Gould's Squid (2018)

Nototodarus gouldi

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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Commonwealth, New South Wales, Tasmania	South-Eastern Australia	N/A, OTF, SESSF (CTS), SESSF (GABTS), SF, SSJF	Sustainable	Catch rates, catch, effort

SESSF (CTS) Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector) (CTH), SESSF (GABTS) Southern and Eastern Scalefish and Shark Fishery (Great Australian Bight Trawl Sector) (CTH), SSJF Southern Squid Jig Fishery (CTH), N/A Not Applicable (NSW), OTF Ocean Trawl Fishery (NSW), SF Scalefish Fishery (TAS)

STOCK STRUCTURE

Genetic studies support the hypothesis of a single biological stock of Gould's Squid throughout south eastern Australian waters [Jackson and McGrath-Steer 2003]. Two techniques, statolith shape and statolith elemental composition, have also been used to determine dispersal patterns of Gould's Squid and evidence of separate stocks [Green et al. 2015, Virtue et al 2011]. Samples were collected from Victoria and the Great Australian Bight. Adult statolith shape provided evidence that adults caught in the two locations belonged to different stocks, however, statolith elemental composition suggested that Gould's Squid caught at each location had hatched throughout their distribution [Green et al. 2015]. Hence, genetic homogeneity of the species is suspected to be a function of egg mass and juvenile drift resulting from seasonal longitudinal ocean currents rather than large-scale migration between the two regions [Green et al. 2015]. Also, this drift appears to provide more juvenile squid from Victoria to the Great Australian Bight than occurs in the opposite direction. The current dominance of Victorian and Tasmanian regions in terms of fishing effort means that a single stock approach to management is appropriate at this time [Green et al. 2015].

Here, assessment of stock status is presented at the biological stock level—South-Eastern Australia.

STOCK STATUS

South-Eastern

The South-Eastern Australia Gould's Squid biological stock is fished in the jurisdictions of the Commonwealth, New South Wales and Tasmania. The status

Australia

presented here for the entire biological stock has been established using evidence from all jurisdictions.

No formal stock assessment is available for the Gould's Squid biological stock in Australia. Gould's Squid is short lived (less than one year), spawns multiple times during its life, and displays highly variable growth rates, and size and age at maturity [Jackson and McGrath-Steer 2003]. These characteristics mean that the population can rapidly increase in biomass during favourable environmental conditions; it is therefore less susceptible to becoming recruitment overfished than longer-lived species. The high historical catches taken by foreign vessels in the late 1970s and 1980s indicate that a high annual harvest can be taken from the stock in years of high abundance without greatly reducing recruitment and biomass for subsequent seasons. However, as the fishery targets a single year class there is potential for recruitment overfishing if insufficient animals survive long enough to reproduce. Given spawning occurs throughout the year [Jackson and McGrath-Steer 2003] there is minimal risk of recruitment overfishing in seasonal and localised fisheries such as those in South-Eastern Australia.

The majority of catch is taken by demersal trawling and squid jigging. Total fishing effort in the Southern Squid Jig Fishery (Commonwealth) (SSJF) decreased from the peak fishing effort of 15 600 jig hours in 1997 to 617 jig hours in 2010. Jig effort increased to approximately 4000 jig hours in 2011–12, but has subsequently decreased to less than 2000 jig hours. Historical changes in fishing effort, prior to 2011, largely reflected economic factors rather than changes in Gould's Squid catch rates with high operating costs and low prices driving contraction of the SSJF [Sahlqvist and Skirtun 2011]. Following increased effort in 2015 and 2016, effort declined in 2017 (1 332 jig hours) [AFMA 2017]. Fishing effort in the Commonwealth Trawl Sector and Great Australian Bight Trawl Sector has also substantially decreased over time from 47 063 trawl hours in 2001 to 26 690 trawl hours in 2017 [Helidoniotis et al. 2018, Moore and Mobsby 2018].

Gould's Squid are taken in small quantities as byproduct of the New South Wales Ocean Trawl Fishery (OTF) [Hall 2015]. Annual landings from New South Wales have steadily decreased since 1998 from 45 tonnes (t) to less than 10 t in each of the last five years [NSW DPI unpublished]. Most of the decline has been in catches from the prawn trawl sector along the northern coast in response to a concurrent decrease in fishing effort (from 9 671 fisher days in 1997–98 to 2 026 fisher days in 2016–17). Nominal commercial catch rates have remained steady over the same period in both the fish trawl and prawn trawl sectors of the OTF [NSW DPI unpublished].

Gould's Squid are sporadically present in high abundances in Tasmanian waters in late summer–early autumn, especially off the south east coast (for example years 2000, 2007, 2012, 2013). In years of high local abundance, dual endorsed automatic squid-jig vessels have concentrated fishing effort in Tasmanian State waters before moving back to more traditional fishing grounds in Commonwealth waters. As a consequence, Tasmanian catches of Gould's Squid have been highly variable through time and strongly influenced by the level of automatic jig activity [Moore et al. 2018]. The reported catch of Gould's Squid from Tasmanian waters was 175.6 t in 2017 [Moore et al. 2018].

Combined total catch from the Commonwealth, New South Wales and Tasmania since 2000 has been below 3 000 t, which is below the historical peak of 7 914 t taken by foreign jig fishing vessels in 1979–80. The nominal catch rates from the Commonwealth Trawl Sector, the Tasmanian Scalefish Fishery and OTF have been stable over time [Emery and Curtotti 2018, Moore et al. 2018]. Depletion analysis suggests the stock has not become recruitment overfished due to jigging or demersal trawling pressure in past years [Emery and Curtotti 2018]. This evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the current level of fishing mortality across jurisdictions is unlikely to cause the stock to become

recruitment impaired.

