ADVICE TO:	**PIRSA FISHERIES AND AQUACULTURE (PROF. GAVIN BEGG – EXECUTIVE DIRECTOR)**
FROM:	**DRS JONATHAN SMART AND JASON EARL (SARDI AQUATIC SCIENCES)**
SUBJECT:	**RISK TO SUSTAINABILITY OF TIER 1 MSF STOCKS IF TACCS WERE INCREASED TO (1) INCORPORATE ADDITIONAL QUOTA ALLOCATIONS, AND (2) ENABLE THE CARRY-OVER OF UP TO 10% OF THE UNCAUGHT QUOTA ON EACH LICENCE FROM THE 2021/22 SEASON TO THE 2022/23 SEASON.**
DATE:	**27 APRIL 2022**

KEY ISSUES

- Additional quota units may be added to the Marine Scalefish Fishery (MSF) for licence holders that were included in an exceptional circumstances process during the MSF reform.
- As these additional units could not have been fished during the 2021/22 season, an increase to the Total Allowable Commercial Catch (TACC) in 2022/23 is being considered to allow these licence holders to catch this quota in a subsequent fishing season.
- In addition, the carry-over of uncaught quota entitlements for Tier 1 stocks on licences from the 2021/22 season to the 2022/23 season is being considered.
- PIRSA Fisheries and Aquaculture have requested advice on the risk these options pose to sustainability for any Tier 1 stock, given the recently recommended TACCs for 2022/23 by the MSF Management Advisory Committee (MSFMAC).
- Three pieces of information were considered for each stock:
    1. The status of each stock
    2. The percentage of the TACC caught to date for the 2021/22 fishing season
    3. The increase in allocated quota units for each stock relating to the exceptional circumstances process.
- Snapper were not considered in this analysis as no additional allocations will occur for the South East fishing zone and the remaining fishing zones have not had a TACC recommended due to their ongoing closure.
- All King George Whiting and Southern Calamari stocks are classified as ‘sustainable’. Garfish are classified as ‘depleted’ and ‘recovering’ for Gulf St Vincent (GSV) and Spencer Gulf (SG), respectively.
- The 2021/22 TACCs for all stocks are not expected to be caught based on the percentage of the TACC caught to date and the remaining length of the 2021/22 fishing season.
- The percentage of uncaught TACC in 2021/22 is likely to be larger than any potential TACC increase for 2022/23. Therefore, a low risk to sustainability was assigned for all Tier 1 stocks.

BACKGROUND

Quota allocations for the 2021/22 fishing season for Tier 1 stocks were calculated and allocated to MSF licence holders on 1 July 2021. These allocations incorporated the results of an exceptional circumstances process that provided additional quota units to licence holders with successful applications. The quota allocations for these fishers may be raised following applications to South Australian Civil and Administrative Tribunal (SACAT). This would increase the total number of units in the fishery from those allocated on 1 July 2021.

Currently, the TACCs for the 2021/22 fishing season for all Tier 1 stocks managed by Individual Transferable Quota (ITQ) were set using estimates of recent average annual catch. The only exception was Snapper in the South East (SE) fishing zone which had a TAC set using a model-based recommended biological catch. However, no additional quota will be allocated for Snapper in the SE fishing zone as no licence holders that were included in the exceptional circumstances process had catch history for this stock.

In April 2022, the MSFMAC recommended that all TACCs be maintained for the 2022/23 fishing season (see Appendices). Currently, Snapper fishing is prohibited until 1 February 2023 in the GSV, SG and West Coast (WC) fishing zones. Therefore, the MSFMAC did not recommend a TACC for these stocks.

PIRSA Fisheries and Aquaculture have requested advice on the risk to Tier 1 stocks if the TACCs recommended by the MSFMAC were increased for the 2022/23 season to enable carry-over of (i) uncaught quota entitlements on individual licences from the 2021/22 season to the 2022/23 season up to a maximum of 10% of total quota entitlements (unknown until the completion of the 2021/22 season; termed 'existing entitlement carry-over'), and (ii) 100% of quota for EC applicants that could not have been fished during the 2021/22 fishing season (termed 'new potential quota unit carry-over').

RESULTS

The risk of both options was considered based on three pieces of information:

1. The status of each stock
2. The percentage of the TACC caught to date for the 2021/22 fishing season
3. The increase in allocated quota units for each stock

Snapper

Snapper did not need to be considered in this analysis as no additional quota units will be allocated for the SE fishing zone and TACCs have not been set for Snapper in the GSV, SG and WC fishing zones for the 2022/23 fishing season.

King George Whiting

- Both GSV and SG stocks were classified as **sustainable** in the most recent stock assessment (Drew et al. 2021).
- Less than 50% of the TACC has been caught for either stock with 75% of the fishing season complete (Table 1).
- The maximum existing entitlement carry-over for the GSV and SG stocks is 4.6 t and 11.1 t, respectively.
- The maximum new potential quota carry-over would increase the number of quota units in the fishery by 0.2% and 8.5% for GSV and SG, respectively (Table 2).

