Australian Government
Australian Fisheries Management Authority

Southern and Eastern Scalefish and Shark Fishery
Shark Resource Assessment Group (SharkRAG)

Meeting minutes

Date: 16 January 2020

Teleconference

Attendees

Name	Membership
Mr Sandy Morison	Chair
Dr Julian Morison	Economics Member
Dr Ian Knuckey	Scientific Member
Dr Charlie Huveneers	Scientific Member
Dr Robin Thomson	Scientific Member
Jamie Papas	Industry Member
Craig Harris	Industry Member
Kyrikos Toumazos	Industry Member
Dr Leonardo Guida	Conservation Member
Brodie Macdonald	AFMA Member
Maxwell Bayly	Executive Officer
Fiona Hill	AFMA Observer
Ross Bromley	Invited Participant
Mr James Woodhams	ABARES Observer

Meeting Minutes

1 Preliminaries

1.1 Introduction and apologies

The Chair opened the meeting and welcomed Members, Invited Participants and Observers.

Members were advised the meeting was being recorded to assist with the preparation of the meeting minutes.

The Chair recorded apologies from industry member Leigh Castle.

The Chair recommended going through the members and giving a brief introduction as this was the first meeting of the new members. SharkRAG members introduced themselves giving a brief background to their work and previous experience.

1.2 Member Obligations

The AFMA member gave a brief overview of the expectations of members of Resource Assessment Groups (RAGs). AFMA reminded SharkRAG members they were required to familiarise themselves with Fisheries Management Papers and Fisheries Administration Papers that had been sent around prior to the teleconference. AFMA reminded RAG members discussions, papers and advice formed from RAG meetings are confidential until finalised and published via meeting minutes on the AFMA website. AFMA added there will be further detail at the first face to face meeting of SharkRAG if there are additional questions. AFMA highlighted the RAG's role to provide advice that is well justified and informed to the AFMA Commission based on comprehensive scientific evidence.

The Chair invited members to raise questions surrounding obligations or processes.

Mr Toumazos raised concerns to ensure member's conflicts of interest are captured in their entirety. Mr Toumazos noted conflicts of interests are often affiliated with industry members and stressed the potential of indirect conflicts of interest for scientific members.

The Chair agreed with the industry member's comments and directed members to Fisheries Administration Paper 12 to ensure comprehensive understanding surrounding conflict of interests.

1.3 Declaration of interests

The Chair discussed the process for the teleconference for members who hold a conflict of interest for an Agenda item. Members with a conflict of interest will be asked to leave the phone call and may re-join the meeting once the remaining members have reached a decision.

Mr Papas noted industry members will have a conflict of interest for most Agenda items. The Chair noted if agreed upon by the RAG, members will be available for discussion but not the formulation of advice.

The Chair asked participants to declare any interests in any Agenda Item to be considered by the RAG:

- Scientific member Dr Robin Thompson noted a conflict of interest for Agenda item 3.
- Industry members and invited participant Mr Bromley noted conflict of interest in Agenda item 2.
- Conservation member Dr Guida noted no conflicts of interest with respect to the Agenda items. However, given the Australian Marine Conservation Society (AMCS) current shark campaign and the redlisting of school shark on their sustainable seafood guide, the RAG found it appropriate that Dr Guida is excluded from forming recommendations for Agenda item 3.

The RAG discussed conflicts of interest for Agenda item 3 noting it was an industry association that commissioned the review of the original close kin mark recapture report. The Chair suggested industry members, Dr Guida and Dr Thomson take part in discussion of Agenda item 3 but are not involved in the formation of any advice. The RAG failed to come to an agreed stance regarding participation in Agenda item 3 for industry members, Dr Guida and Dr Thomson. Following the process outlined in FAP12 where a RAG does not reach a consensus on such matters, the Chair made the decision to allow industry members, Dr Guida and Dr Thomson to be present for discussion but not for formation of advice for Agenda item 3.

Each participant declaring an interest left the teleconference in turn while the RAG considered their interests. The RAG noted the conflict of interest and, recognising the participant's knowledge and valuable contribution to the discussions, agreed participants should participate in all Agenda Items, but not make any recommendations for items for which there was a declared interest.

2 RBC Recomendations

The AFMA member introduced the paper and background to Agenda item 2, noting SharkRAGs oversight of saw shark, gummy shark school shark and elephant fish taken in the Southern and Eastern Scalefish and Shark Fishery (SESSF). The RAG noted:

- the current status of the RBCs for saw shark, gummy shark and school shark, all of which are on multiple year TACs (MYTACs).
- SharkRAG in 2018 and the Southern and Eastern Scalefish and Shark Fishery Resource Assessment Group (SESSFRAG) in 2019 agreed to defer the planned 2019 stock assessment for gummy shark pending additional biological data to be considered in the assessment. The gummy shark assessment is now scheduled to be undertaken in 2020.

AFMA introduced the issues surrounding the assessment of elephant fish noting an assessment was last accepted was 2015.

- At the SharkRAG 2017 meeting, SharkRAG members were not supportive of the assessment options provided and recommended the grouping of elephant fish with other species in the SESSF that were ranked difficult to assess.
- The SESSFRAG Technical Working Group (TWG) met in February 2019 to discuss hard to assess species. For problematic species being assessed using Tier 4 or Tier 5 assessments, the TWG recommended an interim approach, pending the outcomes of the new harvest strategy.
- The TWG recommended setting a TAC based on the existing TAC, subject to sustainability concerns of SESSFRAG and consideration of whether the TAC is restricting catches of that species.
- Ongoing annual monitoring of available fishery indicators are still used, including the results of any ongoing Ecological Risk Assessments (ERA). If concerns are raised around fishing mortality, management measures other than output controls should be considered to constrain catches.
- SESSFRAG recomended that elephant fish should be assessed as an ERA species due to the high discard rates of elephant fish in the SESSF.
- SESSFRAG recommended the setting an RBC for elephant fish based on current catch levels.

Mr Papas raised concerns over the quota price of elephant fish being a major driver for the discard rates of elephant fish. Mr Papas stated it is not economically viable to land elephant fish as there may be situations where the quota price is equal to the costs of landing elephant fish. Mr Papas questioned the potential of AFMA buying back elephant fish quota. The AFMA Member suggested a buy back or surrender of quota SFR was unlikely and consideration of changes to quota species will likely be driven by the categorisation of species under the new harvest strategy.

