Australian Government
Australian Fisheries Management Authority

Southern and Eastern Scalefish and Shark Fishery Resource Assessment Group (SESSFRAG) Chairs' Meeting 2021

Meeting minutes

17-18 March 2021

Microsoft Teams Meeting

Agenda item		Purpose	Paper/Presentation	Time
Pre-Meeting: Declarations of Interest				**8:30 - 9:00**
17 March (Day 1): 9:00am – 5:00pm				
1.	**Preliminaries**			**9:00 – 10:00**
1.1	Acknowledgement of Country Welcome and apologies		Chair	
1.2	Declarations of interest	For action	Chair	
1.3	Adoption of Agenda	For action	Chair	
1.4	Minutes from previous meetings	For endorsement	Chair	
1.5	SESSFRAG TOR	For information	Chair	
2.	**Actions arising from previous meetings**			**10:00-10:45**
		For information	AFMA	
3.	**SESSF History document update**			**10:45-11:00**
		For action	EO / Chair	
Morning Tea				**11:00-11:15**
4.	**Update from the RAGs, EWG and MMWG (verbal update)**			**11:15-11:30**
		For information	RAG Chairs / EWG and MMWG members	
5.	**Review of TAC setting process 2021-22**			**11:30-11:45**
		For discussion	Dan Corrie	
6.	**SESSFRAG working groups updates**			**11:45-12:30**
		For advice	Dan Corrie	
7.	**Redfish**			**12:30-1:15**
7.1 7.2	TSSC decision about listing redfish FRDC trawl selectivity project update	For information	Fiona Hill Matt Broadhurst	
Lunch				**1:15-1:45**
8.	**School shark assessment review and rebuilding strategy update**			**1:45-2:15**
		For advice	Colin Simpfendorfer	
9.	**Process for the peer review of assessments**			**2:15-2:45**
		For advice	Fiona Hill	
10.	**Orange roughy – natural mortality**			**2:45-3:45**
		For discussion	Paul Burch	
Afternoon Tea				**3:45-4:00**
11.	**Upper Slope Dogfish Research and Management Plan**			**4:00-4:45**
		For advice	Sally Weekes	
End of Day 1				

Agenda item	Purpose	Paper/Presentation	Time
18 March (Day 2): 9:00am – 5:00pm			
12. Research: Non-rebuilding species and climate change			**9:00-10:00**
	For discussion	Dan Corrie/Don Bromhead	
13. Blue warehou rebuilding strategy – catch triggers			**10:00-10:45**
	For information	Dan Corrie	
Morning Tea			**10:45-11:00**
14. External impacts (seismic/Covid) on data and assessments			**11:00-1:00**
14.1 ISMP/SiDAC data collection (2020) overview	For information	Nate Meulenberg Simon Boag	
14.2 East Gippsland seismic survey (M-BACI analysis)	For information	Ian Knuckey	
14.3 Assessments/management implications	For advice	Dan Corrie	
Lunch			**1:00-1:30**
15 Automating EM collection of fish lengths			**1:30-2:00**
	For information	Geoff Tuck	
16 Bycatch species groups – discard reporting			**2:00-3:00**
	For discussion	Dan Corrie	
17 2022-23 Research Statement and assessment schedule			**3:00-4:00**
	For recommendation	Dan Corrie	
Afternoon Tea			**4:00-4:10**
18 TAC Setting Process – Data Validation			**4:10-4:40**
	For advice	Paul Burch	
19 Data 2021 meeting dates			**4:40-4:45**
	For decision	EO/Chair	
20 Other business			**4:45-5:00**
20.1 Update on the Multi-Species Harvest Strategy Project	For discussion	Chair	
Meeting close			

Day 1: Wednesday 17 March 2021

Note: Declarations of interest were discussed by the RAG members and the Managers of the trawl (Daniel Corrie) and gillnet hook and trap (Sally Weekes) fisheries, prior to the commencement of Day 1 (8:30-8:45am AEDT). Decisions resulting from this discussion are provided at Agenda Item 1.2: Declarations of Interest.

All formal recommendations were finalised by the RAG members (in the absence of all other attendees) out of session via email.

The Chair opened the meeting at 9:08am (AEDT).

Agenda Item 1: Preliminaries

1.1 Welcome and apologies

1. Dr Cathy Dichmont (the Chair) welcomed members, invited participants and observers to the meeting and made an Acknowledgement of Country statement, recognising the Traditional Owners of the many lands in which we met and paid respect to Elders past, present and emerging.
2. The Chair outlined the logistics for the Microsoft Teams meeting, and commenced proceedings.
3. There was an apology from Tamre Sarhan (AFMA), who was unable to attend the meeting to present Agenda Item 14.1: ISMP/SiDAC data collection (2020) overview . The Chair acknowledged that Nate Meulenberg (AFMA) would present in his place.

Table 1: Meeting attendees

Membership	
Dr Cathy Dichmont	Chair
Mr Lance Lloyd	Scientific member (GABRAG Chair)
Dr Michael Steer	Scientific member (SERAG Chair)
Mr Sandy Morison	Scientific member (SharkRAG Chair)
Dr Sarah Jennings	Economic member
Ms Fiona Hill	AFMA member
Ms Kehani Manson	A/g executive officer
Invited Participants	
Dr Cathy Bulman	CSIRO
Mr Simon Boag	South East Trawl Fishing Industry Association (SETFIA) Southern Shark Industry Alliance (SSIA)
Dr Paul Burch	CSIRO
Dr Jemery Day	CSIRO
Dr Ian Knuckey	Fishwell Consulting
Mr Neil MacDonald	Great Australian Bight Industry Association (GABIA)
Mr Andrew Penney	Pisces Australis
Dr Miriana Sporcic	CSIRO
Mr David Stone	Sustainable Shark Fishing Association

Dr Robin Thomson	CSIRO
Dr Geoff Tuck	CSIRO
Presenters/Observers	
Dr Pia Bessell-Browne	CSIRO
Mr Dan Corrie	AFMA
Ms Natalie Couchman	AFMA
Ms Sally Weekes	AFMA
Mr Nate Meulenberg	AFMA
Dr Tim Emery	ABARES
Dr Geoff Liggins	NSW DPI
Dr Rich Little	CSIRO
Mr Ian Butler	ABARES
Dr Mathew Broadhurst	NSW DPI
Prof Colin Simpfendorfer	James Cook University
Dr Don Bromhead	ABARES

1.2 Declarations of interest

4. The RAG followed the conflict of interest management process (as outlined in *Fisheries Administration Paper 12*) and updated the Declarations of Interest (**Appendix A**) via email prior to the meeting**.**

5. The RAG members considered the potential conflicts of interest with agenda items (Table 2), as disclosed by attendees via email prior to the meeting.

6. Recognising the attendees' knowledge and ability to contribute to the discussions, the RAG members agreed that it was appropriate for them to participate in the discussion, however formal recommendations would be finalised by the members (in the absence of all other attendees) out of session.

Table 2: Agenda items with declared conflicts of interest

Agenda Item		Person with Potential Conflict
5	Review of TAC setting process 2021-22	Neil MacDonald, Simon Boag and David Stone
7	Redfish	Simon Boag, David Stone
8	School shark assessment review and rebuilding strategy	Simon Boag, David Stone
10	Orange roughy – natural mortality	Simon Boag, David Stone
11	Upper Slope Dogfish Research and Management Plan	Ian Knuckey, Neil MacDonald, Simon Boag and David Stone
13	Blue warehou rebuilding strategy – catch triggers	Simon Boag, David Stone
14	External impacts on data and assessments	Neil MacDonald, Simon Boag and David Stone
15	Automating EM collection of fish lengths	Ian Knuckey, Neil MacDonald, Simon Boag and David Stone
16	Bycatch species groups – discard reporting	Neil MacDonald, Simon Boag and David Stone

Agenda Item	Person with Potential Conflict
17 2022-23 Research Statement and assessment schedule	Paul Burch, Miriana Sporcic, Geoff Tuck and Robin Thomson.

1.3 Adoption of agenda

7. An additional agenda item – Update on the Multi Species Harvest Strategy project – was included under other business.

8. The RAG adopted the agenda (Pages 2 & 3) as final.

1.4 Minutes of previous meeting

9. The RAG endorsed the August 2020 Data Meeting minutes as a true representation of the outcomes of that meeting.

1.5 SESSFRAG Terms of Reference (ToR)

10. AFMA advised the RAG of the following:

- In accordance with *Fisheries Administration Paper 12 – Resource Assessment Groups* (FAP 12), unless otherwise stated in a ToR, a quorum consists of the Chair, an AFMA member, an industry member and at least two scientific members covering the relevant scientific disciplines.
    - FAP 12 does not recognise the economic member as a scientific member for the purpose of a quorum; and
    - The current SESSFRAG membership does not meet this requirement as an industry member is not appointed.
- FAP 12 requires the AFMA Commission to adopt a specific ToR, where specific RAG requirements need to be catered for.
- The alternatives to implementing specific ToRs for SESSFRAG are either appointing additional members (with additional associated costs), or amending FAP 12 (with subsequent consultation), both of which are considered to be sub-optimal approaches.
- At their March 2021 Meeting, the AFMA Commission considered the SESSFRAG Terms of Reference, however at the time of the Chairs' Meeting, the outcomes from this Commission Meeting were not yet finalised.

Action Item 1

AFMA to provide SESSFRAG Members with the AFMA Commission Outcomes (March 2021) related to the implementation of the SESSFRAG Terms of Reference once they become publicly available.

Agenda item 2: Actions arising from previous meetings

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

March 2019 (Chairs' Meeting) – Action Item 1 – Agenda Item 4

AFMA to consider adding data from NSW, Dr Haddon and Victoria and provide a revised blue-eye trevalla history report to SESSFRAG in August 2019.

AFMA management recommended making this item redundant, noting that:

- Dr Miriana Sporcic (CSIRO) reviewed the State and Commonwealth catch histories for all Tier 4 species that were assessed in 2020, with advice sought from the South East Resource Assessment Group (SERAG) prior to undertaking Tier 4 assessments in 2020 (including blue-eye trevalla);
- Dr Paul Burch (CSIRO) will liaise with relevant State agencies in 2021 to ensure accurate catch histories are obtained for each SESSF species.

The RAG were provided with a copy of the revised blue-eye trevalla history report as an attachment to this Agenda Item. The RAG supported AFMA Management's recommendation and agreed to mark this action item as complete/redundant.

March 2019 (Chairs' Meeting) – Action Item 11 – Agenda Item 10

NSW DPI to provide their Multi-criteria Decision Matrix for prioritising research and monitoring needs to AFMA. AFMA and NSW DPI to discuss further and provide an update to the SESSFRAG 2020 Chairs' Meeting.

SESSFRAG were provided with a copy of the Decision Matrix as an attachment to this Agenda Item. The RAG agreed to mark this action item as complete/redundant, noting that the Decision Matrix could be referred to at a later date if necessary.

August 2019 (Data Meeting) – Action Item 40 – Agenda Item 18

SESSFRAG to discuss chapters from 'Incorporating the effect of marine spatial closures in risk assessments and fisheries stock assessments' not covered by the presentation at SESSFRAG Data meeting 2019. Including Miriana Sporcic (CSIRO) to present the chapter about the simulation study on the effect of CPUE resource standardisations with and without marine closures.

CSIRO indicated that this was a small part of a research project that is now ageing, with minimal information resulting from the project to report back to the RAG. Dr Sporcic stated that the recommendations from this project are already implemented in the routine analyses undertaken each year.

The RAG agreed to mark this action item as complete/redundant.

August 2019 (Data Meeting) – Action Item 42 – Agenda Item 19

AFMA to update the logbooks to include 'live' status of released school sharks.

Life status of discarded school shark can be recorded in the new Agency Data Collection (ADC) platform. It will also be available in new paper format logbooks currently under development. One e-log provider has issued the new software to all their fishers, and are fully using APIs. The other provider is currently building this capability into their software, with a view to having the new software available in March 2021; however a further extension is anticipated. Existing logbooks will be updated over time, with the preference being for more fishers in the SESSF to transition to e-logs.

Concern was raised regarding the delay in progressing this action item, noting the frustration felt by Industry.

Action Item 2

AFMA to investigate the delay in updating logbooks (paper and e-logs) to include 'live' status of released school sharks; noting that this action item was first raised at the 2019 SESSFRAG Data Meeting and had been previously identified as an issue by SharkRAG in 2017.

August 2020 (Data Meeting) – Action Item 17 – Agenda Item 12

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

(a) *whether to apply Commonwealth discard rates to State catches, where Commonwealth and State gear types or management controls differ;*

(b) *how to estimate State discard rates and total catches where Commonwealth discard rates are not applied because of differences in gear type or management controls; and*

(c) *whether the approach used to determine recreational catch weights for shark species should be extended to other SESSF species, as part of the 2021-22 Data Services Contract.*

(a) and (*b*)– This work is yet to commence and has been flagged as a priority for completion prior to the SESSFRAG Data Meeting 2021; with AFMA to complete in consultation with the State agencies in the first instance, and then with Dr Paul Burch (CSIRO).

(*c*) – This was discussed at SERAG (November 2020), with the decision to not extend the approach to other SESSF species at this stage, as State catches are either low or not provided to CSIRO.

Dr Burch will continue to request recreational catch data from State agencies each year, and include the estimates in the Catch and Discards report.

The RAG agreed to maintain this action item until both (*a)* and (*b)* are completed.

12. The Chair asked attendees whether there were any other questions relating to action items, before moving onto the next agenda item.

13. The list of action items from previous meetings was updated after the meeting (Appendix B). Items that were noted as completed (highlighted green) at the meeting, will be removed and an updated list will be provided to the SESSFRAG Data Meeting (August 2021).

14. The list of action items arising from this meeting, is included at Appendix C.

Agenda Item 3: SESSF History Document Update

15. AFMA advised the RAG that the purpose of this Agenda Item was to provide an updated version of the SESSF History Document, and to seek advice for the inclusion of additional line items. The RAG noted the following:

- The SESSF History Document provides a historical overview of significant changes to management arrangements or changes in the fishery that may influence future management decisions and/or would need to be considered when assessing aspects of the fishery.
- The document is reviewed annually by relevant resource assessment groups (RAGs), or as required by AFMA.
- Since the August 2020 SESSFRAG Data Meeting, there have been several corrections and additions to the document, including:

Corrections

Line 166: *Southern and Eastern Scalefish and Shark Fishery (Minimum Gear Requirements) Direction No. 1 2012*

- This minimum gear requirements direction applied to all sectors and all species, rather than just boarfish and orange roughy (as previously stated).

Additions

Line 227: 08/08/2018 – Marine Debris: A trawl vessel sank in productive royal red prawn fishing grounds, which prevents fishing in the area and may affect future CPUE.

Line 228: 01/05/2019 – Gear Change: Industry-led initiative to increase mesh size in the Commonwealth Danish seine fleet (70mm to 75mm) from the start of the 2019-2020 season.

Line 229: 01/01/2020 – Seismic survey: 3D seismic survey in Bass Strait.

Line 230: 01/11/2019 – Direction Closure: Southern and Eastern Scalefish and Shark Fishery (Closures Variation) Direction (No. 2) 2019 - revocation of the 2013 closures direction.

Lines 232-234: Direction Closures: Temporary pink ling closure directions for 2009, 2010 and 2015: SESSF (Closures) Direction No. 2 2009, SESSF (Closures) Direction No. 1 2010, Fisheries Management (Southern and Eastern Scalefish and Shark Fishery, Pink Ling (Temporary Order 2015 No. 1.

Line 235: 01/05/2016 – Permit and Concession Conditions: Requirement to use seal excluder devices on freezing/processing boats.

Line 236: 1970s – Gear Restriction: Boat size restriction introduced to 32m.

Line 237: 1986 – Gear Restriction: Fleet capacity restriction introduced 24,000 fishing capacity unit (FCU) – vessel dimensions and engine power.

Line 238: 1997 – Access Rights: South east fishery adjustment program.

Line 239: 01/09/1997 – Management Plan Amendment: South East Trawl Fishery Plan of Management finalised.

Line 240: 01/11/1997 – Offshore Constitutional Settlement (OCS): OCS arrangement with Victoria that led to granting of Commonwealth VIT permits in 1998 and 1999.

Line 241: 27/09/2000 – Access Rights: Grant of trawl boat and Quota SFRs under the SETF Plan.

Line 242: 26/09/2003 – Management Plan: Southern and Eastern fisheries united under one plan of management: Southern and Eastern Scalefish and Shark Fishery Management Plan.

Line 243: 01/10/2003 – Determination: Determination of the SESSF Management Plan 2003.

Line 244: 16/01/1991 – OCS: OCS arrangements with NSW providing management of certain species, methods and area to NSW.

Line 245: 10/05/2017 – Permit and Concession Conditions: Removal of gillnet length restrictions, conditional on electronic monitoring.

Recommendation 1

SESSFRAG recommended that AFMA:

- incorporate relevant information from the blue-eye trevalla history document, into the SESSF history document;
- ensure that the introduction of temporary permits (including gillnet to hook) are provided as line items; and
- include a line item relating to the removal of the boat size restriction of 32m (introduced in the 1970s – line item 236).

Agenda Item 4: Update from the RAGs, EWG and MMWG

16. The RAG members provided updates from their respective RAGs and working groups.

Great Australian Bight Resource Assessment Group (GABRAG)

17. Since SESSFRAG last convened (Special Research Meeting December 2020), the Great Australian Bight Fishery Independent Survey (GABFIS) Working Group met to determine whether it would be appropriate to reduce the GABFIS survey to a single trip (minutes available on the GABRAG webpage). The GABFIS Working Group considered an analysis of historical data to identify any potential impacts on Coefficient of Variations (CVs) associated with reducing the survey to a single trip.

18. The GABFIS Working Group recommended the 2021 GABFIS (March 2021) to be reduced to a single trip survey, subject to the results of Dr Knuckey's biomass estimate analysis. The current sampling design for trip 2 should be maintained for the upcoming survey, and discussed further at GABRAG 2021, once GABFIS results become available.

19. Dr Knuckey provided additional data to the working group, which showed that the trend in biomass estimates between the first and second leg of the GABFIS are similar. Accordingly, after considering feedback from the GABFIS Working Group, GABRAG supported the initial recommendation proposed by the Working Group (outlined above).

20. The GABFIS is scheduled to commence in late March 2021.

Shark Resource Assessment Group (SharkRAG)

21. The SharkRAG Chair advised that four meetings of SharkRAG had occurred since the August 2020 SESSFRAG Data Meeting, with the following key items considered:

Gummy shark Tier 1 assessment:

- SharkRAG (December 2020) accepted the new assessment and advised that any of the four RBC options would be appropriate, on the basis that they meet harvest strategy requirements. None of the four RBC options would pose a risk to breaching the 20 per cent limit reference point.
- This RBC recommendation was based on the current structure of the fishery, and should be reviewed if substantial fishery dynamic changes occur.

School shark – independent review of Close Kin Mark Recapture

- SharkRAG accepted Close Kin Mark Recapture as a way forward for school shark, with CSIRO noting that the updated Close Kin assessment is anticipated to be ready in 2024, with a view to presenting the assessment outcomes to SharkRAG.
- SharkRAG also supported this approach for future gummy shark assessments.

Sawshark Tier 4 assessment:

- In addition to the inclusion of new data for 2016-2020, SharkRAG (November 2020) recommended the following changes to data inputs to the assessment:
    - An updated catch series incorporated part of a revised NSW annual catch.
    - Discard values were estimated for years where no data exists, inclusive of the reference period (2002-2008). These values were estimated by calculating the average value for years where data exists.
- Noting that the assessment covers two species (common sawshark and southern sawshark), SharkRAG requested that AFMA monitor species composition over the coming seasons, to respond to potential changes which could result in implications for future assessments.

CPUE standardisations

- SharkRAG recommended the use of net length as indices of effort in the General Linear Models (GLMs) for gummy shark, sawshark and elephantfish, noting that net length is an important factor that affects fishing efficiency.
- SharkRAG noted that the work by CSIRO and Andrew Penney has potential implications for CPUE standardisation of other SESSF species: in the possible use of Tweedie distribution (although not all that influential for GS where zero shots are relatively rare) and the non-linear relationship between effort (net length for shark) and CPUE may also be an issue for other gear types such as trawl.

Gillnet Ecological Risk Assessment (ERA)

- SharkRAG endorsed the gillnet ERA report as final, noting that the data should be made available as an appendix to the final report.

COVID-19 pandemic

- The pandemic may significantly alter the composition of the gummy shark fleet, resulting in the introduction of new entrants to the fishery, which may impact future CPUE series.

Research priorities (further detail provided at Agenda Item 17)

- Improving CPUE standardisations for sharks
- Developing a Harvest Strategy for species where depletion can no longer be estimated against B_0
- School shark post release survival
- Identification and monitoring of school shark pupping grounds, to understand stock structure

South East Resource Assessment Group (SERAG)

22. The SERAG Chair expressed appreciation for the effort displayed by SERAG's members, invited participants and observers, with seven days of SERAG meetings undertaken via teleconference in 2020. The following key items were considered by SERAG:

Tier 1 stock assessments:

- School whiting: updated assessment incorporating recommendations from Dr Tony Smith's independent stock assessment review.
- Eastern redfish: alternative base case was considered and accepted; with the model split into two regions (NSW and Eastern Bass Strait), resulting in improved fits to data with less uncertainty around spawning stock biomass estimates.

Tier 4 stock assessments:

- SERAG provided advice on issues regarding Commonwealth and State catch and discard estimate time series, focusing on obtaining missing State catch data and assumptions about discard estimates for years where data were not available.
- The SERAG Chair noted the outstanding collaboration between CSIRO and NSW on these updated assessments (including the Tier 1 school whiting assessment).

John dory TAC advice

- Concerns were raised regarding John dory, with the RAG recommending setting the TAC for 2021-22 using a weight of evidence approach, instead of the Tier 4 assessment.
- A Tier 5 Catch-MSY analysis and surplus production model were presented to SERAG.
- Given the outcomes of the Catch-MSY and surplus reduction models, SERAG recommended that catches of John dory should not exceed 60 t for the 2021-22 SESSF fishing season.
- Setting a TAC that is below recent catches, may result in increased discarding. SERAG will consider the need for discard buffers at their 2021 meeting.

Orange roughy (eastern) TAC recommendation:

- SERAG noted the need to reach agreement on how to determine natural mortality for the 2021 eastern orange roughy stock assessment.
- Concern was expressed regarding the continued deferment of the stock assessment, with SERAG recommending that the SESSF Harvest Strategy be updated to provide a process for setting TACs when a species exceeds its MYTAC period, and a new assessment has not been completed (see Agenda Item 6 – Tier 5 Harvest Control Rule Working Group update).

Rebuilding species review:

- CSIRO presented a companion species analysis that investigated the link between target species catch and associated bycatch of rebuilding species.
- SERAG raised concerns regarding the failure of overfished stocks on the east coast to recover, and noted the challenges associated with monitoring and assessment, management options and how to disentangle the effects of fishing and climate change.
    - A letter was submitted to the AFMA Commission (March 2021) expressing concern around the difficulties of disentangling environmental changes, recruitment failure

and fishing mortality, as reasons for several depleted stocks' failure to rebuild, and the increasing number of SESSF quota species assessed as declining.

Hagfish research plan

- SERAG identified the urgent need for greater data collection concerning hagfish, given the current lack of life history information and paucity of biological data collected for the species.
- The draft research plan will be updated following SERAG's advice, with consultation undertaken with industry and other relevant stakeholders prior to being presented to SERAG again.

Economic Working Group (EWG)

23. The EWG met on 10 September 2020 and discussed the following items of relevance to the SESSF:

- development of key performance indicators (KPIs) to monitor economic performance of AFMA's fisheries; and
- quota price cleaning/filtering.

KPIs

- The EWG noted that various KPIs can provide different information about performance and may therefore be useful for different purposes. As such, the suite of KPIs would benefit from being described in a conceptual framework, which should indicate how each KPI (or group of KPIs) can be used to inform the Commission about performance against AFMA's objectives.

Action Item 3

Fiona Hill (AFMA) to investigate the progress and timeframe for completing the following action item from the Economic Working Group – September 2020 – Agenda Item 5:

> *AFMA Management to finalise the agreed KPIs and develop a paper for EWG review and Commission approval. The paper will need to provide guidance relating to the timing of reporting and use of economic KPIs by AFMA for performance reporting.*

Quota price cleaning/filtering

- The EWG considered the issues associated with 'cleaning data, including the methods developed by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) to clean water rights price data, as these may be applicable to AFMA quota price data.
  - Issues with quota price data may impact KPIs that utilise this data. AFMA will continue to explore the options to clean the quota price data and work with ABARES to achieve this.

24. The SESSFRAG economic member (EWG member) raised concerns regarding the responsiveness of the EWG, particularly with reference to action items raised by the group.

Marine Mammal Working Group (MMWG)

25. The SESSFRAG AFMA member noted that there was no update from the MMWG.

Agenda Item 5: Review of TAC Setting Process 2021-22

26. Due to the proximity of the Commission Meeting (10 & 11 March 2021) to the SESSFRAG Chairs' Meeting, AFMA were unable to provide the outcomes of the TAC setting process to the RAG.

Action Item 4

AFMA to provide SESSFRAG Members with the outcomes relating to the review of the TAC setting process 2021-22, from the March 2021 AFMA Commission Meeting once publicly available.

Agenda Item 6: SESSFRAG Working Group Updates

27. AFMA advised the RAG that the purpose of this Agenda Item was to provide an overview of the progress of various SESSFRAG working groups, and to adopt recommendations and future workplans.

28. The RAG noted the following background information, outcomes and recommendations from the SESSFRAG working groups, and provided relevant advice:

Fishery Independent Data Working Group (FIDWG)

- The FIDWG met on 6 August 2020, and developed their objectives and Terms of Reference. the meeting outcomes are available on the SESSFRAG working group page.
- In February 2020, the Fisheries Research and Development Corporation (FRDC) called for expressions of interest (EOI) for the research priority 'Abundance Estimation Toolbox.' The intended deliverables include fit-for-purpose abundance estimates (in a timely and cost-effective manner) to inform stock assessment processes that improve the management of fish stocks.
- The project will also identify potential new and novel approaches and/or technologies that might complement or replace current methodologies.

29. The RAG discussed the overlap in planned outcomes between the 'Abundance Estimation Toolbox' and the FIDWG. While AFMA consider it more efficient to engage in the FRDC project (pending the outcomes of the FRDC EOI process) rather than pursue the work identified by the FIDWG in a separate process, it may not address all of the next steps identified by the FIDWG, and is unlikely to provide outcomes specifically applicable to the SESSF.

Recommendation 2

SESSFRAG recommended that the Fishery Independent Data Working Group (FIDWG) is maintained independently from the FRDC 'Abundance Estimation Toolbox' project. The next steps are identified in the FIDWG meeting outcomes.

State Discard and Recreational Catch Working Group

30. Two components were allocated to this working group:

i. *Establishing decision rules to determine when Commonwealth discard rates are applied to State catches for certain species; and where Commonwealth discard rates are not applied, determining discard rate values.*

- This work is yet to progress. AFMA will liaise with the relevant State agencies and draft a set of decision rules, with a view to having an agreed process in time for the 2021 SESSFRAG Data Meeting (August 2021).

- If this work is not completed in time for the 2021 Data Meeting, the current method will be applied, whereby Commonwealth discard rates are applied to State catches, regardless of gear type.

ii. *Obtaining recreational catch data from the State fishery agencies to identify species which have significant recreational catch and should be accounted for in stock assessments and TAC setting processes*.

