to the considerations raised by the ARC above, SESSFRAG recommended the working group also consider new and emerging methods for collecting fishery-independent data which could provide a robust and long-term time series for inclusion in stock assessments and broader assessments of the ecosystem.

An out-of-session paper was considered by SESSFRAG in July 2020 and the Terms of Reference (TOR – at Attachment A) for the Working Group were developed.

3. Key questions to be considered

The Working Group considered each term of reference (as outlined below), aside from considering cost-effectiveness. Cost-effectiveness is to be considered throughout the process.

Develop the objectives of a fishery-independent monitoring program, with a focus on both stock assessment and broader ecosystem assessments in the context of potential climate change impacts

The Working Group developed the following objectives:

> With a focus on fishery and environmentally-driven impacts on fisheries resources and the broader ecosystem in the Southern and Eastern Scalefish and Shark Fishery (SESSF), establish a reliable, long-term and fishery-independent time-series of:
>
> a) abundance indices, catch composition and biological data for key commercial species as an input to stock assessments; and
>
> b) species catch composition and biophysical data as an input to assessments of fishery impacts on the broader ecosystem.

The working group also noted the following:

- The commercial fleet should be utilised where possible to collect information, which is not influenced by fisher behaviour, for example diet and environmental data.
- Catch composition data should be collected from both independent surveys and commercial fleet sources, which may add value to a metier analysis being developed for a multi-species harvest strategy approach.
- Given the decision to cancel the existing Commonwealth Trawl Sector FIS, cost-effectiveness is a key consideration of any approach this group considers – noting that it is somewhat subjective, and will lead to trade-offs (precision/accuracy, species coverage, etc.).

Action Item 1 – Working group to develop a table of different methods/approaches to collecting fishery-independent data, including which data are collected, the pros and cons of each, and relative cost (See Table 1).

- There is a Fisheries Research and Development Corporation (FRDC) project currently underway – *Revisiting biological parameters and information used in the assessment of Commonwealth fisheries: a reality check and work plan for future proofing* –that will consider the risk of using out-of-date parameters and may guide some of the data requirements under objective number (b) above.

Review the current SESSF Data Plan with a focus on identifying gaps in the current plan against the objectives identified above, and establish the data requirements for ongoing collection of fishery independent data

To establish the data requirements and identify the gaps in the current SESSF Data Plan, first considerations are:

- the species/functional groups for which independent data are required;
- the kinds of data that are needed to support assessments of those species/functional groups;
- the methods/approaches that are best suited to collecting those data; and
- the existing sources of fishery-independent data.

Commercial Species

The key economic species – targeted by various sectors within the SESSF and will likely be the focus of a revised SESSF Harvest Strategy – are tiger flathead, blue grenadier, deepwater flathead, gummy shark, orange roughy, blue-eye trevalla, pink ling and school whiting.

Currently, fishery-independent data are collected for:

- deepwater flathead - Great Australian Bight Fishery Independent Survey (GABFIS);
- blue grenadier - opportunistic acoustic data from factory freezer vessels;
- orange roughy - acoustic survey undertaken by CSIRO every three years; and
- school shark - sampling[1] to support close-kin mark-recapture (CKMR) analysis.

Bycatch species and Ecosystems

While the GABFIS, and previously the Commonwealth Trawl Sector (CTS) FIS, have collected catch composition and environmental data, it has not been routinely analysed.

Dr Fulton is in the process of analysing survey and fishery-dependent catch composition data as leading indicators for impacts of climate change. Dr Fulton requested that the FIS data be made available for inclusion in that analysis.

Action Item 2 – Dr Fulton to request access to the full range of data collected under the GABT and CTS FISs for the purpose analysing survey and fishery-dependent catch composition data as leading indicators for impacts of climate change.

There is an opportunity to collect data from the existing commercial fleet such as environment and diet data, which are not influenced by fisher behaviour.

A more structured and standardised program would be required to collect independent and representative data to inform an assessment for bycatch species and the broader ecosystem.

An overview of the species/functional groups for which independent data are required, and options for collecting that data, are provided at Table 2.

