

Southern Calamari (2018)

Sepioteuthis australis



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Commonwealth	Commonwealth	SESSF (CTS)	Undefined	Catch
New South Wales	New South Wales	N/A, OTF	Sustainable	Catch, effort, CPUE trends
Victoria	Victoria	CIF, GLF, ITF, OF, PPBWPF	Sustainable	Catch, effort, CPUE trends
Tasmania	Tasmania	SF	Depleting	Catch, effort, CPUE trends
South Australia	South Australia	MSF NZRLF, NZRLF, SAPF	Sustainable	Catch, effort, CPUE trends

SESSF (CTS) Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector) (CTH), N/A Not Applicable (NSW), OTF Ocean Trawl Fishery (NSW), NZRLF Northern Zone Rock Lobster Fishery (SA), SAPF South Australian Prawn Fishery (SA), SF Scalefish Fishery (TAS), 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), MSF || NZRLF Marine Scale Fishery (including Northern Zone Rock Lobster Fishery) (SA)

STOCK STRUCTURE

The biological stock structure across the distributional range of Southern Calamari is complex and potentially dynamic. One study using allozyme markers identified three genetic types with overlapping distributions and possible stocks off Western Australia, South Australia, New South Wales and Tasmania (data were not available for Victoria) [Triantafillos and Adams 2001]. In contrast, another study using microsatellite markers found little genetic differentiation between seven study sites in Western Australia, Victoria, Tasmania and South Australia [Smith et al. 2015]. It also identified Tasmania as a possible important site for gene flow. Life history dynamics and studies of movement and statolith microchemistry in Tasmania also suggest some localised biological stock structuring [Pech et al. 2011].

In the absence of conclusive evidence on biological stock boundaries, assessment of stock status is presented at the jurisdictional level—Commonwealth, New South Wales, Victoria, Tasmania and South Australia.

STOCK STATUS

Commonwealth Commonwealth fishers take a small catch of Southern Calamari in the Danish-seine component of the Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector). This undoubtedly comprises individuals from biological stocks that spawn, and spend the majority of their lives, in shallower state waters. A larger quantity of squid caught in trawls and reported as Southern Calamari is probably Gould's Squid (*Nototodarus gouldi*) and is not included here. There is insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, Southern Calamari in the Commonwealth is classified as an **undefined stock**.

New South Wales

In New South Wales, Southern Calamari is taken primarily as a byproduct species in the commercial Ocean Trawl Fishery (OTF), particularly by the fish trawl sector off the central and southern coasts. Commercial landings in New South Wales were consistently above 50 tonnes (t) per annum until the mid-2000s, with a distinct peak of more than 100 t in the late-1990s [Hall 2015]. For the past 11 years, commercial catches have been lower at around 30–50 t per annum. These lower landings have resulted from a concurrent decrease in effort in the OTF from a 15 year average of 1 965 fisher days per annum to 992 fisher days in 2016–17 [NSW DPI unpublished]. After a minimum catch of 24 t in 2012, commercial catches have gradually increased again to 48 t in 2016 and 42 t in 2017 [NSW DPI unpublished]. The nominal catch rates by otter trawl nets in the fish trawl sector have been steady over the same period, with recent averages (32.0 kg per day, eight year average between 2009–10 and 2016–17) slightly higher than historical rates (21.0 kg per day, 12 year average between 1997–98 and 2008–09) [Hall 2015, NSW DPI unpublished]. Recreational anglers and charter boat operators in New South Wales also take significant quantities of Southern Calamari in estuaries, bays and inshore ocean waters, but often for bait rather than consumption and at much lower levels (estimated 6 500 squid per annum for the recreational sector in 2013–14) than in southern states [Hall 2015, West et al. 2015]. The above evidence indicates that the biomass is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, Southern Calamari in New South Wales is classified as a **sustainable stock**.