- At its February 2020 TAC meeting, the South East Management Advisory Committee (SEMAC) requested that AFMA more explicitly account for recreational catch in the TAC setting processes for SESSF species.
- At its August 2020 Data Meeting, SESSFRAG noted that the recreational catch of SESSF species is likely low across many of the assessed species (e.g. tiger flathead and blue grenadier), however, for species like silver trevally, blue-eye trevalla or gummy shark, the recreational catch may be high.
- SESSFRAG also noted that the decision to include recreational catch estimates in assessments, needs to consider the quantity recreational fishers take, and whether that amount varies over time; all of which is dependent on available data.

31. The RAG noted that available recreational catch data will be presented each year at the SESSFRAG data meeting, where the RAG may consider whether there is sufficient data to more explicitly account for recreational catch in stock assessments and TAC setting processes.

Recommendation 3

The RAG recommended limiting the scope of the 'State Discard and Recreational Catch Working Group' to developing guidelines for application of discard rates to state catches.

Integrated Scientific Monitoring Program (ISMP) Sampling Target and Frequency Working Group

- At its August 2020 meeting, SESSFRAG recommended an ISMP sampling target and frequency working group (the ISMP Working Group) to develop recommendations on ISMP sampling targets and frequencies for consideration by SESSFRAG.
- The ISMP Working Group met in December 2020 to review the sampling targets for Commonwealth trawl species in the SESSF. The working group considered the assessment schedule and tier level for all species, and made amendments to the sampling plan.
- The revised sampling targets have been implemented in the 2021 ISMP Plan, it may be subject to change pending advice from SESSFRAG.

32. The RAG noted the following:

- Tier 1 species were flagged as the top priority and no changes were made to the sampling plan for these species.
- The ISMP Working Group met prior to SharkRAG's recommendations for shark species data collection.

Action Item 5

AFMA to liaise with Dr Robin Thomson (CSIRO) to ensure that sampling targets for shark species (particularly trawl caught gummy shark) are accurately captured in the 2021 ISMP Plan.

33. The RAG discussed CSIRO's suggestions that it could be beneficial to collect data routinely every 5-10 years for species that are not currently (or are sparsely) sampled. The routine collection of data for such species would incur additional costs, and that they needed to be realistic when identifying species that are likely to benefit from this data collection (i.e. likely to progress to a Tier 1 assessment in the future). The RAG added the following:

    - It may be beneficial to incorporate sampling targets for non-quota species into the ISMP Plan.
    - Advice from relevant RAGs will be incorporated into the 2021 ISMP Plan, with the view to reviewing the Plan at the 2021 SESSFRAG Data Meeting (August 2021).
    - In recent discussions between AFMA and CSIRO, AFMA indicated that it would be possible to macroscopically collect maturity data for certain Tier 1 species, with a reasonable degree of accuracy.

Action Item 6

AFMA to confirm with Tamre Sarhan (Observer Program Coordinator) to determine whether maturity data can be collected by observers and, if so, provide SESSFRAG with a list of species for which this data can be collected.

34. The RAG endorsed the updated ISMP Sampling Plan for SESSF species noting changes may be incorporated at a later date, subject to advice from SharkRAG on sampling targets for trawl caught gummy shark.
35. The finalised sampling plan will be presented with the draft SESSF Data Plan at the SESSFRAG data meeting in August 2020.

Tier 5 Harvest Control Rule Working Group

36. On 12 February 2021, the Tier 5 Harvest Control Working Group (T5WG) met to discuss the following:

    - Incorporating multi-species considerations into the SESSF Harvest Strategy;
    - Developing Tier 5 Harvest Control Rules; and
    - TAC setting for MYTAC break out species

37. The key outcomes are summarised below:

Incorporating multi-species considerations into the SESSF Harvest Strategy

- At its March 2020 Chairs' Meeting, SESSFRAG noted that the current SESSF Harvest Strategy (the Harvest Strategy) employs a single species approach to achieving Maximum Economic Yield (MEY), rather than a multi-species approach.
- The T5WG noted that this issue arose from the following wording used throughout the Harvest Strategy:

    "Alternative reference points may be adopted for some stocks to better pursue the objective of maximising economic returns across the fishery as a whole."

- The T5WG recommended the wording be amended to:

    *"Alternative reference points may be adopted for some stocks to account **for technical interactions and the multi-species nature of the fishery**, and to better pursue the objective of maximising economic returns across the fishery as a whole."*

Developing Tier 5 Harvest Control Rules

- At its March 2020 Chairs' Meeting, SESSFRAG raised concerns regarding the setting of Total Allowable Catches (TACs) for Tier 5 species, noting the absence of an appropriate harvest control rule for Tier 5 assessments.
- The T5WG identified the fundamentals of a five-step approach (around MSY) to inform the TAC setting process for Tier 5 species, recommending that these steps be further developed out of session and considered at the SESSFRAG Data Meeting (August 2021).
    1. Refine biological parameters - Ensure that life-history metrics (e.g. growth, maximum age, resilience etc.) incorporated into the assessment are based on the best available data/information.
    2. Establish a 'one-off' CatchMSY assessment, incorporating all available/relevant catch information
    3. Assess against an ERA framework.
    4. Understand operational changes of the fishery (e.g. economics, regime shifts, weather conditions etc.), to reconcile trends in catch that may impact on the weight of evidence interpretation.
    5. Define a clear pathway out of Tier 5 assessment through data collection, monitoring programs etc.
- CSIRO agreed to consider the proposed five-step approach, and to provide further advice on:
    - methods available within a Tier 5 assessment;
    - criteria for when (and when not) to undertake a Tier 5 assessment for different species;
    - ERA integration; and
    - one-off CatchMSY and how this can be used to inform a TAC and associated triggers.

38. The RAG supported the five-step approach, provided that a more explicit proposal is presented at the August 2021 Data Meeting, with particular reference made to the integration of an ERA into this process.

39. SESSFRAG discussed the terminology of 'weight of evidence approach' and acknowledged that there appears to be a disconnect in how states and the Commonwealth refer to this approach. For Commonwealth fisheries, weight of evidence approaches are implemented to determine status of stocks where traditional stock assessment models are absent or equivocal. By comparison, some state fisheries (e.g. Western Australia) incorporate stock assessments as a line of evidence in their 'weight of evidence' approach.

TAC setting for MYTAC break out species

- At its October 2020 meeting, the South East Resource Assessment Group (SERAG) noted that the current Harvest Strategy does not provide guidance on how to set TACs when a stock assessment is not updated as scheduled, and a multi-year TAC (MYTAC) period is exceeded. SERAG recommended updating the Harvest Strategy to provide a process for setting TACs when a species is no longer within the MYTAC period and a new assessment has not been completed.

- The T5WG identified two possible approaches, with CSIRO indicating that both would be achievable:

    1. *Re-running the last base-case stock assessment, maintaining the same data inputs to generate an additional year's RBC.*

    2. *Re-running the last base-case stock assessment, incorporating updated catch and effort data[1], to generate an additional year's RBC.*

- The T5WG recommended that in the event that a species exceeds its MYTAC period, the relevant RAG should consider the most recent assessment and determine which of the two approaches is most appropriate.

40. The RAG discussed:

- whether a 'time-based buffer' should be incorporated for MYTAC break out species as an additional precaution. Such buffers are being considered as part of the Multi-Species Harvest Strategy Project.
- that additional years RBCs should be generated at the time that the initial assessment is undertaken, to provide an RBC in the event that a MYTAC period is exceeded, without the need for completing an additional assessment.
- it may be best to assess the approach on a species by species basis, which should be determined by the relevant RAG at the time of exceeding the MYTAC period and/or updating stock assessments.

Recommendation 4

The RAG recommended that:

- The preferred approach for setting TACs when a MYTAC species assessment is overdue, be option two identified by the Tier 5 Working Group:
    - *Option 2: re-running the last base-case stock assessment, incorporating updated catch and effort data, to generate an additional year's RBC.*
- Additional wording be included regarding the consideration of discount factors and/or a buffer to account for time-induced risk, noting that this would be species dependent.

GABFIS Working Group

41. An overview of the outcomes from this working group are provided at Agenda Item 4, and minutes are available on the GABRAG webpage.

Agenda Item 7: Redfish

7.1 Threatened Species Scientific Committee (TSSC) Listing Advice

42. The AFMA member advised the RAG that redfish is currently under consideration for listing as threatened by the TSSC. The EPBC Act Listing Status provided on the Department of Agriculture,

[1] The use of new effort is only relevant where a CPUE standardisation is conducted. Updating CPUE can be more time consuming, and adds more time and costs than just a catch update or the option given in (1).

Water and the Environment's website states that this assessment is due for completion in September 2021.

7.2 FRDC trawl selectivity project update

43. Dr Matt Broadhurst (NSW Department of Primary Industries) provided the RAG with an update on FRDC Project 2019-27 *Improving and promoting fish-trawl selectivity in the Commonwealth Trawl Sector (CTS) and Great Australian Bight Trawl Sector (GABTS) of the Southern and Eastern Scalefish and Shark Fishery (SESSF)*.

44. The RAG noted the following:

- The aim of the project is to work with trawl operators in the CTS and GABTS to prioritise, assess and refine modifications to minimise unwanted bycatch, whilst maintaining target catches. In doing so, the project will support the wide-scale voluntary adoption and ongoing exploration of appropriate, best-practice technologies that cumulatively improve the harvesting of important Australian fish stocks.
- The trawl selectivity project is comprised of three phases:

  Phase 1: Reviews (August to December 2020) – review the available domestic and international literature and data, and consult with a project stakeholder committee to prioritise modifications to be formally assessed.

  Based on the outcomes of Phase 1, assess the following modifications to trawls for minimising bycatch, whilst maintaining target catches in the CTS and GABTS:

  Phase 2: Existing modifications (December 2020 to August 2022)

  Phase 3: New modifications (August 2022 to September 2024)

45. Dr Broadhurst provided an overview of the outcomes of Phase 1. The report is available at: https://doi.org/10.1007/s11160-021-09644-0.

46. Dr Broadhurst acknowledged the proactive work undertaken by operators in the GABTS, including the utility of a four-panel T90 codend for improving size and species selection, and their potential work with horizontal separator panels to determine species distributions in the trawl.

47. The RAG discussed the following:

- The last study comparable to this project was undertaken almost 20 years ago, with the only outcomes being a commitment to change codends and/or to include square mesh panels. There have been no follow up studies to monitor/assess the effectiveness of these modifications over time.
- Redfish was a cause for concern in the previous study, as modifying mesh size to accommodate decreased catches of redfish, may have resulted in a reduction in flathead catch, with little to no appetite from operators to adopt these modifications.
- If redfish are listed under the EPBC Act (see Agenda Item 7.1), a proactive management approach will need to be identified for redfish, without significantly impacting the flathead fishery (and other key commercial species).
- In addition to gear modifications to improve selectivity of target and bycatch species, it is also important to consider modifications to decrease interactions with Threatened, Endangered and Protected (TEP) species, with specific reference to seal interactions in the SESSF.

- Acoustic deterrent devices ('pingers') may be a potential solution to mitigate seal interactions, however further studies are required to determine their effectiveness in Australian fisheries.

Agenda Item 8: School Shark Assessment Review and Rebuilding Strategy Update

48. The RAG was asked to consider the key findings and provide advice on future assessment needs and research priorities for school shark, noting SharkRAG recommendations from their 11-12 March 2021 meeting. The RAG was also asked to provide advice on any broader strategic implications from the independent expert peer review.

49. The RAG noted the following:

- The most recent Tier 1 stock assessment showed school shark abundance (expressed in terms of pup production) to be below 20 per cent of unfished biomass in 2008. The School Shark Rebuilding Strategy is based upon this model.
- Given issues with the Tier 1 assessment, the Close Kin Mark Recapture (CKMR) was adopted as the preferred method for use in future assessments.
- In August 2018, SharkRAG recommended the development of a CKMR assessment model based on work completed by CSIRO in 2014, including the incorporation of additional datasets, to replace the stock assessment model.
- This recommendation meant that an estimate of depletion, relative to unfished biomass, is currently not available and therefore the reference points detailed in the SESSF Harvest Strategy (defined relative to unfished biomass) cannot be assessed. SharkRAG advised that a longer term strategy needs to be developed to address this issue.
- In December 2018, CSIRO presented the CKMR assessment for school shark. A key outcome of this assessment was that it provided an estimate of abundance that was three to four times lower than that of the most recent stock assessment model. Nevertheless the RBC was similar to those from the earlier model.
- SharkRAG accepted the CKMR assessment model, noting high confidence in the absolute estimate of abundance produced by the model, and lower confidence in the estimates of trend. Based on the model's projections, SharkRAG recommended an incidental TAC for the subsequent three fishing seasons (2019-20 to 2021-22) and for the model to be updated in 2021.
- The Southern Shark Industry Alliance (SSIA) commissioned a review of the CKMR assessment by Dr Patrick Cordue of Innovative Solutions Limited (ISL). CSIRO supported the review by providing the necessary data and other information. CSIRO also provided a separate response, concerning the findings of the review following its finalisation. FRDC also sought peer reviews of the draft CSIRO report.
- In January 2020, SharkRAG members supported the engagement of a panel of experts to review the results of the CKMR assessment for school shark, with Terms of Reference (TOR) developed by AFMA, and considered by SharkRAG in May 2020 (finalised out of session).
- An Expert Panel (the Panel) was appointed by AFMA in October 2020, comprising of Professor Colin Simpfendorfer (Chair), Professor Sean Cox, Dr Kevin Stokes, Dr Robin Waples.

50. The RAG noted the following:

- The Panel were provided with the ToR for the review and examined the following key documents:
    - School shark CKMR assessment;
    - Review of the CKMR assessment – Patrick Cordue;
    - CSIRO response to the Cordue review;
    - FRDC reviews of the CKMR assessment report; and
    - CSIRO response to review panel questions

ToR 1: Is there an inherent likelihood of consistent under-estimation or over-estimation of school shark abundance and productivity that would be expected to result from the:

a. Sampling design, in particular the assumptions made in the design, the sample size and the distribution of samples, given current knowledge of the range of the school shark population and its movement patterns;

b. Close kin data inputs (i.e. genetic sequences), in particular the methods used in genetic sequencing, their associated uncertainties and assumptions;

c. Fishery dependent data inputs (i.e. landed catch and discards), including their associated uncertainties and assumptions;

d. Biological and selectivity parameters, including their associated uncertainties and assumptions; and

e. Statistical methods and assumptions used to incorporate the close kin data inputs (i.e. genetic sequences) into the assessment model, including the methods applied to kin-finding

The Panel identified three issues regarding ToR 1 and recommended work to improve the accuracy and precisions of assessment outcomes:

i. The ability to precisely and accurately age individuals included in the study. In the current assessment, age uncertainty could cause considerable bias in the results. Inaccurate age estimates affected a number of aspects of the assessment, including significant age differences between full sib pairs. The Panel recommended improved ageing techniques to increase confidence in the results. The Panel concluded that inter-litter sperm storage and repeated mating between individuals were unlikely to be explanations for age differences between full sib pairs, but could be fully eliminated as possibilities through further research on mating systems in school sharks.

ii. The occurrence of skip breeding (females not producing litters every year) that was not explicitly dealt within the assessment. With the current approach, skip breeding could introduce significant bias (estimated to be up to 16 per cent upwards) if females produce litters every three years and males reproduce annually). The Panel recommended that research into the periodicity with which females produce litters and how that periodically affects sibling probabilities, would assist in better incorporating skip breeding into future assessments. Further, simulation work could investigate the potential bias from not accounting for skip breeding, and if this bias could be reduced as more cohorts are included; and, if so, how many cohorts would be required before the bias fully attenuates. Information from CSIRO indicates that it is possible to account for this in the CKMR methodology, but will require some additional work. Regarding the

inclusion of the lucky litter effect, the Panel deemed this factor as appropriate, however improved age certainty would reduce the need for its use.

iii. Stock structure of school sharks caught by Australian fisheries. Knowledge of stock structure will not affect the outcomes of the assessment, however it is important for the interpretation of results and their use to inform management decisions. The Panel recommended undertaking further work to understand the historical and contemporary stock structure to assist in setting management arrangements.

ToR 2: *Based on the response to question 1, do the methods employed in the CKMR assessment provide sufficiently precise, accurate and unbiased estimates of productivity and absolute school shark abundance and trends upon which to base management advice?*

- The Panel concluded that the methods used in the CKMR school shark assessment are suitable for providing management advice. However, they noted two areas where assessment outcomes could be improved to reduce bias in the estimation of abundance and productivity of school sharks:

  i. Improve accuracy and precision of age estimation; and

  ii. Account for skip breeding.

- Further consideration should be given to how the assessment aligns with the *Commonwealth Fisheries Harvest Strategy Policy*, and how stock structure may influence result interpretation. The Panel recommended reviewing historic stock structure to assist with interpreting results and formulating future management recommendations.

- The Panel suggested that Management Strategy Evaluations (MSE), may assist with incorporating CKMR abundance estimates into a Harvest Strategy.

51. SharkRAG (March 2021) considered the outcomes from the Panel's report and developed research priorities, which will be discussed at Agenda Item 17.

52. The RAG noted the outcomes of the review with discussion focusing on the issue of the CKMR assessment providing a biomass estimate but not a measure of stock status in relation to $B_{0,}$ when the broader policies are currently based on obtaining a relative index. Undertaking subsequent assessment would, with time, provide trends in abundance and ecosystem models could potentially provide guidance on the desired abundance of the recovered stock.

Agenda Item 9: Process for the Peer Review of Assessments

53. AFMA advised the RAG that the purpose of this Agenda Item was to seek advice regarding the process for independent peer review of assessments in the SESSF, and the circumstances under which this should occur. The following background was noted by the RAG:

- AFMA's 'Fisheries Research and Science Quality Assurance Policy' (FMP 16) requires that scientific information be submitted for peer review, and that appropriate peer review processes are established.

- AFMA has well established and documented peer review processes through RAGs and MACs, this being a key function of those committees (as outlined in FAP 12 and 'Fisheries Management Paper 1, FMP 1).

- Whilst RAGs serve as one of the primary mechanisms for conducting peer review of fisheries research and science information, they are not the only mechanism.

- AFMA has previously commissioned additional, external, independent expert peer review of selected pieces of research and scientific information, when considered warranted due to the complexity, contentiousness or emergent nature of the research. However, approaches concerning when such reviews should be undertaken, their form and design, have previously been undertaken on an *ad-hoc* basis.

- This process is relevant to the SESSF, given the quantity of assessments undertaken each year. There are 32 species stocks/species baskets currently assessed under the SESSF Harvest Strategy Framework, and in most cases, each stock is assessed using one of three types of assessments (Tier 1, Tier 4 or Tier 5).

54. The RAG were asked to consider the following key questions, and suggested approaches, concerning the design of an independent peer review process, and to provide advice in relation to SESSF assessments.

As needs vs. periodic[2]

Should reviews be undertaken on an 'as needs' basis, or should a program be developed for reviews to be undertaken on a periodic basis (e.g. one assessment review every 2 years/multiple assessment reviews every 3-5 years)?

55. The RAG noted that:

- The FRDC funded project *Development of guidelines for quality assurance of Australian fisheries research and science information* (the Guidelines) recommended that:

    - in addition to existing RAG and MAC processes, and conducting independent expert peer review on an 'as needs' basis, AFMA should look to implement a longer term systematic program of independent peer review to be conducted every three to five years; to provide a secondary check on the quality of key research items that influence decision making on an annual basis.

    - Consideration could be given to whether this is necessary for all species, or if key commercial species and/or Tier 1 assessments, should be reviewed on a semi-regular basis.

56. The RAG discussed the following:

- To date, the majority of reviews have been industry initiated. If periodic reviews were implemented, this would reduce the need for industry to initiate these reviews, noting that industry would need to be engaged as part of the review process. Industry would also need to be consulted when designing the peer review process, however this would not negate the possibility for industry to pursue their own review (outside of this process), should the need be identified.

- Even under a 3-5 year cycle, given the number of stocks and assessments, up to two reviews would be required each year.

- Industry's preference would be to undertake reviews on an 'as needs' basis, to avoid incurring the additional costs associated with more frequent reviews.

[2] SESSFRAG Members reconvened out of session to provide further advice on whether periodic or ad-hoc reviews were recommended.

- Reviews might only be required if there was a major change to the assessment (i.e. new methodology), the assessment hadn't been reviewed for a substantive period of time, or any other concerns were identified by the relevant RAG/MAC.
- Noting that there are different levels of review (with varying associated costs) it is important to consider:
    - whether periodic reviews will be undertaken for all species (and if not, which species are prioritised); and
    - the level of review undertaken for each species, i.e. species-specific for Tier 1 and method based for Tier 4 and 5.

57. The RAG supported implementing periodic reviews, suggesting the review be undertaken every third assessment, unless a reason arises to undertake a review at an earlier time, however exact timing should be given further consideration.

58. Noting the cost to industry, the industry invited participant was not supportive of a rigid application of the periodic review, and suggested it should only be on an 'as needs' basis.

Criteria

What criteria should be applied in deciding to undertake an independent expert peer review on an as needs basis?

59. The RAG supported the suggested criteria for 'as needs' reviews, these being additional to regular periodic reviews of all assessments:

- Independent expert peer review outside of (or in addition to) the normal RAG process, should be considered when:
    - the research is novel, complex or contentious, exceeds the technical expertise of existing science working groups, or requires review beyond the capabilities of established scientific working groups;
    - there is substantial uncertainty and a range of conflicting scientific opinions regarding the interpretation of results;
    - attempts at peer review using existing committees or panels (e.g. RAGs) have resulted in adversarial debate and irreconcilable opposing views;
    - there are strong conflicts of interest relating to potential impacts of fisheries management decisions on organisations, industries or groups, with whom some participants in regular peer review processes are affiliated; or
    - the findings are controversial or implications for fisheries management decisions are substantial.

Funding

How are reviews to be funded?

60. The RAG noted the following:

- FMP 16 details that, in deciding whether to undertake an independent expert peer review, the cost of the review should be appropriate to the potential risk associated with the use of the information under review (risk:catch:cost).

- A simple review generally costs $10,000-20,000, whereas a more complex review can cost significantly more.

61. The RAG recommended that peer reviews should be considered as 'research' with funding sought accordingly.

Scope of work

What is the process for developing a Terms of Reference (ToR) and are there basic standards that all ToR should meet?

62. The RAG supported the process for developing ToRs, as outlined by AFMA. The ToR:

- must be determined in advance of the selection of reviewers;
- should be developed in consultation with the relevant RAG(s);
- should not change during the course of a review;
- should be made publicly available, subject to relevant confidentiality requirements and privacy legislation.
- must:
    - specify the mandate, roles and responsibilities of the participants;
    - require all participants to be familiar with (and to adhere to) requirements for scientific quality assurance, as detailed in FMP 16;
    - identify the research projects or issues to be dealt with (including technical questions);
    - allow peer reviewers the opportunity to express their views (e.g. make recommendations) on the range of research and scientific information under review;
    - require that uncertainties and associated risks for fisheries management are clearly identified, and appropriately and objectively characterised and documented;
    - detail requirements regarding the reporting of review outcomes – reports to be made public, subject to relevant confidentiality requirements and privacy legislation; and
    - require the reviewer(s) to declare all interests relating to any of the research under review, with interests to be made public.
- should not request reviewers to provide advice on policy, such as amount of uncertainty that is acceptable or amount of precaution to use in an analysis.

Selection of reviewer(s)

What are the criteria and process for selecting reviewer(s)?

63. AFMA proposed the following selection criteria and process:

- A reviewer(s) must:
    - not have contributed or participated in the development of the research or scientific information under review;
    - have the appropriate expertise and experience to review the research and scientific information and analyses concerned;
    - be able to provide an impartial and objective review; and

- declare all interests relating to any of the research under review.

- Selection of reviewer(s) should be undertaken as follows:

  - Following finalisation of the ToR, the relevant RAG(s) or a RAG sub-committee to provide advice on the how many and skill set of the reviewer(s) to be selected (e.g. panel or one or more independent experts); and, if appropriate, compile a list of suitable candidates, noting Commonwealth Procurement Rules may require an open tender, depending on the value of the procurement. Panel composition or reviewer skill will depend on the range of expertise required to conduct an effective review, extent to which methods are well established or novel, time constraints, availability of necessary expertise, and the level of independence required;

  - In accordance with the Commonwealth Procurement Rules, AFMA to seek submissions, either through an open approach to the market, or approaching candidates identified by the relevant RAG(s) or a RAG sub-committee, and any other candidates considered to meet the above criteria by AFMA. All candidates to be provided with the same information concerning the review;

  - AFMA to work with the research provider to ensure all information needed to support the review is available;

  - Submissions received from candidates to be assessed against the above criteria by the relevant RAG(s) or a RAG sub-committee. Advice to be provided on preferred candidates. Careful consideration should be given to any declarations of interest; and

  - AFMA to commission review, taking into consideration the relevant RAG(s) or a RAG sub-committee.

64. The RAG discussed the following:

- When selecting reviewers, it should be considered whether the person is likely to be involved in undertaking an associated stock assessment in the near future.

- The prospect of developing a 'pool' of potential reviewers, with candidates able to self-nominate to be considered for future reviews.

- If relevant RAGs related to the SESSF, are asked to identify potential reviewers, a 'pool' of potential reviewers is likely not required.

65. The RAG supported the selection criteria and process proposed by AFMA, emphasising the importance of RAG consultation in the reviewer selection process.

Consideration of review reports

What is the process for consideration and public release of reports?

66. AFMA suggested that review reports are considered by the relevant RAG(s) and AFMA, prior to their finalisation and public release. Public release will be subject to confidentiality requirements and privacy legislation. This will provide the opportunity to evaluate the review against the ToR, seek clarification on any outstanding issues, and for the report to be updated to reflect these considerations.

Implementation of the process

67. AFMA advised the RAG that the above processes and guidance could be incorporated into the document 'Total Allowable Catch (TAC) setting process – Guidelines for provision of data and stock assessment processes' which have already been adopted by SESSFRAG, to provide direction to RAGs

to ensure that the TAC setting process is conducted in the most efficient and cost-effective way each year.

Summary

68. The RAG supported the general process for the independent peer review (external to AFMA's RAG processes) of stock assessments in the SESSF (as outlined by AFMA) noting that:

- The frequency and timing of periodic review should be given further consideration;
- There should be provision for both periodic and 'as needs' reviews;
- Peer reviews should be considered as 'research' with funding sought accordingly;
- RAGs should be consulted to provide advice, assist in the development of the Terms of Reference (ToRs) and aid in the reviewer(s) selection process noting potential conflict of interest;
- The proposed processes and guidance should be incorporated into the document 'Total Allowable Catch (TAC) setting process – Guidelines for provision of data and stock assessment processes' which have previously been adopted by SESSFRAG; and
- AFMA will provide the draft document to the SESSFRAG Data Meeting (August 2021)[3] for further consideration.

Action Item 7

AFMA to incorporate the process for periodic review of stock assessments in the document 'Total Allowable Catch (TAC) setting process – Guidelines for provision of data and stock assessment processes' for further consideration by SESSFRAG. Timeline is subject to other priorities.

Agenda Item 10: Orange Roughy Natural Mortality

69. CSIRO advised the RAG that the purpose of this Agenda Item was to seek endorsement from SESSFRAG, regarding proposed work on the estimation of natural mortality for orange roughy stocks.

Natural Mortality (*M*) for eastern orange roughy

70. The RAG noted the following:

- In 2020, SERAG discussed the uncertainty surrounding the estimate of *M* used in the most recent Eastern Zone orange roughy stock assessment, and how to accommodate the uncertainty in *M* within the 2021 assessment.
- At its November 2020 meeting, SERAG requested CSIRO develop a robust process for estimating *M* for the 2021 Eastern Zone orange roughy stock assessment for review.
- CSIRO proposed estimating *M* within the assessment, using an updated version of the informative prior of Cordue (2014)[4].