Identifying opportunities to collect fishery-independent data using existing programs, such as collecting samples for close-kin analyses under the ISMP, or utilising commercial fishing boats in a modified approach to the previous FIS. Draw from experience in other fisheries

The working group discussed the following approaches to collecting independent data:

[1] school shark sampling currently underway is fishery-dependant (SIDaC collection), however provides an independent estimate of abundance

Close-Kin Mark-Recapture

- While the close-kin mark-recapture methodology can provide an index of abundance as well as survival and fecundity parameters for selected species, the method cannot provide data on the broader ecosystem.
- Sampling can be achieved using existing programs, including industry-led programs and the Integrated Scientific Monitoring Program
- The sampling requirements (number of samples) for CKMR are proportional to the square root of the number of adults in the population, as that increases, so do sampling requirements, but not at a ratio of 1:1.
- CKMR is not suitable for low value, highly abundant species – for example school whiting – but could be cost-effective for higher value species – for example blue grenadier or pink ling.
- A project proposal has been considered by ComRAC, which aims to design a way to manage the SESSF using CKMR. This would involve using the metiers developed already, and scoping out the number of samples (i.e. cost) required to manage those key driving species

Sentinel Fleet with modified ISMP

- Industry's criticism of the CTS FIS was that sampling stations were randomly generated and included areas where operators would not expect to catch fish.
- However, it was noted this is a standard approach to designing independent surveys, and locations should not be selected (or rejected) based on a high expected catch.
- As the FIS progressed, changes were made to remove some of the sampling sites (less than 10) which were considered to be of little value[2].
- Compared to commercial catch rates, catch rates under the FIS were low, and this drove the high costs of conducting the surveys, (charter costs were used to offset the loss of commercial catch).
- A sentinel fleet survey incorporating on board observers under the ISMP is possible, but it likely to suffer from some of the same challenges faced under the CTS FIS:
    - Operators must adhere to the survey design, which will result in better catches for some than others and create incentive issues.

[2] This point needs to be clarified at the next meeting.

    - The more boats that undertake the survey, the larger the Coefficient of Variation (CV) will be due to increased variation related to the use of a range of vessels/skippers.

- CVs are influenced by three things: (1) number of stations (2) environmental factors, and (3) variation in catchability among operators.
- a more useful index of abundance is more likely to be achieved from a design with small surveys every year rather than a large survey every five years as this would better average out environmental effects.
- It is possible to use statistical approaches estimating the variation in catchability among operators (3). Where catches are relatively consistent among operators, for species such as flathead or whiting, this may be less of an issue, and having spatially representative shots may also help address (1) and (2).

Acoustics

- While multi-frequency technology is improving, it is suitable for aggregating species such as orange roughy and grenadier and not currently ideal for species such as flathead or school whiting.
- Calibration of the equipment across boats is paramount to producing useable data, there is also a cost to analysing the data.
- Acoustic optical surveys (AOS) are undertaken every three years for the eastern orange roughy spawning aggregation, three surveys have been completed since 2009, these provide an index of abundance that is used in the Tier 1 assessment.
- 'Boats of opportunity' have been collecting acoustic data while fishing in the winter blue grenadier fishery and have been providing the data to CSIRO. However, the systems have not been calibrated and the data have not been analysed to determine if it can be used as an index in the blue grenadier Tier 1 assessment.

Action Item 3 – Andre Punt to liaise with some of his colleagues and request an overview of survey approaches based on industry sampling used internationally and provide to the working group.

Consider new and emerging methods for collecting fishery-independent data, which could provide robust and long-term time series for inclusion in stock assessments and broader assessments of the ecosystem[3]

In addition to the methods discussed above, new and emerging options for collecting fishery-independent data were discussed briefly, and the Working Group committed to developing a table of different approaches for collecting fishery-independent data (a draft for comment is at Table 1), with a view to identifying which options would be best suited to key species in the SESSF (Table 2).

Provide advice on the recommended coefficient of variation of any independent data to be useful as in index in stock assessments

The required coefficient of variation depends on the effect size (what is to be detected and with what precision) However, this can be expressed as a statistical question once it is established what is being measured. For example:

- if the presence/absence of a species needs to be determined, then fewer surveys will be required and a large CV would be acceptable; or
- if trying to detect a small change in abundance for a particular species over a given timeframe, many surveys (or more stations and shots) will be needed to provide the preferred small CV.

Figure 1 shows the probability of detecting a decline in abundance over 30 years as a function of survey CV if surveys are conducted annually. The figures show that:

- the probability of detecting a change increases with more years of data and lower sampling CVs;
- finding a significant decline gets (a) more likely with a larger effect size, and (b) gets lower if there is process error (environmental variation in catchability).

[3] Note: Beth Fulton provided the following comment subsequent to the meeting: many new sampling innovations are in immature stages of development and may not be ready for 5-10 years. However, whatever is considered should be done so potential new technologies could mesh with them, and potentially replace them in the future. For example, eDNA may seem like science fiction now and is the subject of vigorous debate, but is not beyond the realm of possibility.