The Chair invited members to comment on Agenda item 2:

- Scientific members and the Conservation member questioned if there was additional information for consideration other than the ERA low risk ranking, noting difficulties of making a recommendation based on very limited information available to SharkRAG

members. AFMA noted the weight of evidence approach endorsed by the TWG and SESSFRAG which include ERA results, CPUE data and catch relative to the TAC.

- Dr Knuckey suggested comprehensive recreational catch data should be highly sought after for this assessment. Dr Knuckey emphasised the need for an RBC that would not promote dicards in the fishery.

- Mr Papas reiterated his previous concerns based on the quota price of elephant fish being the major driver for discard rates. Mr Papas also highlighted there is not a reporting method available to fishers to differentiate between live and dead discards and this would affect any outcomes of assessments that use this data.

- The AFMA member agreed to distribute information on the processes followed by SESSFRAG and information it considers as part of its annual review of data for SESSF species. AFMA also noted information will be captured in the meeting minutes and a species summaries document which will be populated post meeting and approved by SharkRAG members.

- Mr Bromley noted no concerns however highlighted the RAG had previously recomended TACs rather than RBCs to include discards as well.

- Mr Woodhams agreed with concerns raised by Dr Huveneers. Mr Woodhams emphasised the need for the RAG to consider what information is needed to move forward with the assessment of difficult to assess species.

SharkRAG agreed to maintain the TAC at 114 tonnes for three years subject to annual review by SESSFRAG and SharkRAG. The under catch and over catch components were agreed to remain at 10%.

Dr Thomson requested an addition to the research needs to examine why the quota/landing price ratio for this species is so high. Dr Knuckey noted a CSIRO PhD student was examining this phenomenon across a range of species and had red flagged elephant fish as a case study.

Action Item 1 – AFMA to distribute information on the processes followed by SESSFRAG and information it considers as part of its annual review of data for SESSF species.

3 School shark review and next steps

The AFMA member introduced the Agenda item noting the paper provides context for new members regarding recommendations for the current fishing season. The RAG noted that:

- the Southern Shark Industry Association (SSIA) initiated a fisheries independent review of the close of kin stock assessment in 2019.
- CSIRO provided a formal response to the review in late 2019.
- AFMA intends on intiating its own review pending further information on the FRDC review process.

AFMA sought advice from SharkRAG regarding how the review should be managed and what information is to be considered. AFMA also requested advice from SharkRAG surrounding the recruitment of an external expert on close kin technology for the review.

The Chair invited members to comment on Agenda item 3:

- Dr Thomson enquired whether RAG members had seen the original close-kin mark recapture report. AFMA noted that the report had not been distributed to the RAG and agreed to distribute the report out of session. Dr Thomson suggested the close kin work may be too technical for SharkRAG to consider and if the RAG are in doubt a third party should be considered by SharkRAG to undertake the review.

- Science members, the economics member and the AFMA and ABARES observers agreed a third party should be considered by SharkRAG to perform an independent review of the original report, taking into account the Cordue Review and response from the CSIRO.

- Ms Hill sought clarification from the RAG as to whether it was comfortable with the FRDC process to be the reviewer or whether the RAG was seeking an external third party reviewer. The Chair suggested that given the anonymous nature of the FRDC reviewer, the RAG may not agree that their expertise is sufficient for the review. Ms Hill noted once the review is complete FRDC will release the identity of the reviewer.

- Dr Knuckey suggested if the FRDC process is to be used that the RAG should ensure FRDC understands the importance of this review and that the review is well resourced. Dr Knuckey noted the FRDC process for the selection of a reviewer is often based on availability of reviewers that can work in the general area and this may result in a reviewer who does not have the necessary expertise for this review. Dr Thomson noted that it is uncertain whether the FRDC reviewer has seen the response to the original review by Patrick Cordue.

- Dr Thomson, Dr Guida, Mr Bromley and industry members left the teleconference for the remainder of the teleconference and were informed they will receive correspondence out of session with the outcomes of Agenda item 3.

The Chair summarised the discussion stating there is support for the engagement of a third party to review the results of the original report. This review is not to be conditional on the results from the FRDC review. The Chair noted CSIRO have drafted a list of potential candidates and CCSBT

had used a panel for similar work in the Southern Bluefin Tuna fishery that could be an option for the review.

The Chair invited remaining RAG members to provide further comments on the next steps for the school shark review process.

The remaining members agreed to consult an independent third party to review the original report. It was recommened that the RAG will play a role in crafting terms of referencing and provide advice on who the person(s) will be for this review. The RAG agreed that AFMA should develop the terms of reference for the review and that they will be distributed out-of-session via email.

The RAG noted difficulties in utilising the FRDC process due to the lack of information surrounding the reviewer and the uncertainty regarding their expertise in the close kin mark recapture field.

Ms Hill suggested that alongside the review there was a role for the RAG in reviewing the assumptions that went into the close-kin assessment model. It was agreed that AFMA would prepare a summary table of these assumptions in conjunction with CSIRO for consideration at the next face-to-face meeting of the RAG.

Action item 2 – AFMA to distribute the original close-kin mark recapture report to SharkRAG members

Action item 3 – AFMA and CSIRO to prepare a summary able of assumptions that went into the original close-kin assessment model.

