

King George Whiting (2018)

Sillaginodes punctatus



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STOCK STATUS OVERVIEW

| Jurisdiction | Stock | Fisheries | Stock status | Indicators |
|-------------------|-----------------------------|--|--------------|--|
| Western Australia | Western Australia | SCEMF, SCEMF WCDSIMF WCEMF WL (SC), WCDSIMF, WCEMF, WL (SC) | Sustainable | Catch, age structure |
| Victoria | Victoria | CIF, GLF, ITF, OF, OW, PPBWPF | Sustainable | Catch, CPUE, age/length structures, pre-recruit survey |
| South Australia | Gulf St. Vincent | MSF NZRLF, NZRLF | Sustainable | Catch, CPUE, age structure, biomass |
| South Australia | Spencer Gulf | MSF NZRLF, NZRLF | Sustainable | Catch, CPUE, age structure, biomass |
| South Australia | West Coast - Eyre Peninsula | MSF NZRLF, NZRLF | Sustainable | Catch, CPUE, age structure, biomass |

NZRLF Northern Zone Rock Lobster Fishery (SA), CIF Corner Inlet Fishery (VIC), GLF Gippsland Lakes Fishery (VIC), OF Ocean Fishery (VIC), PPBWPF Port Phillip Bay and Western Port Bay Fishery (VIC), ITF Inshore Trawl Fishery (VIC), SCEMF South Coast Estuarine Managed Fishery (WA), WCDSIMF West Coast Demersal Scalefish (Interim) Managed Fishery (WA), WCEMF West Coast Estuarine Managed Fishery (WA), WL (SC) Open Access in the South Coast (WA), OW Ocean Wrasse (VIC), MSF || NZRLF Marine Scale Fishery (including Northern Zone Rock Lobster Fishery) (SA), SCEMF || WCDSIMF || WCEMF || WL (SC) Various Fisheries combined due to 3 boat rule (WA)

STOCK STRUCTURE

Research on King George Whiting stock structure in southern Australia using genetic and otolith chemistry approaches indicates that separate stocks occur in each state jurisdiction (Western Australia, Victoria and South Australia), but with some genetic mixing between Victorian and South Australian populations [Jenkins et al. 2015]. King George Whiting sampled from northern Tasmania appear genetically different from those in the mainland states, although further sampling is required to confirm whether there are separate genetic stocks in Tasmania [Jenkins et al. 2015].

The South Australian population of King George Whiting is thought to be comprised of three biological stocks—Gulf St. Vincent, Spencer Gulf and the West Coast - Eyre Peninsula. This delineation has been determined based on a detailed understanding of the life history, including movement patterns of adult fish, knowledge of the location of spawning grounds and nursery areas [Fowler et al. 2000a, Fowler et al. 2002] and understanding of larval advection pathways and distances based on early life history and hydrodynamic modelling [Fowler et al. 2000b]. The Gulf St. Vincent biological stock occurs throughout Gulf St. Vincent, Investigator Strait and around Kangaroo Island. The Spencer Gulf biological stock occurs throughout the waters of Spencer Gulf and adjacent coastal waters from western Kangaroo Island to the Eyre Peninsula. The West Coast - Eyre Peninsula biological stock extends throughout all the bays and offshore areas of the west coast of Eyre Peninsula.

Further subdivision in biological stock structure is uncertain for Western Australian and Victorian populations. In Western Australia, King George Whiting occurs in the West Coast Bioregion (WCB) and South Coast Bioregion (SCB). Juveniles occur in inshore waters of both bioregions, but adults appear to be restricted to offshore waters of the WCB [Brown et al. 2013, Hyndes et al. 1998, Sulin 2012]. On this basis there is assumed to be a single biological stock in Western Australia, with the spawning component of the stock residing in the WCB. Similarly, there is assumed to be a single biological stock in Victorian waters, with juveniles occurring mostly in bays and estuaries and adults in coastal waters [Jenkins 2015].