South Australia Southern Calamari is considered a primary species within South Australia's commercial multispecies, multi-gear and multi-sectoral Marine Scalefish Fishery. The most recent assessment of Southern Calamari was completed in 2018 and used data to the end of December 2017 [Steer et al. 2018]. The primary measure for biomass and fishing mortality is targeted catch per unit effort (CPUE) from jig and hauling-net fishers [Steer et al. 2018]. The total reported commercial catch of Southern Calamari in 2017, combined across all fisheries, was 466 t and has remained relatively stable (> 370 t) over the last seven years. Commercial targeted CPUE has remained relatively high in both the jig and the hauling net sectors of the fishery, exceeding 15 and 20 kg.fisherday⁻¹, respectively [Steer et al. 2018]. The recreational catch of Southern Calamari in South Australia continues to exceed that of other states, at an estimated 155 t in 2013–14 [Giri and Hall 2015]. 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, Southern Calamari in South Australia is classified as a **sustainable stock**.

Tasmania

The commercial fishery for Southern Calamari in Tasmania initially developed in the mid-1990s in the State's south east during the latter half of the 1990s. Annual catches rose from less than 20 t prior to 1995–96 to around 100 t between 1997–98 and 2003–04. Management interventions, such as the introduction of a species-specific licence and seasonal closures on key spawning grounds in the south east, were put in place due to declines in catch and catch rates in the south east of the state. Since these interventions, catches, effort and catch rates in the State's south east have been generally stable, with average annual catches of around 20–30 t reported from this region since 2006–07 [Moore et al. 2018].

Since the late 2000s, commercial landings of Southern Calamari off the State's north coast have increased substantially, increasing from around 15 t prior to 2007 to 72 t in 2015–16 and 81.7 t in 2016–17 [Moore et al. 2018]. These catches have been accompanied by increased levels of fishing effort (fisher days), which have risen sharply over the same period, increasing in the State's north from approximately 325 fisher days (all methods) to a record high of 994 fisher days in 2015–16 [Moore et al. 2018]. Catch rates in the north of the state have also increased over this period, with catch rates in the north-east reaching a record high in 2016–17 [Moore et al. 2018]. As there were no clear indications at the time that fishing mortality was excessive, the stock was considered sustainable [Moore et al. 2018]. However, data for 2017–18 indicates a substantial decline in catches and catch rates off the State's north coast [Moore et al. in prep], with catches declining by 65 per cent along the north coast relative to 2016–17, accompanied by a decline of 57 per cent in catch rates in the State's north east and 62 per cent in the State's north west.

The most recent recreational catch estimate (2012–13) indicated that landings were 63.5 t in 2012–13 [Lyle et al. 2014] and similar to commercial landings in that year. Landings from the recreational fishery have increased consistently since 2000 [Lyle et al. 2009, Lyle et al. 2014], indicating high interest by recreational fishers in the species.

The sharp decline in catch and catch rates for the north coast in 2017–18 raises uncertainty about the sustainability of increased effort from both the commercial and recreational sectors on populations in that region. In addition, egg mop surveys conducted in late 2017 provided evidence of limited spawning activity on the main north coast fishing grounds, implying low abundance of spawning adults, although the role of local environmental factors at that time on spawning behaviour remain unclear. Nevertheless, catches in both 2015–16 and 2016–17 exceeded recent estimates of maximum sustainable yield (MSY) based on catch-only estimation methods (derived using the *simpleSA* R package of Haddon and Punt [2018]). The MSY, derived from commercial catch data, for State waters was estimated to be 75 t (95 per cent CI = 64–84 t), and 33 t (95 per cent CI = 23–48 t) for the north coast. While there is uncertainty as to the current status of the biomass, recent high catches and effort, particularly off the north coast, suggest that fishing mortality has been excessive and likely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, Southern Calamari in Tasmania is classified as a **depleting stock**.

Victoria

In Victoria, Southern Calamari are mostly caught using haul seine nets within the Corner Inlet Fishery (CIF), and Port Phillip Bay and Western Port Fishery (PPBWPF), with a combined catch of 27 t landed in 2017. In the CIF, commercial catch ranged between 9.5 t and 44 t since 2000; while the