Signed (Chairperson):

Date:

Attachments

Attachment A: SharkRAG 1 2020 final agenda
Attachment B: Declarations of interest
Attachment C: Action items
Attachment D: Species summarries

Agenda – 16 January 2020

Day 1: 9:30 – 11:30

1	Preliminaries		
1.1	Welcome and apologies	Chair	For Noting
1.2	Member obligations	Brodie Macdonald	For Noting
1.3	Declarations of interest	Chair	For Noting
2	RBC recommendations	SharkRAG	For Recommendation
3	School shark review and next steps	SharkRAG	For Discussion

Attachment B – Delarations of interest

Member	Interest declared
Sandy Morison	Director of Morison Aquatic Sciences. Chair of SharkRAG. Member of SESSFRAG. 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. No pecuniary or other interest in the SESSF.
Robin Thomson	CSIRO, Assessment scientist. Acquiring funding for research purposes.
Charlie Huveneers	Associate Professor and research scientist. Potential interest in funding for research. No pecuniary interest or otherwise.
Ian Knuckey	**Positions:** Director – Fishwell Consulting Pty Ltd Director – Olrac Australia (Electronic logbooks) Deputy Chair – Victorian Marine and Coastal Council Chair / Director – Australian Seafood Co-products (seafood waste) 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's Prawn Fishery Management Advisory Committee Scientific Member – Tropical Tuna Resource Assessment Group Scientific Member – SESSF Resource Assessment Group **Current projects:** AFMA 2020/0807 Bass Strait Scallop Fishery Survey – 2020-22 FRDC 2017/069 Indigenous Capacity Building FRDC 2016/116 5-year RD&E Plan for NT fisheries and aquaculture Traffic Project Shark Product Traceability FRDC 2018/021 Development and evaluation of SESSF multi-species harvest strategies FRDC 2017/014 Informing structural reform of South Australia's Marine Scalefish Fishery NT Fisheries Design and implementation of a tropical snapper trawl survey Sea Cucumber Ass. Design and implementation of a sea cucumber dive survey FRDC 2019-072 A survey to detect change in Danish Seine catch rates of Flathead and School Whiting resulting from CGG seismic exploration. FRDC 2019-129 Interactions with marine mammals in the SESSF Shark Gillnet Fishery – exploring the possibility and viability of gillnet boats converting to a hook fishery in Bass Strait
Leigh Castle	Tasmanian shark hook, scalefish hook and tuna minor line fisher. Owns SESSF quota and vessel statutory fishing rights. Has a declared interest in shark hook interests and RBC recommendations.

Kyri Toumazos	South Australia/Bass Strait shark fisher, boats fishing with hooks and gillnets. SESSF quota holder. Southern Rock Lobster Board CEO. Declared interests in RBCs.
Jamie Papas	Gillnet fisher and SFR holder. Board Director San Remo Fishermen's Co/Op
Julian Morison	Director, Kuti Co Pty Ltd – SA Pipi quota holder Director, BDO Advisory (SA) Pty Ltd - current contracts with SA & Qld state governments collecting fisheries economic data Member, SA Snapper Management Advisory Committee (PIRSA) Economics member, Scallop Fishery Resource Assessment Group (AFMA) Member, Economics Working Group (AFMA) Member, Human Dimensions Research subprogram (FRDC) Principal & co-investigator on several FRDC research projects
Craig Harris	Gillnet fisher and SFR holder.
Leonardo Guida	Conservation member and lead shark conservation campaigner for the Australian Marine Conservation Society. No pecuniary interest or otherwise.
Brodie Macdonald	AFMA member. No interest pecuniary or otherwise.
Max Bayly	AFMA EO. No interest pecuniary or otherwise.
Ross Bromley	Undertakes contracts as an independent consultant for the Southern Shark Industry Alliance and Girella Fisheries Consulting.
James Woodhams	ABARES Senior Scientist. Potential interest in funding for research projects.

Attachment C - Action items

SharkRAG 1 2020

N	Action item	Member to action	Status
1	AFMA to distribute information on the processes followed by SESSFRAG and information it considers as part of its annual review of data for SESSF species.	AFMA	**Completed** – Distributed to SharkRAG members with draft meeting minutes on 10 February 2020.
2	AFMA to distribute original close-kin mark recapture report to SharkRAG members	AFMA	**Completed** – Distributed to SharkRAG members via email on 22 January 2020
3	AFMA and CSIRO to prepare a summary able of assumptions that went into the original close-kin assessment model.	AFMA /CSIRO	**Ongoing** – to be completed before the next face-to-face meeting of SharkRAG

Elephant fish (Callorhinchus milii)

Ken Graham DPI Fisheries (1984)

Assessed as an 'ERA' species, last assessed by SharkRAG 2020.

Summary			
Stock Structure	Little is known about stock structure from an assessment and management perspective. Their biology suggests some potential for regional management of stocks. However it is currently assessed as a single stock.		
Stock status against reference points and trend	Following the advice from the SESSFRAG Technical Working Group (TWG), at its August 2019 data meeting, SESSFRAG recommended assessing elephant fish as an 'ERA species' recognising issues with the Tier 4 assessment due to high discard rates. This method sets a TAC based on the existing TAC, subject to sustainability concerns of the RAG and consideration of whether the TAC is restricting catches of that species or any other species. The SESSFRAG TWG recommended this method be used as an interim approach pending the outcomes of the multi-species harvest strategy project.		
ABARES most recent assessment (2018)	**Biomass** Not overfished	**Fishing Mortality** Not subject to overfishing	
GVP Figures (2017-18 season)	**GVP** <$0.10 million	**% Fishery GVP** 0.09%	
Is a MYTAC in place this season?	Yes	**Have breakout rules been triggered?**	N/A

Assessment Summary	
Tier Level	Assessed using ERA results and weight of evidence approach.
Stock indicator trends	SAFE (2019) Low risk ($F_{CUR} < F_{MSM}$)

Key model technical assumptions/ parameters	N/A Tier 4 Model no longer used.
Significant changes to data inputs	N/A Tier 4 Model no longer used.
RAG Comments on data	At its February 2018 meeting, considered that neither Tier 4 assessment presented (including or excluding discards) were suitable for providing RBC advice. The RAG rejected the assessments because of concerns about the: • lack of a recent and reference period discard information, and how discard rates are estimated • ability to factor discarding appropriately into CPUE • uncertain estimates of recreational catch, which are a significant proportion of either RBC. The RAG felt that in the application of either Tier 4 method, a prohibitively low TAC would result that would be driven by the assumptions about discards and recreational catch, whereas the CPUE itself suggests that stocks are stable at or above target levels. At its October 2018 meeting, SharkRAG was asked to provide 2019-20 RBC advice for elephant fish. SharkRAG deferred updating the 2017 Tier 4 assessment until the SESSF TWG had provided advice on species identified as 'difficult to assess'. At its January 2020 meeting, SharkRAG noted the "low risk" status of elephant fish from the ERA for the shark gillnet sub-fishery 2012-2016. However, SharkRAG expressed concerns regarding their ability to make a justified recommendation based on limited data other than the ERA results for the species.
RAG Comments on assessment	After noting limited sustainability concerns and after consideration of whether the TAC is restricting catch of the species, SharkRAG 1 2020 recommended maintaining the TAC at the current level of 114 t for three years.
Projected Biomass	N/A