Garfish

- In the most recent stock assessment for Garfish, the GSV stock was classified as **depleted,** and the SG stock was classified as **recovering** (Steer et al 2018). These classifications were maintained in the most recent stock status report (Drew et al 2021).
- Less than 60% of the TACC has been caught for either stock with 75% of the fishing season complete (Table 1).
- The maximum existing entitlement carry-over of uncaught quota for the GSV and SG stocks is 7.1 t and 10 t, respectively.
- The maximum new potential quota carry-over would increase the number of quota units in the fishery by 7.4% and 5.3% for GSV and SG, respectively (Table 2).

Southern Calamari

- Both GSV and SG stocks were classified as **sustainable** in the most recent stock status report (Drew et al 2021).
- In GSV 47.41% of the TACC has been caught while 54.68% of the TACC has been caught in SG with 75% of the fishing season complete (Table 1).
- The maximum existing entitlement carry-over of uncaught quota for the GSV and SG stocks is 16.2 t and 20.4 t, respectively.
- The maximum new potential quota carry-over would increase the number of quota units in the fishery by 3.7% and 5.2% for GSV and SG, respectively (Table 2).

Table 1. The 2021/22 TACCs for Tier 1 stocks and the percentage of each TACC caught by March 2022

SPECIES	Zone	TACC (T)	% TACC CAUGHT
GARFISH	GSV	71	55.15
GARFISH	SG	100	53.18
KING GEORGE	GSV	46	42.28
KING GEORGE	SG	111	46.93
SNAPPER	SE	36	48.63
SOUTHERN	GSV	162	47.41
SOUTHERN	SG	204	54.68

DISCUSSION

There is a low risk to all stocks if the TACCs recommended by the MSFMAC were increased for the 2022/23 season to enable carry-over of uncaught quota entitlements on individual licences from the 2021/22 season to the 2022/23 season, up to a maximum of 10% of total quota entitlements. This is because the total catch would remain below the allocated TACC for 2021/22.

It is unlikely that the TACC will be caught for any Tier 1 stock during the 2021/22 fishing season (Table 1). Consequently, there is also a low risk to all stocks if the TACCs recommended by the MSFMAC were increased for the 2022/23 season to enable 100% carry-over of quota for EC applicants that could not have been fished during the 2021/22 fishing season. This is because the total catch is expected to remain below, or close to, the allocated TACC for 2021/22.

Table 2. The additional quota units for Tier 1 stocks that may be allocated to MSF licence holders.

Species	Zone	Additional units (EC)	Total MSF units	Total fishery units	Updated total fishery units	% increase of total fishery units
GARFISH	GSV	147.19	2000	2000	2147.19	7.4%
GARFISH	SG	106.81	1998	2000	2106.81	5.3%
KING GEORGE WHITING	GSV	3.81	1944	2000	2003.81	0.2%
KING GEORGE WHITING	SG	170.56	1958	2000	2170.56	8.5%
SNAPPER	GSV	450.12	3972	4000	4450.12	11.3%
SNAPPER	SG	97.04	3984	4000	4097.04	2.4%
SNAPPER	WC	74.61	992	1000	1074.61	7.5%
SOUTHERN CALAMARI	GSV	149.19	4000	4000	4149.19	3.7%
SOUTHERN CALAMARI	SG	209.74	3928	4000	4209.74	5.2%

Dr Mike Steer
Research Director, Aquatic & Livestock Sciences

REFERENCES

Drew, M.J., Fowler, A.J., McGarvey, R., Feenstra, J., Bailleul, F., Matthews, D., Matthews, J.M., Earl, J., Rogers, T.A., Rogers, P.J., Tsolos, A. and Smart, J.J. (2021). Assessment of the South Australian Marine Scalefish Fishery in 2019 Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2017/000427-4. SARDI Research Report Series No. 1109. 254pp.

Steer, M.A., Fowler, A.J., McGarvey, R., Feenstra, J., Smart, J., Rogers, P.J., Earl, J., Beckmann, C., Drew, M. and Matthews, J. (2018). Assessment of the South Australian Marine Scalefish Fishery in 2017. Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2017/000427-2. SARDI Research Report Series No. 1002. 230pp.

APPENDICES

Species summary templates considered by the MSFMAC when providing TACC recommendations in April 2022.

MSF Species / Stock summaries – 2022

Southern Garfish *Hyporhamphus melanchir*

Gulf St Vincent/Kangaroo Island
Last revised: 25 March 2022

<table>
<tr><th colspan="7">Stock summary</th></tr>
<tr><td>Stock status</td><td colspan="6">Depleted (2019)</td></tr>
<tr><td>Stock assessment</td><td colspan="6">Tier 1 species – last assessment was 2017 (Steer et al 2018). Most recent stock status was assigned in 2019 (Drew et al 2021).</td></tr>
<tr><td>Fishery/stock trend</td><td colspan="6">Southern Garfish in the Gulf St Vincent/Kangaroo Island (GSV/KI) fishing zone experienced exploitation rates of more than 80% during the 1990’s when the population was only sustained through high levels of recruitment. During this period, few fish survived past age two and the population age structure was severely truncated.

