Australian Government

Australian Fisheries Management Authority

South East Resource Assessment Group (SERAG) Meeting 2, 2022

Meeting minutes

29–30 November 2022

In Person and Virtual

Contents

SERAG Meeting 2, 29–30 November 2022

Agenda

Day 1: Tuesday 29 November

Time (AEDT): 8:30–17:45

Location: Radisson Hotel, 380 William St Melbourne, VIC and Microsoft Teams

Chair: Dr Paul McShane

Time	Item	Purpose	Presenter
8:30 30 mins	**1. Preliminaries**		
	1.1 Welcome and apologies	For action	Chair
	1.2 Declaration of interests	For action	Chair
	1.3 Adoption of agenda	For action	Chair
	1.4 Minutes from previous meeting	For noting	Chair
	1.5 Actions arising from previous meetings	For noting	AFMA
9:00 30 mins	**2. Data updates**	For noting	Paul Burch (CSIRO)
9:30 1.5 hours	**3. Flathead Tier 1 assessment – RBC advice**	For advice	Pia Bessell-Browne (CSIRO)
11:00	Break – 15 mins		
11:15 30 mins	**4. Gemfish (west) Tier 4 – RBC advice**	For advice	Miriana Sporcic (CSIRO)
11:45 30 mins	**5. Mirror dory Tier 4 – RBC advice**	For advice	Miriana Sporcic (CSIRO)
12:15	Lunch – 30 mins		
12:45 2 hours	**6. Hagfish – Data collection and TAC advice**	For advice	Lara Ainley (AFMA)
14:45	Break – 15 mins		
15:00 45 mins	**7. Deepwater shark data review and TAC advice**	For advice	Robin Thomson (CSIRO)
15:45 2 hours	**8. Rebuilding species**		
	8.1 Rebuilding species annual reviews	For advice	Mark Grubert (AFMA)

Time	Item	Purpose	Presenter
	8.2 Rebuilding species TAC advice	For advice	Mark Grubert (AFMA)
17:45	End of day 1		

Day 2: Wednesday 30 November

Time (AEDT): 9:30–16:30

Location: Radisson Hotel, 380 William St Melbourne, VIC and Microsoft Teams

Time	Item	Purpose	Presenter
9:30 1 hour	**9. Blue grenadier Tier 1 assessment – RBC advice**	For advice	Geoff Tuck (CSIRO)
10:30	Break – 15 mins		
10:45 1 hour	**10. Silver trevally joint assessment and RBC advice**	For advice	NSW DPI
11:45	Lunch – 30 mins		
12:15 1.5 hours	**11. Cascade TAC advice**		
	11.1 Orange roughy	For advice	Mark Grubert (AFMA)
	11.2 Smooth oreodory	For advice	Mark Grubert (AFMA)
13:45	Break – 15 mins		
14:00 2 hours	**12. SESSF research priorities**		
	12.1 Feedback on the 2023–24 research proposals	For advice	Mark Grubert (AFMA)
	12.2 Research priorities for 2024–25	For advice	Mark Grubert (AFMA)
16:00 30 mins	**13. Other business** • **Western Orange Roughy TAC (AFMA)** • **Action items review**	For advice	Chair
16:30	End of day 2		

1   Preliminaries

1.1   Welcome and Apologies

1. Dr Paul McShane (Chair) welcomed attendees to the meeting and made an Acknowledgement of Country paying our respects to this country's First People and Traditional Custodians of the land throughout Australia. Acknowledging Australia's Traditional Custodians of Country and recognising their continued connection to land, waters and community. Paying our respects to them and their cultures and to Elders past present and emerging.

2. The SERAG (the RAG) members noted the Acknowledgement of Country, that the meeting was being recorded and commenced proceedings.

3. The RAG noted the apologies received from

    -   Mr Daniel Corrie (AFMA, apology for Day 1)

    -   Mr Will Mure (Industry Member)

    -   Mr Aaron Puckeridge (AFMA, Executive Officer)

    -   Frances Seaborn (Invited Participant, Department of Natural Resources and Environment Tasmania)

Table 1. SERAG members and other attendees

Members	Position
Dr Paul McShane	Chair
Dr Ian Knuckey	Scientific Member
Dr Geoff Tuck	Scientific Member
Mr Andrew Penney	Scientific Member
Mr James Woodhams	Scientific Member
Dr Sarah Jennings	Economics members
Mr Simon Boag	Industry Member
Mr Dan Hogan	Industry Member
Mr Ross Winstanley	Recreational Member
Mr Daniel Corrie	AFMA Member
Acting Executive Officer	**Organisation**
Nathan Jackson	AFMA
Invited Participants	**Organisation**
Dr Paul Burch	Commonwealth Scientific and Industrial Research Organisation (CSIRO)

Dr Miriana Sporcic	CSIRO
Dr Pia Bessell-Browne	CSIRO
Dr Robin Thomson	CSIRO
Dr Ashley Fowler	New South Wales (NSW) Department of Primary Industries (DPI)
Dr Tim Ryan	CSIRO
Dr Sandra Curin Osorio	CSIRO
Dr Douglas Ferrell	Consultant - Hagfish Australia
Mr Christopher Spurrier	Hagfish Australia
Mr Denis Brown	Hagfish Australia
Mr Chad Lunow	QLD Department of Agriculture, Fisheries and Forestry
Dr Natalie Dowling	CSIRO
Observers	**Organisation**
Dr Tim Emery	Australian Bureau of Agricultural Resource Economics and Sciences (ABARES)
Dr Daniel Wright	ABARES
Dr Krystle Keller	ABARES
Dr Lara Ainley	AFMA
Dr Mark Grubert	AFMA
Dr Nastaran Mazloumi	AFMA
Ms Rebecca Jol	AFMA
Mr Roshan Hanamseth	AFMA
Ms Michelle Henriksen	AFMA
Mr Oliver Lilford	AFMA
Ms Anna Willock	AFMA
Ms Rosie Katunar	Department of Natural Resources and Environment Tasmania (DNRET)

1.2   Declaration of Interests

4.   The RAG members followed the conflict-of-interest declarations as outlined in Fisheries Administration Paper 12. Members and participants reviewed/updated the Declarations of Interest at Attachment A.

5.   The RAG decided that when management advice was being determined, any member with declared conflicts of interest (Table 2) would leave the meeting for recommendations but remain present during the discussions.

Table 2. Participation in items where there are declared conflicts of interest.

Agenda item	Persons with potential conflicts of interest	Discussion participation	Recommendation participation
All agenda items seeking RBC/TAC advice (3, 4, 5, 7, 8, 9, 10, 11)	Mr Simon Boag Mr Dan Hogan	Present for discussions	Absent for TAC and RBC recommendations
12.1 SESSF Research Priorities	Dr Geoff Tuck Dr Paul Burch Dr Miriana Sporcic Dr Pia Bessell-Browne Dr Robin Thompson Dr Tim Ryan Dr Sandra Curin Osorio Dr Natalie Dowling	Present for discussions	Absent for decisions or approval of research proposals

1.3   Adoption of Agenda

6.   The RAG adopted the agenda as final.

1.4   Minutes of Previous Meeting

7.   The RAG noted the minutes from SERAG 1 (October 2022) will be sent to members for comment out of session once finalised.

1.5   Actions arising from previous meetings

8.   The RAG noted the action items from previous meeting and the updates provided by the Executive Officer at Attachment B. Specifically the RAG discussed the following action items.

- Action Item 8 – The RAG noted there was scope to include collection of samples for Close-Kin-Market-Capture (CKMR) within the Shark Industry Data Collection (SIDaC) contract. The RAG agreed that AFMA will continue undertaking this action and look to update the item with an appropriate end date.

- Action Item 9 – AFMA has confirmed that 'Black trevally' species recorded in logbooks are blue warehou. The skippers have been informed and will record future catches as blue warehou. The RAG discussed the need for AFMA to review the E-log maintenance and update procedures to establish an on-going process to identify future issues.

- Action Item 25 – The RAG noted that this action item has been raised with the data and licensing team at AFMA who are responsible for developing the Application Programming Interfaces (APIs).

2   Data Updates

9.   Dr Paul Burch (CSIRO) introduced the agenda item and updated the RAG with a presentation and associated paper.

10.   The RAG noted the following background:

- High discard estimates for mixed Oreos and Frostfish in Deng *et al*. (2022a) were identified as unusual at the MYTAC meeting between AFMA and CSIRO on the 12th of August 2022. Further investigation identified that discards of non-target species are not being assigned to the spawning fishery strata when they should be. Either the definition of the spawning fishery strata did not include the non-target species or CSIRO has interpreted the definition incorrectly.

- At the 2022 Southern and Eastern Scalefish and Shark Fishery Resource Assessment Group (SESSFRAG) Data Meeting, SESSFRAG recommended catches of non-target species be incorporated into spawning fishery strata for the purposes of estimating discards.

11.   The RAG noted the following updates from Dr Paul Burch (CSIRO):

- The Integrated Scientific Monitoring Program (ISMP) strata for the spawning fisheries for Blue Grenadier (*Macruronus novaezelandiae*) and Orange Roughy (*Hoplostethus atlanticus*) have been modified to include non-target species. In addition, a new strata ("TR_FV_BGS") has been created for factory vessels targeting Blue Grenadier due to catches and discards of factory vessels differing from those of wet boats. During the process of revising the spawning fishery strata and re-estimating discarded catches, an error was identified in the August 2022 discard estimates for most species due to the under-estimation of logbook catch. This error has been corrected and a process will be established to prevent this error from re-occurring.

- Discarded catches have been re-estimated using the revised strata definitions for 2016–2021.

- The re-estimation resulted in the discard estimates for most species either declining slightly or not changing. Some species which did not have a valid estimate in August 2022 now have a valid estimate. Oreo basket 2021 discard estimate declined from 73% to 66% and Frostfish 2021 discard estimate declined from 55% to 37%.

12.   The RAG made the following key points:

- Frostfish is associated with the spawning fishery for Blue Grenadier and the factory vessels. The vessels are both discarding frostfish and putting frostfish catches through meal plants. The RAG noted the variability in the input of catch into meal plants.

- Observer coverage and data collection requirements on Blue Grenadier factory vessels should be reviewed to ensure appropriate data are collected.

- The RAG noted the ongoing Electronic Monitoring (EM) program at AFMA and its implications on future coverage rates and possibilities to aid in data collection.

2.1   Actions and recommendations from Agenda Item 2

Action Item 1: AFMA to review observer requirements on Blue Grenadier factory vessels to ensure appropriate data are collected.

3   Flathead Tier 1 assessment

13. Dr Pia Bessell-Browne (CSIRO) introduced the agenda item and updated the RAG on the most recent Tier 1 assessment of Tiger Flathead (*Neoplatycephalus richardsoni*). Stock assessment details, RAG comments and recommendations are provided in the species summary at Attachment D.

14. The RAG noted the following key points:

    • At SERAG 1 in October 2022, Dr Pia Bessell-Browne (CSIRO) provided an overview of the preliminary base case assessment for Tiger Flathead. The RAG requested that CSIRO examine the interaction between stock recruitment steepness (h), the biomass target reference point (Btarg), and the pre-specified value of natural mortality (M) in further detail and summarise this for consideration at SERAG 2 2022.

    • In previous Tiger Flathead assessments, estimation of h has allowed accurate determination of biomass at Maximum Sustainable Yield (B_{MSY}). This B_{MSY} estimate was used with a 1.2 multiplier to determine biomass at Maximum Economic Yield (B_{MEY}), which is then used as the target reference point in the harvest control rule (HCR). The form of this HCR was 20:35:(BMSY*1.2). This allowed the target reference point of the HCR to change each time an assessment was completed.

    • SESSFRAG implemented a minimum value of 0.4 for the target reference point to maintain sustainability targets and reduce the risk of overfishing at lower target reference points, this value has not been exceeded since implementation of this rule in 2010, effectively implementing a 20:35:40 HCR.

    • The 2019 assessment and the 2022 preliminary base case identified a very flat likelihood profile for h. This suggests there are insufficient data in the assessment to allow estimation of this parameter. As likelihood profiles on h are not available for assessments prior to 2019 it is difficult to determine whether earlier assessments were able to accurately estimate h, or whether similar issues persisted.

    • A request from the October SERAG meeting was to remove the Tas Trawl CPUE series to investigate the impacts of the improved fit to the early years of the series, which resulted from a trade off with fits to the East trawl CPUE series in the same period. In addition to a model with no Tas trawl CPUE, an additional model with the Tas trawl fleet removed entirely was investigated.

    • The results showed minimal changes in estimated stock status and SSB when removing the Tas trawl CPUE and when removing all Tas trawl data compared to the base case assessment.

    • There were small changes in the fit to the Danish seine index, with a small improvement in the fit between 1986 and 1992 when removing the Tas trawl index and also all Tas trawl data. However, estimates were still well below the input values. Ultimately, there were no improvement to the fit to the data from 2013 onwards when removing the Tas trawl index or all Tas trawl data.

    • The RAG noted the review of likelihood profiles should be conducted before assessment years to ensure adequate time and funding is in place to allow for a comprehensive review.

3.1   Actions and recommendations for agenda item 3

Recommendations

15. SERAG recommended a 3-year MYTAC using the average RBC of 2,831 t. It was considered premature to deviate from the base case agreed at SERAG 1 (Oct 2022), which used a fixed steepness value of 0.75, fixed natural mortality of 0.27 and a target reference point of 40%B_0.

16. SERAG recommends extra work should be undertaken on estimating growth parameters, developing an informative prior on *h*, investigating the different trends apparent between CPUE series by fleet and whether these are indexing abundance, and the preference of the model to estimate higher values of *M*. The results should be presented as advice before the next scheduled Tier 1 Tiger Flathead assessment.

4 Gemfish (west) Tier 4

17. Dr Miriana Sporcic (CSIRO) introduced the agenda item and updated the RAG on the most recent Tier 4 assessment on Gemfish west. Stock assessment details, RAG comments and recommendations are provided in the species summary at Attachment E.