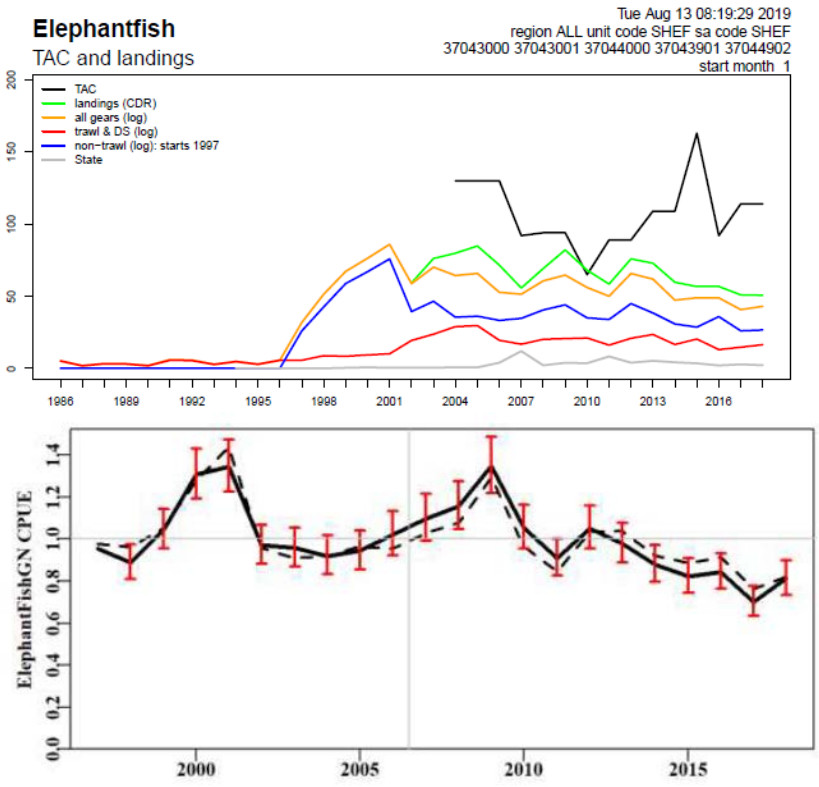
RAG Recommendations		
Recommended Biological Catch (2020/21)	114 t	**Undercatch:** 10% **Overcatch:** 10% **Discount Factor**: 15 % (A discount factor is applied to tier 4 species)

Is a MYTAC recommended for future seasons? *Indicate whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a rollover of catch)*	SharkRAG 1 2020 recommended an RBC at the current TAC level of 114 t for three years.
Probability of RBC (or other levels of catch) causing a decline below limit reference under proposed management *Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).*	N/A
Research Catch Allowance *Included/Addition to TAC*	0 t
Implications for companion species / TEPs / multi-species fisheries	N/A

Catch and TAC						
Assessment Year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Tier / MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	CPUE above target	CPUE above target	Not assessed	Not assessed	Not assessed	Not assessed
SESSF Season	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
RBC (t)	116	357	306	306	306	306
Agreed TAC	109	163	92	114	114	114
TAC after Unders/Overs	117.43	172	108	122	122	122
% TAC caught	52%	32%	59%	38%	36%	22%*

* Current as of 10 February 2020

Catch Trends



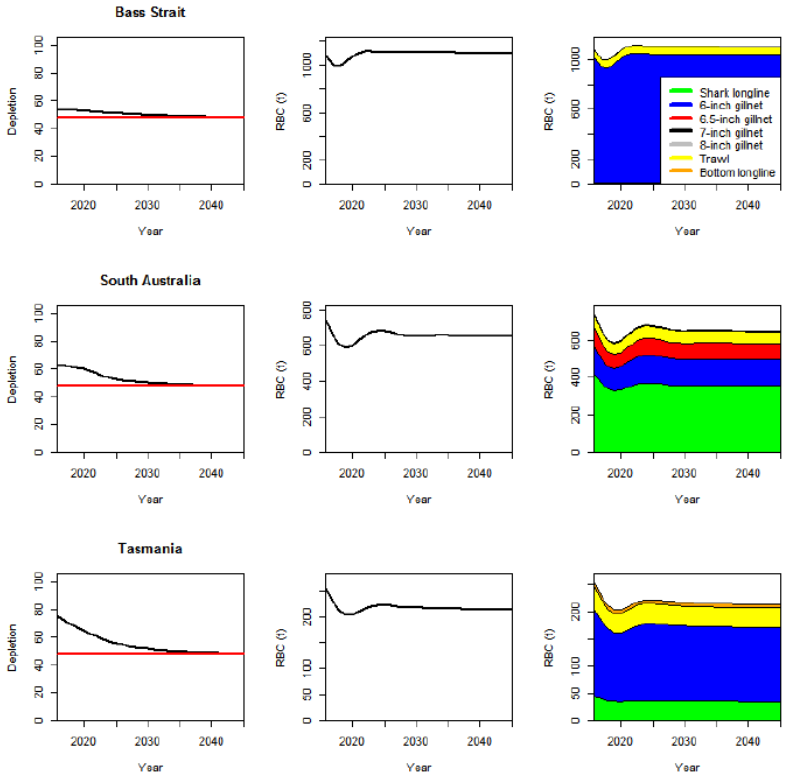
Gummy Shark (Mustelus antarcticus)

Fisheries Research & Development Corporation (2012)