Management measures implemented since 2005 have reduced exploitation rates. However, biomass has not recovered, age structures have remained truncated, and recruitment is impaired. Therefore, this stock was classified as depleted in the last stock assessment (Steer et al 2018).</td></tr>
<tr><td rowspan="11">Current management measure and catch

RBC – recommended biological catch

RBCC - recommended biological commercial catch

TACC – total allowable commercial catch (based on 5-yr average catch from 2015–2019)</td><td colspan="6">Commercial catch and TACC</td></tr>
<tr><td>Year</td><td>Total commercial catch (t)</td><td>RBC (t)</td><td>RBCC (t)</td><td colspan="2">TACC (t)</td></tr>
<tr><td>2016/17</td><td>75</td><td>-</td><td>-</td><td colspan="2">-</td></tr>
<tr><td>2017/18</td><td>81</td><td>-</td><td>-</td><td colspan="2">-</td></tr>
<tr><td>2018/19</td><td>81</td><td>-</td><td>-</td><td colspan="2">-</td></tr>
<tr><td>2019/20</td><td>62</td><td>-</td><td>-</td><td colspan="2">-</td></tr>
<tr><td>2020/21</td><td>67</td><td>-</td><td>-</td><td colspan="2">-</td></tr>
<tr><td>2021/22</td><td>-</td><td>-</td><td>-</td><td colspan="2">71</td></tr>
<tr><td colspan="6">Sector allocations (State-wide)</td></tr>
<tr><td colspan="2">Commercial</td><td>Recreational</td><td>Aboriginal traditional</td><td colspan="2">Total</td></tr>
<tr><td>MSF</td><td>79.33%</td><td rowspan="3">19.5%</td><td rowspan="3">1%</td><td colspan="2" rowspan="3">100%</td></tr>
<tr><td>SZRL</td><td>0.13%</td></tr>
<tr><td>NZRL</td><td>0.04%</td></tr>
</table>

<table>
<tr><td><u>Sector allocations</u>
Allocations in the current management plan are statewide.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Current assessment program</td><td colspan="5">• Weekly length and age structures collected through market sampling in Adelaide.
• Annual fishery statistics provided through a stock status report
• Application of a length-and-age-structured population model every three years
• Recreational data collected every five years through statewide recreational survey
• No information is available for Aboriginal/Traditional fishing.</td></tr>
<tr><td>Assessment summary</td><td colspan="5">There are two biological stocks in the GSV/KI fishing zone which occur in the northern and southern regions. The northern Gulf St Vincent (NGSV) stock constitutes the majority of the biomass and is predominantly fished with haul nets. The southern Gulf St Vincent (SGSV) stock has a much smaller biomass and is fished with dab nets due to haul netting restrictions in this region. Most of the catch and effort for the GSV/KI fishing zone occurs in NGSV via the haul net fishery.

The most recent stock assessment included data up until September 2017 using a weight-of-evidence approach (Steer et al 2018). The GarEst stock assessment model for the GSV/KI fishing zone combines both NGSV and SGSV stocks as some biological mixing occurs, despite demographic separation. The GarEst model includes data on commercial catch and effort, commercial age and length structures, and recreational and charter boat catch and effort. Numerous management measures have been implemented since 2005 which included licence reduction schemes, spatial and temporal closures, changes to gear restrictions and changes to legal minimum length. This assessment demonstrated that these management measures have not yet allowed the stock recovery to occur. As a result, the stock was classified as depleted.

The 2021/22 TACC of 100 t was recommended by the SnapperMAC and was calculated based on the average 5-year annual commercial catch from 2015–2019.</td></tr>
<tr><td>RBC / TACC options for 2022/23
<u>Sector catch shares</u>

Regional catch shares were calculated according to the PIRSA allocation policy</td><td colspan="5">
<table>
<tr><th>Sector</th><th>Commercial sector catch share (%)</th><th>Target H in management plan (0.3)</th><th>Target H = 2/3M (0.23)</th><th>2021/22 TACC</th><th>Five-year average commercial catch (2016/17 – 2020/21)</th></tr>
<tr><td>RBC</td><td>100</td><td>61 t</td><td>48 t</td><td>-</td><td>-</td></tr>
<tr><td>TACC</td><td>82</td><td>50 t</td><td>39 t</td><td>71 t</td><td>73 t</td></tr>
</table>

The RBC’s were determined from average five-year biomass estimates from the last assessment (2013-2017).</td></tr>
</table>

