



Australian Government

Australian Fisheries Management Authority

Southern and Eastern Scalefish and Shark Fishery

South East Resource Assessment Group (SERAG)

2018 Assessment Meeting #1 – September 2018

19-21 September 2018

CSIRO - Hobart, Tasmania

Minutes

Chair: Mr Sandy Morison

Minutes

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DAY 1, Wednesday 19 September 2018

The Chair opened the meeting at 8:45am

Agenda Item 1 – Preliminaries

1.1 Welcome and Introductions

1. Mr Sandy Morison (Chair) welcomed members, invited participants and observers to the meeting. There were no apologies to note. Attendees introduced themselves and outlined their relevant background and/or experience.

Name	Membership
Members	
Mr Sandy Morison	Chair
Dr Rik Buckworth	Scientific Member
Mr Ross Winstanley	Recreational Member
Dr Sarah Jennings	Scientific (Economics) Member
Mr John Jarvis	Industry Member
Mr Tom Bibby	Industry Member
Dr Simon Nicol ¹	Scientific Member, ABARES
Mr Simon Boag	Industry Member
Dr Geoff Tuck	Scientific Member, CSIRO
Mr Andrew Penney	Scientific Member, Pisces Australis
Mr Dan Corrie	AFMA Member
Ms Mardi Albert	Executive Officer, AFMA
Invited Participants	
Mr George Day	Senior Manager, AFMA
Dr Ian Knuckey	Fishwell Consulting
Dr Fay Helidoniotis	ABARES
Dr Malcolm Haddon	CSIRO Honorary Fellow
Dr Miriana Sporcic	Assessment Scientist, CSIRO
Dr Robin Thomson	Assessment Scientist, CSIRO
Dr Jemery Day	Assessment Scientist, CSIRO
Dr Paul Burch	Assessment Scientist, CSIRO
Dr Claudio Castillo-Jordan	Assessment Scientist, CSIRO
Dr Kyne Krusic-Golub	Fish Ageing Services
Observers	
Mrs Sandra Curin-Osorio	Assessment Scientist, CSIRO
Mr Will Mure ²	Industry

¹ Attended on 19, 20 September

² Attended the Blue-eye trevalla section

1.2 Declarations of interest

2. The Chair asked the RAG to review how declared conflicts of interest are handled during the meeting, in light of increasing scrutiny and discussions at the RAG Chair's meeting that the various RAGs address this differently.
3. Currently in SERAG meetings, those with conflicts of interest participate in the relevant conversations but not in the formal recommendation. Currently, everyone remains in the room while RBC advice is formalised; however the Chair proposed that in future a clear rule be that those with conflicts of interest leave the room while advice is finalised.
4. The RAG discussed the following:
 - Prior to formalising RBC advice, there is value in hearing the socio-economic implications of potential options to inform commentary and advice from the RAG. In this regard there is overlap with Management Advisory Committee (MAC) discussions but the RAG's primary focus is providing scientific advice.
 - The RAG is providing RBC advice, not setting TACs, however good governance as a protective measure is important.
 - Industry discussion and observations about biology and what's happening on the water is valuable for the discussion but then they should step out while the RAG finalises advice.
 - To avoid disruption, RBC advice for Tier 1 species may be finalised individually but Tier 4 species could be discussed as a block and then RBC advice finalised at the end of the item.
 - Fisheries Administration Paper 12 (FAP 12) states that members should be excluded from discussions and recommendations only where there is potentially a direct benefit to them rather than all groups equally. However this is difficult to define without detailed knowledge of individual member's interests, and thus it would be better to have a clear rule about when the member leaves the room.
 - Having a blanket rule for all recommendations may not be the best approach and AFMA's policy is to hear industry views and advice. Also it may be hard to determine the point where discussions cease and the member steps out so the RAG can finalise advice.
 - The RAG agreed that members with conflicts of interest can be present during the discussion and provide their views but would leave the room while the RAG finalises RBC advice. Any variation to this rule would need to be agreed to by the RAG prior to the agenda item.
5. The RAG followed the conflict of interest process as outlined in FAP 12. A list of the full declarations made by SERAG members and other participants for the meeting is provided in Attachment A and has been updated since the previous meeting. Note that members arriving during the meeting were asked to make their conflict of interest declarations upon arrival. The Executive Officer noted the declarations and included them in Attachment A.
6. The Chair reiterated that members with conflicts of interest can be present during discussions generally but would need to leave the room for recommendations and when the RAG finalises RBC advice relating to their interests.
7. The Chair further reminded the RAG that potential conflicts can be raised at any time during the meeting if a member becomes aware during discussions of a potential conflict, or if a member becomes concerned about another member's potential conflict of interest.
8. A copy of the group's Declarations of Interest is provided at Attachment A.

1.3 Adoption of agenda

9. Due to a very full agenda, the RAG agreed to the following agenda changes:
 - Agenda item 1.5 about stock assessments preparation and agenda item 2 about IMSP 3rd quarter report will shift to the final meeting day. This allows the RAG to focus on the priority items including stock assessments.
 - Agenda item 5 about Blue-eye trevalla stock assessment will be moved to the morning to accommodate Dr Haddon's schedule. Industry representative Mr Will Mure will attend for this discussion.
10. Mr Penney advised he can contribute to the agenda item 12 discussion about Ecological Risk Assessments (ERAs) and will upload his slides to GovDex before the discussion.
11. The RAG adopted the agenda. Refer to Attachment B for copy of adopted agenda. Note that agenda item numbering has remained consistent to allow tracking of uploaded papers.

1.4 Action items review

12. The RAG considered the outcomes of action items arising from previous meetings and it was agreed to focus on outstanding items (status red). A summary of outcomes is provided at Attachment C.
13. The RAG specifically addressed the following action items:
 - **Action Item 6 (2016.11, 5.1) – Ensure that the redfish otolith collection target is met**

Discussion: Observers have been deployed on NSW trips, however catch remains low. As of Nov 2017, otolith collection is at 21% (165/800). SESSFRAG supported using the Commonwealth Trawl Sector (CTS) Fishery Independent Survey (FIS) to supplement Integrated Scientific Monitoring Program (ISMP) otolith collection. Collection has picked up in the 3rd quarter. Mr Corrie recommended removing this action for redfish specifically but maintain a continued focus on ongoing ISMP collection.

Outcome: The RAG agreed to remove this item.
 - **Action Item 1 (2017.09, 1.4) – Dr Day to prepare a discussion paper regarding the inclusion of winter/summer FIS surveys in future tiger flathead assessments**

Discussion: SESSFRAG agreed that this should be looked at as a sensitivity as part of the stock assessment update in 2019. The FIS more generally will be considered at the SESSFRAG Data Needs workshop in February 2019.

Mr Corrie recommended removing this action and ensuring it's looked at as a sensitivity in the stock assessment and noting that it will be discussed at the workshop in February.

Dr Day clarified that this action item was not about including the winter/summer FIS surveys but including the winter/summer length frequencies, and requested the item be reworded.

Outcome: after discussion it was agreed to keep the action item with correct wording until the assessment has been done.

Correct wording: **Dr Day to prepare a discussion paper regarding the inclusion of winter/summer length frequencies in future tiger flathead assessments**
 - **Action Item 2 (2017/11, Agenda item 4) CSIRO to provide advice on whether data as an input to stock assessments could be reviewed at SESSFRAG data meeting in July/August each year**

- **Action Item 3 (2017.11, Agenda item 4) CSIRO to provide advice on whether the most recent year's data needs to be included in stock assessments to give the assessment scientists more time to identify issues**

Discussion: these action items are grouped together and will be addressed in this meeting under agenda item 1.5.

Mr Corrie explained that Action Item 3 was a question about excluding the most recent year's data in assessments, for example in 2018 assessments excluding 2017 data to give the scientists more time, noting that this might not be appropriate for short-lived species like school whiting but acceptable for longer lived species.

Outcome: these items will be considered in this meeting under agenda item 1.5.

- **Action Item 7 (2017.11, Agenda item 6.2) AFMA to quantify the area of suitable deepwater shark habitat inside and outside closure as a proxy for stock protection**

Discussion: In response to a significant decrease in the eastern deepwater shark RBC in 2017, SERAG suggested quantifying the closed areas to determine if that provides sufficient protection to the stock.

This was part of the broader discussion around discount factors and whether they should be applied when closures are in place.

Dr Tuck will present a paper "Incorporating the effects of marine spatial closures in risk assessments and fisheries stock assessments" at SESSFRAG in March 2019 – SESSFRAG advice may inform the discussions about using closures as proxies for protection.

Mr Corrie suggested that this could be considered when Dr Sporcic presents the Tier 4 deepwater shark assessment at this meeting, to better understand whether accounting for closures would make any difference to the assessment.

Outcome: this item will be considered further when Dr Sporcic presents the Tier 4 deepwater shark assessment at this meeting.

- **Action Item 9 (2017.11, Agenda item 6.3) SESSFRAG to consider a standard approach to limiting the multiplier value (D/C+1) in Tier 4 Assessments where estimated discard rates are high**

Discussion: Mr Corrie explained that this item arose in SESSFRAG discussions with regards to Tier 4 assessments that had high discards relative to overall catch. The approach at SERAG in 2017 was to apply a limiting factor on the multiplier, however SESSFRAG agreed that this was not a suitable approach.

Mr Corrie referred to Appendix A of the action items review paper detailing the recent decision to establish a SESSFRAG working group to look further at several species classed as potentially 'not assessable' to formulate some possible solutions and a way forward.

Outcome: The RAG agreed to remove this item - it will be considered by the SESSFRAG working group.

14. A list of action items and recommendations recorded during this meeting are provided at Attachment D.

1.5 Stock assessments preparation

(Note: this item was shifted to Day 3 but has been recorded here for continuity of minutes)

15. The RAG noted the importance of ensuring that assessments are scheduled to allow adequate time to prepare assessments for review by the RAG. Key discussion points included:

- The spreading of CSIRO's assessment workload over three years is important.

- The average workload is around 3-4 Tier 1 assessments per year.
- The upper limit should be 4 Tier 1 assessments per year noting that for species with an eastern and western stock, like Pink Ling and Jackass Morwong, there are actually two assessments.
- There are often Tier 4s and Tier 1s in the same year.
- The future timing and number of assessments in any given year will depend on recommendations of the Strategic Monitoring and Assessment Review Project (SMARP) and implementation of a revised multi-species harvest strategy framework.
- The management and handling of data for assessments is hugely important.
- In some instances there are several years between assessments – for example Blue Grenadier was last assessed in 2013. Such a large time gap may mean that changes in the fishery are not identified or addressed in a timely manner.
- The issues of capability and corporate memory within CSIRO when there is a big time gap between assessments – e.g. staff with expertise moving on.
- Issues with data processing and transmission from AFMA to CSIRO.
- The timing of RAG meetings is important with scheduling around SESSFRAG and preparation of RBC advice for SEMAC and/or the AFMA Commission meetings. For example, the short time gap between the SESSFRAG Data meeting and the first SERAG meeting where extra analyses were requested.
- Ideally, issues with the data or stock assessments are discussed at the first SERAG meeting and a base-case and set of sensitivities is agreed to. This did not happen in 2017 because there was not enough time for CSIRO to adequately prepare for the first meeting.

16. The RAG further discussed the issues regarding the quality and coverage of the ISMP program:

- Dr Tuck commented that a critical issue for CSIRO is the time taken to receive data from AFMA and correct any issues. The paper 'SESSF: Total Allowable Catch (TAC) setting process' was provided to the 2018 SESSFRAG data meeting and this would be useful to circulate for SERAG. This paper recommended having cut-off times for data provision to CSIRO, the cut-off date specified was 30 April of each year. Currently data is updated right up to the SESSFRAG data meeting which is a key quality checking mechanism. The RAG discussed holding the SESSFRAG data meeting earlier and ensuring that data (from observers and logbooks covering up to December) is entered by April. AFMA is working on getting this data entered more quickly.
- Mr Day said the implementation of e-logs, for example, should create efficiencies and supports moving the SESSFRAG data meeting forward.
- Dr Krusic-Golub added that he has spoken to AFMA about getting the age samples earlier in the calendar year which would allow for earlier provision of age data. He suggested finalising the ageing plan early in the new financial year rather than by the first SESSFRAG meeting in February to allow more time for ageing work.
- Mr Penney suggested implementing a cut-off date where additional data is not included in the current year's assessment. Importantly, it would provide certainty for CSIRO and more lead time for preparation of assessments. Dr Tuck and Dr Thomson agreed that setting a firm date would be helpful to CSIRO and save time and effort of assessment scientists going back and forth to AFMA.
- Given the importance of age data to assessments, and the frequency of delayed delivery of age data in recent times, there may be merit in going back to ageing all the Tier 1 species each year instead of accumulating otoliths for several years. Decisions regarding which Tier 1 species to assess are sometimes not made until at or even after the Feb SESSFRAG meeting by which time it can be too late to perform all the ageing work in time for the Aug meeting.