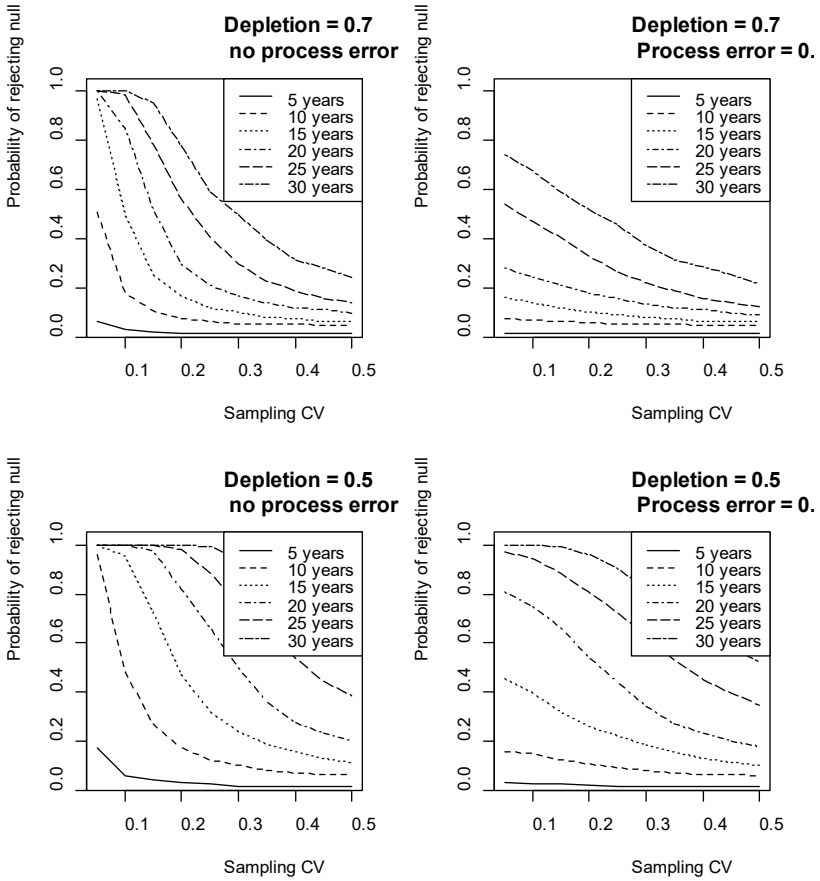

Figure 1 The probability of detecting a decline in abundance given a specific decline over 30 years as a function of survey CV if surveys are complete annually.

Consider opportunities for future projects and surveys to monitor climate change impacts, to complement community structure data previously collected under the CTS FIS

The objectives of the GABT and CTS FISs were focussed on establishing abundance indices for the key species in the SESSF. The surveys also collected information that could be used to support monitoring of climate-driven impacts such as changes in catch composition, species range and environmental data; this is yet to be analysed.

The ability to collect broader catch composition and environmental data as part of a future fishery-independent monitoring program will depend on the approach. For example, a trawl survey could collect environmental and catch composition data, whereas collecting samples to support CKMR would not involve obtaining these additional data.

Catch composition data collected under the existing Integrated Scientific Monitoring Program (ISMP) could also complement fishery-independent data collected in the future.

Some environmental data can be collected as part of commercial fishing activities to complement data already collected by the Integrated Marine Observing System (IMOS).

Larger scale projects, including surveys potentially undertaken by the CSIRO research vessel *Investigator*, could also provide useful data; this should not be viewed as a substitute for data that could otherwise be collected directly from the fishery.

Table 1 Options for fishery independent data collection. Cost: High > $500k, Medium $250k-$500k, Low < $250k.

	Potential Data Collected	Cost Estimate	Pros	Cons
Non-commercial surveys	Abundance Indices Catch Composition Length/biologicals Environmental data	High	Provides a range of data – abundance indices, catch compositions, environmental and biological.	Less effective for species that exhibit schooling behaviour (warehou, grenadier). Expensive – requires chartered boats and observers. The cost limits temporal/spatial coverage.
Sentinel fleet surveys	Abundance Indices Catch Composition Length/biologicals Environmental data	Medium	Can provide spatially and temporally representative data. Provides a range of data – abundance indices, catch comps, environmental, biological.	Logistically challenging – relies on cooperation across boats. Likely would still require some level of payment albeit less than Non-commercial surveys.
Acoustic Surveys	Abundance Indices Length/biologicals[4] Environmental data	Medium		Ideal for species that aggregate in large single-species schools. Accuracy is dependent on sampling protocols and timing.
Close-Kin Mark-Recapture	Abundance Indices	Medium to High (less over time)	Sampling can be achieved relatively cost-effectively	No insight to ecosystem dynamics.