[3] The SESSFRAG Data meeting 2021 was flagged as the potential date for a draft to be presented – this timeline may be reviewed subject to other priorities.

[4] P.L. Cordue. *A Management Strategy Evaluation for orange roughy*. ISL Client Report for Deepwater Group Ltd (2014)

- SERAG supported the proposed process, however, also wanted to ensure that there was a viable alternative approach, should the proposal to estimate *M* fail.
- An Orange Roughy Steering Committee (ORSC)[5] was established to provide inter-sessional review of the work.
- The ORSC have engaged via email in early 2021, to develop a workplan for estimation of *M* for eastern orange roughy.
- To address the potential failure of estimating *M*, it is recommended that the fall back approach be to use a decision table with alternate states of nature and management actions (e.g. Tuck et al. 2018)[6].
- The workplan for the 2021 eastern orange roughy assessment, developed in consultation with the ORSC is:
    i. Undertake a bridging analysis to update the 2017 assessment with the most recent data, catch, age and survey index of abundance.
    ii. Primary approach for *M*: develop and apply a process for constructing an informative prior for M, based on the study by Cordue (2014).
    iii. Fall back approach for *M*: decision table with alternate states of nature and management actions
        a. Construct likelihood profiles for *M* (noting the likelihood profile for *M* will be wider than the distributions for *M* implied by the assessment, which is constrained by an informative prior) and steepness (*h*), to provide the ORSC with information to choose values of *M* and *h*.
        b. Review the Pacific Management Council Terms of Reference for Stock Assessment, and identify a basis for potential values for *M* and *h* that provide an approximate 90 per cent confidence bound for constructing the proposed decision table.
    iv. ORSC to meet in May/June 2021, to discuss the updated assessment, likelihood profiles and to choose parameters for the decision table.
    v. The assessment proceeds using the agreed data to attempt to estimate *M* with an informative prior, with the fall back approach being the construction of a decision table with alternate states of nature and management actions using the agreed values of *M* and *h*.
    vi. An update on progress will be provided to the SESSFRAG Data Meeting (August 2021).
- Progress on the work will also be submitted for presentation at the Centre for the Advancement of Population Assessment Methodology (CAPAM) Natural Mortality Workshop scheduled to be held virtually on 14-18 June 2021.

[5] ORSC Membership included: Dan Corrie (AFMA), Dan Hogan (Industry), Mike Steer (PIRSA), Geoff Tuck (CSIRO), Paul Burch (CSIRO), André Punt (University of Washington), Andrew Penney (Pisces Australis Pty Ltd) and Matt Dunn (NIWA).

[6] Tuck, G.N., Castillo-Jordán, C. and Burch, P. (2018). *Orange roughy east (Hoplostethus atlanticus) cross-catch risk assessment based upon the 2017 stock assessment*. Technical paper presented to the SERAG, 14-16 November 2018, Hobart, Australia.

71. The RAG made the following key points:

- Several meeting attendees raised concerns with using a decision table to select values of *M,* with their view being that this is a more risky approach than using a model or likelihood profiles.
- Concerns were also raised regarding previous decisions relating to the selection of *M*, with the value determined through a likelihood profile, not being used in the assessment; and instead opting for an 'assumed' value, determined through a comparison of Australian and New Zealand orange roughy stocks.
- It was noted that this occurred due to procedural issues, resulting from an alternate base case not being provided with sufficient time prior to the RAG meeting; and the level of impact of the value of *M* (determined through likelihood profile) on the assessment.
- It was emphasised that the process for selecting *M* needs to be clearly identified, to ensure that the value of *M* is selected based on the best available science, not the value that has the least impact on the assessment or that results in the best RBC.

Recommendation 5

The RAG recommended that the eastern orange roughy 2021 stock assessment proceeds using the agreed data, to attempt to estimate *M* with an informative prior, with the fall back approach being the construction of a decision table with alternate states of nature and management actions, using the agreed values of *M* and *h*; with a progress update to be provided to the SESSFRAG Data Meeting (August 2021).

Potential bias in age determinations for Cascade Plateau Orange Roughy

72. The RAG noted the following:

- The 2009 update of the most recent assessment for Cascade Plateau orange roughy used a fixed natural mortality value of M=0.02yr^{-1}(Wayte 2009[7]; Wayte and Bax 2006[8]). This is much lower than the *M* used in other orange roughy stock assessments. However, it is not inconsistent with age frequency data that shows many fish older than 100 years of age.
- The 2009 review of Australian orange roughy stock assessments, questioned the ageing data that has resulted in this natural mortality estimate, and recommended that the reading and interpretation of Cascade Plateau otoliths be revisited (Stokes 2009).
- The potential bias in orange roughy age determinations has been undertaken for Eastern Zone orange roughy (Horn et al. 2016); however, it has not yet been undertaken for Cascade orange roughy.
- CSIRO are requesting that SESSFRAG recommend the re-evaluation of potential bias in Cascade Plateau orange roughy age determinations, be undertaken before any future stock assessment if completed for this stock.

[7] Wayte, S., *Cascade orange roughy stock assessment update. Unpublished document prepared for the November 2009 DeepRAG Meeting* (Report for the Australian Fisheries Management Authority). CSIRO Marine and Atmospheric Research (2009)

[8] Wayte, S and Bax, N. *Stock assessment of the Cascade Plateau orange roughy 2006. Report to DeepRAG* (Report for the Australian Fisheries Management Authority). CSIRO Marine and Atmospheric Research. (2006)

- It is possible that this ageing work can be included under the existing Fish Ageing Services (FAS) contract, which will be considered further as part of Agenda Item 17: SESSF 2022-23 Annual Research Statement.
- Questions were raised regarding whether the otoliths collected were spatially and temporally representative of the stock.
- If the otolith samples are likely to be needed for a future assessment, it is important to re-age the samples, to ensure age determinations are accurate.

Action Item 8

Dr Paul Burch (CSIRO) to liaise with Dr Ian Knuckey (Fishwell Consulting) and Fish Ageing Services, to determine the spatial and temporal data associated with Cascade Plateau orange roughy otolith samples.

Recommendation 6

The RAG recommended re-ageing Cascade Plateau orange roughy otoliths prior to the next stock assessment update, to evaluate potential bias in age determination.

Orange roughy Cascade acoustic biomass estimates – TAC implications

73. The RAG noted the following:

- SERAG and SEMAC made recommendations for orange roughy TACs during the scheduled meetings in late 2020/early 2021. Based on the information available at the time, it was recommended to maintain the TAC for the Cascade Plateau orange roughy stock at 500 t, for the 2021-22 SESSF fishing year.
- In February 2021, AFMA received advice from Dr Paul Burch (CSIRO) on results of a recent study by Scoulding and Kloser (2020)[9], into acoustic biomass surveys – a key input to the 2009 orange roughy Cascade Plateau stock assessment, on which the current TAC advice is based.
- The study concluded that applying acoustic signal strength relationships from other Australian and New Zealand stocks, to large orange roughy, overestimated biomass by 58 per cent. This is significant new information, which has not been considered by SERAG or SEMAC.
- Sensitivities to the stock assessment undertaken in 2009, showed that when the estimate of biomass from the acoustic survey is halved, the resulting Recommended Biological Catch (RBC) is 212-287 t, when all other inputs remain unchanged. However, there have been multiple revisions to model assumptions and model techniques used in the 2009 assessment, (as highlighted by Dr Burch in his correspondence) which would likely result in an upwards revisions of the RBC if the assessment were updated.

[9] Scoulding, Ben, and Rudy Kloser. "Industry-collected target strength of high seas orange roughy in the Indian Ocean." *ICES Journal of Marine Science* (2020)

- Dr Burch further noted that, as the TAC has been substantially undercaught since 2011, and natural mortality is likely too low in the model, the recommended RBC of 500 t for the 2021-22 SESSF fishing year is unlikely to have a material impact on the status of the stock.
- AFMA Management consulted with Dr Mike Steer (SERAG Chair), on the consideration of sustainability and due process. Dr Steer was supportive of Dr Burch's advice – maintaining a 500 t TAC for 12 months presents little risk to the short-term sustainability of the stock – and noted there is insufficient time for SERAG to consider the new information and provide advice for the 2021-22 SESSF fishing year.
- In providing its advice to the AFMA Commission for the 2021-22 TACs, AFMA Management noted Dr Burch's advice and recommended maintaining the current Cascade Plateau orange roughy TAC of 500 t for the 2021-22 fishing year, with the following work to be undertaken in 2021:
    - An acoustic survey of the Cascade Plateau, subject to AFMA Research Committee (ARC) approval; and
    - SERAG to consider the following to inform its advice on the RBC for Cascade Plateau orange roughy in 2022-23:
        i. The 2020 CSIRO study into acoustic signal strength for large orange roughy, and implications for the historic acoustic biomass estimates on the Cascade Plateau;
        ii. Results of the 2021 acoustic survey; and
        iii. The ability to update the Tier 1 stock assessment, including data requirements and revisions to key inputs.

74. The RAG supported the advice provided to the Commission by AFMA Management, including the work identified to be undertaken during 2021.

Agenda Item 11: Upper Slope Dogfish Research and Management Plan

75. AFMA advised the RAG that the purpose of this Agenda Item was to seek support from SESSFRAG on the revised Upper Slope Dogfish Research and Management Plan, which has been updated to reflect the outcomes of the research project '*Research to support the upper-slope dogfish management strategy: options for monitoring the recovery of southern dogfish and Harrisson's dogfish*.'

76. The RAG noted the following information:

- AFMA implemented the Upper Slope Dogfish Management Strategy (the Strategy) in 2012, to meet the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), relating to threatened species listings and accreditation of the SESSF as a Wildlife Trade Operation (WTO).
- As part of the Strategy, AFMA committed to developing a research and monitoring plan within 12 months of the Strategy's implementation.
- The purpose of the Upper Slope Dogfish Research and Monitoring Plan (the Plan) is to outline the priorities for data collection, and how that information will be gathered to assess the performance of the Strategy in meeting its primary objective – to promote the rebuilding of Harrisson's dogfish and southern dogfish. The Plan also provides a summary of research projects underway and a list of recently completed research projects.

- The Plan has been directly informed by the outcomes of the project completed by Williams et al (2018)[10], which built on earlier advice from SESSFRAG and the Upper Slope Dogfish Research Plan Working Group (a subgroup of SESSFRAG). The outcomes of these processes identified an increase in the relative abundance as the best indicator of recovery.
- Williams et al. (2018) identified a preferred sampling design that can be used moving forward.
- Undertaking this survey is currently the highest priority and focus of the research plan for the next five years.

77. The RAG discussed the following:

- Collecting samples for possible future work on genetic connectivity (through population genetics, and / or kin relationships) and possible future close kin assessments would require extensive sampling and ageing of dogfish species, which will be challenging due to their population status and distribution.
- Closures have been implemented over the most viable populations of dogfish
- CSIRO suggested that it might, therefore, be worth opportunistically collecting tissue samples (in consultation with a geneticist regarding tissue sampling and storage protocols), as part of the fishery independent survey required to monitor recovery, particularly given how quickly advances in genetic techniques are made.

Action Item 9

AFMA to consult with a geneticist regarding the design of a sampling protocol that could be used during upper-slope dogfish survey, that could be analysed in the future to assist answering some of the knowledge gaps in relation to dogfish, thereby maximising the value out of the survey.

78. The RAG endorsed the revised Upper Slope Dogfish Research and Management Plan.

The Chair closed Day 1 of the meeting at 4:48pm (AEDT).

[10] Williams A, Green M.A, Althus F, Knuckey I, McLean D, Koopman M (2018) *Research to support the upper-slope dogfish management strategy: options for monitoring the recovery of southern dogfish and Harrisson's dogfish*. Report to AFMA. CSIRO, Australia.

Agenda Item 12: Research: Non-rebuilding Species and Climate Change

79. AFMA advised the RAG that the purpose of this Agenda Item was to discuss the number of rebuilding species that, despite being subject to bycatch TAC limits (and a range of other management interventions, as outlined in individual rebuilding strategies) are not showing signs of rebuilding (e.g. redfish).

80. The RAG were asked to provide advice on any:

- gaps in the Harvest Strategy Policy and associated guidelines, as it relates to the impact of climate change and rebuilding species in the SESSF;
- whether any of the SESSF rebuilding or declining species meet the criteria currently described in the policy regarding climate change impacts;
- data and research needs, including existing sources and options for ongoing collection to demonstrate the impact of climate change, and to inform future management options for rebuilding species; and
- any other considerations outside regime shift, dynamic B_0 etc., which should be considered in the context of managing non-recovering and declining species.

81. The RAG noted the following:

- There have been ongoing discussions (SERAG, SharkRAG, SEMAC) regarding the likelihood of environmental drivers impacting the ability of several SESSF stocks to rebuild to their original biomass, and for the observed decline in several other stocks.
- Climate change and oceanographic conditions were suggested in the Declining Indicators Project as one of the key factors influencing declining species and the failure of rebuilding species to recover. However, to what extent these factors are contributing to declining and non-rebuilding, is largely unknown (based on available data); and is further complicated by other factors, such as changed fishing behaviour and our inability to effectively assess that status of the stock.
- AFMA is pursuing options to collect fishery independent data for declining and non-recovering species.
- A number of projects are either underway or planned, which may address the issue of climate-driven changes on species productivity:
    - Implementation of dynamic reference points and harvest strategies to account for environmentally-driven changes in productivity in Australian fisheries (FRDC 2019-036);
    - Revisiting biological parameters and information used in the assessment of Commonwealth fisheries: a reality check and workplan for future proofing (FRDC project 2019-010); and
    - A proposal for an RV investigator southeast ecosystem survey.
- Recent discussions at SERAG, SharkRAG and SEMAC have suggested that the *Commonwealth Fisheries Harvest Strategy Policy* (HSP) and associated Guidelines, lack clear guidance on how

to adapt the current management framework to recognise factors other than commercial fishing, as likely contributors to the lack of rebuilding and ongoing decline for several SESSF stocks.

82. Dr Don Bromhead (ABARES) provided an overview of the legislation and policy guidance related to overfished stocks and rebuilding species.

Commonwealth Fisheries Harvest Strategy Policy (2018)

- Specifies requirements in relation to overfished stocks and rebuilding strategies in general (s3.13, 3.14).
- Does not specify separate requirements in relation to overfished stocks that are not recovering due to stock regime shifts (caused by climate change or other factors).
- Only gives brief reference to climate change in section 3.3:

  "variability in ocean conditions, due to natural variability, climate change or other factors can affect the productivity of stocks. Fisheries should seek to account for the variability when developing and implementing harvest strategies."

Guidelines for the implementation of the Commonwealth Fisheries Harvest Strategy Policy (2018)

- Provides some information/guidance on the implications of climate change impacts, non-recovering stocks for monitoring, assessment and management of such stocks.
- Section 6 provides guidance in relation to overfished stocks and rebuilding strategies, specifically:
  - Rebuilding strategy key elements, including identifying key threats to recovery and significant environmental impacts
  - criteria for determining rebuild timeframes (6.1);
  - the trade-off between the costs and benefits of different timeframes (6.2.1);
  - the need to reduce targeted fishing and overall fishing mortality and to document and act on risks to rebuilding success (6.2.2);
  - accounting for natural and climate induced variability (6.2.3);
  - recognising natural variability of the stock productivity, growth, and recruitment (6.2.4);
  - performance monitoring and consideration of impacts of targeting cessation on data loss or bias, leading to a need for dedicated data collection (6.3);
  - recommencing targeted fishing (6.4); and
  - reviewing rebuilding strategies (6.5)
- Section 7 relates to the impact of climate change on non-recovering/rebuilding stocks, specifically:
  - variability, regime shift and climate change (7.1) including changes in oceanographic conditions, variation between favourable and unfavourable conditions;
  - monitoring to detect environmental change (7.1.1) including challenges of using fishery-dependent and independent data to detect change in a timely manner, and the

potential need for a coordinated data program serving a range of ecosystem service users;

- Application of harvest strategy design (7.2) including guidance on using available scientific evidence to test a causal hypothesis and adopting revised reference points.

- Section 9 provides guidance on reviewing harvest strategies where external drivers have unexpectedly increased the risk to a fishery and fish stocks, including environmental or climate drivers that have substantially altered the productivity characteristics (growth and/or recruitment) of the stock.

Summary of key points

- The Guidelines predominately refer to the harvest strategies, however some of these points may be relevant to rebuilding strategies including:

  - the link between environmental change and stock productivity changes, and address this in the context of regime shifts and directional change.

  - the need for appropriate data collection and monitoring to detect such changes. However, there is no guidance provided on addressing the "wicked problem" of reduced data resulting from rebuilding strategy restrictions on catch.

  - that changes to the harvest strategy may be required, but only after a weight of evidence approach is taken to establish a causal linkage (e.g. between non-recovery and climate change).

  - that reference points may need to be adjusted to account for changes in stock productivity, and that relative risks associated with the use of $20\%B_{(F=0)}$ may increase in a stock that has suffered a regime shift to lower productivity.

  - That assessments should try to incorporate temporal variability in recruitment, growth and mortality, or should capture uncertainty in productivity variance through sensitivity runs in assessment grids.

How to improve the guidelines

- Pulling together existing relevant information from different sections into a more coherent section on assessing and managing non-recovering stocks.

- Clarifying guidance relevant to harvest strategies compared to rebuilding strategies.

- Building in lessons from recent and ongoing research (e.g. Declining Indicators project, Dynamic reference points, biological parameter projects etc.).

- Strengthening the guidance in relation to data collection and monitoring.

- Include specific case examples.

83. The RAG discussed the following:

- The importance of social licence and the interface between Commonwealth fisheries, the Australian Community and Non-Government Organisations (NGOs). It is widely accepted that the initial decline in rebuilding species stocks, resulted from overfishing. However, it is currently unclear what is preventing these stocks from rebuilding, despite the implementation of management arrangements that limit fishing mortality.

- Mr Penney's dynamic B_0 project is likely to provide guidance on how to model and account for climate change, and provide guidance on indicator and reference point settings for future

assessment and management processes for rebuilding species. However, results from this project are not likely to be available for several years. As such, SESSFRAG raised questions regarding how this issue should be managed in the interim.

- If research indicates that solutions are species specific and/or an ecosystem equilibrium shift has occurred, how would this be accounted for in stock assessment and/or associated management arrangements?
- Although data collection is fundamental to understanding stock recovery, the cost of implementing sufficient data collection programs would be disproportionate to the value of the fishery. If climate change is determined to be significantly impacting the recovery of these species, it should be recognised that these costs cannot solely be covered by industry, and additional Government funding should be sourced.
- Data collection programs do, however, need to be implemented in some capacity, to establish baseline data to ensure that existing models (utilised in previous/ongoing research projects) are reliable and robust. There is a particular need to consider data collection for inclusion in ecosystem models.
- Identifying specific environmental factors responsible for trends in recruitment, growth, and mortality (for example) is difficult. Regime trend models can however be utilised to determine whether environmental factors are able to explain these trends, recognising that specific environmental factors may not be identifiable.
- Stocks are considered to be 'sustainable' as long as they remained above B_{20}. However, it could be true that this reference point is not appropriate for all species. It is anticipated that the Dynamic B_0 project will provide further insight to suitable reference points.
- There may come a time, where the evidence indicates that these stocks may never be able to rebuild. If this occurs, alternatives such as broad closures will need to be considered.
- There is uncertainty around how the impacts of climate change on non-rebuilding species can be addressed from a management and policy perspective. It may be beneficial to consider a single rebuilding species as a case study, and identify an approach for managing this species moving forward.

84. The Chair identified that these issues may be better addressed through a working group, with the RAG to provide the group with targeted questions for consideration.

Action Item 10

AFMA, CSIRO and ABARES to establish a Climate Change & Non-Rebuilding Species Working Group, with SESSFRAG to provide questions for the Working Group (out-of-session) for consideration at a meeting, to be scheduled prior to the SESSFRAG Data Meeting (August 2021).

Recommendation 7

The RAG recommended establishing a Working Group to further consider the implications of climate change on non-rebuilding species, with membership to be determined out of session by AFMA, CSIRO and ABARES

Agenda Item 13: Blue Warehou Rebuilding Strategy: Catch Triggers

85. AFMA advised the RAG that the purpose of this Agenda Item was to seek advice from SESSFRAG regarding the catch triggers in the revised Blue Warehou Rebuilding Strategy 2021 (the 2021 Rebuilding Strategy), noting the SEMAC recommendation to reduce the incidental bycatch TAC from 118 t to 50 t.

86. The RAG noted the following:

- Blue warehou has been managed under a rebuilding strategy since 2008, with little evidence of rebuilding to date.
- AFMA has recently undertaken a formal strategic review of the 2014 Rebuilding Strategy, including public consultation in January 2021. AFMA is currently finalising the 2021 Rebuilding Strategy, to incorporate updates identified during the review process, and feedback received from the relevant RAGs and MACs.
- The final draft of the 2021 Rebuilding Strategy will be presented to SEMAC (March 2021), ahead of a final submission to the Threatened Species Scientific Committee (TSSC) in June 2021, and the AFMA Commission in July 2021.
- Currently, blue warehou catch is managed under an agreed incidental bycatch TAC of 118 t, which was implemented in 2012 to cover unavoidable catches, whilst reducing the risk of discarding by industry.
- Currently, AFMA divides the blue warehou bycatch TAC across the eastern and western zones, and then applies a primary and secondary catch trigger. The primary trigger was based on approximately 60 per cent of the catch limit, and the secondary trigger was based on approximately 80 per cent of the catch limit.
- The 2014 Rebuilding Strategy requires that AFMA notifies operators once the primary trigger has been reached in either zone, and requests operators to provide details of their total catches of blue warehou. The total tonnage is then reconciled against the tonnage recorded by AFMA.
- Additionally, once the primary trigger is reached, all catches of blue warehou must be reported on a weekly basis, until the secondary trigger is reached.
- All operators are required to be notified that the secondary trigger has been reached, and that all catches must, from then onwards, be reported on a per trip basis. If the catch limit of blue warehou is reached in either zone, all landings of blue warehou will cease in that zone. In addition to the above regime, AFMA monitors catch reports for both zones on a quarterly basis.
- At their February 2021 TAC meeting, SEMAC recommended implementing an incidental bycatch TAC of 50 t (a reduction of 68 t to the current bycatch TAC of 118 t). This decision was based on SERAG advice and outcomes from a CSIRO companion species (métiers) analysis, which estimated the unavoidable bycatch of blue warehou for 2021 to be 29.1 t, with a range between 21.2 and 39.9 t. The AFMA Commission TAC decisions for the 2021-22 fishing year are not yet publicly available.
- Based on advice from SERAG and SEMAC, AFMA are removing the requirement for operators to provide weekly and daily reports, because of the implementation of electronic monitoring and AFMA's ability to monitor catches in real time. Noting the primary and secondary triggers

were designed to trigger these reporting requirements, AFMA proposed removing these triggers from the 2021 Rebuilding Strategy.

- AFMA also proposed that the east/west catch limits are removed from the 2021 Rebuilding Strategy. These catch limits were implemented based on estimates of unavoidable bycatch in each region and were designed to reduce total fishing mortality. Now, each year as part of the annual review of the Rebuilding Strategy, AFMA considers an analysis of targeting and unavoidable bycatch to inform incidental bycatch TACs and management arrangements for the following fishing year.
- Provided SERAG are satisfied each year that there is no targeted fishing, setting regional catch limits within the global 50 t may simply lead to discarding, if the true level of unavoidable bycatch were to increase in any given year, and would not reduce total fishing mortality.

87. The RAG discussed the following:

- Blue warehou is caught as a byproduct species when targeting other key commercial species. The amount of bycatch of the species will likely remain constant. Imposed limits (i.e. decreased TAC) will only result in increased discards. It is important that operators are recording their discards (particularly quota species) accurately.
- AFMA acknowledged these concerns, however advised the RAG that the triggers are based on retained catch, and do not consider discarded amounts. AFMA are committed to improving reporting of discards in the SESSF, which will likely be improved through implementation of electronic monitoring (EM) in the trawl sector. Discard reporting is discussed further at Agenda Item 16.
- Industry indicated that a more effective approach would be to understand the level of actual bycatch associated with targeting key commercial species, and then maintain an index of abundance. The most effective way to reduce catches would be to implement effort restrictions i.e. reducing net length, length tow, number of boats etc.

88. SESSFRAG supported removing the primary and secondary catch triggers from the 2021 Rebuilding Strategy.

89. SESSFRAG did not support AFMA's recommendation of removing the east/west catch limits from the 2021 Rebuilding Strategy, noting the following:

- The métier analysis is a useful tool for incidental bycatch species, and provides the ability to discriminate at a spatial level. More data/information would be useful to support management arrangements, therefore it would be beneficial to maintain this spatial component.
- Concerns were raised regarding how other agencies (i.e. ABARES) may view the removal of the east/west divide, and problems associated with exceeding the east/west notional limits.
- Dr Tim Emery (ABARES) advised the RAG that the east/west limits have not previously been used to determine fishing mortality status. This status has historically been informed by the catch and discard data provided in CSIROS's report. As catch limits have not been provided through an assessment process, fishing mortality status is classified as 'uncertain.'

Recommendation 8

The RAG recommended:

- removing the primary and secondary catch triggers from the Blue Warehou Rebuilding Strategy;
- maintaining the east/west catch limit within the 2021 Rebuilding Strategy; and
- calculating the east/west catch triggers using the ratio implemented in previous fishing years for the 2021-22 incidental bycatch TAC.

Agenda Item 14: External Impacts (Seismic/COVID-19) on Data and Assessments

14.1 ISMP/SIDaC data collection (2020) overview

90. AFMA advised the RAG that the purpose of this Agenda Item was to provide SESSFRAG with a summary of the data collected in the SESSF for the 2020 calendar year, under the Shark Industry Data Collection (SIDaC) Program and the Integrated Scientific Monitoring Program (ISMP) and to review the ISMP Plan for 2021.

SIDaC Program

91. Mr Simon Boag (the South East Trawl Fishing Industry Association, SETFIA) provided the following update:

- The SIDaC Program (commenced in October 2018), collects length and otolith/vertebrae samples for school shark, gummy shark, pink ling, blue-eye trevalla and ribaldo. These data are used to inform stock assessments for these species.
- There was an increase in sampling in quarters 3 and 4 (2020), noting that sampling in quarters 1 and 2 were impacted by the COVID-19 pandemic and associated restrictions.
- Quarter 4 (2020) saw improved record performance, despite the COVID-19 pandemic and Christmas shut down.
    - 111 per cent achievement of the gross shark target – the second highest achieved to date;
    - Improved collection of school shark samples, with 627 biologicals collected from 33 vessel voyages, resulting in 66 per cent achieved for school shark;
    - There was an increase in school shark samples collected from Bass Strait, which could indicate that school shark abundance may vary temporally in this area;
    - 2 844 biologicals collected in total – the highest sampling recorded to date;
    - 86 per cent gross achievement of the plan – the highest achievement recorded to date;
    - An increase in the number of shark vessels sampled – 3.62 average vessels per strata, the highest sampling recorded to date;
    - 67 per cent achievement for the gummy shark plan – the highest ever achieved to date; and
    - Pink ling, blue-eye trevalla and ribaldo (auto-bait sector) – an increase in sampling resulted in the highest ever sampling rate of ribaldo, and the second highest for both pink ling and blue-eye trevalla.

92. The RAG discussed the inclusion of ribaldo in this sampling program. AFMA advised the RAG that ribaldo is one of three species of finfish caught in the hook sector. It was however, noted that otolith are no longer collected for ribaldo and otolith sampling targets should be removed from the plan.