This should be budget neutral, because the same amount of ageing work will be done, but in a way that allows FAS to plan their time. Note, that some species are more time consuming than others, e.g. shark species and orange roughy.

- At the SESSFRAG data meeting, it is useful having already run the updated data through the previous Tier 1 assessment
- There is no guarantee that the data is in 'good shape' and so perhaps there is another deadline that could be considered around setting a date for an 'agreed and accepted dataset'. Mr Day advised that AFMA has planned meetings with relevant AFMA and CSIRO personnel to do initial checks and to ensure data is ready. Dr Thomson advised that CSIRO has now documented their data management procedures and are liaising directly with John Garvey (AFMA) about his data warehouse.
- The RAG supported having distinct data cut-off dates:
 - 30 April - Logbook, CDR and ISMP data
 - 30 June - Ageing, State catch, and FIS data
 - SESSFRAG Data meeting - final data-sets for assessments.

Note: the timing of the data meeting should allow time for initial data checking. Dates prescribed here are *target* due dates and CSIRO may still accept late data. State catch is not always provided on time.

- The RAG supports AFMA and CSIRO reviewing relevant dates for provision and finalising assessment data in the 'TAC setting paper' and reporting back to the SESSFRAG Chair's meeting in 2019.

17. Dr Day noted assessments are based on calendar years but TACs are based on fishing season. This causes confusion (e.g. note the false claims in the Edgar paper) and perhaps this needs to be clarified in the appropriate documents. Dr Day will discuss further with AFMA.

ACTION ITEM 16: AFMA and CSIRO to review the TAC setting guidelines paper and due dates for data preparation and report back to SESSFRAG Chair's meeting in 2019.

Agenda Item 2 – ISMP Quarter 3, 2018 report (period up to August 2018)

(Note: this item was shifted to Day 3 but has been recorded here for continuity of minutes)

18. The RAG reviewed the year-to-date ISMP coverage and data collection against targets and noted the following:

Table 2 (Sea-days)

- There were more ISMP sea-days spent on the orange roughy trips than was budgeted despite a decrease in the level of compulsory coverage. This is at the expense of coverage in other strata. AFMA will review the level of compulsory observer coverage for orange roughy in 2019.
- Royal Red Prawn (RRP) was oversampled (days) but length frequency data showed only 25 per cent was obtained. Length-frequencies are an important indicator and this is something for AFMA to investigate.
- AFMA should check the units of measurement for RRP in the database (mm used instead of cm) and correct if required.

ACTION ITEM 17: AFMA to correct units of Royal Red Prawn in database (sometimes in mm not cm).

Table 12 (length collections)

- The table should be reformatted to incorporate the red/amber/green as an indicator of coverage.

ACTION ITEM 18: AFMA to incorporate traffic-light system in the ISMP coverage report for year-to-date tables

19. The RAG noted the shortfalls in data collection remain an issue noting that this has been raised with AFMA previously and work is progressing to address these issues. The RAG highlighted the following concerns:

- An overall average of approximately 33 per cent collection is not ideal.
- There are significant gaps in the west for relevant species.
- Otolith samples are low for a number of species, particularly in the west.
- Even when sea-day targets were met, some targets for otoliths and lengths were not met.

20. Mr Corrie said port-based sampling for length and otolith collection is about to commence at Sydney Fish Markets. The RAG noted the following:

- Mr Cordue didn't include port-based length samples for eastern pink ling because there's no depth data associated with it. Depth is needed only when there is a size-depth relationship and this is true for gummy shark, school shark, pink ling, silver warehou and a couple of other species.
- Otolith samples from the Sydney markets would still be useful for conditional length-at-age.
- AFMA and CSIRO should develop a list of species for which port-based sampling is useful. Representative sampling should consider gear type and linking samples back to shots, gear type, seasons and zones.
- AFMA has discussed the coverage issues with the observer section.
- The RAG supports staying with the current data plan and refining what is required next year.

21. Noting the shortfalls in data collection, the RAG anticipates seeing improvements in the next report and encourages AFMA further explore ways to improve meeting the targets.

Agenda Item 3 – ISMP Discards and Catch Reports

3.1 Issues identified with SESSF data

22. Mr Corrie outlined some of the issues identified with the AFMA ISMP data:

- Small fish showing up in length frequencies for some species:

AFMA has identified issues with a particular observer's recording of length frequencies (observer used the form for millimetres rather than centimetres). John Garvey (AFMA) is writing code to fix this error for affected records. For all records, except school whiting and redfish, where length is less than 13cm the decimal point will be shifted. The RAG discussed what methods would be best to identify these errors but the Chair concluded that the RAG trusts AFMA to fix the errors appropriately without introducing further errors.

- Records of large school whiting discards:

This relates to action item - 2017.11 Agenda item 4 “AFMA to investigate the occurrence of 22cm+ school whiting recorded as discarded in 2016 ISMP records.” (status: underway).

AFMA traced this back to the observer’s recording sheets and found that this was recording error - the observer circled ‘discarded’ instead of ‘retained’. This was clear from other data recorded (sample size and total weight of the shot). These errors will be fixed before the next assessment.

3.2 Revisions to ISMP Discards Report

23. Dr Burch noted that changes to the catch and discards report has substantial implications for some assessments, particularly Tier 4s. There is less of an impact for Tier 1 assessments.

24. The RAG noted the 2018 revisions:

- A revised methodology for calculating species-specific discard estimates was applied retrospectively over the time-series, 1992-2017. This is because of changes to the criteria for what is accepted as a legitimate discard, agreed last year to apply in 2018 over the entire time series.
- The method (based on Bergh *et al.* 2009) assumes discards are normally distributed but fisheries data are often not. SESSFRAG agreed to investigate use of a geometric mean in 2019, which may result in further changes to the discard time-series.
- The method assumes observer effort is allocated proportionally to fishing effort. The removal of observers from the GHAT in 2015 may have resulted in biased discard estimates for some species groups. If observer effort is removed from sector, the method assumes nil discards in that sector. In the absence of GHAT discard estimates, total discards are scaled to CDR data using trawl catches only. GHAT discard estimates from electronic monitoring and logbook data may be used in future however current estimates (without GHAT data) may be biased.
- Until recently, only Coefficients of variation (CVs) for total catch (discard + retained) were presented which have much lower CVs than discard-only CVs. In the 2018 report, CVs for total catch and discards are now included in Table 2.
- Note: Coefficients of variation (CVs) are a measure of the uncertainty in an estimated quantity and can help to quantify the estimate’s reliability (i.e. standard deviation/mean). It influences how well the model fits each data source and has the potential to help assess the validity of the estimate.

25. Currently, Tier 1 assessments use discard estimates and associated CVs. Discard estimates are fleet based so smaller sample sizes require a slightly different method similar to Bergh *et al.* 2009³.

26. Low CVs encourage the model to fit to the data whereas data points with high CVs can be ‘ignored’ if there is inconsistency.

27. Dr Burch presented slides with examples of various CV values (refer to graphs presented with tables 13 and 35 in the full report):

Blue-eye trevalla example - high discard CV with low total catch CV:

- Discard estimates are small (<1t) and highly uncertain (CV = 107.7%) however total catch (253 t) has low CVs (0.0%). The use of discard estimates has a low impact on the assessment.
- Dr Knuckey pointed out that ‘logbook catch - retained and discarded’ should be ‘logbook catch of retained’ and ‘the estimated discard’. The table will be corrected to avoid confusion.

³ Bergh M, Knuckey I, Gaylard J, Martens K, Koopman M (2009) A revised sampling regime for the Southern and Eastern Scafish and Shark Fishery – Final Report. OLRAC and Fishwell Consulting

- There are two separate reports; the 2018 Discard Report and the 2018 Catch and Discard Report for TAC Setting Purposes. Dr Burch clarified that the discard report doesn't include the last step of multiplying up the proportion of discarded catch to the CDR data landed values. This is done and reported in the catch and discard report. For the discard report, scaling is applied to the logbooks and not to CDRs, so the actual discard tonnage is usually higher than the values shown in graphs.

Deepwater shark East example - high discard CV with high total catch CV:

- high discard CV with high total CV - Discarded catches are large (109 t) and highly uncertain (CV = 184.1%) and total catch is highly uncertain (CV = 146.6%). It is unclear how to use these discard estimates given the uncertainty.
- Tier 4s essentially ignore CVs. The current approach is to assume the average is the best estimate or don't use them.
- The graph shows recent years retained catch is 20 t and discarded catch is 80 t. This doesn't make sense given the TAC is under-caught. Dr Burch commented that potentially the stratum is not appropriate i.e. deepwater shark live in deep water but the observer data are not depth-stratified. All of the effort for a particular gear type in a stratum contributes to the estimate of discards based on the observations of that species being discarded in that fishery.
- RAG members agreed it would be good to revisit this issue to understand it better with regards to deepwater shark and blue grenadier.

28. Other issues to be addressed in 2019 include:

- Current method to estimate discards may not be appropriate for the distribution of the data, updates for 2019 include evaluating the appropriateness of current method and investigating a geometric mean (used for lognormal data). This may result in further changes to the discard time-series affecting Tier 4 assessments
- Validity rules for discard estimates will be investigated.
- Evaluation of the effectiveness of observer coverage and observer allocation to trips.
- Investigation of potential bias resulting from poor observer coverage (e.g. removal of observers from GHAT).
- Decision from SESSFRAG to exclude strata where there is only one observed shot when estimating discards and consider sensitivities for 2, 3, 4 and 5 shots etc.
- Include additional diagnostic plots to show the size/weight composition of discards.

29. There are a number of unresolved issues with how discards are estimated and it is likely that the discard time-series will change again in 2019, thereby affecting Tier 4 assessments. Sampling effort is low and estimates for some species will always have high uncertainty. Accordingly, methods need to be developed to accommodate this uncertainty.

30. Members of the RAG asked whether the 'discards' and 'catch and discards' reports could be combined to avoid confusion:

- The discard report contains strata-specific data used to estimate the discard rates for each species and allows the RAGs to scrutinise the results. This is then scaled-up using CDR in the catch and discard report for TAC setting purposes. Keeping them separate helps in navigating the large number of tables.
- There was agreement that the overall discard rates (%) from Table 2 should be added to bottom of each of the individual species tables in the discard report.

Recommendation: The 'ISMP Discards Report' and the 'Catch and Discard Report for TAC Setting Purposes' should remain as separate reports with clear wording indicating the

differences (based on logbooks or CDR) and the overall discard percentages for each species will be added to the species specific tables.

Action item 1: CSIRO to add species specific discard proportions to the bottom row of the species-specific tables in the ISMP Discards Report.

31. There would be value in providing a comparison of discard time-series to capture the change in methodology in future discussions.

3.3 Catch and Discards Report for TAC Calculations

32. Dr Burch outlined revisions made to the 'Catch and Discards Report' in September 2018:

- Error corrected in the estimates of CDR catch (due to wrong field used in AFMA database and a whole weight/processed weight conversion error) – species landed whole are less impacted than those that are processed. CSIRO discussed this issue thoroughly with John Garvey (AFMA) and are confident the report is now using the correct field from the database. The correct field was used for blue grenadier and pink ling.
- Updates to AFMA database – resulting in changed historical catches, minor impact: ~ 2% in most cases.
- Incorporated the revised discard time-series.
- Ocean perch catches from NSW previously labelled 'inshore ocean perch' now split into inshore/offshore.
- Inclusion of discard estimates for oreos, ribaldo and deepwater sharks.
- Inclusion of recreational standard error data, where available.
- Asterisks now denote where missing discard estimates are replaced by the previous values.
- Prior to the January 2018 report, catches of flathead (other than tiger flathead) reported by NSW, were included in the report.

33. Dr Knuckey noted ongoing concerns with AFMA's data handling and maintenance processes including handling of metadata and changes to field names/formats that aren't adequately recorded, which causes issues later in assessments. This was a key recommendation from SMARP. Dr Thomson advised CSIRO is arranging for John Garvey (AFMA) to visit the team in Hobart in late 2018 to review and discuss rectifying these issues.

34. Mr Corrie confirmed the need to develop data dictionaries, changelogs and documentation is being addressed and an AFMA data committee has been established that will include representation from CSIRO. Mr Day noted the recent SESSFRAG data meeting's minutes will include a transitional plan that collates all the identified data issues around monitoring, collection, QA processes and harvest control rules and this will be open for review/comment.

35. The RAG noted the issue of Commonwealth discard rates being applied to State catches as there is no viable alternative. This is a data gap that needs to be addressed. The RAG noted that NSW is implementing quota for a number of SESSF species so size/trip limits will no longer exist for these species.

