

# Yellowfin Whiting (2023)

*Sillago schomburgkii*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Northern Western Australia	Sustainable	Catch, effort, CPUE, age composition
Western Australia	Southern Western Australia	Sustainable	Catch, CPUE, age, SPR
South Australia	Gulf St. Vincent	Sustainable	Catch, effort, CPUE
South Australia	Spencer Gulf	Sustainable	Catch, effort, CPUE

## STOCK STRUCTURE

Yellowfin Whiting is endemic to south-western Australia, being found in coastal waters from Exmouth in Western Australia to the gulf waters of South Australia [Gomon et al. 2008]. There is some uncertainty about the continuity of the species' distribution through the remote coastal waters between Western Australia and South Australia. Based on this possible discontinuous distribution, there is a possibility of separate stocks in these areas [Steer et al. 2018]. Western Australian populations in northern (Gascoyne Coast Bioregion) and southern (West Coast and South Coast Bioregions) regions also appear to have low connectivity. Adults in northern and southern regions have distinctly different size-at-age due to different growth rates, which suggests low levels of movement among regions [DPIRD unpublished data]. Northern and southern regions are therefore assumed to support separate biological stocks. In South Australia, oceanographic separation of the two gulfs during the spawning season in summer must considerably reduce the opportunity for mixing of eggs and larvae. As such, the populations in the gulfs may constitute separate stocks, but more evidence is required to confirm this.

Here, assessment of stock status is presented at the biological stock level—Northern Western Australia, Southern Western Australia, Spencer Gulf (South Australia) and Gulf St. Vincent (South Australia).

## STOCK STATUS

### Gulf St. Vincent

The Yellowfin Whiting is considered to be a Tier 2 species within South Australia's commercial multispecies, multi-gear and multi-sectoral Marine Scalefish Fishery. The most recent assessment of Yellowfin Whiting was completed in 2023 and used data to the end of June 2022 [Smart et al. 2023]. The primary indicators used for biomass and fishing mortality are catch, effort and targeted catch per unit effort (CPUE) [Smart et al. 2023]. The statewide recreational catch of Yellowfin Whiting was estimated to be 45.3 tonnes (t) in 2013–14 and 27.3 t in 2021–22. This was estimated from nominal catch data and there was no regional breakdown of catches for this or other species (Giri and Hall 2015; Beckmann et al. 2023).

Commercial catches from Gulf St. Vincent have been consistently lower than those from Spencer Gulf [Smart et al. 2023]. Annual catches were historically low during the 1980s but were double that level in most years from 2001–02 to 2013–14. Since 2014–15, catches were half the level of the previous decade, partially due to the implementation of marine parks in 2014 [Smart et al. 2023]. The low proportion of targeted effort impedes estimation of CPUE as an index of abundance and CPUE was not estimated in 2021–22. A catch-maximum sustainable yield (catch-MSY) model indicated that during 1999–2000 to 2013–14 catches may have exceeded MSY in several years, reducing the overall biomass from 2014–15 onwards, although catches have remained below MSY since then [Smart et al. 2023]. A similar trend was observed for standardised CPUE which rose to a peak in 1991–92 and remained stable at a historically high level to 2008–09 before declining to 2016–17 where it remained stable at an historically moderate level through to 2021–22 [Smart et al. 2023]. 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 Gulf St. Vincent biological stock is classified as a **sustainable stock**.

### Northern Western Australia

A recent stock assessment (unpublished report) has been conducted for Yellowfin Whiting in the Gascoyne Coast Bioregion (GCB) using state space biomass dynamics models (JABBA, SPiCT) fitted to annual catch (1956–2022) and standardised catch per unit effort data (CPUE; 1976–2022) to estimate biomass (B) and fishing mortality (F). Both biomass dynamics models yielded similar results indicating that Yellowfin Whiting in northern Western Australia has recovered from early historical overfishing, with current biomass above  $B_{MSY}$ , and associated estimates of fishing mortality remaining below  $F_{MSY}$  since the early 1960s. Since that time, catches have typically remained below model estimates for maximum sustainable yield (MSY). The above results are supported by an abundance-maximum sustainable yield (AMSY) analysis, a recently-developed stock assessment approach requiring only a spawning stock abundance index [Froese et al. 2020]. AMSY was applied to standardised CPUE data (1976–2022) and yielded results consistent with outputs for F and relative