[4] Only collected from trawl acoustic surveys

Table 2 Options for independent data collection for key commercial and bycatch species

Species / Functional Group		Suitable sources of independent data	Independent data currently available?	Proposed source of independent data
Key Commercial Species[5]	Tiger Flathead	Trawl Survey CKMR (maybe)		
	Deepwater flathead	Trawl Survey CKMR	Trawl Survey (GABFIS)	
	Blue grenadier	Acoustic Survey CKMR	Acoustic Trawl Survey[6]	
	Blue-eye Trevalla	CKMR		CKMR has been proposed
	School Whiting	Trawl Survey		
	Pink Ling	Trawl/Hook(?) Survey CKMR		
	Gummy Shark	Trawl Survey		

[5] GVP may not be the solely appropriate determinant of key commercial species as these may change over time, ocean jackets, flathead, warehous, morwong and ling have all varied in their importance to the fishery through time, and the fishery is in an area of fast changing ecosystem from climate change. As such, the list of species needs further consideration.
[6] Not routinely collected

		CKMR		
	Orange Roughy (East and potentially Cascade Plateau)	Acoustic Survey	Acoustic Survey	
	Orange Roughy (other stocks)	Trawl Survey		
Bycatch Species[7]	Chondrichthyans (Demersal)			
	Chondrichthyans (Pelagic)			
	Teleosts (Demersal)			
	Teleosts (Pelagic)			
	Molluscs (Demersal)			
	Molluscs (Pelagic)			
	Crustaceans (Demersal)			
	Crustaceans (Pelagic)			

[7] These groupings of species may also benefit from the consideration of a shelf and slope spatial split.

Attachment 6 – MYTAC Species and Species Being Assessed

Table 1 Stock assessment being conducted in 2020. For relevant species emboldened red cells illustrate the reason why a review of fisheries indicators is required.

Species	MYTAC year	Stock biomass (or proxy) above TRP?	TAC <50% caught	TAC <50% caught for operational reasons only?	Comments
Gummy shark **(Tier 1 - 2016)**	4th of 3yr MYTAC	Yes (2016) Target: 48% B_0 Limit: 20% B_0 **Bass Strait: 59% B_0** **Tas: 83% B_0** **SA: 69% B_0**	No 100% caught 1779 t of 1785 t TAC	-	At the 2018 SESSFRAG data meeting there was concern that there was insufficient new data (poor spatial coverage) to run an updated assessment for gummy shark in 2019. The assessment has been rescheduled to 2020 with further work being done in the interim to improve the gillnet CPUE standardisations used in the assessment (using catch per metre instead of catch per shot), use electronic monitoring data to improve discard estimates, and collect additional biological data through the Shark Industry Data Collection (SIDAC) program.
John dory **(Last assessed as Tier 3 in 2017 but will be assessed as Tier 4 in 2020)**	3rd of 3yr MYTAC	Yes (2017) F_{spr40}: 0.126 F_{20}: 0.198 **F_{cur}: 0.036**	Yes 17% caught 68 t of 395 t TAC	Yes	In 2019 SESSFRAG noted that the species is not targeted and the undercaught TAC is not a concern. SESSFRAG (2019) recommended, for non-Tier 1 species with conflicting data, that catch rate assessments are generally more conservative and Tier 4 assessments should be adopted. This will be considered by SERAG in 2020 when updating the assessment.
Mirror dory **(Tier 4 - 2019)**	Single year TAC	No (2019) East C_{targ}: 1.1542 C_{lim}: 0.4809 **C_{cur}: 0.6482** West	No 62% caught 117 t of 188 t TAC	-	

