



Australian Government

Australian Fisheries Management Authority

Southern and Eastern Scalefish and Shark Fishery

South East Resource Assessment Group (SERAG)

2019 Meeting #2 – December 2019

Minutes

3-4 December 2019

CSIRO - Hobart, Tasmania

Chair: Dr Michael Steer

Minutes

DAY 1, Tuesday 3 December 2019

The Chair opened the meeting at 9am

Agenda item 1 – Preliminaries

1.1. Welcome and other preliminaries

1. Dr Mike Steer (Chair) welcomed members, invited participants and observers to the meeting and made an Acknowledgement of Country statement recognising the Tasmanian Aboriginal people as the traditional custodians of the land on which we meet - Muwina country, and paying our respects to their Elders both past and present.

There was an apology from Dr Ian Knuckey who nominated Dr Matt Koopman to attend in his place. Daniel Hogan was also an apology for the first day of SERAG.

The Chair welcomed Ms Fiona Hill, the recently appointed Senior Manager, Demersal and Midwater Fisheries at AFMA.

Attendees introduced themselves, outlined their relevant background and/or experience and provided a statement Declaration of Interest by exception. Some attendees arrived later and at that point, introduced themselves and noted any conflicts of interest.

Members	Role
Dr Michael Steer	Chair
Dr Matt Koopman	On behalf of Dr Ian Knuckey - Scientific Member, Fishwell Consulting
Mr Ross Winstanley	Recreational Member
Dr Sarah Jennings	Scientific (Economics) Member
Mr John Jarvis	Industry Member - east
Mr Daniel Hogan	Industry Member - west
Mr Simon Boag	Industry Member
Mr James Woodhams	Scientific Member, ABARES
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	
Ms Heather Johnston	AFMA
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 Geoff Liggins	Senior Fisheries Scientist, NSW DPI
Dr Karina Hall	DPI NSW
Observers	
Dr Veronica Silberschneider	DPI NSW
Mr Nicholas Marton	ABARES

Ms Sandra Curin	CSIRO
Ms Florence Briton	CSIRO
Mr Jamie Dunkley-Price	Skipper of <i>FV Saxon Onward</i> (invited to attend orange roughy items)

1.2. Declarations of interest

2. A list of all conflict of interest declarations was updated from the previous meeting, and provided to attendees on GovTeams. The Chair noted that attendees could provide further updates by exception.
3. The Chair outlined that attendees with conflicts of interest would be required to leave when decisions were being finalised for the relevant item. To facilitate this process, each attendee noted which agenda items may pose a conflict of interest. The RAG then discussed the conflict as each person left the room and agreed on the process in advance of the item discussed.
4. The RAG agreed that each person with a conflict of interest could remain and participate in the discussions but would leave the room when a decision or recommendation was made.
5. A copy of the updated Declarations of Interest is provided at [Attachment A](#).

1.3. Adoption of agenda

6. The agenda was reorganised to facilitate the attendance of various members.
7. The adopted agenda is provided at [Attachment B](#).

1.4. Action items review

8. Mr Corrie drew the RAG's attention to the list of action items noting that the items were colour-coded according to their status. The RAG noted that many items were completed at the previous meeting and updates were noted in the status column, in bold. The RAG focussed on the items that were underway and highlighted red for RAG discussion. The following updates were discussed:

Action item 2 (2019.11 action items review):

AFMA to ensure that the SiDAC data collection includes total and partial lengths of school and gummy shark including school sharks larger than 160cm, and tissue samples of Blue-eye trevalla for CSIRO's close-kin work and for ageing: (a) Start collecting 20 samples from approximately 20% of the shots, and (b) The SSIA co-management contract needs to be finalised and this action item incorporated into the SiDAC Data Plan.

Mr Corrie noted that this was underway and that AFMA has a draft of the data plan. Sampling is expected to commence in early 2020. However, the contract between SETFIA and SSIA is yet to be signed. The RAG requested to keep this item open until the contract has been signed. Dr Thomson noted that the '20 from 20' idea was very arbitrary and that a phone meeting due to take place during SERAG would come up with a more carefully considered sampling target. The minutes of that meeting are provided at Appendix A.

Action item 4 (2019.11 agenda item 3):

AFMA to investigate logbook records of catches of 'Black Trevally' (also called Black Snotty) from the last 2 years and verify with skippers whether species recorded on CDRs is Blue Warehou. If so, AFMA will correct data records and correct recording practices.

This item is not yet underway, to be completed in early 2020.

Action item 8 (2019.11 agenda item 8)

SERAG sub-working group (Dan Corrie, Geoff Tuck, Jamie Dunkley-Price, Rudy Kloser and Paul Burch) to develop a proposal for developing an Oreo fishery, present to SERAG #2.

This item was discussed at SERAG #1 with the intent of drafting a proposal to develop the smooth oreo fishery, including a sampling design and assessment approach.

Mr Corrie noted that if the smooth oreo TAC is close to being fully caught, there is the likelihood of catching more if operators are provided access to the western orange roughy grounds as part of the proposed Western Orange Roughy Research Plan. Rather than developing a separate research program for smooth oreo, the RAG suggested including sampling for smooth oreo within the Western Orange Roughy Research Plan (WORP).

Mr Boag noted recent industry advice that the take of smooth oreos as part of the WORP might not be as large as previously thought. The RAG suggested reviewing historical catch data.

The RAG agreed to close this action item and discuss bycatch considerations under agenda item 12.

Action item 9 (2019.11 agenda item 10.1)

AFMA to get Sydney Fish Market price data for the rebuilding species (eastern redfish, blue warehou and eastern gemfish) to present at SERAG #2.

Mr Corrie advised that this information is available and will be presented as part of the rebuilding species agenda item. The RAG agreed the action item can be closed.

Action item 11 (2019.11 agenda item 11)

Ian Knuckey to provide GAB survey design to Dan/Simon for consideration when developing the Western Orange Roughy research plan.

This was provided and will be discussed under the Western Orange Roughy research plan agenda item. The RAG agreed the action item can be closed.

Action item 12 (2019.11 agenda item 11)

AFMA and SETFIA to present an updated draft Western Orange Roughy proposal to SERAG #2 in 2019.

This will be presented at agenda item 12. The RAG agreed the action item can be closed.

Outcome (2019.11 agenda item 10.1)

SERAG recommends a targeting analysis for Blue Warehou is completed as part of the March 2020 package to the Commission, to inform the TAC for the 2020/21 season.

Mr Corrie noted this action item arose because the Commission was concerned about catches and discards of blue warehou and redfish. The Commission reduced the TAC for Redfish from 100 t to 50 t for the 2019-20 season, noting concerns about a lack of recovery. The Commission did not reduce the TAC for blue warehou but requested a companion species and targeting analysis be completed for both species to inform the TAC for the 2020-21 season.

Mr Corrie advised that this would be further discussed under agenda item 11, including a presentation from Dr Burch and Ms Briton to inform this discussion. The RAG requested to keep this item open.

Action item 7 (2018.11 agenda item 10)

Refer to the ERA Technical Working Group: consider providing better guidance to observers to address species identification issues for cephalopods in order to assist with future ERAs.

This was driven by a number of Cephalopod species identified as high risk under the ERA and issues with species identification in logbooks and observer records. Mr Penney is a member on the ERA TWG and suggested their advice would likely be for AFMA to improve species identification as a priority in the Fisheries Management Strategy. The RAG agreed to close this item, noting SERAG had already provided this advice, and it will be further considered by SEMAC.

9. The list of action items was updated after the meeting and is included at [Attachment C](#). Items that were noted as completed (highlighted green) at the meeting are included in Attachment C but will be removed from the list that is provided to the next SERAG meeting in 2020.
10. The list of new action items arising from this meeting is included at [Attachment D](#).

Agenda item 2 – ISMP Discards, Catch Reports and Data Summary

11. Dr Burch advised that the SESSF 2019 Data Summary report had been updated to include Great Australian Bight (GAB) industry data for 2017/18 and 2018/19 but these additions are not directly relevant to SERAG.
12. In 2020, there is a new whole-of-government requirement for all content to comply with accessibility requirements. The Catch and Discards report and the Discards report will be made accessible, however meeting these requirements for the complex data graphs, plots and figures in the Data Summary report would mean replacing existing figures with tables that would significantly change how the report looks and likely reduce the utility of the report. Dr Burch suggested this is unlikely for the 2020 report and suggested a phased approach, and addressing accessibility requirements over several years.
13. The following points were discussed:
 - The accessibility requirements are a whole-of-government requirement and it is difficult to avoid.
 - Members prefer seeing the technical data presented in the current format and converting to a table format would render some graphed data meaningless. The current format has evolved over time based on RAG requirements and much of it is now automated.
 - Adding 'Alt Text' is a simple process, however optimising it for accessibility would take significant time and cost to complete.
 - Industry are concerned about the additional costs involved and questioned whether costs would be covered by government, suggesting that the costs to do so are identified separately within the data services contract.
 - There are two options: (1) produce two reports, one in the current format for RAG considerations and another in an accessible format for the website, (2) keep the report as it is but do not publish it on the website.
 - SERAG prefers to keep the report in its current format, and suggested AFMA address this as part of contract discussions with CSIRO, separately to SERAG, and clarify the costs. There may be alternatives to make the reports available to the public in a format that is compliant with accessibility requirements.
14. The 2019 Discard Report included corrections to the columns in species-specific tables specifying the number of logbook shots per stratum and the discard rate. Shots with zero discards are now included in the histograms of discarded catches.
15. The 2019 Catch and Discard Report includes corrections to minor errors; discard rate estimates, recreational catches now match the 2018 report, some table captions updated to include species-specific information, and the four year average state catches and discards table now includes the previous four years' estimates for comparison.
16. 'Validity rules' have been revised so that estimates with coefficients of variation (CV) greater than 100% fail the validity test. The RAG noted the following:
 - This affects discard estimates for blue-eye trevalla and orange roughy south (low discard rate) and deepwater shark east, mirror dory east and redfish (moderate discard rate, 12-35%).
 - When the new CV rule is applied to discard estimates prior to 2018, all recent discard estimates for deepwater sharks (east and west) are rejected. This is not considered an issue for the current Tier 4 assessment because discards are not included.
 - When a discard estimate is rejected the most recent valid discard estimate is used.
17. Dr Burch noted there were a large number of logbook records of deepwater shark caught in less than 200 metres. Discussion points included:

- Mr Jarvis advised this species is likely a soft-skinned shark. While it is typically discarded, it is sometimes incorrectly recorded as a quota species when landed. Historically, it can be assumed that any deepwater shark caught inside 300-400 metres depth is this soft-skinned shark.
- Dr Thomson advised that a depth restriction rule was agreed at the SESSFRAG August 2019 meeting. For the purposes of total discards and landed catch, it was agreed that deepwater shark basket are only caught water between 600-1500m.
- The RAG requested AFMA investigate the species identification of the 'soft-skinned shark' and whether it is part of the deepwater shark quota basket. If it is not part of the basket, AFMA need to educate industry so it is correctly recorded on logbooks and CDRs.

ACTION ITEM 1: AFMA and Simon Boag to investigate with industry to identify '*soft skinned shark*' that is caught inside 300 metres, including species ID and whether it is part of the deepwater shark quota basket. If it is identified as not being part of the quota basket, then AFMA to ensure industry are not incorrectly recording it as part of the deepwater shark quota species in CDRs.

ACTION ITEM 2: For each of the species in the deepwater shark quota basket, AFMA to investigate catch at depth and provide data to Robin Thomson, including the CAAB codes for each species.

18. The RAG discussed updates to blue warehou discard estimates:

- The discard estimate for eastern blue warehou in 2017 and 2018 was revised to account for a discrepancy between the logbook reported catch and the CDR catch, where logbook records were significantly lower than CDR records (50%). A single operator was also recording blue warehou as 'black trevally' (a tropical species) in e-logs.
- Once logbooks were scaled to CDRs, and in addition to revisions to the Tasmanian blue warehou catch, the 2017 discard estimate increased from 151.7 t to 215.8 t.
- This estimate remains highly uncertain, and is based on a discard rate obtained from a single Danish seine trip in 2017.

19. Mr Boag questioned why the Commonwealth trawl discard rate was being applied to Tasmanian gillnet catch to estimate total discards. The RAG noted the following:

- Applying Commonwealth discard rates to state catches is common for other species, but is usually for the same gear type.
- A model based approach could be used to estimate discards which incorporates gear types.
- Using discard rates for the same gear types in other fisheries would be more appropriate than, for example, applying a trawl rate to gillnet methods.
- The Commonwealth trawl discard rate should not be applied to Tasmanian gillnet catches in this instance.
- A decision rule could be developed based on the relative size of the landed catch and the discard proportion. There is an existing SESSFRAG subgroup (lead by Dr Burch) looking into decision rules for discards; this issue should be part of their considerations, with a resolution to be considered at the March 2020 SESSFRAG Chair's meeting.

20. Mr Boag emphasised the benefits of having NSW DPI representatives at SERAG, and Dr Liggins agreed to provide further input to support provision and review of State data in 2020. The RAG supported having similar input from other States.

ACTION ITEM 3: In addition to decision rules being considered by the SESSFRAG discard working group, Paul Burch to consider the decision rules regarding application of Commonwealth discard rates to State fisheries catches, particularly as it relates to different gear types.

21. Dr Burch noted proposed changes for the 2020 reports:

- Future Catch and Discard reports to include discards for frostfishes and king dory, squid, latchet and ocean jacket due to increased catches of these species.
- Inclusion of additional recreational catch data, to convert catches reported in numbers to catch by weight, using mean weight from other relevant studies.
- Inclusion of tonnage on the discard maps.
- CSIRO and AFMA to revise ISMP strata for deepwater sharks off southern Tasmania to align their strata with current management boundaries and to investigate whether depth zonation is needed.
 - With reference to action item 1 and 2 for this meeting, Mr Penney suggested clarifying the depth restrictions and whether the soft skinned shark is included. If it turns out the species is part of the quota basket, the depth restrictions may need to be revised.
- A model based approach to estimating discards is being investigated. This will be discussed at the SESSFRAG 2020 Chairs meeting.

Agenda Item 6 – Tier 4 Gemfish west

22. There was no update from industry.

23. Dr Sporic provided a summary of the assessment:

- The FRDC project '*Research to underpin a better understanding of Western Gemfish stocks in the Great Australian Bight*' showed evidence of genetically different populations between the east and west (no gene flow), with a mixing (overlap) of the two stocks in western Bass Strait through to Portland (zone 40 and 50).
- While western gemfish are known to occur throughout the GABT and into CTS zones 40 and 50, it is only under quota in the CTS and the Tier 4 assessment consists of zone 50 only.
- A zone 50 CPUE analysis was not included in the standardised CPUE August 2019 report considered by SESSFRAG because the genetics research work from Dr Moore was not yet available.
- Catch in 2018 was the lowest in the series, with 66 t landed.
- In 2016, the assessment produced an RBC of 436 t. The current assessment produces an RBC of 423 t (difference of 13 t). The decrease is due to the recent decrease in CPUE reducing the average slightly.

24. The RAG's key discussion points included:

- Discards have decreased to 11% in 2018. A four-year weighted average of discards is used in the assessment, and for TAC setting purposes. The discards seem to be tracking CPUE.
- A Tier 1 and Tier 4 assessment were undertaken in 2016. There was considerable uncertainty in the CPUE series, and the RAG did not accept either assessment. The TAC was set based on a weight of evidence approach.
- After application of the discount factor (15% for Tier 4) the TAC would be well above 300 t, however, the 50% large change limiting rule will apply here, limiting the 2020-21 TAC to 300 t, compared to the 2019-20 TAC of 200 t.

- It is not clear why the discount factor was not applied as part of the 2016 TAC setting process. [After meeting, Mr Corrie added explanation: There was considerable uncertainty in the CPUE series, and the RAG did not accept either assessment. The TAC was set based on a weight of evidence approach and the discount factor was not applied.]
 - Dr Tuck noted that if the Tier 1 assessment was rejected then the RBC should not have been considered. He also clarified that there are two rules regarding the application of discount factors (1) whether there are sufficient spatial closures, and (2) whether there is stable catch and CPUE over a significant period of time.
25. The RAG agreed to the recommended RBC of 423 t with a discount factor of 15% (i.e. 359.6 t) and then applied the 50% large change limiting rule, resulting in the proposed 2020-21 TAC of 300 t The RAG also recommended setting a three-year TAC (MYTAC).
26. The species summaries has been updated and is provided at [Attachment E](#).