Agenda Item 5 – Blue-eye Trevalla

5.2 Blue-eye Trevalla - Tier 5 stock assessment

36. The Chair welcomed Mr Will Mure to attend the Blue-eye agenda item. Mr Mure's conflict of interest declaration is included at Attachment A.
37. The Chair outlined the recent history for the RAG:
- There was a blue-eye trevalla workshop held in March 2018 with presentations from Peter Horn (NZ) and Dr Alan William's regarding blue-eye stock structure.
 - There was agreement that the seamount populations are a separate stock, to some extent, to slope stocks. There were also suggestions of potential boundaries within slope populations (GABT & CTS).
 - It was agreed a Tier 4 would apply to the slope population and a Tier 5 would be used for the seamounts because of poor CPUE data.
 - There should be subsequent management considerations for how the revised stock structure is managed in future.
38. Dr Thomson will present a scoping proposal for close-kin research to the next SERAG meeting in November 2018 as part of the SESSF Research Plan item.
39. A paper by Dr Paul Tixier from Deakin University on Orca depredation in Blue-eye fisheries in South-Eastern Australia (Tixier et al, 2018) is available on GovDex. The Chair suggested the RAG should take some time to read the paper and consider in terms of Blue-eye stock assessments.
40. Mr Mure commented that Orca depredation of Blue-eye has been ongoing for decades. He also queried whether the seamounts have been confirmed as a separate stock to slope. The RAG noted the science suggests they are not genetically separate but there is sufficient local residency of populations after settlement that indicates they need to be managed separately.
41. Dr Haddon agreed that the spatial structure needs to be taken into account when setting TACs. If the seamount population was depleted it would take a long time to recover. The Chair noted that Dr William's research report emphasised the potential for localised depletion of the stock.
42. Dr Haddon presented the Tier 5 assessment for blue-eye trevalla. The RAG noted the following:
- Some of the historical data comes from Richard Tilzey publications.

Action item 2: Dr Haddon to scan the relevant pages of the Blue-eye report and digitised book referred to during presentation (Tilzey et al. 1994 and 1997) and share with the RAG.

Link to [Tilzey 1994 library record](#) and [Tilzey 1997 library record](#).

- Data includes all methods from database spanning 1986 to 2017.
- Catch is included for zones 70, 90 and 91.
- Catch by method produces a sparse matrix and obscures variable locations of the fishing effort in different years. Some catches are so low the catch rate is not meaningful.
- It was currently not possible to produce a meaningful index of relative abundance through time.
- There is a big peak in catch seen from 1985-1992. This may have been in response to a media release by AFS specifying catch history during that period would be considered as part of quota allocation. It was also driven by the uptake of better satellite positioning systems and boats were able to use plotters to target seamounts.
- This peak is very influential on the catch-only assessment.

- Prior to these catches it may have been a virgin stock which was ‘fished down’ and the stock may take time to recover.
43. Dr Haddon outlined the Catch-MSY ‘stock reduction’ methodology, noting it is a very uncertain method and provides for a conservative output. The RAG noted the following with regards to blue-eye trevalla:
- This is the first time a Tier 5 for a Blue-eye stock has been presented to SERAG.
 - Choosing to employ catch-only methods means accepting its limitations. Qualitative statements defending the outcome are useful in giving comfort but the decision whether to use the results or not is the key question.
 - Mr Cordue suggested using a minimum/maximum exploitation rate noting that changes in catches are not necessarily driven by changes in stock status. He emphasised that surplus production models are not recommended for fisheries stock assessments. He considered there was enough data here to use an age-structured production model and explore the consequences of different biological parameters. He also considered this would be a very quick process.
 - A set of projections led to an estimate of sustainable catch in the order of 46 t, although this was made with considerable uncertainty. The RAG should consider whether concerns with the Tier 5 method necessitates applying conservative harvest control rules.
 - Tier 5 assessments may be applied to a broader range of species under a revised harvest strategy and so the methodology should be explored, including application of RBCs over a longer period.
 - Given the economic importance of blue-eye trevalla, it might be worth investing in a more comprehensive analysis exploring underlying biology – i.e. trying to apply a more plausible model to understanding the catch reduction analysis.
44. The Chair summarised the blue-eye trevalla Tier 5 assessment:
- There are separate assessments for the slope and seamount populations.
 - The RAG does not have enough information to make a clear recommendation on the slope Tier 5 assessment at this meeting.
 - Historical catch data seems to suggest that periods where catch is over 45 t are followed by periods of reduced catches which may be attributable to stock depletion. There is inadequate data to determine current stock size and any catches above this threshold may lead to further depletion of stocks.
45. Mr Mure noted using a multi-year catch limit creates a race to fish. The stock may be fished to a point where it may be unrecoverable for a long period. Mr Day indicated that AFMA is looking for separate RBCs and initially would be looking to use a trigger on the seamounts.
46. Dr Knuckey suggested targeted data collection on the seamounts to support more quantitative stock assessments.
47. The RAG was not in a position to finalise RBC advice based on the current assessment and suggested AFMA and CSIRO discuss the possibility of completing an age-structured production model for blue-eye trevalla (seamount) can be completed prior to SERAG 2 in November 2018.

Action item 3: AFMA/CSIRO to discuss whether ASPM age-structured production model for Blue-eye trevalla (seamount) can be completed prior to SERAG 2 (November 2018). NB. This may be considered for application to other species in future.

5.1: Blue-eye Trevalla - Tier 4 stock assessment

48. Dr Sporcic presented the blue-eye trevalla Tier 4 assessment:

- This assessment covers zones 20-50 as a separate stock to seamounts using non-trawl data.

Changes from 2017 include:

- CDR data used for all fishery in 2017. However, this should consist of catches in the relevant zones and exclude seamounts.
- GAB catch data included as part of catch history. SERAG to decide whether this is included in the CPUE series.
- State catches from NSW (zone 10) were excluded.

49. The RAG agreed that the Tier 4 analysis should include GABT and NSW (zone 10) catches when calculating C_{targ} . GABT catches should also be used for the CPUE analysis and monitored separately for signs of depletion.

50. The Chair referred to a FRDC Final Report (2012/201) by Dr Haddon (status: awaiting CSIRO internal review) recommending how shots targeting blue-eye and pink ling can be identified. Some operators have targeted blue-eye because of restrictions on Ling. This issue won't be addressed until next year's assessment.

51. The RAG agreed that the Tier 4 assessment will exclude discards, noting they are very small anyway.

52. Mr Day clarified that NSW catches of blue-eye trevalla will not be deducted from the RBC for TAC setting.

53. Dr Sporcic will present the updated Tier 4 assessment to the SERAG November meeting.

Agenda Item 4 – Tier 4 stock assessments

4.1: Mirror Dory East - Tier 4 stock assessment

54. Dr Sporcic provided an overview of the data as an input to mirror dory east Tier 4 assessment:

- Catches have been stable in recent years.
- State catches for 2016 have been projected forward as 2017 state catches were unavailable.
- CDR data is only available from 1998, and landed catches have been converted from processed weights to whole weights resulting in small increases since 2008. There was a decrease in 2012 but this is not in the reference periods and will not affect the Tier 4.
- Recent average CPUE has been below the long-term mean with a small increase from 2016 to 2017.
- The new methodology for discard estimation involves changed decision rules not changed methods. This has had significant impacts (both increases and decreases) on discard rates from early 2000s.

55. Industry members suggest that some of the discard estimates were not realistic. The RAG recognised that the following may have contributed to uncertain discard estimates:

- changes in AFMA database
- the separation of discard estimates for east and west (previously combined)
- the previous method wasn't automated so there is no guarantee it was applied consistently

- low observer coverage is scaled to very large numbers of logbook shots

56. Dr Thomson noted that CSIRO now apply the Bergh method to the whole time series (tonnage discarded) whereas in 2001 a different method (average portion discarded) was used by Dr Knuckey.
57. This discussion would be better informed by giving Dr Burch 12 months to analyse and report on impacts of changes to the methodology for discard estimation.
58. The RAG agreed to the general principle: historical discard estimates for Tier 4 species will not be updated this year.
59. After further discussion, the RAG agreed to update the Tier 4 assessment using the previous discard series and include updates for 2016 and 2017.

4.2 Mirror Dory West - Tier 4 stock assessment

60. Dr Sporcic provided a brief overview of the mirror dory west Tier 4 stock assessment:
- The reference period starts at 1996 and differs from the East.
 - As in the east, CDR data is available from 1998.
 - Discards in the west are very low and so changes to methodology for calculating discards have not had the same impact as in the west
 - The RAG agreed discards would not be included in the mirror dory west Tier 4.
61. Dr Sporcic will present the mirror dory west Tier 4 to SERAG in November 2018.

4.3: Deepwater Shark Eastern - Tier 4 stock assessment

62. Dr Sporcic provided an overview of the eastern deepwater shark Tier 4 assessment:
- The reference period is 1997 to 2004
 - At the RAG's request, the analysis only uses catch and effort data from areas currently open to fishing to account for the fact that a large portion of the suspected stock exists in closed areas.
 - Excluding historical catch data from areas that are currently closed to fishing made little difference to standardised CPUE.
 - CDR data is available from 2005, prior to which catch history from logbooks are used (from open areas only).
63. The RAG noted some potential issues with estimates of discards:
- There is a large increase in the estimated discards in 2016 (22.1 t) to 2018 (84.1 t). Two tonnes of deepwater shark was recorded by an observer in a single shot in 2017 which could be driving this. Either this amount is an incorrect or it is a different species. The RAG requested AFMA go back to original records to investigate this.
 - Table 33 in the discards report shows no observed discards of deepwater shark in orange roughy strata.

Action item 4: AFMA/CSIRO to check whether observations of deepwater shark catch and/or discards are occurring in orange roughy zones (there are no records in the ISMP discards report). Also CSIRO (Paul Burch) to check ISMP strata definitions.

Action item 5: AFMA to check pre 2017 observer reported discards of deepwater shark to confirm estimates in the ISMP discard report. Status: done for 2017 and large discard of deepwater shark confirmed as data punching error.

64. Dr Burch was asked to check ISMP strata definitions with particular reference to inclusion of the TasWest trawl. Dr Thomson added they would check with previous authors to confirm how this was done previously.
65. Dr Knuckey suggested there is a need to develop deepwater shark specific strata.
66. The RAG suggested resolving these issues before the next SERAG meeting, noting that the eastern deepwater shark Tier 4 would exclude discards.

4.4: Deepwater Shark Western - Tier 4 stock assessment

67. The RAG agreed to apply the same approach for the Tier 4 in the west as in the east. Analyses would only apply to open areas and discards will not be included.
68. The discards issue will be investigated under action item 4 and 5.
69. Dr Sporic will present a final Tier 4 assessment at the November 2018 SERAG meeting.

Agenda Item 6: Blue Grenadier - Tier 1 stock assessment

6.1 Update from industry perspective

70. Industry members advised there were lots of juveniles (recruits) coming through the fishery, even as far north as Ulladulla. They suggested there has been 4-5 years of good recruitment.

6.2 Overview of recent data

71. Key points from Dr Castillo-Jordan's presentation:
 - Fleet (spawn and non-spawn) composition data split into 'port' and 'on-board'.
 - Catch period 1980-2017, noting decrease in spawning fleet from 2013.
 - The non-spawning fishery is the main part of the fishery now.
 - Discard data for 1995-2002 is from MAFRI, and 2003-2017 estimated derived from AFMA observer data and non-spawning catches – agreed by SlopeRAG, Oct 2011.
 - Inclusion of acoustic and egg survey data in spawning fishery.
 - Length compositions by fleet, discard/retained, sex (if available), port/on-board.
72. Model structure including estimates of mortality and growth parameters (agreed at SlopeRAG, Nov 2011):
 - Two-sex model, age-structured.
 - Female M estimated, male 20% larger ($1.2 * M_f$)
 - Steepness is 0.75.
 - Recruits estimated between 1974 and 2015.
 - All growth parameters estimated by sex.
 - Cohort specific growth (estimated for cohorts from 1977 - 2015).
 - Maturity: 50% female maturity at 63.7 cm.

- Proportion of females that spawn 0.84 (Russell and Smith, 2006).
- Spawning fleet (logistic selectivity).
- Non-spawning fleet (dome-shaped selectivity).

73. The bridging analysis (Figure 6 in report) shows a significant change in estimated biomass trajectory - the relative spawning biomass decreased to below management target in around 2013 but increased dramatically after that due to sustained recruitment.

74. Dr Tuck advised the model estimates an increased the estimated value for female natural mortality (up from 0.15 to 0.17).

6.3 Preliminary 2017 stock assessment – base case presentation

75. Dr Castillo-Jordan presented the 2018 preliminary base-case assessment for blue grenadier:

- A growth comparison from 2013 to 2018 shows the rate of growth and final length-at-age for all cohorts has been reduced for young ages in the update (refer to Appendix figure A.18 in the report) Need to review how the growth has changed for each cohort.
- A large cohort in the 1994 may have depressed growth rates (density dependent) over time.