Here, assessment of stock status is presented at the jurisdictional level—Western Australia and Victoria; and at the biological stock level—Spencer Gulf, Gulf St. Vincent and West Coast - Eyre Peninsula (South Australia).

STOCK STATUS

Gulf St. Vincent

Commercial catch and effort for the Gulf St Vincent biological stock were considerably higher during the 1990s compared to the 2000s, consistent with a long-term decline in the number of fishers participating in the fishery. In particular, between 2009 and 2013, there were considerable declines in commercial catch and effort [Steer et al. 2018]. Whilst CPUE displayed a long-term increasing trend between 1984 and 2007, the longest period of consistent decline was between 2007 and 2012, during which time CPUE fell by 25.1 per cent. As such, the estimated biomass from the stock assessment model showed a decline of 11.7 per cent from 2008 to 2012. This was associated with a period of declining recruitment. Based on these fishery performance indicators, the fishery was classified as transitional depleting [Fowler et al. 2014]. Given this classification, a review of management arrangements was undertaken in consultation with industry, recreational fishing groups and the public, which resulted in several changes that were implemented in December 2016: the legal minimum length was increased from 310 to 320 mm total length (TL); recreational bag and boat limits were reduced; a month-long spatial spawning closure was implemented in Investigator Strait and southern Spencer Gulf.

Since 2012, total catch and effort have been relatively stable, but in 2016 and 2017 CPUE increased by over 20 per cent to be among the highest levels recorded [Steer et al. 2018]. Estimated biomass from the stock assessment model has also stabilised in recent years, reflecting an increasing trend in recruitment [Steer et al. 2018]. The above evidence indicates that the biomass of this stock is now unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the above evidence indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the Gulf St. Vincent (South Australia) biological stock is classified as a **sustainable stock**.

Spencer Gulf

Throughout the 2000s total catch and effort for the Spencer Gulf biological stock have been low relative to the levels recorded through the 1980s and 1990s [Steer et al. 2018]. The CPUE has also varied cyclically over time but nevertheless demonstrated a long-term increasing trend. However, from 2007 to

2013, catch, effort and CPUE all declined simultaneously [Fowler et al. 2014]. The estimated biomass from the stock assessment model also declined through this period, indicating a significant decline in recruitment. On the basis of these declining fishery performance indicators, this stock was classified as transitional depleting [Fowler et al. 2014]. Given this classification, a review of management arrangements was undertaken in consultation with industry, recreational fishing groups and the public which resulted in several changes that were implemented in December 2016: the legal minimum length was increased from 310 to 320 mm TL; recreational bag and boat limits were reduced; a month-long spatial spawning closure was implemented in Investigator Strait and southern Spencer Gulf.

From 2013 to 2017, there has been a notable improvement in the commercial fishery indicators for this stock. Over this four year period, handline effort increased by 28 per cent, total catch by 41 per cent and handline CPUE by 21 per cent [Steer et al. 2018]. The estimates from the stock assessment model indicated that from 2013 to 2016, there was an upward trend in recruitment that resulted in an 11.3 per cent increase in the fishable biomass [Steer et al. 2018]. The above evidence indicates that the biomass of this stock is now unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the above evidence indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the Spencer Gulf (South Australia) biological stock is classified as a **sustainable stock**.

Victoria

King George Whiting occur in bays, estuaries and coastal waters throughout Victoria. The most productive fisheries occur in Port Phillip Bay, Corner Inlet-Nooramunga and Western Port. Stock status of King George Whiting in Victoria is assessed using a weight-of-evidence approach that considers catch per unit effort (CPUE) from both commercial and recreational sectors, annual fishery-independent surveys of post-larval recruitment in Port Phillip Bay, and age/length composition of the catch [VFA 2017]. Importantly, the indicator data are derived from bay and inlet fisheries that only catch juvenile King George Whiting because the adult life stage occurs in coastal waters [Jenkins et al. 2015]. When describing the status of the Victorian King George Whiting stock it is important to consider how the life history characteristics influence the above indicators.