biomass from the two biomass dynamics models. A further data-limited assessment analysis (catch-MSY) yielded a prediction for MSY that was similar to those from the two biomass dynamics models. The results from all four dynamic models are consistent with the conclusion of Smith et al. [2019] from their analysis of commercial fishery trends for Yellowfin Whiting in Shark Bay that, apart from a period of overfishing in the early 1960s, there is no evidence of major changes in abundance. A previous (equilibrium) per recruit model analysis, based on mortality estimates from catch curve analysis applied to commercial age composition data from 2014 [Brown 2014] estimated spawning potential ratio above the target (0.4) and relative biomass between the target and threshold (0.3). The results from this historic assessment indicate that, in 2014, the stock was being fished sustainably, which is consistent with outputs from the above dynamic assessment models.

The commercial catch in the GCB in 2022 was 96 t with the estimated boat-based recreational catch less than 1 t. While there are no formal catch limits in place, catches in recent years have remained stable within the historic range of 70–230 t. 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 Northern Western Australia stock is classified as a **sustainable stock**.

### **Southern Western Australia**

A per recruit model, based on mortality estimates from a catch curve analysis applied to commercial age composition data from 2015–2016 [Duffy et al. 2022], estimated female spawning potential ratio (SPR) above the target (0.4). The results from this assessment indicate that the stock was being fished sustainably in 2015–16. The maximum age of fish sampled in 2015–16 was 11 years, which is close to the maximum recorded age for Yellowfin Whiting in southern Western Australia of 12 years. From an analysis of commercial catch per unit effort (CPUE) trends for Yellowfin Whiting throughout different areas of its distribution in Western Australia, Smith et al. [2019] concluded that its abundance in southern Western Australia towards the northern extent of this region (and thus, for example, in the Peel-Harvey Estuary, Swan Canning Estuary and adjacent ocean waters) has increased gradually in recent years. On the south coast of the state, the abundances of this species have increased more substantially (e.g., in Hardy Inlet and Irwin Inlet) [Smith et al. 2019]. The study concluded that these trends reflect a multi-decadal poleward shift in the geographic centre of the abundance of this species, associated with warming trends in coastal waters.

Despite increasing commercial CPUE trends, commercial catches of Yellowfin Whiting in recent years (average of approximately 27 t in 2018–2022 for West and South Coast Bioregions combined) are lower than for some earlier periods (i.e., greater than 60 t in several years during the mid-1970s-1980s, and in 2000–2001). The recreational catch of Yellowfin Whiting is estimated from annual shore-based surveys of the Perth Metropolitan area (within the West Coast Bioregion) [Tate et al., 2022] and statewide boat-based surveys every 2–3 years [Ryan et al. 2022]. In 2021–22, the shore-based recreational catch of all whiting species combined in the Perth Metropolitan area was 0.6 t (95% CI; 0–1 t) [Tate et al. 2022]. In 2020–21, the boat-based recreational catch of Yellowfin Whiting was 6.3 t (95% CI; 2.6–8.9 t) for the West Coast Bioregion and 0.9 t (95% CI; 0.1–1.7 t) for the South Coast Bioregion (DPIRD unpublished data). As statewide shore-based catches are unknown, recreational catches of nearshore

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species will be underestimated from the statewide survey, particularly for species harvested in high proportions by shore-based recreational fishers. However, known recreational catches are low relative to commercial catches. 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 Southern Western Australia stock is classified as a **sustainable stock**.