76. Dr Knuckey noted the model has been given a lot of flexibility based on one cohort and suggested running a sensitivity to remove that one cohort (from one year) to see how it affects the trend. This could be done by specifying the year range for the cohort-dependent growth.

77. Mr Cordue suggested before estimating density dependent growth, you need to carefully stratify and scale the length frequencies. Scaling to shot is not enough. Dr Thomson noted that scaling to statistical cells is not practical when data are sparse.

78. Recent estimates of discards are high and include small fish. The 2018 model allows for smaller fish to be discarded because of the addition of this data. The 2018 model shows recent good fits to discards for non-spawning fishery.

79. CPUE is not used in the spawning fishery because they fish on aggregations. For non-spawning CPUE, there are similarities between the 2013 and 2018 series with a marked increase from 2013. There is a very poor fit to the CPUE series. The RAG suggested to leave out CPUE as a sensitivity.

80. Length composition data shows a poor fit to discard lengths from 1993, 1995, 1996 and the RAG supported removing this data from the model as it may not be representative (refer to Apx Figure A.21 in the report).

81. There are discrepancies between the port-retained and on-board-retained length data. The model fits the on-board-retained length frequency data better than the port data.

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82. The Chair reconvened the meeting at 8:30am and introduced Nick Hill who is studying a PhD at IMAS, and requested to observe part of the meeting.

Agenda Item 6: Blue Grenadier (continued)

83. Dr Castillo-Jordan presented likelihood profiles:

- Natural mortality is estimated at $M_{\text{female}} = 0.173$. The profile on M shows that this parameter is generally well estimated with conditional age-at-length, length composition and the index data all consistent in terms of the relative support for the estimated value of natural mortality. Mr Cordue advised that New Zealand also estimates natural mortality for males, and female at age. RAG suggests to estimate natural mortality for males as a sensitivity.

- Steepness is fixed at 0.75. The likelihood profile on steepness confirms that it is not a well-defined parameter. The 95% confidence intervals are very broad, starting at 0.6 and going beyond what would be considered reasonable values for this parameter. The spawning biomass trajectory for alternative values of steepness is invariant to values greater than 0.5. Consequently, the base case value of 0.75 is reasonably retained for the base case.
- Supports the $\ln(R0)$ estimated at 9.73 (95% Confidence Interval of 9.3-10.2). This is a broad range and corresponds to values of initial female spawning biomass between 46,800t and 70,000t. This matches much of the variation already observed in estimated values of initial biomass from historical assessments.

6.4 Discussion

84. The RAG agreed to the following changes to the base-case:

- Include non-spawn FIS data (mirror the non-spawn selectivity).
- Remove discard length frequencies for 1993, 1995, 1996 because they appear unrepresentative.
- Estimate recruitment up to 2014 instead of up to 2015.

85. Regarding estimates of time-variant growth, Mr Cordue suggested starting with no time-variant growth and gradually add it, or gradually remove it. This is a standard approach to avoid over-parameterisation. At the moment there are parameters for every cohort. This is too much work now but might be considered for next assessment.

86. Recommended sensitivities to be run before the next SERAG meeting:

- remove the CPUE index to see what influence it has on the model.
- Remove port length data.
- Remove cohort-dependent growth.

Agenda Item 7: Pink Ling 1 - Tier 1 stock assessment

7.1 Update from industry perspective

87. Industry members provided an update for pink ling from an industry perspective:

- Pink ling market prices are low at present, possible because of New Zealand imports.
- Industry have not been targeting ling due to management restrictions.
- Boats in the west have struggled to catch ling in the early summer period but have not had issues during the spawn.
- NSW-licensed line boats have had a few exceptional years including large fish caught.

7.2 Preliminary stock assessment – base case presentation

88. The RAG noted that there were some contractual issues which meant that Mr Cordue was delayed in commencing his assessment.

89. Mr Cordue introduced the preliminary base-case assessment for pink ling:

- The 2018 Pink Ling assessment is an update to the 2015 assessment with the inclusion of new data in the east and west.

- The main problem encountered was dealing with the impacts of trip limits in the east since 2013. Historically, discards have been very low but will vary as trip limits have been applied since 2013. Also SETFIA catch arrangements have been in place since May 2016.
- Catch histories were constructed for the model noting that eastern and western assessments each have a trawl and non-trawl component. Catch histories were revised for 2013 and 2014 and then extended to 2017.
- Discards were applied to Commonwealth catches using landing multipliers and State catches were included. This was a more complicated process in the east. Fishing method and trip limit period specific landings multipliers were used to estimate discards.
- For trawl CPUE in the east: used time blocking with linking vessels and in the west: no time blocking used as it made little difference. Previously in the east 'period effects' were estimated to deal with impacts of trip limits. For this assessment, method involved estimating landing multipliers for each period and applying it to individual landing records within the period for each vessel (turns landings back into a catch), however this misses the avoidance effect.

90. Model structure (same for east and west).

- Single area, two-sex, age structured.
- Von Bertalanffy growth, single M.
- Fixed maturity and steepness, $h = 0.75$
- SSB: female only, mid-year.
- Two fisheries: trawl, non-trawl.
- Time-blocked selectivities for trawl.
- Estimate lots of parameters: B_0 , growth, recruitment strengths, M, selectivities.

91. Data preparation – East:

- Length frequencies stratified by depth and zone for trawl (10, 20, 30) and zone only for non-trawl (20, 30). Non-trawl: port data used but trawl: port data not used (no depth information).
- Age-length data: sexed data stratified by zone for trawl (10, 20) but not stratified for non-trawl (20, 30), unsexed data from zone 20 used as age-length keys to convert recent length frequencies age frequencies.
- Data weighting following Francis an iterative approach, except age-length was not fully down-weighted. For CPUE assigned CVs of 15% on the basis of loess fits outside model. Data not tuned beyond that, further detail is available in the 2015 document.
- New composition data for 2018 has not yet been incorporated due to time constraints but this should only have a minor effect on outcome.

92. Data preparation – West:

- Length frequencies required no stratification.
- Sexed age-length data required no stratification, used as individual fish.
- Data weighting following Francis except age-length not fully downweighted.
- As in the east, new composition data for 2018 has not yet been examined.

93. The RAG discussed the period effects on eastern trawl CPUE:

- Period 6 (under SETFIA catch arrangements) is showing a hugely amplified avoidance effect which Mr Cordue suggests is implausible.

- Mr Jarvis commented how his industry has been under immense pressure the last 3 years to reduce Ling catches and boats did not want to exceed limits, they had just enough quota. The only way to keep fishing was to lease quota off another eastern Ling operator.
- Mr Boag suggests the large increase in CPUE is correct because he put continual pressure on the operators to reduce their ling catches and so their behaviour changed.
- Mr Cordue was concerned the divergence is due to there being too many parameters estimated e.g. 6 period effects over a relatively short time period and the potential for confounding.
- The eastern trawl CPUE fits showed excellent fit but need to revisit the avoidance effect because it may alter the results. Mr Cordue advised he will reduce 6 periods to 3 and then check against the AIC criterion (Akaike Information Criterion).

94. Western trawl CPUE:

- FIS indices show a much stronger increase.
- When trawl duration is included it suppresses the CPUE indices and there has been a trend towards longer tow duration since 2002.
- Mr Bibby noted the longitudinal effect would likely have more effect than latitude.
- The depth effect is strong but not as strong as in the east.

7.3 Discussion

95. Eastern base-case:

- The RAG agreed to include the FIS CPUE indices.
- Use the FIS length frequencies if the CPUE is included but must be properly stratified. Mr Cordue will discuss this further with AFMA (including for the west).
- Sensitivities: number of linking vessels.

96. Western base-case:

- The RAG agreed to include the FIS CPUE indices.
- Use the FIS length frequencies if the CPUE is included but must be properly stratified.

97. For the base-case, a two-step Bayesian estimation process using best-fit MPDs was used. A Markov Chain Monte Carlo (MCMC) risk analysis will be applied for the final assessment. Estimates from these processes can vary greatly.

98. Mr Cordue later presented an analysis of the changes in the number of parameters used to fit period effects. While the theory behind increases in AIC suggests that using '6 periods' is the most appropriate, the resulting CPUE trend is unrealistically high.

99. After discussion, the RAG supported using the landing multipliers CPUE as an input to the base-case and using a period-effect CPUE as a sensitivity.

Agenda Item 8 – Silver Warehou Tier 1 assessment

8.1 Update from industry perspective

100. Industry members commented that the fishery is recovering and there are a large number of small fish, however the vessels are not targeting them. There is little value in the Sydney Fish Market and; the Melbourne market can only handle a little before the market collapses - they are consequently not a heavily targeted fish.

101. Silver warehou has always been a market driven fish. There is recovery in the west with juveniles and medium sized fish just out front of Portland being found.

8.2 Overview of recent data and presentation of base-case

102. Dr Burch advised the last stock assessment for silver warehou was completed in 2015. The report initially uploaded to GovDex contained two errors and these have been corrected in the revised report. The errors included:

1. A change in the discard series that involves manually adjusting discard rates to account for factory trawlers that don't discard. To correct this, the existing discard time-series to 2015 has been modified in the assessment with new discards for 2015-2107 included. Note factory trawlers have not operated in this fishery in 2015-2017.
 - Mr Bibby commented that silver warehou destroy meal plant product and are therefore discarded.
2. The likelihood profile for natural mortality in the document uploaded to GovDex was incorrect – the correct likelihood profile suggests the model prefers a natural mortality value of $M = 0.5$ which is inconsistent with the biology of the species.
 - The Chair questioned why a value of $M = 0.5$ would be derived if the model accounts for the species biology.
 - The age data suggests there is a broad range of values for M and Dr Day advised that the likelihood components are not explicitly weighted in the model, they are summed – the CVs and the effective sample sizes drive the relative weights.
 - The 'index' value is causing the higher M value in the overall profile. Mr Cordue indicated this should have no impact on M and suggests this could be investigated further.
 - The RAG agreed to use a fixed natural mortality of $M=0.3$ in the base case silver warehou assessment, consistent with previous assessments.

103. Dr Burch noted a significant concern regarding the CPUE series and that reliability of the CPUE time-series in both east and west may no longer be acting as a valid index of relative abundance through time.

104. Key points from the Silver Warehou assessment in 2015 include:

- Prior to 2015 this species was modelled as a single stock in zones 10-50, single sex model and natural mortality was fixed at 0.3.
- In 2015 the stock was split into an eastern trawl fleet (zones 10-30) and western trawl fleet (zones 40, 50) and logistic selectivity was estimated separately for each fleet along with discard estimates separately by fleet. Also the discards in the model are time blocked, pre and post 2002.

105. In 2018, the model structure is the same as in 2015 and conditional age-at-length data for the western trawl fleet has now been included.

106. The data summary presented shows that catches have declined, and note that there is no FIS length data in the model. Refer to data summary plot presented:

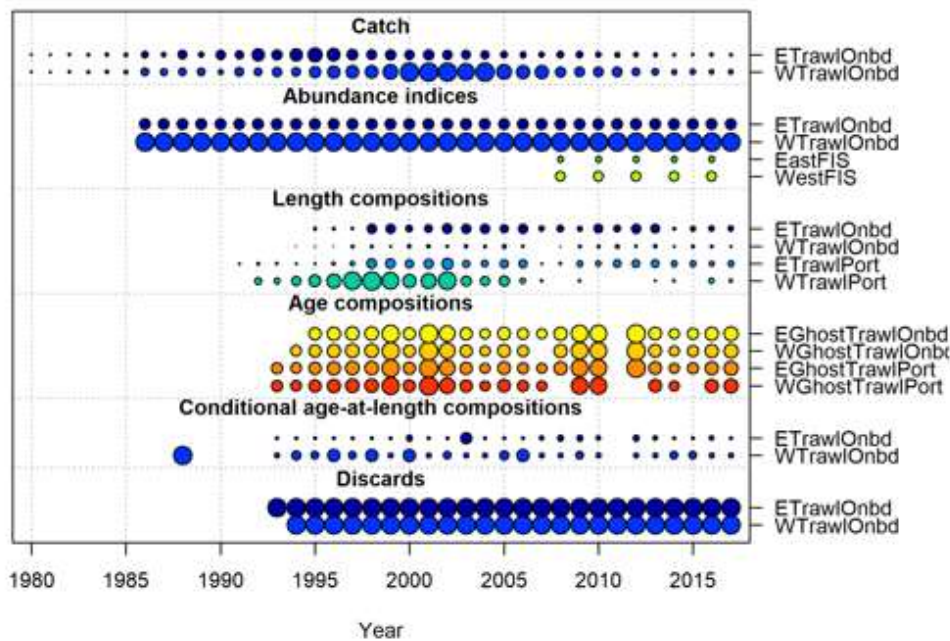


Figure 1 Data included in the Silver Warehou stock assessment

107. Retained catch data shows a peak in early 2000s then declining until 2014 and has stabilised since.
108. In this assessment, the data weighting (tuning) has changed:
 - 3 components tuned: effective sample sizes for length and conditional age at length data, indices and recruitment bias ramp
 - Update to Stock Synthesis (SS) software and rebalance translated model
 - The procedure used constitutes current best practice for tuning assessments.
109. With the new tuning protocols, the CPUE fits show better fits for western trawl but poor fits for eastern trawl noting higher catches in west, which may be due to weighting and conflicts between the two data sources.
110. The recruitment deviations showed minor changes under the new tuning protocols. The three most recent recruitments were higher than average.
111. Trends in biomass were similar, particularly in recent years and new tuning leads to lower relative spawning biomass in recent years.
112. Again the point was raised about how discarded silver warehou on factory trawlers is recorded. Mr Bibby suggests it is recorded as caught and landed, then discarded. Different boats handle it differently but the important point is to ascertain which data stream it appears in. Dr Thomson suggests looking at the minutes from the Blue Warehou assessment group for decisions about this (silver warehou were handled under the blue warehou assessment group in the early 2000s, when the issue of factory vessel discarding was first raised).

