



Australian Government

Australian Fisheries Management Authority

Annual Research Statement 2022-23

Southern & Eastern Scalefish and Shark Fishery (SESSF)

2021

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 Harrison'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 Harrison's dogfish (Williams <i>et al.</i> 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
	<p>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:</p> <ul style="list-style-type: none"> 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	<p>Improve standardisations:</p> <ul style="list-style-type: none"> 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
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 including length, weight, sex, spawning stage and otolith extraction.	High	TBC (subject to outcome of 2021 survey)	High
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.	Low	High	High

Title	Objectives and component tasks	Evaluation		
		Total cost (\$) (approx. only)	Priority/ ranking	Feasibility
	Note: this priority is only required if it cannot be included under the existing Fish Ageing Services (FAS) contract.			

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)	<ol style="list-style-type: none"> To develop and evaluate multi-species harvest strategies, including reference points and decision rules. 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
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)	<ol style="list-style-type: none"> 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)	<p>Quantify the performance of discard and bycatch reduction strategies in the GABT Sector and SET Sector.</p> <p>Recommendations for reducing discards and increasing NER and boat level profits in the trawl fisheries.</p>	High (\$776,376 total SESSF and GAB)	High	High

<p>Implementation of dynamic reference points and harvest strategies to account for environmentally-driven changes in productivity in Australian fisheries (FRDC project 2019-036)</p>	<ol style="list-style-type: none"> 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 	<p>Low</p>	<p>High</p>	<p>High</p>
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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	<p>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.</p> <p>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.</p>	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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	7 th 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	2 nd of 5-year MYTAC	2019	1					1	GABMAC raised concerns about uncertainty in the model and recent biomass estimates from 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	3 rd 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	2 nd of 3-year MYTAC	2019	1			1			
Deepwater shark east	3 rd of 3-year MYTAC	2018 (T4)			5			5	
Deepwater shark west	3 rd of 3-year MYTAC	2018 (T4)			5			5	
Elephant fish	2 nd of 3-year MYTAC	2020		WOE			WOE		Assessed using weight of evidence approach in Jan 2020.
Flathead	2 nd 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	2 nd 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	1 st 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	3 rd of 3-year MYTAC	2018			1			1	
John dory	3 rd 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 and CPUE.
Mirror dory	Single year TAC	2020	4	4	4	4	4	4	Annual assessment given the cyclical nature of stock abundance
Ocean perch	1 st 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	4 th 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 & Esperance	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	1 st 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	3 rd 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	1 st of a 3 year MYTAC	2017		4			4		
Royal red prawn	1 st of a 3 year MYTAC	2017		4			4		
Saw shark	1 st of a 3 year MYTAC	2020		4			4		
School shark	N/A (rebuilding species)	2018						1	
School whiting	1 st 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	3 rd of 3 year MYTAC	2018			1			1	
			2019	2020	2021	2022	2023	2024	