Tier 1: Last assessed by SharkRAG in 2016

<table>
<tr><th colspan="4">Summary</th></tr>
<tr><td>Stock Structure</td><td colspan="3">Gummy shark is endemic to southern Australia. It is considered a single genetic stock across the SESSF extending from Bunbury in Western Australia to Jervis Bay in NSW. The single genetic stock is assessed as three separate sub-stocks within broad regions on the continental shelf of Bass Strait, Tasmania and South Australia...</td></tr>
<tr><td>Stock status against reference points and trend</td><td colspan="3">
<table>
<tr><th>Current (2016)</th><th>Target</th><th>Limit</th></tr>
<tr><td>Bass Strait: 0.59% B_0
Tasmania: 0.83% B_0
South Aust: 0.69% B_0</td><td>48% B_0</td><td>20% B_0</td></tr>
</table>
Limit reference point is 20 per cent of unfished biomass (pup production is used as a proxy for breeding biomass)
Target reference point is 48 per cent of unfished biomass (pup production is used as a proxy for breeding biomass)
The 2016 assessment estimates that each of the three sub-stocks are above the target reference point.
</td></tr>
<tr><td>ABARES most recent assessment (2018)</td><td>Biomass
Not overfished</td><td colspan="2">Fishing Mortality
Not subject to overfishing</td></tr>
<tr><td>GVP Figures (2017-18 season)</td><td>GVP
$17.1 million</td><td colspan="2">% Fishery GVP
22.5 %</td></tr>
<tr><td>Is a MYTAC in place this season?</td><td>Yes</td><td>Have breakout rules been triggered?</td><td>No</td></tr>
</table>

Assessment Summary	
Tier Level	Level 1
Stock indicator trends	All three assessment stocks remain above target, with no evidence that stocks were ever below the management target.
Key model technical assumptions/ parameters	The model uses three management regions which are assessed simultaneously. Differing availability to gear by age is incorporated into model reflecting the varying ability to target gummy shark. Although this approach improves fits to data, for the next gummy shark assessment, SharkRAG agreed to investigate estimating selectivity separately for each region and allowing it to be a more flexible form. This may allow the differing availability function to be removed from the assessment.
Changes to model structure/assumptions	The following changes were made to the 2013 model: • catches by various gear types are assumed to occur simultaneously rather than sequentially • the 'hook fleet' is now separated into shark longline, trawl, and scalefish longline gear type • allowance is made for age reading error.
Significant changes to data inputs	The following data were added to the 2016 model: • landings for the seven gear types included in the assessment • length composition data for the seven gear types • age composition data for 1995, 1997, 2002 and 2003 • updated catch rate data.
RAG Comments on data	Standardised CPUE from South Australia is no longer used in the assessment. At the 2018 SESSFRAG meeting there was concern that there was insufficient new data (poor spatial coverage) to run an updated assessment for gummy shark on 201. The RAG also noted that there are issues with calculation of standardised CPUE by shot and work is being undertaken on changing this to be calculate by metre of net set in 2049. This was considered by SharkRAG in October 2018, Noting that a crew collected data program as introduced in 2018 by the Southern Shark Industry Alliance and that work was underway to use electronic monitoring data for discard estimates, SharkRAG provided advice to consider delaying the assessment to at least 2020. This was supported at the SESSFRAG 2019 data meeting.

RAG Comments on assessment	SharkRAG provided advice to consider delaying the assessment to at least 2020. This recommendation was supported at the SESSFRAG 2019 data meeting. Previously the state allocations agreed under the shark memorandum of understanding with Southern Australia, Victoria and Tasmania have been deducted from the RBC. However in 2018 SharkRAG recommended deducting the weighted average state catch from the RBC, as is the case for other SESSF species. This approach was introduced for the 2019-20 fishing year.
Projected Biomass (including confidence intervals)	 Figure 19. Time-trajectories of depletion (pup production relative to unfished pup production) (left panels), Recommended Biological Catch (center panels), and Recommended Biological Catch by gear-type (right panels) for projections based on Model 5D (the reference case model).

RAG Recommendations		
Recommended Biological Catch (2020/21)	1775 t	**Undercatch:** 10% **Overcatch:** 10% **Discount Factor**: 0%
Is a MYTAC recommended for future seasons? *Indicate whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a rollover of catch)*	No, to be assessed in 2020.	

Probability of RBC (or other levels of catch) causing a decline below limit reference under proposed management *Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).*	Alternative Catch Scenarios: The RAG considered 10 year projections where catch is taken by different gear types (pup production as a percentage of unfished pup production) Rag noted that even where all the RBC that even where all the RBC in South Australia (743.8t is taken by longline, the stock remains above target to 2026 (case 2). Even if longline catch in South Australia increased to the maximum historic catch, all gear the stock would remain above target to 2021.

Table 11. Results of 10-year projections (pup production as a percentage of unfished pup production) under various scenarios regarding future catches.