Action item 6: AFMA/Industry to clarify how observers have recorded discards of Silver Warehou on the factory boats (suggesting it was discarded but covered by quota, so should be in CDR records).

113. With the addition of the revised discard series, relative spawning biomass just dips below the limit reference point in 2016.

114. The data for recruitment deviations 2015 vs 2018 indicates:
- recruitment has been below average for the last decade and the last three years are above average
 - the model needs several years of age / length data before it is able to estimate recruitment reliably..
115. Mr Penney suggested excluding the most recent recruitment year because it is too early to tell whether it is real, and might be driving an overly optimistic projection. Excluding it would likely result in average recent recruitment. The RAG suggested running projections under average recruitment over 5 years.
116. Dr Burch summarised the assessment as follows:
- Spawning biomass from mid-1990s to 2002 is stable among different models.
 - There is a decline in spawning biomass before 1990s and after 2002 with inclusion of the updated data.
 - The revised (corrected) base-case has slightly higher spawning biomass than the preliminary base case (provided in the report).
 - The revised (corrected) base-case model estimated the stock was at or around the limit reference point from 2014-2017.
 - The 3 most recent estimated recruitments are above average, however the 2015 assessment also had optimistic recruitment estimates of recent recruitment that were revised lower in the 2018 assessment.
117. The Chair asked Dr Burch to revisit the CPUE issue raised by Dr Sporic and Dr Haddon where they noted the period 1999-2006 was 'exceptional'. Dr Sporic advised that this referred to the west, where efficient vessels had high catches in the early period of the time-series and then left the fishery. The RAG agreed further exploration of the CPUE is required as it is fundamental to the assessment.
118. With regards to poor fits to FIS, Mr Cordue noted that there is a school of thought that CVs are not tuned on biomass indices, particularly if there are not many points in the time-series.
119. The RAG discussed whether to leave the FIS indices in or to only include it as a sensitivity, noting that the east and west are different and could be separated out. There was a suggestion to remove the one 'huge shot'. Mr Day noted that when the FIS was assessed in SESSFRAG, Silver Warehou had average CVs and high inter-survey variation, so if it's not indexing the stock then it could be left out. The RAG agreed to leave it out of the base-case for east and west and include it as a sensitivity.
120. Mr Penney questioned whether steepness at 0.75 is appropriate or whether an alternative should be considered given the history of the stock having large recruitment episodes followed by a period of low recruitment which may be breaking now.

8.3 Discussion

121. Dr Sporic advised that the apparent departure of the efficient vessels from the fishery may be due to changes in vessel call-sign. The call-sign/vessel ID aspect needs to be checked first. This is an issue in the AFMA database and needs to be rectified by 2019.

Action item 7: AFMA to rectify the issues with use of vessel call-signs in the AFMA database as boat identifiers, as it affects the assessments.

122. The RAG agreed that not much extra work is required to finalise the assessment and the RAG would be comfortable recommending an RBC.

123. Mr Boag sought clarification about the 3 most recent recruitment episodes and how they are estimated. Mr Penney advised that because we don't have an actual measure of recruitment, the model is using other information it has to estimate recruitment. This includes data about length frequencies, catch etc. This data is also being used to estimate other parameters.
124. The RAG noted that the current TAC is much higher than the catch and this has been the case for some time.
125. In summary, the RAG agreed to the following changes to the base-case:
 - Exclude the FIS indices from the base case, but include them as a sensitivity.
 - Exclude the most recent recruitment (2015), noting that the cohort has been seen only once and so the estimate will likely be revised at the next assessment.
126. The RAG requested to see projections with average recruitment and resulting RBCs, and also the last 5-10 years recruitment average for alternative projections.

Agenda Item 9 – Jackass Morwong Tier 1 assessment

9.1 Update from industry perspective

127. Industry provided an overview of recent catches:
 - there has been some variability in the east in the last year, where fishing was good for a few months and then dropped off around March-May.
 - Vessels catch Jackass Morwong when the sea temperature is around 16.5 degrees.
 - They are being caught in the traditional areas like around Flinders Island. Nowadays boats are not targeting them because as soon as there are too many boxes in the market (e.g. 20 boxes), it collapses. The price doesn't encourage fishers to target them.

9.2 Overview of recent data

128. Dr Day referred the RAG to GovDex to review the previous assessment documents which provide considerable detail about the structure of the assessments. These are also available on the AFMA website.
129. Dr Day presented the east and west jackass morwong assessments at the same time and noted that this species was last assessed in 2015. At that time, spawning biomass was estimated to be 37% in the east (zones 10, 20, 30) and 69% in the west (zones 40, 50) and natural mortality was fixed at 0.15 for both.
130. There is an accepted productivity shift in the east. The productivity shift was implemented differently in the updated version of stock synthesis (v3.30.12) and so the assessment team spent significant time identifying this and negotiating updates to Stock Synthesis to recreate a productivity shift in the new version of the software which can be used to apply the Australian Harvest Control Rule.
131. Changes resulting from bridging from the 2015 assessment – east:
 - Differences due to changes in implementation of productivity shift between SSv3.24 to SSv3.30 and new tuning methods –
 - Slightly lower relative biomass at the start of 2016, relative to estimated 1988 spawning biomass.
 - Most remaining changes related to differences between estimated B_0 values before and after the productivity shift.

- Of the updated data sources, discard data has the largest influence due to changes to the methods for calculating discard estimates.
- The fits to the FIS abundance index are poor.
- Time series of spawning biomass has shifted lower in recent years with a minimum biomass level in 2013 and 2014 of around 23%.
- There is apparent recovery since then due to stronger recruitment and low fishing pressure in recent years.
- Recruitment is only estimated for one additional year, despite using three more years of additional data.
- There was an upward revision to the recruitment estimates from 2010 and 2011 and slightly higher than average recruitment estimated for 2012.

132. Changes resulting from bridging from the 2015 assessment – west:

- There were considerable changes relating to new tuning methods applied to the old data, suggesting a lower relative biomass from 2005 onwards.
- There were mostly small changes as new data is then added with more significant changes occurring in updating the discard data and the age data.
- New data reduces the relative spawning biomass from 1994-2014, but increases relative spawning biomass from 2016-2019.
- There was an upwards revision of the most recently estimated recruitment events (2010-2012), mostly influenced by the new age data.

133. Dr Day outlined the revised tuning procedures since the last assessment:

- Use of Francis weighting for length-composition and conditional age-at-length data while tuning the weight assigned to the CPUE series within SS.
- Improvements to how the recruitment bias ramp adjustment is calculated.
- Improvements to estimated standard deviation on the abundance indices which affects the minimum size on the length-at-age compositions (capped at 1 fish in the old version but now capped at 0.001 – i.e. can essentially tune small length samples more appropriately now).
- Change in absolute recruitment shows large changes in west and small changes in east.
- Length samples are tuned according to Francis.

134. Mr Cordue commented that the Francis (2011) philosophy doesn't support tuning of CVs on biomass indices and because you're changing CVs on biomass indices, you're not necessarily fitting them. Mr Cordue said he wouldn't tune a biomass time-series unless it was quite long.

135. The RAG acknowledged that there are various approaches to tuning and the decision about which approach to use is made by CSIRO. While discussed at the RAG, the process of choosing tuning protocols is not a topic that non-fisheries scientists can contribute to. Having another scientist like Mr Cordue present for other stock assessment discussions besides pink ling has been particularly helpful and insightful for the RAG.

136. There seems to be a slight improvement with the new tuning. However abundance indices are not well fitted and so the model is struggling, particularly in the west. Industry suggested this is because fishing is occurring on the edges of the stock and is not targeted.

137. There was considerable uncertainty about recruitment in the west over the last four recruitment events. However, projections are always subject to uncertainty because recruitment events are poorly informed until the cohorts fully enter the fishery. With regards to the 2018 assessment:

- only one additional year of recruitment was estimated despite three more years of data.

- new data resulted in revising recruitment estimates upwards for 2009-2011, with above average recruitment in 2012 as well.
 - the last 5 years of estimated recruitment are now above average (compared to 3 of the last 5 years for the 2015 assessment).
138. Growth is estimated in the east and fixed in the west because of a lack of data in the west. The data indicates minor changes that will not make much difference to the base-case.
139. Catch data shows recent increases in the west since 2015 with no notable changes in the east.
140. Discard rates are now estimated for the west and continue to be estimated in the east ; east of 4-7% and 3-5% in the west.
141. There are very few discard length frequencies in the west for the last 5 years. The 1994 discard data may not be representative and is not fitted well by the model in any case. Noting this single year of data may not make much difference, the RAG agreed to remove the 1994 discard length frequency for the west.
142. The length fits are good in the east and acceptable for the west.

9.3 Preliminary stock assessment – base case presentation

143. Base-case summary for EAST:
- 2015 assessment: spawning stock biomass of 37% of virgin stock biomass.
 - Proposed base-case in 2018: spawning stock biomass of 35% of virgin stock biomass.
 - Female equilibrium spawning biomass:
 - 1988 = 3,523t
 - 2015 = 3,977t (last assessment)
 - 2019 = 1,237t (projected)
 - Same assumptions as 2015 assessment except:
 - Updated tuning procedure (Francis weighting).
 - Recruitment now estimated 1985 to 2012 (previously to 2011).
 - Last 4 recruitment estimates (2009-2012) are all close to average.
 - Unresolved issues:
 - Including FIS length frequencies.
 - Excluding all FIS data.
144. Base-case summary for WEST:
- 2015 assessment: spawning stock biomass of 69% of virgin stock biomass.
 - Proposed base-case in 2018: spawning stock biomass of 69% of virgin stock biomass.
 - Female equilibrium spawning biomass:
 - 1986 = 1,328t
 - 2015 = 1,501t (last assessment)
 - 2019 = 918t (projected)
 - Same assumptions as 2015 assessment except:
 - Updated tuning procedure (Francis weighting).
 - Discard rates included and retention estimated.
 - Recruitment now estimated 1985 to 2012 (previously to 2011).
 - Recent recruitment estimates (2007-2010) are all above average.
 - Unresolved issues:
 - Discards – should they be estimated or added to the catch. The RAG agreed to estimate discard rates but remove the 1994 discard length frequency data.

- Including FIS length frequencies.
- Excluding all FIS data.
- Tier 1 or Tier 2, 3 or 4? There's a great deal of uncertainty in this assessment and not good data in the west. Dr Day said there's merit in considering a Tier 2 for the west but noting that the RBC is set for both east and west.

145. Likelihood profile: M for EAST:

- Fixed value chosen for M (0.15yr^{-1}) is outside the 95% confidence interval suggested by likelihood profile (approximately 0.18-0.34).
- Driven by fits to the CPUE, particularly the Eastern trawl fleet (from 1986 only).
- Discard, age and length data in conflict with the CPUE series (this is a little strange).
- Model suggests increasing M allows better fits to the recent index data - perhaps the decline cannot be explained by catches alone?
- Maximum age observed and biology should be considered when choosing M.
- M should not be chosen based on results from a likelihood profile alone.
- Biology and maximum age suggest that $M = 0.15\text{ yr}^{-1}$ is reasonable.
- Large conflict between likelihood profile and biological considerations.

146. Likelihood profile: M for WEST:

- Fixed value chosen for M (0.15yr^{-1}) is close to the minimum of the likelihood profile, 0.16 yr^{-1}
- Age, discard and index data most influential.
- Index data suggests a lower value for M (0.12).
- Age data suggest a higher value for M (0.22).
- M should not be chosen based on results from a likelihood profile alone.
- Biology and maximum age suggest that $M = 0.15\text{ yr}^{-1}$ appears very reasonable.
- No conflict between likelihood profile and biological considerations.