Species	MYTAC year	Stock biomass (or proxy) above TRP?	TAC <50% caught	TAC <50% caught for operational reasons only?	Comments
		C_{targ}: 0.9941 C_{lim}: 0.4142 **C_{cur}: 0.7488**			
Ocean perch **(Tier 4 - 2017)**	3rd of 3yr MYTAC	Yes (2017) Inshore: C_{targ}: 0.9182 C_{lim}: 0.4591 **C_{cur}: 0.9669** Offshore: C_{targ}: 0.9283 C_{lim}: 0.4642 **C_{cur}: 0.9669**	No 70% caught 169 t of 241 t TAC	-	Catches low and discards are typically high for inshore ocean perch leading to uncertainty in the tier 4 assessment. The most recent MYTAC was set on the tier 4 assessment for offshore ocean perch
Smooth oreo-other **(SAFE - 2019)**	Single year TAC	Yes (2019) $F < F_{MSY}$	No 84% 76 t of 90 t TAC	-	Previously assessed as a Tier 5. SERAG recommended rolling over the 90 t TAC for a single year, and reviewing catches in 2020. Given the increase to the orange roughy TAC in the Pedra Branca area for the 2020-21 season, SEMAC was concerned that smooth oreo could become a choke species. SEMAC recommended setting the smooth oreo (other) TAC at 135 t for the 2020-21 season, subject to a trigger at 70 t, at which point SERAG advice would be sought regarding catches up to the 135 t TAC. As at 29 July 12 tonnes of smooth oreo (other) has been caught.
Oreo Basket **(Tier 4 - 2017)**	3rd of 3yr MYTAC	No (2017) C_{targ}: 0.441	No 51%	-	While mixed oreos can be targeted, they are not an economic driver in the fishery

Species	MYTAC year	Stock biomass (or proxy) above TRP?	TAC <50% caught	TAC <50% caught for operational reasons only?	Comments
		C_{lim}: 0.1837 **C_{cur}: 0.4297**	94 t of 185 t TAC		SERAG have previously noted that mixed oreos are a potential candidate for a lower target reference point (e.g. B_{40}). As of the end of July 2020, approximately 64 t of oreo (basket) has been caught, approximately 44 t of which has been caught during trips under the Western Orange Roughy Research Plan.
Redfish **(Tier 1 - 2017)**	Rebuilding species	No (2017) Target: 48% B_0 Limit: 20% B_0 8% B_0	No 59% 29 t of 50 t TAC	-	Reviewed by SERAG under the Redfish Rebuilding Strategy SERAG (2019) noted the collection of age and length information for redfish is improving, however, at low catch levels, CPUE may be becoming less informative as an index of abundance.
Ribaldo **(Tier 4 - 2017)**	3rd of 3yr MYTAC	Yes (2017) C_{targ}: 0.3597 C_{lim}: 0.1799 **C_{cur} :0.7978**	Yes 30% 129 t of 422 t TAC	Yes	Only trawl data is used in the assessment. Industry members have previously noted the undercatch is because a large portion of the stock is unavailable due to closures.
Royal red prawn **(Tier 4 - 2017)**	3rd of 3yr MYTAC	Yes (2017) C_{targ}: 1.0692 C_{lim}: 0.4455 **C_{cur}: 1.1114**	Yes 40% 164 t of 409 t TAC	Yes	Operators are avoiding a productive area where a vessel sank approximately 2.5 years ago Royal Red Prawn fishing grounds off Sydney occur in areas of core habitat for Harrisson's and southern dogfish and much of the fishing grounds have been closed under the Upper Slope Dogfish Management Strategy.
Saw shark **(Tier 4 - 2017)**	3rd of 3yr MYTAC	Yes (2017) C_{targ}: 0.7237 C_{lim}: 0.3618 **C_{cur}: 0.9119**	Yes 44% 189 t of 430 t TAC	Yes	The standardised trawl CPUE has been relatively flat. In the 2017 assessment, the recent average standardised CPUE-based proxy for biomass was above the target reference point. Previous advice (SharkRAG, December 2017) is that sawshark is not targeted (secondary commercial species/byproduct). An industry

Species	MYTAC year	Stock biomass (or proxy) above TRP?	TAC <50% caught	TAC <50% caught for operational reasons only?	Comments
					member has also noted that market price is the primary reason that operators do not target or land elephant fish and saw shark.
School whiting **(Tier 1 - 2017)**	3rd of 3yr MYTAC	No (2017) Target: 48% B_0 Limit: 20% B_0 **2017: 47% B_0** **2019: 35%B_0**	No 67% 526 t of 788 t TAC	-	In November 2019, the stock assessment was updated to include recent catch (including NSW) and CPUE data. Updates to the assessment resulted in a downward revision to the 2018 estimated spawning stock biomass from 47% B_0 to 36% B_0. These changes are largely driven by a downward turn in Commonwealth CPUE, revisions to the NSW catch data from 2017 and 2018, and predicted combined catches for 2019. The estimated biomass from the 2019 assessment update was 35%B_0. NSW catch, CPUE and age/length data should be available to use in the 2020 assessment.
Silver trevally **(Tier 4 - 2017)**	3rd of 3yr MYTAC	No (2017) C_{targ}: 0.9026 C_{lim}: 0.3761 **C_{cur}: 0.6722**	Yes 7% 21 t of 292 t TAC	Unclear	Assessed by NSW as 'transitional depleting' using a weight of evidence approach including declining CPUE from state boats. NSW stock assessment scientists to be engaged as part of the Commonwealth tier 4 stock assessment this year. Commonwealth catches have been low for the last six years, with less than 15 per cent of the Commonwealth TAC caught since 2013. While it is unclear whether the TAC is undercaught due to declines in abundance or operational reasons, industry have suggested that silver trevally are not targeted.