**Spencer Gulf**

Yellowfin Whiting are considered to be Tier 2 species within South Australia's commercial multispecies, multi-gear and multi-sectoral Marine Scalefish Fishery. The most recent assessment of Yellowfin Whiting was completed in 2023 and used data to the end of June 2022 [Smart et al. 2023]. The primary indicators used for biomass and fishing mortality are catch, effort and targeted CPUE [Smart et al. 2023]. The statewide recreational catch of Yellowfin Whiting was estimated to be 45.3 t in 2013–14 and 27.3 t in 2021–22. This was estimated from nominal catch data and there was no regional breakdown of catches for this or other species (Giri and Hall 2015; Beckmann et al. 2023).

Most of the Yellowfin Whiting taken in South Australia are taken from northern Spencer Gulf, although the commercial fishery in this region is characterised by high levels of variability. This may reflect the transient nature of targeted fishing effort, with fishers opportunistically targeting Yellowfin Whiting due to market demands, or when the availability of higher-value species is low [Smart et al. 2023]. There was a declining trend in fishing effort for Yellowfin Whiting from 2004–05 to 2014–15 although this decline was not reflected in total catch, targeted catch or targeted CPUE. Increasing effort from 2015–16 to 2017–18 was reflected in increases in total catch, targeted catch and both raw and standardised CPUE [Smart et al. 2023]. Target effort declined from 2017–18 to 2021–22 while total catches remained stable and targeted CPUE increased [Smart et al. 2023]. A catch-MSY model indicated that recent catches remained close to, but rarely exceeded an MSY of 112 t [Smart et al. 2023]. 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.

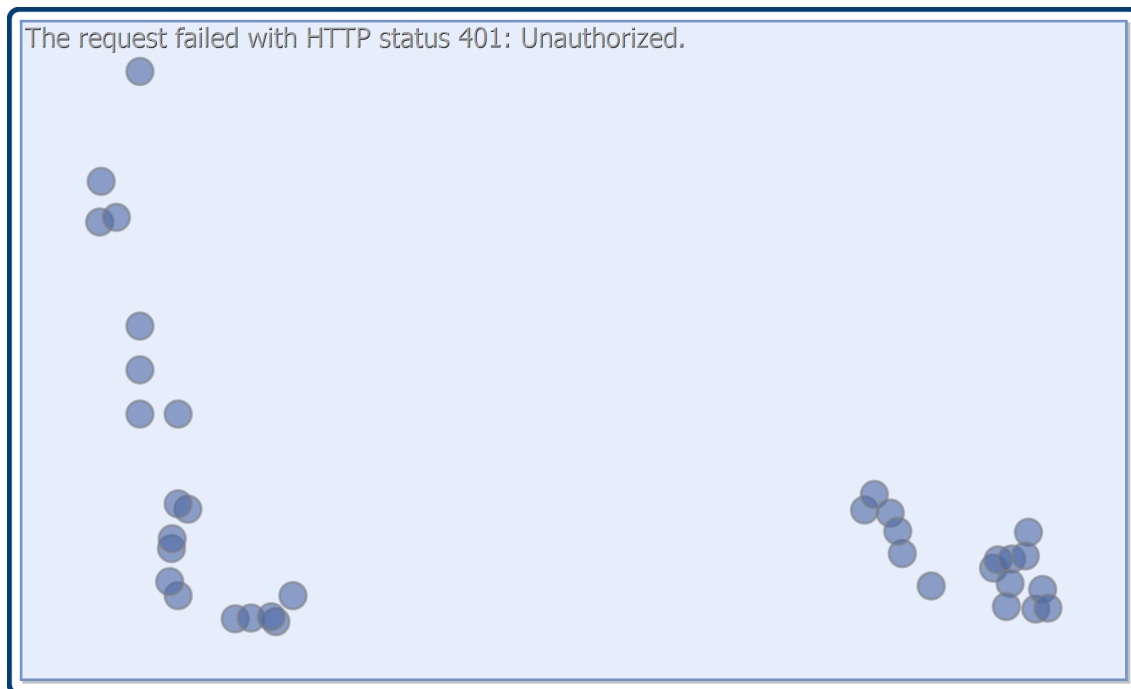
On the basis of the evidence provided above, the Spencer Gulf biological stock is classified as a **sustainable stock**.