using new MSF zones. M = natural mortality	
Research needs	• Development of harvest strategy with performance indicators, reference points and harvest control rules. • Standardisation of commercial CPUE, using improved measures of fishing effort. • Improved estimates of recreational catch and effort.
SSC recommendation	A new stock assessment was being finalised and the results still being considered. The previous assessment indicated signs of stock recovery and there are continuing trends of stock recovery in the new assessment. The target harvest fraction of 30% as provided in the MSF Management Plan was considered appropriate for the species. Whilst the stock has a depleted status, the biomass has been stable and there was a significantly reducing harvest fraction. Catches in recent years were below average and this was likely due to a combination of changes to the legal minimum length in addition to MSF reform and covid-19 market related impacts. Noting the above factors, the MSFMAC considered there was no basis to reduce catch limits and recommended a rollover of the current 2021/22 TACC of 71t.
References	Drew, M., A. J. Fowler, R. McGarvey, J. E. Feenstra, F. Bailleul, D. Matthews, J. M. Matthews, J. Earl, T. A. Rogers, P. J. Rogers, A. Tsolos and J. Smart (2021). Assessment of the South Australian Marine Scalefish Fishery in 2019. Report for PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences). SARDI Publication No. F2017/000427-4. SARDI Research Report Series No. 1109. 254 pp. Steer, M.A., Fowler, A.J., McGarvey, R., Feenstra, J., Smart, J., Rogers, P.J., Earl, J., Beckmann, C., Drew, M. and Matthews, J. (2018). Assessment of the South Australian Marine Scalefish Fishery in 2017. Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2017/000427-2. SARDI Research Report Series No. 1002. 230pp.

Southern Garfish *Hyporhamphus melanchir*

Spencer Gulf
Last revised: 25 March 2022

Stock summary	
Stock status	**Recovering** (2019)
Stock assessment	Tier 1 species – last assessment was 2017 (Steer et al 2018). Most recent stock status was assigned in 2019 (Drew et al 2021).
Fishery/stock trend	Southern Garfish in the Spencer Gulf (SG) fishing zone experienced exploitation rates of more than 90% during the 1990's when the population was only sustained through high levels of recruitment. During this period, few fish survived past age two and the population age structure was severely truncated. Management measures implemented since 2005 have allowed stock recovery. Exploitation has been reduced, biomass has been stable and age structures have become less truncated. However, as of the last assessment, biomass has not yet begun to increase and recruitment remains impaired.

Current management measure and catch

RBC – recommended biological catch

RBCC - recommended biological commercial catch

TACC – total allowable commercial catch (based on 5-yr average catch from 2015–2019)

Sector allocations Allocations in the current

Commercial catch and TACC

Year	Total commercial catch (t)	RBC (t)	RBCC (t)	TACC (t)
2016/17	107	-	-	-
2017/18	91	-	-	-
2018/19	110	-	-	-
2019/20	99	-	-	-
2020/21	109	-	-	-
2021/22	-	-	-	100

Sector allocations (State-wide)

Commercial		Recreational	Aboriginal traditional	Total
MSF	79.33%	19.5%	1%	100%
SZRL	0.13%			
NZRL	0.04%			

<table>
<tr><td>management plan are statewide.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Current assessment program</td><td colspan="5">Weekly length and age structures collected through market sampling in Adelaide.
Annual fishery statistics provided through a stock status report
Application of a length-and-age-structured population model every three years
Recreational data collected every five years through statewide recreational survey
No information is available for Aboriginal/Traditional fishing.</td></tr>
<tr><td>Assessment summary</td><td colspan="5">There are two biological stocks in the SG fishing zone which occur in the northern and southern regions. The northern Spencer Gulf (NSG) stock constitutes the majority of the biomass and is predominantly fished with haul nets. The southern Spencer Gulf (SSG) stock has a much smaller biomass and is fished with dab nets due to haul netting restrictions in this region. Most of the catch and effort for the SG fishing zone occurs in NSG via the haul net fishery.

The most recent stock assessment included data up until September 2017 using a weight-of-evidence approach (Steer et al 2018). The GarEst stock assessment model for the SG fishing zone combines both NSG and SSG stocks as some biological mixing occurs, despite demographic separation. The GarEst model includes data on commercial catch and effort, commercial age and length structures, and recreational and charter boat catch and effort. Numerous management measures have been implemented since 2005 which included licence reduction schemes, spatial and temporal closures, changes to gear restrictions and changes to legal minimum length. This assessment demonstrated that these management measures have been effective and that the stock was recovering.

The 2021/22 TACC of 100 t was recommended by the SnapperMAC and was calculated based on the average 5-year annual commercial catch from 2015–2019.</td></tr>
<tr><td>RBC / TACC options for 2022/23

<u>Sector catch shares</u>

Regional catch shares were calculated according to the PIRSA allocation policy using new MSF zones.</td><td colspan="5"><table>
<tr><th>Sector</th><th>Commercial sector catch share (%)</th><th>Target H in management plan (0.3)</th><th>Target H = 2/3M (0.23)</th><th>2021/22 TACC</th><th>Five-year average commercial catch (2016/17 – 2020/21)</th></tr>
<tr><td>RBC</td><td>100</td><td>79 t</td><td>62 t</td><td>-</td><td>-</td></tr>
<tr><td>TACC</td><td>78</td><td>62 t</td><td>48 t</td><td>100 t</td><td>102 t</td></tr>
</table>
The RBC’s were determined from average five-year biomass estimates from the last assessment (2013-2017).</td></tr>
</table>