Action Item 11

AFMA and SIDaC to amend the SIDaC sampling plan to remove the otolith sampling targets for ribaldo, noting that otolith samples are no longer collected.

ISMP

93. The RAG noted the following:

- The ISMP provides fisheries managers, research organisations, environmental agencies, the fishing industry and the wider community with independent, reliable, verified and accurate information on the fishing catch, effort and practice of Commonwealth trawl vessels.
- Program performance and planning for the coming sampling year is presented annually to SESSFRAG. A summary of samples collected in 2020 is available on the SESSF Webpage under Data Publications.
- The 2021 sampling plan was considered and approved by SESSFRAG at its August 2020 data meeting. The sampling targets for several species were revised at the ISMP Sampling Target and Frequency Working Group in January 2021. The revised targets have been incorporated into the plan, and were considered by SESSFRAG under Agenda Item 6 – SESSFRAG Working Group Updates.
- 2019 was a successful year for the ISMP, which continued into the first quarter of 2020. However, due to Australian COVID-19 restrictions that were enforced during March 2020, AFMA placed limitations on the deployment of observers, to align with specified health regulations, and with due consideration of the health and safety of AFMA employees. This impacted the number of observer deployments during 2020, resulting in a significant reduction in allocated observer days at sea.
- AFMA restricted the deployment of observers from 23 March 2020, until mid-October 2020. At the time of this meeting, the deployment schedule has not yet returned to full coverage, noting the challenges of managing various restrictions and border closures across states and territories.
- Due to the COVID-19 pandemic, samples collected are not temporally dispersed, with data gaps occurring in Quarters 2 and 3. Although sampling targets were met in most cases, samples were primarily collected in Quarters 1 and 4.
- There is currently no port-based sampler for the ISMP, operating out of Portland on a regular basis. The RAG emphasised the importance of ensuring that port-based samples are collected from Portland.
- Concerns were raised regarding the large proportion of observer effort focused on blue grenadier and orange roughy (i.e. freezer vessels). It was unclear how this level of effort was justified, given the associated costs and information collected. There were also concerns that this level of coverage inhibits observer coverage in other areas of the fishery, particularly during winter months.
    - AFMA advised the RAG that a higher level of coverage is required on freezer vessels, particularly in the absence of electronic monitoring. Observers are also required for

implementing quota conversion factors and monitoring TEP species interactions on these vessels.

- Costs for observers are directly recovered from the vessels for the blue grenadier spawn, and the majority of the cost is cost-recovered for orange roughy, until sampling targets are reached, after which point the process becomes a fee for service.
- The RAG requested that AFMA's observer program monitor any impacts on ISMP sampling targets resulting from the level of effort deployed on freezer vessels, particularly with reference to sampling targets on the east coast during winter months.

Action Item 12

Mr Nate Meulenberg to follow up with Mr Tamre Sarhan regarding the status of employing a Portland based observer to collect port-samples under the ISMP.

14.2 East Gippsland seismic survey (M-BACI analysis)

94. AFMA advised the RAG that this Agenda Item was for information only, to provide SESSFRAG with the results of the Multiple-Before After Control Impact (M-BACI) analysis of the impacts of the CGG seismic survey on catch rates in the Danish seine sector of the SESSF.

95. The RAG noted the following:

- In July 2020, the French-owned oil and gas company CGG completed a six-month seismic survey south of Lakes Entrance, Victoria, in an area that overlaps with a significant part of the Danish seine fishery. Operators in the SESSF have subsequently reported significant declines in catch rates of flathead and eastern school whiting, in the survey area.
- The potential impact of the seismic survey for some SESSF stocks, including implications for catch rate standardisation as an input to future stock assessments, has been noted by SERAG and SEMAC at recent meetings.
- Fishwell Consulting were engaged to undertake an M-BACI analysis to test whether catch rates of key target species, flathead and eastern school whiting, in the Danish seine commercial fishery off Lakes Entrance were impacted by the CGG survey.

96. Dr Ian Knuckey provided the following study overview:

- M-BACI experimental designs allow for robust tests of environmental impacts in real world situations. These designs account for natural spatial and temporal variation and allow for the estimation of the magnitude of environmental change caused by a disturbance.
- Environmental measurements are taken from multiple impact sites (subjected to the disturbance and potentially affected by it) and multiple control sites (similar to impact sites but not subject to the disturbance).
- Each site is then sampled multiple times before and after the disturbance event to ensure appropriate temporal replications.
- Due to logbook requirements in the Danish seine fishery, there is extensive fine-scale spatial and temporal data on Danish seine catch rates for all key commercial species. Further, as shots are relatively short, up to ten shots can be completed in a day, which is advantageous

for obtaining the large number of shots required to generate adequate statistical power in an M-BACI survey design.

- The extensive coverage of Danish seine shots (both inside and outside of the seismic survey area), was utilised as the 'before' data used to estimate catch rates in both control and impact sites, prior to the commencement of the seismic survey.
- The 'after' data of catch rates were obtained through charters of commercial fishing vessels, within control and impact sites, both during and after the CGG marine seismic acquisition.
- Scientific observers were onboard during each M-BACI shot undertaken by chartered Danish seine vessels, to monitor the validity of each shot with respect to the experimental design, to record catch composition of each shot and to record length frequency of both species.

Flathead

- In general, commercial flathead catches (from logbook data) declined over 2015 to 2019, and continued to decline during 2020.
- During Phase I (the first data acquisition period), the impact on flathead was estimated to be a 78.1 per cent reduction in catch rates relative to control sites, which was statistically significant.
- During Phase II, the impact on flathead was estimated to be a 58 per cent reduction in catch rates, relative to control sites, which was statistically significant.
- During Phase III, the impact on flathead was estimated to be a 65.5 per cent reduction in catch rates relative to control sites, which remained statistically significant.

Eastern school whiting

- Commercial catches of eastern school whiting (from logbook data) exhibited substantial year-to-year variation.
- During Phase I, the impact effect on eastern school whiting was estimated to be a 99.7 per cent reduction in catch rates relative to control sites, which was statistically significant.
- During Phase II, the impact effect on eastern school whiting was estimated to be a 42.7 per cent reduction in catch rates relative to control sites, which was statistically significant.
- During Phase III, the impact effect on eastern school whiting was between 79.5 per cent less and 60.1 per cent more than those from control sites, which was not statistically significant.

Conclusion

- Overall, the M-BACI analyses provided robust evidence for a negative impact of the seismic survey on both flathead and eastern school whiting catch rates in the Danish seine fishery for up to approximately:
    - 200 days for flathead; and
    - 100 days for eastern school whiting.

97. Dr Knuckey noted that the results from this study are only indicative for the vessels chartered for this survey, and do not account for other vessels that may have been operating and/or avoiding the area. Further analyses of these vessels will be undertaken.

98. The RAG discussed the following:

- Whether environmental changes (i.e. significant temperature changes) and/or natural migration of the species (into/out of the survey area) were considered in the analyses.
    - Dr Knuckey advised the RAG that environmental changes were considered in the analysis, with no difference detected across/between sites.
    - The M-BACI design considered variation in catches/catch rates over time within both control and impact sites.
- The potential for behavioural changes, resulting in the demonstrated changes in catchability.
    - Dr Knuckey advised that the results of this study won't provide substantial insight into any behavioural changes, as it was only designed to consider changes in catches/catch rates.
- Whether the history of seismic surveys (and their associated impacts) in the SESSF have been compiled, and if so, what were the outcomes?
    - CSIRO advised the RAG that the impacts of seismic survey in the SESSF have previously been investigated, with no significant impacts on stocks detected. However, it was noted that this was not necessarily because there were no associated impacts, but may have been rather related to data quality. Limited technical information was provided, with the data too coarse to be able to identify exact location, timing, frequency and duration of the surveys.
- The area over which the sound emitted from seismic surveys can travel and impact the surrounding environment. The RAG noted that this would be highly variable and dependent on factors such as bottom substrate and water temperature.

99. The RAG emphasised the importance of the results of this study, not only for understanding the implications of this current seismic survey, but for predicting potential outcomes of future surveys undertaken in key commercial fishing areas.

14.3 External impacts on data and assessments: assessment/management implications

100. AFMA advised the RAG that the purpose of this Agenda Item was to highlight two key events, the COVID-19 pandemic and seismic testing in the Bass Strait, that will likely influence fishery indicator data and future SESSF stock assessments, and to seek SESSFRAG advice on how to account for these impacts in future stock assessments.

101. In addition to the information provided at Agenda Items 14.1 and 14.2, The RAG noted the following:

- The recently released FRDC report 'Impacts of COVID-19 on the Australian Seafood Industry January-June 2020', provides an overview of the economic impacts of, and responses to, the early phase of the Covid-19 pandemic on the Australian seafood industry. The report is a first step towards understanding how the global pandemic has disrupted Australia's seafood industry, and considers how the industry can prepare for greater uncertainty and future shocks through planning and partnerships with relevant governments.
- CSIRO advised the RAG that there have been past instances where data gaps have occurred. The impacts of this will only be realised once an assessment is undertaken. At the time of the assessment, it will be important to consider the impacts of external factors (COVID-19 and/or seismic surveys), with the potential to exclude data if required. It was suggested that seasonal patterns in the length distribution data for species scheduled for Tier 1 assessments, could be undertaken and presented at the 2021 Data Meeting.

Action Item 13

CSIRO to assess potential impacts of no ISMP coverage between 23 March and mid-October, on Tier 1 species scheduled for assessment in 2021. CSIRO to plot length distributions by month to investigate any seasonality in lengths, and present outcomes to the SESSFRAG Data Meeting (August 2021).

102. The AFMA member advised the RAG that the Commission has requested that an updated flathead assessment be completed in 2021. Implications from the seismic survey, as identified in the M-BACI study should be considered within this updated assessment.

103. Dr Knuckey noted that in a few months' time, once the additional commercial data (i.e. data associated with non-chartered vessels) is assessed, the implications for the entire fleet may be identified. This analysis will occur prior to, and can be presented at, the Data Meeting (August 2021).

104. Mr Simon Boag (SETFIA) stated that the work completed by Fishwell Consulting is revolutionary, providing a live running index of what was occurring in the fishery as the seismic survey was being conducted. Mr Boag expressed his gratitude to Dr Knuckey and his team, for their work on this project.

Recommendation 9

The RAG noted the difficulties with quantifying the impacts of external factors on fishery dependent data before the 2020 data is analysed and individual stock assessments are undertaken.

Acknowledging that the stock assessment scientists were aware of these external impacts, the RAG recommended considering this item further at the SESSFRAG Data Meeting (August 2021), should any impacts be identified for species scheduled for assessment in 2021.

Agenda Item 15: Automating EM Collection of Fish Lengths

105. AFMA advised the RAG that the purpose of this Agenda Item was for CSIRO to provide SESSFRAG with an update on their machine learning applications to fisheries electronic monitoring, and for the RAG to consider whether real-world application of length estimation is a high priority for the SESSF.

106. The RAG noted the following:

- CSIRO's Marine Visual Technologies (MVT) Team was established in 2017, to look at machine learning applications to fisheries monitoring. MVT's main focus has been the Australian Eastern Tuna and Billfish Fishery (ETBF), with software trained to identify catch events and species (target and more recently moving to non-target bycatch species).
- Prototype software has been developed to easily allow users to input video(s), run marine learning identification algorithms, bookmark catch events, inspect and modify species and produce a summary trip report of catch.
- Algorithms have also successfully been applied to the sub-Antarctic Patagonian toothfish fishery. As yet, there are no applications applied to the SESSF, with length estimation currently not a feature of the developed software.

- CSIRO recognise that length/weight estimation has strong global demand, resulting in the development of a 'mocked-up lab-based demonstration of length estimation' to show that it is achievable.
- Real-world application of length estimation is a high priority, however considerable on-boat footage of ground-truthed lengths are required as the first step of this process. If this is also considered a high priority in the SESSF, then MVT may be able to assist.

107. The RAG discussed whether there was potential to install stereo video cameras on vessels to aid in length measurement capabilities.

108. AFMA supported pursuing the implementation of this technology in the SESSF, particularly within the GHAT Sector, however further conversation with CSIRO and Industry were needed.

Action Item 14

AFMA to liaise with their Eastern Tuna and Billfish Fishery Management Team, to determine whether they have investigated the possibility of installing stereo video cameras on their vessels, and/or whether such technology is available through current providers.

Action Item 15

AFMA to liaise with Industry and CSIRO to discuss the potential for implementing EM collection of fish lengths within the SESSF, for vessels fitted with cameras (i.e. GHAT Sector), noting that length estimation is not currently a feature of the current software.

Agenda Item 16: Bycatch Species Groups – Discard Reporting

109. AFMA advised the RAG that the purpose of this Agenda Item was for SESSFRAG to consider the non-quota species discard reports (with reference to reporting groups, outlined at Appendix D), provided for the trawl sectors of the SESSF, for the 2019-2020 and 2020-21 (as at 12 March 2021) SESSF fishing years (summaries provided at Appendix D); and for SESSFRAG to provide advice on whether the change in reporting requirements (discard groups) could affect future Ecological Risk Assessments (ERAs).

110. The RAG noted the following:

- Historically, all operators in the CTS and GABTS of the SESSF, were required to report all retained and discarded species (quota and non-quota) to the species level (by weight in kilograms).
- In April 2016, AFMA introduced groups (based on morphology) for reporting discarded, non-quota species (Appendix D). It was intended that these changes would improve the quality of discard reporting in the SESSF trawl sectors, and reduce operator workload. Obtaining accurate discard data would improve the understanding of stock status and allow for implementation of more efficient management arrangements.
- In 2015, AFMA began developing the 'Commonwealth and Great Australian Bight Trawl Sector Discard Strategy' (the Discard Strategy), which included providing individual operators with six monthly discard reports. These reports compared individual vessel discard rates against discard rates through the ISMP, allowing for vessel-specific discard monitoring over time.

- Due to the implementation of the CTS and GABTS bycatch and discarding workplans (the Workplans), the Discard Strategy was not formally implemented, with initiatives to improve discard reporting included in the Workplans instead.
- Vessel-specific discard reports were discontinued in December 2017.
- At their August 2020 Data Meeting, SESSFRAG requested that AFMA provide an update to the 2021 Chairs' meeting on bycatch discard reporting (by species group) in the SESSF trawl sectors, with the RAG to provide advice on whether the change in reporting requirements could affect ERAs, noting that ISMP data could be used to understand species composition.
- ERAs rely on logbook and observer reported catches of bycatch species, to inform the initial scoping stage, and then to validate or review risk scores once the level 2 assessments have been completed. Catch has previously been recorded in logbooks at the species level, though likely unreliably, however from 2016, will mostly be recorded into the groups in Appendix D. Observer records should still be at the species level.
- AFMA have identified the benefit of reinstating vessel-specific discard reports and have considered the potential for human error within the existing methodology (manual data analysis using Microsoft Excel).
- To standardise the approach, AFMA will work with CSIRO to develop an automated process, likely using statistical computing software 'R', with a view to providing an update to the SESSFRAG 2021 Data Meeting (August 2021).
- Several issues with the existing discard groups were identified through this discard reporting review, including:
    - The code provided to operators for 'Barracoutas' (37439918) is the code for 'Gemfishes.' Some operators are instead reporting to the CAAB Code – 37439001 'Barracouta.'
    - There are two sets of groups that are causing confusion, and leading to discards being reported to incorrect groups:
        - 'Skates and Rays' – 37990018 (incorrect) and 'Skate and Rays (mixed)' – 37990030 (correct)
        - 'Fish (mixed)' – 37999999 (incorrect, not an actual CAAB Code) and 'Fish oceanic (mixed)' – 37990020 (correct)
- Once AFMA and CSIRO have developed an automated reporting process, AFMA will contact operators to advise that vessel-specific bycatch discard reports will be provided biannually, and notify of changes to discard groups, which will include the following:
    - Removal of the incorrect discard groups 'Skates and Rays' – 37990018 and 'Fish (mixed)' – 37999999 from e-log systems, to increase the accuracy of reporting to the 11 discard groups; and
    - Update to the CAAB code provided for 'Barracoutas.'

111. The RAG discussed the following:

- Bycatch discard groups were only possible due to the collection of ISMP data to species level. ISMP data is the most accurate and is important data for inclusion in ERAs, both prior to and post introduction of bycatch discard groups.
- Logbook discard data is not currently considered to be accurate or useable in stock assessments. Through reducing operator workload associated with reporting, it is anticipated that the accuracy of discard reporting will improve.

- Logbook reported discard data, should be compared to that recorded by the ISMP, to understand the level of reporting accuracy.

Action Item 16

AFMA to compare discard data reported in logbooks, to those recorded by the ISMP program, to determine the accuracy of operator reported discards.

112. Mr Boag noted that SETFIA invested significant effort into improving discard reporting, including working with AFMA to implement the discard groups. It may be beneficial to present this Agenda Item to the Seine and Trawl Advisory Group (STAG) to develop additional approaches to improve further discard reporting in the SESSF.

113. CSIRO noted concerns regarding the ERAs, and the potential implications associated with only reporting to discard groups. It was recommended that high-risk species (as identified in the ERA) are able to be reported against separately from the discard groups.

114. The RAG supported this approach, and recommended that AFMA and CSIRO liaise to identify the high-risk species, which should remain as discard reporting options in e-logs. It was also recommended that all other reporting options (excluding species identified as high-risk, discard groups and quota species) should be removed as options to be reported against in e-logs.

Action Item 17

AFMA to liaise with CSIRO (Dr Miriana Sporcic and Dr Cathy Bulman) to identify non-quota species to remain as discard reporting options in e-logs, outside of the bycatch discard groups (i.e. those that are high-risk as identified through the ERA).

115. It was however noted, that there could be issues associated with identification to species level. The cost-benefits would then need to be assessed as to whether it is realistic to provide operators with species identification training, or whether identification to species level should only be undertaken by trained observers.

116. The RAG advised that the change in reporting requirements (discard groups) would not significantly affect future ERAs, as the ISMP data is the main data source used for species composition in ERAs. It was however, recommended that key species (i.e. high risk species identified by ERAs and quota species) remain as reporting options in e-logs, separate to the identified discard groups.

Recommendation 10

The RAG recommended that:

- AFMA liaise with CSIRO to determine non-quota bycatch species of interest (i.e. high-risk species identified by the 2019 ERAs) to incorporate into discard reporting requirements for the GABT and CTS sectors of the SESSF;

- AFMA update the bycatch species discard list in e-logs to:
    - remove duplicates of generic reporting common names identified as part of the discard analysis, including:
        - 'Skates and Rays' – 37990018; and
        - 'Fish (mixed)' – 37999999
    - remove all other reporting options, only allowing reporting to non-quota species of interest, bycatch discard groups and quota species; and
- The STAG should meet to consider the proposed changes to non-quota bycatch discards (species and groups) as identified by AFMA and CSIRO.

Agenda Item 17: 2022-23 Research Statement and Assessment Schedule

117. AFMA advised the RAG that the purpose of this Agenda Item was to seek advice from SESSFRAG on research priorities to be included in the GABTS and SESSF Annual Research Statements 2022-23, including the assessment schedule for the relevant SESSF species.

118. The RAG noted the following:

- Each year, relevant RAGs are asked to provide advice on upcoming research needs for their fisheries, this is required in the context of the Strategic Research Plan. As part of this process, RAGs are asked to prepare an Annual Research Statement and complete a research Gap ID form for each new priority.
- The Annual Research Statement includes consideration of the cost-effectiveness, priority and timeframes for achieving identified priorities.
- Where research has already been funded, the Annual Research Statement identifies this, including the source of funding. It will be used by the AFMA Research Committee (ARC) at its annual meeting in August, to develop the annual research call for proposals for potential AFMA funding in September each year.
- Priorities for potential funding by the FRDC are also included in the Annual Research Statement.
- Research proposals submitted to both AFMA and FRDC will be circulated to relevant RAGs/MACs for comment out of session.

Outcome of the 2021-22 ARC research funding round

- Several projects were progressed to the ARC for consideration for funding during the 2021-22 research funding round. The following priorities were supported by the ARC and are scheduled for completion during the 2021-22 financial year:
    i. Pink ling Tier 1 stock assessment 2021
    ii. Blue grenadier acoustic survey 2021, including analysis of data collected by industry in 2019, for potential inclusion in the 2021 Tier 1 stock assessment
    iii. Research to support the Upper-Slope Dogfish Management Strategy
    iv. Orange Roughy (Cascade) Acoustic Survey 2021

v. ISMP Data Services (previously funded by the fishery – will now be included as research).

Research Priorities for ARC funding in 2022-23

- A number of research priorities have been identified for inclusion in the 2022-23 research statements for ARC funding.

SERAG

- Research priorities **supported** by SERAG at their November 2020 meeting for inclusion in the SESSF research statement are:

  i. *Stock assessments for SESSF quota species (as identified by the relevant RAG and agreed by AFMA) in the SESSF in 2022 (using data to 2021) and 2023 (using data to 2022).*

  ii. *Fish ageing for SESSF quota species (3 year project ending 2025/26)*

  iii. *Blue grenadier acoustic survey 2022*

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

  SERAG supported this priority, but agreed it should be put on hold, pending the outcome of the FRDC Close Kin Mark Recapture (CKMR) proposal for rebuilding species (see below).

  v. *Alternative methods for establishing an index of abundance for rebuilding species*

  A research scope was submitted to FRDC as part of the 2021-22 SESSF Annual Research Statement, to consider CKMR methods for rebuilding species, however it was not considered by ComRAC. AFMA will resubmit the research priority scope to FRDC as part of the next call for research.

  Additionally, the FRDC November 2020 call for research included a priority titled 'Abundance Estimation Tool Box' (See Agenda Item 6 – SESSF Working Group Updates).

- Research priorities **not supported** by SERAG at their November 2020 meeting, for inclusion in the SESSF Annual Research Statement are:

  i. *Further investigations of factors (length/depth relationship) that influence length frequencies for all species and ISMP port sampling*

  The ARC (August 2020) did not support this project in its current form. The ARC agreed that a review of the sampling approach in the fishery is required. If port samples can be linked to shot, then there may not be a need for this additional research.

  ii. *Desktop study to determine herding behaviour for various SESSF species, to inform future ERA assessments.*

  SERAG did not consider this an immediate research priority, and recommended updating the 2019 otter board trawl ERA to increase estimates of swept area as a sensitivity, to demonstrate the change in risk scores. If the change is significant, then characterising herding behaviour for vulnerable species may be reconsidered as a future research priority. This has been included as a future priority in the SESSF Research Plan.

  iii. *Desktop study to determine which important Commonwealth fish species are also targeted by recreational fishers.*

  SERAG did not consider this an immediate research priority, noting that CSIRO already engages with States to request recreational catch data each year. There are a number of SESSFRAG and SERAG action items related to engaging State fisheries agencies and determining the relative importance of key SESSF species in recreational fisheries.

iv. *Genetic analysis of pink ling stock structure*

SERAG did not consider this an immediate research priority, given that sufficient differences in fishery and stock dynamics are already apparent to warrant assessing pink ling as two stocks. SERAG advised that genetic analysis would be unlikely to provide evidence that would change current assessments.

- Research priorities which have **not yet been considered by SERAG**, however are included in the SESSF Annual Research Statement 2022-23, are:

i. *Orange Roughy (Cascade) Acoustic Survey 2022*

This research will provide an acoustic based biomass estimation for orange roughy (Cascade) for the 2022 fishing season. It will also include the collection of biological samples, including length, weight, sex, spawning stage and otolith extractions.

ii. *Re-ageing of historical Cascade Plateau orange roughy otoliths*

As part of the Kevin Stokes Orange Roughy Stock Assessment Review, it was recommended that the reading and interpretation of Cascade Plateau otoliths should be revisited to investigate the potential for systematic bias between Australian and New Zealand ageing protocols; due to the link between natural mortality and fish age (see Agenda Item 10 – Orange Roughy Natural Mortality).

SharkRAG

- Research priorities **supported** by SharkRAG at their March 2021 meeting, for inclusion in the SESSF Annual Research Statement are:

i. *Improving CPUE standardisations for sharks*

To clarify the relationship between CPUE and net length, the effects of Australian Sea Lion and other closures on CPUE and account for changing dynamics of the fleet with new entrants. SharkRAG identified as low cost, high priority and high feasibility.

ii. *Obtaining discard data and fish lengths using electronic monitoring*

Project will investigate implementation issues, cost and solutions to adopt electronic monitoring to collect length frequency information for key commercial species on hook and gillnet vessels to support Tier 1 assessments. SharkRAG identified as low cost, high priority and high feasibility.

iii. *Environmental drivers for stock abundance*

Project will examine environmental, and other factors (e.g. seismic testing) on stock abundance. SharkRAG requested that AFMA summarise the current background work being undertaken in regards to this project, before determining the research priority.

GABRAG

- Research priorities **supported** by GABRAG at their October 2020 meeting for inclusion in the GABT Annual Research Statement are:

i. *Stock assessments for SESSF quota species (as identified by the relevant RAG and agreed by AFMA) in the SESSF in 2023 (using data to 2022) and 2024 (using data to 2023)*

GABRAG recommended undertaking the deepwater flathead Tier 1 stock assessment in 2022.

ii. *Fish ageing for SESSF quota species (3 year project ending 2025/26)*

GABRAG supported the ongoing ageing of otoliths for species relevant to the GABTS.

iii. *Ageing of GABTS orange roughy otoliths*

Orange roughy otoliths have been (and continue to be) collected under the 'GABT Orange Roughy Research Plan', with the view to undertaking a future stock assessment. GABRAG supported the ageing of otoliths to inform future sampling protocols and assessment options.

AFMA are investigating whether this sampling can be included under the existing contract with FAS.

iv. *Alternatives for undertaking orange roughy stock assessments*

This research priority has been identified to establish metrics for existing and potential data sources, including options for assessing the status of orange roughy in the GABT.

SERAG also identified the need to produce a document outlining assessment options, including data requirements and metrics for orange roughy stocks, with a view to demonstrating recovery. This has been flagged as a potential joint project between CSIRO and AFMA, to be presented at the SESSFRAG Data Meeting (August 2021) and may not require research funding.

v. *Developing mitigation devices for deepwater shark*

GABIA have expressed interest in developing mitigation devices for deepwater shark, with a view to allowing access to grounds currently closed under the Upper Slope Dogfish Management Strategy.

This can potentially be pursued as part of the FRDC Project 2019-027 (See Agenda Item 7.2 – FRDC Trawl Selectivity Project Update). This research project is considered a high priority, but should only progress if it is not pursued as part of the FRDC project.

Research priorities for FRDC funding in 2022-23

- AFMA understand that a number of research proposals previously submitted for FRDC funding in 2020-21 and 2021-22, were not considered by ComRAC, and will either need to be resubmitted to FRDC for consideration in 2021, or included in the 2022-23 SESSF Annual Research Statement.

- The following research priorities are currently listed as research priorities in the 2022-23 SESSF Annual Research Statement, and will need to be progressed:

  - Application of Close Kin assessments for key and rebuilding species in the SESSF;
  - Developing a Harvest Strategy for species, where depletion can no longer be estimated against B0;
  - School shark post release survival; and
  - Identification and monitoring of school shark pupping grounds to understand stock structure.

119. The RAG supported the inclusion of all proposed ARC and FRDC research priorities, with the following exceptions:

- Removal of research priority 'Alternative methods for establishing an index of abundance for rebuilding species' due to the broad scope of this priority;

- Amendment to the wording of the FRDC priority relating to the development of a Harvest Strategy for species where depletion can no longer be estimated against B0:

- "Developing a Harvest Strategy for **school shark as a case study for** species where depletion can no longer be estimated against B_0"; and

- Developing mitigation devices for deepwater shark (GABT Annual Research Statement 2022-23), with GABRAG to further consider progressing this research priority (independently of FRDC 2019-027), in the 2023-24 Annual Research Statement, if it is determined to be an ongoing priority.