The dynamics of King George Whiting populations and fisheries in Victorian bays and inlets are strongly influenced by climatic factors that influence the number of larvae transported into the bay and inlet nurseries from coastal spawning areas during spring [Hamer and Jenkins 1996, Jenkins and May 1994, Jenkins et al. 2000, Jenkins 2005]. Because most King George Whiting leave the bays and inlets permanently by four years of age (prior to adulthood) [Hamer et al. 2004], these fisheries are based on just a few age classes/cohorts at any point in time. This means that the fisheries are highly variable at short time scales. Over the past 60 years King George Whiting fisheries production in Victorian bays and estuaries has shown peaks and troughs at approximately 10 to 12 year intervals. These cycles are thought to be related to variation in zonal westerly winds that influence larval transport and survival [Jenkins 2005]. The focus of the fisheries on the bays and inlets also means that the adults occurring in coastal waters are subject to low fishing mortality.

The most recent state-wide King George Whiting assessment was conducted in 2017 [VFA 2017], and assessments of the Port Phillip Bay, Western Port and Corner Inlet fisheries were conducted in 2016 [Conron et al. 2016a, Conron et al. 2016b, Hamer and Giri 2016]. These assessments indicated that King George Whiting catch rates for the main commercial fishing method (haul seine) had increased from 2014–15 to 2015–16 in the two main fisheries at that time; Port Phillip Bay and Corner Inlet. Since 2015/16, commercial catch rate information is no longer informative for Port Phillip Bay due to the removal of most of the haul

seine effort. For Corner Inlet, catch rates declined sharply after 2015–16 [VFA, unpublished data]. The recent increase and decrease in catch rate is consistent with surveys of post-larval recruitment in Port Phillip Bay that showed higher recruitment of post-larvae in spring 2013, followed by lower recruitment in 2014 and 2015 [VFA 2017]. Length compositions of recreational catches in Port Phillip Bay and Western Port show long-term stability since surveys began in 2002 [Conron et al. 2016b, VFA 2017]. Length compositions for commercial catches in Corner-Inlet Nooramunga are consistently bi-modal reflecting the two age classes that dominate the harvests, with few fish over 400 mm [Conron et al. 2016].

Recent surveys of post-larvae recruitment have shown increased recruitment in 2016 and 2017, with 2017 being the third highest recruitment of post-larvae observed since surveys began in 1998 [VFA, unpublished data]. This suggests the stock is not recruitment impaired. The 2016 and 2017 cohorts will enter the fishery over the coming few years.

Commercial effort for all gear types in Victoria has decreased since 1999 due to a reduction in the number of licensed commercial fishers in Victorian waters [VFA 2017]. Commercial netting is being phased out in Port Phillip Bay. Since 2016, 34 of the 43 licences have been bought out by the Victorian Government. Commercial net fishing in Port Phillip Bay will cease by 2022. Commercial harvest of King George Whiting from Port Phillip Bay reduced from approximately 62 t in 2016 to 28 t in 2017, largely due to the reduced effort. The main commercial King George Whiting fishery is now the Corner Inlet-Nooramunga Fishery, where the catch in 2017 was approximately 32 t, down from approximately 140 t in 2016.

The species remains highly targeted by recreational fishers in Port Phillip Bay, Corner Inlet-Nooramunga, and Western Port, although no recent information on recreational catch is available. The most recent estimate of State-wide recreational catch was approximately 155 t in 2006–07 [Ryan et al. 2009].

The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Further, the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence above, King George Whiting in Victoria is classified as a **sustainable stock**.