Agenda Item 5 – Updates to Pink Ling and Blue-eye Trevalla data

27. Ms Johnston advised that the Shark Industry Data Collection (SIDAC) program is currently only collecting otoliths and lengths for pink ling and blue-eye trevalla (BET) from automatic longline vessels, which may not be representative of the entire fishery. AFMA is seeking RAG advice on whether to extend the program to include dropline vessels. The SESSF Data Summary will be updated accordingly.
28. Key discussion points included:
- Pink Ling is a Tier 1 assessment so age composition data is essential.
 - Dr Thomson noted that it is unclear whether they can use manual dropline data without adding in a new fleet to the assessment, which also adds complexity. There is a separate action item for SIDAC to collect BET samples for close-kin analysis.
 - Understanding the proportion of catch taken by drop-line would help determine whether the data is useful. Current figures show that 60 t of pink ling is caught by dropline and 220 t caught by autoline.
 - There is a cost associated with collecting samples so it is important it will be used, if collected.
 - There has been an increase in BET caught by drop-line in the east and west in recent years, however there has been very little increase in catches of pink ling caught by dropline; drop-line samples for pink ling do not need to be collected.
 - A Tier 4 assessment is used for the BET stock on the slope, and Tier 5 for the seamount stock. Droplining is an ongoing gear type in the SESSF so good data collection is needed to support future assessments.
 - Current SIDAC BET targets include 750 otoliths and 1200 lengths. The 1200 lengths target consists of 75 samples per quarter, per zone. The RAG should consider whether the dropline targets should be scaled according to the proportion of the catch.
 - Dr Thomson suggested discussing appropriate BET sampling further at the meeting referred to under point 8, refer to minutes provided at Appendix A.
29. The RAG recommended including BET sampling targets for drop-line, noting a figure is yet to be determined.

ACTION ITEM 4: AFMA, SIDAC program and Robin Thomson to confirm biological sampling targets for hook caught blue eye trevalla, noting SERAG's advice to include the dropline method for blue eye trevalla.

Agenda Item 8 – Hagfish research sampling program

30. Mr Dan Corrie outlined an AFMA proposal for a Hagfish Research Plan that would provide a more structured approach to fishing for hagfish in the SESSF under scientific permits. AFMA is seeking RAG advice on the sampling design and data requirements, including a recommended Research Catch Allowance (RCA)

31. The RAG considered the following background:

- There are currently two trap permits in the GHAT fishery, one of these is endorsed to use hagfish traps. This operator has been hagfish fishing since 2015 and now there is interest from other operators to develop a fishery.
- An exploratory fishery policy is in development, which will provide a formal framework for developing new fisheries. Until then, a formal plan and a structured approach to data collection is required. (link: <https://www.afma.gov.au/fmpconsult>)
- A similar approach is taken in the GAB Trawl sector, whereby operators apply for scientific permits to fish for orange roughy, with the intent of collecting data to inform a future stock assessment.
- There are limited examples of existing hagfish fisheries, and little is known about hagfish life history and how populations respond to fishing effort (Ellis et.al 2015). In some parts of the world (Japan, British Columbia, Massachusetts and Maine) hagfish stocks are identified as depleted due to overfishing (Powell et.al 2005).
- 80 t of hagfish was caught in the SESSF in 2018.
- The current operator is currently unaware of this research proposal; the RAG was reminded of their confidentiality requirements.

32. The RAG discussed the following points:

- Industry suggested limiting access to existing operators, noting the knowledge and experience developed over time as well as their original financial investment in the fishery.
- Lessons could be learned from the US hagfish fishery, particularly patterns of localised decline in CPUE and information about the effective fishing area, i.e. the radius of attraction to traps.
- The RAG does not have enough information to recommend a defensible RCA, and precaution should be exercised.
- At its November 2017 meeting, SERAG provided initial advice on what data should be captured, including logbooks catch and effort, species composition and observer data.
- A better understanding of the data collected since the current operator started fishing in 2015 is required, particularly logbook catch and effort data and any biologicals collected by AFMA observers. The existing data has not been summarised yet.
- Mr Penney noted the paper¹ by Knapp et al. that said 100% of hagfish species off southern Australia are at an elevated risk of extinction using IUCN criteria, suggesting (M) is not high and productivity is low.

33. Several members noted the lack of information and guidance provided in the paper, however the RAG noted the following with regards to data collection and analysis:

- This is a developing fishery, so it is important to refine the sampling program once further information is available.
- Catch and effort data could inform questions of localised depletion but needs to be at a fine enough scale; the RAG suggested analysing CPUE in 10km x 10km grids would be sufficient. Catch should be reviewed after the first 12 months to better understand potential localised depletion.

¹ Knapp et al. 2011, Conservation status of the world's hagfish species and the loss of phylogenetic diversity and ecosystem function, source: <https://onlinelibrary.wiley.com/doi/abs/10.1002/aqc.1202>

- Observers could estimate fish lengths as they are discarded, noting they are difficult to handle at sea. Port sampling may be a better option, provided specimens can be kept alive for export.
- For longer lived species, more samples are generally required, however an estimate of natural mortality (M) is required to provide any further advice.
- 1500 samples per zone should be sufficient to start with.
- Mr Woodhams suggested that the RAG required the following before it was in a position to provide robust advice:
 - a detailed summary of the existing data, including a summary of the spatial and temporal extent of activities to date (Dr Tuck suggested CSIRO could undertake this work if time and staff were available).
 - a literature review, covering the international experience (noting limited domestic experience) with similar fisheries, would assist in understanding the potential impacts of fishing in the SESSF so far, and what is proposed under the research plan.

34. The RAG noted the following with regards to management arrangements considered in proposed research plan:

- The plan would allow for four permits, corresponding to ISMP sampling zones.
- The current catch of 80 t in 2018 comes from one zone, and the RAG were concerned about the level of catch that could be taken if this were to apply to each of the four permits.
- The Asian Hagfish fisheries have collapsed, though it is not clear whether these collapses occurred suddenly after a period of apparent stability in catch rates (indicating hyperstability), or whether there was a sudden collapse in catch rate which tracked biomass.
- When New Zealand introduced the hagfish fishery, they created 10 zones with varying TACs and an overall 100 t commercial TAC. In doing so, New Zealand considered three options: (1) average landings over the previous seven years, (2) average of the two years showing the highest reported landings over the previous seven years, and (3) no caps - open access fishery.

35. The RAG supported AFMA further developing the research plan for consideration by SEMAC, and provided the following guidance:

- AFMA should exercise caution when setting the TAC and noted that catches in excess of 80 t could represent a risk to the stock.
- The RAG is not in a position to provide RCA advice based on species biology. A relatively low risk approach would be to set an RCA at the suggested 40 t per zone, however AFMA needs to justify this amount.
- Catch and effort data is critical; the RAG can review data after 12 months to better understand the fishery and to provide more informed advice.
- Data on life history characteristics for species should be summarised where known or collected, if not known.
- An FRDC proposal for a PhD project to better understand life history, could run in parallel.

36. The Chair reiterated the point that this research plan is confidential at this point in time.

ACTION ITEM 5: AFMA to finalise the Hagfish research plan for consideration by SEMAC at its February 2020 meeting. SERAG have requested additional information before the plan is taken to SEMAC, including a thorough analysis of: (1) the existing scientific literature, (2) the management arrangements in other jurisdictions, and (3) the current operator's logbook data from the preceding four years to better understand spatial extent of catches.

Agenda Item 4 – School whiting and NSW catches

37. Mr Corrie provided some background to this agenda item:

- NSW introduced quota shares in 2019, including a combined school whiting and stout whiting TAC of 1189 t, close to the highest historical catch over the last nine years.
- Under the SESSF Harvest Strategy Framework, TACs are set each year by deducting all known sources of mortality from the RBC, which is mainly state catches and discards.
- Under the current harvest strategy, recent increases in NSW catches of school whiting would typically result in the Commonwealth TAC being reduced from 788 t in 2019-20, to 270 t for the 2020-21 fishing year.
- After consultation with industry, it became clear that a reduction of the Commonwealth school whiting TAC of this magnitude would have significant and long-lasting impacts on the SESSF, in particular the Danish seine fleet based in Lakes Entrance, Victoria.
- The AFMA Commission has agreed in-principle to maintain the 2019-20 school whiting TAC of 788 t for the 2020-21 and 2021-22 SESSF fishing years, subject to advice from SERAG regarding the long-term impact to sustainability of exceeding the RBC for the next two seasons.

38. At the SERAG October 2019 meeting, AFMA requested an update to the 2017 stock assessment, including catch projections to assess the impact on the long-term sustainability of the eastern school whiting stock of catches in excess of the RBC over the next two SESSF seasons. AFMA also asked for advice on the risks of postponing the Tier 1 stock assessment until 2021 (currently scheduled for 2020).

39. The following projections were requested from CSIRO:

- Using the 2017 Tier 1 stock assessment model, under ‘average’, ‘below average’ and ‘above average’ recruitment scenarios, project predicted stock status for the start of the following years: 2020, 2021, 2022 and 2023 under the following catch scenarios:
 - Scenario 1 – 1615 t (current RBC)
 - Scenario 2 – 1700 t
 - Scenario 3 – 1800 t
 - Scenario 4 – 1900 t
- Then, using average catch, project beyond 2023 to ascertain how long it is projected for the stock to approach the target biomass. Note: due to time constraints, this task was not undertaken.

Refer to the species summaries at [Attachment E](#) for an overview of updates to the 2017 stock assessment and catch projections.

40. The RAG noted the following key points with regards to catch projections:

- There is uncertainty around the stock structure as well as the species composition of NSW catches, particularly north of Barrenjoey Head. An FRDC project is currently underway (led by Dr Karina Hall and scheduled for completion by May 2022) to better understand stock structure. The results from this project will not be available to feed into the stock assessment for several years.
- The worst case scenario is that the 788 t Commonwealth TAC is fully caught, NSW catches remain the same and discards remain the same. This would equate to approximately 2200 t of catch.
- Of the scenarios considered, scenario 4 (1900 t) is closest to the ‘worst case’ scenario and is the tipping point, where the biomass is expected to decrease under average recruitment.

- The 1900 t scenario was chosen because it was noted at the previous SERAG meeting that the Commonwealth TAC was unlikely to be fully caught, and as such would constitute the most likely 'worst case' scenario.

41. The RAG noted the following key points with regards to NSW catches:

- Dr Silberschneider noted:
 - NSW catches will likely be high again in 2019 because the quota season started on 1 May 2019, and there were four months of fishing prior to this.
 - The Southern Fish Trawl Fishery (SFTF) has not yet transitioned to Commonwealth jurisdiction, and catches remain unrestricted.
 - Catch sharing negotiations between the Commonwealth and NSW are in very preliminary stages, and TACs for shared species in the NSW Ocean Trawl Fishery will be considered by the independent NSW Total Allowable Fishing (TAF) committee in January 2020, and will provide advice to the NSW Fisheries Minister in preparation for the 2020-21 season.
- Dr Hall advised that the composition of the fish trawl fleet in NSW has changed, and is likely to have affected the catch rates. Catches and catch rates have increased, though this is unlikely to be related to an increase in abundance.

42. The RAG noted the following key points with regards to providing advice to the AFMA Commission:

- It is not the role of the RAG to provide management advice, rather, robust scientific advice about the risk to the stock under various catch scenarios.
- Outcomes of the assessment update and risk to the stock under various scenarios should be synthesised for the Commission in an easy to understand format, including a comparison to the 2017 assessment for context.
- The low recruitment scenarios are possible, and if the 1900 t catch scenario eventuates, the biomass is expected to decrease. However, while recruitment has only been estimated up to 2013, there is no evidence of a long-term shift to below average recruitment, and it would be reasonable to consider the projections under average recruitment.

43. The RAG agreed that AFMA would synthesise the RAG's advice in a matrix for the Commission that includes: base case, four scenarios (1615, 1700, 1800, 1900 t) low, average and high recruitment and 2200 t.

ACTION ITEM 6: AFMA to summarise results from the eastern school whiting catch projections in a table for the purpose of providing advice to the Commission. Confirm accuracy with Jemery Day.

44. The RAG noted the following with regards to delaying the 2020 assessment:

- The 2017 assessment incorporating updated catch and effort data estimates the stock to be at 35% of B_0 , which is half way between the target and limit reference point.
- Delaying an assessment could put the stock at risk because the impact of changes to recruitment, catches and catch rates may go unnoticed, and the stock may decline further. A full update to the assessment would provide a better understanding of the stock including any recent recruitment patterns.
- The 2020 assessment will include another year of data, including recruitment estimates, known NSW 2019 catches, and the NSW 2020-21 TAC will also have been determined.
- Undertaking an assessment in 2020 will provide an updated biomass estimate, and may provide some comfort to the Commission, given their decision to maintain the Commonwealth TAC at 788 t, potentially exceeding the RBC.

45. After CSIRO members left the room, the RAG recommended undertaking the assessment in 2020, noting the delay was initially proposed, in the expectation that results from the stock structure project would be available for an assessment in 2021, however, this is not the case.

46. The RAG discussed AFMA's proposal to have the school whiting stock assessment externally reviewed:
- AFMA noted that industry have instigated their own review of the school shark assessment.
 - External reviews of assessments could be undertaken on an ad-hoc basis, however, members agreed that incorporating independent external review was good scientific practice, and this includes expert review of the underlying model.
 - Mr Boag emphasised the importance of having NSW DPI involved in future stock assessments.
 - There may be value in waiting until the stock structure results are available before instigating an external review. However, a model incorporating the stock structure results could be several years away. Reviewing now, and then again in several years' time, may be the best approach.
47. SERAG recommended AFMA implement a formal external review process for stock assessments in the harvest strategy.
- This should include the relevant RAG and commence with school whiting in 2020, and then other stocks considered on a case-by-case basis.
 - The usual process would be for applications to be considered by SESSFRAG and SEMAC as part of the call for research, however, given the tight timeframes, AFMA will need to consider an alternative approach.
48. The species summaries has been updated and is provided at [Attachment E](#).

Agenda Item 3 – Tier 1 Tiger Flathead

49. The flathead Tier 1 base case assessment was presented to [SERAG #1 in October 2019](#).
50. Dr Day provided an overview of biomass estimates from the last three flathead Tier 1 assessments:
- The 2014 assessment estimated the biomass to be 50% of virgin stock biomass
 - The 2016 assessment estimated the biomass to be 43% of virgin stock biomass
 - The current 2019 assessment estimated the biomass to be 33% of virgin stock biomass
51. Dr Day reminded the RAG of the key changes and additional data included in the 2019 assessment:
- The base case included updates to software, three years additional catch and effort data, length and age data to 2018, an updated ageing error matrix, and new Fishery Independent Survey (FIS) abundance indices from 2016.
 - Since the base case presented at the first SERAG meeting (October 2019), summer length frequencies and the 'FIS3' indices have been included instead of 'FIS1' indices. This resulted in minor differences.
 - The retrospective analysis showed no pathological problems or biases in the estimates at the end of the time series due to the addition of new data.
 - Estimates of recent recruitment were reviewed. Of the last 10 years, there was:
 - 4 years of good recruitment (2008, 2010, 2011, 2012)
 - 3 years of poor recruitment (2009, 2013, 2014)
 - 3 years of average recruitment (2006, 2007, 2015)
 - A number of sensitivities to the base case were explored, most notably:
 - In the base case assessment, natural mortality M is typically fixed at 0.27 and h has been estimated. After minor changes to the base case (inclusion of FIS3 data length frequencies) the estimated h increased from 0.62 to 0.72, however it was poorly estimated.

As a sensitivity, h was fixed at 0.75 and M was estimated. However, this gave implausible values of M.

For the current assessment, Dr Day recommended continuing to estimate h (estimated to be 0.72) and fixing M at 0.27. For future assessments, Dr Day recommended fixing M at 0.27 and fixing h at 0.75.

ACTION ITEM 7: At its first meeting in 2021, SERAG to consider how to fix steepness (h) for Tiger Flathead, in preparation for the 2022 stock assessment.

Refer to the species summaries at [Attachment E](#) for an overview of the outcomes of the revised base case, including catch projections under various recruitment scenarios.

The RAG discussed the following:

- Dr Koopman referred to the 2007 ERA for Danish seine sub-fishery (Zhou et al, 2007²), noting the post-capture mortality for discarded tiger flathead was assumed to be less than 100%, whereas the Tier 1 stock assessment assumes 100% mortality. He also noted the potential to incorporate a post-release tagging study as part of the Danish seine survey. The RAG agreed the future assessment could consider reviewing post-capture mortality for discards.
- Industry members expressed concern about how quickly the changes are occurring in the fishery and water temperatures are affecting spawning (suggesting that flathead do not spawn below 18 degrees). There is no data to verify the climatic effects.

The Chair closed Day 1 of the meeting and noted that this agenda item would be completed first thing on the following morning.

DAY 2: Wednesday 4 December 2019

The Chair reconvened the meeting at 8am.

Continuation of Agenda Item 3 – Tiger Flathead

52. The RAG considered whether the outcomes of various catch projections and recruitment scenarios should be presented to the AFMA Commission for the purpose of setting the 2020-21 Total Allowable Catch (TAC):

- while there were two years of poor recruitment in 2013 and 2014, the most recent recruitment estimate (2015) is considered to be average. While the 2015 recruitment estimate may also be revised as additional data is collected on this recruitment event, the RAG recommend setting RBCs based on average recruitment.