On the basis of the evidence provided above, the South-Eastern Australia biological stock is classified as a **sustainable stock**.

BIOLOGY

Gould's Squid biology [Jackson and McGrath-Steer 2003]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Gould's Squid	< 1 year, 350–400 mm ML	6–9 months, 170–300 mm ML

DISTRIBUTION

Distribution of reported commercial catch of Gould's Squid

TABLES

Commercial Catch Methods	Commonwealth	New South Wales	Tasmania
Danish Seine	✓		
Demersal Pair Trawl	✓		
Hand Line, Hand Reel or Powered Reels			✓
Midwater Trawl	✓		
N/A		✓	
Otter Trawl	✓	✓	
Squid Jigging			✓
Squid jigs (mechanised)	✓		✓
Unspecified			✓

Fishing methods			
	Commonwealth	New South Wales	Tasmania
Charter			
Hook and Line		✓	
Squid Jigging		✓	
Commercial			
Danish Seine	✓		
Otter Trawl	✓	✓	
Squid jigs (mechanised)	✓		
Unspecified			✓
Indigenous			
Hook and Line		✓	✓
Squid Jigging		✓	✓
Recreational			
Hook and Line		✓	✓
Squid Jigging		✓	✓

Management Methods			
	Commonwealth	New South Wales	Tasmania
Charter			
Bag limits		✓	
Gear restrictions		✓	
Spatial closures		✓	
Commercial			
Effort limits	✓		
Gear restrictions		✓	
Limited entry	✓	✓	✓
Spatial closures		✓	✓
Temporal closures			✓
Trigger limits	✓		
Vessel restrictions	✓	✓	✓
Indigenous			
Bag and possession limits			✓
Bag limits		✓	✓

Gear restrictions			✓
Native Title		✓	
Section 37 (1d)(3)(9), Aboriginal cultural fishing authority		✓	
Temporal closures			✓
Recreational			
Bag and possession limits			✓
Bag limits		✓	✓
Gear restrictions		✓	✓
Spatial closures		✓	
Temporal closures			✓

Active Vessels			
	Commonwealth	**New South Wales**	**Tasmania**
	29 Vessels in SESSF (CTS), 4 Vessels in SESSF (GABTS), 6 Vessels in SSJF,	45 Fishing Business in OTF,	16 Vessels in SF,

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

SESSF (GABTS) Southern and Eastern Scalefish and Shark Fishery (Great Australian Bight Trawl Sector)(CTH)

SSJF Southern Squid Jig Fishery(CTH)

OTF Ocean Trawl Fishery(NSW)

SF Scalefish Fishery(TAS)

Catch			
	Commonwealth	**New South Wales**	**Tasmania**
Charter		34 squid (2017)	
Commercial	568.857t in SESSF (CTS), 45.6867t in SESSF (GABTS), 213.123t in SSJF,	0.165t in N/A, 7.883t in OTF,	175.637t in SF,
Indigenous	Unknown	Unknown	Unknown
Recreational	Unknown	Unknown	21 t in 2012–13

SESSF (CTS) Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector) (CTH), SESSF (GABTS) Southern and Eastern Scalefish and Shark Fishery (Great Australian Bight Trawl Sector) (CTH), SSJF Southern Squid Jig Fishery (CTH), N/A Not Applicable (NSW), OTF Ocean Trawl Fishery (NSW), SF Scalefish Fishery (TAS),

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

Commonwealth – Indigenous The Australian Government does not manage non-commercial Indigenous fishing in Commonwealth waters, with the exception of the Torres Strait. In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters.

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; and (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.

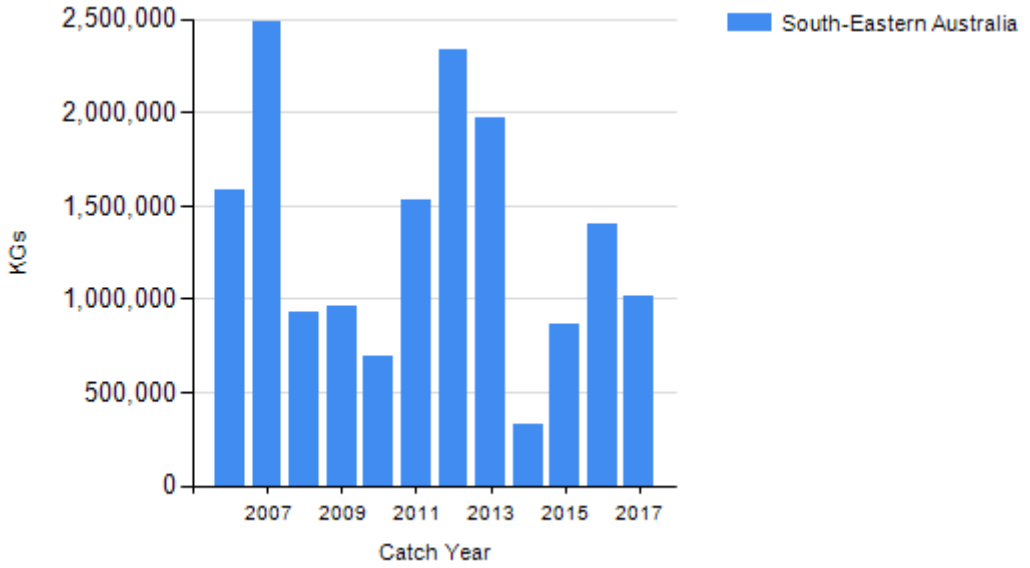
New South Wales – Charter (catch) Considerable under-reporting of catch by this sector is likely [NSW DPI unpublished].

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 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 15 individuals and a possession limit of 30 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 Gould's Squid - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on Gould's Squid

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