**West Coast
- Eyre
Peninsula**

From 2002 to 2013, total catch from the West Coast - Eyre Peninsula biological stock increased by 27.6 per cent, but subsequently dropped by 42.5 per cent in 2017 [Steer et al. 2018]. Handline effort has had a long-term decreasing trend, consistent with a declining number of fishers [Steer et al. 2018]. However, between 2013 and 2017, the rate of decline in effort increased considerably, falling by 35.5 per cent [Steer et al. 2018]. CPUE increased by 53 per cent between 2002 and 2009 and has subsequently remained at around this high level despite the recent declines in catch and effort. Estimates of fishable biomass from the stock assessment model have gradually increased over time, particularly between 1984 and 1999, and again between 2008 and 2016 [Steer et al. 2018]. The general increasing trend in biomass reflects a long-term increasing trend in recruitment and long-term declining fishing effort due to the declining numbers of commercial fishers targeting this stock.

The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the above evidence indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the West Coast - Eyre Peninsula

(South Australia) biological stock is classified as a **sustainable stock**.

Western Australia

Recreational fishers take the majority of King George Whiting in Western Australia. The current shore-based recreational catch is unknown, but is likely to be smaller than the boat-based catch [Brown et al. 2013]. The estimated boat-based recreational catch (95 per cent confidence interval catch range) for King George Whiting in Western Australia was 18–36 tonnes (t) in 2011–2012, 13–31 t in 2013–2014 and 10–19 t in 2015/2016 [Ryan et al. 2017]. In those years, the total commercial catch was 15, 14 and 20 t, respectively. In 2017, the total commercial catch was approximately 10 t. Recreational catches are taken in the WCB and SCB, however, the majority (> 90 per cent) of commercial catches are taken in the SCB.

The latest stock assessment of King George Whiting was completed in 2013 [Fisher et al. 2014] based on age structure data collected in 2010–12 in the WCB. Fishing mortality was estimated to be moderate in inshore waters where juveniles occur, but low in offshore waters where adults occur. The spawning potential ratio (SPR), which is used as a proxy for spawning biomass, was estimated to be around the target level of 40 per cent of the unfished level. Total annual catches (commercial plus recreational) have remained at a similar level since 2010–12, which suggests that the stock level is stable. On this basis, current fishing mortality and SPR are assumed to have remained similar and at the target level.

Commercial catch rates are not regarded as reliable indices of abundance due to the multispecies nature of the fisheries that capture King George Whiting, which makes it difficult to quantify targeted effort and species-specific catch rates. However, the commercial catch has followed a stable long-term trend and the current catch is within the historical range, which suggests stable stock availability.

The catch level can fluctuate markedly in response to recruitment variations, with higher recruitment levels being observed during strong Leeuwin Current (La Niña) years. A recruitment-driven peak in commercial catches last occurred in 2015 [Department of Primary Industries and Regional Development, Western Australia, unpublished data].

The above evidence indicates that this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Also, the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, King George Whiting in Western Australia is classified as a **sustainable stock**.

BIOLOGY

King George Whiting biology [Fowler et al. 2000, Hamer et al. 2004, Hyndes et al. 1998, Sulin 2012]

| Species | Longevity / Maximum Size | Maturity (50 per cent) |
|---------------------|--|--|
| King George Whiting | South Australia 22 years, 590 mm TL Western Australia at least 14 years, 620 mm TL Victoria at least 11 years, 600 mm TL | South Australia 3–4 years, 300–350 mm TL Western Australia 3–4 years, 410 mm TL Victoria unknown |

DISTRIBUTION



Distribution of reported commercial catch of King George Whiting

TABLES

| Commercial Catch Methods | South Australia | Victoria | Western Australia |
|---------------------------------------|------------------------|-----------------|--------------------------|
| Beach Seine | | | ✓ |
| Dropline | | | ✓ |
| Gillnet | ✓ | | ✓ |
| Hand Line, Hand Reel or Powered Reels | | | ✓ |
| Haul Seine | | | ✓ |
| Hook and Line | ✓ | ✓ | |
| Net | | ✓ | |
| Otter Trawl | | | ✓ |
| Seine Nets | ✓ | | |
| Unspecified | ✓ | ✓ | ✓ |