53. The RAG recommended a three-year RBC using either the single year RBCs or the 3-year average RBC, noting the expected biomass in 2023 under each scenario is 36.7%B₀ and 36.6%B₀, respectively.

Note: An error was identified in the catch series used in the assessment after the December 2019 SERAG. While the changes to the catch series were relatively minor, it resulted in changes to the spawning biomass series, recruitment and resulting RBCs. SERAG recommended the revised RBCs (below) out of session on 16 January 2020.

² Zhou et al, 2007 Rapid quantitative risk assessment for fish species in selected Commonwealth fisheries. CSIRO.

Final RBCs:

2334 t (2020)

2648 t (2021)

2706 t (2022)

2563 t (3-year average)

54. The RAG thanked Dr Day for producing the various catch and recruitment scenarios, and noted they are included in the stock assessment report, and are captured at a high level in the species summaries at [Attachment E](#).

55. Prior to finalising the agenda item, the RAG recommended:

- monitoring catch rates as part of the annual MYTAC analysis.
- monitoring other available data sources – e.g. analysis of catch rates before and after the seismic survey scheduled for January 2020, and the FIS scheduled for 2020.
- future assessments should consider:
 - monitoring changes to length frequencies to assess the impact of changes to Danish seine mesh size on selectivity
 - a potentially separate stock occurring off the east coast of Tasmania
 - ensure historical data is not lost during data processing – requires additional checking
 - differences between steam trawl lengths (Blackburn, 1945-55 and Sydney Fish Market 1953-58) noting it may not be possible to resolve.

56. The species summaries has been updated and is provided at [Attachment E](#).

Agenda Item 7 – Update on pre-1998 ISMP data

57. Dr Matt Koopman provided an update on a project that investigated issues with incorrect pre-1998 observer data. He outlined the history of observer data in the SESSF since 1992, which includes state and Commonwealth data collection programs.

- The first coordinated observer program in the SESSF was run from 1993 to 1995, known as the Scientific Monitoring Program (SMP).
- To improve efficiency in data collection from the South East Trawl fishery, a statistically rigorous sampling program (the Integrated Scientific Monitoring Program, ISMP) was designed in 1996/97 and then implemented in 1998.
- During 1996 and 1997, an interim ISMP was undertaken to maintain the time-series of data, which was managed by AFMA, with NSW and Victoria conducting the sampling and BRS managing the databases.
- At some stage prior to 1998, observer data from the SMP, NSW sampling program and the interim SMP were combined into one database.
- For some reason, possibly caused by differences in the types of data collected or how they were stored, the resulting on board length frequency data contained many obvious errors.

58. As part of this project, Dr Koopman noted that 60 excel files were found that included port measurements for blue grenadier and school whiting in differing formats. The formats were too different to address within the scope of this project, and this data was not included (Dr Koopman estimates it would take around 5 days to sort through it).

59. Dr Koopman outlined three main datasets and identified the following errors that were the focus of this project:

- Various terms, or 'classification', as to whether or not the catch was sorted before the length frequency sample was taken;
- misclassification of retained lengths as discarded lengths;
- missing proportion of catch weight sampled for length measurement; and
- missing catch and sample size information.

60. Dr Koopman noted that significant numbers of port-based length frequencies found in files from the VFA are missing from the AFMA database. The addition of those data to the database is outside the scope of this project, but should be addressed.

61. Dr Koopman provided an overview of the results:

- Of the 319,311 on board length records considered in this project:
 - about 33% were incorrectly coded.
 - 69,612 (22%) were re-coded from 'discarded' to 'retained', 32 (0.01%) from 'discarded' to 'retained', 36,246 (11%) from 'discarded' to 'fate unknown' and 66 (0.2%) from 'retained' to 'fate unknown'.

62. The RAG noted the following key points:

- The project did not include investigation of the origins of the errors.
- Dr Thomson suggested correcting the data at the source (in the AFMA database) with appropriate justification recorded, and keep a copy of the source data and documentation for future reference, to reside with CSIRO or AFMA.
- It is important to stratify length data (e.g. by factors such as depth, zone, season where relevant) and catch weight the lengths within those strata before combining them to give an annual length frequency for a fleet. That, however, cannot be done effectively if the number of samples within strata is very small. ISMP samples used to be large enough to allow adequate stratification but the size and patchiness of sampling in recent years has prevented stratification and catch weighting.

63. The RAG recommended this revised dataset should be considered as the default dataset, replacing the existing dataset, and should be added to the AFMA database by April 2020 in order to be used in stock assessments in 2020.

- Mr Garvey (AFMA) should be requested to put this new data into new tables, capture Dr Koopman's corrections in code, and rebadge the old data in some way.

ACTION ITEM 8: AFMA to ensure the revised pre-1998 ISMP dataset is captured into the AFMA database and Dr Koopman's code corrections are stored and the old data rebadged appropriately.

Agenda Item 9 – SESSF research priorities

64. Mr Corrie advised that the intent of this agenda item is to consider research priorities for inclusion in the SESSF 2021-22 research statement. The overarching five-year strategic research plan will be reviewed at the SESSFRAG meeting in March 2020.

65. The RAG recommended including a standing item in the SERAG agenda each year, and to allow funds (e.g. \$10,000) in the budget, to consider independent reviews of stock assessments. A formal approach will be considered at the 2020 SESSFRAG Chairs meeting.

66. Mr Corrie provided an overview of projects that are underway, in progress or about to start. The RAG discussed key points:

- There are significant economic implications with AFMA's proposal to regionalise quota SFRs (e.g. pink ling and blue warehou). As part of the 2020-21 call for research, AFMA is

seeking EOIs to undertake a desktop study to analyse existing data and investigate stock structure. Mr Boag noted there are challenges associated with managing eastern catches of pink ling in practice and with convincing industry that the stocks should be managed as two distinct stocks.

- An FRDC project is scheduled to start soon to quantify discards and investigate bycatch mitigation approaches in the SESSF. Dr Matt Broadhurst (NSW) is the Principal Investigator.
- The EOI for investigating dynamic reference points was approved and submitted for funding, however FRDC have not responded yet. The 'cost' of this project in the draft research plan needs to be changed to 'high' as it expected to be around \$500,000.
- The Upper Slope Dogfish Management Strategy is currently being reviewed, and a project scoping proposal has been submitted to FRDC for funding in the 2020-21 financial year to establish a baseline index of abundance using a non-invasive approach. The proposal included using deepwater BRUVs (underwater baited cameras).
- Currently, all discarded school shark are considered to be mortalities. A project scoping proposal has been submitted to FRDC for funding in the 2020-21 financial year to investigate school shark post-release survival. The gillnet industry considers this work to be critically important.

67. The annual research statement includes consideration of the cost-effectiveness, priority and timeframes each research priority. Various research priorities have been identified at recent SESSF resource assessment groups. The RAG noted the following with respect to each priority:

Investigation of factors (length/depth relationship) that influence length frequencies for all species and ISMP port sampling

The potential introduction of EM on trawl vessels and the need to collect length samples in port was the driver for this project. Dr Thomson has undertaken initial work (see SESSF 2019 data meeting minutes), however, a more in depth investigation is required. Dr Thomson proposed selecting a subset of 4-5 SESSF species to investigate whether port-based sampling for lengths is appropriate.

Include in the SESSF 2021-22 research plan. SESSF 2020-21 Chairs meeting.

Non extractive survey methodology for establishing Eastern Gemfish index of abundance.

SERAG have proposed alternative approaches to establishing an index of abundance, including a targeted fishing survey during the winter spawning aggregation, or the use of close-kin genetic analyses. The RAG recommended considering all rebuilding species for application of close-kin assessments.

Include in the SESSF 2021-22 research plan. SESSF 2020-21 Chairs meeting.

Research to determine if the Tiger Flathead - Tasmanian stock is a separate stock (requested at SERAG #1, 2019).

AFMA noted there are potential management implications, and asked that SERAG allow AFMA to discuss this internally before it is considered as a research priority.

Blue Warehouse targeting analysis to inform the TAC for the 2020-21 season.

This will be reconsidered after Dr Burch and Ms Briton's presentation on the [metiers analysis](#).

Analysis of Blue Grenadier acoustic survey data collected by industry in 2019 for inclusion in the 2021 Tier 1 stock assessment.

Acoustic data was collected from the factory freezer vessel that fished Blue Grenadier in 2019.

Further advice is needed from Dr Tuck (not present during this item) and the utility of ongoing survey data should be considered by SESSFRAG at its Chairs meeting in March 2019 as part of the research agenda item.

Include in the SESSF 2021-22 research plan. SESSFRAG to consider costs and priority at its 2020 Chairs meeting.

Re-affirm priority for SESSF catch histories project.

AFMA will discuss this further with Dr Thomson.

Include in the SESSF 2021-22 research plan. SESSFRAG to consider costs and priority at its 2020 Chairs meeting.

Impacts of recreational fishing.

There is not a large overlap in the SESSF with recreationally caught species. Current recreational fishing projects undertaken by ABARES (with coinvestigators) will not be relevant to setting TACs in the SESSF. Do not include in the SESSF 2021-22 research plan.

Examination of data acquired through electronic monitoring, logbooks and on board observers.

This item was not discussed and will be referred to SharkRAG.

Herding behaviour for various SESSF species to inform future ERA assessments.

The current ERA methodology calculates 'swept area' by using the width of the net, but does not include the sweeps, bridles or doors. The effective swept area is therefore likely larger, particularly for species which exhibit herding behaviour. At its 2019 data meeting, SESSFRAG recommended investigating herding behaviour to inform future ERA assessments.

Include in the SESSF 2021-22 research plan. SESSFRAG to consider costs and priority at its 2020 Chairs meeting.

Agenda Item 12 – Western Orange Roughy research plan

68. Mr Boag provided background that has led to development of the draft Western Orange Roughy Research Plan (WORRP):

- There was a decline in western orange roughy CPUE during the same period the eastern stock was overfished.
- While rebuilding of the eastern stock has been demonstrated, and it would be reasonable to assume the western stock has undergone a similar rebuild, the characteristics are different between the two stocks.
- At its October 2019 meeting, SERAG supported further development of the WORRP, and asked that a draft be provided to this meeting that focussed on:
 - data collection, including research zones (identified using maps of historical catch),
 - potential bycatch implications (smooth oreos, deepwater sharks and gulper sharks),
 - trigger limits for TEPs and sensitive benthos,
 - a separate RCA for smooth oreo dory (other),
 - observer coverage and logistic.

69. The updated draft WORRP proposed the following:

- A Research Catch Allowance (RCA) of 200 t of Western Orange Roughy.
- Details of data collection, include catch and effort, catch composition and biological samples (otoliths and lengths), to be implemented under the existing AFMA/SETFIA co-management agreement.
- Collection of 1000 otoliths and length frequencies at the rate of 50 kg of orange roughy per shot (2 cases or approx. 67 fish). This aligns with previous CSIRO-led AOS surveys.

- The AFMA/SETFIA co-management agreement will cover program management, reporting, training, coordination of port sampling and data provision to AFMA.
- SETFIA will coordinate the selection process for allocating scientific permits in consultation with AFMA, based on factors that include the skipper's experience (particularly with regards to western orange roughy), the skipper's previous engagement with SETFIA/AFMA, and the vessel's capabilities.
- Limiting effort across zones to provide a representative spread of data collection. For example, 100 t per zone.
- Allocation of research permits for 6 months (this being the maximum time allowed), including conditions as outlined in the draft WORRP.

70. The RAG discussed the following points with regards to data collection:

- SERAG had previously noted that acoustic surveys would not be suitable for the western stock because the western stock was not thought to aggregate like they do in the east. However, Mr Dunkley-Price suggested the species does aggregate to some extent in some areas.
- At its October meeting, the RAG agreed not to include acoustics in the initial sampling design, noting this could be revised if it becomes apparent that aggregations are large enough to warrant acoustics. Should this change occur, it may have implications for structure and resources required for the research plan.
- Mr Woodhams highlighted that given the overfished nature of the stock, it was important to explain why extractive methods (like targeted fishing) of data collection were necessary/appropriate for this stock (or conversely why acoustic survey approaches would be inappropriate).
- Large shots should be avoided where possible. To ensure sufficient sampling, operators should be encouraged to keep shots to less than 10 t. This condition should be reflected in research permit conditions.
- Current annual catches in the west are around 30 t and were previously as high as 800-1000 t (1992) and reached 5000 t in the 1990s.
- Dr Thomson noted the importance of collecting length samples from fish that have not also been sampled for otoliths. i.e. sample separate fish for otoliths and lengths.
 - Failure to do so may result in insufficient length frequencies in the future stock assessments.
 - Length sampling should be proportionate to the catch, whereas otoliths collection should ensure a representative sample across the lengths to develop an age-at-length key.
- The RAG requested collecting 100 lengths and 50 otoliths from separate fish, per shot, with an overall target of 1000 otoliths and 2000 lengths from across the three zones.
- There are significant cost implications for carrying observers. The current proposal includes carriage of an observer for the initial trip, or at least once during the permit period. This will be considered further at SEMAC, noting the potential to incorporate it as part of the existing ISMP coverage.
- Getting a better understanding of bycatch composition is important. Industry suggested smooth oreos are not caught in large numbers in the proposed areas, however mixed oreo would likely be caught. Permit holders would need to have quota to cover any catches of oreos.
- Water temperature information is useful for orange roughy. AFMA and SETFIA could investigate which data logging device has been used on previous surveys or check with the Australian Antarctic Division (to ensure the quality of data collected). An AFMA graduate team also recently wrote a report about the capacity for industry to collect environmental data, including availability of suitable devices.

71. The RAG discussed the proposed research zones referred to in Figure 1:

- Mr Dunkley-Price suggested not opening up the Sandy Cape area because it was the original catch 'hot-spot' that was fished very heavily in the past so it should continue to be protected; another hill just north of Sandy Cape (referred to by industry as the penis) would provide adequate samples.
- Mr Boag noted that the proposal would extract a maximum of 100 t which is precautionary, and data collected across the three zones will provide information to make an informed decision about which areas to open in future. Also that the Murray Dogfish closure covers an areas which was reportedly as important a fishing ground as Sandy Cape.

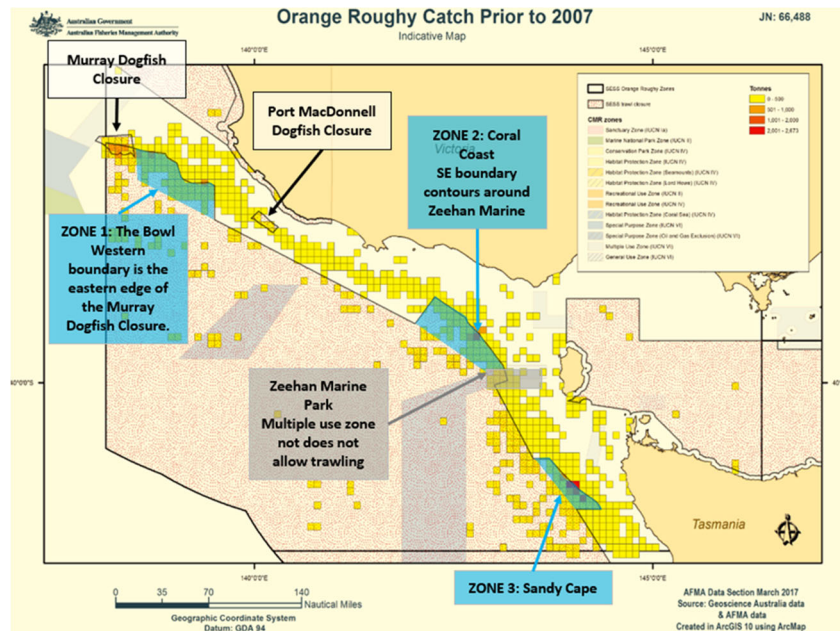


Figure 1 Proposed research zones under the draft western orange roughy research plan

72. The RAG noted the following with regards to additional management arrangements:

- The Upper Slope Dogfish Management Strategy (USDMS) includes four species (Harrison's dogfish, southern dogfish, endeavour dogfish and greeneye spurdog).
- The existing rules in place under the USDMS would apply to fishing under this research plan. There is an existing catch trigger of 4.5 t total for gulper sharks. If this were to be reached in total, then all permits would be revoked.

73. In providing advice, members noted the following key considerations:

- Orange roughy in the western zone is classified as overfished and is subject to a rebuilding strategy. The primary purpose of the proposed research plan is to collect information to support a stock assessment and through stock assessment determine the extent of rebuilding. It's important that the plan is written in the context of assessing the state of the western orange roughy stock.
- The plan intends to collect data to support a Tier 1 stock assessment. The requirements for such an assessment should be documented and understood prior to the plan being enacted.
- There are previous samples collected before the closures were implemented that should be available in the database. This is very valuable because it's a long lived stock.
- Consider the advice about otolith/length sampling to ensure representative sampling and for 1000 otoliths and 2000 lengths per zone.
- The limits on catch provided for under the research permits should be driven by the data needs of the intended stock assessment. Catch limits should be set so as to achieve the necessary number of samples for an assessment, while at the same time not putting the

stock at risk. Limits in the order of 75t - 100 t per zone were discussed. Trigger limits were proposed for each of the three zones.