M = natural mortality	
Research needs	• Development of harvest strategy with performance indicators, reference points and harvest control rules. • Standardisation of commercial CPUE, using improved measures of fishing effort. • Improved estimates of recreational catch and effort.
SSC recommendation	A new stock assessment was being finalised and the results still being considered. The target harvest fraction of 30% as provided in the MSF Management Plan was considered appropriate for the species. Whilst the stock has a recovering status, the stable to increasing biomass and reducing harvest fraction indicate that recent catches have been at an appropriate level. It was noted that positive changes have been observed by SARDI in the age structure of the stock. Noting the above factors, the MSFMAC considered there to be no basis to reduce catch limits, and recommended a rollover of the current 2021/22 TACC of 100t.
References	Drew, M., A. J. Fowler, R. McGarvey, J. E. Feenstra, F. Bailleul, D. Matthews, J. M. Matthews, J. Earl, T. A. Rogers, P. J. Rogers, A. Tsolos and J. Smart (2021). Assessment of the South Australian Marine Scalefish Fishery in 2019. Report for PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences). SARDI Publication No. F2017/000427-4. SARDI Research Report Series No. 1109. 254 pp. Steer, M.A., Fowler, A.J., McGarvey, R., Feenstra, J., Smart, J., Rogers, P.J., Earl, J., Beckmann, C., Drew, M. and Matthews, J. (2018). Assessment of the South Australian Marine Scalefish Fishery in 2017. Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2017/000427-2. SARDI Research Report Series No. 1002. 230pp.

King George Whiting *Sillaginodes punctatus*

Gulf St. Vincent / Kangaroo Island
Last revised: 23 March 2022

Stock summary						
Stock status	**Sustainable** (2019)					
Stock assessment	Tier 1 species – last assessment was 2019 (Drew et al 2021).					
Fishery/stock trend	Fishable biomass has been stable for the past ten years at ~650 t. The harvest fraction has had a decreasing trend during this period and was estimated as 20% in 2019. Targeted hand line CPUE has had an increasing trend over this period which has been driven through consistent annual decreases of commercial catch and effort.					
Current management measure and catch RBC – recommended biological catch RBCC - recommended biological commercial catch TACC – total allowable commercial catch (based on 5-yr average catch from 2015–2019) <u>Sector allocations</u> Allocations in the current	**Commercial catch and TACC**					
	Year	Total commercial catch (t)	RBC (t)	RBCC (t)	TACC (t)	
	2016/17	52	-	-	-	
	2017/18	37	-	-	-	
	2018/19	40	-	-	-	
	2019/20	42	-	-	-	
	2020/21	31	-	-	-	
	2021/22		-	-	46	
	Sector allocations (State-wide)					
	Commercial		Recreational		Aboriginal traditional	Total
	MSF	49.5%	REC	45.5%	1%	100%
	SZRL	0%	CHT	3%		
	NZRL	1%				

<table>
<tr><td>management plan are statewide.</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Current assessment program</td><td colspan="6">Weekly length and age structures collected through market sampling in Adelaide and regional areas.
Annual fishery statistics provided through a stock status report
Application of a length-and-age-structured population model every three years
Recreational data collected every five years through statewide recreational survey
Daily egg production methods (DEPM) have been established to estimate spawning biomass but are not undertaken as part of ongoing assessments.
No information is available for Aboriginal/Traditional fishing.</td></tr>
<tr><td>Assessment summary</td><td colspan="6">The most recent stock assessment was completed for data up until 31 December 2019 using a weight-of-evidence approach (Drew et al. 2021). The primary fishery performance indicators were total catch, targeted handline catch, targeted handline CPUE, and fishery age structure. All datasets pertaining to the fishery were integrated in a computer stock assessment model (WhitEst) that produced time-series of annual estimates of output parameters that included fishable biomass, recruitment, harvest fraction and egg production. This assessment demonstrated that this stock was sustainable.

The 2021/22 TACC of 46 t was recommended by the SnapperMAC and was calculated based on the average 5-year annual commercial catch from 2015–2019.</td></tr>
<tr><td>RBC / TACC options for 2022/23

<u>Sector catch shares</u>

Regional catch shares were calculated according to the PIRSA allocation policy using new MSF zones.

M = natural mortality</td><td colspan="6">
<table>
<tr><th>Sector</th><th>Commercial sector catch share (%)</th><th>Target H in management plan (0.28)</th><th>Target H = 2/3M (0.125)</th><th>2021/22 TACC</th><th>Five-year average commercial catch (2016/17 – 2020/21)</th></tr>
<tr><td>RBC</td><td>100</td><td>184 t</td><td>74 t</td><td>-</td><td>-</td></tr>
<tr><td>TACC</td><td>40</td><td>82 t</td><td>33 t</td><td>46 t</td><td>40 t</td></tr>
</table>

The RBC’s were determined from average five-year biomass estimates from the last assessment (2015-2019).</td></tr>
</table>

Research needs	• Development of harvest strategy with performance indicators, reference points and harvest control rules. • Standardisation of commercial CPUE, using improved measures of fishing effort • Improved estimates of recreational catch and effort.
SSC recommendation	The stock was classified as sustainable with a stable and increasing biomass, declining harvest fraction and increasing CPUE. There had been no change in status since the current catch limits had been set. The harvest fraction of 28% provided in the Management Plan was no longer considered appropriate for King George Whiting. The SSC noted the latest year's catch was below the 5yr average and this was likely due to a combination of the reform, covid-19 and market-related impacts contributing to less targeting of the species. Considering the above, the SSC considered there to be no basis to reduce the current catch limit and recommended to rollover the current 2021/22 TACC of 46t.
References	Drew, M., A. J. Fowler, R. McGarvey, J. E. Feenstra, F. Bailleul, D. Matthews, J. M. Matthews, J. Earl, T. A. Rogers, P. J. Rogers, A. Tsolos and J. Smart (2021). Assessment of the South Australian Marine Scalefish Fishery in 2019. Report for PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences). SARDI Publication No. F2017/000427-4. SARDI Research Report Series No. 1109. 254 pp.