147. The RAG noted a large conflict between what the likelihood profiles are producing for natural mortality considering the biological characteristics of the species. Dr Day will include sensitivities on fixed values of M at the November 2018 SERAG meeting.

148. The likelihood profile for steepness (h is fixed at 0.7) is uninformative for both east and west. Dr Day will check if there is a reason why h is 0.7 and not 0.75.

149. The likelihood profile for $\ln(R_0)$ was not completed for the east but Dr Day noted it is confounded by the productivity shift and resetting B_0 in 1988. The likelihood profile for $\ln(R_0)$ in the west suggests a value for B_0 between 1,000t and 1,650t however there is considerable uncertainty.

150. Dr Knuckey and Dr Jennings referred to a paper about the changing growth rates of Jackass Morwong in the east (Thresher *et al.*, 2007) which may provide insight about the link to the productivity shift.

151. Dr Day went on to provide an overview of retrospective analyses and proposed sensitivities:

Retrospective analysis for the EAST:

- Change in estimate of B_0 (both 1988 and 1915) when data is successively deleted.
- Possibly confounded by treatment of recruitment.

Retrospective analysis for the WEST:

- When data is successively deleted, the pattern becomes difficult to interpret.
- Minimum spawning biomass increasing as data is removed.
- Possibly confounded by treatment of recruitment.

Proposed FIS sensitivities for east and west:

- Include FIS length frequencies in the model.
- Exclude all FIS data from the model, so exclude both abundance indices and length frequencies.

152. Recommended changes to the base-case:

- Remove the 1994 discard length frequency from the west and estimate the discard rate.
- Update the fixed growth parameters in the west (estimated in the east).

153. Recommendations:

- Provide projections under average recruitment in the east.
- Leave the FIS indices in the base-case but do not include the raw length data.

154. Dr Day asked the RAG to consider forming a position with regards to the productivity shift which was criticised in a paper by Edgar et al. noting there were false claims made in the paper.

- There is now enough impetus to discuss how to include the impact of oceanographic and climatic changes in assessments, however, revisiting how and why the productivity shift was accepted by ShelfRAG for this species involves a scientifically published, evidence-based rationale. An outcome from SESSFRAG is to consider regime shifts more broadly for other species rather than responding directly to claims made in the paper.
- Dr Helidoniotis noted there is a meeting (international conference: [‘Sustainability thresholds and ecosystem functioning: the selection, calculation, and use of reference points in fishery management’](#)) with a session on regime shifts and biological reference points that may be helpful. She is doing some analysis in this area and agreed to discuss this further with CSIRO.
- The mechanism for accepting regime shifts may be considered for other non-recovering species and the revised Harvest Strategy guidelines explicitly recognise moving towards dynamic reference points.

Agenda Item 10 – Species for prioritisation (updating biological information)

155. Mr Corrie outlined that in the current SESSF Research Statement there is an item to reconsider biological assumptions for key species as a high priority, and the RAG needs to consider what species should this cover.
156. Dr Knuckey suggested this should cover any species initially assessed as a single stock that now have an east and west component. The Chair noted that Tier 1s would also be a priority.
157. The RAG agreed to Mr Corrie’s proposal for AFMA to prepare a paper the SERAG meeting in November 2018 for the RAG to consider.

Action item 9: AFMA to consult Ian Knuckey for a paper to SERAG 2, regarding recommendation of prioritised species for inclusion in the scoping paper for ‘Updating knowledge of key species biology’ project.

Agenda Item 11 – Orange Roughy RBC advice

11.1 Industry proposal and risk assessment

158. Mr Corrie recalled that the agreed base-case assessment for eastern Orange Roughy was presented at the November 2017 SERAG meeting which used a natural mortality estimate of 0.04 and steepness of 0.75. An alternative assessment was also presented based on a likelihood profile analysis suggesting that productivity parameters may be lower than those presented in the agreed assessment – i.e. $M = 0.036$ and $h = 0.6$.
159. The RAG then considered a series of deterministic projections for each of the models and catches under the harvest control rules for each scenario. Under all scenarios the stock biomass was expected to increase over the period of the MYTAC.
160. The RAG advice, supported by SEMAC and AFMA management, was to proceed with the base-case and recommended a 3-year TAC.
161. In March 2018, the AFMA Commission accepted this advice for one year but requested further advice from SERAG regarding RBCs for the second and third years of the MYTAC i.e. 2019-20 and 2020-21 seasons.
162. The Commission also asked SESSFRAG to review the use of likelihood profiles more generally in assessments and the implications of the lower stock productivity assessment for orange roughy.
163. At the Data meeting in August 2018, SESSFRAG was asked to provide advice on setting an RBC for the remainder of the 3-year MYTAC while considering an industry proposal to constrain catches at 900 t for the second and third years, and to support the 2019 acoustic survey that feeds into the 2020 assessment.
164. SESSFRAG was also asked to consider whether any additional work was required on the orange roughy stock assessment during the current MYTAC period. SESSFRAG supported the acoustic survey but deferred consideration of the industry proposal and advice for the 2020 stock assessment to SERAG.
165. SESSFRAG requested that SERAG:
 1. be provided with an exploration of alternative calculations of M with consideration of life history parameters. (This has been completed).
 2. consider the industry proposal to limit the Orange Roughy TAC for the second and third year of the current MYTAC.
 3. further consider an exploration of uncertainties in the existing assessment noting projections have been undertaken on a risk assessment basis to understand the impacts of higher catches being included in the lower production model.
166. Dr Haddon undertook a review of empirical methods to estimate M (e.g. Hoenig's method), which suggested that M may be as low as 0.032. This paper is provided as an attachment to this agenda item.
167. Mr Cordue commented about his experience with orange roughy assessments in 2014. They used $M = 0.045$ based on two independent estimates from age frequencies from near virgin fisheries. Dr Haddon added that not all orange roughy fisheries have the same biological properties.
168. The Chair asked the RAG to consider the proposal to focus on six scenarios (table below).

Scenarios for deterministic projections		Model	
		Base-case (BC) (M=0.04, h=0.75)	Low Productivity (LP) (M=.032, h=0.75)
Catch	Base-case HCR	1	2
	Low-productivity HCR	3	4
	Industry proposal	5	6

Figure 2 The six scenarios proposed for deterministic projections

169. The Chair provided the opportunity for Mr Boag to discuss the industry proposal:
- There was quite a difference between the RBCs from the low productivity model and the base-case, so industry have proposed a 900 t RBC for the second and third years of the 3-year MYTAC.
 - In AOS years, the hill is closed to fishing for a month leading up to the end of the spawning aggregation and so carrying over the under-catch for two years has economic benefit.
 - Industry have proposed funding the AOS out of research allowance rather than from levies, resulting in a significant management cost reduction.
 - SETFIA's analysis shows that levies as a percentage of turnover was 12 % under the base-case, 16 % under the low productivity model and around 4 % under the industry proposal. This drove the proposal which was put forward directly to the Commission.
170. The RAG requested Mr Boag present a paper to SERAG 2 in November 2018 outlining the full proposal.

Action item 8: Simon Boag to present paper regarding industry proposal to limit orange roughy TACs for 2nd and 3rd year of MYTAC, to SERAG 2.

171. The RAG agreed with the recommendations in the paper:
- By SERAG 2 November 2018 - provide deterministic projections using natural mortality values of 0.04 and 0.032 that include harvest control rule catches as well as the industry proposed catches. This would produce six scenarios and biomass trajectories.
- As part of future research – undertake a larger Management Strategy Evaluation (MSE) project to improve sampling in the fishery including the frequency of AOS surveys that may lead to an improved estimation of M.
172. Mr Boag asked the RAG to include the carryover of under-catch over two years in the projections.

Agenda Item 12 – ERA Assessments

173. The Chair asked for an overview of changes to the ERA methodology noting it will be useful to see if reduction in trawl effort over time had resulted in a reduction in risk.
174. Mr Penney wrote a paper for the ERA technical working group regarding reassessment triggers that has recently been updated for the SESSF. The paper has been uploaded to the SERAG GovDex page.
175. Mr Corrie outlined AFMA's updated Ecological Risk Management (ERM) framework as it relates to Ecological Risk Assessments (ERAs):

- Productivity and Susceptibility Analysis (PSA), the base Sustainability Assessment of Fishing Effects (bSAFE) and enhanced Sustainability Assessment of Fishing Effects (eSAFE) are all classified as Level 2 assessments.
- The bSAFE has now been classified as the preferred Level 2 method (over PSA) where sufficient spatial and biological data (to support bSAFE) are available (typically used for teleost and chondrichthyan species).
- Once high risk species have been identified under bSAFE, the RAG and AFMA should decide whether to do an eSAFE or manage the risk.
- Either a PSA or SAFE assessment is completed for a particular species, not both.

176. The species list for the trawl fisheries were generated using historical log books and observer records. The assessment was based on catch and effort information from 2012 to 2016 and species classification was based on contribution to overall landings, however unlike species classification under SMARP, did not use economic value.

12.1 Otter Board Trawl ERA Assessment

177. Dr Sporic noted there was further information in the final report regarding generation of species lists including apportionment of catch from undefined species groups. Currently, the otter board trawl (OBT) list contains 524 species, including: 10 key economic, 9 secondary, 112 byproduct and 288 bycatch species. There were also 25 habitat types and 33 communities identified within the area of the fishery, however these were not assessed at level 2, as the latter two were outside the scope of the project.

178. The chair highlighted the increase in byproduct and bycatch species since 2006. Such differences could be due to the classification of BP/BC species. Dr Sporic agreed that the 2006 report could be used to compare with this assessment. In addition, the RAG discussed possible causes of the increase including spatial range.

179. Dr Sporic noted that under the revised framework, any species assessed using a tiered quantitative assessment (level 3) such as SESSF tiered species are not currently assessed in ERAs. However, given that there are Tier 4 species which are becoming non-assessable, these species have been incorporated in the draft report.

180. Dr Knuckey suggested the thresholds for classifying species included in the agenda item paper should be included in the final report.

181. The RAG was asked to provide feedback on any species assessed as high risk for PSA or SAFE, including those whose risk was revised using residual risk guidelines.

Productivity Susceptibility Assessment (PSA)

182. Gould's squid (*Nototodarus gouldi*) – high risk

- No tiered assessment in the SESSF however trawl consistently catches more than the jig sector with an average of 430 t landed each year over the 2012-16 period.
- It is a short-lived species (12 months) so the impact of fishing is unlikely to be a high risk.
- Distribution range from around Eden (east coast) through to Portland (west coast).
- In the 1970s Taiwanese fleet caught 5-7000t for three years in a row.
- This species spends time high in the water column i.e. vertical migration at night.
- The RAG agreed that from a common-sense perspective, this doesn't seem to be a genuinely high-risk species. All productivity attributes are known and the species is highly productive.
- Susceptibility is the issue because of overlap with the fishery and availability to fishing gear.
- Mr Boag referred to work by Roland Pitcher and noted only 6 per cent of the fishery is trawled and this needs to be considered within the residual risk assessment.

The RAG suggested that the susceptibility scores be reviewed given the large area closures and vertical migration of the species. Dr Sporcic will look at the susceptibility scores and report back to the next SERAG meeting.

183. Sandy Skate (*Pavoraja arenaria*) - high-risk

- Deep water skate occurring around 200-800m. Only a small proportion of this species distribution falls within the CTS.
- This is a bycatch species with 12 kg discarded since 2012 from the observer records.
- 186.3 t retained and 42 t discarded 'skates and rays' in logbooks.
- Assessed under PSA with six missing attributes (5 P; 1 S).
- Dr Knuckey suggested using the catch composition of sandy skate relative to other skates and rays from observer records and scale to logbook data. The expectation is there are low catches.
- Sydney and Melbourne skates are more likely the high-risk skate species.
- Skates might be a candidate for eSAFE.

184. The RAG suggested determining overlap with the fishery and estimating logbook catches based on observer catch compositions.

185. Northern Draughtboard Shark (*Cephaloscyllium variegatum*) - high-risk

- The data showed 28 kg retained and less than half a tonne discarded according to observer records.
- The species is known to be a very tough, resilient species and the survivability score was changed in the previous ERA assessment.

The RAG suggested checking previous ERA assessments to confirm that risk scores were amended for this species and whether they are still relevant. The paper on survivability (Port Jackson swell sharks) by Matias Braccini may be of use.