- After a year's operation, the spatial and temporal spread of catches across the zones can be reviewed and revised if needed.
- The survey should be undertaken over the same six month period each year to capture seasonality.
- Observer coverage should be defined at AFMA's discretion (taking into account the experience of skippers) and SEMAC advice, in order to validate logbook data for bycatch and robust catch estimates.
- Important to manage shot size, i.e. 100 shots across or more across the survey, shots no bigger than 10 t.

74. The RAG was supportive of the proposed 200 t RCA as part of the Western Orange Roughy Research Plan, as separate from the existing 60 t bycatch TAC.

Agenda Item 10 – Rebuilding strategy reviews

10.1 Eastern Gemfish

75. Ms Johnston noted that the RAG is requested to consider the results and provide advice on the effectiveness of the eastern gemfish Stock Rebuilding Strategy 2015. The aim is to prevent targeting and to rebuild eastern gemfish to the limit reference point (20% of unfished spawning biomass) by 2027 and to measure rebuilding progress.

76. The RAG noted the following with regards to stock assessments:

- The 2010 Tier 1 assessment indicated it was at 15.6% of B_0 .
- The assessment was updated with new data in 2016 but was not accepted by the RAG. However the RAG noted that the data provided no evidence of stock rebuilding.
- The next assessment is scheduled for 2020 however the lack of data will likely result in the stock assessment not being conducted.

77. The RAG noted the following with regards to recent catch and discards:

- In 2019, there was an increase in eastern gemfish catch, with 56.3 t reported (as at 19 November 2019) - the highest catch since 2013 (57.6 t).
- There are no figures for 2019 discards yet but in 2018, estimated discards increased to 63.6% - the highest estimated discard rate since 2013 (67.4%). Note: this figure is obtained by applying the discard rate to the landed catch and there is considerable uncertainty around this estimate.
- 46% (18.7 t) of the estimated discarded catch pertains to the trawl fishery off Eden (NSW) and Mr Jarvis noted that even with restrictions on pink ling catches in the last 3 years, they are still catching eastern gemfish without targeting and perhaps this is an indicator of rebuilding.
- In 2018, 840 shots were reported in logbooks as containing eastern gemfish, of these 84 shots were observed.
- Mr Corrie emphasised the considerable uncertainty around the high discard rate presented.
- Dr Liggins suggested making it clear which estimates were accepted in previous years, to provide some indication of the discard for the current year. Dr Burch noted that the CV on estimated discards is 83% so it's high but doesn't fail the 100% rule.
- In 2017, SESSFRAG agreed to alter the stratum definitions used in discard calculations to match those used for setting ISMP target sea days.
- In 2019, there were 31 shots of eastern gemfish over 250kg – this is the highest since 2013 and there has been an increase in the number of shots containing over 250kg since 2016.

- The targeting analysis reviewed catches by the top 10 vessels and the shots that contained eastern gemfish. There were 884 shots and 631 shots for the 2018/19 and 2019/20 seasons respectively, and the analysis found no indication of targeting. In future, Dr Burch will be able to generate a bubble plot to aid the analysis.
- There has been approximately 40 t of eastern gemfish caught so far this year.

78. The RAG noted the following with regards to management measures:

- Management measures implemented include having an incidental catch TAC (100 t since 2002), specifying a minimum codend mesh size, limited entry to the fishery, enforcing trip limits (50kg in NSW) and compulsory pre-reporting when landing eastern gemfish catch during specified periods (over the spawning aggregation) within the season.
- Mr Corrie asked the RAG if pre-reporting was still a valid approach if we are not getting an index of abundance from catches of the spawning aggregation, noting that targets for ages and lengths are being met.
- Dr Silberschneider advised that in NSW they maintain a 50kg trip limit for ocean trawl and less than 1 t has been taken since 1 May 2019.
- Mr Jarvis noted the challenges of targeting - that while targeting blue-eye trevalla some gemfish is caught but then in the next shot in close proximity to the initial shot, only gemfish is caught. Members noted this was useful information.

79. After considering the data and catch maps presented, the RAG discussed the following:

- Noting ISMP targets are being achieved, is there value in port-sampling when large shots of eastern gemfish are landed? Doing so doesn't resolve the issue of being able to establish an abundance index. Noting that catches from zone 10 are reported to AFMA so samples can be collected, consider whether the focus remains on the spawning aggregation in zone 10 or broaden the reporting rule to specify other zones.
- While there are signs of rebuilding and samples are continuing to be collected, there is not enough data to assess whether rebuilding is actually occurring and by how much. This is preventing the development of a CPUE index. Two possible options are to conduct a survey of the spawning plume with a camera on the open codend or to invest in close-kin analysis. Note however there is the targeting issue associated with rebuilding species.
- It is important to resolve the issues with pink ling as well as focusing on eastern gemfish catches – these are caught together in the deeper waters.
- The Data Summary indicates that gemfish age range is 7-11 years but mostly under seven years. Maturity is 4-6 years. So fish caught over 10 years ago are less likely to be useful in an assessment when there is no index of abundance.
- The spawning run survey (providing historical lengths at age data) could be useful to provide an indication of stock status until then.
- Waiting another year for more data to be available would be cautionary to build a better picture of stock rebuilding.
- Mr Jarvis advised that where the data is coming from has changed, data is coming from the Gabo Island to Tasman Island area and very few boats are working the north now.
- Dr Liggins noted mismatches in data between fleets and that it's important to check what is being compared (if using as the basis to argue that there is rebuilding and then to do further surveys) when using data from both spawning and non-spawning runs. Suggests AFMA analyses time and location. Winter spawning aggregation will be a useful index.

80. The Chair summarised the discussion:

- There is some indication of stock improvement but the assessment is inhibited by lack of an abundance index and data to inform an assessment.
- Recommendation to keep a watching brief for at least 12 months.
- There is an opportunity to break the deadlock by developing a research plan with survey options, e.g. close kin analysis and supporting a desktop study to consider the sampling data required for depleted stocks and to obtain an index of abundance.

10.2 Orange Roughy

81. Ms Johnston advised that a five year review of the *Orange Roughy Stock Rebuilding Strategy 2014* is now due and thus, consultation is in progress with GABRAG, SERAG, SEMAC and GABMAC. The species is listed as conservation dependent so all orange roughy zones are included in the rebuilding strategy.

82. The RAG discussed or noted the following points:

- The orange roughy rebuilding strategy is different to the other rebuilding strategies in that an annual review is not routinely undertaken. The other rebuilding species (blue warehou, redfish and eastern gemfish) are caught as part of commercial fishing so they undergo an annual review but management measures for orange roughy include applying closures in locations where it is caught i.e. targeting is not an issue.
- Management measures in place include catch limits, closures, limited entry, reporting and monitoring requirements, observer requirements, minimum quota holdings and a stop fishing trigger (that was subsequently removed in 2019).

Eastern zone

- The 2017 assessment indicated that the biomass had continued to increase and estimated the female spawning biomass had rebuilt to 33% of unfished biomass (33% B₀) at the beginning of 2018. The next assessment is scheduled for 2020.
- Six acoustic surveys have been undertaken since 2006 (the most recent survey completed in 2019) and the abundance estimates support the model predicted increase in spawning biomass.
- Most of the catch comes out of the eastern Orange Roughy Management Area (ORMA) that includes St Patricks Head and St Helen's Hill.
- The stock appears to be tracking well in terms of rebuilding and the aim is to continue rebuilding towards the target reference point.
- The current RBC is 900 t.
- In 2019, SEMAC supported removing the existing trigger that implements a closure of the ORMA grounds once the TAC is 80% caught. SEMAC considered that quota holding requirements and overcatch provisions were sufficient to cover the small amount of incidental catch that is known to occur outside the spawning period.
- There will continue to be observer coverage to ensure biological samples are collected. Mr Boag highlighted that it was an industry proposal to use observers initially (since 2014).
- Mr Boag noted that MSC certification for the eastern zone is pending.

Cascade Plateau

- The Cascade Plateau is managed as a separate zone.
- Currently there is an annual TAC of 500 t with a trigger in place.
- In the last season, only 23.6 t was caught on the Cascade Plateau.
- SESSFRAG considered the Cascade Plateau earlier this year and noted that orange roughy effort and catch is very low – due to its remoteness.

Southern zone

- The southern zone is a large area that includes the Pedra Branca region.
- The southern zone has a 31 t incidental catch TAC. Separately to this, the Pedra Branca region has its own RBC of 63 t which is taken from the eastern zone RBC – i.e. 7% of the eastern zone RBC of 900 t (due to stock structure assumptions).
- In summary, the 94 t TAC consists of:
 - 31 t incidental catch TAC for the southern zone.
 - 63 t TAC for the Pedra Branca region.

Western zone

- The last stock assessment for the western zone was in 2006.

- Fishing effort has been low but since the eastern stock has rebuilt to be above the limit reference point, it is possible that similar rebuilding may have occurred in the western zone.
- Accordingly, a Western Orange Roughy Research Plan is being developed to commence in 2020, to collect appropriate data that will inform future stock assessments.
- The western zone currently has a 60 t bycatch TAC and catches in recent years has been low – e.g. 15 t this year and 19 t in the previous year.
- The western zone includes a deepwater shark 700 metre closure which has been excised with a trigger to close the area once 20 t of orange roughy is caught. This trigger has not been reached.

Southern remote and North East remote zones

- There are no known spawning aggregations in these zones.
- Catches have been low in both zones and there is no stock assessment available.
- These zones are not classified in the ABARES Fishery Status report, the RAG was unsure of the background to this.

South Tasman Rise

- The South Tasman Rise is an undersea ridge that extends south of Tasmania and into the Southern Ocean, straddling the Australian Fishing Zone (AFZ) and the high seas.
- The last stock assessment was undertaken in 2003 and indicated that the original stock was not large and had reduced significantly since 1997.
- The zone has been closed since 2007 and there has been no biomass updates since.
- An MOU between Australia and New Zealand is in place for the South Tasman Rise. Ms Hill noted that there is a joint project with New Zealand – a bottom fishing impact assessment is planned under the South Pacific Regional Fisheries Management Organisation (SPFRMO) and involving Dr Roland Pitcher (CSIRO).

East Coast Deepwater Trawl Sector

- There has been some fishing within this sector however no recent catches of orange roughy.
- The last reported catch was 150kg in the 2003-04 season.
- There is no stock assessment for orange roughy in this sector and the stock is not classified in the ABARES Fishery Status Report.

Albany & Esperance

- There has been no large aggregations of orange roughy reported in this zone since 1990 and it is assumed that the stock has declined in the GAB in line with declines in other SESSF regions.
- GABRAG reviews the research plan and the rebuilding strategy for orange roughy in the GAB.
- There is no stock assessment for orange roughy in the GAB due to low catches and data collection has been sporadic and spatially scattered.

83. Mr Penney raised the point of what happens once the stock has rebuilt to above the limit – how and at what point could the stock be removed from the rebuilding strategy and a Harvest Control Rule be implemented. Noting however that the rebuilding strategy is a requirement of the EPBC listing process. AFMA can discuss this with the Department of the Environment to remove the rebuilding strategy from their listing process which may prompt a reassessment that changes the status of the species in regard to the EPBC Act.

AFMA can also check the updated Guidelines to the updated Harvest Strategy Policy which has a section on recommencing targeted fishing (section 6.4) – once there is a high probability that the stock is above the limit, then targeted fishing can commence under a Harvest Control Rule.

84. The RAG recommended:

Eastern Gemfish

- Continue monitoring the rebuilding strategy for another 12 months leading to the development of a research plan to stimulate data collection in support of a stock assessment.
- Explore opportunities for obtaining data that would contribute to a Tier 1 stock assessment - e.g. open codend sampling, a targeted spawning run survey and a close kin assessment.
- Undertake a desktop study to determine the feasibility of using close-kin mark recapture techniques for this stock. Mr Boag noted that school shark had recently undergone a review which may inform the use of close-kin assessments.

Orange Roughy

- Continue monitoring stocks against the rebuilding strategy, noting the need to determine the process for transitioning to an approved harvest strategy (i.e. exiting the rebuilding strategy) when the stock has rebuilt to be above the limit reference point.
- SERAG considers there are indications that eastern orange roughy has rebuilt to above the limit reference point. Current TACs for the stock are being output from an agreed harvest control rule. SERAG supports AFMA investigating the process for transitioning a species from being managed under a rebuilding strategy to being managed under a harvest strategy.

85. The species summaries has been updated and is provided at Attachment E.

RECOMMENDATION 1

SERAG recommends that eastern Orange Roughy is removed from the rebuilding strategy.

ACTION ITEM 9: AFMA to provide advice to SEMAC about the process for transitioning stocks or a species from rebuilding strategies to harvest strategies once it has been demonstrated they have rebuilt to be above the limit reference point. *(Note link to Recommendation 1 to remove eastern Orange Roughy from the rebuilding strategy)*

Agenda Item 11. Incidental TAC advice for rebuilding species

86. Mr Corrie noted for this item, TAC advice is required for each of the rebuilding species (blue warehou, eastern redfish, eastern gemfish and orange roughy) noting that for orange roughy, an incidental TAC is required for the southern and western zones and an RBC recommendation is required for the Cascade zone. Key points included:

Blue Warehou

- The TAC decreased from 365 t (2008-09) to an incidental TAC of 118 t in 2012/13 where it has remained since and has not been breached.
- The Commission requested advice on:
 - the effectiveness of the current move-on provision,
 - an updated companion species and targeting analyses to update estimates of unavoidable bycatch,
 - the likely impact of recent discards (including the high 2017 estimate) on stocks, and
 - the feasibility of updating the assessment in light of recent catch increases and discard estimates.
- At SERAG #1 (2019), members agreed to maintain the move-on provision because it seems to have been effective though it may compromise the CPUE series in future, and suggested reinforcing the message via educative campaigns, including SETFIA texting operators again.

The recommendation from SERAG #1 was to develop an alternative primary index of abundance as a high priority for use in future stock assessments.

Eastern Redfish

- A stock assessment is scheduled for 2020.
- The TAC decreased from 100 t in 2018/19 to an incidental TAC of 50 t in 2019/20 based on catches in recent years and the 2017 stock assessment which indicated stock to be below the limit reference point (estimated at 8% of B_0) and lower than the 2014 assessment (estimated at 11% of B_0) with no signs of recovery to date.
- The ABARES Fisheries Status Report 2019 classified redfish as having an 'overfished' biomass, and as 'uncertain if subject to overfishing'.
- In 2018, SERAG recommended an RBC of zero and an incidental TAC of 100 t for 2019-20, noting that the rebuilding timeframes were based on recruitment estimates that have been below average since the early 2000's.
- The Commission requested advice on:
 - recent recruitments as an indicator of likely recruitment scenarios to inform rebuilding timeframes,
 - the available data with a view of updating the stock assessment in 2020,
 - an updated companion species and targeting analyses to update estimates of unavoidable bycatch, and
 - the outcomes of the tiger flathead Tier 1 stock assessment (an expected reduction in the TAC) and the potential impact of on redfish catches.
- At SERAG #1 (2019), members noted that the assessment could not provide a definitive answer about recruitment due to a lack of data and poor sampling from previous years and emphasised that improved sampling is critical. Some evidence of recruitment was noted but sampling has not been of sufficient quality to indicate if it's occurring across the range of fish (port sampling was primarily from NSW but on board sampling seemed to be representative of distribution of the fishery). SERAG agreed it was unclear if it will translate into an index of abundance. Members also noted that recreational and commercial catch data will be available to update the assessment, and while the quality of data seems to be improving, such low catch levels mean CPUE may be becoming less useful as an index of abundance.

87. Dr Burch and Ms Briton (a PhD student at CSIRO) provided an overview of the metiers analysis they are developing that is intended to assist SERAG in responding to the Commission's request (for an updated companion species and targeting analysis to provide updated estimates of unavoidable bycatch). Dr Burch and Ms Briton noted the following, along with some preliminary outputs:

- A metier is a group of fishing operations targeting a specific assemblage of species using a specific gear, during a precise period of the year and within a specified area. It relies on logbook data, gear used, the timing and location of catches and species composition. It is missing the targeting intention so this inferred from observations, the catch composition or a combination of inputs.
- This analysis is related to the multi-species harvest strategy project and builds upon previous work Ms Briton undertook in early 2019.
- The key issues driving this analysis include that when catching multiple species in the SESSF, the TACs of rebuilding species may prevent the TACs of primary species being achieved and that if the TACs of primary species are too high, they may impact the recovery of rebuilding species. Thus this analysis investigates the impacts of multiple species being caught together and attempts to identify characteristics associated with the catches of rebuilding species.
- A companion species analysis identifies which species are caught together and the impacts of modifying TACs and a targeting analysis seeks to identify the characteristics (e.g. location, depth, month) associated with individual rebuilding species catches.