commercial catch within the PPBWPF declined from around 72 t in 2001 to 7.6 t in 2017 [VFA unpublished data 2017]. Catch rates in the CIF by haul seine nets are highly variable from year to year and have been above the limit reference point since 2000–01 [VFA 2017]. In 2017, catch rates of 7.8 kg per shot were achieved, consistent with the long-term average. In the PPBWPF during 2017, catch rates were 15.8 kg per shot and have been above the limit reference since of 5.9 kg/ shot since 1997–98 [VFA 2017]. Commercial netting is being phased out in Port Phillip Bay and since 2016, 34 of the 43 licences have been bought out by the Victorian Government. This has significantly reduced the commercial fishing effort from 25 licences in 2015 to 9 in 2017 with catch reduced from 27 t to 7.6 t, respectively. Commercial net fishing in Port Phillip Bay will cease by 2022 and has already ceased in Corio Bay. In recent years, recreational effort has increased in Port Phillip Bay; however, the impact on the total catch is unknown [Green 2015]. The above evidence indicates that the biomass is unlikely to be depleted and that recruitment is unlikely to be impaired. The evidence also indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

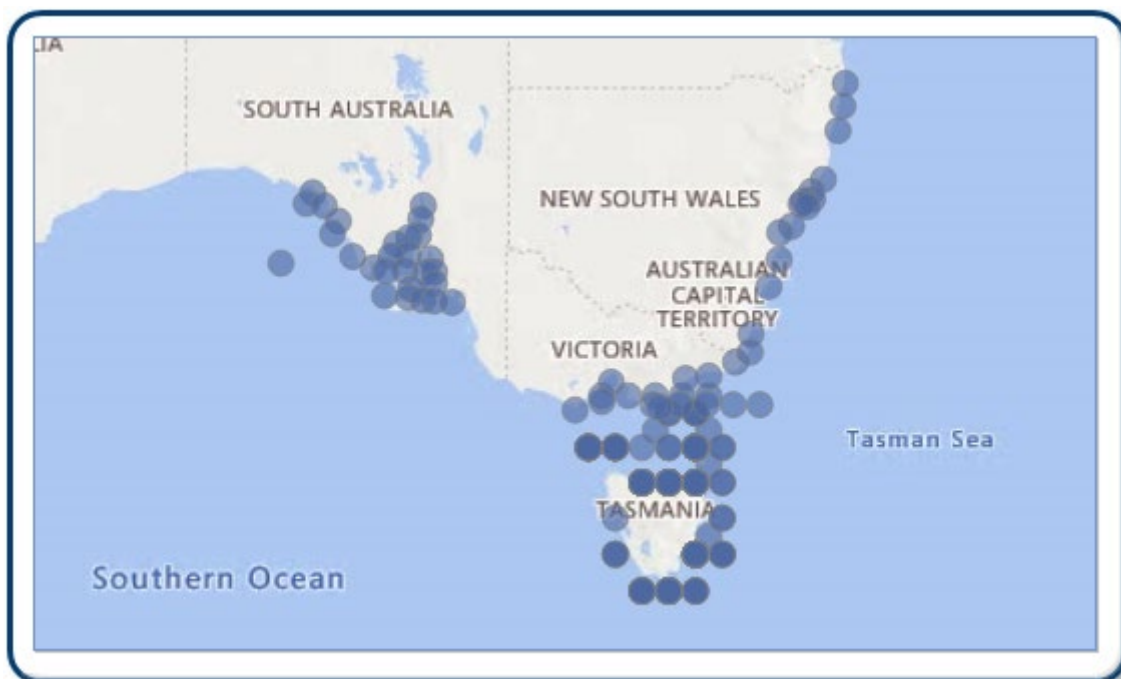
On the basis of the evidence provided above, Southern Calamari in Victoria is classified as a **sustainable stock**.

BIOLOGY

Southern Calamari biology [Pecl 2001, Pecl et al. 2004, Triantafillos 2004]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Southern Calamari	< 1 year, 550 mm ML, 3–4 kg	3–6 months; 150–200 mm ML

DISTRIBUTION



Distribution of reported commercial catch of Southern Calamari

TABLES

Commercial Catch Methods	Commonwealth	New South Wales	South Australia	Tasmania	Victoria
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Danish Seine	✓				
Dip Net				✓	
Gillnet				✓	
Hand Line, Hand Reel or Powered Reels				✓	
Haul Seine				✓	
Hook and Line					✓
Mesh Net				✓	
Net					✓
Otter Trawl		✓			
Seine Nets			✓		
Spearfishing				✓	
Squid Jigging			✓	✓	✓
Trawl			✓		
Unspecified		✓	✓	✓	✓