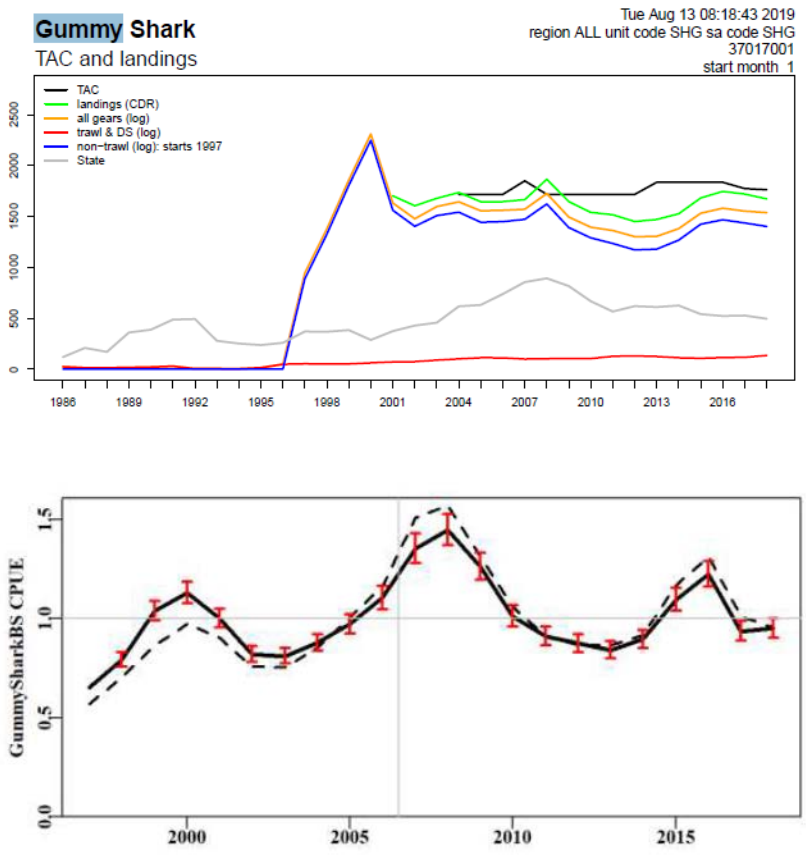
Region	2017	2019	2021	2026
Base case: catches equal RBCs				
Bass Strait	53.2	53.0	52.4	50.9
South Australia	62.5	61.2	58.5	51.8
Tasmania	71.7	66.7	62.5	54.7
Case 2: All catch by shark longline in South Australia				
Bass Strait	53.2	53.0	52.4	50.9
South Australia	61.5	59.1	55.8	48.1
Tasmania	71.7	66.7	62.5	54.7
Case 3: Longline catch in South Australia increases so total catch equals maximum historical catch				
Bass Strait	53.2	53.0	52.4	50.9
South Australia	62.5	58.5	52.3	42.8
Tasmania	71.7	66.7	62.5	54.7
Case 4: All catch by 6.5" gillnets				
Bass Strait	53.2	53.1	52.4	50.9
South Australia	62.9	62.4	60.3	53.4
Tasmania	71.9	67.2	63.1	55.1
Case 5: All catch by shark longline				
Bass Strait	51.9	50.0	48.9	48.0
South Australia	63.4	63.2	61.3	56.8
Tasmania	71.3	66.2	62.4	56.0
Case 6: All catch by scalefish longline				
Bass Strait	50.3	46.6	44.2	40.1
South Australia	61.5	59.1	55.8	48.1
Tasmania	69.0	61.4	56.4	47.7
Case 7: Total catch = 2052t; split by region and gear according to 2015 catch				
Bass Strait	51.8	47.1	41.9	34.2
South Australia	63.9	63.9	61.8	57.2
Tasmania	75.3	76.9	79.3	82.3
Case 8: Total catch = 1961t; split by region and gear according to 2015 catch				
Bass Strait	52.1	48.2	43.9	37.6
South Australia	64.1	64.6	63.1	59.2
Tasmania	75.4	77.2	79.9	83.3
Case 9: Total catch = 1922t; split by region and gear according to 2015 catch				
Bass Strait	52.2	48.7	44.7	39.0
South Australia	64.2	64.9	63.6	60.1
Tasmania	75.5	77.4	80.1	83.8

Research Catch Allowance *Included/Addition to TAC*	0 t
Implications for companion species / TEPs / multi-species fisheries	The gillnet sector interactions with Australian sea lions in waters off South Australia. Interactions are mitigated by using trigger limits that close spatial zones for 18 months if an interaction occurs. Dolphin interactions are managed through the GHAT Dolphin Strategy which sets performance criteria for individual operators To reduce targeting of school shark, GHAT operators (excluding scalefish hook) must limit their school shark catch to 20% of their gummy shark catches.

Catch and TAC						
Assessment Year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Tier / MYTAC	Tier 1	MYTAC	MYTAC	Tier 1	MYTAC	MYTAC
Stock Status	>BTARG	>BTARG	>BTARG	>BTARG	>BTARG	>BTARG
SESSF Season	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
RBC (retained)	2010	2010	2010	1961	1961	1961
Agreed TAC	1836	1836	1836	1774	1763	1785
TAC after unders/overs	1986	1978	1935	1916	1871	1897
% TAC caught	77%	91%	87%	91%	90%	66%*

* Current as of 10 February 2020

Catch Trends



Sawshark (*Pristiophorus spp*)

CSIRO national Fish Collection (2009)

Tier 4: last assessed by SharkRAG in 2017

<table>
<tr><th colspan="2">Summary</th></tr>
<tr><td>Stock Structure</td><td>Three endemic species of sawsharks occur off southern Australia, but their distributions have not been described precisely. Common Sawshark (Pristiophorus cirratus) is reported to range from Jurien Bay in WA to Eden in NSW, including Tasmania, to depths of 310 m.

Southern Sawshark (P. nudipinnis) is reported to range from the western region of the Great Australian Bight to eastern Gippsland in Victoria, including Tasmania, to depths of 70 m. The Eastern Sawshark (Pristiophorus sp. A) is reported to range from approximately Lakes Entrance in Victoria to Coffs Harbour in NSW at depths of 100–630 m (Last and Stevens 1994).

Little is known of stock structure or movement rates.

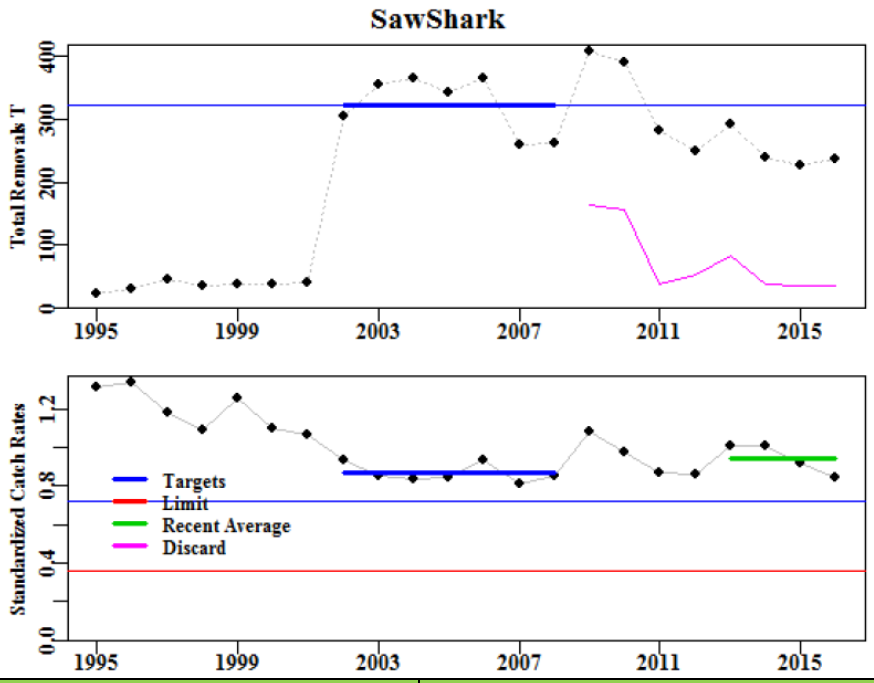
For assessment purposes, all sawsharks south of the Victoria–NSW border are assumed to be Common Sawshark and Southern Sawshark, whereas those north of this border are assumed to be Eastern Sawshark.</td></tr>
<tr><td>Stock status against reference points and trend</td><td>Tier 4 species use CPUE targets as a proxy of biomass targets.