- The Klaer and Smith method (2008 and 2012) assigns ‘target species’ to shots as species with the greatest value and aggregates by: 50m depth intervals, month and day/night. The advantages are that it works, it’s repeatable and is simple. The disadvantages are that it assumes targeting, needs price data, the uncertainty is poorly described and it is sensitive to missing data.
- Metiers can be defined either from the input or the output side. By looking at the data from the input side, the assumption is that catch composition can be predicted from the combination of inputs, and that it was the intended catch - this is the main assumption behind the companion species approach. If metiers are defined based on catch outcome, the assumption is that the output reflects the fisher’s intention – but in reality this is not always the case.
- In multi-species fisheries, output based approaches are generally used and multi-variate statistical methods, specifically multivariate clustering methods. A clustering analysis groups things that are similar e.g. shots with similar catch compositions.
- This analysis for the SESSF analysed logbook data from 2012-2017 and fish price data from ABARES (to calculate the species contribution to the total shot value), and separate clustering analyses for 5 gear types/regions (Trawl East, Trawl West, Danish Seine, Gillnet and Hooks). The clustering analysis was conducted on the species value contribution rather than the species weight contribution because targeting is more likely to be driven by the value rather than the weight of the catch.
- Mr Penney raised a concern about the time period that metiers are defined for and evaluated, noting that metier definitions change over time and other factors are important e.g. the implementation of closures which alter the range where some species are caught. Mr Penney noted that Dr Little had suggested that metiers need to be defined around current fishing. It is important to see a historical trend in clusters. We need to see the next step – i.e. what the species associations are likely to be in terms of bycatch.
- In summary, the companion species analysis using the metier analysis shows that changes in the flathead TAC have most impact on redfish and some impact on blue warehou and eastern gemfish catches. Changes in the pink ling TAC have the most impact on eastern gemfish catches.
- Mr Boag noted that there are differences in quota ownership between flathead and Eastern gemfish for example.
- Dr Burch added that this analysis (which uses metiers from 2012-2017) assumes that species composition remains constant, i.e. it doesn’t account for changes when a species rebuilds.
- The RAG noted that this metiers work is a good start – it will tie in nicely with the Multi-species Harvest Strategy and may provide some predictive ability of species behaviour change. It is advisable to make the Commission aware that this analysis looks back in time and won’t predict sudden changes in stocks.

88. Mr Hogan noted that in the eLog there is ‘intended target species’ column for shots (which the RAG noted that not all fishers use) but there is now an error that won’t allow the species to be edited. This is an eLogs software issue that can be rectified.

ACTION ITEM 10: AFMA to liaise with eLog providers regarding the inability to change species in the “targeted species” field in the eLog software.

Advice to the Commission

89. Noting the advice above, no new information was provided to the RAG to warrant a change to the recommended bycatch TACs for blue warehou, eastern redfish and eastern gemfish.

90. The blue warehou bycatch TAC has been 118 t since 2012 and increasing catches have been observed but there is no information available to deviate from this TAC. The RAG would like to see Dr Burch's analysis in 2020, updated with 2018 and 2019 data. The RAG recommended to maintain the 118 t bycatch TAC.
91. The eastern redfish TAC is currently 50 t and this hasn't been exceeded, catches are around 30 t. The 2020 assessment will inform the setting of a new TAC. The RAG recommended to rollover the 50 t TAC.
92. The eastern gemfish TAC is currently 100 t and informed by an old Tier 1 assessment. There's been no update to the assessment and the TAC has not been exceeded. Recent catches are rising slightly but there are no indications of targeting. The RAG recommended to maintain the 100 t TAC.
93. The orange roughy southern incidental TAC has been set at 31 t for several years (noting this is in addition to the Pedra Branca area which is on the second year of a 3 year MYTAC). The RAG could not recall how the 31 t incidental TAC has been set previously, so this will be noted as an action item - to determine and document for all rebuilding species.

The RAG agreed to maintain the 31 t incidental TAC.

ACTION ITEM 11: AFMA to investigate and document the original justification for setting incidental TACs for all rebuilding species. This includes documenting the evidence base for showing where the bycatch TACs are currently set or historically set, and providing to the RAG when setting bycatch TACs in future RAG meetings.

94. As part of the Western Orange Roughy research plan, the RAG recommended to set the Research Catch Allowance (RCA) at 200 t. There remains the 60 t bycatch TAC that is available to those not participating in the survey. Recent catches have been around 30 t and the RAG agreed there is no basis to change this TAC but requested that AFMA ensure the 60 t is not used in addition to the 200 t RCA that would be allocated under the Western Orange Roughy research plan. A condition can be added to the scientific permits.

ACTION ITEM 12: AFMA to ensure the 60 t by-catch TAC for Western Orange Roughy cannot be utilised in addition to the 200 t Research Catch Allowance allocated under the Western Orange Roughy Research Plan.

95. The Orange Roughy Cascade Plateau has an annual TAC of 500 t, noting this is not a bycatch TAC. Catches have been low and SESSFRAG has supported maintaining the TAC. The RAG noted there is no justification to change it and recommended to rollover the 500 t TAC.

Agenda Item 14 – East Coast Deep Water Trawl triggers

96. Effort remains low in the ECDWT sector, with a single trawl trip reported in 2018-19 and another in the 2019-20 season. Orange roughy has not been caught in the ECDWT sector since 150 kg was reported in the 2003-04 season. For the 2019-20 season, 77 kg of boarfish was reported and 39 kg reported in 2018-19. This is following a period of no catches since the 2013-14 season where 8.4 t was reported.
97. There was no new information to support a change to TACs or catch limits and the RAG agreed to maintain catch limits at 200 t for boarfish (trigger) and a 50 t incidental TAC for orange roughy.

Agenda Item 15 – Action items and close

98. Due to lack of time, action items were not reviewed at the end of the meeting but were instead circulated after the meeting and then feedback was incorporated before being finalised for inclusion in the minutes.
99. The Chair thanked all attendees for their input and closed the meeting at 4.20pm.

Appendix A

Reference: Action items review, point 8

Minutes of a meeting to discuss future SIDaC sampling of blue-eye trevalla

Location: CSIRO, Hobart

Date: 4 December 2019

Attendees:

Robin Thomson (CSIRO)

Ross Bromley (Girella Fisheries Services)

Simon Robertson (by phone, Fish Ageing Services)

Matt Koopman (Fishwell Consulting)

Belinda Norris (by phone, AFMA)

Fiona Hill (AFMA)

Minutes:

Dropline sampling

We decided that although it would be desirable to sample dropliners but that because SIDaC hasn't done this before, and dropliners land in a bunch of places over a bunch of months, this is too hard to do in the current FY. Ross will ask AFMA for information regarding the number of fishing trips and landed catch of blue-eye, by port of landing, and month and year. Ross will start thinking about how SIDaC might be extended to dropliners in the next FY.

Tissue sampling

The most efficient way to sample blue-eye tissues is thought to be:

- Sampler to take a tissue sample from the 'cheek' of the fish when taking an otolith (from the same fish)
- The sample will be taken using the 'tip' provided to SIDaC by CSIRO (Ross knows how to do this)
- The 'tip' will be dropped into a plastic vial (also provided by CSIRO) that will be pre-numbered (1,2,3 etc)
- Matt will amend the SIDaC software so that there is an additional 'button' marked "tissue" and there will be a window for tissue sample number (corresponding to the vial into which the 'tip' is dropped)
- The tips will then be sent to CSIRO

Ross and Matt will work out the additional cost of taking a tissue sample for each of the 47 (by zone and by quarter) blue-eye that are already part of the SIDaC schedule, and will liaise with AFMA. Robin will track down vials, and tips and provide those to Ross. It was noted that there might be a problem in taking vials into fish processing factories because they contain a chemical (RNAIater). Ethanol might be a safer chemical to use. Robin will investigate that further.

ATTACHMENT A – Declarations of interest

Member	Declaration
Dr Michael Steer (Chairperson)	Principal Scientist at SARDI Aquatic Sciences (Finfish Fisheries) Chair of SERAG Member of SEMAC Member of Commercial Marine Scalefish Fishery Reform Advisory Committee (SA) Member of Marine Scalefish Fishery Management Advisory Group (SA) Member of Charter Boat Management Plan Advisory Group (SA) No pecuniary interest in the SESSF.
Dr Sarah Jennings	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.
Mr Daniel Corrie	Employed by AFMA. Manager of Southern Trawl, Scallop and Squid Fisheries. No pecuniary or other interest in the SESSF.
Dr Geoff Tuck	CSIRO. Involved in stock assessments. Interest in obtaining funding for future research. Principle investigator on the SESSF stock assessment project.
Dr Matt Koopman*	*On behalf of Ian Knuckey. Works for Fishwell Consulting with Dr Ian Knuckey. Works on the FIS surveys and various projects in the SESSF for industry, government and NGOs. Involved in the Danish Seine survey in 2020 and provide advice to oil and gas companies about the potential impacts of their surveys on fisheries.
Mr Andrew Penney	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.
Mr Ross Winstanley	No pecuniary interest in SESSF however declares he has a brother-in-law that holds a Victorian Inshore Trawl Licence.
Mr Daniel Hogan	Owner operator of trawler Zeehaan out of Portland, Vic. Commonwealth Trawl Sector boat and quota SFR holder.
Mr John Jarvis	Commonwealth Trawl Sector boat and quota SFR holder. Member of SETFIA. Worked with NSW Primary Industry Minister for Comfish.

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 in SESSF, pecuniary or otherwise.

Invited Participant	Declaration
Dr Robin Thomson	CSIRO, assessment scientist. Acquiring funding for research purposes. Principal Investigator for 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 Paul Burch	CSIRO, assessment scientist. Principal Investigator for data services project. Acquiring funding for research purposes.
Dr Geoff Liggins	DPI NSW. Research scientist. No interest in SESSF, pecuniary or otherwise.
Ms Heather Johnston	Employed by AFMA. A/g Manager Southern Trawl, Scallop and Squid. No interest in SESSF, pecuniary or otherwise.

Observer	Declaration
Ms Florence Briton	CSIRO, PhD student.
Ms Sandra Curin-Osorio	CSIRO, PhD student.
Mr Nic Marton	ABARES. No interest in SESSF, pecuniary or otherwise.
Dr Veronica Silberschneider	Acting Senior Fisheries Manager, NSW Department Primary Industry. Cross jurisdictional management and research interests for NSW DPI, no pecuniary interest.

Attachment B – Adopted agenda

ADOPTED AGENDA

Day 1: Tuesday 3 December 2019

Time: 09:00 to 17:30

Chair: Dr Michael Steer

Time	Item	Presenter
09:00	Agenda item 1. Preliminaries Acknowledgement of country, introductions and apologies Declarations of interest Adoption of agenda Action items review	Chair
09:30	Agenda item 2. Discards and Catch, Data Summary and ISMP Discards reports Discards and Catch reports Data Summary report ISMP Discards report	Paul Burch and Robin Thomson
10:30	<i>Morning Tea</i>	
	Agenda item 6. Tier 4 Gemfish west Updates from base case presentation Discussion RBC recommendation	Miriana Sporcic
	Agenda item 5. Updates to Pink Ling and Blue eye Trevalla data collection	Heather Johnston
	Agenda item 8. Hagfish research sampling program	Dan Corrie
	<i>Lunch</i>	
	Agenda item 4. School whiting and NSW catches Update and catch projections RAG advice to the Commission	Dan Corrie and Jemery Day
	Agenda item 3. Tier 1 Tiger Flathead	Jemery Day
17:30	<i>Adjourn</i>	

Day 2: Wednesday 4 December 2019**Time: 08:00 to 16:15**

Time	Item	Presenter
08:00	Continuation of Agenda item 3 – Tiger Flathead	Jemery Day
	Agenda item 7. Update on pre-1998 ISMP data	Matt Koopman
	Agenda item 9. SESSF research priorities Review the Five Year Strategic Research Plan 2016-2020 Identify research priorities for 2021-22	Dan Corrie
11:30	<i>Morning Tea</i>	
	Western Orange Roughy research plan Update on proposal	Simon Boag and Dan Corrie
	Rebuilding strategy reviews Eastern gemfish – annual review Orange roughy – 5 year strategy review and annual review	Heather Johnston
	Incidental TAC advice for rebuilding species Blue warehou Eastern redfish Eastern gemfish Orange roughy	Dan Corrie
	<i>No lunch break</i>	
	East coast deep water trawl triggers Boarfish Orange roughy	Dan Corrie
	Other business and meeting closed	Chair
16:15	<i>Close of meeting</i>	

Agenda item 13. Species summaries was not completed, agreed to circulated with the minutes.

Attachment C – List of action items (updated)

List of action items – updated after SERAG #2 (2019)

Complete/Redundant	Underway	Yet to start	SERAG advice required / for noting
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Table 1. Action items from SERAG #1 (2019) updated after SERAG #2 (2019) – does not yet include current action items (refer to Attachment D)

	Meeting & agenda item ref	No.	Description	Responsibility	Timeframe	Status update after SERAG #2 (2019)
	2019.11 (Action items review)	1	Geoff Tuck to provide feedback from CAPAM workshop (Seattle, March 2020) to the SESSFRAG data meeting in August 2020, to inform discussions and the stock assessment for Orange Roughy, including issues around natural mortality and stock recruitment relationships.	Geoff Tuck, CSIRO	By Aug 2020 (SESSFRAG data meeting)	Scheduled for 2020
	2019.11 (Action items review)	2	AFMA to ensure that the SiDAC data collection includes total and partial lengths of school and gummy shark including school sharks larger than 160cm, and tissue samples of Blue-eye trevalla for CSIRO's close-kin work and for ageing: (a) Start collecting 20 samples from approximately 20% of the shots, and (b) The SSIA co-management contract needs to be finalised and this action item incorporated into the SiDAC Data Plan.	AFMA (Brodie MacDonald)	As soon as possible	Underway. The updated sampling requirements are being incorporated into the SiDAC data collection contract and should commence in early 2020. SERAG requested to keep this item open until the contract has been signed.
	2019.11 (Action items review)	3	AFMA to schedule in-depth discussion about stock assessments of Deepwater Sharks and how to set an RBC, at SERAG in 2020 in preparation for the 2021 assessment.	AFMA (EO)	By SERAG #1, 2020	Scheduled for 2020
	2019.11 Agenda item 3	4	AFMA to investigate logbook records of catches of 'Black Trevally' (also called Black Snotty) from the last 2 years and verify with skippers whether species recorded on CDRs is Blue Warehou. If so, AFMA will correct data records and correct recording practices.	AFMA	By SERAG #2, Dec 2019	This item is not yet underway, will be completed in early 2020.

2019.11 Agenda item 3	5	CSIRO to investigate Bight Redfish discrepancy (page 5 of Data Summary), between logbooks and CDR catches in 2017, to understand where the discrepancy coming from.	CSIRO, Robin Thomson	By GABRAG, 21 Nov 2019	Error identified as an incorrect entry in logbooks. On 14 June, a vessel recorded a 125 t shot in their logbooks. AFMA yet to contact operator to confirm this was a 25 kg shot.
2019.11 Agenda item 8	6	Dr Sporcic to check whether the latest PSA methodology have incorporated the new way susceptibility is calculated.	CSIRO, Miriana Sporcic	By SERAG #2, Dec 2019	In progress.
2019.11 Agenda item 9	7	Update the ISMP data plan to collect otolith and length data for Smooth Oreos.	AFMA	By SERAG #2, Dec 2019	Complete. 500 otoliths added to the SSSF Data plan. Will be updated pending finalisation of oreo research plan. Item can be closed.
2019.11 Agenda item 9	8	SERAG sub-working group (Dan Corrie, Geoff Tuck, Jamie Dunkley-Price, Rudy Kloser and Paul Burch) to develop proposal for Oreo fishery, present to SERAG	AFMA	By SERAG #2, Dec 2019	This has been superseded and included in the Western Orange Roughy Research Plan developed by AFMA and Simon Boag. The RAG agreed to close this item noting it is included under agenda item 12 of this meeting.
2019.11 Agenda item 10.1	9	AFMA to get Sydney Fish Market price data for the rebuilding species (eastern redfish, blue warehou and eastern gemfish) to present at SERAG #2.	AFMA	By SERAG #2, Dec 2019	This was presented at the meeting. RAG agreed to close this item.
2019.11 Agenda item 10.2	10	AFMA to investigate CDR data for redfish catches in the west - how it is reported as either Bight Redfish or redfish, and correct errors.	AFMA	By SERAG #2, Dec 2019	Underway.
2019.11 Agenda item 11	11	Ian Knuckey to provide GAB survey design to Dan/Simon for consideration when developing the Western Orange Roughy research plan.	Ian Knuckey	ASAP	Provided and discussed as part of agenda item 12. Item closed.
2019.11 Agenda item 11	12	AFMA and SETFIA to present an updated draft Western Orange Roughy proposal to SERAG #2 in 2019.	AFMA and SETFIA	By SERAG #2, Dec 2019	This was completed - covered under agenda item 12. Item closed.
2019.11 Agenda item 12	13	SERAG sub group (Mike Steer, Dan Corrie, Geoff Tuck, Jemery Day, Karina Hall (DPI NSW) and Mardi Albert) to meet out-of-session to agree on catch projections for eastern school whiting for consideration at SERAG #2 2019. Jemery Day will aim to complete the work by SERAG #2 (2019)	Jemery Day and others	By SERAG #2, Dec 2019	The group met on 30/10/19 - catch projections agreed for Dr Day to prepare. A summary of outcomes was provided in Minutes for SERAG #1 meeting at Appendix A (emailed to members on 21/11/19. Item can be closed.