Table 2 Species not due for stock assessment in 2020 but have triggered breakout rule. Emboldened red cells illustrate the reason why a review of fisheries indicators is required.

Species	MYTAC year	Stock biomass (or proxy) above TRP?	TAC <50% caught	TAC <50% caught for operational reasons only?	Comments
Alfonsino **(Tier 3 - 2013)**	6th of 3yr MYTAC	Yes (2013) F_{48}: 0.149 F_{20}: 0.479 **F_{cur}: 0.022**	Yes 1% caught 6 t of 1017 t TAC	Yes	SESSFRAG advice to stop using Tier 3 as little new data is available due to a lack of fishing. Future assessment subject to periodic review (SESSFRAG 2019 recommended to commission – delay the next assessment until 2020 due to low catches and lack of data) Last assessed in 2013: indicated stock had not been greatly impacted by fishing.
Bight Redfish **(Tier 1 - 2019)**	1st of 5yr MYTAC	Yes (2019) Target: 41% B_0 Limit: 20% B_0 **64% B_0**	Yes 28% 170 t of 600 t TAC	Yes	Industry have raised concerns about the availability of Bight Redfish during the FIS, this will be considered at GABRAG in Oct 2020. GABRAG have requested that fishery indicators are reviewed annually.
Blue eye trevalla **(Tier 4 – Slope - 2018)** **(Tier 5 – Seamount - 2018)**	2nd of 3yr MYTAC	No (2018) **Slope** C_{targ}: 1.2288 C_{lim}: 0.512 **C_{cur}: 0.9994** **Seamount** N/A – see comments	Yes 47% 217 t of 458 t TAC	Uncertain	A catch limit applies for the seamount stocks of 108 t over the 3-year period with no more than 54 t to be caught in a single year. For the seamount stock, a catch-MSY analysis and an age-structured stock reduction analysis were considered by the RAG. Catch-MSY predicted that constant catches of 40 t over five years would lead to the mean and median depletion levels remaining stable. The age-structured stock reduction analysis predicted that constant catches at about 25 t for lower productivity scenarios and 48 t for higher productivity scenarios would lead to relative stability in depletion.

Species	MYTAC year	Stock biomass (or proxy) above TRP?	TAC <50% caught	TAC <50% caught for operational reasons only?	Comments
					Recognising uncertainty in the Tier 4 stock assessment and industry concerns around low catch rates up to January 2020, SEMAC recommended SESSFRAG (August 2020) consider fishery indicator data and: • consider an alternative approach to assessing the slope stock in 2021 and applying a precautionary reduction to the TAC for the 2021-22 SESSF season; or • bring the assessment forward to 2020, if the Tier 4 assessment is to be applied again, SERAG should consider application of the 15 per cent discount factor.
Blue grenadier **(Tier 1 - 2018)**	2nd of 3yr MYTAC	Yes (2018) Target: 48% B_0 Limit: 20% B_0 **122% B_0**	No 58% 7044 t of 12183 t TAC	-	SEMAC recommended a breakout rule for blue grenadier: if more than 50% of the TAC is caught in a given season. SESSFRAG should consider fishery indicators with a particular focus on wet-boat CPUE and recent recruitment. One factory freezer vessel fished the spawning aggregation in 2019 and this is the reason for the TAC being more than 50% caught.
Deepwater Flathead **(Tier 1 - 2019)**	1st of 3yr MYTAC	Yes (2019) Target: 43% B_0 Limit: 20% B_0 **45% B_0**	No 61% 694 t of 1128 t TAC	-	Assessed in 2019 and considered by GABRAG, with the next assessment scheduled for 2022 GAB FIS due to be run in 2021. GABRAG have requested that fishery indicators are reviewed annually
Deepwater shark – east **(Last assessed as Tier 4 in**	2nd of 3yr MYTAC	No (2018) C_{targ}: 1.1592 C_{lim}: 0.483	No 89% 21 t of 24 t TAC	-	Deepwater shark strata modified to be consistent with the quota zones in the fishery.