120. The RAG members further prioritised the research items (in the absence of all other attendees) after the meeting concluded (updated SESSF 2022-23 Annual Research Statement provided at Appendix E).

Stock assessment schedule

121. The SESSF and GABT Annual Research Statements include a schedule for planned stock assessments (Appendices E and F). SESSFRAG were asked to consider the current research schedule, noting that it will be finalised at the SESSFRAG Data Meeting (August 2021) as part of the multi-year TAC (MYTAC) analysis.

122. CSIRO expressed concern regarding the large number of Tier 1 assessments scheduled for 2021 and requested that the RAG consider whether any of these assessments could be deferred.

- The RAG agreed that there was no urgency to undertake the eastern gemfish assessment and recommended deferring this assessment to 2022.

- Blue grenadier is due for assessment in 2021, however the ARC funded a 2021 acoustic survey[11], which included the analysis of data collected by industry in 2019 (that, should be included in the updated assessment).

    - The RAG noted that it is currently uncertain whether the acoustic data collected in 2019, will be able to provide an index of abundance. Depending upon the analysis of this data, it may be possible to defer the blue grenadier Tier 1 assessment to 2022.

Recommendation 11

The RAG recommended:

- deferring the eastern gemfish Tier 1 assessment to 2022; and

- considering the deferment of the 2021 blue grenadier Tier 1 assessment (dependent upon the analysis for the 2019 acoustic survey data – to be completed in May/June 2021).

Agenda Item 18: TAC Setting Process – Data Validation

123. AFMA advised the RAG that the purpose of this Agenda Item was to seek endorsement from SESSFRAG regarding proposed inclusion of data validation timelines in the TAC Setting Process document.

124. The RAG noted the following:

- The validation of data used for assessment and management purposes is crucial for confidence in the reliability of fisheries management outcomes. Data validation is currently

[11] The data from the survey conducted in 2021 will not be available for the 2021 Tier 1 assessment.

undertaken by both AFMA and CSIRO in an ad hoc manner, as particular issues are identified, in some cases after the SESSFRAG Data Meeting.

- The earlier data can be validated and accepted by RAGs, the more opportunity there is for consideration of assessment and management decisions.
- Under the proposed guidelines, AFMA and CSIRO will undertake data validation in late March and present the results to the SESSFRAG Data Meeting, where recent catches, standardised CPUE and discard estimates should be agreed to.
- Historical catch reconstructions, length, age and any other data (e.g. abundance from surveys) should be agreed to at the first assessment meeting.

125. Dr Paul Burch provided proposed text to be included under the following headings:
    - Validation of AFMA Data
    - Timing of provision of data to research providers
    - Review of data used for assessment and management
126. The RAG discussed the following:
    - The optimal timing for providing data to CSIRO, with CSIRO indicating that ideally the data would be received in February (early March at the very latest).
    - Providing CSIRO with data according to this earlier timeframe, would allow for the data meeting to be moved forward (earlier than late August); which, in recent years, has resulted in issues for presenting base-case assessments to SERAG and GABRAG with enough time to hold a second meeting to sign off on the final assessment and recommend RBCs/TACs.

Recommendation 12

The RAG supported the inclusion of guidelines on the timing of data provision and validation in the updated 'TAC setting process guidelines,' with CSIRO to make minor amendments to the section 'timing of provision of data to research providers' to include an additional data dump in February.

The amended version will be circulated to members out of session, prior to the SESSFRAG Data Meeting (August 2021).

Agenda Item 19: Data Meeting – 2021 Meeting Dates

127. The RAG members supported the proposed meeting dates of 25-26 August 2021 for the SESSFRAG 2021 Data Meeting.

128. It was recommended that this meeting be pursued as a face-to-face meeting, with the location to be determined at a later date (Canberra or Hobart). Flexible bookings should be made, to adhere to COVID-19 restrictions/border closure changes (if required).

Agenda Item 20: Other Business

20.1 Update on the Multi-Species Harvest Strategy Project

129. Dr Ian Knuckey provided the RAG with an update on the SESSF Multi-Species Harvest Strategy Project.

130. The RAG noted the following:

- The SESSF is a multi-gear, multi species fishery. Over 100 different species are harvested, with TACs set for 32 species/species groups. As a result, there are difficulties in developing an appropriate SESSF Harvest Strategy. Currently, this is achieved by setting multiple TACs, each with separate MEY targets. The current Harvest Strategy does not account for species technical interactions and fleet targeting dynamics. It is considered inefficient, cumbersome, expensive and sub-optimal for maximising economic yield from the whole fishery.
- The objectives of the Multi-Species Harvest Strategy Project are to:
    i. Develop and evaluate multi-species harvest strategies, including reference points and decision rules;
    ii. Evaluate future monitoring and assessment options identified in the SESSF Monitoring and Assessment Research Project (SMARP) and the Declining Indicators Project; and
    iii. Develop a process and set of design principles for multi-species harvest strategies.
- It is important to manage expectations and understand the scope of what this study may or may not deliver.
- This project will:
    - Provide a harvest strategy that accounts for the technical interactions of species, with cost considerations, noting that the project is almost entirely cost recovered by Industry;
    - Address some of the issues arising from the Declining Indicators project, most notably undercaught TACs; and
    - Align with the *Commonwealth Fisheries Harvest Strategy Policy 2018* and *Commonwealth Fisheries Bycatch Policy 2018*.
- This project will not specifically address:
    - Non-recovering stocks; or
    - Declining CPUEs.
- The revised harvest strategy will need to be flexibly designed to operate under conditions of environmental change associated with global warming; particularly given that southeast Australia is considered a global warming hotspot.
- There are three main harvest strategy designs that are being considered:
    i. Indicator species;
    ii. Pretty Good Multi-species Yield; and
    iii. Trigger species.
- The project is also considering potential variations of these harvest strategy designs, including
    i. Close Kin assessment;
    ii. Dynamic Tier 4 assessment;
    iii. Multi-species production model;

iv. Effect of data richness (e.g. FIS)

v. Economically optimised target reference points;

vi. MYTACs with time varying buffers; and

vii. Tier-based assessment with tier based buffers.

Indicator species approach

- An indicator species is a species (or group of species) whose status provides information on the overall condition of an ecosystem, and of other species in that ecosystem. They reflect the quality and changes in environmental conditions, as well as aspects of community composition[12].
- There are three kinds of indicator species to optimise a fishery overall:

  i. Least resilient/most vulnerable: species expected to be overfished by overall management arrangements

  - Monitor and assess indicator species to ensure they are not excessively depleted;
  - Seek to decrease selectivity; and
  - Manage sub-fisheries

  ii. Management Determining species: species for optimised yield

  - Design overall management for these species; and
  - Adjust catch, effort and technical measures according to assessed status.

  iii. Most resilient/least vulnerable: species expected to be under-fished by overall management arrangements

  - Monitor and assess some species to confirm expected stock status;
  - Seek to increase selectivity on these; and
  - Manage sub-fisheries.
- The indicator species approach would be a management framework that would identify, monitor and assess indicator species, with associated management and action triggers implemented accordingly.
- This approach would not be an ecosystem or population model, however different models would be incorporated into its application.
- Chosen indicator species should reflect the range of fishery risks and consequences, and should differ in the following (with multiple species selected for each):

  - Inherent biological variability;
  - Current or planned exploitation status; and
  - Value (environmental, economic and social).
- Indicator species may also represent extreme cases in fisheries (i.e. highly vulnerable species), which would provide fisheries management with advance notice of potential future impacts for the fishery.
- These species should also reflect the intentions of management arrangements. For example, is the intended or acceptable impact and/or direction of change being achieved?
- Different indicator species may be required to:

[12] Heywood, V.H. (Ed.) *Global Biodiversity Assessment* UNEP (1996)

- reflect the needs of different sub-fisheries; and
- address specific conservation needs.

- Indicator species must be able to be cost effectively monitored and practical in management.
- TACs for assessed species will be set as per current processes, with an algorithm currently being developed for setting TACs for other species.

Pretty Good Multi-species Yield (PGMSY)

- The PGMSY approach would:
    - Set TACs for key commercial species using current, robust statistical catch-at-age (Tier 1) stock assessments with biomass able to fluctuate about target reference points.
    - Set TACs for secondary/bycatch species based on the incidental catch rates associated with targeting key commercial species, with biomass to remain above limit reference points.
- Harvest control rules are essential for this option, with the following staged approach identified:
    - Stage 1 – identify a set of 'core' species for Tier 1 assessments (i.e. tiger flathead, blue grenadier, pink ling and gummy shark)
    - Stage 2 – identify byproduct species for each 'core' species and fleets and find B_{TARGET} (B_{MSY} or B_{MEY}) for either:
        a. the joint production by 'core' species; or
        b. the 'core' species and the consequent target for the byproduct species and the range at which yield or profit is at least 90 per cent of the maximum
    - The target for a byproduct species cannot be "too near" the limit reference point ($0.2B_0$).
    - Some byproduct species will have targets that are higher than the nominal B_{TARGET}.
- The focus of this approach is on technical, not biological interactions.
- The reference points will be consistent among species and responsive to fleet changes.
- Targets will be ranges and not fixed values and reflect that it is not possible to achieve MEY (or MSY) simultaneously for all stocks.
- Impacts of TEPs and habitats will need to be managed separately.

Trigger species

- This approach would only assess primary commercial species, with TACs for assessed species determined using the current process.
- TACs would also be determined for byproduct species, with monitoring arrangements and breakout rules implemented.

131. Dr Knuckey advised the RAG of the next steps for the project, in relation to consultation and engagement:

- Development of a video (released publicly on YouTube) explaining the project and the anticipated outcomes.
- Fortnightly meetings with AFMA Managers, and regular AFMA Commission engagement.
- Semi-regular meetings with the Steering Committee.

- Engagement with the Department of Agriculture, Water and Environment and ABARES, with the next virtual meeting scheduled for April/May 2021.
- Candidate strategies will be presented and discussed in June 2021.

132. The RAG discussed, with reference to the PGMSY approach, whether target reference points for maximum sustainable yield of primary species, would be determined based on the current situation in the fishery or on historical position:
    - Dr Knuckey advised the RAG that target reference points will be informed by the current situation, with species that were historically overfished and not exhibiting signs of recovery, having to be addressed separately (i.e. redfish).

133. The RAG raised several questions regarding the Multi-Species Harvest Strategy Project which AFMA should seek answers to prior to the SESSFRAG Data Meeting (August 2021).

Action Item 18

AFMA to liaise with the Multi-Species Harvest Strategy Project Committee to address the following questions raised by SESSFRAG at their March 2021 Chairs' Meeting:

1. Testing of approaches: Would it be possible to use a retrospective approach to testing alternatives, to see how the fishery might have progressed if they were first applied in the late 90s or early 2000s?
2. Metrics of success: Is this determined solely by total yield or will the number/proportion of species that remain at Target or above Limit Reference Points also be considered?
3. Will the Candidate Harvest Strategies only consider the current Harvest Strategy Policy settings (B_{MEY} = 48%, LRP = 20%), or will they consider potential performance if alternative (higher or lower) settings were applied? Could an alternative have worked well under different Harvest Control Rules?

Close of meeting

134. The Chair thanked the RAG members and attendees for their contribution and closed the meeting at 5:05pm (AEDT).

Appendix A – Register of Interest

	Declared Interest – Last updated February 2021
Members	
Dr Cathy Dichmont	Director of Cathy Dichmont Consulting. Contracted by various state and Commonwealth agencies to undertake various reviews and consultancies not related to SESSF. No pecuniary interest in the SESSF.
Ms Fiona Hill	Employed by AFMA, Senior Manager of Demersal and Midwater Fisheries. No interest, pecuniary or otherwise.
Dr Sarah Jennings	Economics coordinator, FRDC Human Dimensions Research Subprogram Adjunct Senior Researcher, TSBE and casual employee IMAS University of Tasmania. Economics member of SERAG Economic member of SEMAC Member of AFMA EWG Independent economics consultant No pecuniary or other interest in the SESSF.
Mr Lance Lloyd	GABRAG Chair Member of GABMAC Board Member, AwF – Aquaculture without Frontiers (Australia) Director; Lloyd Environmental Pty Ltd. Research Fellow; Federation University Australia No pecuniary interest.
Mr Sandy Morison	Director of Morison Aquatic Sciences Chair of SharkRAG Contracted by government departments, non-government agencies and companies for a range of fishery related matters including research and for MSC assessments of AFMA managed and other Australian and international fisheries. Undertaken work for SETFIA in 2021 reviewing a proposed submission to the Department of Agriculture, Water and the Environment No pecuniary or other interest in the SESSF.
Dr Michael Steer	A/g Research Director SARDI (Aquatic Sciences) Chair of SERAG Member of SEMAC No pecuniary interest in the SESSF.
Executive Officer	
Ms Kehani Manson	Employed by AFMA. No interest, pecuniary or otherwise.

	Declared Interest – Last updated February 2021
Invited Participants	
Dr Cathy Bulman	Senior Research Scientist, Ecological Modelling Team, Oceans and Atmosphere CSIRO. Ecological Risk Assessments FRDC review of biological parameters, intrinsic to stock assessments and ERAs.
Mr Simon Boag	Executive Officer South East Trawl Fishing Industry Association (SETFIA) EO on SSIA EO on SPFIA Non-beneficiary Director of two fishing companies in the SESSF one of which is a significant quota owner. Industry member on both SERAG and SEMAC. SSIA is engaged by AFMA to collect shark industry biological data PI on the fishery independent survey SETFIA is the PI on the orange roughy east AOS SETFIA is engaged to undertake a variety of tasks under the co-management arrangement with AFMA
Dr Paul Burch	Employed by CSIRO, assessment scientist. Acquiring funding for research purposes. PI on data services contract. CSIRO representative at Fisheries Statistics and Information Working Group (a sub-committee of the Australian Fisheries Management Forum)
Dr Jemery Day	CSIRO, assessment scientist. Acquiring funding for research purposes Scientific member of the Sub-Antarctic Resource Assessment Group (SARAG) PI – SESSF species stock structure review Interests in promoting good science.
Dr Ian Knuckey	**Positions:** Director – Fishwell Consulting Pty Ltd Director – Olrac Australia (Electronic logbooks) Deputy Chair – Victorian Marine and Coastal Council Chair – Northern Prawn Fishery Resource Assessment Group Chair – Tropical Rock Lobster Resource Assessment Group Chair – Victorian Rock Lobster and Giant Crab Assessment Group Chair – Victorian Central Zone Abalone Fisheries Resource Advisory Group Chair – Gulf of St Vincent's Prawn Fishery MAC Research Scientific Committee Scientific Member – Northern Prawn Management Advisory Committee Scientific Member – SESSF Shark Resource Assessment Group Scientific Member – SESSF Great Australian Bight Resource Assessment Group Scientific Member – Gulf of St Vincent Prawn Fishery Management Advisory Committee Scientific Member – Tropical Tuna Resource Assessment Group Scientific Member – SESSF Resource Assessment Group

	Declared Interest – Last updated February 2021
	Current projects: AFMA 2020/0807 – Bass Strait Scallop Fishery Survey – 2020-22 AFMA 2019-0836 – Information to the Bass Strait Central Zone Scallop Fishery Harvest Strategy and TAC setting process with economic data and MEY proxies Australia Bay – Information to support Wildlife Trade Operation for the Queensland Gulf of Carpentaria Developmental Fin Fish Trawl Fishery FRDC 2019/129 – Potential transition of shark gillnet boats to longline fishing in Bass Strait - ecological, cross-sectoral, and economic implications FRDC 2019/072 – A survey to detect change in Danish Seine catch rates of Flathead and School Whiting resulting from CGG seismic exploration. FRDC 2019/027 – Improving and promoting fish-trawl selectivity in the SESSF and GABTS FRDC 2018/021 – Development and evaluation of SESSF multi-species harvest strategies FRDC 2017/069 – Indigenous Capacity Building FRDC 2017/014 – Informing structural reform of South Australia's Marine Scalefish Fishery FRDC 2016/116 – 5-year RD&E Plan for NT fisheries and aquaculture NT Fisheries – Design and implementation of a tropical snapper trawl survey PEMSEA – Developing EAFM Plan of Red Snapper for Arafura and Timor Seas Region Sea Cucumber Ass. – Design and implementation of a sea cucumber dive survey Sea Cucumber Ass. – Information to support non-detrimental finding of fisheries for black teatfish and white teatfish Tas. Abalone – Scientific Advisor for Tasmanian Abalone Council Ltd Traffic Project – Shark Product Traceability Beach Energy – Proposal to conduct a survey to determine whether proposed Prion Marine Seismic Survey impacts relative biomass of scallops on beds in the immediate vicinity. BCI Minerals – Potential impacts on commercial fishing and aquaculture operations resulting from the Mardie Project development DAWE Project – Multi-sector capacity building
Mr Neil MacDonald	Director NMAC(SA) P/L Executive officer of the Great Australian Bight Industry Association Executive officer of Surveyed Charter Boat Owners and Operators Association South Australia Executive officer of Southern Fishermen's Association Executive officer of Saint Vincent Gulf Prawn Boat Owner's Association Executive officer of Marine Scale Net Fishers Association Committee support services South Australian Rock Lobster Management Advisory Committee and Research Sub-Committee (SARLAC) Great Australian Bight Management Advisory Committee (AFMA) - Member Great Australian Bight Research Advisory Committee (AFMA) - Member Gulf St Vincent Prawn Fishery Management Advisory Committee (SVGPBOA) - Member Gulf St Vincent Prawn Fishery Research Sub-Committee (SVGPBOA) - Member

	Declared Interest – Last updated February 2021
	Lakes & Coorong Fishery Management Advisory Committee (LCFMAC) - Member CGG Gippsland MSS Scientific Advisory Committee – Chair Australian Council of Prawn Fisheries - Director
Mr Andrew Penney	Director of Pisces Australis Pty Ltd, an Australian registered marine and coastal research and management consultancy based in Canberra. As such, I have an interest in any opportunities in this regard. Currently principal investigator on two FRDC Projects: 2017-180: Design and implementation of an Australian National Bycatch Report: Phase 1 – Scoping; 2019-036 Implementation of dynamic reference points and harvest strategies to account for environmentally-driven changes in productivity in Australian fisheries. Scientific Member of AFMA Tropical Rock Lobster RAG and Small Pelagic Fishery Scientific Panel Member of the AFMA ERA Technical Working Group. No shareholding and hold no positions relating to any other companies, including any fishing companies or industry associations
Dr Miriana Sporcic	Employed by CSIRO, Assessment scientist. Acquiring funding for research purposes
Mr David Stone	Executive Officer for Sustainable Shark Fishing Association. Declared interests in representing hook and gillnet industry member interests. Declared interest in RBCs
Dr Robin Thomson	Employed by CSIRO, Assessment scientist. Acquiring funding for research purposes PI on close kin project for school shark. PI on blue-eye trevalla close kin scoping project
Dr Geoff Tuck	Employed by CSIRO. Involved in Stock assessments. Interest in obtaining funding for future research. Principle investigator on the SESSF stock assessment project.
Observers/Presenters	
Dr Pia Bessell-Browne	Employed by CSIRO, Assessment scientist. Acquiring funding for research purposes
Mr Dan Corrie	Employed by AFMA, South East Trawl, GABT, Scallop and Squid Manager. No interests, pecuniary or otherwise.
Ms Natalie Couchman	Employed by AFMA, Gillnet, Hook and Trap, High Seas and Norfolk Is Manager. No interest, pecuniary or otherwise.

	Declared Interest – Last updated February 2021
Ms Sally Weekes	Employed by AFMA, Small Pelagic Fishery Manager – no interest pecuniary or otherwise.
Dr Tim Emery	Employed by ABARES. No interest, pecuniary or otherwise.
Dr Geoff Liggins	Cross-jurisdictional research and management interests for DPI NSW, no pecuniary interests.
Dr Rich Little	Employed by CSIRO, assessment scientist. Acquiring funding for research purposes. Member of the Total Allowable Fishing Committee for NSW, conflicts with all items with state fisheries and in particular involved with setting the TAC for school whiting.
Mr Tamre Sarhan	Employed by AFMA, Observer Coordinator. No interest, pecuniary or otherwise.
Dr Matt Broadhurst	Cross-jurisdictional research and management interests for DPI NSW, no pecuniary interests.
Mr Ian Butler	Employed by ABARES. No interest, pecuniary or otherwise.
Prof. Colin Simpfendorfer	Adjunct Professor, College of Science and Engineering, James Cook University Adjunct Senior Researchers, Institute of Marine and Antarctic Studies, University of Tasmania Member of the national Threatened Species Scientific Committee Private consultant undertaking work on sharks and fisheries. Acquiring funding for research and conservation purposes.
Dr Don Bromhead	Employed by ABARES. No interest, pecuniary or otherwise.

Appendix B – Actions arising from previous meetings

No.	Ag. Itm / Mtg Date	Action Item	Agency / Person	Timeframe	Progress as of SESSFRAG Chairs' meeting 2021
1	4 SESSFRAG Chairs' 2019	AFMA to consider adding data from NSW, Dr Haddon and Victoria and provide a revised blue-eye trevalla history report to SESSFRAG in August 2019.	AFMA	SESSFRAG Data meeting 2020	The RAG agreed this item was redundant, noting that: - Dr Miriana Sporcic has reviewed the State and Commonwealth catch histories for all Tier 4 species in 2020, with advice from SERAG prior to undertaking Tier 4 assessments in 2020 (including blue-eye trevalla) - Dr Paul Burch will liaise with relevant State agencies in 2021 to ensure accurate catch histories are obtained for each SESSF species. Blue-eye trevalla history report was provided as an attachment to the Agenda Item 2 paper.
4	4 SESSFRAG Chairs' 2019	AFMA to obtain and include in its database the following data sets: • Great Australian Bight (GAB) and South East Trawl Fishery Independent Surveys • crew collected data (incl. GABT and the GHAT) • historic blue warehou industry collected data	AFMA	As soon as practicable	FIS collected data – Complete – added into the database. Crew collected data – Complete –Crew collected data for the GAB is still recorded on paper and sent to AFMA for entering. This is done in batches and is dependent on staff resourcing. AFMA/GABIA are investigating options for collecting this information electronically. SIDaC data is now in the database. Blue warehou data – Underway - AFMA to follow up.
11	10 SESSFRAG Chairs' 2019	NSW DPI to provide their *Multi-criteria Decision Matrix* for prioritising research and monitoring needs to AFMA. AFMA and NSW DPI to discuss further and provide an update to the SESSFRAG 2020 Chairs' Meeting.	Dr Hall – NSW DPI / Mr Day – AFMA	SESSFRAG Chairs' meeting 2020	The RAG agreed to mark this action item as complete/redundant, noting that the Decision Matrix could be referred to at a later date if necessary. The NSW paper was provided as an attachment to the Agenda Item 2 paper.

21	15 SESSFRAG Chairs' 2019	AFMA and CSIRO to develop a detailed project proposal for a comparison of GHAT EM and observer data for submission to the ARC / ABARES.	AFMA and CSIRO	September 2019	A review of data needs (including those raised at the July 2020 SEMAC meeting) will be considered by SharkRAG at their March 2021 meeting. Note: at its meeting in July 2020, SEMAC suggested during the development of a GHAT data plan, that the data needs are examined and available tools for data collection are identified.
26	15 SESSFRAG Chairs' 2019	Data exclusion to investigate the effect of biennial sampling to be undertaken during the next gummy shark assessment to determine the impact of biennial data collection by removing every second year of length and age data.	CSIRO – Dr Thomson	During the gummy shark assessment in 2020	Dr Punt is completing significant investigations in this space. A workplan for the next assessment will be considered at SharkRAG in October 2021, and this issue will be progressed then. CSIRO will provide an update when available.
4	6 SESSFRAG Data 2019	AFMA to seek advice from the Economic Working Group (EWG) about which KPIs are being adopted and what data are to be collected and presented. Following this, add an information item to the 2020 SESSFRAG Chairs' meeting agenda regarding economic KPIs.	AFMA / Sarah Jennings	SESSFRAG Chairs' meeting 2020	The Commission is currently reviewing how performance against the economic objective is measured. The outcome of this assessment will have implications to fishery specific KPI and how their performance is measured.
5	7 SESSFRAG Data 2019	The bSAFE2 results and updated methodology to be taken to the individual SESSF resource assessment groups for consideration	SERAG / SharkRAG / GABRAG	Next relevant RAG meeting	SERAG and GABRAG have considered the results for Danish seine and trawl methods. SharkRAG endorsed the gillnet ERA report as final. AFMA are expecting final reports to be made available in early 2021.
13	12 SESSFRAG Data 2019	Seek advice from SERAG/SharkRAG to update the SIDaC data collection plan to include: • tissue samples of blue eye trevalla for CSIRO close-kin work along with otoliths for ageing by FAS (SERAG).	AFMA / SSIA	October 2019 SERAG meeting / November 2019	SERAG item – included in the SESSF Data Plan. SharkRAG items – SharkRAG considered these items at their March 2021 meeting. Total and partial lengths to be included in the SESSF Data Plan. Further analysis to be

		• the collection of total and partial lengths of school and gummy shark particularly any school sharks larger than 160cm total length (100cm partial length). Gummy shark over 160 TL and 100cm PAR are also important (SharkRAG) • collection of gummy and school shark samples from automatic longline vessels (SharkRAG).		SharkRAG meeting	undertaken regarding the need for sampling from automatic longline vessels.
33	15 SESSFRAG Data 2019	SERAG and SharkRAG to consider the data for the remaining rebuilding species that were not discussed during the SESSFRAG data meeting.	SERAG / SharkRAG	October & December 2019 SERAG meetings / November 2019 SharkRAG meeting	SERAG considered the data for blue warehou and redfish at their meetings in October and December 2019. Update on school shark assessment provided at the January 2020 meeting.
40	18 SESSFRAG Data 2019	SESSFRAG to discuss chapters from *incorporating the effect of marine spatial closure in risk assessments and fisheries stock assessments* not covered by the presentation at SESSFRAG Data meeting 2019, including Miriana Sporcic to present the chapter about the *simulation study on the effect of CPUE resource standardisation with and without marine closures*.	SESSFRAG / Miriana Sporcic	SESSFRAG Chairs' meeting 2020	The RAG agreed to mark this action item as complete/redundant. The recommendations from this project are already implemented in the routine analyses undertaken each year.
42	19 SESSFRAG Data 2019	AFMA to update the logbooks to include 'live' status of released school sharks	AFMA	As soon as practicable	While life status of discarded school shark can be recorded in the new Agency Data Collection (ADC) platform etc. SESSFRAG (March 2021) raised concerns regarding the delay in progressing this action item, and requested AFMA further investigate this delay (action item 1, March 2021).
1	5 SESSFRAG Chairs' 2020	Ensure the SESSF Harvest Strategy Framework is updated to enable multispecies considerations rather just single species considerations where appropriate.	Sarah Jennings, Ian	By the SEMAC TAC setting	Updated as part of Tier 5 Harvest Control Working Group at their February 2021 meeting.