King George Whiting *Sillaginodes punctatus*

Spencer Gulf
Last revised: 23 March 2022

<table>
<tr><th colspan="7">Stock summary</th></tr>
<tr><td>Stock status</td><td colspan="6">Sustainable (2019)</td></tr>
<tr><td>Stock assessment</td><td colspan="6">Tier 1 species – last assessment was 2019 (Drew et al 2021)</td></tr>
<tr><td>Fishery/stock trend</td><td colspan="6">Trends in fishable biomass have been cyclical since 1984, reflecting periods of increase and decline, but nevertheless have shown a long-term increase. Biomass has been stable for the past five years at ~1,500 t. The harvest fraction been stable since the early 2000s and was 20% in 2019. Recruitment, which has historically been heavily cyclical in nature, declined steeply from 2016 to 2019. However, the lower recruitment during that period was not reflected in lower fishable biomass, with low exploitation rates in recent years enabling the highest estimated biomass levels in recent years to be retained.

Targeted handline CPUE has shown a long-term increasing trend, although with clear cyclical variation. It increased to a record-high level in 2016, and then marginally declined in the three subsequent years to a moderate–high level in 2019. Catch and targeted handline effort have been stable at low levels since 2010.</td></tr>
<tr><td rowspan="10">Current management measure and catch

RBC – recommended biological catch

RBCC - recommended biological commercial catch

TACC – total allowable</td><td colspan="6">Commercial catch and TACC</td></tr>
<tr><td>Year</td><td>Total commercial catch (t)</td><td>RBC (t)</td><td>RBCC (t)</td><td>TACC (t)</td></tr>
<tr><td>2016/17</td><td>126</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>2017/18</td><td>108</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>2018/19</td><td>103</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>2019/20</td><td>96</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>2020/21</td><td>69</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>2021/22</td><td></td><td>-</td><td>-</td><td>111</td></tr>
<tr><td colspan="6">Sector allocations (State-wide)</td></tr>
<tr><td colspan="2">Commercial</td><td colspan="2">Recreational</td><td>Aboriginal traditional</td><td>Total</td></tr>
</table>

<table>
<tr><td rowspan="4">commercial catch (based on 5-yr average catch from 2015–2019)

<u>Sector allocations</u> Allocations in the current management plan are statewide.</td><td>MSF</td><td>49.5%</td><td>REC</td><td>45.5%</td><td rowspan="4">1%</td><td rowspan="4">100%</td></tr>
<tr><td>SZRL</td><td>0%</td><td rowspan="3">CHT</td><td rowspan="3">3%</td></tr>
<tr><td rowspan="2">NZRL</td><td rowspan="2">1%</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Current assessment program</td><td colspan="6">Weekly length and age structures collected through market sampling in Adelaide and regional areas.
Annual fishery statistics provided through a stock status report
Application of a length-and-age-structured population model every three years
Recreational data collected every five years through statewide recreational survey
Daily egg production methods (DEPM) have been established to estimate spawning biomass but are not undertaken as part of ongoing assessments.
No information is available for Aboriginal/Traditional fishing.</td></tr>
<tr><td>Assessment summary</td><td colspan="6">The most recent stock assessment was completed for data up until 31 December 2019 using a weight-of-evidence approach (Drew et al. 2021). The primary fishery performance indicators were total catch, targeted handline catch, targeted handline CPUE, and fishery age structure. All datasets pertaining to the fishery were integrated in a computer stock assessment model (WhitEst) that produced time-series of annual estimates of output parameters that included fishable biomass, recruitment, harvest fraction and egg production. This assessment demonstrated that this stock was sustainable.

The 2021/22 TACC of 111 t was recommended by the SnapperMAC and was calculated based on the average 5-year annual commercial catch from 2015–2019.</td></tr>
<tr><td>RBC / TACC options for 2022/23

<u>Sector catch shares</u></td><td colspan="6"><table>
<tr><th>Sector</th><th>Commercial sector catch share (%)</th><th>Target H in management plan (0.28)</th><th>Target H = 2/3M (0.125)</th><th>2021/22 TACC</th><th>Five-year average commercial catch (2016/17 – 2020/21)</th></tr>
<tr><td>RBC</td><td>100</td><td>418 t</td><td>187 t</td><td>-</td><td>-</td></tr>
<tr><td>TACC</td><td>44</td><td>184 t</td><td>82 t</td><td>111 t</td><td>100 t</td></tr>
</table></td></tr>
</table>