Species	MYTAC year	Stock biomass (or proxy) above TRP?	TAC <50% caught	TAC <50% caught for operational reasons only?	Comments
2018 but will be assessed as Tier 5 in 2021)		**C_{cur}: 0.5332**			
Deepwater shark -west **(Tier 5 - 2018)**	2nd of 3yr MYTAC	Yes (2018) C_{targ}: 0.6073 C_{lim}: 0.253 **C_{cur}: 0.7292**	Yes 36% 85 t of 235 t TAC	Uncertain	Deepwater shark strata modified to be consistent with the quota zones in the fishery. SESSFRAG to consider an annual effort over time plot compared with a plot of CPUE in the CPUE standardisation report.
Flathead **(Tier 1 - 2019)**	1st of 3yr MYTAC	No (2019) Target: 40% B_0 Limit: 20% B_0 **34% B_0**	No 80% 1967 t of 2496 t TAC	-	Catches and catch rates from the start of 2020 will potentially be impacted due to seismic testing off Lakes Entrance. SERAG noted, while there were two years of poor recruitment in 2013 and 2014, there is no evidence of ongoing poor recruitment, and the most recent recruitment estimate (2015) is above average.
Jackass morwong **(Tier 1 - 2018)**	2nd of 3yr MYTAC	No (2018) **West** Target: 48% B_0 Limit: 20% B_0 **68% B_0** **East** Target: 48% B_{1988} Limit: 20% B_0 **35% B_{1988}**	Yes 23% 109 t of 469 t TAC	Uncertain	FIS indices decreasing over last 5 surveys. Total removals in both east and west remain below the RBC. The assessments are uncertain and poor data quality and quantity continues to be an issue, particularly in the west. Industry noted that catches continued to be patchy, noting jackass morwong were a very temperature-dependant species.
Orange roughy – east	3rd of 3yr MYTAC	No (2017) Target: 48% B_0	No 69%	-	SESSFRAG agreed to delay the assessment by a year to enable further consideration of natural mortality.

Species	MYTAC year	Stock biomass (or proxy) above TRP?	TAC <50% caught	TAC <50% caught for operational reasons only?	Comments
(Tier 1 - 2017)		Limit: 20% B_0 **33% B_0**	619 t of 900 t TAC		Acoustic survey abundance estimates (2013, 2016 and 2019) support the model predicted increases in biomass estimates.
Pink ling **(Tier 1 - 2018)**	2nd of 3yr MYTAC	No (2018) **West** Target: 48% B_0 Limit: 20% B_0 **84% B_0** **East** Target: 48% B_0 Limit: 20% B_0 **30% B_0**	No 65% 833 t of 1288 t TAC	-	Current pink ling stock status in the east is not well estimated. It varies across model runs and is heavily dependent on values adopted for natural mortality. The CPUE series that has been adopted for the assessment is conservative in that it does not account for management arrangements that restrict catches (e.g. trip limits and voluntary industry restrictions). While the pink ling TAC is set globally (east and west), pink ling is assessed separately as an eastern and western stock. During the 2019-20 fishing season the eastern catch constraint was set at 428 t with 414 t caught.
Silver warehou **(Tier 1 - 2018)**	2nd of 3yr MYTAC	No (2018) Target: 48% B_0 Limit: 20% B_0 **31% B_0**	No 68% 307 t of 450 t TAC	-	The 2018 assessment estimates the stock was close to the limit reference point in 2016 increasing to an estimated biomass in 2019 of 31% B_0. In 2018, SERAG recommended using a low recruitment scenario (the average of the last five years) for the purposes of setting the TAC. Some industry are reporting improved catch rates for silver warehou off the east coast from St Helens head to Ulladulla, potentially brought on by south-easterly weather patterns which are thought to drive the fish up the east coast.

Table 3. stocks/species managed under a rebuilding strategy not being assessed in 2020

Species	MYTAC year	Stock biomass (or proxy) above TRP?	Incidental catch <50% caught	TAC <50% caught for operational reasons only?	Comments
Blue warehou **(Tier 4 - 2013)**	Single year TAC	No (2013) **East** C_{targ}: 2.0717 C_{lim}: 0.8287 **C_{cur}: 0.1861** **West** C_{targ}: 1.9249 C_{lim}: 0.7699 **C_{cur}: 0.2681**	Yes 9% 10 t of 118 t TAC	Yes	Reviewed by SERAG under the Blue warehou Rebuilding Strategy
Gemfish - east **(Tier 1- 2009)**		No (2009) Target: 48% B_0 Limit: 20% B_0 **16% B_0**	No 71% 71 t of 100 t TAC	-	Reviewed by SERAG under the Eastern Gemfish Rebuilding Strategy
Orange roughy - south **(Tier 1 – 2000)** **Pedra Branca (Tier 1 – 2017)**		No (2009) Target: 48% B_0 Limit: 20% B_0 **Southern Zone <20% B_0** **Pedra Branca 33% B_0**	No 97% 91 t of 94 t TAC	-	Reviewed by SERAG under the Orange Roughy Rebuilding Strategy
Orange roughy - west		No (2009) Target: 48% B_0	Yes 40%	Yes	Reviewed by SERAG under the Orange Roughy Rebuilding Strategy