4.1 Actions and recommendations for Agenda Item 4

Recommendations:

18. SERAG (Nov 2022) recommended a 3-year MYTAC using the RBC of 221 t from the 2022 Tier 4 assessment.

5 Mirror dory Tier 4

19. Dr Miriana Sporcic (CSIRO) introduced the agenda item and updated the RAG on the most recent Tier 4 assessment on Mirror dory (east and west). Stock assessment details, RAG comments and recommendations are provided in the species summary at Attachment F.

5.1 Actions and recommendations for Agenda item 5.

20. The RAG recommended a single year TAC using a combined east and west RBC of 186.5 t for the 2023–24 SESSF season.

6 Hagfish – Data collection and TAC advice

21. Dr Lara Ainley (AFMA) opened the agenda item and the RAG was provided with a presentation from Dr Doug Ferrell (on behalf of Hagfish Australia), on Hagfish data collection and TAC advice.

22. The RAG noted the following background information:

- There is insufficient information on which to base reliable TAC advice. The collection of data that can support future stock assessments and management arrangements for the fishery remains a high priority.

- Industry has independently collected finer scale data on Hagfish catch and effort since fishing commenced, however, this information has only been recorded in the AFMA logbooks since 2021.

- AFMA are working with Hagfish operators to improve logbook reporting and data collection by transitioning to the use of electronic logbooks (e-logs).

- Currently, catch rates are calculated as the total catch over the total number of traps set per day. The RAG has previously recommended collecting the number/weight of Hagfish for every trap to improve CPUE calculations. However, due to operational constraints this is unrealistic.

- Due to operational constraints, the 2022 escape hole trial has not progressed.

- Based on the logbook information available, the level of bycatch in the Hagfish fishery is minimal and discarding is largely non-commercial sized Hagfish. AFMA will maintain 10% observer coverage for Hagfish operations for the 2023–24 fishing season to ensure sufficient data is collected.

- A preliminary assessment of the Hagfish fishery using FishPath was undertaken by Dr Ferrell as an exploratory exercise only. Noting that improvements to data collection are progressing, the caveats identified, level of uncertainty, and any assumptions that need to be made will need to be carefully considered before determining a possible assessment methodology for Hagfish.

23. The RAG considered the presentation from Dr Ferrell and made the following key points:

- There is still insufficient information to provide advice on sustainable TACs. The data collection must be improved and provided to the RAG in a clear and concise format.

- The escape hole trial should continue, with the results provided to RAG members as an information paper.

- Concerns around hyperstability could be resolved if other data sources are considered, e.g. trawl data or effort from outside the hagfish fishery.

- The string should be used as the unit of effort for CPUE and logbooks need to include:

  i. start and end time and location for set and haul (string)

  ii. escape hole size

  iii. skipper name

- Any information relating climate change impacts on hagfish should be considered in the future.

6.1   Actions and recommendations for Action Item 6

24. There was mixed support to establish a working group to guide data collection and future assessment requirements for Hagfish. AFMA will consider the form and function of this group. The RAG suggested that they only need to be consulted when thorough analyses of selectivity, catch rates and relevant biological information are available.

7   Deepwater shark data review and TAC advice

25. Dr Robin Thomson (CSIRO) opened the agenda item and updated the RAG on the work conducted to date regarding data availability and stock assessment approaches for deepwater sharks.

26. The RAG noted the background information and Dr Robin Thomson's presentation, key points included:

- The RAG last considered Deepwater Sharks in October 2021.

- The Deepwater shark basket consists of 18 species, many of which are difficult to identify; discard rates are high, making management and stock assessments difficult.

- In the absence of new information, the RAG have considered the available indicators and recommended that the existing TACs of 24 t (east) and 235 t (west) remain in place for the last two fishing seasons.

- Work currently underway is focused on *Deania spp.* ('Platypus Shark') and *Deania calceus* in particular. The remaining 16 species in the Deepwater Shark basket are not being directly considered; instead, the assumption is being made that managing the most biologically vulnerable species is likely to afford sufficient protection to all other species. However, given the diverse

range of life histories and differences in catchability among the 18 species in this basket, this assumption has some uncertainty. Improved species identification in logbooks as well as improved understanding of discarding would be valuable.

- Any quantitative assessment - including a Tier 1-style age-structured assessment model - could be applied, albeit with unavoidable uncertainty regarding catches and catch-per-unit-effort (CPUE). This uncertainty is particularly severe prior to the routine collection of catch data (before 1992) and the 1992-1996 period likely had higher discard rates than later years, before an oil market developed. In addition, length composition data is likely to be unrepresentative due to spatial population structure.

- A Tier 4 assessment is a possibility for *Deania spp.*, with the new 'dynamic Tier 4' recommended over the current Tier 4 (if MSE testing shows it to be reliable).

- A better understanding of the spatial distribution of the stock (by sex and life stage) would improve our understanding of the level of protection provided by the spatial closures.

- Declining catches between 1997 and 2000, and a significant reduction in *FRV Kapala* survey catch rate for *Deania spp.* (from 200–605 m depth off New South Wales, NSW) caused concern in the past, but current indicators of stock health (rising catches and catch rates, noisy but stable length frequencies) suggest little cause for concern in recent years (but do not provide a measure of *Deania spp.* abundance on the NSW upper slope, specifically).

- Prior to 1985, trawlers were not fishing deeper than 600 m and landings were only recorded from 1992. The discards in these years were likely much higher due to only a small market for the catch at this time. This could be modelled at a higher detail.

- There are discrepancies in the CDR and logbook data. This could be because catch in one zone was landed in another, or an issue of trunked vs whole weight reporting. The RAG suggested investigation through matching weights (CDR vs logbook) on a trip level to see if there is a consistent bias in reporting.

- There is an overall increase in the CPUE for east and west. CPUE calculation could be improved by focussing on shots targeting deepwater sharks, however, this might leave insufficient data for standardisation. Survey CPUE and length data, perhaps along with commercial data (when mesh size is the same), could be used to extend the time series. However length data would have to be entered from scans of paper log books.

- The biological parameter values required by quantitative stock assessment models are available, either from Australia or overseas.

27. The RAG noted the following key points:

- A deepsea gillnet fisher, who operated in the past, did focus on deepwater shark. There is a possibility that these catches are recorded in state catch records and CSIRO will request this information the next time they approach the states for information.

- Consideration should be given to whether a Tier 4 assessment based on *Deania spp.* would be adequate to provide RBC advice for the whole basket. Dr Robin Thomson (CSIRO) noted that the assessment would use the CPUE and landed catch for all species.

- The RAG supported a tier 4 assessment on the basis that further work will be undertaken in line with the recommendations from *Thomson et al.* (2022).

- The RAG also requested if Sushmita Mukherji (a PhD candidate with UTAS/CSIRO) could provide an update to SERAG in 2023 on her work on the assessment and management options for the remaining 16 species in the deepwater shark basket.

7.1   Actions and recommendations for Agenda item 7

Recommendations

28. The RAG recommended further investigation into a tier 4 assessment in line with the recommendations from Thomson *et al.* (2022).

8   Rebuilding Species

8.1   Rebuilding Species Annual Review

29. Dr Mark Grubert (AFMA) introduced the agenda item and updated the RAG on the progression of the rebuilding strategies for Orange Roughy and Blue Warehou and also the impacts of impending changes in the Commonwealth Trawl Sector (CTS; i.e. closures and a structural adjustment program) on the rebuilding strategy review process.

30. The RAG noted the following background information:

    - The Chair of the AFMA Commission wrote to CTS concession holders on 26 September 2022 advising that the design of the five spatial closures have been finalised and that the closures will come into effect on 1 May 2023.

    - Noting the history of low catches of at-risk species, and comparatively large catches of flathead by Danish seiners in the area known as Closure D, the Commission proposed that this closure may only apply to otter trawl boats, subject to gear modifications being adopted across the Danish seine fleet to offset catches of at-risk species in this and other areas of the fishery. AFMA Management are currently evaluating the Danish seine gear modifications proposed by the South East Trawl Fishing Industry Association (SETFIA) and expect to provide as response to the proposal by early December.

    - AFMA have postponed reviews of the rebuilding strategies for redfish and eastern gemfish until after the trawl closures and structural adjustment process have been completed. Rebuilding strategies for jackass morwong and John dory, which were assessed as depleted in 2021, will be developed at the same time. Rather than having individual rebuilding strategies for all species, AFMA are considering the merits of a single strategy under which all shelf species (i.e., excluding orange roughy and school shark) could be managed to improve consistency and reduce the administrative burden of reviewing and maintaining individual strategies.

    - Given the impending closures and structural adjustment process expected to commence in early 2023 (details below), the outputs of targeting and metier analyses are unlikely to be a reliable predictor of catch and effort for the 2023-24 fishing season and thus have not been conducted.

    - AFMA are seeking advice on an appropriate research catch allowance (RCA) to support data collection in the closures.

31. The RAG noted the following key points:

    - Future rebuilding strategies should incorporate the effects of climate change.

    - The nature of the SESSF quota market means that not all quota that is set will be caught due to inefficiencies in the market.

    - RCA should be at a sufficient level to incentivise industry. However, it should not be an additional allocation on top of total mortality for a rebuilding stock.

    - Mr Simon Boag and Dr Ian Knuckey noted they may have a potential conflict of interest on future research that occurs within the closures.

- In the absence of a detailed research proposal, the RAG cannot support a RCA for rebuilding species within the new closures.

- Tier 4 assessments are unlikely to provide an indication of the effectiveness of the closures in the short term.

8.2   Rebuilding Species TAC advice

32. The RAG noted the following key points:

- There is no new information with which to revise bycatch TAC advice – the RAG recommended maintaining the current bycatch TACs.

- The consequence of implementing these closures is the loss of data that normally accompanies the commercial fishing operations.

- The potential for non-extractive survey methods should be considered.

8.3   Actions and recommendations from Agenda item 8

Recommendations

33. SERAG is not comfortable recommending a research catch allowance without a detailed research plan. The RAG can support the development of a research plan to measure the effectiveness of the closures, whether this is through an existing stock assessment process or a new focused survey.

34. SERAG recommend maintaining the current bycatch TACs for rebuilding species.

> **Action Item 2:** AFMA to provide SERAG members with the decision making and rationale that informed the implementation of the structural closures.

9   Blue grenadier Tier 1 assessment

35. Dr Geoff Tuck (CSIRO) introduced the agenda item and updated the RAG on the most recent Tier 1 assessment on Blue grenadier (*Macruronus novaezelandiae*) accompanied by a report and presentation. Stock assessment details, RAG comments and recommendations are provided in the species summary at Attachment G.

36. The RAG noted the following key points:

- The Dynamic B_0 project indicated that Blue Grenadier was very strongly influenced by environmental effects. The actual environmental drivers would be a complex mix due to the area and depths at which Blue Grenadier occurs. The RAG believes this could be an indication of why the spawning stock biomass is high compared to other species within the SESSF.

- The omission of the acoustic survey estimates for 2020 and 2021 produced higher estimates of both virgin female spawning biomass (B_0) and projected 2023 spawning biomass (B_{2023}) than those of the base case. The resultant estimate of relative biomass (i.e. B_0/B_{2023}) was 1.40, compared to 1.24 for the base case.

- A peer review of the Blue Grenadier stock assessment is considered important and should occur before the next assessment, noting the history of waiting until poor predictions are given from assessments before reviews are undertaken. There is also a belief that a rolling review will benefit the stock assessment process.

- Historical industry reports on finding spawning fish on the east coast should be provided to CSIRO.

9.1 Actions and recommendations from agenda item 9

Recommendations

37. SERAG recommended a 3-year RBC using the average of 17,313 t (inc. discards) with an assessment review to be completed in 2024/25 and the next Tier 1 assessment planned for 2025/26. If it becomes apparent that more time is required to refine the model, then SERAG believes the assessment can be moved back to 2026/27 and revisit RBC advice for the additional year.

10 Silver trevally joint assessment and RBC advice

38. Stock assessment details, RAG comments and recommendations considered at the October 2022 SERAG meeting are provided in the species summary at Attachment H.

39. Dr Geoff Liggins (NSW DPI) and Dr Ashley Fowler (NSW DPI) provided an overview of the NSW assessment.

40. The RAG noted the following key points:

- The results of the most recent NSW assessments are consistent with those presented by NSW at previous SERAG meetings. They continue to be at odds with the outputs of the Commonwealth Tier 4.

- Assumptions about the status of the stock during the reference period for the Commonwealth Tier 4 assessment are inconsistent with the findings of the NSW assessments and may be incorrect. This should be considered as part of the joint stock assessment.

- A recent 2-day workshop was undertaken for the joint assessment on the use of Stock Synthesis Data Limited (SS-DL) which will be used to help build an integrated model.

- Recent rainfall may be influencing availability and masking declines in the CPUE.

- Some of the boats that catch Silver Trevally are dual endorsed. If these boats exit the fishery as part of the structural adjustment process, effort may shift into NSW.

- Silver Trevally needs to be managed for the next 12 months as if current biomass is below the LRP (20%), noting the upcoming advice from the joint assessment to be provided to the SESSFRAG Chairs' meeting in 2023.

10.1 Actions and recommendations from action item 10

Recommendations

41. SERAG recommended that Silver Trevally be managed as a depleted species, noting that the structure of the joint assessment model requires approval from SESSFRAG in 2023 before it can be used to generate TAC advice for SERAG.

11 Cascade TAC advice

42. Mr Daniel Corrie (AFMA) opened the agenda item and presented background information to assist SERAG in recommending a TAC for Cascade Plateau orange roughy (*Hoplostethus atlanticus*) and Cascade Plateau smooth oreo (*Pseudocyttus maculatus*) during the 2023–24 season.

43. Stock assessment details, RAG comments and recommendations are provided in the species summary at Attachment I (Orange Roughy) and Attachment J (Smooth Oreo).