186. Green-eye Spurdog (*Squalus chloroculus*) - high-risk

- Species identification may be an issue as this species is often confused with the short-spine spurdog. It is a synonym of *S. mitsukirii*. Logbooks have 14 t retained and 63 t discarded and 53 kg retained from the observer records of *S. mitsukirii*.
- Species distribution is 300m inshore so there is little overlap with closures.
- The fact that only 6 per cent of the trawl fishery is fished was raised again by some members. The Chair noted that the distribution of fishing effort (fine scale fishing effort) is being correctly incorporated into the ERA and this was confirmed by Dr Sporcic.
- The scores for availability (S1 = 1.15), encounterability (S2 = 3), selectivity (S3, missing) and post-capture mortality (s4 = 3) are available in Table 2.25 of the draft ERA report.
- Mr Penney noted there has been a change to continuous scoring for some of the attributes scores. Issues arise when RAG members try to redo the analyses in their heads (e.g. geospatial overlap mapping) when the question should be whether the overlap is accounted for correctly.
- ABARES are proposing to review and update the information used in the Fisheries Status Reports over the coming 12 months and are considering hosting work placements for third year students from the University of Canberra. A desktop study by students could be considered in AFMA's Annual Research Statement.
- The species was assessed in the 2012 SAFE as extreme high risk. Productivity scores must have been available. It's a different time period so the overlap scores will be different.

The RAG suggested looking for the missing attributes used in the last SAFE assessment and consider if a bSAFE could be undertaken. Dr Ross Daley may be able to provide advice.

187. Due to time constraints, the RAG agreed to prioritise the remaining high-risk species.

Skates and rays – group together (also include angel shark with this group too) and then decide how to address them as a group.

Southern (Pacific) sleeper shark (bSAFE high risk) - wide-ranging species through the southern ocean and records show very low interaction. On average 89kg retained per year (Logbooks).

Whitefin swellshark and northern draughtboard shark - Consider reviewing PSA survivability (S4).

Tier 4 deepwater shark 'basket' species - should not be assessed at all. Remove all of the deepwater shark species as they are in the basket.

Bigeye ocean perch – also assessed as Tier 4. Remove from the list.

Southern bailer shell - precautionary high risk in the PSA due to missing productivity attributes. There were discrepancies in risk scores between tables. Dr Sporcic will confirm the risk score.

Fairy terns - 30 kg recorded in logbooks as retained. The RAG noted this is an unusual inclusion in the list and needs further investigation of observer records.

Pelagic armourhead (extreme high risk under SAFE) - A wide ranging species and the RAG agreed this is an unusual inclusion on the list. Overlap is likely trivial. Check information on Fishbase for distribution and abundance.

Dolphins – all attributes are available, revise risk scores down due to level of interaction.

Kellogg's Seahorse – high level of missing attributes and it is an expanded species. Check to see if there is information about other seahorse species can be applied here and check with a seahorse expert.

188. The RAG questioned whether it would be better to have a smaller group initially undertake the preliminary analysis out-of-session to then present findings to the RAG. The Chair noted this was a suggestion from the recent SESSFRAG meeting (July 2018). This is for consideration by AFMA.

189. An analysis that compares the results (pre residual) of previous ERA assessments with the current one, so the RAG can see what was high-risk then compared to now, and what has changed. The RAG requested AFMA prepare this comparison document.

ACTION ITEM 10: AFMA and CSIRO to follow up on all queries raised in SERAG 1, 2018 regarding ERA high-risk species. Refer to agenda item 12 minutes for details.

ACTION ITEM 11: AFMA to prepare a document comparing results of 2018 ERA assessments with previous assessments and report back to SERAG 2, 2018.

190. The RAG will need to decide whether to undertake an eSAFE for some of these species.

12.2 Danish Seine ERA Assessment

191. Effort has increased in this sector but the fishing area and range of operators hasn't increased.

192. There were similar questions regarding overlap of fishing effort with Gould's squid and green-eye spurdog in the Danish seine fishery. Depth distribution and footprint should be considered.

193. Giant cuttlefish and southern octopus each have 10 missing attributes (Table 2.23):

- Species identification is an issue for both of these species.

- There is dispute about whether these species are being retained. Dr Sporcic spoke to an AFMA observer however industry noted catches of giant cuttlefish are very low. Industry reported that it may be a species ID issue. Dr Sporcic noted that further advice from experts would be undertaken regarding this and other cuttlefish species within this fishery.
- The RAG suggested species identification issues need to be addressed.
- Consultation with an octopus/cuttlefish expert (e.g. Mark Norman) is recommended.

ACTION ITEM 12: AFMA to confirm species identification for southern octopus and giant cuttlefish in the Danish Seine ERA, and provide info to CSIRO.

ACTION ITEM 13: AFMA to confirm the protocol for recording unknown species by observers.

ACTION ITEM 14: AFMA to investigate missing ERA productivity attributes for southern octopus and giant cuttlefish, as well as distribution overlap of Danish seine effort and green-eye spurdog.

194. The RAG agreed that Mr Penney should present his paper on ERA triggers to the SESSFRAG Chair's meeting in 2019 after the SESSF ERA's are completed.

ACTION ITEM 15: Ensure agenda item for ERA triggers is added to SESSFRAG Chair's meeting, 2019.

195. The Chair summarised the list of action items that arose during the meeting and the group agreed on items allocated and due dates.

196. Before closing the meeting, the group reviewed the list of action items. Two additional items were agreed by the RAG and noted below. The Chair then formally closed the meeting.

ACTION ITEM 19: Malcolm Haddon to clarify which length plus age frequencies time-series were used in the HOENIG method for orange roughy mortality estimation (generally relies on age frequency at start of exploitation). Report back to SERAG 2, 2018 as part of orange roughy agenda item.

ACTION ITEM 20: CSIRO to consider which factors (season depth zone) influence length frequencies for all species, to update data plans and targets for observer program and port sampling.

Table 10. Member and invited participants declarations of interest

Member	Declared Interest
Mr Sandy Morison (Chairperson)	<p>Director of Morison Aquatic Sciences. Chair of SharkRAG, SERAG and the Tropical Rock Lobster Working Group. Scientific member on SEMAC. Contracted by government departments, non-government agencies and companies for a range of fishery related matters including research and (by SCS Global Services) for MSC assessments of AFMA managed and other Australian and international fisheries. No pecuniary or other interest in the SESSF.</p>
Mr Daniel Corrie	<p>Employed by AFMA. Manager of Southern Trawl and Coral Seas Fisheries. No pecuniary or other interest in the SESSF.</p>
Dr Sarah Jennings	<p>Economics member on SESSFRAG. Invited economics participant on SEMAC. Economics coordinator, FRDC Human Dimensions Research Subprogram. Member of AFMA Economics Working Group. Adjunct Senior Researcher, TSBE, University of Tasmania. Independent economics consultant. No pecuniary or other interest.</p>
Dr Rik Buckworth	<p>Partner - Sea Sense and Director, Aquatic Remote Biopsy (independent fisheries research consultants). Scientific Member - NPRAG, SERAG, TSFRAG. Chair - NT Research Advisory Committee, FRDC. University Fellow - Charles Darwin University. No pecuniary or other interests in this fishery.</p>
Mr Andrew Penney	<p>Sole Director of Pisces Australis Pty Ltd, an Australian registered marine/coastal research and management consultancy based in Canberra - interests in any opportunities in this regard. Principal Investigator on FRDC Project No 2014-009: Development of guidelines for quality assurance of Australian fisheries research and science information, and co-investigator on FRDC Project No 2014-203: SESSF Monitoring and Assessment – Strategic Review. 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.</p>
Mr Ross Winstanley	<p>No pecuniary interest in SESSF however declares he has a brother in law that holds a Victorian Inshore Trawl Licence.</p>
Dr Simon Nicol	<p>ABARES. Interest in obtaining funding for future research. No pecuniary interest.</p>
Mr John Jarvis	<p>Commonwealth Trawl Sector boat and quota SFR holder. Owns a seafood retail shop. Member of SETFIA.</p>
Dr Geoff Tuck	<p>CSIRO. Involved in stock assessments. Interest in obtaining funding for future research. Principle investigator on the SESSF stock assessment project.</p>

Mr Simon Boag	<p>Runs a fisheries consulting firm Atlantis Fisheries Consulting Group. Clients include associations such as SETFIA, SSIA, SPFIA but also other private clients. Has recently been engaged by AFMA to collect biological data in the shark fishery.</p> <p>Non-beneficiary Director of two fishing companies in the SESSF one of which is a significant quota owner.</p> <p>Industry member on SERAG and SEMAC.</p>
Ms Mardi Albert	Employed by AFMA. Executive Officer of SERAG. No interest, pecuniary or otherwise.
Invited Participant	Declared Interest
Dr Ian Knuckey	<p>Positions:</p> <p>Director – Fishwell Consulting Pty Ltd Director – Olrac Australia (Electronic logbooks) Deputy Chair – Victorian Marine and Coastal Council Chair / Director – Australian Seafood Co-products & ASCo Fertilisers (seafood waste) Chair – Northern Prawn Fishery RAG Chair – Tropical Rock Lobster RAG Chair – Victorian Rock Lobster and Giant Crab Assessment Group Scientific Member – Northern Prawn Management Advisory Committee Scientific Member – SESSF Shark RAG Scientific Member – Great Australian Bight RAG Scientific Member – Gulf of St Vincents Prawn Fishery Management Advisory Committee Scientific participant – SEMAC, SERAG</p> <p>Current projects:</p> <p>AFMA 2018/08 - Bass Strait Scallop Fishery Survey – 2018 and 2019 FRDC 2017/069 - Indigenous Capacity Building FRDC 2017/122 - Review of fishery resource access and allocation arrangements FRDC 2016/146 - Understanding declining indicators in the SESSF FRDC 2016/116 - 5-year RD&E Plan for NT fisheries and aquaculture AFMA 2017/0807 - Great Australian Bight Trawl Survey – 2018 Traffic Project - Shark Product Traceability FRDC 2018/077 - Implementation Workshop re declining indicators in the SESSF FRDC 2018/021 - Development and evaluation of SESSF multi-species harvest strategies AFMA 2017/0803 - Analysis of Shark Fishery E-Monitoring data AFMA 2016/0809 - Improved targeting of arrow squid</p>
Dr Malcolm Haddon	<p>CSIRO Honorary Fellow, stock assessment scientist actively involved in the development of new methods and processes.</p> <p>May consider joining research proposals for obtaining funding for research deemed of high priority by the RAGs and MACs.</p> <p>Former member of GABRAG, Northern Prawn RAG and sub-Antarctic RAG; also former scientific member of the sub-Antarctic MAC.</p>
Dr Robin Thomson	CSIRO, assessment scientist. Acquiring funding for research purposes. Principal Investigator on data services contract and close kin project for school shark.
Dr Miriana Sporcic	CSIRO, Assessment scientist. Acquiring funding for research purposes.

Dr Jemery Day	CSIRO, Assessment scientist. Acquiring funding for research purposes. Interests in promoting good science.
Dr Kyne Krusic-Golub	Director – Fish Ageing Services. No other interests pecuniary or otherwise.
Mr George Day	AFMA, Demersal and Midwater Fisheries Manager. No interest, pecuniary or otherwise.
Dr Paul Burch	CSIRO, assessment scientist. Acquiring funding for research purposes.
Dr Fay Helidoniotis	ABARES. No pecuniary interest.
Dr Claudio Castillo-Jordan	CSIRO, assessment scientist. Acquiring funding for research purposes.
Dr Patrick Cordue	Innovative Solutions Ltd, assessment scientist. Acquiring funding for research purposes.
Mr Tom Bibby	Commonwealth Trawl Sector boat and quota SFR holder.
Mr Will Mure	Interests in Pink Ling and Blue-eye Trevalla discussions. Autoline boat catches. Has a fish receiver's license and various seafood interests.