| Fishing methods | | | |
|---------------------------------------|------------------------|-----------------|--------------------------|
| | South Australia | Victoria | Western Australia |
| Commercial | | | |
| Beach Seine | | | ✓ |
| Dropline | | | ✓ |
| Gillnet | ✓ | | ✓ |
| Hand Line, Hand Reel or Powered Reels | | | ✓ |
| Haul Seine | | | ✓ |
| Hook and Line | ✓ | ✓ | |

| | | | |
|-----------------------------|---------------------------------|----------------------------|--------------------------|
| Net | | ✓ | |
| Seine Nets | ✓ | | |
| Unspecified | ✓ | | ✓ |
| Indigenous | | | |
| Spearfishing | ✓ | | |
| Recreational | | | |
| Hook and Line | ✓ | ✓ | ✓ |
| Spearfishing | ✓ | ✓ | ✓ |
| Management Methods | | | |
| | South Australia | Victoria | Western Australia |
| Commercial | | | |
| Gear restrictions | ✓ | ✓ | ✓ |
| Licence | | ✓ | |
| Limited entry | ✓ | ✓ | ✓ |
| Size limit | ✓ | ✓ | ✓ |
| Spatial closures | | | ✓ |
| Spatial restrictions | ✓ | ✓ | |
| Indigenous | | | |
| Bag and boat limits | ✓ | | |
| Size limit | ✓ | | |
| Recreational | | | |
| Bag and boat limits | ✓ | | |
| Bag and possession limits | | | ✓ |
| Bag limits | | ✓ | ✓ |
| Gear restrictions | | ✓ | |
| Licence | | ✓ | |
| Licence (boat-based sector) | | | ✓ |
| Size limit | ✓ | ✓ | ✓ |
| Spatial closures | | ✓ | |
| Active Vessels | | | |
| | South Australia | Victoria | Western Australia |
| | 219 Licences in MSF. 6 Licences | 18 Licence Holders in CTF. | 20 in SCEMF, <:3 in |

| | | | |
|--|--------------------------------------|--|---|
| | in NZRLF, 1 Licences in SZRLF, | 8 Licence Holders in GLF, 14 Licence Holders in OF, 9 Licence Holders in PPBWPF, 3 Licence Holders in ITF, 1 Licence Holders in OW, | WCDSIMF, 6 in WCEMF, 25 in WL (SC), 19 in Charter, |
|--|--------------------------------------|--|---|

MSF Marine Scalefish Fishery(SA)

NZRLF Northern Zone Rock Lobster Fishery(SA)

SZRLF Southern Zone Rock Lobster Fishery(SA)

CIF Corner Inlet Fishery(VIC)

GLF Gippsland Lakes Fishery(VIC)

OF Ocean Fishery(VIC)

PPBWPF Port Phillip Bay and Western Port Bay Fishery (VIC)

ITF Inshore Trawl Fishery(VIC)

SCEMF South Coast Estuarine Managed Fishery(WA)

WCDSIMF West Coast Demersal Scalefish (Interim) Managed Fishery(WA)

WCEMF West Coast Estuarine Managed Fishery(WA)

WL (SC) Open Access in the South Coast(WA)

OW Ocean Wrasse(VIC)

Charter Tour Operator(WA)

| Catch | | | |
|--------------|------------------------------|---|---|
| | South Australia | Victoria | Western Australia |
| Charter | | | 0.108143t in Charter, |
| Commercial | 244.215t in MSF NZRLF, | 32.1555t in CIF, 0.84684t in GLF, 0.4745t in OF, 28.538t in PPBWPF, | 10.1586t in SCEMF WCDSIMF WCEMF WL (SC), |
| Indigenous | Unknown | Unknown | Unknown |
| Recreational | 367 t (2013–14) | Unknown | 14 t (2015–16) Boat-based only |