44. The RAG noted a presentation from Dr Tim Ryan with the following key information:

- Acoustic data collection for the recent scheduled survey did not happen.

- The observations from 2022 showed extensive searching and temporal coverage (14th June to 10th July). It is highly unlikely that substantial aggregations would have been missed. Only occasional prospective orange roughy acoustic marks identified but limited trawling meant that no ground truthing was possible. Multifrequency deployed acoustics would provide the most certainty in species identification. No surveyable, high confidence Orange Roughy aggregations were found resulting in biomass estimates not being possible for 2022.

- Dr Tim Ryan recommended that skippers record acoustic data (from sounders) as often as practical. This is inexpensive and reduces lingering questions about the timing of spawning aggregations.

- Dr Tim Ryan noted that for a survey to succeed you need good weather conditions, calibrated vessel, and aggregations that are strong enough to stand out from the surrounding scatter. This vessel-based survey will have biases but will provide ballpark estimates of biomass.

11.1 Actions and recommendations from agenda item 11

Recommendations

45. Noting the low levels of catch since 2009, SERAG did not have concerns regarding the sustainability of the stock. However, the committee did note a need to update the assessment to inform future TACs. SERAG recommended a TAC of 397 t for Cascade Orange Roughy for the 2023-24 fishing year. This TAC is based on the long-term RBC from the 2009 stock assessment, noting there is reduced confidence in the outputs given the assessment was completed over a decade ago.

46. SERAG did not believe there was a basis to recommend a change to the management advice for Smooth Oreo (Cascade) and recommended maintaining the 150 t TAC.

Agenda Item 12 – SESSF research priorities

47. Dr Mark Grubert introduced the agenda item with the purpose of SERAG providing advice on research priorities to be included in the Southern and Eastern Scalefish and Shark Fishery (SESSF) Annual Research Statement 2024–25 (the 2024–25 Research Statement) and seeking feedback on the research proposals submitted in response to the AFMA call for research for the 2023–24 financial year. Research proposals were assessed on their relevance to identified priorities, clarity of objectives and benefits, likelihood that the outputs will be adopted, value for money, consultation, and data sharing.

48. The RAG provided the following feedback on the received proposals:

Close-Kin Mark-Recapture (CKMR) assessment design for selected key and rebuilding species in the SESSF and development of CKMR tool for bycatch stocks.

- This project is required to scope future CKMR options and the proposal is consistent with the call for research.

- There were some concerns about the cost of the research, however there is no benchmark for comparison as this work has not been conducted before.

- SERAG supported the proposal overall.

Acoustic Biomass estimates and monitoring metrics for blue grenadier – 2023 surveys.

- The proposal was supported with all criteria scoring a 2 (maximum).

Fish ageing for SESSF quota species 3-year project ending 2025-26.

- There are no competing research providers for this service.
- The proposal lacks sufficient details around costs.
- The proposal was supported with all criteria scoring a 2 (maximum).

Acoustic Optical Surveys (AOS) of the eastern zone Orange Roughy stocks during the July 2023 spawning event.

- The 2020 AOS utilised an RCA whereas this project does not, therefore costs are greater.
- The proposal was supported with all applicable criteria scoring a 2 (maximum)

Stock assessments for target species in the SESSF 2023-25.

- The data processing component of the project is still extremely high and is a poor reflection of the current state of data environment at AFMA.
- The current process is highly inefficient and is costing the fishery. Dr Paul Burch suggested that automation can only reduce costs if AFMA were to implement a consistent timeseries of logbook data, as task CSIRO currently has to complete annually.
- The RAG requests that the costs be broken down to see what the process involves. CSIRO can provide a rough approximation of the tasks that go into the data processing component.
- The AFMA member noted that even upon completion of SMARP objectives processing work will still be required as a part of this proposal.
- Future calls for research should be species-specific to encourage other applicants.
- The cost effectiveness of the proposal was rated a 1 noting the inefficiencies in the overall data processing process.
- All remaining applicable criteria was scored a 2 (maximum).

49. The RAG was asked to provide advice on the research priorities to be included in the 2024-25 research statement.

50. The RAG noted the following key points:

- There is an error in the Southern and Eastern Scalefish and Shark Fishery Annual Research Statement for 2023-24 stating there is no CPUE data available for Gummy Shark. AFMA will correct this statement.
- The following research priorities were not included in the 2023-24 call for research because they were either not identified as high priorities or are subject to future work being completed:
    i. Non-extractive survey methodology for establishing eastern gemfish index of abundance
    ii. Acoustic optical survey (AOS) of the Cascade Plateau Orange Roughy stock
    iii. Evaluating contributing factors to catch per unit effort (CPUE) standardisation in the SESSF (subject to environmental data being collected).

- The following projects are currently listed for 'inclusion in future research plans':
    i. Obtaining discard data and fish lengths using EM
    ii. Establish ecosystem indicators to inform species management
    iii. Economic data collection
- The priority "Non-extractive survey methodology for establishing eastern gemfish index of abundance" and "Acoustic optical survey (AOS) of the Cascade Plateau Orange Roughy stock" are not considered cost-effective options.
- The priority "Evaluating contributing factors to catch per unit effort (CPUE) standardisation in the SESSF" is subject to environmental data being collected.
    i. There may never be sufficient environmental indices to use in standardisations.
    ii. This should be retained as a future priority – consider rewording it to include broader aim.
    iii. Dr Ian Knuckey noted the FRDC project supported to collect environmental data from commercial fishing gear during commercial operations.
    iv. AFMA have included an agenda item on the SESSFRAG Chairs 2023 meeting agenda to identify all data requirements to improve CPUE standardisation.
- Regarding the future priority "Obtaining discard data and fish lengths using EM"
    i. This priority would consider collecting non-trawl length measurements by holding catch over a physical on-board tape measure within camera view.
    ii. Mr Simon Boag noted that the EM footage review would make this an expensive process and suggested that this approach should be pursued as a deliverable within the AFMA EM program – not as a priority in the research plan.
    iii. The RAG supported keeping the priority as a possible future research item and recommended retaining footage beyond 6 months to support future projects.
    iv. The RAG noted CSIRO on-going work on AIML and having measuring tapes would benefit this work moving forward.
- Regarding the priority "Establish ecosystem indicators to inform species management"
    i. This priority is to focus on environmental indicators of ecosystem health. This is being considered by Dr Beth Fulton in the multi species harvest strategy project.
    ii. This priority could be adapted to "Identify environmental indicators of ecosystem health to inform species management". AFMA should engage with the ecosystem team at CSIRO to establish if this work has been performed already.
    iii. There is insufficient documentation of the discussions around climate change and ecosystem health – a compendium of indicators the RAG uses for each species should be considered.
    - Regarding the priority "Economic Data Collection"
        i. AFMA began a process to include a broader suite of indicators (share of benefits, employment etc) however this did not progress. Rather, a Fisheries Management Paper was developed that focuses very strongly on economic objectives of maximising net economic return.
        ii. The RAG now relies on Industry to provide indicators such as current price etc when asked.

iii. This priority is meaningless without further consideration of the scope.

51. The RAG noted the following regarding new priorities to include in the Research Plan:

- The Pink Ling stock assessment to be included as a standalone assessment (2024/25).

- Include as a research priority to have the Blue Grenadier and Tiger Flathead stock assessments independently reviewed.

- Monitoring for recovery of depleted stocks should become a broader priority.

- Mr Daniel Corrie (AFMA) noted he will pull together a more comprehensive paper and send to RAG members out of session regarding support for AFMA to collect data from the upcoming closures.

12.1 Actions and recommendations from agenda item 12

Recommendations

52. The RAG supported the research proposals, noting comments above.

> **ACTION ITEM 3 – Dr Paul Burch to break down tasks and allocated effort involved in the data processing component of the research proposal Stock Assessments for target species in the SESSF 2023-25. To be provided to SESSFRAG.**
>
> **ACTION ITEM 4 -- During the first draft of the research plan for the project "Identify environmental indicators of ecosystem health to inform species management" AFMA should engage with the ecosystem team at CSIRO to establish if this work has been performed already.**
>
> **ACTION ITEM 5 – AFMA to develop a research plan to support data collection in rebuilding species closures.**

13 Other Business and Action Item review

53. Dr Mark Grubert (AFMA) opened the Agenda item with the purpose to provide an overview of catch and effort, and biological samples collected under the Western Orange Roughy Research Plan 2020-2022 (WORRP) in 2022 and to seek SERAG's advice on a western Orange Roughy Research Catch Allowance (RCA) for the 2023-24 Southern and Eastern Scalefish and Shark Fishery (SESSF) season.

54. SERAG noted the following background information:

- AFMA granted scientific permits to five boats under the WORRP to collect data for the six-month period from 01 May 2022 to 30 October 2022.

- The focus of the WORRP is to collect catch and effort data, as well as biological information on the age and size structure of the western Orange Roughy stock, with a view to accumulating sufficient information to undertake a stock assessment and then develop a set of indicators and reference points to potentially allow for target fishing of western Orange Roughy at some future time (in accordance with the Commonwealth Harvest Strategy Policy 2018 (HSP) and the SESSF Harvest Strategy).

- There was no observer coverage for the 2022-23 SESSF season.

55. The RAG made the following key points in relation to the Western Orange Roughy Research program:

- Industry collected 87% of the target for length samples and 123% of the target for otolith samples.

- A request from Dr Paul Burch (CSIRO) to start ageing some of the otoliths collected through the WORRP program. The stock structure hypothesis for the Western Orange Roughy zone is believed to be mostly non spawning. Maturity information is being collected through sampling at markets and there is some difficulty matching location to samples. Dr Paul Burch (CSIRO) requested that future otolith ageing should be those where locations can be matched to avoid additional costing.

- Industry members noted there have been strong currents in the area during the recent fishing season.

- The RAG noted Dr Ian Knuckey's comments regarding historical locations were Orange Roughy eggs were found in the western zone. These locations (Attachment K) are now within Portland Area Trawl Closure. Dr Ian Knuckey noted there should be a AFMA corporate database of historical AFMA funded research projects and associated papers.

13.1   Actions and recommendations from Agenda item 13.

Recommendations

56. SERAG supported the 200 t Research Catch Allowance for the Western Orange Roughy research program and recommends the RCA and sampling protocols be considered on an annual basis. SERAG notes Dr Paul Burch request to begin ageing otoliths that have been collected through the program, noting not all otoliths are required to be aged.

Close of Meeting.

57. The Chair thanked the RAG for their contribution and closed the meeting.

Attachment A – Register of interests

Member	Declaration
Dr Paul McShane (Chair)	Chair of SERAG and a member of SEMAC and SESSFRAG. No pecuniary interest in the SESSF. Principal of Global Marine Resource Management Pty Ltd. Adjunct Professor (Fisheries and Aquaculture) College of Science and Engineering, James Cook University.
Dr Mark Grubert	Employed by AFMA, Manager of the South East Trawl (SET) and Great Australian Bight (GAB) Trawl sectors. No pecuniary or other interest.
Dr Sarah Jennings	Economics member on SERAG, SESSFRAG and SEMAC. Economics coordinator, FRDC Human Dimensions Research Subprogram. Member of AFMA Economics Working Group. Adjunct Senior Researcher, TSBE, University of Tasmania. Casual employee, IMAS, University of Tasmania. Independent economics consultant. No pecuniary or other interest.
Dr Geoff Tuck	Employed by CSIRO and involved in stock assessments. Interest in obtaining funding for future research. Principal investigator on SESSF stock assessment project.
Mr Andrew Penney	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. Currently Principal Investigator on FRDC Projects Nos 2017-180: Design and implementation of an Australian National Bycatch Report: Phase 1 – Scoping; and 2019-036: Implementation of dynamic reference points and harvest strategies to account for environmentally-driven changes in productivity in Australian fisheries. Independent scientific member on the AFMA Southeast RAG, the Tropical Rock Lobster RAG and the Small Pelagic Fishery RAG. Member of the AFMA ERA Technical Working Group. Deputy Scientific Member on the New South Wales Fisheries Total Allowable Fishing Committee Sep 2020 to Sep 2023. No shareholding and hold no positions relating to any other companies, including any fishing companies or industry associations.
Dr Ian Knuckey	**Ian Knuckey positions:** Director – Fishwell Consulting Pty Ltd Director – Olrac Australia (Electronic logbooks) Chair – Northern Prawn Fishery Resource Assessment Group Chair – Tropical Rock Lobster Resource Assessment Group Chair – Victorian Rock Lobster and Giant Crab Assessment Group Chair – Victorian Central Zone Abalone Fisheries Resource Advisory Group Chair – Gulf of St Vincent's Prawn Fishery MAC Research Scientific Committee Scientific Member – Northern Prawn Management Advisory Committee Scientific Member – Gulf of St Vincent's Prawn Fishery Management Advisory Committee Scientific Member – Tropical Tuna Resource Assessment Group

	Scientific Member – SESSF Resource Assessment Group
	Councillor – Victorian Marine and Coastal Council
	Member – The Geelong Agri Collective
	Fishwell current projects:
	DAWE Project Multi-sector fisheries capacity building
	AFMA 2022- Annual monitoring, reporting and assessment of SPF marine mammal interactions, including effectiveness of mitigation measures
	AFMA 2020-0807 Bass Strait Scallop Fishery Survey – 2020-22
	AFMA project Design sea cucumber fishery-independent survey for Coral Sea
	FRDC 2019-027 Improving and promoting fish-trawl selectivity in the SESSF and GABTS
	FRDC 2018-021 Development and evaluation of SESSF multi-species harvest strategies
	Traffic Project Shark Product Traceability
	Sea Cucumber Ass. Design and implementation of various sea cucumber dive surveys.
	Australia Bay QLD Gulf of Carpentaria Developmental Fin Fish Trawl Fishery
	Expert Witness Gladstone Harbour development impacts
Mr James Woodhams	Employed by ABARES.
	On behalf of ABARES, has a minor financial stake in the project '2019-036: Implementation of dynamic reference points and harvest strategies to account for environmentally-driven changes in productivity in Australian fisheries'.
	Non-financial roles on the steering committee for the Multi species harvest strategy project led by CSIRO, the Reviewing biological parameters project led by CSIRO and Alternate indicators for the SESSF (working group reporting to SESSFRAG).
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 Will Mure	Sole Director of Mures Fishing P/L
	Commonwealth fish receiver permit
	Tasmania fish processing licence
	Scalefish hook boat SFR, SEQ Quota Holding Permits, Auto longline fishing permit
	High Seas permit
	Blue eye trevalla SFRs, Ling SFRs, Ribaldo ITP
	Mixed species Individual Transferable Quotas (ITQs) and SFRs
	Member of various fishing related associations including Seafood Industry Australia (SIA), South East Trawl Fishing Industry Association (SETFIA), Southern Shark Industry Alliance (SSIA), Tasmanian Seafood Industry Council (TSIC)