**BIOLOGY**

**Yellowfin Whiting biology** [Ferguson 2000; Hutchins and Swainston 1986; Hyndes and Potter 1997]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Yellowfin Whiting	Western Australia: 12 years, 420 mm TL South Australia: 11 years, 420 mm TL	Western Australia: 2 years, 180–200 mm TL South Australia: 2 years, 220–240 mm TL

**DISTRIBUTION**



Distribution of reported commercial catch of Yellowfin Whiting

**TABLES**

<b>Fishing methods</b>		
	<b>South Australia</b>	<b>Western Australia</b>
<b>Charter</b>		
Rod and reel		✓
<b>Commercial</b>		
Beach Seine		✓
Gillnet		✓
Haul Seine		✓
Net		✓
Seine Nets	✓	
Unspecified	✓	
<b>Recreational</b>		
Hook and Line	✓	✓
Unspecified		✓

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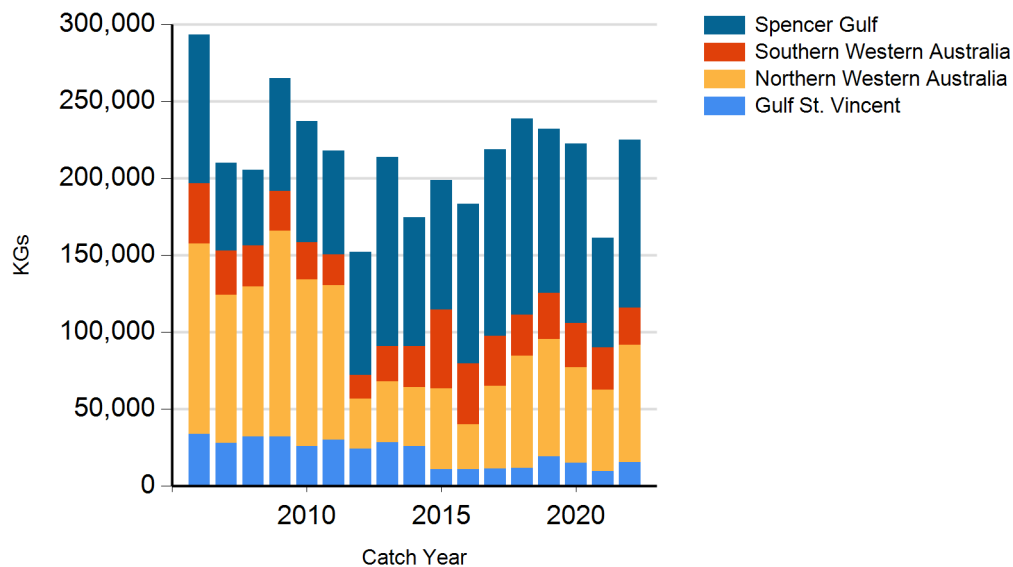
Management Methods		
	South Australia	Western Australia
<b>Commercial</b>		
Effort limits	✓	
Gear restrictions	✓	✓
Limited entry	✓	✓
Size limit	✓	
Spatial closures	✓	✓
Temporal closures	✓	
<b>Recreational</b>		
Bag limits	✓	✓
Gear restrictions	✓	
Possession limit		✓
Size limit	✓	

Catch		
	South Australia	Western Australia
<b>Commercial</b>	124.913 t	100.301 t
<b>Indigenous</b>	Unknown	
<b>Recreational</b>	27.3 t (2021–22), 45.3 t (2013–14)	Unknown

**Western Australia – Recreational (Catch).** Recreational catches of Yellowfin Whiting are taken by shore-based fishers. The current recreational catch is unknown due to the absence of any recent surveys of shore-based fishing.

**CATCH CHART**

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Commercial catch of Yellowfin Whiting - note confidential catch not shown

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