		Changes to the framework should ensure that the overarching high-level goal is to produce B_{MEY} for a fishery level goal and not be a full review of the framework, noting that the multi-species harvest strategy project is already undertaking this process.	Knuckey, Fiona Hill	meeting in 2021	The Working Group noted that this issue arose from the following wording used throughout the Harvest Strategy: "Alternative reference points may be adopted for some stocks to better pursue the objective of maximising economic returns across the fishery as a whole." The Working Group recommended that the wording be amended to: "Alternative reference points may be adopted for some stocks to account for technical interactions and the multi-species nature of the fishery, and to better pursue the objective of maximising economic returns across the fishery as a whole."
2	5 SESSFRAG Chairs' 2020	Establish a 'Tier 5 TAC setting working group' prior to SERAG 1 to develop harvest control rules for converting Tier 5 assessment outcomes into TACs, noting Tier 5 methods may be broader than those currently specified, and these methods may need different harvest control rules.	AFMA (Dan Corrie, Fiona Hill, Natalie Couchman), CSIRO (Geoff Tuck, Miriana Sporcic and Malcolm Haddon) and Industry (TBD)	Prior to the TAC setting process of tier 5 species	The Tier 5 Harvest Control Working Group was established and met in February 2021. The Working Group identified the fundamentals of a five-step approach (around MSY) to inform the TAC setting process for Tier 5 species, recommending that these steps be further developed out of session and considered at the August 2021 SESSFRAG Data Meeting. i. Refine biological parameters o Ensure that life-history metrics (e.g. growth, maximum age, resilience etc.) incorporated into the assessment are based on the best available data/information. ii. Establish a 'one-off' CatchMSY assessment, incorporation all available/relevant catch information iii. Assess against an ERA framework. iv. Understand operational changes of the fishery e.g. economics, regime shifts, weather conditions etc., to

					reconcile trends in catch that may impact on the weight of evidence interpretation. v. Define a clear pathway out of Tier 5 assessment through data collection, monitoring programs etc.
8	7 SESSFRAG Chairs' 2020	Natalie Couchman to discuss with the SIDaC program, the collection of dual length measurements for school and gummy sharks that are longer than 160cm total length, to enable new conversion factors to be established for these larger sharks.	AFMA	As soon as practicable	Discussed at the March 2021 SharkRAG meeting, to be included in SESSF Data Plan.
9	7 SESSFRAG Chairs' 2020	Natalie Couchman to discuss with CSIRO on how to progress the approach of using electronic monitoring (EM) for the collection of length frequency data for sharks – discuss out of session if urgent or at the next RAG.	AFMA	As soon as practicable	Discussions occurred. Considered further at SharkRAG meeting in March 2021, to be included in SESSF Data Plan.
10	7 SESSFRAG Chairs' 2020	CSIRO to provide an update to SESSFRAG on their work to automate the collection of fish lengths by EM.	CSIRO	As soon as practicable	Geoff Tuck will provide an update at Agenda Item 16 (SESSFRAG Chairs' 2021). Note: related to Action Item 9 possible planning of automation work.
13	9 SESSFRAG Chairs' 2020	SESSFRAG to establish a SESSF FIS working group to consider cost-effective alternatives to collecting fishery independent data. The first meeting of the working group should establish the data requirements for ongoing data collection programs, and propose possible solutions to SESSFRAG at the August SESSFRAG Data meeting 2020. SESSFRAG members to determine the membership, terms of reference and objectives of the group prior to the working group meeting.	SESSFRAG members (bar SERAG Chair – Mike Steer)	SESSFRAG Data meeting 2020	In July 2020, terms of reference were established by SESSFRAG out of session, establishing the basis for the FIDWG, including its membership (provided at Agenda Item 6, Attachment B) The FIDWG was established and met on 6 August 2020, with an update provided at Agenda Item 6 (SESSFRAG Chairs' 2021).
15	9 SESSFRAG Chairs' 2020	GABRAG to establish a GABFIS technical working group to consider:	GABRAG	Prior to the next GABFIS process	The GABFIS Working Group met on the 7 December 2020 to consider the effectiveness of the current GABFIS design. Following the recommendation from the Working Group

		• the outcomes from the GABFIS and its utility for Tier 1 assessments • possible changes to survey design to account for any temporal shifts in availability. Information to be provided to SESSFRAG at the SESSFRAG Chairs meeting 2021.			(and subsequent GABRAG endorsement), the GABFIS will be reduced to a single trip survey. The survey will now only include what was previously the second of two trips, typically undertaken in March or April, depending on the moon phase. The first trip of the survey, typically undertaken in February, will not be completed in 2021. GABRAG will consider the results of the 2021 survey at their meeting later in 2021, and provide advice on the future survey design for the GABFIS.
21	10 SESSFRAG Chairs' 2020	The CAPAM Natural Mortality (M) workshop in Seattle has been delayed until 2021, as such SERAG to seek advice from relevant experts on the use of M for orange roughy prior to the orange roughy eastern Tier 1 assessment, scheduled for 2021. Include an agenda item on the SERAG #1 meeting for 2020 to discuss M, and consider the best approach to the assessment, particularly if the CAPAM workshop does not proceed.	SERAG	SERAG meeting #1	SERAG (October 2020) established a working group to provide advice on Natural Mortality, with a view to seeking approval from SESSFRAG at its August 2021 Data meeting, prior to undertaking the stock assessment. An update will be provided at Agenda Item 10 (SESSFRAG Chairs' 2021).
1	5 SESSFRAG Data 2020	AFMA to liaise with Simon Boag regarding his involvement in the Tier 5 TAC setting working group.	AFMA/Simon Boag	As soon as practicable	Simon Boag attended the Tier 5 Harvest Control Working Group on 12 February 2021.
2	8 SESSFRAG Data 2020	AFMA (Dan Corrie) to speak with Matt Broadhurst to request that the FRDC trawl selectivity project include reducing catches of small redfish by improving selectivity as a focus. Include an item on the SESSFRAG Chairs' meeting agenda in March 2021.	AFMA	Chairs' meeting 2021	Phase 2 of the project will focus on ground gear. There will be an opportunity to consider improved selectivity in phase 3 of the project, subject to the outcomes of phase 2. Matt Broadhurst will provide an update at Agenda Item 7.2 (SESSFRAG Chairs' 2021)

3	8 SESSFRAG Data 2020	The RAG to discuss the implications of the MSHS project on the ageing plan and the inclusion of non-quota species, such as leatherjackets, at the Chairs' 2021 meeting.	SESSFRAG	Chairs' meeting 2021	This item will be considered at the 2021 Data meeting.
4	10 SESSFRAG Data 2020	AFMA to analyse gillnet and hook catch and effort data with a view to providing the SIDaC program guidance on which boats are more likely to catch school shark to facilitate sampling.	AFMA	As soon as practicable	AFMA provided SIDaC with details of boats more likely to catch school shark to facilitate sampling, in September 2020.
5	10 SESSFRAG Data 2020	AFMA and the SIDaC program to report to SharkRAG at their September 2020 meeting regarding costs for collecting school shark length samples at sea as part of a crew-based program. In addition to the sampling requirements across the strata (method and location), the SIDaC program should consider: • ensuring lengths are linked to the tissue samples, as lengths alone are not used in the assessment; and • including sampling targets for the trawl fleet, particularly from deeper water.	SIDaC	September 2020	Discussed at SharkRAG in March 2021, further work to be completed.
6	10 SESSFRAG Data 2020	SharkRAG to revisit the school shark data collection plan including the data needs and a gap analysis on the data currently being collected.	SharkRAG	As soon as practicable	Discussed at March 2021 SharkRAG meeting, to be reflected in updated SESSF Data Plan.
7	10 SESSFRAG Data 2020	Subject to SharkRAG advice, the SESSF data plan and ISMP plan to be updated to include the collection of school shark lengths and vertebrae from otter board trawl boats in the CTS.	AFMA	January 2021	Considered at SharkRAG in March 2021, to be included in SESSF Data Plan. Arrangements with ISMP yet to be made.
8	11 SESSFRAG Data 2020	CSIRO to ensure the boundaries for the deepwater shark management zones are correct for reporting purposes.	CSIRO	As soon as practicable	Dan Corrie and Paul Burch confirmed the boundaries of the deepwater shark strata in 2020.

9	11 SESSFRAG Data 2020	Paul to check with Malcolm Haddon on possible methods to estimate or account for changes in fisher behaviour when an observer is on board. David Stone may also be able to provide some thoughts on how to analyse the data to take into account any bias.	Paul Burch / David Stone	As soon as practicable	Dr Burch and Dr Haddon advised that if observer coverage was higher, there would be the potential to use a model of observed shots to predict the discards of the logbook shots (like the model used to analyse the FIS). Unfortunately, there is insufficient data available at this time.
10	11 SESSFRAG Data 2020	Geoff Liggins to send Paul Burch the research reports from the early 2000s regarding bias in discard estimates due to changes in fisher behaviour when observers are onboard.	NSW DPI	As soon as practicable	Dr Liggins sent the reports to Dr Burch.
11	11 SESSFRAG Data 2020	Updates to the ISMP discard report (refer to the summary table in the report (2)) to include: • a separate table for Tier 1 species with model estimate of discards to enable comparison to observer estimates of discards, • a pass or fail for all species; and • footnote explaining observer coverage for school and gummy shark.	CSIRO	SERAG 1 2020	Tables in the discard report were modified as requested.
12	11 SESSFRAG Data 2020	Paul Burch to provide the 'Discard Method Evaluation' report, an output from the Discard Estimation Working Group, to the SESSFRAG EO when finalised so that it may be distributed to SESSFRAG.	Paul Burch	As soon as practicable	Paul Burch to provide final report prior to SESSFRAG Chairs' Meeting (March 2021).
13	11 SESSFRAG Data 2020	AFMA to evaluate the benefits of undertaking another analysis of discard reporting for fisheries that have EM to determine if there are continuing improvements in reporting (as per the review that ABARES undertook).	AFMA	As soon as practicable	Preliminary discussions have occurred with ABARES, pending identification of resourcing to do this work.

14	11 SESSFRAG Data 2020	CSIRO and AFMA to check the discard rate estimates for the following species from the 2019 discarded and total catch table (table 2 (on page 19 Deng et. al. 2020 report)) to ensure that this is completed prior to the SERAG meeting. Inform SESSFRAG out of session: Assessed in 2020 – school whiting, eastern redfish, gummy shark, mirror dory (east and west), john dory, and smooth oreo (non-Cascade) Rebuilding species – school shark and eastern gemfish. Assessed in 2021 – blue grenadier, jackass morwong (east) and deepwater shark (east) Other – orange roughy (GAB)	CSIRO / AFMA	SERAG 1 2020	There were some errors in the discard data that were corrected resulting in revisions to discard estimates for alfonsino, blue-eye trevalla, blue grenadier, frostfish, gemfish east, mirror dory west, pink ling west, ribaldo, school shark and silver warehou.
15	11 SESSFRAG Data 2020	AFMA to investigate and compare logbook reported discards for school and gummy shark to (1) observers for trawl boats, and (2) EM for gillnet/hook boats.	AFMA	As soon as practicable	This comparison is yet to be completed.
16	12 SESSFRAG Data 2020	Geoff Liggins to provide further clarification on catch figures for relevant species in the updated NSW catch dataset, in particular data for 2009 as well as for ocean jackets, silver trevally and pink ling.	NSW DPI	SERAG 1	Catch figures for these species for 2009 (and previous years) were provided to CSIRO prior to their assessments and SERAG meetings in 2020.
17	12 SESSFRAG Data 2020	AFMA and CSIRO to liaise with the states regarding estimates of discards for SESSF quota species and consider establishing a discard and recreational fishing working group to consider a set of decision rules, in particular: a. whether to apply Commonwealth discard rates to state catches when Commonwealth and state gear types or management controls differ;	AFMA / CSIRO	As soon as practicable	a-b: This work is yet to commence. It has been flagged as a priority before the SESSFRAG Data meeting for AFMA to complete in consultation with the state agencies initially, and then between Dan Corrie and Paul Burch. c: This was discussed at SERAG in November 2020, and it was decided not to extend the approach to other SESSF species at this stage – state catches are either low, or not provided to CSIRO.

		b. how to estimate state discard rates and total catches where Commonwealth discard rates are not applied because of differences in gear type or management controls; and c. whether the approach used to determine recreational catch weights for shark species should be extended to other SESSF species as part of the 2021-22 Data Services Contract.			Dr Burch will continue to request recreational catch data from state agencies each year and include the figures in the Catch and Discards report. The RAG agreed to maintain this action item until both (a) and (b) are completed.
18	12 SESSFRAG Data 2020	As part of the annual data request to the states, CSIRO to also request the latest available recreational data (numbers, conversion. factors and weights). It is anticipated that if the states hold the data they should be able to provide it.	CSIRO	As soon as practicable	Dr Burch will continue to request all available data from the states as part of the annual request for data.
19	12 SESSFRAG Data 2020	Consider whether it is worthwhile undertaking a desktop study to determine which important Commonwealth fish species are also targeted by recreational fishers.	AFMA	As soon as practicable	SERAG decided that this was not an immediate research priority, noting that CSIRO already engage with the states to request recreational catch data each year.
20	12 SESSFRAG Data 2020	CSIRO to circulate to the SESSFRAG a more detailed recreational catch data spreadsheet and incorporate this into the final report.	CSIRO	As soon as practicable	Paul Burch circulated the spreadsheet during the August 2020 Data meeting.
21	14 SESSFRAG Data 2020	SharkRAG to discuss the new approaches for estimating CPUE in the gillnet sector, in particular those that investigate zero catches such as the Tweedie GLM.	SharkRAG	SharkRAG September meeting 2020	Scheduled for discussion at the October 2021 SharkRAG meeting, as part of the workplan for the next gummy shark assessment.
22	14 SESSFRAG Data 2020	That CSIRO (Miriana Sporcic) investigate removing closures, particularly those relating to sea lions, from the CPUE analysis using net length as part of future work.	CSIRO	As soon as practicable	Identified as a high research priority by SharkRAG (December 2020).

23	14 SESSFRAG Data 2020	Provide a plot of annual gillnet length deployed in the GHAT over time to SharkRAG for their information.	CSIRO	SharkRAG September meeting 2020	Status of this action item to be provided at the next SESSFRAG meeting.
24	14 SESSFRAG Data 2020	Miriana Sporcic to update the catch-per-net-length analysis for gummy shark (for each of the fleets) to include 2019 to be included in this year's gummy shark assessment.	Miriana Sporcic	SharkRAG September meeting 2020	Incorporated into the 2020 gummy shark stock assessment.
25	14 SESSFRAG Data 2020	Miriana Sporcic and Natalie Couchman to discuss historical management changes (e.g. ASL closures) that have been made in the gillnet sector which may influence CPUE, including whether these changes can be accounted for in the analysis, as this can change the overarching approach to CPUE standardisation.	AFMA / CSIRO	As soon as practicable	To be discussed as part of gummy shark assessment work plan at next SharkRAG meeting in October 2021.
26	15 SESSFRAG Data 2020	AFMA to provide an update at the SESSFRAG Chairs' meeting in 2021 on bycatch discard reporting by species groups in the trawl sector. The RAG to provide advice on whether the change in reporting requirements could affect Ecological Risk Assessments.	AFMA	Chairs' meeting 2021	Was discussed at Agenda Item 16 (Bycatch species groups – discard reporting).
27	16 SESSFRAG Data 2020	AFMA (Tamre Sarhan) to investigate the spike of 24cm school whiting and long 'tail' of large redfish in the length frequency distributions for 2019.	AFMA	SERAG 1 2020	School whiting: One voyage with large discards. Two shots in particular, one record of 450kg discarded and one record of 380kg. Tamre verified with the observer, the data is correct. Redfish: Several shots/voyages with medium to large amounts of discards. Mostly small fish or non-target species. The data is correct.

28	16 SESSFRAG Data 2020	Dan Corrie to arrange a meeting between Jemery Day, John Garvey and Tamre Sarhan regarding changes in historical length frequencies for school whiting.	AFMA	SERAG 1 2020	Issues regarding length frequencies were ether resolved before the assessment, or flagged as SERAG action items to resolve before the next assessment.
29	16 SESSFRAG Data 2020	Miriana Sporcic and Karina Hall to examine the school whiting CPUE standardisation for NSW fisheries, with a particular focus on adding standard diagnostics for the NSW standardised CPUE series.	NSW DPI / CSIRO	As soon as practicable	This was completed, and NSW will consider adding diagnostic plots in their NSW standardized CPUE report.
30	16 SESSFRAG Data 2020	Establish a school whiting working group (to meet before SERAG 1 2020) to provide guidance to Jemery Day on how to treat NSW data in the stock assessment with the following membership: Mike Steer (Chair), Dan Corrie, Karina Hall, and Ian Knuckey.	CSIRO	SERAG 1 2020	New NSW data incorporated into alternative base case presented to SERAG meeting October 2020.
31	17 SESSFRAG Data 2020	SERAG to consider the reference period for undertaking the John dory Tier 4 assessment – CDRs are available from 1998 onwards, whereas fishing for John dory commenced in 1986 according to logbook records. SERAG to discuss at the first meeting, if possible (depending on the outcome), enable the RBCs to be considered at the second meeting.	Miriana Sporcic / SERAG	SERAG 1 2020	SERAG agreed not to proceed with the Tier 4 assessment this year. There is a SERAG action item for AFMA/CSIRO to resolve the issue before the next assessment in 2021. A weight of evidence approach (Commonwealth definition) was used to set the TAC for 2021.
32	17 SESSFRAG Data 2020	SharkRAG to confirm whether discards are included in the Tier 1 gummy shark assessment and whether they are deducted from the RBC.	SharkRAG	SharkRAG September meeting 2020	Undertaken at SharkRAG meeting in December 2020.
33	17 SESSFRAG Data 2020	AFMA/CSIRO to investigate the significant catches of John dory recorded at depths deeper than 150m, which have become evident since 2017.	AFMA / CSIRO	SERAG 1 2020	While there has been an increase in catches of John dory at ~160m since 2017, an analysis of catch and effort data suggests this does not constitute a 'shift' in catch of effort to deeper waters.

34	17 SESSFRAG Data 2020	Paul Burch to investigate the length frequency data and discard estimates for John dory prior to SERAG 1 with a particular focus on spikes in length frequencies in 2017-2019 and the high discard estimates for 2019 – the RAG noted the increase might be due to catches of small fish.	Paul Burch	SERAG 1 2020	Discard estimates were considered and no changes made. The 'spike' in lengths relates to smaller fish being measured onboard as retained and discarded. No further issues were raised.
35	17 SESSFRAG Data 2020	NSW DPI to check the state catches of silver trevally and John dory. SERAG noted the catches are high, and there may be some confusion with reported catches of estuarine John dory.	NSW DPI	SERAG 1 2020	State catch time series were updated for a number of species as part of the 2020 Tier 4 assessment process – NSW supplied data and provided commentary regarding the uncertainties to CSIRO prior to their assessments and SERAG meetings in 2020.
36	17 SESSFRAG Data 2020	AFMA to provide Paul Burch with list of freezer / factory vessels active in the SESSF by year.	AFMA	SERAG 1 2020	Completed during the August 2020 data meeting.
37	17 SESSFRAG Data 2020	As part of the redfish 2020 Tier 1 assessment, SERAG to discuss and provide advice about the difference in length frequencies between redfish samples collected in port and onboard – port based length frequencies in 2017 and 2019 include a disproportionate quantity of small fish.	SERAG	As soon as practicable	See below (#38).
38	17 SESSFRAG Data 2020	As part of the redfish 2020 Tier 1 assessment, CSIRO to run sensitivities to explore different selectivity and discard functions by zone to account for the small fish recorded in port-based length frequencies.	CSIRO	SERAG 1 2020	An alternative base-case was presented to SERAG (October 2020). This model was split into two regions – NSW (Zone 10) and Eastern Bass Strait (EBASS, Zones 20 and 30). This change in the model structure resolved the problem of fitting to different length structures from port sampling between NSW and EBASS. The model had improved fits to data with less certainty around spawning stock biomass estimates. SERAG supported CSIRO proceeding with this alternative base-case redfish stock assessment.

39	17 SESSFRAG Data 2020	AFMA to check logbook depth records, including the metric (metres or fathoms) that has been used for royal red prawn to clarify the spike in catch at shallower depths – prior to SERAG 1.	AFMA	SERAG 1 2020	Issues were identified with incorrect reporting of depth for a number of species, including royal red prawn. Depth records were modified using bathymetry data for the 2020 assessments, and AFMA are addressing the depth reporting issue with industry and e-log providers.
40	17 SESSFRAG Data 2020	Tamre Sarhan to check the recent ISMP discard data for royal red prawns as it is unlikely the discard rate is so high. Paul Burch to confirm why royal red prawn failed the discard estimate validity test. This is a low priority, as the discard data will not affect the assessment.	AFMA / CSIRO	SERAG 1 2020	In both 2017 and 2018 the discard estimate failed the 100% CV rule that SESSFRAG adopted at the 2019 Data Meeting (the current criteria was applied to the revision of the 2016-2018 discard estimates). As the discards for this stock are low (2-3%) it is unlikely to impact the assessment.
41	17 SESSFRAG Data 2020	Tamre Sarhan to check the logbooks with the CDRs for silver trevally as the 2019 catch at depth records are inconsistent with previous years and could be due to misreporting or misidentification.	Tamre Sarhan	SERAG 1 2020	It is possible that two vessels reported silver warehou as silver trevally, with little to no silver trevally recorded in CDRs, but some recorded in logbook data. This would make sense given the depth records. AMA to quantify the issue and amend the data if necessary.
42	17 SESSFRAG Data 2020	Dan Corrie to update SEMAC regarding the SESSFRAG's analysis of blue grenadier wetboat CPUE (it does not indicate an issue with the stock status – noting it is considered poor indicator of stock status).	AFMA	SEMAC November meeting 2020	SEMAC were provided an update at their November 2020 meeting.
43	17 SESSFRAG Data 2020	AFMA to clarify whether model estimated discards for jackass morwong should be deducted from RBC instead of weighted average.	AFMA	Prior to the jackass morwong assessment in 2021	Model estimated discards are deducted from the RBC

44	17 SESSFRAG Data 2020	Ian Knuckey to provide the 2007-2012 length data from the industry survey on orange roughy (east) data to John Garvey for incorporating into the database.	Ian Knuckey / AFMA	As soon as practicable	
45	17 SESSFRAG Data 2020	Tamre Sarhan to investigate instances in 2016 of unusually high pink ling discard levels (as identified by CSIRO) as these may have been incorrectly coded.	AFMA	As soon as practicable	Tamre Sarhan confirmed that the unusually high pink ling discard levels were recorded correctly.
46	17 SESSFRAG Data 2020	In preparation for the 2021 silver warehou assessment, Paul Burch to check the difference between 2019 on board and port length frequencies, noting an absence of larger fish in the on board length frequencies.	CSIRO	As soon as practicable	While there does appear to be less large fish observed in the onboard, rather than the port samples for the eastern trawl fleet, it does not appear that there are any errors in the data; other than potentially unrepresentative onboard sampling.
47	18 SESSFRAG Data 2020	A working group to be established to develop recommendations on ISMP sampling targets and frequency for out-of-session consideration by the SESSFRAG. Membership of the group to include: Mike Steer (Chair), Dan Corrie, Simon Boag, Tamre Sarhan, Kyne Krusic-Golub, and Paul Burch. Conflicts of interest will need to be managed. Advice from the SESSFRAG is required before the ISMP plan for 2021 will be finalised at the end of January 2021. A matrix of assessment schedule is needed for Tier 4 species, including their life history strategy (whether they are fast or slow growing). The RAG advice is to collect all samples in the appropriate year and spread across appropriate areas.	AFMA / 2021 ISMP plan working group	January 2021	The Working Group was established and met on 17 December 2020. The sampling targets have been incorporated in the 2021 ISMP plan.
48	18 SESSFRAG Data 2020	AFMA to work with Robin Thomson to include the collection of school shark samples from deeper water in the 2021 ISMP plan – consider whether these are collected from trawl boats (see also action item 5).	AFMA / Robin Thomson	January 2021	Considered at SharkRAG in March 2021, to be included in SESSF Data Plan. Arrangements with ISMP yet to be made.

49	19 SESSFRAG Data 2020	CSIRO to incorporate the SESSFRAG's feedback regarding the stock structure report, and present an updated report to SERAG for advice in 2020.	CSIRO / SERAG	SERAG 2 2020	Updated report provided to SERAG in November 2020
50	20 SESSFRAG Data 2020	AFMA to arrange a meeting of the SESSFRAG before the end of 2020 to consider the next SESSF five year strategic research plan for the years 2021-25.	AFMA / SESSFRAG	December 2020	A SESSFRAG Special Research Meeting was held on 15 December 2020.
51	22 SESSFRAG Data 2020	Jemery Day to provide the presentation giving an overview of the project 'reviewing biological parameters' to the EO for circulation to the SESSFRAG meeting attendees.	Jemery Day / SESSFRAG EO	As soon as practicable	Dr Day presented to SERAG in December 2020 and the presentation was circulated.
52	24 SESSFRAG Data 2020	An item to be included on the agenda for the SESSRAG Chairs' meeting in 2021 to discuss the impact of seismic surveys – preliminary data from the Fishwell Multiple-Before After Control Impact (M-BACI) analysis should be available.	SESSFRAG	Chairs' meeting 2021	Was discussed at Agenda Item 14.2
53	24 SESSFRAG Data 2020	In preparation for the SERAG meeting scheduled for November 2020, CSIRO to repeat the metier analysis undertaken in 2019 with the current 2014-19 data and undertake a targeting analysis for rebuilding species. The school shark targeting analysis should include consideration of the 20 percent retention rule for school shark – refer to the previous analysis by Malcolm Haddon.	CSIRO	SERAG 2 2020	Dr Paul Burch presented a multivariate companion analysis at SERAG 2.2 (December 2020). The analysis investigated the link between target species catch and associated bycatch of recovering species. The main species associated with harvesting of recovering species included blue-eye trevalla, flathead, blue grenadier and pink ling. The main gear associated with harvesting recovering species is trawl.