Mr Simon Boag	Runs a fisheries consulting firm Atlantis Fisheries Consulting Group. Clients include associations such as SETFIA, SSIA, SPFIA but also other private clients. SSIA was engaged by AFMA to collect biological data in the shark fishery. Non-beneficiary Director of two fishing companies in the SESSF one of which is a significant quota owner. Industry member on SERAG and SEMAC. Member (Chair) of Seine and Trawl Advisory Group (STAG).
A/g EO Mr Nathan Jackson	Employed by AFMA, Senior Management Support Officer, SET and GAB Trawl sectors. No pecuniary or other interest.
Invited Participants	**Declaration**
Dr Robin Thomson	CSIRO Assessment Scientist. Acquiring funding for research purposes. Principal Investigator (PI) for close kin project for school shark. PI on close kin scoping study for blue-eye trevalla.
Dr Miriana Sporcic	CSIRO Assessment Scientist. Acquiring funding for research purposes.
Dr Paul Burch	CSIRO Assessment Scientist. Acquiring funding for research purposes. CSIRO representative on the Fisheries Statistics and Information Working Group. PI on the data services contract.
Dr Pia Bessell-Browne	CSIRO Assessment Scientist. Acquiring funding for research purposes.
Dr Geoff Liggins	NSW DPI, Fisheries scientist. Involvement in NSW resource assessments. Potential interest in the acquisition of funding for research/assessment purposes concerning cross-jurisdictional stocks.
Dr Ashley Fowler	NSW DPI, Fisheries scientist involved in NSW resource assessments. Potential interest in the acquisition of funding for research/assessment purposes concerning cross-jurisdictional stocks.
Dr Heath Folpp	NSW DPI, Program Leader, Resource Management. No pecuniary or other interest.
Ms Frances Seaborn	Department of Natural Resources and Environment (DNRE) Tasmania Senior Fisheries Management Officer. No pecuniary or other interest.
Dr Tim Ryan	CSIRO Scientist. Acquiring funding for research purposes.
Mr Chad Lunow	Fisheries Manager, Management and Reform DAFF QLD No pecuniary or other interest
Observers	**Declaration**
Dr Krystle Keller	Employed by ABARES. No pecuniary or other interest.
Dr Daniel Wright	Employed by ABARES. No pecuniary or other interest.
Dr Tim Emery	Employed by ABARES. No pecuniary or other interest.

Dr Sandra Curin-Osorio	CSIRO Assessment Scientist. Acquiring funding for research purposes.
Mr Denis Brown	NSW and Commonwealth SFR and permit holder. Consultant and business associate of Hagfish Australia Pty Ltd.
Mr Christopher Spurrier	Owner of Hagfish Australia and the Norwest Pearl. Commonwealth Trap Fishing permit holder.
Dr Douglas Ferrell	Director of Oceanwatch Australia, a marine natural resource management charity. Sole trader providing natural resource management advisory services.
Ms Rosie Katunar	Fisheries Management Officer Department of Natural Resources and Environment Tasmania No pecuniary or other interest.
AFMA Attendees	**Declaration**
Mr Daniel Corrie	Employed by AFMA, Senior Manager of Demersal and Midwater Fisheries. No pecuniary or other interest.
Dr Lara Ainley	Employed by AFMA, Manager of the Gillnet Hook and Trap (GHAT) sector. No pecuniary or other interest.
Dr Nastaran Mazloumi	Employed by AFMA, Senior Management Officer for the GHAT sector. EO of SESSFRAG. No pecuniary or other interest.
Mr Roshan Hanamseth	Employed AFMA, Senior Management Officer for the GHAT sector. EO of SharkRAG. No pecuniary or other interest.
Ms Rebecca Jol	Employed by AFMA, Senior Management Officer, SET and GAB Trawl sectors. EO of SEMAC. No pecuniary or other interest.
Ms Michelle Henriksen	Employed by AFMA, Senior Management Support Officer, SET and GAB Trawl sectors. EO of GABRAG and GABMAC. No pecuniary or other interest.
Ms Anna Willock	Employed by AFMA, Deputy Chief Executive Officer. No pecuniary or other interest.
Mr Oliver Lilford	Employed by Department of Agriculture, Fisheries and Forestry, completing a graduate rotation in AFMA's Climate Adaptation section. No pecuniary or other interest.

Attachment B – Progress of Action Items from previous SERAG meetings

Complete/Redundant	Underway	Yet to start	Advice required

Table 1. Progress of action items from previous SERAG meetings

Meeting and Agenda Item	No.	Description	Responsibility	Timeframe	Status
November 2019 Action items review	8	AFMA to ensure that the SIDAC data collection includes total and partial lengths of school and gummy shark including school sharks larger than 160 cm, 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 (GHAT manager)	As soon as possible	The SIDAC data contract was revised and updated in June 2022 and length data collection for sharks is included. The project to scope the sampling required for blue-eye trevalla CKMR was partially completed and absorbed into broader work by CSIRO to scope multiple species. AFMA will look into the current SIDAC contract to determine scope to include some preliminary sampling.
November 2019 Agenda item 3	9	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	AFMA have confirmed the species is blue warehou. The skippers have been informed and will record future catches as blue warehou. AFMA are yet to update the database but will inform SERAG once the change is made.
October 2022 Agenda item 2 Data updates	19	Dr Miriana Sporcic (CSIRO) is to present two CPUE series to SESSFRAG data meeting in 2023, one including and one excluding catches from the Cascade Plateau so that SESSFRAG can advise which should be used for the 2023 Tier 4 for the blue-eye trevalla slope stock. Furthermore, CSIRO should create a third zone, 'Cascade Plateau', when presenting blue-eye trevalla catches in future data reports.	Dr Miriana Sporcic (CSIRO)	By the 2023 SESSFRAG data meeting	To be considered at the SESSFRAG data meeting 2023.

October 2022 Agenda item 2 Data updates	20	SERAG to write a letter the AFMA Commission, outlining data issues in the SESSF and methods to address some of these issues.	AFMA and SERAG	As soon as possible	This letter has not yet been drafted. AFMA has confirmed that the issue with repeated depth records has been corrected and the vendors have updated their e-log software. The continued issue may be arising from industry inputting the same depth values, or repeatedly fishing in the same depth. AFMA will also contact operators to address this issue.
October 2022 Agenda item 4 Silver trevally Tier 4	21	AFMA to generate heatmaps of Commonwealth silver trevally catch to help inform the discussion at SERAG 2 (November 2022).	AFMA	SERAG 2 November 2022	AFMA have generated the heatmaps which are included as part of Agenda Item 10 - Silver trevally joint assessment and RBC advice.
October 2022 Agenda item 5 Blue grenadier Tier 1 preliminary base case	22	Dr Geoff Tuck (CSIRO) to run the final blue grenadier assessment with and without the acoustic survey data from 2019, 2020 and 2021 so that so that SERAG can consider the effects of the acoustic survey estimates on the assessment.	Dr Geoff Tuck (CSIRO)	SERAG 2 November 2022	Dr Geoff Tuck will present this to SERAG as a part of the final Tier 1 stock assessment.
October 2022 Agenda item 6 Flathead Tier 1 preliminary base case	23	CSIRO to examine the interaction between the steepness (h), and the biomass target reference point (B_{targ}), and the pre-specified value of natural mortality (M) in further detail and summarises this for consideration at SERAG 2.	CSIRO	SERAG 2 November 2022	See Executive Summary for the Flathead Tier 1 assessment report submitted for Agenda Item 3.

	October 2022 Agenda item 6 Flathead Tier 1 preliminary base case	24	Dr Pia Bessell-Browne to add an additional sensitivity to the standard model runs that excludes the Tasmanian trawl CPUE series so that SERAG can examine its effect on the flathead RBC.	Dr Pia Bessell-Browne	SERAG 2 November 2022	Dr Pia Bessell-Browne will present this to SERAG as a part of the final Tier 1 stock assessment.
	October 2022 Agenda item 9 Blue-eye trevalla Tier 4 assessment (slope)	25	AFMA to examine the possibility of adding 'bait type' as a field in e-logs so that it can be included as a factor in the blue-eye trevalla CPUE series.	AFMA	SERAG 2023	This is one of several issues raised with the blue-eye trevalla assessment. A blue-eye trevalla working group may need to be convened to provide advice on data deficiencies, suitable assessment approaches, and management options for this species.
	October 2022 Agenda item 10 Deepwater shark assessment approach	26	AFMA to confirm whether observers record deepwater shark sexes and if not, consider adding this to data collection protocols.	AFMA	As soon as possible	AFMA's observer team confirmed that observers record the sex of sharks when collecting length frequency information.

Attachment C – Actions Arising from SERAG 2 November 2022

Meeting and Agenda Item	No.	Description	Responsibility	Timeframe	Status
November 2022 Agenda Item 2: Data Updates	27	AFMA to review observer requirements on Blue Grenadier factory vessels to ensure appropriate data are collected.	AFMA	As soon as possible	
November 2022 Agenda Item 8: Rebuilding Species TAC	28	AFMA to provide SERAG members with the decision making and rationale that informed the implementation of the trawl closures.	AFMA	As soon as possible	
November 2022 Agenda Item 12: SESSF Research Priorities	29	Dr Paul Burch to break down tasks and allocated effort involved in the data processing component of the research proposal Stock Assessments for target species in the SESSF 2023-25. To be provided to SESSFRAG.	CSIRO	SESSFRAG	
November 2022 Agenda Item 12: SESSF Research Priorities	30	During the first draft of the research plan for the project "Identify environmental indicators of ecosystem health to inform species management" AFMA should engage with the ecosystem team at CSIRO to establish if this work has been performed already.	AFMA		

November 2022 Agenda Item 12: SESSF Research Priorities	31	AFMA to develop a research plan to support data collection in rebuilding species closures.	AFMA	

Attachment D – Tiger Flathead

Neoplatycephalus richardsoni

Species summary						
Common names	King flathead, trawl flathead, deep-sea flathead					
Stock assessment	Tier 1 Species - last assessed by SERAG in 2022.					
Stock structure	For management purposes a single continuous stock has been assumed throughout all zones of the SESSF.					
Stock status against reference points (%B_0 in year +1)	**Tier**	**Assessment Year**	**Biomass (from assessment year)**	**Biomass (revised in most recent assessment)**	**Target**	**Limit**
	1	2022	40	40	40	20
	1	2019	34	33		
	1	2016	42	34		
Stock trend and other indicators	Otter board trawl CPUE in Zone 30 (east coast of Tasmania) - The annual standardized CPUE trend was noisy and flat between 1986-2001, and after a transitional period between 2002-2006 during which catches increased, is noisy and flat from 2007 to 2021. Annual catches have increased again in more recent years. The reported catch in Zone 30 during 2021 (~205 t) was the lowest since 2014 (Sporcic, 2022a). Otter board trawl CPUE in Zones 10 and 20 – Annual standardized CPUE appears cyclical above and below average, has remained below average in 2017-2018 and increased to the long-term average in 2019, 2020 and 2021, based on the 95% confidence intervals. The 2005 structural adjustment had a profound effect upon the influence of the vessel factor reducing the standardized trend well below the nominal geometric mean CPUE (Sporcic, 2022a). Danish seine in Zone 20 and 60 – Annual standardized CPUE appears cyclical above and below average and has remained below average since 2012. There has also been an overall decrease in standardized CPUE over the 2007-2020 period and a significant increase in CPUE in 2021 relative to the previous year (Sporcic, 2022a).						
Multi-Year TAC	**Year of MYTAC (2022-23)**			**MYTAC advice**		
	3rd of 3-year MYTAC			Continue with 2022 assessment		
Catch and TAC (t)	**SESSF fishing year**		**Agreed TAC**	**TAC after unders/overs**	**Cth Retained Catch**	
	2022-23		2,333	2,483	-	

	2021-22	2,333	2,361	2,143
	2020-21	2,010	2,236	2,183

Economics (Primary) Commonwealth Trawl and Scalefish Hook	Financial Year	Species GVP ($m)	Fishery GVP ($m)	% Fishery GVP
	2020-21	17.06	64	26.66
	2019-20	12.96	51.34	25.24
	2018-19	13.16	49.47	26.60

ABARES Status (2022 report)	Fishing Mortality: Not subject to overfishing		Biomass: Not overfished	

Climate sensitivity	Sensitivity	Preliminary projection	Confidence in projection	Comments
	Low	uncertain	High	While ↑10-15% possible (especially in short term), if the environment continues to change declines are possible as suitable habitats are lost (but not for a few decades).

Assessment summary

| Key model technical assumptions/ parameters | The current assessment models growth separately for males and females.

Tiger Flathead constitute a single stock within the area of the fishery, from zone 10 (NSW), through zone 20 (eastern Bass Strait), zone 60 (Bass Strait) and zone 30 (eastern Tasmania). While alternative stock structures have been previously suggested, with the eastern Tasmanian stock potentially a separate stock (Cui *et al*. (2004); Punt (2005a); Punt (2005b); Klaer (2006); Klaer (2009); Klaer (2010)), this is the current stock structure agreed to by the SERAG.