Regional catch shares were calculated according to the PIRSA allocation policy using new MSF zones. M = natural mortality	• The RBC's were determined from average five-year biomass estimates from the last assessment (2015-2019).
Research needs	• Development of harvest strategy with performance indicators, reference points and harvest control rules. • Standardisation of commercial CPUE, using improved measures of fishing effort. • Improved estimates of recreational catch and effort.
SSC recommendation	The stock was classified as sustainable with a stable and increasing biomass and declining harvest fraction. There had been no change in status since the 2021/22 TAC had been set. The harvest fraction of 28% was no longer considered appropriate for King George Whiting. The SSC noted the latest year's catch was below the 5yr average MSF average and this was likely due to a combination of the MSF reform, Covid-19 and market-related impacts contributing to less targeting of the species. Considering the above the factors the MSFMAC considered there was no basis to change the current catch limits and recommended a rollover of the current 2021/22 TACC of 111t.
References	Drew, M., A. J. Fowler, R. McGarvey, J. E. Feenstra, F. Bailleul, D. Matthews, J. M. Matthews, J. Earl, T. A. Rogers, P. J. Rogers, A. Tsolos and J. Smart (2021). Assessment of the South Australian Marine Scalefish Fishery in 2019. Report for PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences). SARDI Publication No. F2017/000427-4. SARDI Research Report Series No. 1109. 254 pp.

Southern Calamari *Sepioteuthis australis*

Gulf St Vincent/Kangaroo Island
Last revised: 23 March 2022

Stock summary	
Stock status	**Sustainable** (2019)
Stock assessment	Tier 1 species – no stock assessment has been undertaken. Most recent stock status was assigned in 2019 at the State-wide / biological stock level (Drew et al 2021).
Fishery/stock trend	Annual catches have been relatively stable at moderate levels over the past ten years, consistent with stable targeted jig effort and targeted jig CPUE. In the past 5 years, catch has declined, consistent with a decline in targeted jig effort, while estimates of targeted jig CPUE for northern and southern GSV have been stable at moderate–high levels. This information indicates that biomass is unlikely to be depleted and that recruitment is unlikely to be impaired. The current level of fishing mortality is unlikely to reduce biomass to a recruitment impaired state.

Current management measure and catch

RBC – recommended biological catch

RBCC - recommended biological commercial catch

TACC – total allowable commercial catch (based on 5-yr average catch from 2015–2019)

Commercial catch and TACC

Year	Total commercial catch (t)	RBC (t)	RBCC (t)	TACC (t)
2016/17	170	-	-	-
2017/18	176	-	-	-
2018/19	150	-	-	-
2019/20	154	-	-	-
2020/21	129	-	-	-
2021/22	-	-	-	162

Sector allocations (State-wide)

Commercial		Recreational	Aboriginal / Traditional	Total
MSF	56%	37.4%	1%	100%
NZRL	0.45%			
GSVPF	0.45%			
SGPF	4.6%			
WCPF	0.1%			

<table>
<tr><td><u>Sector allocations</u>
Allocations in the current management plan are statewide.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Current assessment program</td><td colspan="5">• No formal stock assessment.
• Annual fishery statistics provided through a stock status report.
• Recreational data collected every five years through statewide recreational survey.
• No information is available for Aboriginal/Traditional fishing.</td></tr>
<tr><td>Assessment summary</td><td colspan="5">The most recent stock assessment was completed for data up until 31 December 2019 using a weight-of-evidence approach (Drew et al. 2021). The primary measure for biomass and fishing mortality is targeted jig CPUE. This assessment demonstrated that South Australia’s Southern Calamari stock was sustainable.

The 2021/22 TACC of 162 t was recommended by the SnapperMAC, and was calculated based on the average annual commercial catch from the from 2015–2019.</td></tr>
<tr><td>RBC / TACC options for 2022/23
<u>Sector catch shares</u>

Regional catch shares were calculated according to the PIRSA allocation policy using new MSF zones.

Hmsy = Harvest fraction corresponding to maximum sustainable yiefd (MSY)</td><td colspan="5"><table>
<tr><th>Sector</th><th>Commercial sector catch share (%)</th><th>Target Hmsy (0.39)</th><th>Target H = 2/3Hmsy (0.26)</th><th>2021/22 TACC</th><th>Five-year average commercial catch (2016/17 – 2020/21)</th></tr>
<tr><td>RBC</td><td>100</td><td>358 t</td><td>238 t</td><td>-</td><td>-</td></tr>
<tr><td>TACC</td><td>62</td><td>216 t</td><td>143 t</td><td>162 t</td><td>156 t</td></tr>
</table></td></tr>
</table>

Research needs	• Development of a stock assessment program that can be used to assign stock status, estimate RBCs and inform setting of TACCs. • Development of harvest strategy with performance indicators, reference points and harvest control rules. • Standardisation of commercial CPUE, using improved measures of fishing effort • Improved estimates of recreational catch and effort.
SSC recommendation	There is no formal stock assessment for Southern Calamari and it was noted that only commercial catch statistics were available to evaluate. Hmsy figures provided in previous recommendations were based on catch-only models and there was less confidence in the appropriateness of these for Southern Calamari. It was recognised that CPUE had been stable. Noting the above, the MSFMAC considered there was no basis to change the current catch limits and recommended a rollover of the current 2021/22 TACC of 162t.
References	Drew, M., A. J. Fowler, R. McGarvey, J. E. Feenstra, F. Bailleul, D. Matthews, J. M. Matthews, J. Earl, T. A. Rogers, P. J. Rogers, A. Tsolos and J. Smart (2021). Assessment of the South Australian Marine Scalefish Fishery in 2019. Report for PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences). SARDI Publication No. F2017/000427-4. SARDI Research Report Series No. 1109. 254 pp.