Fishing methods					
	Commonwealth	New South Wales	South Australia	Tasmania	Victoria
Charter					
Handline		✓			
Hook and Line					✓
Commercial					
Danish Seine	✓				
Gillnet				✓	
Hand Line, Hand Reel or Powered Reels				✓	
Haul Seine				✓	
Hook and Line					✓
Net					✓
Otter Trawl		✓			
Seine Nets			✓		
Squid Jigging			✓	✓	✓
Trawl			✓		
Unspecified		✓	✓	✓	
Indigenous					
Handline		✓			
Spearfishing				✓	
Squid Jigging			✓	✓	
Recreational					
Diving					✓
Hand held-					✓

Implement s					
Handline		✓			
Hook and Line					✓
Spearfishing				✓	
Squid Jigging			✓	✓	
Management Methods					
	Commonwealth	New South Wales	South Australia	Tasmania	Victoria
Charter					
Bag limits		✓			✓
Gear restrictions		✓			✓
Licence					✓
Spatial closures		✓			✓
Commercial					
Effort limits					✓
Gear restrictions	✓	✓	✓		✓
Licence					✓
Limited entry	✓	✓	✓	✓	✓
Spatial closures		✓	✓	✓	✓
Temporal closures (spawning season)				✓	
Vessel restrictions		✓			
Indigenous					
Bag and possession limits				✓	
Bag limits		✓	✓	✓	
Customary fishing permits					✓
Native Title		✓			
Section 37 (1d)(3)(9), Aboriginal cultural fishing authority		✓			
Temporal closures (spawning season)				✓	

Recreational					
Bag and possession limits				✓	✓
Bag limits		✓	✓	✓	✓
Gear restrictions		✓			✓
Licence					✓
Spatial closures		✓			✓
Temporal closures (spawning season)				✓	

Active Vessels					
	Commonwealth	New South Wales	South Australia	Tasmania	Victoria
	12 Vessels in SESSF (CTS),	43 Fishing Business in OTF,	205 Licences in MSF, 3 Licences in NZRLF, 52 Licences in SAPF,	62 Vessels in SF,	16 Licence Holders in CIF, 1 Licence Holders in GLF, 3 Licence Holders in OF, 9 Licence Holders in PPBWPF, 5 Licence Holders in ITF,

SESSF (CTS) Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector)(CTH)

OTF Ocean Trawl Fishery(NSW)

MSF Marine Scalefish Fishery(SA)

NZRLF Northern Zone Rock Lobster Fishery(SA)

SAPF South Australian Prawn Fishery(SA)

SF Scalefish Fishery(TAS)

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)

Catch					
	Commonwealth	New South Wales	South Australia	Tasmania	Victoria
Charter		923 squid (2017)			
Commercial	0.426t in SESSF (CTS),	1.256t in N/A, 40.458t in OTF,	413.585t in MSF NZRLF, 52.6378t in SAPF,	122.582t in SF,	19.6184t in CIF, 0.384t in ITF, 7.5918t in PPBWPF,
Indigenous	Unknown	Unknown	Unknown	Unknown	Unknown (No

					catch under permit)
Recreational	Unknown	6 500 squid (2013–14)	155 t (2013–14)	65 t (2012–13)	Unknown

SESSF (CTS) Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector) (CTH), N/A Not Applicable (NSW), OTF Ocean Trawl Fishery (NSW), NZRLF Northern Zone Rock Lobster Fishery (SA), SAPF South Australian Prawn Fishery (SA), SF Scalefish Fishery (TAS), 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), MSF || NZRLF Marine Scale Fishery (including Northern Zone Rock Lobster Fishery) (SA),

Commonwealth – Recreational The Commonwealth Government does not manage recreational fishing. Recreational fishing in Commonwealth waters is managed by the states or territory immediately adjacent to those waters, under their management regulations.

Commonwealth – Indigenous The Commonwealth Government does not manage non-commercial Indigenous fishing (with the exception of the Torres Strait). In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the states or territory immediately adjacent to those waters. In the Torres Strait both commercial and non-commercial Indigenous fishing is managed by the Torres Strait Protected Zone Joint Authority (PZJA) through the Australian Fisheries Management Authority (Commonwealth), Department of Agriculture Fisheries and Forestry (Queensland) and the Torres Strait Regional Authority. The PZJA also manages non-Indigenous commercial fishing in the Torres Strait.