The stock is assumed to be unexploited at the start of 1915 when the steam trawl fishery commenced. Catches prior to this time are thought to have been minimal.

The CVs of all abundance indices (including the FIS) were initially set to the root mean squared deviation from a loess fit to the fleet specific indices (Sporcic, 2022), and then tuned to match the model-estimated standard errors by estimating an additional variance parameter within SS.

Six fishing fleets are modelled.

Selectivity is assumed to vary among fleets, but the selectivity pattern for each separate fleet is modelled as length-specific, logistic and mostly time-invariant. The selectivity for Danish seine is allowed to change in 1978, and that of the East trawl is changed in 1985. The two parameters of the selectivity function for each fleet are estimated within the assessment.

Retention is also defined as a logistic function of length, and the inflection and slope of this function are estimated for the 3 fleets where discard information is available (Danish seine, East trawl and Tas trawl). Retention for the Steam trawl fleet was implicitly assumed to be independent of length as no length frequency composition data is available on discards for this fleet. |
|---|---|

	The sample sizes for length and age frequencies were tuned for each fleet so that the input sample size was approximately equal to the effective sample size calculated by the model. Before this retuning of length frequency data was performed, any sample sizes with a sample size greater than 200 shots or trips were individually down-weighted to a maximum sample size of 200. Samples with fewer than 100 measured fish were excluded from the analysis. This is because the appropriate sample size for length frequency data is more closely related to the number of shots or trips sampled, rather than the number of fish measured (Bessell-Browne 2022).
Significant changes to data inputs	The following were included in the updated 2022 assessment: Steepness (h) was fixed at 0.75. rather than being estimated in the base case. This change resulted from likelihood profiles in the 2019 assessment and 2022 preliminary base case highlighting that there was limited information in the available data to inform estimation of this parameter. This meant that each time the assessment was conducted, h was estimated to be higher (0.62, 0.72 and 0.85 in 2016, 2019 and 2022 respectively), resulting in undesirable retrospective patterns. Fixing h at the SESSF default value of 0.75 resolved this problem, however, future work should investigate whether another fixed value of h may be more suitable for tiger flathead (Bessell-Browne 2022). The maximum length bin was extended from 59 cm to 65 cm. This change was made because there was a large proportion of measured lengths, in both the East trawl and Tas trawl fleets, in the 59 cm plus group over the past 10 years. Extending the plus group to 65 cm removed the large peak of measured fish in the maximum length bin and allows more accurate estimation of growth parameters (Bessell-Browne 2022).
Data and RAG comments	SERAG (Oct 2022) agreed to add an additional sensitivity to the standard model runs which excludes the Tasmanian trawl CPUE series so that SERAG can examine its effect on the flathead RBC. SERAG (Oct 2022) agreed to h (0.75), B_{Target} (0.4) and M (0.27), noting CSIRO would include an examination of the interactions between the parameters in the final report.
Stock assessment information and RAG comments	There are poor fits to the end of the Danish seine CPUE index from 2013 onwards, where the model is overestimating the input values, this trend was also apparent in the 2019 assessment (Day, 2019). While sensitivities have shown that this is not due to fitting the Tas trawl CPUE series further investigation into the cause of this misfit would benefit future assessments (Bessell-Browne 2022), SERAG (Nov 2022) supports this investigation. Discard proportion was showing cyclical patterns in all fleets, while the input data was remaining relatively flat. The RAG hypothesised this was perhaps due to smaller fish coming through the fishery. The RAG noted the increase in estimated stock status since the 2019 assessment was in-part influenced by the new age and length data. Likelihood profiles have demonstrated there is conflict between different data sources in the assessment when estimating key parameters. The profile on M suggests higher parameter values are preferred by the model and this is also supported by sensitivity results. The preference of the model to estimate higher values of M has been evident since the 2010 assessment and investigating this alternative parameter space and its feasibility should be a focus of future work (Bessell-Browne 2022). The 2019 assessment and the 2022 preliminary base case identified a very flat likelihood profile for h, suggesting that there is insufficient data in the assessment to allow estimation of this parameter. This led to fixing this parameter at 0.75, the default value used in the SESSF, for this assessment. As likelihood profiles on h are not available for assessments prior to 2019 it is difficult to determine whether earlier assessments were able to accurately estimate h, or whether similar issues persisted. There is a likelihood profile on h that was conducted in Punt *et al*. (2014), which revealed a minimum log likelihood was obtained at h values around 0.6, suggesting that earlier assessments may have had adequate information in the data to inform estimation of this parameter. Given this estimated value of around 0.6 and the 2010 stock assessment h estimate of 0.62, these informed values would be a better

	choice to base the pre-specified value rather than the default value of 0.75, which has no specific relation to Tiger Flathead (Bessell-Browne 2022). SERAG (Nov 2022) noted this should be considered in future assessments.

The assessment estimates that the projected 2023 stock status will be 40% of unfished spawning stock biomass ($SSB0$), assuming 2021 catches are maintained in 2022. Under the 20:35:40 HCR, the 2023 recommended biological catch (RBC) is 2,838 t, while the long-term yield is 2,867 t. The average RBC over the 3-year period 2023-2025 is 2,831 t. Exploration of model sensitivity showed a variation in spawning biomass from 28% to 68% of SSB_0 in 2022, which occurred when natural mortality (M) was fixed ($M = 0.22$) and estimated ($M = 0.37$), respectively. For the other standard sensitivities, the variation in spawning biomass was narrower, ranging between 33% and 45% of SSB_0 (Bessel-Browne 2022). |
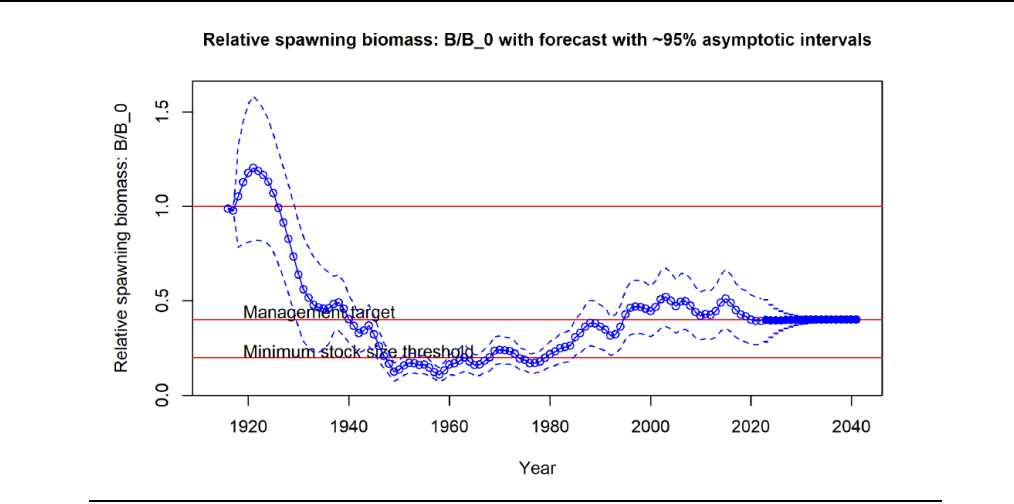| **Projected biomass** |

Figure 24 from Bessell-Browne 2022: The estimated time-series of flathead relative spawning biomass. |

Species specific research and priorities

SERAG (Dec 2022) recommended an examination of the interactions between key assessment parameters be included in the next assessment.

RAG Recommendations

SERAG (Nov 2022) recommended a 3-year MYTAC using the average RBC of 2,831 t. It is premature to deviate from the base case agreed at SERAG 1 (Oct 2022) which used a fixed steepness value (0.75), fixed natural mortality of 0.27 and a target reference point of B_{40}.

SERAG recommends extra work should be undertaken on estimating growth parameters, developing an informative prior on h, investigating the different trends apparent between CPUE series among fleets and whether these are indexing abundance, and the preference of the model to estimate higher values of M. The results should be presented as advice before the next scheduled Tier 1 tiger flathead assessment commences.

	Year	RBC (t)	Is a MYTAC Recommended?
Recommended Biological Catch (t)	2025	2,828	Yes.

Using the 3-year average value as fluctuations are minor. |
	2024	2,827	
	2023	2,838	
	3-year average	2,831	

Discount factor (t)	N/A	Discount factors are not applied to Tier 1 assessments.
State catches (t)	122.1	Mostly NSW catches – NSW maintained the 2019-20 TAC of 166.9 t for the 2022-23 fishing year, which was set at the maximum annual catch during the 8-year individual allocation period.
Discards (t)	213 t (2023) 214 t (2024) 215 t (2025)	The 3-year average modelled discards for the period 2023-2025 are deducted from the 3-year average RBC.
Recreational catch (t)	N/A	Assessment only considers tiger flathead, which are not considered a key recreational species.
Research Catch Allowance (t)	N/A	There has been no specific research catch allocated.
Provisional TAC under the Harvest Strategy	2,495 t	

Attachment E – Gemfish west

Rexea solandri
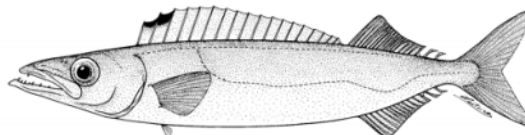
ABARES (2012): Line Drawing – Shane Weidland

Species summary	
Common names	Barraconda, common gemfish, deepsea kingfish, hake, king barracouta, king couta, silver gemfish, silver kingfish.
Stock assessment	Tier 4 Species - last assessed by SERAG in 2022
Stock structure	Recent genetic research (Ovenden *et al*. 2020) has revealed evidence of genetically different populations between the east and west (boundary: west of 146°22'E, north of 42°43'S) (with no gene flow), with a mixing (overlap) of the two stocks in western Bass Strait, through to Portland. 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.

Stock status against reference points (C$_{Lim}$/C$_{Targ}$)

Tier	Assessment Year	CPUE$_{Recent}$	CPUE$_{Target}$	CPUE$_{Limit}$
4	2022	1.0459	1.0289	0.4287
4	2019	1.0418	0.9942	0.4143
4	2016	0.9378	1.1816	0.4923

Stock trend and other indicators

Zones 40 and 50 – Annual standardized CPUE are noisy and flat since 1992 and consistently below average since 2001. However, there has been an overall increase in CPUE (to the long-term average) since 2007, with estimates in the last two years above the long-term average (Sporcic, 2022a).

Zones 40 and 50 in the GAB – Annual standardized CPUE has been consistently below average and flat since 1999, with small overall increases in annual estimated CPUE (to the long-term average) in 2020 and to above the long-term average in 2021. However, the CPUE from 1986 - 1994 is more representative of zone 50 than of the GAB. Given recent evidence that the stocks of western Gemfish in the GAB and most of zone 50 are different biological stocks it is doubtful that these data should be combined (Sporcic, 2022a).

Multi-Year TAC

Year of MYTAC (2022-23)	MYTAC advice
3rd of 3-year MYTAC	Continue with 2022 assessment

Catch and TAC (t)

SESSF fishing year	Agreed TAC	TAC after unders/overs	Cth Retained Catch
2022-23	340	371	-
2021-22	343	372	73
2020-21	300	317	84

Economics (**Secondary**) Commonwealth Trawl and Scalefish Hook	Financial Year	Species GVP ($m)	Fishery GVP ($m)	% Fishery GVP
	2020-21	0.04	64	0.06
	2019-20	Not Available	51.34	Not Available
	2018-19	0.21	49.47	0.42

ABARES Status (2022 report)	Fishing Mortality: Not subject to overfishing		Biomass: Not overfished	

Climate sensitivity	Sensitivity	Preliminary projection	Confidence in projection	Comments
	There is currently no available information regarding climate change sensitivity for western gemfish.			

Assessment summary

Key model technical assumptions/ parameters	The Tier 4 assessment assumes there is a linear relationship between -CPUE and exploitable biomass, and that the character of the estimated CPUE has not changed in significant ways . It also assumes the reference period provides a good estimate of the stock when it was at a depletion level of 48%B_0 and that historical catch records are accurate.
Significant changes to data inputs	N/A
Data and RAG comments	The standardised CPUE series has increased since 2017, with the recent 4-year CPUE average currently above the Target CPUE. SERAG (Nov 2022) noted a very high discard estimate for 2013.
Stock assessment information and RAG comments	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. This species is now assessed as a Tier 4 species only, based on advice from SESSFRAG, using CPUE from Zone 50 in the CTS. The 2022 estimated RBC was approximately 221.37 t, a 201.69 t decrease compared to the 2019 estimated RBC (423.06 t; Sporcic 2019). The decrease in RBC of approximately 202 t can be mostly attributed to a decrease in the most recent CPUE (including discards) and hence the mean of the most recent four-year average which is used to calculate the RBC. The 2022 RBC is greater than the reported catch of approximately 75.1 t (75.5 t including estimated discards) in 2021 for this stock (Sporcic 2022b).
Projected biomass	N/A

Species specific research and priorities

There is no species-specific research currently underway or identified as future priorities.