Appendix C – Summary of Action Items and Recommendations arising from SESSFRAG Chairs' March 2021

Action Item	Agenda Item	Description	Responsibility	Timeframe
1	1.5	AFMA to provide SESSFRAG Members with the AFMA Commission Outcomes (March 2021) related to the implementation of the SESSFRAG Terms of Reference once they become publicly available.	AFMA	As soon as available
2	2	AFMA to investigate the delay in updating logbooks (paper and e-logs) to include 'live' status of released school sharks; noting that this action item was first raised at the 2019 SESSFRAG Data Meeting and had been previously identified as an issue by SharkRAG in 2017.	AFMA	August 2021 meeting
3	4	Fiona Hill (AFMA) to investigate the progress and timeframe for completing the following action item from the Economic Working Group – September 2020 – Agenda Item 5: *AFMA Management to finalise the agreed KPIs and develop a paper for EWG review and Commission approval. The paper will need to provide guidance relating to the timing of reporting and use of economic KPIs by AFMA for performance reporting.*	Fiona Hill (AFMA)	August 2021 meeting
4	5	AFMA to provide SESSFRAG Members with the outcomes relating to the review of the TAC setting process 2021-22, from the March 2021 AFMA Commission Meeting once publicly available.	AFMA	August 2021 meeting
5	6	AFMA to liaise with Dr Robin Thomson (CSIRO) to ensure that sampling targets for shark species (particularly trawl caught gummy shark) are accurately captured in the 2021 ISMP Plan.	AFMA	August 2021 meeting
6	6	AFMA to confirm with Tamre Sarhan (Observer Program Coordinator) to determine whether maturity data can be collected by observers and, if so, provide SESSFRAG with a list of species for which this data can be collected.	AFMA	August 2021 meeting
7	9	AFMA to incorporate the process for periodic review of stock assessments in the document 'Total Allowable Catch (TAC) setting process – Guidelines for provision of data and stock assessment processes' for further consideration by SESSFRAG. Timeline is subject to other priorities.	AFMA	As soon as practicable

8	10	Dr Paul Burch (CSIRO) to liaise with Dr Ian Knuckey (Fishwell Consulting) and Fish Ageing Services, to determine the spatial and temporal data associated with Cascade Plateau orange roughy otolith samples.	Dr Paul Burch	August 2021 meeting
9	11	AFMA to consult with a geneticist regarding the design of a sampling protocol that could be used during upper-slope dogfish survey, that could be analysed in the future to assist answering some of the knowledge gaps in relation to dogfish, thereby maximising the value out of the survey.	AFMA	As soon as practicable
10	13	AFMA, CSIRO and ABARES to establish a Climate Change & Non-Rebuilding Species Working Group, with SESSFRAG to provide the Working Group with questions (out-of-session), for consideration at a meeting, to be scheduled prior to the SESSFRAG Data Meeting (August 2021).	SESSFRAG	August 2021 meeting
11	14.1	AFMA and SIDaC to amend the SIDaC sampling plan to remove the otolith sampling targets for ribaldo, noting that otolith samples are no longer collected.	AFMA/SiDaC	August 2021 meeting
12	14.1	Mr Nate Meulenberg to follow up with Mr Tamre Sarhan regarding the status of employing a Portland based observer to collect port-samples under the ISMP.	Nate Meulenberg (AFMA)	August 2021 meeting
13	14.2	CSIRO to assess potential impacts of no ISMP coverage between 23 March and mid-October, on Tier 1 species scheduled for assessment in 2021. CSIRO to plot length distributions by month to investigate any seasonality in lengths, and present outcomes to the SESSFRAG Data Meeting (August 2021).	CSIRO	August 2021 meeting
14	15	AFMA to liaise with their Eastern Tuna and Billfish Fishery Management Team, to determine whether they have investigated the possibility of installing stereo video cameras on their vessels, and/or whether such technology is available through current providers.	AFMA	August 2021 meeting
15	15	AFMA to liaise with Industry and CSIRO to discuss the potential for implementing EM collection of fish lengths within the SESSF, for vessels fitted with cameras (i.e. GHAT Sector), noting that length estimation is not currently a feature of the current software.	AFMA	August 2021 meeting

16	16	AFMA to compare discard data reported in logbooks, to those recorded by the ISMP program, to determine the accuracy of operator reported discards.	AFMA	Include in future discard reviews to SESSFRAG
17	16	AFMA to liaise with CSIRO (Dr Miriana Sporcic and Dr Cathy Bulman) to identify non-quota species to remain as discard reporting options in e-logs, outside of the bycatch discard groups (i.e. those that are high-risk as identified through the ERA).	AFMA	August 2021 meeting
18	20.1	AFMA to liaise with the Multi-Species Harvest Strategy Project Committee to address the following questions raised by SESSFRAG at their March 2021 Chairs' Meeting: 1. Testing of approaches: Would it be possible to use a retrospective approach to testing alternatives, to see how the fishery might have progressed if they were first applied in the late 90s or early 2000s? 2. Metrics of success: Is this determined solely by total yield or will the number/proportion of species that remain at Target or above Limit Reference Points also be considered? 3. Will the Candidate Harvest Strategies only consider the current Harvest Strategy Policy settings (B_{MEY} = 48%, LRP = 20%), or will they consider potential performance if alternative (higher or lower) settings were applied? Could an alternative have worked well under different Harvest Control Rules?	AFMA	August 2021 meeting

	Recommendation
1	SESSFRAG recommended that AFMA: - incorporate relevant information from the blue-eye trevalla history document, into the SESSF history document; - ensure that the introduction of temporary permits (including gillnet to hook) are provided as line items; and - include a line item relating to the removal of the boat size restriction of 32m (introduced in the 1970s – line item 236).

2	SESSFRAG recommended that the Fishery Independent Data Working Group (FIDWG) is maintained, independently from the FRDC 'Abundance Estimation Toolbox' project. The next steps are identified in the FIDWG meeting outcomes.
3	The RAG recommended limiting the scope of the 'State Discard and Recreational Catch Working Group' to developing guidelines for application of discard rates to state catches.
4	the RAG recommended that: - The preferred approach for setting TACs when a MYTAC species assessment is overdue, be option two identified by the Tier 5 Working Group: o *Option 2: re-running the last base-case stock assessment, incorporating updated catch and effort data, to generate an additional year's RBC.* - Additional wording be included regarding the consideration of discount factors and/or a buffer to account for time-induced risk, noting that this would be species dependent.
5	The RAG recommended that the eastern orange roughy 2021 stock assessment proceeds using the agreed data, to attempt to estimate M with an informative prior, with the fall back approach being the construction of a decision table with alternate states of nature and management actions, using the agreed values of M and h; with a progress update to be provided to the SESSFRAG Data Meeting (August 2021).
6	The RAG recommended re-ageing Cascade Plateau orange roughy otoliths prior to the next stock assessment update, to evaluate potential bias in age determination.
7	The RAG recommended establishing a Working Group to further consider the implications of climate change on non-rebuilding species, with membership to be determined out of session by AFMA, CSIRO and ABARES
8	The RAG recommended: - removing the primary and secondary catch triggers from the Blue Warehou Rebuilding Strategy; - maintaining the east and west catch limit within the 2021 Rebuilding Strategy; and - calculating the east/west catch triggers using the ratio implemented in previous fishing years for the 2021-22 incidental bycatch TAC.

9	The RAG noted the difficulties with quantifying the impacts of external factors on fishery dependent data before the 2020 data is analysed and individual stock assessments are undertaken. Acknowledging that the stock assessment scientists were aware of these external impacts, the RAG recommended considering this item further at the SESSFRAG Data Meeting (August 2021), should any impacts be identified for species scheduled for assessment in 2021.
10	The RAG recommended that: - AFMA liaise with CSIRO to determine non-quota bycatch species of interest (i.e. high-risk species identified by the 2019 ERAs) to incorporate into discard reporting requirements for the GABT and CTS sectors of the SESSF; - AFMA update the bycatch species discard list in e-logs to: o remove duplicates of generic reporting common names identified as part of the discard analysis, including: ▪ 'Skates and Rays' – 37990018; and ▪ 'Fish (mixed)' – 37999999 o remove all other reporting options, only allowing reporting to non-quota species of interest, bycatch discard groups and quota species; and - The STAG should meet to consider the proposed changes to non-quota bycatch discards (species and groups) as identified by AFMA and CSIRO.
11	The RAG recommended: - deferring the eastern gemfish Tier assessment to 2022; and - considering the deferment of the 2021 blue grenadier Tier 1 assessment (dependent upon the analysis for the 2019 acoustic survey data – to be completed in May/June 2021).
12	The RAG supported the inclusion of guidelines on the timing of data provision and validation in the updated 'TAC setting process guidelines,' with CSIRO to make minor amendments to the section 'timing of provision of data to research providers' to include an additional data dump in February. The amended version will be circulated to members out of session, prior to the SESSFRAG Data Meeting (August 2021).

Appendix D – Bycatch discard groups

Table 1: Non-quota species discard groups for the trawl sectors of the SESSF

CAAB Code	Common Name (CAAB Taxon Report)	Name in logbooks
37465000	Triggerfishes and Leatherjackets	Leatherjackets
37990084	Scorpionfishes, gurnards & latchets	Scorpionfishes/Gurnards/Latchets
37439918	Gemfishes	Barracoutas
37440000	Hairtails & cutlassfishes	Frostfish/Hairtails
37990077	Dories	Dories/Oreodories
37990020	Fish oceanic/marine	Other Finfish
23590000	Cephalopods	Squids/Octopus/Cuttlefishes
37020923	Dogfishes (squalidae)	Dogfish (inc Spurdog)
37990030	Skates & Rays (mixed) (Rajiformes)	Skates/Rays/Stingarees/Guitarfish
37990003	Sharks (other)	Other Sharks
10000000	Sponges	Sponges

Table 2: Discard reporting to the 11 discard groups, from the SESSF trawl sectors for the 2019-2020 and 2020-2021 (as at 12 March 2021) SESSF fishing years.

2019-2020	
Discard Group	**Discards (t)**
Cephalopods	6.69
Cutlassfishes - unspecified	114.67
Dogfishes (mixed)	67.66
Dories (mixed)	12.74
Fish Oceanic (mixed)	909.55
Gemfishes & Snake Mackerels (mixed)	11.18
Leatherjackets - unspecified	175.94
Scorpionfishes, Gurnards & Latchets	390.68
Sharks (mixed)	40.09
Skates and rays (mixed)	275.38
Sponges	0.58
Total	**2,005.14**
Proportion total non-quota discards	**77.81%**

2020-2021	
Discard Group	**Discards (t)**
Cephalopods	9.09
Cutlassfishes - unspecified	124.78
Dogfishes (mixed)	82.86
Dories (mixed)	14.13
Fish Oceanic (mixed)	1140.56
Gemfishes & Snake Mackerels (mixed)	20.96
Leatherjackets - unspecified	196.00
Scorpionfishes, Gurnards & Latchets	489.89
Sharks (mixed)	53.22
Skates and Rays (mixed)	382.00
Sponges	1.88
Total	**2,515.37**
Proportion total non-quota discards	**78.32%**

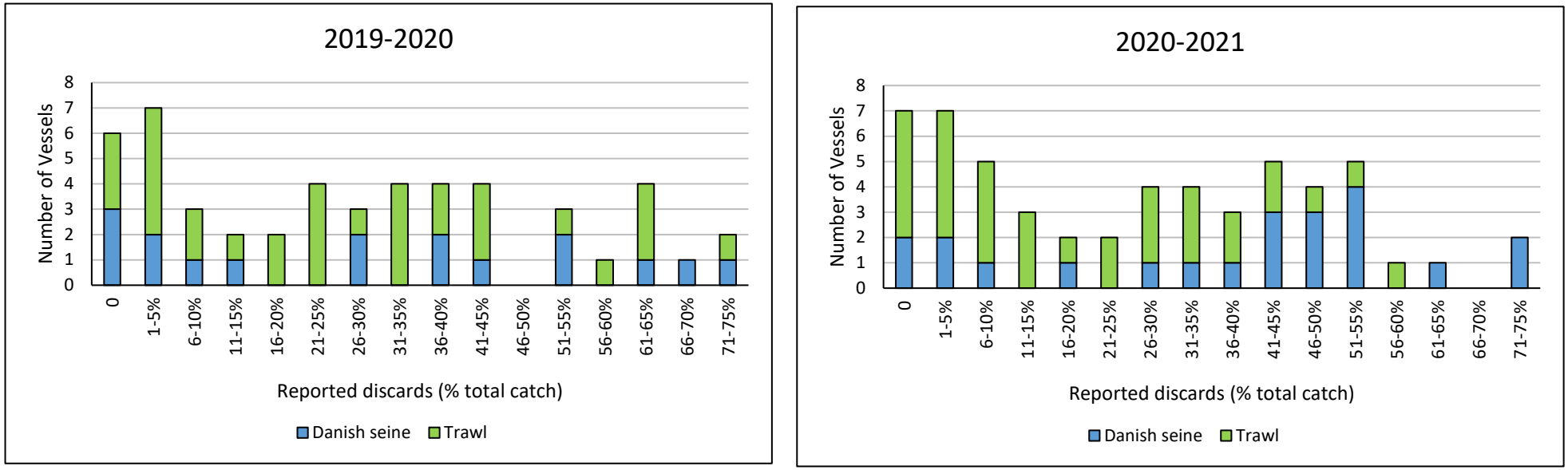


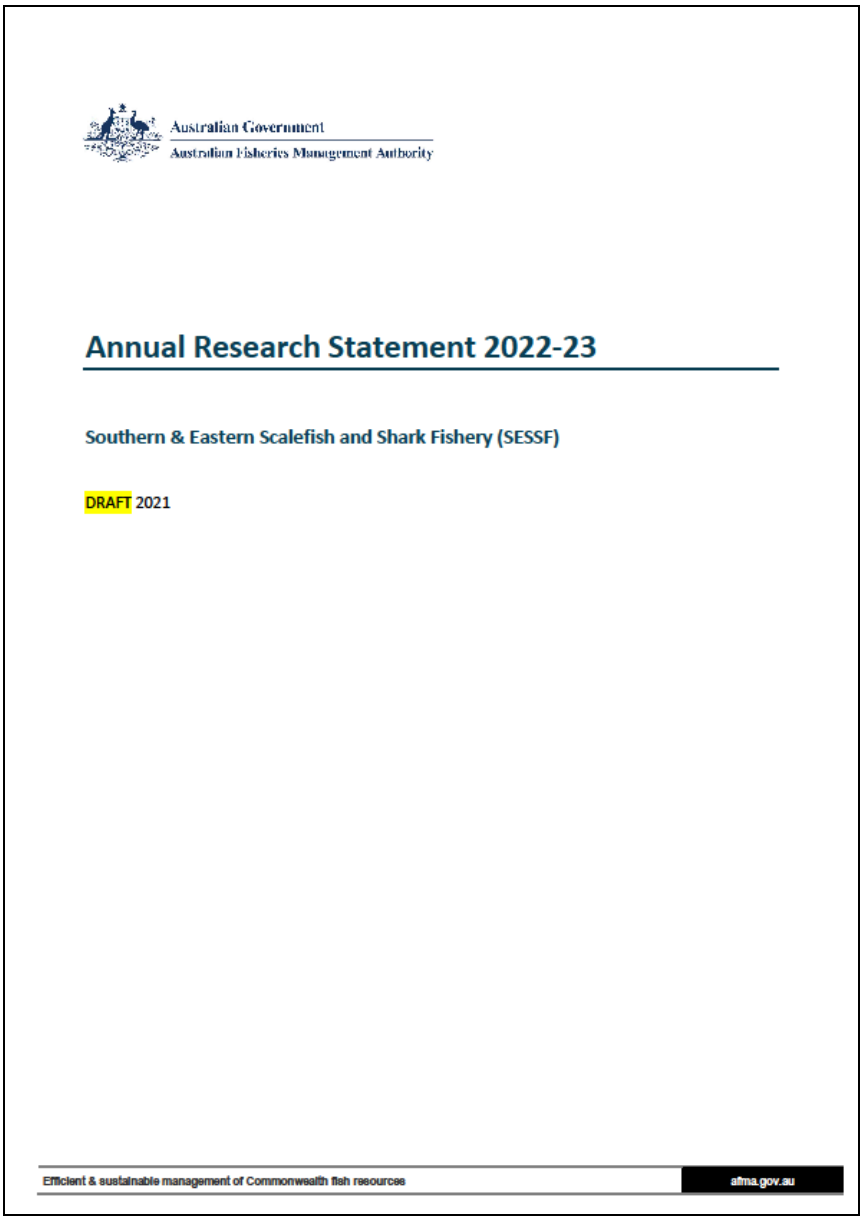
Figure 1: The proportion of discards reported by Danish seine (blue) and trawl (green) vessels in the trawl sectors of the SESSF, for the 2019-2020 and 2020-2021 (as at 12 March 2021) SESSF fishing years.

Table 3: Non-quota species discard reporting data for the trawl sectors of the SESSF for the 2019-2020 and 2020-2021 (as at 12 March 2021) SESSF fishing years.

	2019-2020			2020-2021		
Vessels reporting:	**Total**	**Trawl**	**Danish Seine**	**Total**	**Trawl**	**Danish Seine**
Correctly to discard groups (100%)	27	16	11	28	13	15
<50% discards to discard groups	7	4	3	7	4	3
Discards of non-quota species (not reported to AFMA discard groups):						
Most discards reported	**Group/species**	**Proportion of discards (%)[13]**		**Group/species**	**Proportion of discards (%)[1]**	
	Fish (mixed)	13.59		Fish (mixed)	19.04	
	Latchet	15.20		Latchet	15.63	
	Cocky Gurnard	9.61		Cocky Gurnard	9.72	
	Skates and Rays	8.75		Skates and Rays	11.23	
	Ocean Jacket	8.86		Ocean Jacket	8.40	
	Stingrays – unspecified	11.13		Stingrays – unspecified	6.41	
	Frostfish	5.44		Blacktip Cucumberfish	4.99	
				Toothed Whiptail	4.54	
Most frequently reported	**Group/species**	**Number of Vessels**		**Group/species**	**Number of Vessels**	
	Skates and Rays	8		Skates and Rays	9	
	Barracouta	6		Piked spurdog	7	
				Fish (mixed)	6	
				Frostfish	6	

[13] Proportion of non-quota species discards, that were not reported to the 11 AFMA discard groups

Appendix E – SESSF Annual Research Statement 2022-23



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Annual Research Statement 2022-23

Southern & Eastern Scalefish and Shark Fishery (SESSF)

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Southern & Eastern Scalefish and Shark Fishery (SESSF)

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Southern and Eastern Scalefish and Shark Fishery Annual Research Statement for 2022-23

This Southern and Eastern Scalefish and Shark Fishery (SESSF) Annual Research Statement was developed by AFMA, in consultation with the SESSF Resource Assessment Group (SESSFRAG), South East Resource Assessment Group (SERAG) and the South East Management Advisory Committee (SEMAC). It identifies areas of high priority research for both AFMA and potential FRDC funding in 2022-23 and will be presented to the AFMA Research Committee (ARC) for consideration as part of the 2022-23 funding round.

AFMA funding in 2022-23 - AFMA Research Committee (ARC)

Title	Objectives and component tasks	Evaluation		
		Total cost ($) (approx. only)	Priority/ ranking	Feasibility
APPROVED RESEARCH (UNDERWAY OR RECENTLY COMPLETED)				
Integrated Scientific Monitoring Program (ISMP) (funded by the fishery)	AFMA observer program, logbooks	$600k	Essential	High
Shark Industry Data Collection (SIDaC) Program – 3 year co-management contract ending 2021/22 (funded by the fishery)	Crew-based data collection program	Total project cost around $423k (excl. GST) over three years (funded by the fishery, not ARC)	Essential	High
Fish ageing for SESSF quota species (190840) – 3 year project ending 2022/23	Undertake fish ageing for the SESSF to support stock assessments for the period 2020/21 to 2022/23.	Total project cost around $777k over three years	Essential	High
SESSF Stock Assessment 2019-20 to 2020-22 (project 190800) – 3 year project ending in 2021/22 (31 May 2022)	Provide quantitative and qualitative species assessments in support of the five SESSFRAG assessment groups, including RBC calculations within the SESSF harvest strategy framework	Three year project (Total cost $1.255m) 2019/20 $50k 2020/21 $503,575 2021/22 $701,667	Essential	High

Title	Objectives and component tasks	Evaluation		
		Total cost ($) (approx. only)	Priority/ ranking	Feasibility
Continued Close Kin Mark Recapture sampling and analysis for school shark (190841) (ending in 24/25)	Continue close kin sampling and analysis for school shark as the primary indicator of abundance for this species.	Total project cost about $300K	Essential	High
Blue-eye Close-Kin Scoping Study (190842)	A scoping study to assess close-kin as a risk assessment approach for blue-eye trevalla.	Two year project, total cost of $37K	High	High
Pink ling Teir 1 Stock Assessment 2021	Provide a quantitative stock assessment for pink ling, including RBC calculations consistent with the SESSF harvest strategy framework. The assessment for pink ling is not included in the broader stock assessment contract with CSIRO.	Low	Essential	High
Research to support the Upper-Slope Dogfish Management Strategy	Undertake an initial baseline survey, which will underpin a long-term monitoring plan to measure the relative abundance and recovery of Harrisson's dogfish and southern dogfish. The survey is to be conducted in accordance with 'Option 1A with DeepBRUVS identified in the report 'Research to support the upper slope dogfish management strategy: Options for monitoring the recovery of SOUTHERN DOGFISH and Harrisson's dogfish (Williams *et al*. 2018)'	High, noting costs are split between SESSF and GAB fisheries.	High	High
Orange roughy (Cascade) Acoustic Survey 2021	Submitted to the AFMA Research Committee in January 2021 – was not considered by SERAG or SESSFRAG. This research will provide an acoustic based biomass estimation for orange roughy (Cascade) for the 2021 fishing season. It also includes the collection of biological samples including length, weight, sex, spawning stage and otolith extraction.	High	High	High

Title	Objectives and component tasks	Evaluation		
		Total cost ($) (approx. only)	Priority/ ranking	Feasibility
Analysis of blue grenadier acoustic survey data collected by industry in 2019 for inclusion in the 2021 Tier 1 stock assessment.	The next blue grenadier Tier 1 stock assessment is scheduled for 2021 – the outputs of which will be used to recommend the total allowable catch for the period 2022-2024. While the assessment relies on catch per unit effort (CPUE) and length/age data as inputs, the outputs from acoustic surveys may also be used as an index of abundance, or used to validate the results of the assessment.	High	High	High
NEW IDENTIFIED RESEARCH NEEDS FOR 2022-23				
Stock assessments for SESSF quota in the SESSF in 2022 (using data to 2021) and 2023 (using data to 2022).	The annual assessment presents fishery statistics and catch at size/age data and synthesises existing stock assessment information for the key target species of the SESSF. This is a requirement of the SESSF Harvest Strategy.	High	Essential	High
Fish ageing for SESSF quota species 3 year project ending 2025/26	Undertake fish ageing for the SESSF to support stock assessments for the period 2023/24 to 2025/26.	High	Essential	High
Non-extractive survey methodology for establishing Eastern Gemfish index of abundance	Alternative approaches to establishing an index of abundance, including a targeted fishing survey during the winter spawning aggregation. An earlier project showed that stereo cameras on nets are effective at sampling gemfish, including length frequencies and biomass estimates (pending outcome of the close kin project below – Application of close-kin assessments for rebuilding species in the SESSF))	High	TBC (pending FRDC consideration of project - Application of Close-Kin assessments for rebuilding species in the SESSF)	High
Blue grenadier acoustic survey 2022 (including planning for 2023)	The next blue grenadier Tier 1 stock assessment is scheduled for 2021, and if a three-year Multi-year TAC (MYTAC) is adopted, the following assessment would be scheduled for	High	High	High

Title	Objectives and component tasks	Evaluation		
		Total cost ($) (approx. only)	Priority/ ranking	Feasibility
	2024. An acoustic survey is scheduled for 2021. Additionally, surveys will need to be completed in 2022 and in 2023. Given the overlap of project milestones and financial years, AFMA are proposing to: a) include a research priority in the 2022-23 Research Statement to allow for a survey to be completed in 2022, and have data analysed and available for the 2024 assessment; and b) include a research priority in the 2023-24 Research Statement to allow for a survey to be completed in 2023, and have data analysed and available for the 2024 assessment.			
Improving CPUE standardisations for sharks	Improve standardisations: a) Clarify relationship between CPUE and net length b) Effects of Australian Sea Lion and other closures on CPUE c) Account for changing dynamics of fleet with new entrants.	Low	High	High
Obtaining discard data and fish lengths using electronic monitoring	Investigate implementation issues, cost and solutions to adopt electronic monitoring to collect length frequency information for key commercial species on hook and gillnet vessels to support Tier 1 assessments.	Low	High	High
Orange roughy (Cascade) Acoustic Survey 2022	This research will provide an acoustic based biomass estimation for orange roughy (Cascade) for the 2022 fishing season. It also includes the collection of biological samples	High	TBC (subject to outcome of 2021 survey)	High

Title	Objectives and component tasks	Evaluation		
		Total cost ($) (approx. only)	Priority/ ranking	Feasibility
	including length, weight, sex, spawning stage and otolith extraction.			
Re-ageing orange roughy (Cascade) otoliths	Revaluation of potential bias in Cascade Plateau orange roughy age determination (that resulted in a lower natural mortality rate than that used in other orange roughy assessments), to be completed prior to any future stock assessment. Note: this priority is only required if it cannot be included under the existing Fish Ageing Services (FAS) contract.	Low	High	High

Cost

- High: >$200,000
- Medium: $100,000 - $200,000
- Low: <$100,000

Management priority categories

- Essential
- High
- Medium
- Low

Feasibility categories

- High
- Medium
- Low

FRDC funding in 2022-23 - Commonwealth Research Advisory Committee (ComRAC)

Title	Objectives and component tasks	Evaluation		
		Total cost (approx. only)	Priority/ ranking	Feasibility
APPROVED RESEARCH (UNDERWAY OR RECENTLY COMPLETED)				
Development and evaluation of multispecies harvest strategies in the SESSF (FRDC project 2018-021)	1. To develop and evaluate multi-species harvest strategies, including reference points and decision rules. 2. To evaluate future monitoring and assessment options identified in the SESSF Monitoring and Assessment Research Project. 3. To develop a process and set of design principles for multi-species harvest strategies.	$464,973 Commenced October 2018 and is due to finish in October 2020	High	High
An updated understanding of Eastern School Whiting stock structure and improved stock assessment for cross jurisdictional management (FRDC project 2019-030)	Determining the stock structure of eastern school whiting stock and better understanding the species composition mix between eastern school whiting and stout whiting. Recommendations for approaching assessment(s) based on the outcomes of stock structure work.	$420,285 3 year project commencing in Sept 2019 and ending in May 2022	High	High

Title	Objectives and component tasks	Evaluation		
		Total cost (approx. only)	Priority/ ranking	Feasibility
Revisiting biological parameters and information used in the assessment of Commonwealth fisheries: a reality check and workplan for future proofing. (FRDC project 2019-010)	1. Identify the origin of current biological information used in assessments of species (including empirical stock assessments and ecosystem modelling efforts) carried out under the Commonwealth Harvest Strategy Policy, including the pedigree of the information (provenance, age, appropriateness of methods used). 2. Assess the implications and risks associated with using dated and borrowed information in assessments currently used for informing fisheries management, including the scale of any risks and the species for which a change in biological parameters used in assessments has the greatest impact. 3. Identify the methods that might be applied to update priority biological parameters, including a review of the efficacy and applicability of novel methods and approaches developed in recent years. 4. Articulate a work plan including appropriate sampling regimes required for updating priority biological parameters used in assessments for those species identified as being at most at risk.	$189K	High	High
Improving and promoting fish trawl selectivity in the SESSF and GABTS (FRDC project 2019-027)	Quantify the performance of discard and bycatch reduction strategies in the GABT Sector and SET Sector. Recommendations for reducing discards and increasing NER and boat level profits in the trawl fisheries.	High ($776,376 total SESSF and GAB)	High	High

Implementation of dynamic reference points and harvest strategies to account for environmentally-driven changes in productivity in Australian fisheries (FRDC project 2019-036)	1. To review relevant international research and management approaches to account for environmentally-driven productivity change in stock assessments, reference points and harvest strategies for selected Australian fish stocks. 2. To identify and describe circumstances and fish stocks for which dynamic reference points should or should not be used in stock assessments and harvest strategies, and develop appropriate methodology for conducting assessments using dynamic reference points. 3. To identify selected candidate fish stocks showing likely environmentally-driven productivity change, conduct comparative assessments for these stocks using equilibrium and dynamic reference points, and prepare a candidate harvest strategy that includes dynamic reference points for testing in the FRDC Multi-Species Harvest Strategy project. 4. To make recommendations on future implementation of dynamic reference points and harvest strategies for Australian fish stocks. 5. To develop and improve methods for detecting and quantifying changes in productivity (growth and recruitment) in stock assessments, to relate these to environmental mechanisms causing productivity changes, and to evaluate data needs, including environmental indices, required to usefully detect and evaluate productivity change under various circumstances. 6. To consider and evaluate options for effective harvest control rules, incorporating dynamic reference points, that might appropriately respond to changes in fish stock productivity, including environmentally driven trends in productivity. 7. To identify environmental circumstances and fish stock characteristics under which it would be appropriate and advisable to move to using assessments and management approaches incorporating dynamic productivity and reference points, vs. stocks for which dynamic approaches offer no benefit compared to existing equilibrium approaches. 8. To make recommendations on future stock assessment approaches, data requirements, harvest control rules and management approaches incorporating	Low	High	High