New South Wales – Indigenous (management methods) (a) Bag limits - the Aboriginal Cultural Fishing Interim Access Arrangement allows an Indigenous fisher in New South Wales to take in excess of a recreational bag limit in certain circumstances—for example, if they are doing so to provide fish to other community members who cannot harvest themselves; (b) Aboriginal cultural fishing authority - the authority that Indigenous persons can apply to take catches outside the recreational limits under the *Fisheries Management Act 1994* (NSW), Section 37 (1d)(3)(9), Aboriginal cultural fishing authority; (c) Native title - in cases where the *Native Title Act 1993* (Cth) applies fishing activity can be undertaken by the person holding native title in line with S.211 of that Act, which provides for fishing activities for the purpose of satisfying their personal, domestic or non-commercial communal needs. In managing the resource where native title has been formally recognised, the native title holders are engaged with to ensure their native title rights are respected and inform management of the State's fisheries resources.

New South Wales – Charter (catch) Considerable under-reporting of catch by this sector is likely [NSW DPI unpublished].

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.

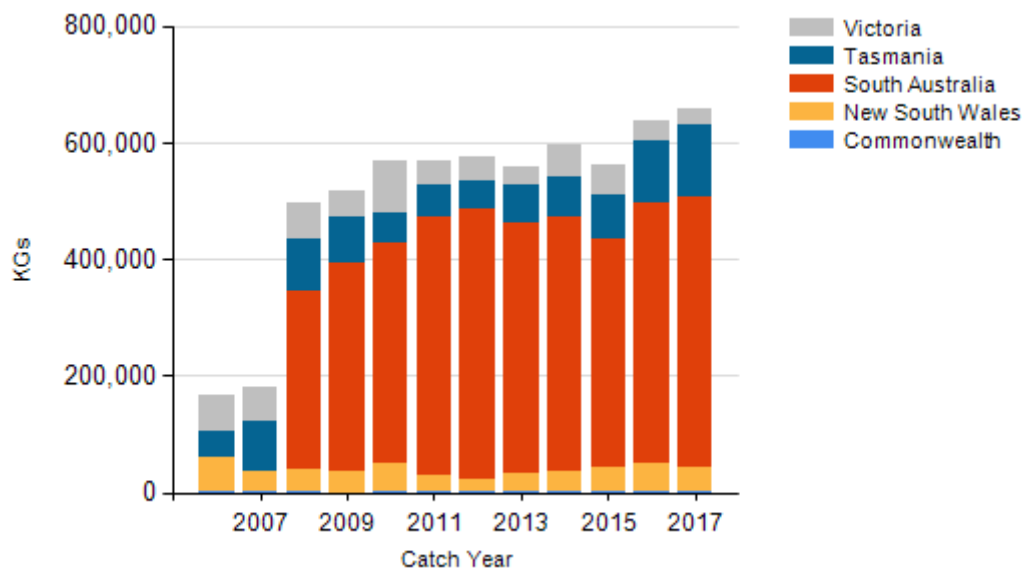
Tasmania – Commercial (catch) Catches reported for the Tasmanian Scalefish Fishery are for the period 1 July to 30 June the following year. The most recent (complete) assessment available is for 2016–17.

Tasmania – Recreational (management methods) In Tasmania, a recreational licence is required for fishers using dropline or longline gear, along with nets, such as gillnet or beach seine. A bag limit of 10 individuals and a possession limit of 20 individuals is in place for recreational fishers.

Tasmania – Indigenous (management methods) In Tasmania, Indigenous persons engaged in aboriginal fishing activities in marine waters are exempt from holding recreational fishing

licences, but must comply with all other fisheries rules as if they were licensed. Additionally, recreational bag and possession limits also apply. If using pots, rings, set lines or gillnets, Indigenous fishers must obtain a unique identifying code (UIC). The policy document Recognition of Aboriginal Fishing Activities for issuing a UIC to a person for Aboriginal Fishing activity explains the steps to take in making an application for a UIC.

CATCH CHART



Commercial catch of Southern Calamari - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on Southern Calamari

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