RAG Recommendations			
SERAG (Nov 2022) recommended a 3-year MYTAC using the RBC of 221 t from the 2022 Tier 4 assessment.			
	Year	**RBC (t)**	**Is a MYTAC Recommended?**
Recommended Biological Catch (t)	2025	221	Yes. 3-year MYTAC using the RBC of 221 t from the 2022 Tier 4 assessment.
	2024	221	
	2023	221	
Discount factor (t)	33		The default Tier 4 discount factor of 15 per cent is applied.
State catch (t)	N/A		State catches are not included in the assessment and are considered low.
Discards (t)	8.1		Weighted average, noting discard estimates for recent years were 2.67 t (2018), 6.34 t (2019), 22.62 t (2020) and 0.40 t (2021).
Recreational catch (t)	N/A		Recreational catch is not significant and not considered in the assessment.
Research Catch Allowance (t)	N/A		There has been no specific research catch allocated.
Provisional TAC under the Harvest Strategy	180 t		

Attachment F – Mirror Dory

Zenopsis nebulosus

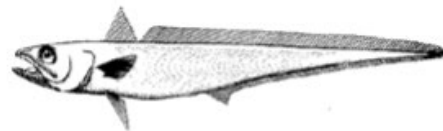| Species summary					
Common names	Deepsea dory, mirror perch, trawl dory, silver dory				
Stock assessment	Tier 4 Species – last assessed by SERAG in 2022.				
Stock structure	An eastern and western stock is currently assumed for assessment purposes. However, mirror dory is managed under a global TAC.				
East **Stock status against reference points** **(C_{Lim}/C_{Targ})**	**Tier**	**Assessment Year**	**CPUE$_{Recent}$**	**CPUE$_{Target}$**	**CPUE$_{Limit}$**
	4	2022	0.7170	1.1842	0.493
	4	2021	0.6543	1.178	0.4908
	4	2020	0.729	1.1808	0.492
West **Stock status against reference points** **(C_{Lim}/C_{Targ})**	**Tier**	**Year**	**CPUE$_{Recent}$**	**CPUE$_{Target}$**	**CPUE$_{Limit}$**
	4	2022	0.6374	1.0244	0.4268
	4	2021	0.6655	1.018	0.4242
	4	2020	0.6798	1.0054	0.4189
Stock trend and other indicators	Zones 10 - 30 exhibits large scale, apparently cyclical changes in CPUE. It appears that as catches decline so does CPUE, and as catches increase so does the CPUE. This is unexpected as the intensity of fishing is usually expected to be negatively correlated with CPUE. It may be the case that catches and CPUE change relative to availability of the stock rather than the influence of the fishery on the stock. Better evidence is needed to make such an assertion with confidence. Over the period when CPUE was lower than average (about 1995 - 2004) there was an increase in small shots of < 30 kg, which is suggestive of low availability or high levels of small fish. Standardized CPUE has declined on average from 2009 to 2016. It differs from unstandardized CPUE early in the fishery (1986 - 1990), in the second half of the fishery (2000 - 2007), over the 2014 - 2017 period and over the last three years. The most recent changes appear strongly correlated with changes in the average depth of fishing with a shift to more relatively shallow water fishing, compared to the second half of the fishery. Standardized CPUE increased in 2021 relative to the previous year and has been below the long-term average and relatively stable for the past four years (Sporcic, 2022a). Zones 40-50 – Mirror Dory catches in the west appear to be episodic with peaks in 1997, 2001 - 2003, and 2010 and 2011, which roughly coincides with minor peaks in CPUE in a manner similar to that observed in the east, although with a more rapid cycle and less extreme variation. As on the east coast in the last few years, there has been an increase of reported catches in waters of 200 m, which is unusual for Mirror Dory in the west. The amount of catch remains minor until about 1995 after which the amount of					

catch and the number of records remains at levels that permit usable analyses, with relatively tight precision levels around the mean estimates to be made. From 1990 the CPUE trend for Mirror Dory in the west appears to be relatively periodic and noisy around the long-term average with periods above and below (Sporcic, 2022a).

Multi-Year TAC	Year of MYTAC (2022-23)		MYTAC advice	
	Single year TAC		Continue with 2022 assessment	

Catch and TAC (t)	SESSF fishing year	Agreed TAC	TAC after unders/overs	Cth Retained Catch
	2022-23	129	140	-
	2021-22	144	154	107
	2020-21	137	155	102

Economics (Secondary) Commonwealth Trawl and Scalefish Hook	Financial Year	Species GVP ($m)	Fishery GVP ($m)	% Fishery GVP
	2020-21	0.50	64	0.78
	2019-20	0.47	51.34	0.92
	2018-19	0.37	49.47	0.75

ABARES Status (2022 report)	Fishing Mortality: Not subject to overfishing		Biomass: Not overfished	

Climate sensitivity	Sensitivity	Preliminary projection	Confidence in projection	Comments
	Low	↓ 15%	Medium	N/A

Assessment summary

Key model technical assumptions/ parameters	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 significantly.
Significant changes to data inputs	**East** For any year where discard estimates are not available after 1998, the average of the years for which there are estimates available are used to 'fill' estimates for those years. The same average is applied to all years pre-1988. The Mean Proportion Discarded (MPD) for Mirror dory east increased to 0.1940 in the most recent assessment, up from 0.1925 in the 2021 tier 4. The catch time series used in this assessment was derived from Sporcic and Day (2021), which incorporated the July 2021 revised NSW estimates and endorsed by SERAG

	(September 2021). Discard estimates were based on revised Althaus *et al*. (2022) and modifications requested by SERAG in 2020 (Sporcic, 2021). **West** The catch time series used was derived from Sporcic and Day (2021).
Data and RAG comments	**East** Most of the catch is from Zone 10.There was a significant drop in discard estimates from 2017 to 2018 but estimates have been relatively consistent since this time. **West** The CPUE series is quite noisy for this stock, though relatively flat over the long-term.
Stock assessment information and RAG comments	**East** The most recent catch and standardized CPUE has increased relative to the previous year. Revised estimates of NSW State catches included in the previous assessment were also included in this assessment. Discard estimates used for Mirror Dory East were based on both Althaus *et al*. (2022) and Deng *et al*. (2022). The coefficient of variation (CV) of the 2018 discard estimate was originally greater than 100 % (i.e., ~189 %; Table 2 in Althaus *et al*., 2020). Therefore, as agreed by SESSFRAG (meeting 20-22 August 2019), it was replaced with the 2017 estimate (0.02; CV: 52 %) and repeated this year (Sporcic, 2022b). The 2022 estimated RBC was 137.77 t, an increase of 24.84 t compared to the 2021 estimated RBC (112.93 t; Sporcic 2021). The increase in RBC of approximately 25 t can be mostly attributed to an increase in the most recent CPUE (including discards) and hence the mean of the most recent four-year average which is used to calculate the RBC. The 2022 RBC is greater than the reported catch of approximately 77.6 t (135 t including estimated discards) in 2021 for this stock. Also, the CPUE in 2021 is above the CPUE limit based on the Tier 4 Harvest Control Rule (0.49) compared to the previous CPUE (in 2020) which is at the CPUE limit (Sporcic, 2022b). **West** With the fishery only beginning to report significant catches from about 1996 onwards the reference period used is relatively recent. Nevertheless, there are now 12 years between the reference period and the start of the most recent four years used to denote the current state of the fishery (Sporcic, 2022b). The 2022 estimated RBC was 48.72 t, a decrease of 7.46 t compared to the 2021 estimated RBC (56.18 t; Sporcic 2021). The decrease in RBC of approximately 7.5 t can be attributed to a decrease in the mean of the most recent four-year average CPUE which is used to calculate the RBC. The 2022 RBC is greater than the reported catch of approximately 29 t in 2021 for this stock (Sporcic, 2022b).
Projected biomass	N/A

Species specific research and priorities

There is no species-specific research currently underway or identified as future priorities.

RAG Recommendations

SERAG (Oct 2022) recommended a single year TAC using a combined east and west RBC for the 2023-24 SESSF fishing year.

	Year	RBC (t)		Is a MYTAC Recommended?
Recommended Biological Catch (t)	2023	East: 137.77 West: 48.72	Total: 186.5	No. Single year TAC.
	2022	East: 112.9 West: 56.18	Total: 169.1	
	2021	East: 145.7 West: 61.7	Total: 207.4	
Discount factor (t)	28	The default Tier 4 discount factor of 15 per cent is applied.		
State catch (t)	East: N/A West: N/A	There are no estimates of State catch for mirror dory (west).		
Discards (t)	East: 38 West: N/A	Discards are considered low for the west and are not included in the Tier 4 assessment. Estimated discard rates in the east increased from 11% (8.8 t) in 2020 to 42.6% (57.5 t) in 2021 resulting in an increase to the weighted average discards.		
Recreational catch (t)	N/A	Recreational catches are not considered in assessment and are assumed to be low.		
Research Catch Allowance (t)	N/A	There has been no specific research catch allocated.		
Provisional TAC under the Harvest Strategy	121 t			

Attachment G – Blue Grenadier

Macruronus novaezelandiae

ABARES (2012) Line drawing - Rosalind Poole

Species summary	
Common names	Hoki, blue hake, whiptail
Stock assessment	Tier 1 Species - last assessed by SERAG in 2022.
Stock structure	Blue grenadier is assessed as one stock, however there is some evidence of separate stocks occurring across the SESSF. There are two defined sub-fisheries, the spawning fishery dominated by catches off western Tasmania and the widely spread catches of the non-spawning fishery.

Stock status against reference points (%B_0 in assessment year +1)	Tier	Assessment Year	Biomass (from assessment year)	Biomass (revised in most recent assessment)	Target	Limit
	1	2022	124	124		
	1	2021	155	123	48	20
	1	2018	122	109		

Stock trend and other indicators	Annual standardized CPUE were below average between 1993 – 2013 for the non-spawning stock, with two apparent cycles, each peaking in 1999 and 2008 respectively. Between 2014 to 2015, these indices were above average. Also, there has been a consistent and above average increase between 2018-20, despite the decrease in 2021 (Sporcic, 2022a).

Multi-Year TAC	Year of MYTAC (2022-23)		MYTAC advice	
	Single-year MYTAC		Continue with 2022 assessment	

Catch and TAC (t)	SESSF fishing year	Agreed TAC	TAC after unders/overs	Cth Retained Catch
	2022-23	18,275	19,217	-
	2021-22	12,183	13,040	10,958
	2020-21	12,183	13,316	11,891

Economics (Primary)	Financial Year	Species GVP ($m)	Fishery GVP ($m)	% Fishery GVP
	2020-21	21.86	64	34.16
	2019-20	12.47	51.34	24.29

Commonwealth Trawl and Scalefish Hook	2018-19	4.55	49.47	9.20
ABARES Status (2022 Report)	**Fishing Mortality: Not subject to overfishing**		**Biomass: Not overfished**	

	Sensitivity	Preliminary projection	Confidence in projection	Comments
Climate Sensitivity	Low	Uncertain	Medium	↓15% through to ↑60%. Spatially uniform

Assessment summary

Key model technical assumptions/ parameters	2 sex model, age-structured Steepness (h) is fixed at 0.75 Recruits estimated between 1974 and 2018 Maturity: 50% female maturity at 63.7 cm The base case estimates natural mortality for females to be $M_f = 0.23$ and males $M_m = 0.24$
Significant changes to data inputs	The base case specifications agreed by the SERAG in 2021 were maintained into the preliminary base case. The main difference between the assessment model of 2021 and 2022 is the inclusion of 2020 and 2021 acoustic survey estimates of biomass. This was recommended due to the high degree of uncertainty in the 2021 assessment.
Data and RAG comments	The assessment has been updated since the previous full assessment by including recent length-composition and conditional age-at-length data from the spawning and non-spawning fisheries; updated standardized CPUE series (Sporcic, 2022a), the total mass landed and discarded, and updated age-reading error matrices. Acoustic estimates of spawning biomass (2003–2010; 2020–2021) and estimates of the female spawning biomass in 1994 and 1995 from egg surveys (Bulman *et al.*, 1999) are included. Data were formulated by calendar year, as in previous models (Tuck and Bessell-Browne, 2022). SERAG (October 2022[1]) noted adding the new data did not affect the assessment history greatly and reduced uncertainty in the estimate of biomass, however, there has been a downward revision to recruitment estimates.
Stock assessment information and RAG comments	Results of the base case show reasonably good fits to the length-composition data, conditional age at length, egg and discard mass. Fits to the newly included 2020 and 2021 acoustic survey biomass estimates are reasonable but with a preference for the higher 2020 survey point. As has been noted in previous blue grenadier assessments, the fit to the standardized non-spawning CPUE index is generally poor; the model is unable to fit to the high early catch rates and over-estimates catch rates during the early 2000s. More recent catch rates fit reasonably well, with a reduction in recent estimated catch rates coinciding with a decrease in the observed catch rate value in 2021 (Tuck and Bessell-Browne 2022). The estimated virgin female spawning biomass (B_0) is 35,680 tonnes (compared to 37,445 tonnes in the 2021 assessment) and the projected 2023 spawning stock biomass is 124% of virgin female spawning biomass (projected assuming 2021 catches in 2022), compared to

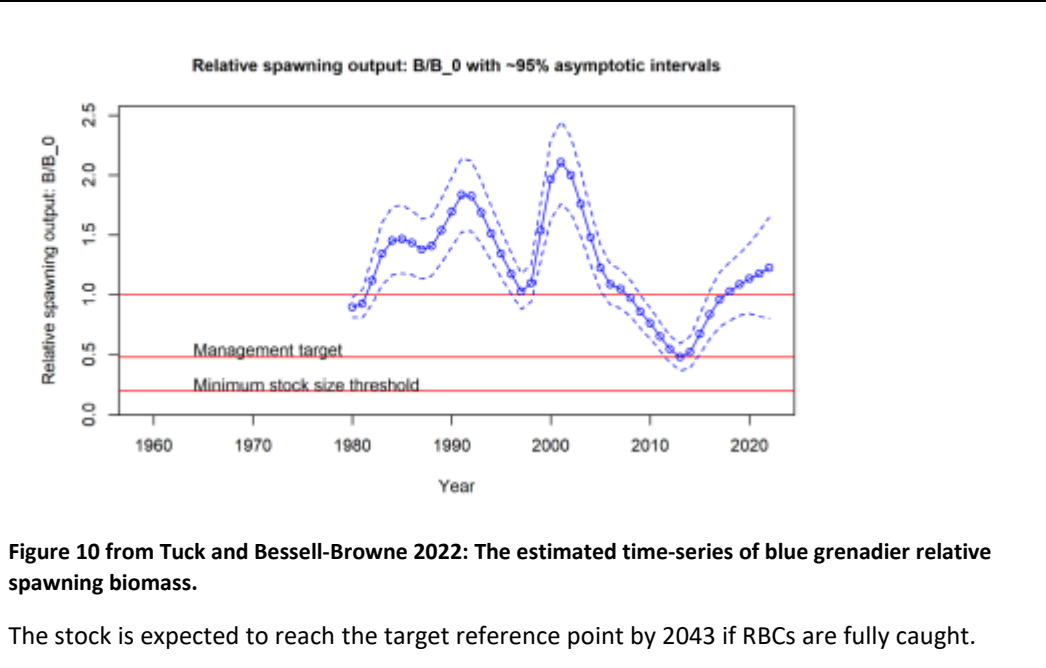[1] Minutes are currently being finalised

155% at the start of 2022 from the 2021 assessment. The reduction in estimated relative spawning biomass is likely due to the reduced 2021 catch rate, the inclusion of the acoustic survey points and updated composition data leading to slightly reduced estimates of recent recruitment (Tuck and Bessell-Browne 2022).