Title	Objectives and component tasks	Evaluation		
		Total cost (approx. only)	Priority/ ranking	Feasibility
	environmental indicators, dynamic productivity and dynamic reference points for Australian fish stocks.			
NEW IDENTIFIED RESEARCH FOR 2022-23				
Application of Close-Kin assessments for key and rebuilding species in the Southern and Eastern Scalefish and Shark Fishery (SESSF)	A feasibility study to determine whether close-kin assessments are an option for key commercial species in the SESSF, including what a sampling design would look like and how much it would cost. Include blue-eye trevalla pending ARC support for blue-eye trevalla close-kin project.	High (500k)	High	High
Developing a Harvest Strategy for school shark as a case study for species where depletion can no longer be estimated against B_0	Investigate development of a harvest strategy for species where depletion can no longer be estimated against B_0 (absolute estimate is only available), using school shark as a case study. To be informed by the multi-species harvest strategy project (MSHSP), and dynamic reference points project.	High	High	High
School shark post release survival	Investigation of the post release survival rates of school shark (focus on immediate and post- release mortality), and the application of survivability to discard estimates for this species.	Medium	Medium	High
Identification and monitoring of school shark pupping grounds to understand stock structure	Identify nursery areas for school shark in South Australia for potential future conservation areas. Including locations, connectivity to get better understanding of stock structure. Monitor known pupping grounds to monitor recruitment levels and stock structure.	Medium	Medium	Medium

Research projects identified for inclusion in future research plans

Title	Objectives and component tasks	Evaluation		
		Total cost (approx. only)	Priority/ ranking	Feasibility
Orange roughy (Eastern) acoustic survey 2023	This research will provide an acoustic based biomass estimation for orange roughy (Eastern) for the 2023 fishing season. It also includes the collection of biological samples including length, weight, sex, spawning stage and otolith extraction.	Low (not directly funded through ARC)	High	High
Desktop study to determine herding behaviour for various SESSF species to inform future ERA assessments	The current ERA methodology calculates 'swept area' by using the width of the net, but does not include the sweeps, bridles or doors. However, the effective swept area may be larger if trawl doors, sweeps and bridles are included, and this may have an influence on herding behaviour for different species or species groups. The next ERA is due in 2024 for trawl fisheries of the SESSF. SERAG did not consider this an immediate research priority, and recommended updating the 2019 otter board trawl ERA to increase estimates of swept area as a sensitivity to demonstrate the change in risk scores. If the change is significant, then characterising herding behaviour for vulnerable species may be reconsidered as a future research priority.	Low	High (done as part of ERA in 2023/24)	High
Changes to CPUE standardisations	Develop general approaches for SESSF CPUE standardisations that deal with such issues as structural adjustment and targeting.	Low	Medium	High
Better understanding of protected species interactions and potential impacts	• Quantitative measure of TEP interactions in the SESSF. • Assessment of population size for relevant species.	High	Low	Medium
Changes in fishing power	Literature review/meta-analysis of changes to fishing power over time. Relates to under-caught TAC project. Commence with desktop study looking at available information. Note work already done on mesh sizes on the Danish seine fleet.	Low	Low Being considered at	High

Title	Objectives and component tasks	Evaluation		
		Total cost (approx. only)	Priority/ ranking	Feasibility
			implementation workshop	
Maximising economic returns for the Australian community	• Identify factors which impact on the profitability of individual operators and the fishery. • Improve market dynamics. • Increase efficiency of vessels.	Medium	Medium Await outcomes of under-caught TACs and multi-species harvest strategy project. If gaps remain priority might be revised.	
Identification of school shark nursery areas in South Australia	Identify nursery areas for school shark in South Australia for potential future conservation areas. Current work: PhD student (Matt McMillan).	Low	Medium	High
Options for data poor assessments	Develop improved assessment methods for low catch and data poor species in the SESSF.	Low	Medium	High
Close Kin Mark Recapture (CKMR) for gummy shark	Consider whether the CKMR approach can be applied to gummy shark cost effectively, noting some concerns with CPUE as an index for gummy shark with ongoing avoidance of school shark.	High	Medium	High
Standardising CPUE for skipper effect using logbook skipper ID and experience in the SESSF.	To improve CPUE standardisations in the SESSF.	Low	High	High

Title	Objectives and component tasks	Evaluation		
		Total cost (approx. only)	Priority/ ranking	Feasibility
Examination of data acquired through electronic monitoring, logbooks and on board observers (CTS)	Since the introduction of EM in the Gillnet, Hook and Trap Sector, and more recently as part of the trial of EM in the Commonwealth Trawl Sector there has been overlap of data collected by onboard observers, EM coverage and logbooks. At its 2018 Data Meeting, SESSFRAG prioritised the need to review and compare the data acquired through the various sources, with a particular focus on discard estimates and catch composition.	Medium	Low Pending outcomes of CTS trial	High

SESSF stock assessments schedule

Species	MYTAC in 2021-22 season[1]	Last assessed	2019	2020	2021	2022	2023	2024	AFMA management comment
Alfonsino	7th year of 3-year MYTAC	2013							Future assessment subject to periodic review (SESSFRAG 2019 recommended to commission – delay the next assessment until 2020 due to low catches and lack of data)
Bight redfish	2nd of 5-year MYTAC	2019	1					1	GABMAC raised concerns about uncertainty in the model and recent biomass estimates form the FIS – however the TAC is largely undercaught.
Blue eye trevalla	Single year TAC	2018 (Seamount) 2020 (Slope)		4 (slope)	4 (slope) 5 (S/M)			4 (slope) 5 (S/M)	Tier 4 for slope stock only updated in 2020 – single year MYTAC for 2021-22 season. Tier 4 scheduled for slope and Tier 5 for seamounts in 2021. Trigger to be implemented for the seamounts with no more than 54 t to be taken in any fishing year. * CKMR being investigated.
Blue grenadier	3rd of 3-year MYTAC	2018			1			1	Under-caught and above target. As this is a very consistent stock, the stock assessment could be delayed a year (and perhaps thereafter undertaken every four years rather than three) SESSFRAG (March 2021) recommended considering deferring the 2021 blue grenadier Tier 1 assessment (dependent upon the analysis for the 2019 acoustic survey data – to be completed in May/June 2021).
Blue warehou	N/A (rebuilding species)	2013							Schedule subject to annual review of fishery indicators
Deepwater flathead	2nd of 3-year MYTAC	2019	1			1			
Deepwater shark east	3rd of 3-year MYTAC	2018 (T4)			5			5	
Deepwater shark west	3rd of 3-year MYTAC	2018 (T4)			5			5	
Elephant fish	2nd of 3-year MYTAC	2020		WOE			WOE		Assessed using weight of evidence approach in Jan 2020.
Flathead	2nd of 3-year MYTAC	2019	1		Update	1			

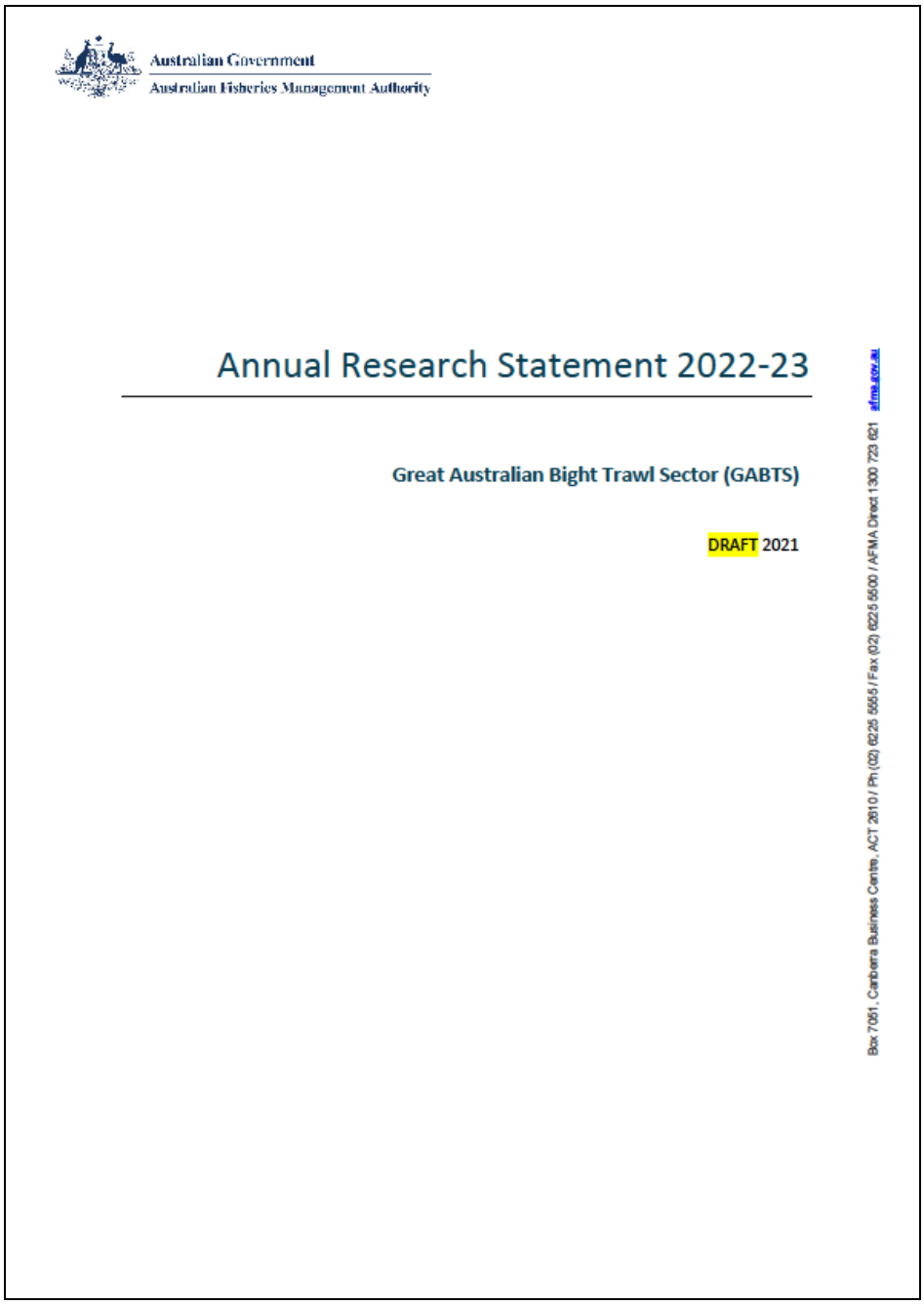
[1] For some MYTAC scheduling, assumption that decisions of the Commission will be consistent with AFMA management advice

Species	MYTAC in 2021-22 season[1]	Last assessed	2019	2020	2021	2022	2023	2024	AFMA management comment
Gemfish - east	N/A (rebuilding species)	2009				1		1	Schedule subject to annual review of fishery indicators. SESSFRAG (March 2021) agreed to defer the eastern gemfish Tier 1 assessment to 2022, noting the large number of Tier 1 assessments scheduled for 2021.
Gemfish - west	2nd of 3-year MYTAC	2019	4			4			Moved to a Tier 4 for the CTS component of the stock. Stock structure research has revealed evidence of genetically different populations between the east and west (no gene flow), with a mixing of the two stocks in western Bass Strait through to Portland
Gummy shark	1st of a 3-year MYTAC	2020		1			1		The original schedule for assessment in 2019 was delayed to 2020. There was concern of insufficient new data to run an updated assessment in 2019.
Jackass morwong	3rd of 3-year MYTAC	2018			1			1	
John dory	3rd year of 3-year MYTAC	2020		WOE[2]	4				A weight of evidence approach was used in 2020 given uncertainty about the status of the stock during the default reference period and whether CPUE is indexing stock abundance. Scheduled for a Tier 4 in 2021, subject to resolving issues regarding stock status abd CPUE.
Mirror dory	Single year TAC	2020	4	4	4	4	4	4	Annual assessment given the cyclical nature of stock abundance
Ocean perch	1st of 3-year MYTAC	2020		4			4		
Orange roughy - south	N/A (rebuilding species)	2000							The Pedra Branca portion of the orange roughy was assessed as part of the eastern stock.
Orange roughy - east	4th of a 3-year MYTAC	2017			1			1	SESSFRAG agreed to delay the assessment until 2021 to enable further consideration of natural mortality.
Orange roughy - west	N/A (rebuilding species)	2002							Limited effort, bycatch TAC and RCA
Orange roughy - Cascade Plateau	Single year TAC	2009							Limited data. Acoustic survey scheduled for 2021.
Orange roughy - Albany & Esperence	N/A (rebuilding species)	N/A							Limited effort, bycatch TAC
Oreo smooth - cascade	Long term TAC (catch dependent)	2010							Limited data
Oreo smooth - other	Single year TAC	2020	WOE	WOE	WOE	WOE	WOE	WOE	
Oreo basket	1st of a 3-year MYTAC	2020		4			4		

[2] Weight of evidence (WOE) adopted in 2020 due to concerns about the CPUE series.

Species	MYTAC in 2021-22 season[1]	Last assessed	2019	2020	2021	2022	2023	2024	AFMA management comment
Pink ling	3rd of a 3 year MYTAC	2018			1			1	
Redfish	N/A (rebuilding species)	2017		1			1		Avoidance behaviour by operators and low catches may mean that CPUE is becoming less informative as an index of abundance. Redfish may be assessed in 2020 subject to data availability, the available data will be assessed at the August SESSFRAG data 2020 meeting.
Ribaldo	1st of a 3 year MYTAC	2017		4			4		
Royal red prawn	1st of a 3 year MYTAC	2017		4			4		
Saw shark	1st of a 3 year MYTAC	2020		4			4		
School shark	N/A (rebuilding species)	2018						1	
School whiting	1st of a 3 year MYTAC	2020		1			1		
Silver trevally	Single year	2020		4	4			TBC	Single-year TAC due to concerns about most recent CPUE point
Silver warehou	3rd of 3 year MYTAC	2018			1			1	
			2019	2020	2021	2022	2023	2024	

Appendix F – GABTS Annual Research Statement 2022-23



Australian Government
Australian Fisheries Management Authority

Annual Research Statement 2022-23

Great Australian Bight Trawl Sector (GABTS)

DRAFT 2021

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DRAFT 2021

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Great Australian Bight Trawl Sector Annual Research Statement for 2022-23

The Great Australian Bight Trawl Sector (GABTS) Annual Research Plan is developed by AFMA, in consultation with the Great Australian Bight Resource Assessment Group (GABRAG) and the Great Australian Bight Management Advisory Committee (GABMAC). In developing the Plan consideration is given to the broader Southern and Eastern Scalefish and Shark Fishery Five Year Strategic Research Plan (SESSF Research Plan 2016-2020).

AFMA funding in 2022-23 (AFMA Research Committee; ARC)

Title	Objectives and component tasks	Evaluation		
		Total cost ($) (approx. only)	Priority/ rank	Feasibility
APPROVED RESEARCH (UNDERWAY OR RECENTLY COMPLETED)				
GABT Fishery Independent Survey 2021	GABRAG proposed to postpone April 2020 survey to April 2021. Conduct a winter survey which will provide further points in the times-series of fishery independent survey (FIS) indices of abundance. The resulting FIS data series will be included in stock assessments of target species and time series analysis of major by-product and by-catch species. The FIS also provides time series information on the spatial and temporal distribution of a large number of non-commercial fish species and a platform from which biological information (length, sex, maturity, age etc) can be collected in a systematic way from these species.	Medium Cost subject to review of vessel charter costs.	Essential	High
Fish ageing for SESSF quota species (included in SESSF research statement)	Undertake fish ageing for the SESSF to support stock assessments for the period 2020/21 to 2022/23.	Low Total cost approx $262k p/a for SESSF. GABT proportion based on 2 species	Essential	High

Title	Objectives and component tasks	Evaluation		
		Total cost ($) (approx. only)	Priority/ rank	Feasibility
SESSF Stock Assessment 2019-20 to 2020-22 (project 190800) – 3 year project ending in 2021/22 (31 May 2022)	Provide quantitative and qualitative species assessments in support of the five SESSFRAG assessment groups, including RBC calculations within the SESSF harvest strategy framework	Three year project (Total cost $1.255m) 2019/20 $50,000 2020/21 $503,575 2021/22 $701,667	Essential	High
Research to support the Upper-Slope Dogfish Management Strategy	Undertake an initial baseline survey, which will underpin a long-term monitoring plan to measure the relative abundance and recovery of Harrisson's dogfish and southern dogfish. The survey is to be conducted in accordance with 'Option 1A with DeepBRUVS identified in the report 'Research to support the upper slope dogfish management strategy: Options for monitoring the recovery of southern dogfish and Harrisson's dogfish (Williams *et al*. 2018)' GABRAG have requested that at least one of the GAB closures is included in the survey design.	High (noting costs are split across SESSF and GAB)	High	High
NEW IDENTIFIED RESEARCH FOR 2022-23				
Stock assessment for species identified in the SESSF Assessment Schedule (Appendix A) (included in SESSF Research Statement)	Deepwater flathead Tier 1 stock assessment	Low	Essential	High
Developing mitigation devices for deepwater shark.	GABIA have expressed interest in developing mitigation devices for deepwater shark with a view to allowing access to grounds currently closed under the Upper-slope Dogfish Management Strategy.	Low / Medium (consider co-management	High (pending outcomes of	High

Title	Objectives and component tasks	Evaluation		
		Total cost ($) (approx. only)	Priority/ rank	Feasibility
	Improving and promoting fish trawl selectivity in the SESSF and GAB (***FRDC* 2019-027**). The Principal Investigator (Matthew Broadhurst) has indicated this research could be included in the project if there is sufficient interest from industry. This research is considered a high priority, but should only progress if it is not pursued as part of FRDC project 2019-027. SESSFRAG (March 2021) did not support the inclusion of this research priority as part of the existing FRDC project, and recommended that GABRAG further consider progressing this priority (independently of FRDC 2019-027) in the 2023-24 Annual Research Statement, if it is determined to be an ongoing priority.	approach to reduce costs)	FRDC project 2019-027)	
Alternatives for orange roughy stock assessment	GABRAG (October 2020) considered alternative approaches to assessing the GAB orange roughy stock, and determined that an evidence based approach may provide an estimate of whether the stock has recovered above the limit reference point. This research priority has been identified to establish metrics for existing and potential data sources, including options for assessing the status of orange roughy in the GABT. Identified lines of evidence included: Currently available: - Ecological Risk Assessment (ERA) - Age structure (compare age structure of an orange roughy stock with known estimates of depletion) - CPUE (further analyses required to determine if this is an appropriate index Potentially available:	Low (to be undertaken withing existing staff budget, not for ARC funding)	High (Potential to undertake outside of research cycle)	High

Title	Objectives and component tasks	Evaluation		
		Total cost ($) (approx. only)	Priority/ rank	Feasibility
	- Acoustic surveys - Egg surveys			
Ageing orange roughy otoliths	Orange roughy otoliths have been (and continue to be) collected under the GABT Orange Roughy Research Plan, with the view to undertaking a future stock assessment. GABRAG are interested in pursuing the ageing of these otoliths to inform assessment options (above) and inform future sampling protocols.	Low (within existing ageiging contract, not for ARC funding)	High	High

FRDC funding in 2022-23 (Commonwealth Research Advisory Committee; ComRAC)

Title	Objectives and component tasks	Evaluation		
		Total cost (approx. only)	Priority/rank	Feasibility
APPROVED RESEARCH (UNDERWAY OR RECENTLY COMPLETED)				
Development and evaluation of multispecies harvest strategies in the SESSF (FRDC project 2018-021)	1. To develop and evaluate multi-species harvest strategies, including reference points and decision rules. 2. To evaluate future monitoring and assessment options identified in the SESSF Monitoring and Assessment Research Project. To develop a process and set of design principles for multi-species harvest strategies.	$464,973 Commenced October 2018 and is due to finish in October 2020	High	High
Improving and promoting fish trawl selectivity in the SESSF and GAB (**FRDC project 2019-027**)	Quantify the performance of discard and bycatch reduction strategies in the GABT Sector and SET Sector. Recommendations for reducing discards and increasing NER and boat level profits in the trawl fisheries.	High	High	High
NEW IDENTIFIED RESEARCH FOR 2022-23				
There are no new research priorities identified for FRDC funding.				

Cost

- **High: >$200,000**
- **Medium: $100,000 - $200,000**
- **Low: <$100,000**

Management priority categories

- **Essential**
- **High**
- **Medium**
- **Low**

Feasibility categories

- **High**
- **Medium**
- **Low**

APPENDIX A: GABTS - monitoring, research and assessment schedule (updated January 2019)

		09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
Bight redfish	TAC (t)	2,000	1,653	1,556	2,334	2,358	2,358	2,358	800	800	800	800	800	
	Assessment	✓		✓				✓					✓	
Deepwater flathead	TAC (t)	1,300	1,100	1,500	1,560	1,150	1,150	1,150	1,150	1,128	1,128	1,128		
	Assessment		✓		✓	✓			✓			✓		
Western gemfish (West from 20219)	Assessment				✓	✓			✓					
	Stock strucutre project					✓	✓	✓						
Orange roughy	Assessment								Data review					
FIS			✓					✓			✓			✓
FIS Review									✓					
Research priorities teleconference				✓	✓	✓	✓	✓	✓	✓				
MEY study		Developed				Review sensitivity	Examine breakout	GABIA, John T, S Pascoe re focusing						
GABIA length /age sampling	Industry on-board	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ISMP	Onboard *		✓		✓		✓		✓		✓		✓	✓
	Onshore	✓		✓		✓		✓		✓		✓		
Slope species monitoring	Onshore non quota length / otolith	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Byproduct monitoring						Latchet?	Ocean jacket?	Ornate angel?	Stingaree?					
Bycatch	Seabird Management Plan	Developed	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Logbook (e-log & paper)	Discard reporting	Monitoring	Audit					Focus - industry recording of discards						
RAG meeting		2	2	2	2	1	2	2	2	1	2	2	2	2
MAC meeting		1	1	1	1	1	1	1	1	1	1	1	1	1

* - Calendar year not financial year

SESSF stock assessments schedule

Species	MYTAC in 2021-22 season[1]	Last assessed	2019	2020	2021	2022	2023	2024	AFMA management comment
Alfonsino	7th year of 3-year MYTAC	2013							SESSFRAG advice to stop using Tier 3 as little new data is available due to a lack of fishing. Future assessment subject to periodic review (SESSFRAG 2019 recommended to commission – delay the next assessment until 2020 due to low catches and lack of data)
Bight redfish	2nd of 5-year MYTAC	2019	1					1	GABMAC raised concerns about uncertainty in the model and recent biomass estimates form the FIS – however the TAC is largely undercaught.
Blue eye trevalla	Single year TAC	2018 (Seamount) 2020 (Slope)		4 (slope)	4 (slope) 5 (S/M)			TBC	Tier 4 for slope stock only updated in 2020 – single year MYTAC for 2021-22 season. Tier 4 scheduled for slope and Tier 5 for seamounts in 2021. Trigger to be implemented for the seamounts with no more than 54 t to be taken in any fishing year. * CKMR being investigated.
Blue grenadier	3rd of 3-year MYTAC	2018			1			1	Under-caught and above target. As this is a very consistent stock, the stock assessment could be delayed a year (and perhaps thereafter undertaken every four years rather than three)
Blue warehou	N/A (rebuilding species)	2013							Schedule subject to annual review of fishery indicators
Deepwater flathead	2nd of 3-year MYTAC	2019	1			1			
Deepwater shark east	3rd of 3-year MYTAC	2018 (T4)			5			5	
Deepwater shark west	3rd of 3-year MYTAC	2018 (T4)			5			5	
Elephant fish	2nd of 3-year MYTAC	2020		WOE			WOE		Assessed using weight of evidence approach in Jan 2020.
Flathead	2nd of 3-year MYTAC	2019	1			1			

[1] For some MYTAC scheduling, assumption that decisions of the Commission will be consistent with AFMA management advice

Species	MYTAC in 2021-22 season[1]	Last assessed	2019	2020	2021	2022	2023	2024	AFMA management comment
Gemfish - east	N/A (rebuilding species)	2009			1			1	Schedule subject to annual review of fishery indicators. SERAG - recognised the difficulties in undertaking the scheduled assessment in 2020 given the paucity of data. The RAG recommended investigating options for establishing an alternative index of abundance, given the issues with CPUE.
Gemfish - west	2nd of 3-year MYTAC	2019	4			4			Moved to a Tier 4 for the CTS component of the stock. Stock structure research has revealed evidence of genetically different populations between the east and west (no gene flow), with a mixing of the two stocks in western Bass Strait through to Portland
Gummy shark	1st of a 3-year MYTAC	2020		1			1		The original schedule for assessment in 2019 was delayed to 2020. There was concern of insufficient new data to run an updated assessment in 2019.
Jackass morwong	3rd of 3-year MYTAC	2018			1			1	
John dory	3rd year of 3-year MYTAC	2020		WOE[2]	4				A weight of evidence approach was used in 2020 given uncertainty about the status of the stock during the default reference period and whether CPUE is indexing stock abundance. Scheduled for a Tier 4 in 2021, subject to resolving issues regarding stock status.
Mirror dory	Single year TAC	2020	4	4	4	4	4	4	Annual assessment given the cyclical nature of stock abundance
Ocean perch	1st of 3-year MYTAC	2020		4			4		
Orange roughy - south	N/A (rebuilding species)	2000							The Pedra Branca portion of the orange roughy was assessed as part of the eastern stock.
Orange roughy - east	4th of a 3-year MYTAC	2017			1			1	SESSFRAG agreed to delay the assessment by a year to enable further consideration of natural mortality.
Orange roughy - west	N/A (rebuilding species)	2002							Limited effort, bycatch TAC and RCA
Orange roughy - Cascade Plateau	Single year TAC	2009							Limited data. Acoustic survey scheduled for 2021.
Orange roughy - Albany & Esperence	N/A (rebuilding species)	N/A							Limited effort, bycatch TAC
Oreo smooth - cascade	Long term TAC (catch dependent)	2010							Limited data

[2] Weight of evidence (WOE) adopted in 2020 due to concerns about the CPUE series.

Species	MYTAC in 2021-22 season[1]	Last assessed	2019	2020	2021	2022	2023	2024	AFMA management comment
Oreo smooth - other	Single year TAC	2020	WOE	WOE	WOE	WOE	WOE	WOE	
Oreo basket	1st of a 3-year MYTAC	2020		4			4		
Pink ling	3rd of a 3 year MYTAC	2018			1			1	
Redfish	N/A (rebuilding species)	2017		1			1		Avoidance behaviour by operators and low catches may mean that CPUE is becoming less informative as an index of abundance. Redfish may be assessed in 2020 subject to data availability, the available data will be assessed at the August SESSFRAG data 2020 meeting.
Ribaldo	1st of a 3 year MYTAC	2017		4			4		
Royal red prawn	1st of a 3 year MYTAC	2017		4			4		
Saw shark	1st of a 3 year MYTAC	2017		4			4		
School shark	N/A (rebuilding species)	2018			1				Scheduled for 2021, pending outcomes of independent peer review of close-kin mark recapture assessment. Further consideration required by SharkRAG regarding available data and timing for next assessment.
School whiting	1st of a 3 year MYTAC	2020		1			1		
Silver trevally	Single year	2020		4	4			TBC	Single-year TAC due to concerns about most recent CPUE point
Silver warehou	3rd of 3 year MYTAC	2018			1			1	
			2019	2020	2021	2022	2023	2024	