Shark RAG reviewed the target reference point for sawshark and supported an MSY proxy target of B_{40}. This was based on consideration that sawshark is not targeted, it is considered sustainable and it is a secondary commercial species contributing about 1% to GVP. The limit reference point is 20% of the B_0 proxy.

<table>
<tr><th>Parameter</th><th>Value</th><th>Parameter</th><th>Value</th></tr>
<tr><td>Reference Years</td><td>2002-2008</td><td>Scaling</td><td>1.6098</td></tr>
<tr><td>CE_Targ</td><td>0.7236</td><td>Last Year’s TAC</td><td>433</td></tr>
<tr><td>CE_Limit</td><td>0.3618</td><td>C_{targ}</td><td>322.13</td></tr>
<tr><td>CE_Recent</td><td>0.9443</td><td>RBC</td><td>518.555</td></tr>
<tr><td>Wt_Discard</td><td>39.714</td><td></td><td></td></tr>
</table>

Stock status: in the 2017 Tier 4 assessment the recent average standardized CPUE-based proxy for biomass was above the target limit reference point.

The standardised trawl CPUE which is used in a Tier 4 assessment has been relatively flat. In the 2017 Tier 4 assessment, the recent average standardised CPUE-based proxy for biomass is above the target reference point.</td></tr>
</table>

			
ABARES most recent assessment (2018)	**Biomass** Not overfished	**Fishing Mortality** Not subject to overfishing	
GVP Figures (2017-18 season)	**GVP** $0.63 million	**% Fishery GVP** 0.83%	
Is a MYTAC in place this season?	Yes	**Have breakout rules been triggered?**	No

Assessment Summary	
Tier Level	Tier 4
Stock indicator trends	
Key model technical assumptions/ parameters	Sawshark catches have been split primarily between gillnets and trawls (with a lesser quantity taken by Danish seine). The standardized gillnet-CPUE has been declining since 2004, with slight increases in recent years, although it does not account for the level of discarding that occurs. By contrast, the standardized trawl-CPUE has been relatively flat. Catches by trawl are now almost as high as those taken by gillnets, illustrating the uncertainty in this analysis and providing some evidence that there may be an element of avoidance by gillnet fishers.
Changes to model structure/assumptions	None
Significant changes to data inputs	None
RAG Comments on data	None

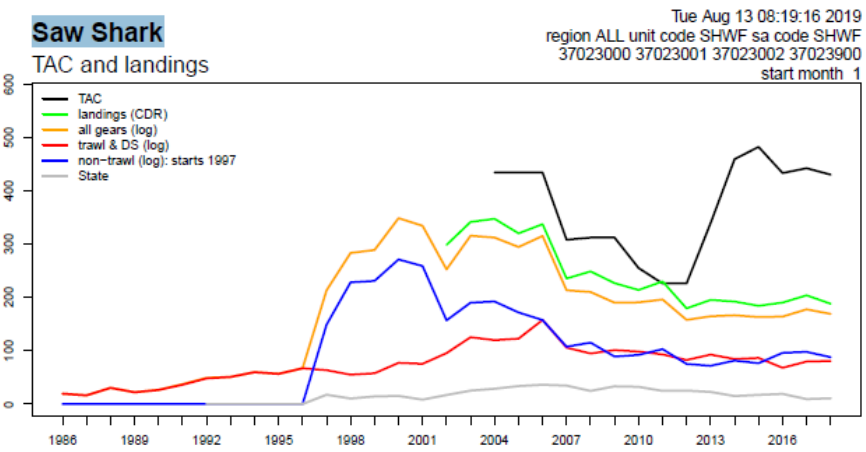
RAG Comments on assessment	N/A

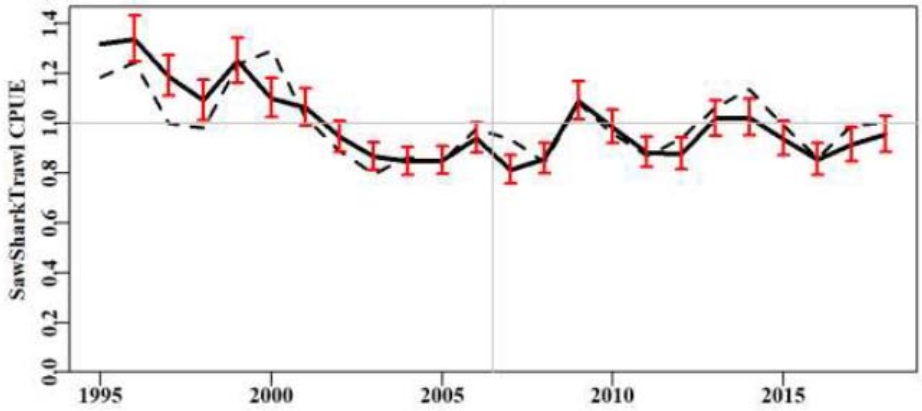
RAG Recommendations		
Recommended Biological Catch (2020-21)	430 t	**Undercatch:** 10% **Overcatch:** 10% **Discount Factor**: 15%
Is a MYTAC recommended for future seasons? *Indicate whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a rollover of catch)*	Yes, continue with the third year of a 3-year MYTAC.	
Probability of RBC (or other levels of catch) causing a decline below limit reference under proposed management *Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).*	N/A	
Research Catch Allowance *Included/Addition to TAC*	0 t	
Implications for companion species / TEPs / multi-species fisheries		

Catch and TAC						
Assessment Year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Tier / MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	CPUE between target and limit	CPUE between target and limit	Not assessed	Not assessed	CPUE above target	Not assesed
SESSF Season	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
RBC	459	600	455	535	519	519
Agreed TAC	459	482	433	442	430	430
TAC after unders/overs	487.66	522	478	482	472	472
% TAC caught	51%	36%	42%	42%	38	27%*