2019.11 Agenda item 10.1 OUTCOME	SERAG recommends a targeting analysis for Blue Warehou is completed as part of the March 2020 package to the Commission, to inform the TAC for the 2020/21 season.	Dr Burch presented a draft targeting and companion species analysis at SERAG #2 (2019), Agenda Item 11. SERAG requested to keep this item open.
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Table 2 Action items outstanding from previous SERAG meetings

Complete/Redundant	Underway	Yet to start	SERAG advice required / for noting
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Meeting & agenda item ref	No.	Description	Responsibility	Timeframe	Status update after SERAG #2 (2019)
2018.11 Agenda item 10	7	Refer to the ERA Technical Working Group: consider providing better guidance to observers to address species identification issues for cephalopods in order to assist with future ERAs.	AFMA	Next ERA technical working group meeting?	The need for better identification of cephalopods was identified by SERAG, given results of recent ERAs. The RAG agreed to close this item, noting SERAG had already provided this advice, and it will be further considered by SEMAC.
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. Not an issue for redfish alone. CSIRO are working on these figures and they will be ready for the August 2020 Catch report.
2017.11 Agenda item 6.4	10	AFMA to investigate records of oxeye oreo dory in logbooks and CDRs.		Prior to 2020 assessment.	To start in 2020.
2018.09 Agenda item: 8	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).	Dan Corrie	ASAP	Logbook discard record books show 1t discarded by a factory trawler - AFMA will follow up with the observer section.

Note: The action items from SERAG #2 (2019) provided in Attachment D in this document will be added to this list and all items marked green (complete) will be removed when the final list is prepared for the next meeting (SERAG 2020).

Attachment D – Action Items from SERAG #2

ACTION ITEM	Agenda Item Ref	Description	Responsibility	Timeframe
1	2	AFMA and Simon Boag to investigate with industry to identify 'soft skinned shark' that is caught inside 300 metres, including species ID and whether it is part of the deepwater shark quota basket. If it is identified as not being part of the quota basket, then AFMA to ensure industry are not incorrectly recording it as part of the deepwater shark quota species in CDRs.	AFMA and Simon Boag	ASAP
2	2	For each of the species in the DW shark basket, investigate catch at depth and provide data to Robin Thomson, including the CAAB codes for each species.	AFMA	Before the AFMA/CSIRO pre data transfer meeting (March 2020 TBC)
3	2	In addition to decision rules being considered by the discard working group, Paul Burch to consider the decision rules regarding application of Commonwealth discard rates to State fisheries catches with a particular focus on different gear types.	Paul Burch	SESSFRAG Chairs' meeting – March 2020
4	5	AFMA, SIDAC program and Robin Thomson to confirm biological sampling targets for hook caught blue eye trevalla, noting SERAG's advice to include the dropline method for blue eye trevalla.	Brodie Macdonald, SIDAC program and Robin Thomson	ASAP (after Robin Thomson's meeting on 4/12/19)
5	8	AFMA to finalise the Hagfish research plan for consideration by SEMAC at its February 2020 meeting. SERAG have requested additional information before the plan is taken to SEMAC, including a thorough analysis of: (1) the existing scientific literature, (2) the management arrangements in other jurisdictions, and (3) the current operator's logbook data from the preceding four years to better understand spatial extent of catches.	AFMA	By SEMAC – Feb 2020

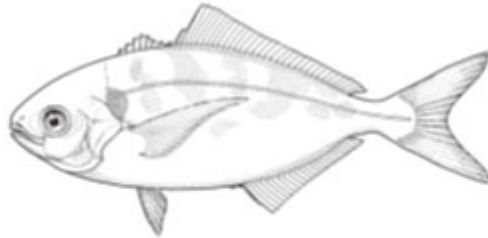
ACTION ITEM	Agenda Item Ref	Description	Responsibility	Timeframe
6	4	AFMA to summarise results from the eastern school whiting catch projections in a table for the purpose of providing advice to the Commission. Confirm accuracy with Jemery Day.	AFMA	By SEMAC – Feb 2020
7	3	At its first meeting in 2021, SERAG to consider how to fix steepness (<i>h</i>) for Tiger Flathead, in preparation for the 2022 stock assessment.	AFMA	SERAG #1, 2021
8	7	AFMA to ensure the revised pre-1998 ISMP dataset is captured into the AFMA database and Dr Koopman’s code corrections are stored and the old data rebadged appropriately.	AFMA	SERAG #1, 2020
9	10	AFMA to provide advice to SEMAC about the process for transitioning stocks or a species from rebuilding strategies to harvest strategies, once it has been demonstrated they have rebuilt to be above the limit reference point.	AFMA	SEMAC - Feb 2020
10	11	AFMA to liaise with eLog providers regarding the inability to change species in the “targeted species” field in the eLog software.	AFMA	ASAP
11	9	AFMA to investigate and document the original justification for setting incidental TACs for all rebuilding species. This includes documenting the evidence base for showing where the bycatch TACs are currently set or historically set, and providing to the RAG when setting bycatch TACs in future RAG meetings.	AFMA	SERAG #1, 2020 ?
12	9	AFMA to ensure the 60 t by-catch TAC for Western Orange Roughy cannot be utilised in addition to the 200 t research catch allowance allocated under the Western Orange Roughy Research Plan.	AFMA	Before the Western Orange Roughy Research Plan is finalised.

RECOMMENDATION 1

SERAG recommends that eastern Orange Roughy is removed from the rebuilding strategy. [note link to Action item 8 (2019.12)]

Attachment E - Species Summaries

Blue Warehou (*Seriolella brama*)



ABARES (2012): Line Drawing – Rosalind Poole

Common names: Black trevally, sea bream, snotty trevalia.

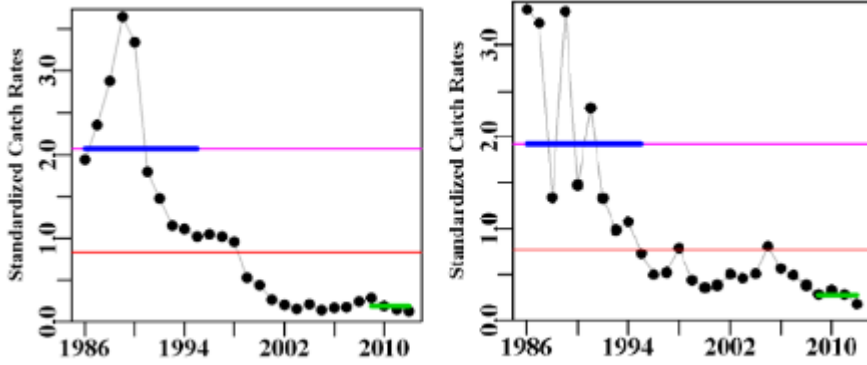
Under a [Stock Rebuilding Strategy](#).

Tier 4 last assessed in 2013 by ShelfRAG. Rebuilding strategy reviewed by SERAG in 2019.

Summary													
Stock Structure	There is good evidence that there are two stocks of blue warehou, east and west of the Bass Strait, but the species is managed under a single TAC.												
Stock Status	<p>Tier 4 species use CPUE targets as a proxy of biomass targets. SERAG noted a significant increase in estimated discards in 2017 for the eastern stock (215 t), driven largely by small fish caught by Danish seiners in eastern Bass Strait. The 2018 discard estimate for the eastern stock was much lower (27.6 t).</p> <p>The Tier 4 target reference point is the level of CPUE assumed to be a proxy for spawning biomass of 48% of unfished levels. The limit reference point is the equivalent CPUE that acts as a proxy for 20% of unfished levels.</p> <table border="1"> <thead> <tr> <th>CPUE</th> <th>East</th> <th>West</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>2.0717</td> <td>1.9249</td> </tr> <tr> <td>Limit</td> <td>0.8287</td> <td>0.7699</td> </tr> <tr> <td>Current</td> <td>0.1861</td> <td>0.2681</td> </tr> </tbody> </table> <p><u>Stock status:</u> In 2013 blue warehou was expected to be below the limit reference point and is subject to a rebuilding strategy. The last agreed Tier 1 assessment in 2005-06 found the eastern stock to be depleted below the limit reference point.</p> <p>In contrast, the western stock was thought to be above the limit reference point and close to the biomass maximum sustainable yield (B_{40}) level. However, the assessment predicted that the western stock will have dropped below the limit reference point by 2007 if the landed catches remained high and if recruitment was average.</p>	CPUE	East	West	Target	2.0717	1.9249	Limit	0.8287	0.7699	Current	0.1861	0.2681
CPUE	East	West											
Target	2.0717	1.9249											
Limit	0.8287	0.7699											
Current	0.1861	0.2681											
ABARES most recent assessment (2019)	<table border="1"> <tr> <td style="background-color: red; color: white; text-align: center;">Biomass Overfished</td> <td style="background-color: yellow; text-align: center;">Fishing Mortality Uncertain</td> </tr> </table>	Biomass Overfished	Fishing Mortality Uncertain										
Biomass Overfished	Fishing Mortality Uncertain												

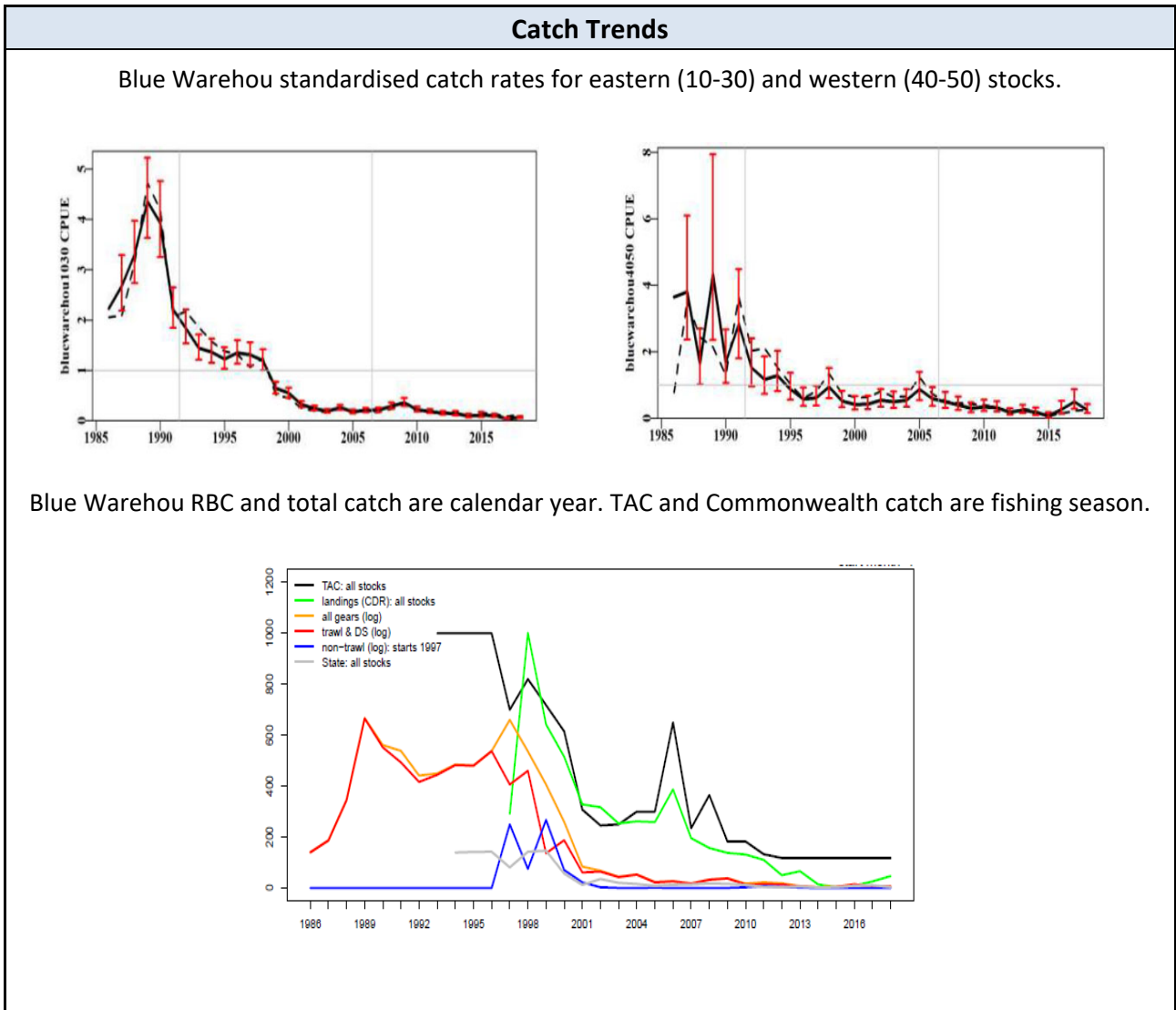
GVP Figures (2017-18 season)	GVP \$0.1 million	% Fishery GVP 0.03%	
Is a MYTAC in place this season?	No	Have breakout rules been triggered?	N/A

Assessment Summary	
Tier Level	Tier 4
Stock indicator trends	<p><u>Biomass trend</u></p> <p>The standardised CPUE for both stocks continue to be low and declining in 2019, however, due to avoidance of blue warehou by operators the use of CPUE as an index of abundance is no longer considered reliable.</p> <p><u>Catch against TAC</u></p> <p>Since the implementation of the Blue Warehou Stock Rebuilding Strategy in 2008, the TAC has decreased from 365 t in 2008-09 to an incidental TAC of 183 t in 2009-10 and 2010-11, 133 t in 2011-12, and 118 t in 2012-13. The TAC has remained at 118 t since.</p> <p>Commonwealth catches have always been less than the incidental TAC, however catches in 2018-19 were higher than recent years, with 46% of the TAC (54.2 t) caught. This, combined with potential increases in discarding, suggest there might be a level of recovery.</p>
Key model technical assumptions/ parameters	N/A
Changes to model structure/assumptions	N/A
Significant changes to data inputs	N/A
RAG Comments on data	<p>Logbook catch and effort data is the only information available for this species – age and length data are not collected.</p> <p>The method used to estimate discarded catch of blue warehou in the east in 2017 and 2018 was revised to account for a discrepancy between the logbook reported catch and the CDR catch, where some operators were recording ‘black trevally’ (a tropical species) in e-logs. This, in addition to revisions to the Tasmanian blue warehou catch, have increased the 2017 estimate of discarded blue warehou in the east, from 151.7 t to 215.8 t.</p> <p>This estimate remains highly uncertain, and is based on a discard rate obtained from a single Danish seine trip in 2017.</p> <p>The 2018 discard estimate in the east is 27.6 t.</p>

<p>RAG Comments on assessment</p>	 <p>Blue warehou (east left, west right) standardized catch rates from the 2013 Tier 4 assessment, with the upper fine line representing the target catch rate and the lower line the limit catch rate. Thickened lines represents the reference period for catches, catch rates, and the recent average catch rate.</p> <p>An alternative primary index of abundance needs to be developed as a high priority for use in future stock assessments, and this species should be considered as a candidate for application of close-kin genetics assessments.</p>
<p>Projected Biomass (including confidence intervals)</p>	<p>N/A (Tier 4)</p>

RAG Recommendations		
<p>Recommended Biological Catch (2020-21)</p>	<p>0 t</p>	<p>Undercatch: 0%</p> <p>Overcatch: 0%</p> <p>Discount Factor: 0%</p>
<p>Is a MYTAC recommended for future seasons?</p>	<p>No. Single-year bycatch TAC of 118 t</p>	
<p>Probability of RBC (or other levels of catch) causing a decline below limit reference under proposed management <i>Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).</i></p>	<p>N/A – Already considered to be below the limit reference point.</p> <p>Alternative Catch Scenarios: N/A</p>	
<p>Research Catch Allowance <i>Included/Addition to TAC</i></p>	<p>0 t</p>	
<p>Implications for companion species / TEPs / multi-species fisheries</p>	<p>N/A.</p>	

Catch and TAC						
Assessment Year	2014	2015	2016	2017	2018	2019
Tier / MYTAC	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
Stock Status	E: CPUE less than limit W: CPUE less than limit	E: CPUE less than limit W: CPUE less than limit	E: CPUE less than limit W: CPUE less than limit	E: CPUE less than limit W: CPUE less than limit	E: CPUE less than limit W: CPUE less than limit	E: CPUE less than limit W: CPUE less than limit
SESSF Season	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
RBC (retained)	0	0	0	0	0	0
Agreed TAC	118	118	118	118	118	
TAC after unders/overs	118	118	118	118	118	
% TAC caught	2%	14%	21%	46%		



Flathead



Common names: Deep sea flathead, flathead, king flathead, spiky flathead, trawl flathead.