The likelihood profiles reinforce that initial biomass is uncertain, as is the estimate of current stock status. The stock status uncertainty has reduced somewhat when compared to the broader estimates of the 2021 assessment, which may reflect the inclusion of more recent survey estimates of biomass. All model sensitivities showed current relative biomass being well above the target and likely to be above virgin biomass levels. There continues to be strong estimates of recent recruitment (the most recent nine years are all above average) which is a positive sign for the fishery. As has been observed in previous assessments of blue grenadier, the fit to the non-spawning fleet CPUE, especially in the early years, is poor. Further refinement of the model should consider alternative GLM models for CPUE standardisation, or potential changes to model structure to account for the poor fit. The assessment shows retrospective patterns of concern for recruitment. This result suggests that there could be some misspecification in the assessment with a time varying factor that may not be accounted for in the assessment. Further investigation of these patterns in future assessments is warranted (Tuck and Bessel-Browne 2022).

At SERAG (October 2022[9]) Industry members noted that this fishery is well suited to cope with recruitment-driven fluctuations in biomass. Freezer boats are unlikely to fish when TACs are low.

SERAG (November 2022[2]) noted that the recent high RBC's have resulted from consecutive strong recruitment pulses into the fishery, possibly influenced by environmental drivers such as westerly winds.

Projected biomass	Relative spawning output: B/B_0 with ~95% asymptotic intervals **Figure 10 from Tuck and Bessell-Browne 2022: The estimated time-series of blue grenadier relative spawning biomass.** The stock is expected to reach the target reference point by 2043 if RBCs are fully caught.

Species specific research and priorities

An acoustic survey proposal has been supported by SERAG (November 2022) for 2023. Acoustic surveys through the 2023 winter spawning aggregation (together with historical surveys conducted during 2003-2010 and 2019-

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[2] Minutes from this meeting are currently being finalised

2022) will provide a comprehensive view of the fishery and estimates of biomass as an input to stock assessments for supporting management decisions.
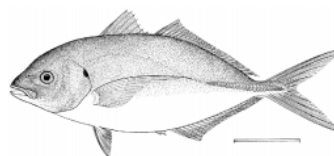
RAG Recommendations

SERAG (December 2022) recommended an external review of the assessment be completed in 2024/25 and another assessment in 2025/26. If additional time is required to refine the model, the assessment can be pushed back to 2026/27 and revisit the RBC advice for the additional years.

	Year	RBC (t)	Is a MYTAC Recommended?
Recommended Biological Catch (t)	2025	14,590	Yes. Using the 3-year average RBC
	2024	17,182	
	2023	20,168	
	3-year average	17,313	
Discount factor (t)	N/A	A discount factor was not applied.	
State catch (t)	N/A	State catches are negligible and not included in the assessment.	
Discards (t)	240 t (2023) 225 t (2024) 222 t (2025) 3 year average 229 t	Model estimated discards in 2023.	
Recreational catch (t)	N/A	There are no estimates of recreational catch.	
Research Catch Allowance (t)	N/A	There has been no specific research catch allocated.	
Provisional TAC under the Harvest Strategy	17,084 t		

Attachment H – Silver Trevally

Pseudocaranx georgianus

Species summary	
Common names	Silver bream, skippy, white trevally, skipjack trevally
Stock assessment	Tier 4 Species - last assessed by SERAG in 2022. NSW preliminary assessment also considered. Joint assessment results to be presented in 2023.
Stock structure	Preliminary research suggests that the silver trevally off south-eastern Australia represents a single stock.

Stock status against reference points (C_{Lim}/C_{Targ})	Tier	Assessment Year	CPUE$_{Recent}$	CPUE$_{Target}$	CPUE$_{Limit}$
	4	2022	0.4787	0.9504	0.396
	4	2021	0.5172	0.9418	0.3924
	4	2020	0.5642	0.9221	0.3842

Stock trend and other indicators	Zones 10-20 including MPA. Annual standardized CPUE trend is noisy and relatively flat since about 1992 and has remained below average since 2012 despite the recent increases in both 2020 and 2021 relative to 2019. A major change from the nominal geometric mean occurs from 2013 onwards and this is mainly due to changes in the vessels operating, the depths in which they fish, and the reduced amount of fish caught. The number of vessels actively contributing to this fishery has now reduced to low numbers and this may also be related to the recent major deviation from the nominal CPUE. Seven vessels operated in 2019 contributing to a total of only 1.9 t, the lowest in the series (Sporcic, 2022a). Zones 10-20 excluding MPA. Annual standardized CPUE trend is noisy and relatively flat since about 2012 and below average. A deviation similar to that in the 'include MPA' scenario is apparent where the standardized trend deviates markedly from the nominal geometric mean trend from 2013 - 2017 due to changes in vessels fishing, low numbers of significantly contributing vessels, changes in the depth distribution of fishing and lower catches and numbers of records (Sporcic, 2022a).

Multi-Year TAC	MYTAC (2022-23)		MYTAC advice	
	Single year TAC		Proceed with 2022 assessment.	

Catch and TAC (t)	SESSF fishing year	Agreed TAC	TAC after unders/overs	Cth Retained Catch
	2022-23	51	70	-
	2021-22	197	226	23
	2020-21	289	318	25

Economics (Secondary) Commonwealth Trawl and Scalefish Hook	Financial Year	Species GVP ($m)	Fishery GVP ($m)	% Fishery GVP
	2020-21	0.08	64	0.12
	2019-20	0.21	51.34	0.41
	2018-19	0.01	49.47	0.02

ABARES Status (2022 report)	Fishing Mortality: Not subject to overfishing		Biomass: Not overfished	

Climate sensitivity	Sensitivity	Preliminary projection	Confidence in projection	Comments
	Medium	There is no additional information regarding silver trevally sensitivity to climate change.		

Assessment summary

Key model technical assumptions/ parameters	The assessment excludes all data from inside the Batemans Bay Marine Protected Area (MPA).
	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 significantly since the reference period to the end of the most recent year. The tier 4 HCR also makes assumptions about the extent of depletion of the stock over the reference period, which may not be accurate.
Significant changes to data inputs	Estimated annual proportion discards were taken from Althaus *et al*. (2022), and the mean proportion estimated discard from 1998–2001 were used to backfill estimates from 1986–1997. Where the annual proportion discarded were missing (2016–21), data was forward filled for missing years. Discards are used in the Tier 4 but are quite low.
Data and RAG comments	The NSW results are consistent with recent assessment presented by NSW at previous RAGs. SERAG noted the ongoing concern with the Commonwealth Tier 4 assessment and the reference period used. The RAG believes the current Commonwealth assumption around the state of exploitation of the stock during the reference period may be incorrect. The RAG believes a decision regarding the change in reference period should be made after the joint assessment results are presented in 2023.
Stock assessment information and RAG comments	NSW DPI and CSIRO are working on a joint stock assessment model that considers all available data from NSW and the Commonwealth. This work is still in progress and will be completed in early 2023. Therefore, SERAG will consider additional information that NSW DPI holds, so that TAC advice is based on all available evidence.
	NSW Stock Assessment 2021-22 uses NSW Ocean Trawl data and a weight of evidence approach (catch rates, catch only methods, length based SPR)
	The CPUE series starts from 1997, where catch and effort can be linked to specific gear types. Data to 2009 is only available by month, and since then, daily catch and effort is available.

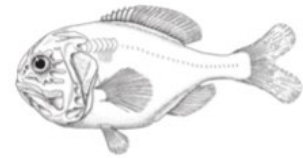|	NSW total catch peaked during the 1980s and has reduced to historical lows in 2019 and 2020 - most catch is from trawlers. Effort has decreased since 2007.
	Standardised CPUE series (3 series: 1998-2009, 2010-2020, 1998-2020) standardised for month, ocean zone, fisher and depth. All series show a recent declining trend, including when estimates of discards are included.
	Catch only modelling approaches produce estimates of B/BMSY from the trawl catch ranging from 0.18-0.20 (zBRT) and 0.25-0.30 (Optimise Catch-Only) and F/FMSY of 0.60 - 1.12 (Optimised Catch-Only). When total NSW catch was analysed, B/BMSY was estimated at 0.09 (zBRT) and 0.22 (OCOM).
	Length proportions from NSW observer records show fish >30cm FL from 1993-1995 range between 0.46 and 0.72, then declines from 0.4 in 1997 and to 0.06 in 2019. The Kapala survey during the 1993-95 period are consistent with the NSW observer data.
	Length-based Spawning Potential Ratio (LB-SPR) model estimates F/M is highly variable, ranging from 2.0 - 8.4 between 2004 and 2019. SPR shows consistent low value between 0.1 and 0.18 for the same period.
	Future work would ideally include Commonwealth catch data in catch-only modelling.
	While SERAG noted some potential issues with the various approaches, the review of various indicators shows a consistent story, that the stock has declined over time and may have been depleted below the LRP.
	Commonwealth Tier 4
	The catch time series used in this assessment was derived from Sporcic and Day (2021), which incorporated the July 2021 revised NSW catch estimates and endorsed by SERAG (28-29 September 2021). There has been an overall decrease in the total annual catch (up to two orders of magnitude) since the start of this series, despite relatively small increases between some years. The 2021 annual catch decreased by 28.7 t relative to the previous year (84.6 t vs 113.3 t excluding discards;) (Sporcic, 2022c).
	The 2022 estimated RBC was 117.4 t, a 61.45 t decrease compared to the 2021 estimated RBC (178.85 t; Sporcic 2021a). This decrease can be mostly attributed to a decrease in the most recent four-year average CPUE which was used to calculate the RBC, despite an increase in the most recent (2021) standardized CPUE (including discards). The 2022 RBC is greater than the reported annual catch (including discards) of approximately 97.36 t in 2021 (Sporcic, 2022c).
Projected biomass	N/A

Species specific research and priorities

A joint stock assessment between the Commonwealth and NSW will be considered in 2023.

RAG Recommendations

The RAG noted concerns regarding the outputs of the 2022 Tier 4, including application of the default reference period and stock status, and the information provided by NSW and recommended setting a 2023-24 TAC akin to an unavoidable bycatch TAC.

Attachment I – Orange Roughy Cascade Plateau

Hoplostethus atlanticus

ABARES (2012): Line Drawing – Rosalind Poole

Species summary	
Common names	Slimehead, deep sea perch, red roughy, orange ruff
Stock assessment	Historically a tier 1 Species - last assessed by DeepRAG in 2009.
Stock structure	The stock structure of Orange Roughy in the AFZ remains unresolved. Based on the existing data fishery dynamics multiple regional stocks of Orange Roughy are assumed. The Cascade Plateau, however, holds Orange Roughy with distinct morphometrics, parasite populations, size and age composition, and which also have a distinct spawning time from other adjacent stocks. For assessment and management purposes they are regarded as a separate stock.

Stock status against reference points (%B$_0$)

Tier	Assessment Year	Biomass	Target	Limit
1	2009	64	48	20
2	2006	73		
2	2005	30-60		

Stock trend and other indicators

There are no recent data to assess the biomass trend. Catches have remained below the RBC since the assessment and the stock likely remains above the target reference point.

Multi-Year TAC

Year of MYTAC (2022-23)	MYTAC advice
Single year TAC	N/A

Catch and TAC (t)

SESSF fishing year	Agreed TAC	TAC after unders/overs	Cth Retained Catch
2022-23	397	447	-
2021-22	500	550	266
2020-21	500	550	211

Economics ([Primary](#))

Commonwealth Trawl and Scalefish Hook

Financial Year	Species GVP ($m)	Fishery GVP ($m)	% Fishery GVP
2020-21	Not Available	64	Not Available
2019-20	Not Available	51.34	Not Available

	2018-19	0		49.47	0

ABARES Status (2022 report)	Fishing Mortality: Not subject to overfishing		Biomass: Not overfished	

		Sensitivity	Preliminary projection	Confidence in projection	Comments
Climate sensitivity		High	Uncertain	High	↓40% through to ↑10-60% (dependent on trophic interactions and oceanography). Spatially uniform

Assessment summary					

Key model technical assumptions/ parameters	N/A
Significant changes to data inputs	N/A
Data and RAG comments	Low levels of fishing has resulted in insufficient data being available to update the assessment.
Stock assessment information and RAG comments	The first quantitative stock assessment of the Cascade Plateau Orange Roughy population was produced in 2004 (Wayte, 2004). The 2004 assessment used catch records, biological data collected over the previous 6 years, and the 2003 acoustic biomass estimate. The 2004 stock assessment estimated the Orange Roughy biomass at Cascade Plateau to be between 7,000 and 18,700 t and the long-term sustainable catch to be 300-400 t. In 2006, the assessment was again updated, using the acoustic biomass estimate from the 2005 winter spawning aggregation which was about three times larger than previous estimates. The 2006 assessment estimated the stock to be about 20,000 t and the current biomass as 72-73% of the unfished biomass (B_0) approximately 20% higher than the target reference point and 12% higher than the target under the Conservation Program. At the DeepRAG meeting in 2009, DeepRAG requested a re-run of the assessment using an alternative 2005 acoustic biomass estimate of 18,400 t, instead of the 31,600 t estimate used in the 2006 assessment. Using these data the assessment estimated a female spawning stock status of 64%B_0, and produced an RBC of 492 t under the 20:35:48 harvest control rule, or a long term RBC of 397 t. There were low levels of fishing on the Cascade Plateau (<1% of TAC caught) during 2011 and 2012. An update to the assessment was due for 2012 but this was deferred due to the lack of new data and a higher priority being assigned to other species. SERAG (September 2021) Recent studies into target strength estimates from acoustic biomass surveys of large Orange Roughy indicates that 2003-05 acoustic biomass estimates should be revised. When all other inputs are unchanged this would result in a decrease to the estimate of biomass. However, there have been multiple revisions (based on discussions between AFMA and CSIRO) to model assumptions (e.g., natural mortality) and model techniques used in the 2009 assessment which would likely result in an upwards revision of the RBC if the assessment were updated.