Southern Calamari *Sepioteuthis australis*

Spencer Gulf
Last revised: 23 March 2022

Stock summary	
Stock status	**Sustainable** (2019)
Stock assessment	Tier 1 species – no stock assessment has been undertaken. Most recent stock status was assigned in 2019 at the State-wide / biological stock level (Drew et al 2021).
Fishery/stock trend	There has been evidence of regional depletion in the northern and southern Spencer Gulf over the past ten years. This was particularly evident in southern Spencer Gulf where targeted jig CPUE declined by 31% between 2012 and 2019. Similar declines in targeted jig CPUE had also been occurring over this period in northern Spencer Gulf but with less severity. A **sustainable** status was assigned at the State-wide/biological stock level.

Current management measure and catch

RBC – recommended biological catch

RBCC - recommended biological commercial catch

TACC – total allowable commercial catch (based on 5-yr average catch from 2015–2019)

Sector allocations Allocations in the current

Commercial catch and TACC

Year	Total commercial catch (t)	RBC (t)	RBCC (t)	TACC (t)
2016/17	218	-	-	-
2017/18	235	-	-	-
2018/19	164	-	-	-
2019/20	185	-	-	-
2020/21	206	-	-	-
2021/22		-	-	204

Sector allocations (State-wide)

Commercial		Recreational	Aboriginal / Traditional	Total
MSF	56%	37.4%	1%	100%
NZRL	0.45%			
GSVPF	0.45%			
SGPF	4.6%			
WCPF	0.1%			

<table>
<tr><td>management plan are statewide.</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Current assessment program</td><td colspan="5">No formal stock assessment.
Annual fishery statistics provided through a stock status report.
Recreational data collected every five years through statewide recreational survey.
No information is available for Aboriginal/Traditional fishing.</td></tr>
<tr><td>Assessment summary</td><td colspan="5">The most recent stock assessment was completed for data up until 31 December 2019 using a weight-of-evidence approach (Drew et al. 2021). The primary measure for biomass and fishing mortality is targeted jig CPUE. This assessment demonstrated that South Australia’s Southern Calamari stock was sustainable.

The 2021/22 TACC of 204 t was recommended by the SnapperMAC, and was calculated based on the average annual commercial catch from the from 2015–2019.</td></tr>
<tr><td>RBC / TACC options for 2022/23

<u>Sector catch shares</u>

Regional catch shares were calculated according to the PIRSA allocation policy using new MSF zones.

Hmsy = Harvest fraction corresponding to maximum sustainable yiefd (MSY)</td><td colspan="5"><table>
<tr><th>Sector</th><th>Commercial sector catch share (%)</th><th>Target Hmsy (0.39)</th><th>Target H = 2/3Hmsy (0.26)</th><th>2021/22 TACC</th><th>Five-year average commercial catch (2016/17 – 2020/21)</th></tr>
<tr><td>RBC</td><td>100</td><td>400 t</td><td>267 t</td><td>-</td><td>-</td></tr>
<tr><td>TACC</td><td>62</td><td>247 t</td><td>165 t</td><td>204 t</td><td>202 t</td></tr>
</table></td></tr>
<tr><td>Research needs</td><td colspan="5">Development of a stock assessment program that can be used to assign stock status, estimate RBCs and inform setting of TACCs.
Development of harvest strategy with performance indicators, reference points and harvest control rules.</td></tr>
</table>

	• Standardisation of commercial CPUE, using improved measures of fishing effort • Improved estimates of recreational catch and effort.
SSC recommendation	There is no formal stock assessment for Southern Calamari and it was noted that only commercial catch statistics were available to evaluate. Hmsy figures provided in previous recommendations were based on catch-only models and there was less confidence in the appropriateness of these for Southern Calamari. It was recognised that CPUE had been increasing in recent years. Noting the above, the MSFMAC considered there was no basis to change the current catch limits and recommended a rollover of the current 2021/22 TACC of 204 t.
References	Drew, M., A. J. Fowler, R. McGarvey, J. E. Feenstra, F. Bailleul, D. Matthews, J. M. Matthews, J. Earl, T. A. Rogers, P. J. Rogers, A. Tsolos and J. Smart (2021). Assessment of the South Australian Marine Scalefish Fishery in 2019. Report for PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences). SARDI Publication No. F2017/000427-4. SARDI Research Report Series No. 1109. 254 pp.