Tier 1 assessed by SERAG in 2019

Summary									
Stock Structure	For management purposes a single continuous stock has been assumed throughout all zones of the SESSF. The 2019 SERAG October meeting identified the need to review stock structure, given the differences in east Tasmania catch rates and length frequencies.								
Stock status against reference points and trend	<table border="1"> <thead> <tr> <th>Current</th> <th>Target</th> <th>Limit</th> </tr> </thead> <tbody> <tr> <td>2019: 34% B₀</td> <td>40% B₀</td> <td>20% B₀</td> </tr> </tbody> </table> <p>Stock status: The last assessment in 2016 estimated the spawning biomass at 42% of unexploited stock biomass. The 2019 assessment estimates the stock has decreased to 34% over the last three years, driven primarily by poor recruitment in 2013.</p>			Current	Target	Limit	2019: 34% B ₀	40% B ₀	20% B ₀
Current	Target	Limit							
2019: 34% B ₀	40% B ₀	20% B ₀							
ABARES most recent assessment (2019)	Biomass Not overfished	Fishing Mortality Not subject to overfishing							
GVP Figures (2017-18 season)	GVP \$15.8 million	% Fishery GVP 37.7%							
Is a MYTAC in place this season?	Yes	Have breakout rules been triggered?	No.						

Assessment Summary	
Tier Level	Tier 1
Stock indicator trends	There has been a decrease in the estimated spawning stock biomass from 42%B ₀ in 2017 to 34%B ₀ in 2020. This decrease is supported by historically low catches and catch rates over the last three seasons.
Key model technical	The current assessment assumes a single growth curve for the whole stock, an assumption also made in previous assessments. Steepness (h) is currently estimated to be 0.72, and natural mortality (M) fixed at 0.27. The likelihood profile for h is not particularly informative, and suggests

assumptions/ parameters	a range from 0.6 to 0.9. Dr Day does not believe steepness (h) should be estimated in the next assessment, rather, fixed at 0.75 with natural mortality (M) also fixed at 0.27.
Significant changes to data inputs	<p>The following was included in the updated assessment</p> <ul style="list-style-type: none"> - Recruitment estimated from 1915 to 2015 - Length frequency data from the 2008, 2010, 2012, 2014 and 2016 fishery independent survey (FIS) - Age-at-length data from the 2008 FIS - FIS3 abundance indices
RAG Comments on data	<p>October 2019</p> <p>Catch rates have been lower over the past few years out of Lakes Entrance. There are 12-15 Danish seine vessels working similar grounds, and access to those grounds have been impacted by entrants to the Victorian octopus fishery.</p> <p>The poor recruitment in 2014 is difficult to distinguish in the 2018 length frequency data.</p> <p>There is a need to investigate spatial differences in growth parameters between eastern Tasmania and other regions.</p> <p>There was a questions around the post-capture mortality assumed in the assessment, noting the susceptibility score in the 2007 ERA considered post-capture mortality for discards was not 100%.</p>
RAG Comments on assessment	<p>Updates to the software (SS-V3.24Z to SS-V3.30.14.05) affected historical estimates of biomass but made very little difference to the estimate of current spawning biomass.</p> <p>Recent recruitments are well estimated, and the last three years of recruitment estimates, including a reduction to the 2012 estimate, have resulted in a lower estimate of current biomass.</p> <p>Fits to CPUE are generally poor, especially for the last six years, partly because we're trying to fit the indices to three different fleets. The fits to CPUE for Danish seine and eastern trawl CPUE during the 90's are poor.</p> <p>Generally, there were minor differences in the bridging process from the 2016 assessment.</p> <p>An alternative discard estimate series was used (reverting to previously used methodology) which increased biomass estimates slightly, including the 2016 estimate being above the target, but the final estimate is similar.</p> <p>Likelihood profiles</p> <p style="padding-left: 40px;">SSB₀ estimated to be 22,000 t with plausible estimates ranging 15,000 t - 29,000 t.</p> <p style="padding-left: 40px;">SSB₂₀₁₈ estimated to be 7,000 t with plausible estimates ranging 5,500 – 8,750 t.</p> <p style="padding-left: 40px;">Current depletion estimated to be 33%B₀, with plausible estimates ranging 20%B₀ to 45%B₀.</p> <p>At its October 2019 meeting, SERAG requested fixed catch projections using low, average and high recruitment scenarios.</p>

Under average recruitment, the biomass is expected to increase to 36.7%B₀ by 2023 under the harvest control rule with RBCs of 2,334 (2020), 2648 t (2021) and 2706 t (2022). If a three year average is applied (2563 t) the biomass is expected to increase to 36.6%B₀.

Under low recruitment, and assuming the RBC's from the average recruitment scenario are fully caught, the biomass is expected to decrease to 29.2%B₀ by 2023. Under high recruitment, and assuming the RBCs from the average recruitment scenario are caught, the biomass is expected to increase to 49.8%B₀.

While there were two years of poor recruitment in 2013 and 2014, the most recent recruitment estimate (2015) is considered to be average. While the 2015 recruitment estimate may also be revised as additional data is collected on this recruitment event, the RAG recommend setting RBCs based on average recruitment.

The RAG recommended a three-year RBC using either the single year RBCs or the 3-year average RBC, noting the expected biomass in 2023 under each scenario is 36.7%B₀ and 36.6%B₀, respectively.

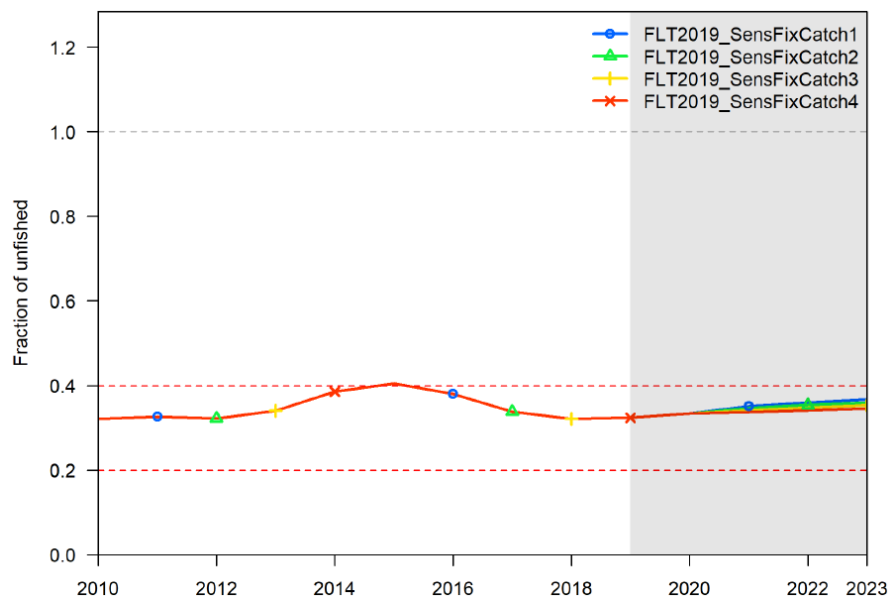
Industry have noted poor catches and changes in environmental conditions, which may have implications for recruitment. The RAG recommended monitoring fishery indicators closely each year as part of the annual MYTAC analysis.

Note

An error was identified in the catch series used in the assessment after the December 2019 SERAG. While the changes to the catch series were relatively minor, it resulted in changes to the spawning biomass series and recruitment, and resulting RBCs. These changes have been incorporated in the figures above.

Projected Biomass

Relative spawning biomass (2020-2023) projections under four average recruitment scenarios. The blue line represents catches from the 2019 base case RBCs.

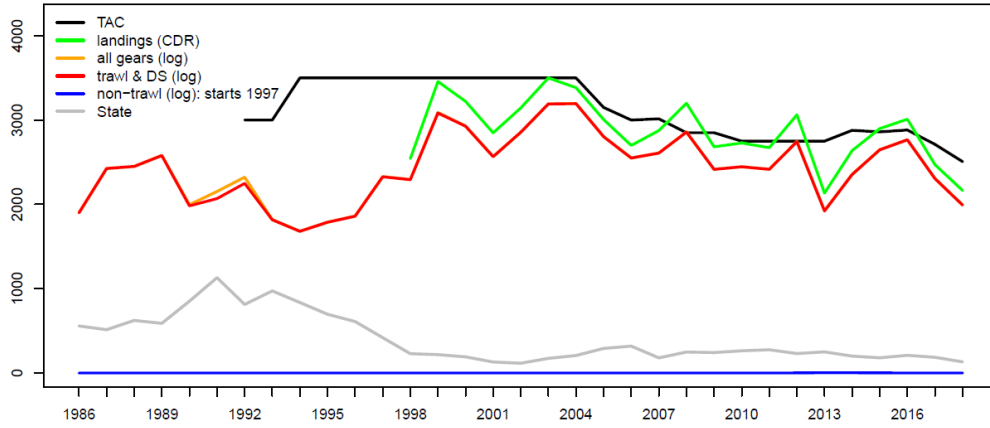


RAG Recommendations		
Recommended Biological Catch (2019/20)	2334 t (2020) 2648 t (2021) 2706 t (2022) 3-year average 2563 t	Undercatch: 10% Overcatch: 10% Discount Factor: N/A
Is a MYTAC recommended for future seasons? <i>Indicate whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a rollover of catch)</i>	Yes. 3-year MYTAC.	
Probability of RBC (or other levels of catch) causing a decline below limit reference under proposed management <i>Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).</i>	RBC recommendation = <10% (very unlikely)	
Research Catch Allowance <i>Included/Addition to TAC</i>	N/A	
Implications for companion species / TEPs / multi-species fisheries	N/A	

Assessment Year	2014	2015	2016	2017	2018	2019
Tier / MYTAC	MYTAC	MYTAC	Tier 1	MYTAC	MYTAC	Tier 1
Stock Status	Not assessed	Not assessed	42%	Not assessed	Not assessed	34%
SESSF Season	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
RBC (t)	3334	3334	1yr: 3089	2837	2826	1yr: 2334 t 3yr: 2563 t
Agreed TAC	2860	2882	2712	2507	2468	
TAC after Unders/Overs	3092	2992	2850	2761	2695	
% TAC caught	90%	94%	86%	74%		

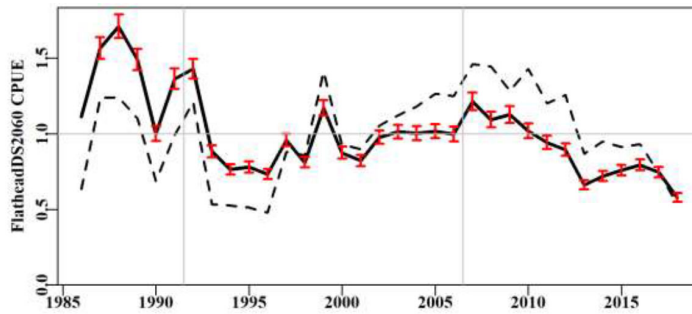
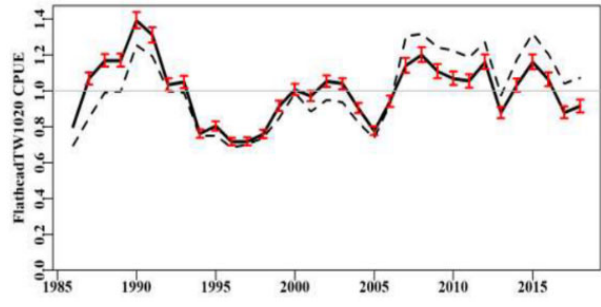
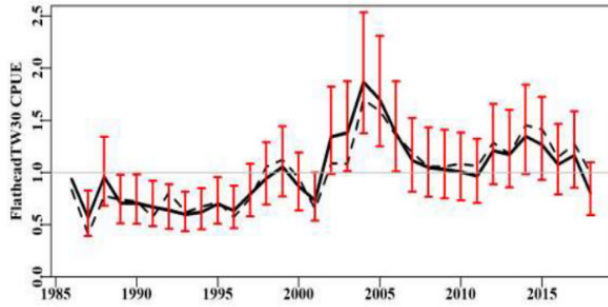
Catch Trends

Flathead Catch Against TAC

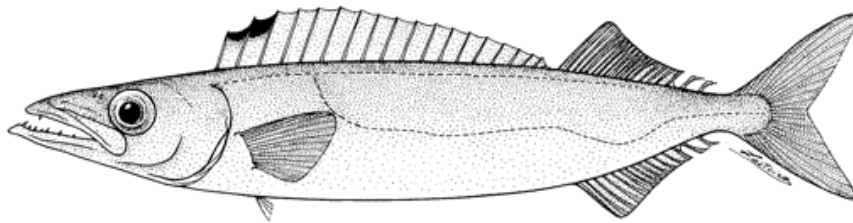


Standardised CPUE for flathead

Trawl Zone 30 (top left) Trawl Zone 10-20 (right) Danish seine Zone 20:60 (bottom)



Gemfish West (*Rexea solandri*)



ABARES (2012): Line Drawing – Shane Weidland

Obsolete common names: Hake, Common gemfish, Deepsea Kingfish, King barracouta, King couta, Silver Gemfish, Southern Kingfish

Tier 4 last assessed by SERAG in 2019

Summary									
Stock Structure	<p>There are considered to be two stocks of <i>R. solandri</i> in Australia. Recent genetic research has revealed evidence of genetically different populations between the east and west (no gene flow), with a mixing (overlap) of the two stocks in western Bass Strait through to Portland.</p> <p>Both eastern and western Gemfish migrate towards opposite ends of their distributions and spawn six months apart, which is likely to be the major contributor to the genetic differentiation seen.</p>								
Stock status against reference points and trend	<p>The Tier 4 assessment is based on catch rates from zone 50 of the CTS only.</p> <table border="1" data-bbox="480 1086 1262 1220"> <thead> <tr> <th>Current</th> <th>Target</th> <th>Limit</th> </tr> </thead> <tbody> <tr> <td>CPUE_{current} = 1.0418</td> <td>CPUE_{targ} = 0.9942</td> <td>CPUE_{lim} = 0.4143</td> </tr> </tbody> </table> <p>The Tier 4 target reference point is the proxy level of CPUE assumed to produce a target biomass consistent with the harvest strategy policy, and avoid the limit reference point.</p> <p>Stock Status</p> <p>Standardised CPUE has been variable, but increasing, since 2008. While the most recent CPUE point is below the target reference point, the recent average CPUE remains well above the target.</p>			Current	Target	Limit	CPUE _{current} = 1.0418	CPUE _{targ} = 0.9942	CPUE _{lim} = 0.4143
Current	Target	Limit							
CPUE _{current} = 1.0418	CPUE _{targ} = 0.9942	CPUE _{lim} = 0.4143							
ABARES most recent assessment (2019)	Biomass Not overfished	Fishing Mortality Not subject to overfishing							
GVP Figures (2017-18 season)	GVP \$0.17 million	% Fishery GVP 0.41%							
Is a MYTAC in place this season?	Yes.	Have breakout rules been triggered?	No.						

Assessment Summary	
Tier Level	Tier 4
Stock indicator trends	Standardised catch rates have been variable, but increasing, since 2008. While the last two years' estimates are decreasing, with the 2018 estimate being below the target reference point, the recent average remains above the long term average.
Key model technical assumptions/ parameters	<p>The Tier 4 assessment assumes there is a linear relationship between catch rates and exploitable biomass, and that the character of the estimated catch rates has not changed in significant ways through the period from the start of the reference period to the end of the most recent year i.e. effort creep.</p> <p>It also assumes the reference period provides a good estimate of the stock when it was at a depletion level of 48%B₀ and that historical catch records are accurate.</p>
Significant changes to data inputs	CPUE from zone 50 only are used in the Tier 4 assessment.
RAG Comments on data	The estimated discard rate seems to be tracking the CPUE trajectory, with a decrease in the estimated from 27% in 2017 to 11% in 2018.
RAG comments on assessment	<p>GABRAG previously considered a Tier 1 assessment, a Tier 4 assessment (no discards) and a Tier 4 assessment (discards). These analyses identified deficiencies in the data which prevented precise estimates of stock status being made, and a weight of evidence approach was adopted to set an RBC of 200 t for 2019.</p> <p>This species is now assessed as a Tier 4 species only, based on advice from SESSFRAG, using CPUE from zone 50 in the CTS.</p> <p>The 2017 Tier 4 assessment produced an RBC of 436 t. The current 2019 Tier 4 assessment produces an RBC of 423 t (difference of 13 t) with a discount factor of 15% (i.e. 359.6 t) and then with the application of the 50% large change limiting rule, it results in the proposed 2020-21 TAC of 300 t.</p> <p>The RAG also recommended setting a three-year TAC.</p>
Projected Biomass	N/A - Tier 4 species.