	The annual TAC has been set at 500 t based on the 2009 stock assessment, however there has been very little fishing on the Cascade Plateau since then. There have been no catches in most years, and they have only increased recently with 211 t in 2020 and 266 t in 2021.
	SERAG (November 2022)
	A hull-mounted acoustic survey was completed for Orange Roughy (Cascade Plateau) in 2021 and 2022. A towed body acoustic optical survey (AOS) was identified as a research priority to support a potential stock assessment in 2024. However, the unpredictable nature of the aggregation on the Cascade Plateau, evident through the lack of catch in 2022, means there is a risk that an AOS will not provide useful data.
	SERAG noted it was not ready to give a recommendation on assessment options until the presentation of the fish ageing data collected from the most recent fishing events. There isn't a lot of strength in current information to inform a decision and this highlights the need to gather up to date information.
	SERAG noted SESSFRAG will consider a CSIRO paper in April 2023 to discuss alternative assessment approaches, as well as comparisons of fish-length/otolith weight ratios.
	SERAG recommended maintaining the 397 t TAC for 2023-24 on the basis that it promotes data collection, however urged caution about setting the TAC for another year without information.
Projected biomass	N/A

Species specific research and priorities

Acoustic biomass estimates and monitoring of Cascade Plateau Orange Roughy

Following a high level of research input in the early days of this fishery, the information flow has essentially all but ceased since 2006 due to a combination of low catches and fishing effort. The need for an updated stock assessment is apparent to inform appropriate TAC levels into the future.

RAG Recommendations

Noting the low levels of catch since 2009, SERAG did not have any concerns regarding the sustainability of the stock, however noted the need to update the assessment to inform future TACs.
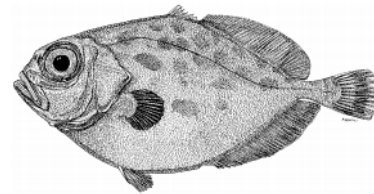
SERAG recommended a TAC of 397 t for Cascade Orange Roughy for the 2023-24 season. This TAC is based on the long-term RBC from the 2009 stock assessment, noting there is reduced confidence in the outputs given the assessment was completed in 2009 and the new research on target strength estimates from acoustic biomass surveys.

	Year	RBC (t)	Is a MYTAC Recommended?
Recommended Biological Catch (t)	2023	397	No.
	2022	397	SERAG (2022) recommended that the RBC be set at 397 t again for a single year, which was the long-term RBC from the 2009 stock assessment.
	2021	500	
Discount factor (t)	N/A		Discount factors are not applied to Tier 1 assessments.
State catch (t)	N/A		There are no State catches.
Discards (t)	N/A		There are no estimates of discards.

Recreational catch (t)	N/A	There are no known recreational catches for Orange Roughy.
Research Catch Allowance (t)	N/A	There has been no specific research catch allocated.
Provisional TAC under the Harvest Strategy	397 t	

Attachment J – Smooth oreo (Cascade)

Pseudocyttus maculatus

Species summary	
Common names	Smooth dory, smooth oreo, spotted dory, St. Pierre
Stock assessment	Historically a tier 4 Species – last assessed by SlopeRAG in 2010.
Stock structure	Stock structure of smooth oreodory is unknown. For assessment and management purposes the Cascade Plateau is regarded as a separate stock.

Stock status against reference points (C_{Lim}/C_{Targ})	Tier	Assessment Year	$CPUE_{Recent}$	$CPUE_{Target}$	$CPUE_{Limit}$
	4	2010	1.3575	0.4989	0.1996
	4	2008	1.962	0.4905	0.1962
	4	2008	96 t (C_{CUR})*	-	-
	*Tier 4 assessment used geometric mean catch rates rather than standardised CPUE				

Stock trend and other indicators	Stock status: The most recent assessment (a Tier 4 assessment in 2010 using data up to 2009) concluded that the CPUE-based biomass proxy was above the target reference point. SlopeRAG (November 2011) questioned the validity of the unrealistically high RBC from the updated assessment, concluding that CPUE may not be an accurate index of abundance.
	Low catch and effort levels since 2009 have precluded any updates to the Tier 4 assessment.
	Biomass trend: When last assessed, CPUE had been extremely variable and the fluctuations were considered to be not indicative of changes in stock status.

Multi-Year TAC	Year of MYTAC (2022-23)	MYTAC advice
	Single year TAC	Continue with 2022 review of catch

Catch and TAC (t)	SESSF fishing year	Agreed TAC	TAC after unders/overs	Cth Retained Catch
	2022-23	150	169	-
	2021-22	150	168	0
	2020-21	150	169	6

Economics (Byproduct) Commonwealth Trawl and Scalefish Hook	Financial Year	Species GVP ($m)	Fishery GVP ($m)	% Fishery GVP
	2020-21	0	64	0
	2019-20	0	51.32	0
	2018-19	0	49.47	0

ABARES Status (2022 report)	Fishing Mortality: Not subject to overfishing		Biomass: Not overfished	
Climate sensitivity	Sensitivity	Preliminary projection	Confidence in projection	Comments
	Medium	↓5%	Low	Declines stronger in the north (information relevant to Western Deepwater Trawl)

Assessment summary

Key model technical assumptions/ parameters	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 significantly since the reference period to the end of the most recent year. Catch rates are estimated as catch per shot rather than catch per hour.
Significant changes to data inputs	SlopeRAG (October 2010) considered whether data from Zone 70 should be included in the analysis, given that the area was now closed to fishing. Noting the uncertainty of movement of the species between closures and permitted areas, SlopeRAG recommended excluding Zone 70 catches and CPUE from future stock assessments.
Data and RAG comments	Using the standardised CPUE and the updated catches for 2009, the Tier 4 assessment showed the recent CPUE are well above the target, resulting in the calculation of a large RBC (711 t). It is uncertain whether the CPUE value for 2009 is valid, as only 60 kg of data meet reporting requirements.
Stock assessment information and RAG comments	The rapid changes in CPUE indicates that the observed catch rates are unlikely to be representative of the stock size, therefore the validity of applying a Tier 4 should be considered. SlopeRAG (October 2010) noted that were was a low number of boats, with a low level of catch, and that standardised CPUE contained a large number of errors.
Projected biomass	N/A

Species specific research and priorities

There is no species-specific research currently underway or identified as future priorities.

RAG Recommendations

SlopeRAG (October 2010), due to the lack of confidence in CPUE as an indicator of stock status, recommended using the RBC from the previous assessment (247 t) and maintaining the TAC from the 2010-2011 fishing year (150 t). SlopeRAG recommended maintaining the TAC at this level until catches reach at least 10 t.

SERAG (November 2022) noted the there is no basis to change management advice.

	Year	RBC (t)	Is a MYTAC Recommended?
Recommended Biological Catch (t)	2010	711	No. Single year TAC 150 t recommended until catch levels reach at least 10 t.
	2009	770	
	2008	247	
Discount factor (t)	N/A	SlopeRAG (November 2011) determined that a discount factor was not required, due to the TAC being set at a level well below the RBC.
State catch (t)	N/A	There are no estimates of State catch.
Discards (t)	N/A	There are no estimates of discards.
Recreational catch (t)	N/A	There are no estimates of recreational catch.
Research Catch Allowance (t)	N/A	There has been no specific research catch allocated.
Provisional TAC under the Harvest Strategy	150 t	

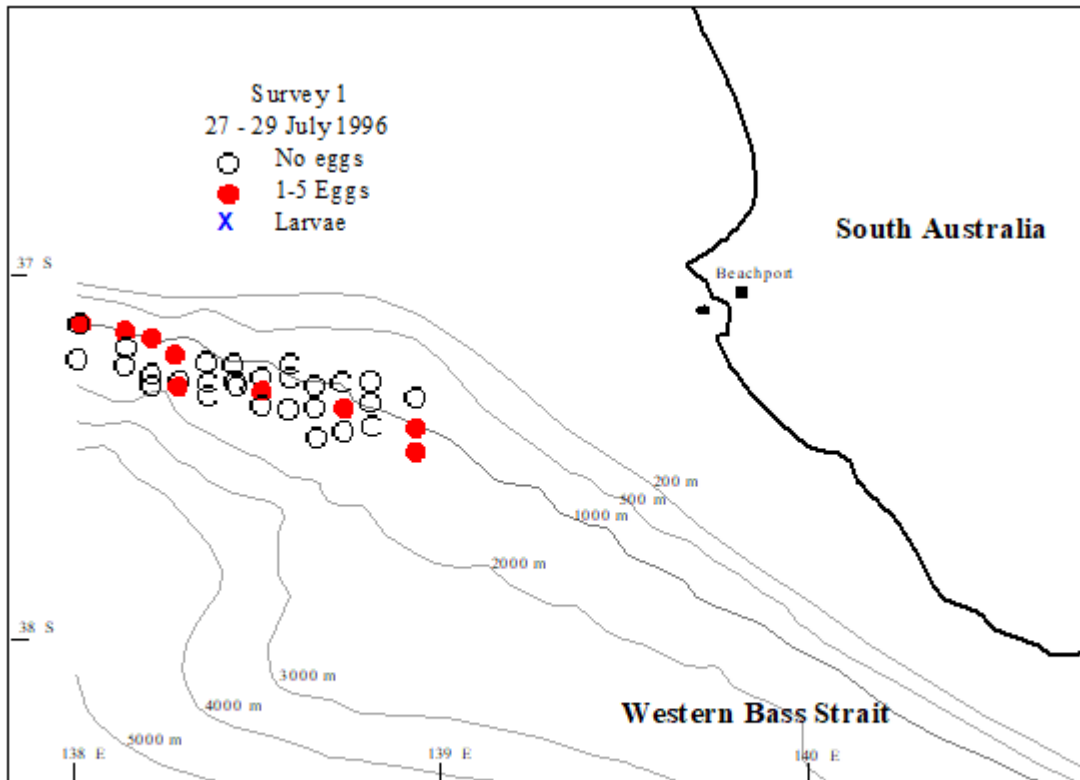# Attachment K – Orange Roughy historical egg location

Fig. 3. Distribution and abundance of orange roughy eggs and larvae from the first survey of the far west of the Western Zone.
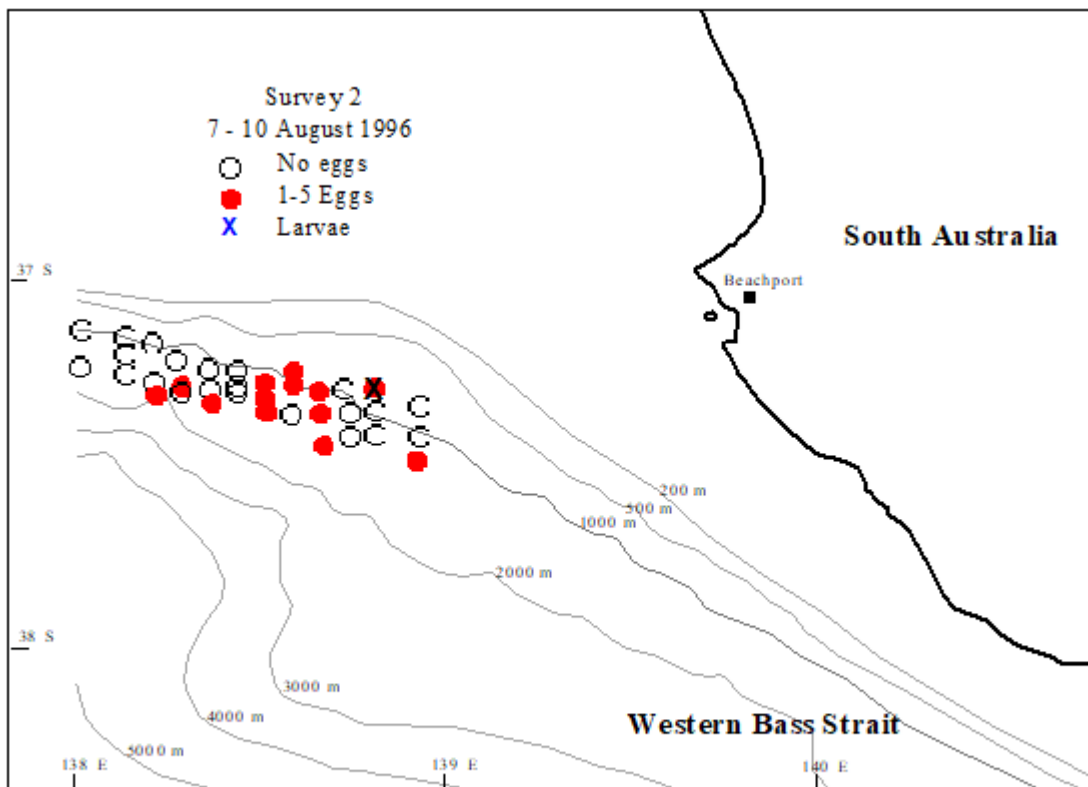

Fig. 4. Distribution and abundance of orange roughy eggs and larvae from the second survey of the far west of the Western Zone.

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