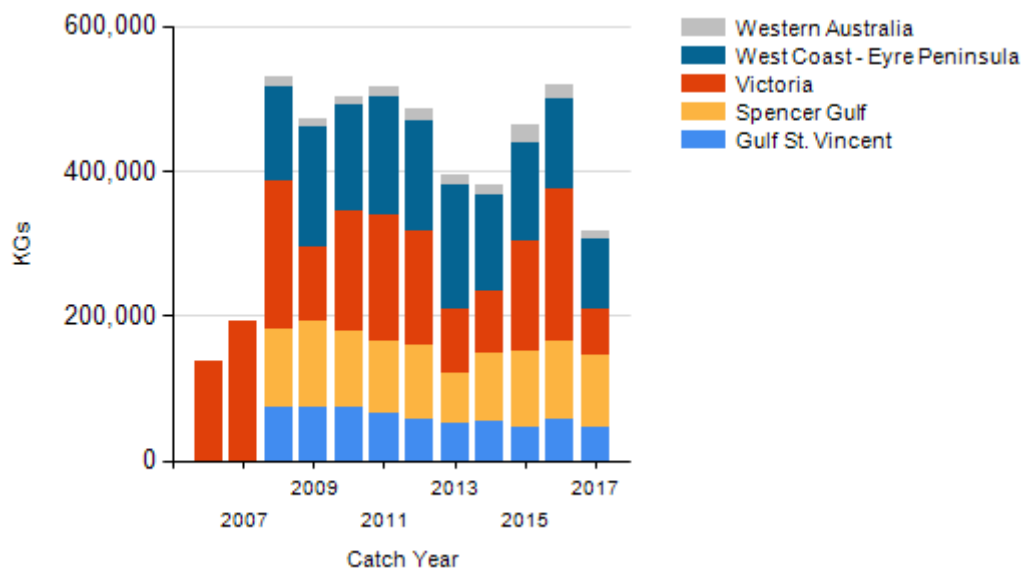
NZRLF Northern Zone Rock Lobster Fishery (SA), CIF Corner Inlet Fishery (VIC), GLF Gippsland Lakes Fishery (VIC), OF Ocean Fishery (VIC), PPBWPF Port Phillip Bay and Western Port Bay Fishery (VIC), ITF Inshore Trawl Fishery (VIC), SCEMF South Coast Estuarine Managed Fishery (WA), WCDSIMF West Coast Demersal Scalefish (Interim) Managed Fishery (WA), WCEMF West Coast Estuarine Managed Fishery (WA), WL (SC) Open Access in the South Coast (WA), OW Ocean Wrasse (VIC), MSF || NZRLF Marine Scale Fishery (including Northern Zone Rock Lobster Fishery) (SA), SCEMF || WCDSIMF || WCEMF || WL (SC) Various Fisheries combined due to 3 boat rule (WA),

Western Australia – Recreational (Management methods) In Western Australia a recreational fishing licence is only required for fishing from a boat.

Victoria – Recreational (Management methods) Boat limits do not apply in Victoria. In Victoria a recreational fishing licence is required for all forms of recreational fishing, unless exempt.

Victoria – Indigenous (Management methods) In Victoria, regulations for managing recreational fishing may not apply to fishing activities by Indigenous people. Victorian traditional owners may have rights under the Commonwealth's *Native Title Act 1993* to hunt, fish, gather and conduct other cultural activities for their personal, domestic or non-commercial communal needs without the need to obtain a licence. Traditional Owners that have agreements under the *Traditional Owner Settlement Act 2010* (Vic) may also be authorised to fish without the requirement to hold a recreational fishing licence. Outside of these arrangements, indigenous Victorians can apply for permits under the *Fisheries Act 1995* (Vic) that authorise fishing for specific indigenous cultural ceremonies or events (for example, different catch and size limits or equipment). There were no indigenous permits granted in 2017 and hence no indigenous catch recorded.

CATCH CHART



Commercial catch of King George Whiting - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on King George Whiting

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