* Current as of 10 February 2020

Catch Trends





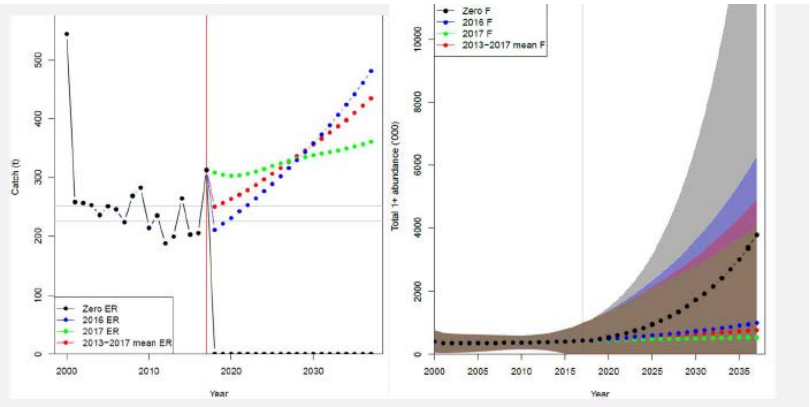
Schoolshark (*Galeorhinus galeus*)

Fisheries Research & Development Corporation (2012)

Tier 1 under a stock rebuilding strategy. Last assessed by SharkRAGSharkRAG in 2018.

Summary			
Stock Structure	Tagging and genetic data shows some evidence for one well mixed stock. However, earlier data suggests there could be an east/west divide in stocks. This is supported by research documenting a collapse in the eastern part of the fishery around Tasmania and Bass Strait. After this collapse a fishery subsequently established in the west suggesting a reproductively isolated stock.		
Stock status against reference points and trend	Target reference point is 48 per cent of the unfished biomass (pup production is used as a proxy for breeding biomass). Limit reference point is 20 per cent of the unfished biomass (pup production is used as a proxy for breeding biomass). Gillnet CPUE is not considered a reliable index of abundance as school shark are actively avoided by gillnet fishers. In 2016 SharkRAG noted that there are continuing positive signs suggesting that the school shark is rebuilding. This is based on an overall increasing trend in trawl CPUE (since 2003). This is consistent with advice from industry that school shark, particularly juveniles, are in relatively high abundance.		
ABARES most recent assessment (2018)	**Biomass** **Overfished**	**Fishing Mortality** **Uncertain**	
GVP Figures (2017-18 season)	**GVP** $1.87 million	**% Fishery GVP** 2.46 %	
Is a MYTAC in place this season?	No	**Have breakout rules been triggered?**	No

Assessment Summary	
Tier Level	Tier 1

Stock indicator trends	The CK model provides an estimate of current absolute abundance with trend back to 2000. It does not provide an estimate pf depletion from B_0. The CK model indicates that the stock had recovered slightly during the period from 2000-2017. 
Key model technical assumptions/ parameters	The assessment model assumes that there is one well mixed stock.
Changes to model structure/assumptions	The close kin assessment model considers only one region, one population, starts in 2000 and does not allow (or need to take account of) movement between regions) because there is only one region.
Significant changes to data inputs	
RAG Comments on data	The RAG accepted the close kin assessment model noting high confidence in the absolute estimate of abundance produced by the mode, but accepting lower confidence in the estimates of trend.

RAG Comments on assessment	Assessments (since 1991) have consistently estimated the school shark population to be below the limit reference point of 20 per cent of unfished levels. The RAG recommended setting an incidental catch TAC based on projections using the average fishery mortality rates over the last five years. The rate taking into account increasing stick size due to rebuilding give total fishing morality estimate of 256t in 2019-20, 263 t in 2020-21 and 270t in 2021-2022. This level of fishing mortality rate would lead to an initial reduction in stock size before recovery due to effect of age class inputs into the model. The base case model shows a population that is relatively small compared with that estimated by the previous stock assessment model. However the model is inconsistent with the catches taken during the 1990s which brings into question whether or not the stock from which the close kin sample was taken is different from the stock that sustained catches prior to 2000. That is, the stock being assessed may have been a different smaller stock than the stock that was historically fished. Any future consideration of B_o and associated reference points will need to take this into account. In 2019, the Southern Shark Industry Alliance (SSIA) commissioned an independent review of the 2018 stock assessment that was followed by a formal response from CSIRO in late 2019. The Fisheries Resource and Development Corporation (FRDC) is also initiating a review of the original stock assessment report, as part of its normal project review process. SharkRAG met via teleconference on 16 January 2020 to discuss the process for considering the review of the assessment model. SharkRAG members agreed to a process for undertaking an independent review of the assessment model, taking into account the industry commissioned review, the response from the CSIRO and the FRDC review process. AFMA is currently working to identify suitable reviewers and to develop terms of reference for the RAG to consider.

RAG Recommendations		
Recommended Biological Catch (2019-20)	195 t incidental bycatch only	**Undercatch:** 0% **Overcatch:** 0% **Discount Factor**: 0%
Is a MYTAC recommended for future seasons? *Indicate whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a rollover of catch)*	No, incidental bycatch only	
Probability of RBC (or other levels of catch) causing a decline below limit reference under proposed management *Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).*	N/A	
Research Catch Allowance *Included/Addition to TAC*	0 t	
Implications for companion species / TEPs / multi-species fisheries	The gillnet fishery interacts with Australian sea lions in waters off South Australia. Interactions are mitigated by using trigger limits that close spatial zones for 18 months if an interaction occurs. Dolphin interactions are managed through the GHAT Dolphin Strategy which sets performance criteria for individual operators. To reduce targeting, gillnet operators are subject to a rule that constrains their catches of school shark to 20 per cent of their gummy shark catches.	

Catch and TAC						
Assessment Year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Tier / MYTAC	rollover	rollover	rollover	rollover	rollover	Tier 1
Stock Status	<BLIM	<BLIM	<BLIM	<BLIM	<BLIM	<BLIM
SESSF Season	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**
RBC	0	0	0	0	0	256
Agreed TAC	215	215	215	215	215	189
TAC after unders/overs	215	215	215	215	215	189
% TAC caught	94%	84%	81%	96%	91%	87%*

*Current as of 10 February 2020

Catch Trends