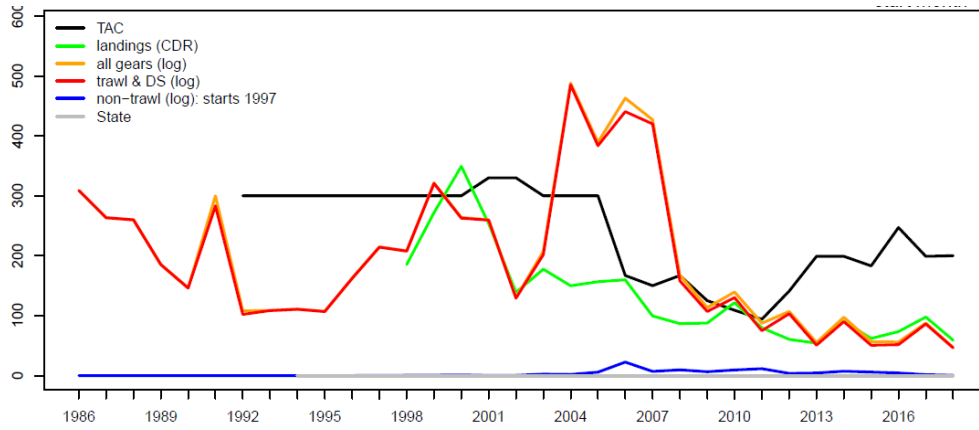
RAG Recommendations		
Recommended Biological Catch (2020/21)	423 t (3-year RBC)	<p>Undercatch: 10%</p> <p>Overcatch: 10%</p> <p>Discount Factor: 15%</p>

Is a MYTAC recommended for future seasons?	Yes. 3 year: 423 t with a discount factor of 15% (i.e. 359.6 t) and then with the application of the 50% large change limiting rule, it results in the proposed 2020-21 TAC of 300 t.
Probability of RBC (or other levels of catch) causing a decline below limit reference under proposed management <i>Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).</i>	The Tier 4 assessment indicated that there was a low risk of the stock declining below the limit reference point. Over the last five years catch and discards have remained below the RBC. Alternative Catch Scenarios = N/A
Research Catch Allowance <i>Included/Addition to TAC</i>	N/A
Implications for companion species / TEPs / multi-species fisheries	N/A

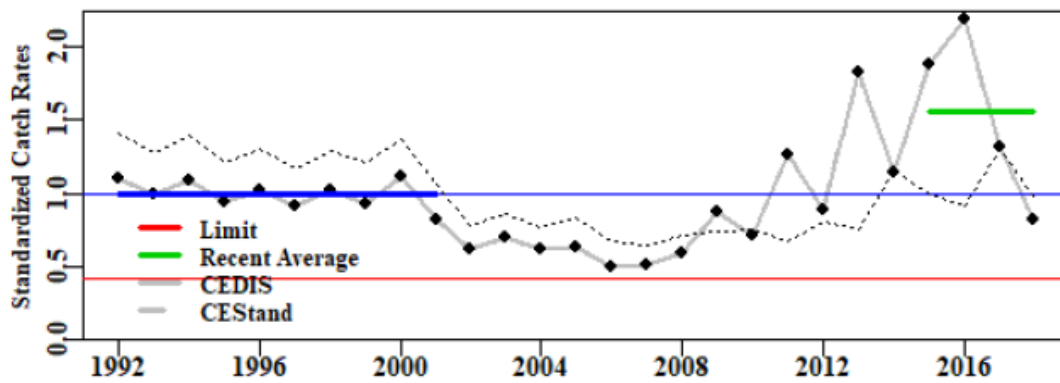
Catch and TAC						
Assessment Year	2014	2015	2016	2017	2018	2019
Tier / MYTAC	2 nd Year of 3-year MYTAC	3 rd year of 3-year MYTAC	Tier 1/4	2 nd year of 3-year MYTAC	3 rd year of 3-year MYTAC	Tier 4
Stock Status	Not assessed	Not assessed	Tier 1 – 43% Tier 4 (CTS) Above the limit (no discards) and above the target (discards)	Not assessed	Not assessed	Recent CPUE is above target CPUE.
SESSF Season	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
RBC (t)	247 (T4)	247 (T4)	200 (T1) 139 (T4) 423 (T4 discards)	200	200	423
Agreed TAC	183	247	200	200	200	
TAC after Unders/Overs	200	261	223	218	218	
% TAC caught	41%	28%	35%	36%		

Catch Trends

Catch against TAC

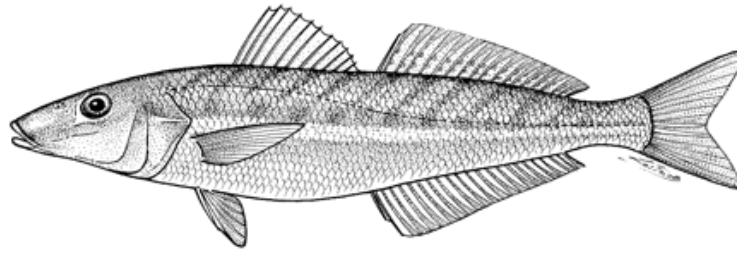


Standardised Catch Rates



Western Gemfish standardised catch rates with the upper fine line representing the target catch rate and the lower line the limit catch rate. Thickened lines represents the reference period for catches, catch rates, and the recent average catch rate.

School Whiting (*Sillago flindersi*)



Common names: Red spot whiting, spotted whiting, silver whiting, trawl whiting.

Tier 1 last assessed by SERAG in 2017.

Summary									
Stock Structure	<p>Early genetic studies suggested two stocks with the division between 'northern' and 'southern' stocks in the Sydney – Jervis Bay area.</p> <p>An FRDC project investigating stock structure is currently underway.</p>								
Stock status against reference points and trend	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Current</th> <th>Target</th> <th>Limit</th> </tr> </thead> <tbody> <tr> <td>2019: 35% B₀</td> <td>40% B₀</td> <td>20% B₀</td> </tr> </tbody> </table> <p>The 2017 Tier 1 school whiting stock assessment estimated the spawning stock biomass to be 47% B₀ at the beginning of 2018.</p> <p>In Nov 2019, the stock assessment was updated to include recent catch and CPUE data. Updates to the assessment have resulted in a downward revision to the 2018 estimated spawning stock biomass from 47% B₀ to 36% B₀.</p> <p>Under this 2019 update, the biomass is estimated to be 35% B₀ at the beginning of 2020.</p>			Current	Target	Limit	2019: 35% B ₀	40% B ₀	20% B ₀
Current	Target	Limit							
2019: 35% B ₀	40% B ₀	20% B ₀							
ABARES most recent assessment (2019)	Biomass Not overfished	Fishing Mortality Not subject to overfishing							
GVP Figures (2017-18 season)	GVP \$2.27 million	% Fishery GVP 5.4%							
Is a MYTAC in place this season?	Yes.	Have breakout rules been triggered?	No						

Assessment Summary	
Tier Level	Tier 1
Stock indicator trends	<p>Standardized catch rates for trawl in zones 10 and 20 (east coast) have been increasing since 2013, however there was a decrease in 2018.</p> <p>Similarly, landings have increased since 2013, with the TAC between 79-83% caught, however there was a decrease in catches in 2018.</p>

<p>Key model technical assumptions/ parameters</p>	<p>There is assumed to be a single stock across zones 10, 20, 30 and 60 and then north of Barrenjoey Point to Ballina.</p> <p>Single sex model.</p> <p>Three fleets: historical NSW Danish seine (recently reactivated) in addition to the Commonwealth Danish seine and otter board trawl.</p> <p>Selectivity is estimated within the model for each fleet.</p> <p>Discard estimates are calculated for the Danish seine and trawl fleets.</p> <p>Natural mortality (M) is estimated by the model to be 0.53.</p>
<p>Changes to model structure/assumptions</p>	<p>The 2017 assessment fits four growth parameters, whereas the 2014 assessment only fitted three.</p>
<p>Significant changes to data inputs</p>	<p>New data in the assessment included revised conditional age-at-length data and ageing error based on sectioned otolith readings.</p>
<p>RAG Comments on data</p>	<p><u>Comments from 2017 assessment:</u></p> <p>79% of the TAC was caught for the 2016-17 season, and operators found it hard to obtain quota.</p> <p>NSW data has been separated north and south of Barrenjoey Point. Only catch data from NSW, not length and age data. NSW indicated that data would be available for future assessments.</p> <p>Discards have increased slightly in the past three years however are still below 10 per cent. There are larger fish being discarded in 2016, which is in contrast to previous years.</p> <p>ISMP sampling across the months was good in 2016, especially through the winter months where there have been issues in the past getting samples in those months.</p> <p>The final year for recruitment estimation changed from 2005 to 2013.</p> <p>Recent recruitments are well estimated and seven of the last eight years recruitment estimates are below average.</p> <p>There were issues with updates to a new version of Stock Synthesis. These issues were rectified, and a final base case was presented to SERAG in December via teleconference.</p>
<p>RAG comments on assessment</p>	<p>January spawning has been set as the base case with the following sensitivities:</p> <ul style="list-style-type: none"> • July as the spawning month • January as the spawning month with improved growth fits to the model (Day 2017). • Exclusion of catches north of Barrenjoey Head. <p>The RAG adopted the January spawning and the improved growth curves as the base case.</p> <p>The RAG noted that under the previous long-term RBC the stock declined below the target reference point. This was largely due to below-average recruitment during that time and the proposed long-term RBC was appropriate.</p>

RAG Comments on assessment (cont'd)

The assessment outcome is very sensitive to assumptions about stock structure. Catches north of Barrenjoey Head are used in the assessment, but are not included when calculating standardised CPUE. When the catches are excluded as a sensitivity, the estimated biomass of the stock south of Barrenjoey Head is 39%.

SERAG supported an investigation into stock structure. Stock structure work also needs to assess the latitudinal variation in seasonality of spawning.

The recent NSW length, age, catch rate and some discard data should be made available for the next eastern school whiting assessment.

2019 Update

The 2017 Tier 1 school whiting stock assessment estimated the spawning stock biomass to be 47% B_0 at the beginning of 2018.

In November 2019, the stock assessment was updated to include recent catch and CPUE data.

- Updates to the assessment have resulted in a downward revision to the 2018 estimated spawning stock biomass from 47% B_0 to 36% B_0 .
- These changes are partly due to a downward turn in CPUE (driven by Commonwealth operators as NSW does not provide these data) as well as revisions to the NSW catch data from 2017, which were much higher than the estimated NSW catch included in the 2017 assessment.

Under the updated 2019 assessment, the biomass is estimated to be 35% B_0 at the beginning of 2020.

Table 1 shows the Recommended Biological Catches (RBC) for 2020-2022, assuming average recruitment and application of the SESSF HS harvest control rule.

For comparison, the 2017 assessment produced a 3-year average RBC of 1615 t.

Table 1 RBC from the 2019 updated assessment

Year	RBC (t)
2020	1165
2021	1357
2022	1433
3-year average	1318

Under the 2019 update, the 2020 RBC is less than recent NSW landed catches alone, and RBCs for all years are significantly less than the combined Commonwealth and NSW catches in 2017 and 2018, which were 2151 t and 1943 t, respectively.

Noting the Commission's in-principle agreement to maintain the Commonwealth TAC at 788 t for the 2020-21 and 2021-22 SESSF seasons, SERAG considered the likely impact to the stock under various catch scenarios for the next two years.

Table 2 shows the estimated relative abundance at the start of 2022 under various catch scenarios. For the purpose of these scenarios, 'catch' is taken to be total mortality, and includes discards. For example, 1900 t (scenario 4) consists of State catches + Commonwealth catches + discards for both jurisdictions.

Table 2 Estimated relative biomass at the start of 2022

Biomass in 2022		Catch scenarios			
		1*	2	3	4
		HCR RBC	1600	1800	1900
Recruitment	High ¹	48.3	48.3	N/A ²	43.8
	Average	43.5	38.5	35.6	34.1
	Low ¹	30.6	25.8	N/A ²	21.7

* RBCs from the projected 'average recruitment' scenario (Table 1) is applied.

¹ Recruitment is fixed for the period 2014-2021

² Recruitment scenario not considered

Overview of projections

Recruitment Scenarios

While recruitment has only been estimated up to 2013, there is no evidence of a shift to below average recruitment, and it would be reasonable to consider the projections under average recruitment.

Biomass Estimates

The current (2020) biomass is estimated to be 35% B_0 .

Under an average recruitment scenario, the biomass is expected to:

- return to 43.5% B_0 at the beginning of 2022 if RBCs from the harvest control (Table 1) are applied.
- remain stable at around 36% B_0 at catches up to 1800 t each year
- decrease to 34.1% B_0 at catches up to 1900 t each year.

Under a low recruitment scenario, the biomass is expected to decrease under all catch scenarios.

Under a high recruitment scenario, the biomass is expected to increase under all catch scenarios.

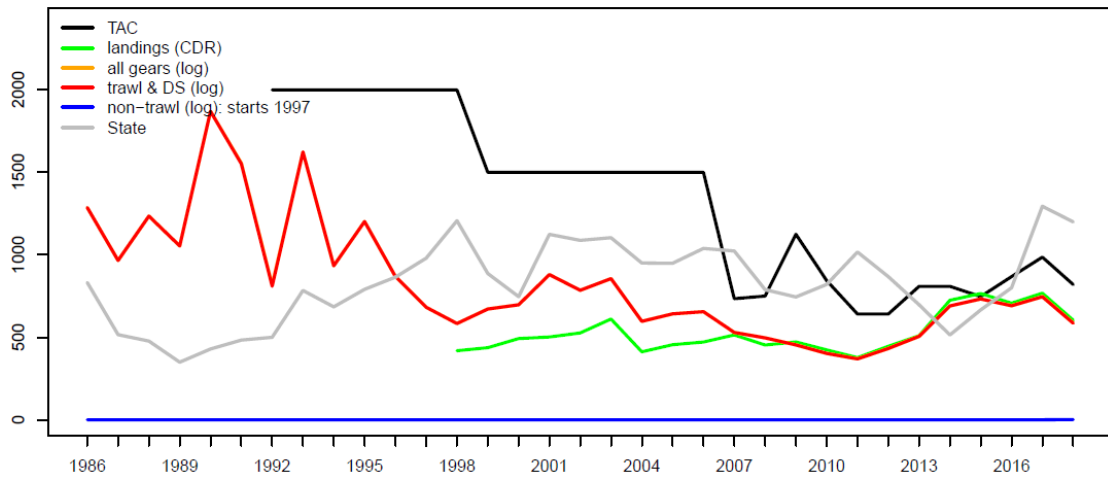
In forming its advice, the RAG agreed that AFMA would synthesise the RAG's advice in a matrix for the Commission to consider. The matrix should include: base case and five catch scenarios (1615, 1700, 1800, 1900 t, 2200 t) under low, average and high recruitment scenarios.

RAG Recommendations	
<p>Recommended Biological Catch (2020-21)</p>	<p>The updated assessment produced a single year RBC for 2020-21 of 1165 t and a 3-year average of 1318 t. This will only be used for the purpose of proving TAC advice to the Commission for the 2020-21 season.</p> <p>The 3-year average RBC from the 2017 assessment is 1615 t.</p> <p>Undercatch: 10% Overcatch: 10% Discount Factor: 0%</p>
<p>Is a MYTAC recommended for future seasons?</p> <p><i>Indicate whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a rollover of catch)</i></p>	<p>No. Single year TAC to be determined based on various catch scenarios. Assessment to be updated in 2020.</p>
<p>Probability of RBC (or other levels of catch) causing a decline below limit reference under proposed management</p> <p><i>Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).</i></p>	<p>RBC recommendation: P < 10%. Alternative Catch Scenarios: N/A</p>
<p>Research Catch Allowance</p> <p><i>Included/Addition to TAC</i></p>	<p>0 t</p>
<p>Implications for companion species / TEPs / multi-species fisheries</p>	<p>N/A.</p>

Catch and TAC						
Assessment Year	2014	2015	2016	2017	2018	2019
Tier / MYTAC	Tier 1	MYTAC	MYTAC	Tier 1	MYTAC	Tier 1 (2017 update)
Stock Status	Not assessed	Not assessed	Not assessed	47%	Not assessed	35%
SESSF Season	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
RBC	1660 (long term RBC)	1660 (long term RBC)	1660 (long term RBC)	1615 (first of 3-year)	1615	1165 (1-year) 1318 (3-year)
Agreed TAC	747	868	986	820	788	
TAC after unders/overs	790	911	1071	915	867	
% TAC caught	93%	79%	69%	59%		

Catch Trends

Catch against TAC



Standardised CPUE for: Trawl Zone 10:20:91 (left) Trawl Zone 60 (right)