Species	MYTAC year	Stock biomass (or proxy) above TRP?	Incidental catch <50% caught	TAC <50% caught for operational reasons only?	Comments
(Tier 1 – 2002)		Limit: 20% B_0 **<30% B_0**	24 t of 60 t TAC		
Orange roughy – Albany and Esperance **(Tier 1)**		Unknown	Yes 0% 0 t of 50 t TAC	Yes	Reviewed by SERAG and GABRAG under the Orange Roughy Rebuilding Strategy
Orange roughy – Cascade Plateau **(Tier 1 – 2009)**		Yes (2009) Target: 60% B_0 Limit: 20% B_0 **64% B_0**	Yes 5% 24 t of 500 t TAC	Yes	Reviewed by SERAG and GABRAG under the Orange Roughy Rebuilding Strategy Catches have remained well below the RBC since the assessment and the stock likely remains above the target reference point.
School Shark **(Tier 1 (close kin mark recapture or CKMR) – 2018)**		No (2018) Target: 48% B_0 Limit: 20% B_0 **Unknown**	No 97% 184 t of 189 t TAC	-	Reviewed by SharkRAG under the School Shark Rebuilding Strategy. SharkRAG (December 2018) accepted the CKMR assessment model noting high confidence in the absolute estimate of abundance produced by the model, but accepting lower confidence in the estimates of trend. The 2018 assessment is currently undergoing independent peer review which will inform a broader review of the Strategy (also underway). Outcomes of this work will be considered by SharkRAG, SESSFRAG (as appropriate) and SEMAC. The next school shark assessment was originally scheduled for 2020. However, SharkRAG (May 2020) received advice from CSIRO that there is insufficient data to inform a stock assessment in 2020. SharkRAG will further consider the scheduling of the assessment at their September 2020 meeting. This will include consideration of any new data

Species	MYTAC year	Stock biomass (or proxy) above TRP?	Incidental catch <50% caught	TAC <50% caught for operational reasons only?	Comments
					collected since the last assessment in 2018, including recent work by CSIRO to quantify recreational catches.

Table 4. Species not due for stock assessment in 2020 and have not trigger breakout rules

Species	MYTAC year	Stock biomass (or proxy) above TRP?	TAC <50% caught	TAC <50% caught for operational reasons only?	Comments
Elephant Fish **(SAFE - 2020)**	1st of 3yr MYTAC	Yes (Jan 2020) $F<F_{msy}$	Yes 41% 47 t of 114 t TAC	Yes	Recognising issues with the Tier 4 assessment, SESSFRAG (2019) recommended setting the 2020-21 TAC for elephant fish using a weight of evidence approach, including recent catches and the outcomes of the most recent ERA. RAG industry members have previously expressed that a precautionary long-term TAC should be set for elephant fish as the TAC level does not influence landings. SEMAC (February 2020) noted this a low value species, and discards were driven by the cost landing the species outweighing the market value. An industry member has also noted (SharkRAG, December 2017) that market price is the primary reason that operators do not target or land elephant fish and saw shark. Considering the outcomes of the ERA, SharkRAG recommended a three year MYTAC of 114 t.
Gemfish – west **(Tier 4 - 2019)**	1st of 3yr MYTAC	Yes (2019) C_{targ}: 0.9942 C_{lim}: 0.4143 **C_{cur}: 1.0418**	Yes 48% 96 t of 200 t TAC	Yes	

Species	MYTAC year	Stock biomass (or proxy) above TRP?	TAC <50% caught	TAC <50% caught for operational reasons only?	Comments
Oreo smooth – Cascade **(Tier 4 – 2010)**	Single year TAC	Yes (2010) C_{targ}: 0.4989 C_{lim}: 0.1996 **C_{cur}: 1.3575**	Yes 0% 0 t of 150 t TAC	Yes	When last assessed, CPUE had been extremely variable and the fluctuations were considered to not be indicative of changes in stock status