ADOPTED AGENDA**Day 1: Wed 19 September 2018****Time: 08:45 to 17:00****Chair: Mr Sandy Morison**

Time	Item	Presenter
08:45	Agenda Item 1: Preliminaries 1.1 Welcome and introductions/apologies 1.2 Declarations of interest 1.3 Adoption of agenda 1.4 Action items review	Sandy Morison
10:00	Agenda Item 3: ISMP Discards and Catch Reports 3.1 Issues identified with SESSF data 3.2 Revision to ISMP Discards Report 3.3 Catch and Discards report for TAC calculations	Robin Thomson & Paul Burch
10:30	<i>Morning Tea</i>	
10:45	Agenda Item 5: Blue-eye Trevalla 5.2 Tier 5 stock assessment 5.1 Tier 4 stock assessment	Malcolm Haddon & Miriana Sporcic
12:30	<i>Lunch</i>	
13:00	Agenda Item 4: Tier 4 Stock Assessments 4.1 Mirror Dory 4.2 Deepwater Shark Eastern 4.3 Deepwater Shark Western	Mariana Sporcic
15:30	<i>Afternoon Tea</i>	
15:45	Agenda Item 6: Tier 1 Stock Assessment – Blue Grenadier 6.1 Update from industry perspective 6.2 Overview of recent data 6.3 Preliminary 2017 stock assessment – base case presentation 6.4 Discussion	Geoff Tuck & Claudio Castillo-Jordan
17:00	<i>Adjourn</i>	

Day 2: Thursday 20 September 2018**Time: 08:30 to 17:00****Chair: Mr Sandy Morison**

Time	Item	Presenter
08:30	Agenda Item 7: Tier 1 Stock Assessment – <i>Pink Ling</i> 7.1 Update from industry perspective 7.2 Overview of recent data 7.3 Preliminary 2017 stock assessment – base case presentation 7.4 Discussion	Patrick Cordue
10:30	<i>Morning Tea</i>	
10:45	Agenda Item 8: Tier 1 Stock Assessment – <i>Silver Warehou</i> 8.1 Update from industry perspective 8.2 Overview of recent data 8.3 Preliminary 2017 stock assessment – base case presentation 8.4 Discussion	Paul Burch
12:30	<i>Lunch</i>	
13:00	Agenda Item 9: Tier 1 Stock Assessment – <i>Jackass Morwong</i> 9.1 Update from industry perspective 9.2 Overview of recent data 9.3 Preliminary 2017 stock assessment – base case presentation 9.4 Discussion	Jemery Day
15:00	Agenda Item 10: Species for prioritisation in the ‘Updating knowledge of key species biology’ project.	Dan Corrie
15:30	<i>Afternoon Tea</i>	
15:45	Agenda item 11: Orange roughy RBC advice 11.1 Industry proposal and risk assessment 11.2 Preparation for 2020 stock assessment (M risk profiles etc.)	Dan Corrie
17:00	<i>Adjourn</i>	

Day 3: Friday 21 September 2018

Time: 08:30 to 12:30

Chair: Mr Sandy Morison

Time	Item	Presenter
08:30	Agenda Item 12: ERA Assessments 12.1 Otter Board Trawl ERA Assessment 12.2 Danish Seine ERA Assessment	Miriana Sporcic & Dan Corrie
10:30	<i>Morning Tea</i>	
10:45	ERA Assessments (continued)	
11:00	<i>(this item was moved from Day 1)</i> Agenda Item 1.5: Stock Assessments Preparation: 1.5.1 Scheduling of assessments 1.5.2 Review of data as an input to stock assessments 1.5.3 Inclusion of recent years' data in assessments	Dan Corrie
12:00	<i>(this item was moved from Day 1)</i> Agenda Item 2: ISMP Quarter 3, 2018 report (period up to Aug 2018)	Dan Corrie
12:30	<i>Close</i>	

Table 11: Actions Items Summary

• Complete/Redundant	• Underway	• Yet to start	• Need SESSFRAG advice
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Meeting & agenda item reference	No.	Description	Responsibility	Timeframe	Status
2017.11 Agenda Item 2	1	Dr Knuckey to provide documentation regarding school whiting spawning for AFMA to scan and upload to GovDex.	Dr Knuckey AFMA	As soon as possible	Completed and uploaded to the 'Papers' page on the SERAG GovDex site.
2016.10 12.0	11	AFMA to liaise with Tasmanian authorities and obtain a copy of the giant crab final report.	AFMA	When giant crab report is completed	AFMA met with Tas fisheries in August to discuss the outcomes of the final report. The report has been uploaded to the 'Papers' page on the SERAG GovDex site.
2016.11 5.1	6	Ensure that the redfish otolith collection target is met.	AFMA	Immediately	Observers have been deployed on NSW trips, however catch remains low. As of November 2017, otolith collection is at 21% (165/800). SESSFRAG supported using the CTS FIS to supplement ISMP otolith collection. AFMA recommended removing this item for redfish specifically but maintain a continued focus on ongoing ISMP collection. The RAG agreed to remove item, item closed.
2017.09 1.4	1	Dr Day to prepare a discussion paper regarding the inclusion of winter/summer length	AFMA and CSIRO	To raise at SESSFRAG Chairs meeting 2018 (for	SESSFRAG agreed that this should be looked at as a sensitivity in the stock assessment update in 2019.

		frequencies in future tiger flathead assessments.		action at SESSFRAG Data Meeting 2018)	The RAG corrected the wording for this item to reflect the action required and requested this item remain open until the assessment is completed.
2017.11 Agenda Item 2	1	Evaluate application of alternative assessments for John dory using data up to 2017 for consideration at the first 2018 SERAG meeting. AFMA and CSIRO.	CSIRO AFMA	2018 SERAG meeting 1.	It was agreed at the SESSFRAG 2018 Data meeting that John Dory would be assessed as a Tier 4 species in 2020. In the short term considered under the 'un-assessable' species (conflicting age and CPUE data)
2017.11 Agenda item 4	2	CSIRO to provide advice on whether data as an input to stock assessments could be reviewed at SESSFRAG data meeting in July/August each year.	CSIRO Dr Thomson Dr Tuck	SESSFRAG Chairs meeting 2018.	This was discussed at SERAG 1, 2018 and is covered by action item 16 (2018.09, 1.5)
2017.11 Agenda item 4	3	CSIRO to provide advice on whether the most recent year's data needs to be included in stock assessments to give the assessment scientists more time to identify issues.		SESSFRAG Chairs meeting 2018.	This was discussed at SERAG 1, 2018 and is covered by action item 16 (2018.09, 1.5)
2017.11 Agenda item 4	4	AFMA to investigate the occurrence of 22cm+ school whiting recorded as discarded in 2016 ISMP records.		Prior to next stock assessment.	AFMA records indicate eleven 22cm+ fish (8*22cm, 1*24cm and 1*25cm) were discarded in 2016. Observer trip reports confirm this was the case. AFMA and CSIRO are resolving the issue.
2017.11 Agenda item 5	5	Dr Thomson to include NSW recreational catch data in the SESSF catch and discard summary for redfish.		2018 Data Summary.	So far only included where estimates of recreational catch weight are available. This will eventually be extended to include numbers of fish, or using numbers to estimate weights. This is not an issues for redfish alone.

2017.11 Agenda item 6.2	7	AFMA to quantify the area of suitable deepwater shark habitat inside and outside closures as a proxy for stock protection.		2018 Assessment period.	Dr Tuck will also present the paper <i>"Incorporating the effects of marine spatial closures in risk assessments and fisheries stock assessments"</i> at SESSFRAG in March 2019. Subject to advice from SESSFRAG on using closures as proxies for protection, this item may be revisited. Item will remain until resolved, or advice is received.
2017.11 Agenda item 6.2	8	As part of the 2018 deepwater shark east and west stock assessment, assess the trends in catch rates inside and outside the deepwater closures prior to implementation.	CSIRO	2018 assessment period.	Dr Sporcic has advised that excluding catches from inside closures in the CPUE standardisations makes very little difference.
2017.11 Agenda item 6.3	9	SESSFRAG to consider a standard approach to limiting the multiplier value (D/C+1) in Tier 4 assessments where estimated discard rates are high.		2018 SESSFRAG data meeting.	SESSFRAG agreed that this was not a suitable approach and a working group has been established to propose a way forward for 'non-assessable' species, including Tier 4 species with high discard proportions. The RAG agreed to remove this item – it will be considered by the SESSFRAG working group ('basket' species').
2017.11 Agenda item 6.4	10	AFMA to investigate records of oxeve oreo dory in logbooks and CDRs.		Prior to 2020 assessment.	
2017.11 Agenda item 8.2	12	AFMA to investigate the top redfish catching vessels to ensure targeting is not occurring.		As soon as possible.	This will be completed as part of the rebuilding strategy review for SERAG 2, Nov 2018.

Table 12: SERAG MEETING 1 (Sept 2018) – Action Items

FINAL AGREED ACTION ITEMS

Meeting No. and agenda ref	ACTION No.	Topic	Description	Responsibility	Timeframe
2018.09 3.21	1	ISMP Discards report	CSIRO to add species specific discard proportion to the bottom row of the species-specific tables in the discards report.	Robin Thomson	By SERAG 2 (14/11/18)
2018.09 5.2	2	Blue-eye trevalla (seamounts) Tier 5	Malcolm Haddon to scan the relevant pages of historical Blue-eye trevalla reports (e.g. Tilzey, 1997?) and circulate to SERAG.	Malcolm Haddon	ASAP
2018.09 5.2	3	Blue-eye trevalla (seamounts) Tier 5	AFMA/CSIRO to discuss whether ASPM age-structured production model for Blue-eye trevalla (seamount) can be completed prior to SERAG 2 (November 2018). NB. This may be considered for application to other species in future.	Geoff Tuck, Dan Corrie & George Day	By SERAG 2 (14/11/18)
2018.09 4.2	4	Deepwater shark east Tier 4	AFMA/CSIRO to check whether observations of deepwater shark catch and/or discards are occurring in orange roughy zones (there are no records in the ISMP discards report). Also CSIRO (Paul Burch) to check ISMP strata definitions.	Paul Burch & Dan Corrie	By SERAG 2 (14/11/18)
2018.09 4.2	5	Deepwater shark east Tier 4	AFMA to check pre 2017 observer reported discards of deepwater shark to confirm estimates in the ISMP discard report. Status: done for 2017 and large discard of deepwater shark confirmed as data punching error.	Dan Corrie	By SERAG 2 (14/11/18)
2018.09 8	6	Silver Warehou Tier 1	AFMA/Industry to clarify how observers have recorded discards of Silver Warehou on the factory boats (suggesting it was discarded but covered by quota, so should be in CDR records).	Dan Corrie	ASAP
2018.09 8	7	Silver Warehou Tier 1	AFMA to rectify the issues with use of vessel call-signs in the AFMA database as boat identifiers, as it affects the assessments.	Dan Corrie & John Garvey	Check and rectify by 2019 (prior to AFMA sending data to CSIRO)
2018.09 11	8	Orange Roughy RBC advice	Simon Boag to present paper regarding industry proposal to limit orange roughy TACs for 2 nd and 3 rd year of MYTAC, to SERAG 2.	Simon Boag	By SERAG 2 (14/11/18)

Meeting No. and agenda ref	ACTION No.	Topic	Description	Responsibility	Timeframe
2018.09 10	9	Research Statement - species for prioritisation	AFMA to consult Ian Knuckey for a paper to SERAG 2, regarding recommendation of prioritised species for inclusion in the scoping paper for 'Updating knowledge of key species biology' project.	Mardi Albert & Ian Knuckey	By SERAG 2 (14/11/18)
2018.09 12	10	ERA risk assessment – high-risk species	AFMA and CSIRO to follow up on all queries raised in SERAG 1, 2018 regarding ERA high-risk species. Refer to agenda item 12 minutes for details.	Dan Corrie & Miriana Sporcic	By SERAG 2 (14/11/18)
2018.09 12	11	ERA assessments process	AFMA to prepare a document comparing results of 2018 ERA assessments with previous assessments and report back to SERAG 2, 2018.	Dan Corrie	By SERAG 2 (14/11/18)
2018.09 12.2	12	ERA assessments - attributes	AMFA to confirm species identification for southern octopus and giant cuttlefish in the Danish Seine ERA, and provide info to CSIRO.	Mardi Albert	By SERAG 2 (14/11/18)
2018.09 12	13	ERA assessments	AFMA to confirm the protocol for recording unknown species by observers.	Mardi Albert	By SERAG 2 (14/11/18)
2018.09 12	14	ERA assessments – Danish	AFMA to investigate missing ERA productivity attributes for southern octopus and giant cuttlefish, as well as distribution overlap of Danish seine effort and green-eye spurdog.	Dan Corrie	By SERAG 2 (14/11/18)
2018.09 12	15	ERA assessments	Ensure agenda item for ERA triggers is added to SESSFRAG Chair's meeting, 2019.	Mardi Albert	ASAP
2018.09 1.5	16	Stock assessments preparation	AFMA and CSIRO to review the TAC setting guidelines paper and due dates for data preparation and report back to SESSFRAG Chair's meeting in 2019.	Dan Corrie & Geoff Tuck	By SESSFRAG Chair's meeting, 2019

Meeting No. and agenda ref	ACTION No.	Topic	Description	Responsibility	Timeframe
2018.09 2	17	Database – Royal Red Prawns	AFMA to correct units of Royal Red Prawn in database (sometimes in mm not cm). (status: being addressed in SESSFRAG Data meeting action items)	Dan Corrie & John Garvey	Before 2019 data provision to CSIRO
2018.09 2	18	ISMP status reports	AFMA to incorporate traffic-light system in the ISMP coverage report for year-to-date tables	AFMA (Observer team)	ASAP
2018.09 11	19	Other items – orange roughy advice	Malcolm Haddon to clarify which length plus age frequencies time-series were used in the HOENIG method for orange roughy mortality estimation (generally relies on age frequency at start of exploitation). Report back to SERAG 2, 2018 as part of orange roughy agenda item.	CSIRO, Malcolm Haddon	By SERAG 2 (14/11/18)
2018.09 2	20	Other items	CSIRO to consider which factors (season depth zone) influence length frequencies for all species, to update data plans and targets for observer program and port sampling.	Robin Thomson	By SESSFRAG Chairs meeting, 2019