

Gummy Shark (2020)

Mustelus antarcticus



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Commonwealth, Western Australia, Victoria, Tasmania, South Australia	Southern Australia	Sustainable	Estimated pup production (proxy for biomass)
New South Wales	Eastern Australia	Undefined	

STOCK STRUCTURE

Gummy Shark (*Mustelus antarcticus*) is distributed throughout the temperate waters of Australia, from at least Port Stephens in New South Wales, to Geraldton in Western Australia (including Tasmania) [Gardner and Ward 2002, Last and Stevens 2009]. There is most likely two biological stocks of *M. antarcticus* in Australia; one in southern Australia (extending from the lower west coast of Western Australia to Jervis Bay in New South Wales and a second in eastern Australia, extending from Newcastle to the Clarence River in New South Wales [Last and Stevens 2009]. The lower fecundity and smaller total length at a reproductive maturity of the eastern stock relative to the southern stock supports this division (see Biology Table).

Conventional tagging showed adult Gummy Sharks exhibit broad-scale displacements from tagging locations of up to 2362 km in 6.8 years, yet only 15 per cent of adults were recaptured > 250 km from the tagging location. The mean displacement was approximately 150 km [Walker 2000]. Acoustic tagging in Western Australia showed comparable movements, with average long-distance displacements of 238 km and maximum displacements of > 900 km [Braccini et al. 2017].

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

STOCK STATUS

Eastern Available information indicates that there is little catch of Gummy Shark (less

Australia than 50 t per year) off NSW [Peddemors 2015]. In the 2019 calendar year, the total catch was around 23 t. CPUE in NSW has remained relatively stable since 2014. There is insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, the Eastern Australia biological stock is classified as an **undefined stock**.

Southern Australia The Southern Australian biological stock is split into 4 stocks for modelling and assessment purposes; the continental shelf of Bass Strait, Tasmania, South Australia and Western Australia. The first 3 are assessed together by the Commonwealth [Punt et al. 2016]. The fourth is assessed and reported separately by Western Australia. The status presented here for the entire biological stock has been established using the Commonwealth assessment. Additional catch and effort information is provided for relevant jurisdictions.

There is a close relationship between the number of pups and both the number, and length, of females [Walker 1992] and so the Commonwealth assessment uses pup production as an indicator of biomass for Gummy Shark. The base-case model from the most recent assessment [Punt et al. 2016] estimated the 2016 pup production as a proportion of the unfished level of pup production (P₀; 1927) to be above 0.48P₀ (48 per cent of virgin pup production). As a result, this part of the biological stock is not considered to be recruitment impaired. The 2016 stock assessment estimated a recommended biological catch (RBC) of 1 961 t [Punt et al. 2016]. The total catch in the Commonwealth Southern and Eastern Scalefish and Shark Fishery (SESSF) for the 2019–20 fishing season was 1 781 t (1682 for the 2018–19 fishing season). This level of fishing mortality is unlikely to cause the biological stock to become recruitment impaired.

Fishers in South Australia's commercial multi-species, multi-gear and multi-sectoral Marine Scalefish Fishery (MSF) take Gummy Shark as bycatch when targeting Snapper and other species using demersal long-lines, gill-nets and hand-lines. The total reported catch of Gummy Shark by the MSF in 2018–19 was 80 t. Gummy Sharks are also targeted by clients of the South Australian Charter Fishery [Rogers et al. 2020] and by the recreational fishery [Steer et al. 2020]. The South Australian State-wide recreational catch of Gummy Shark was estimated at approximately 37 t in 2013–14 [Giri and Hall 2015].

Gummy Shark landings were relatively high (500–1000 t) in Victoria from 1978–1997 until trip limits were introduced for most state fisheries [Conron et al. 2020]. In recent years, fishing effort in Victorian state fisheries have increased in Corner Inlet and decreased in Port Phillip Bay, with the latter a result of licence buy-outs [Conron et al. 2020]. In recent years Gummy Shark long line CPUE in Port Phillip Bay has been above the 1979–2015 average CPUE, potentially due to targeting this species as snapper abundance decreased [Conron et al. 2020]. Conversely, CPUE has been declining in Corner Inlet since ~2006, having fallen below the average in 2012 where it has remained since, but has remained above the minimum Conron et al. 2020]. Recreational CPUE in Western Port has remained relatively consistent as has the size composition of the catch [Conron et al. 2020]. Results from the most recent Victorian assessment (2019) show increases through time in both recreational CPUE in Western Port and commercial longline CPUE in Port Phillip Bay, consistent with the Commonwealth stock assessment on which this report is based. Although trends in commercial mesh net CPUE in Corner Inlet were contrary to the positive trends elsewhere, Gummy Shark represent a by-product in this region of the fishery [Conron et al. 2020]. Therefore, mesh-net CPUE trends from Corner Inlet may not accurately reflect underlying stock dynamics. Overall, Victorian CPUE trends support the status determination derived from the Commonwealth stock assessment [Punt et al. 2016].

The Western Australian component of the stock was recently assessed using a risk-based weight of evidence approach using all available lines of evidence,

including simulated biomass trajectories derived from a combination of demographic modelling and catch-only stock reduction analysis [Braccini et al. 2018]. This assessment estimated a “Low” current risk level for the Gummy Shark stock, with 87 per cent, 100 per cent and 100 per cent of the simulated current (2015–16) relative total biomass trajectories being above the target, threshold and limit biomass reference points, respectively [Braccini et al. 2018].

In addition, standardised catch rates have been stable since 2010 [Braccini et al 2019]. Therefore, this part of the biological stock is not considered to be recruitment impaired.

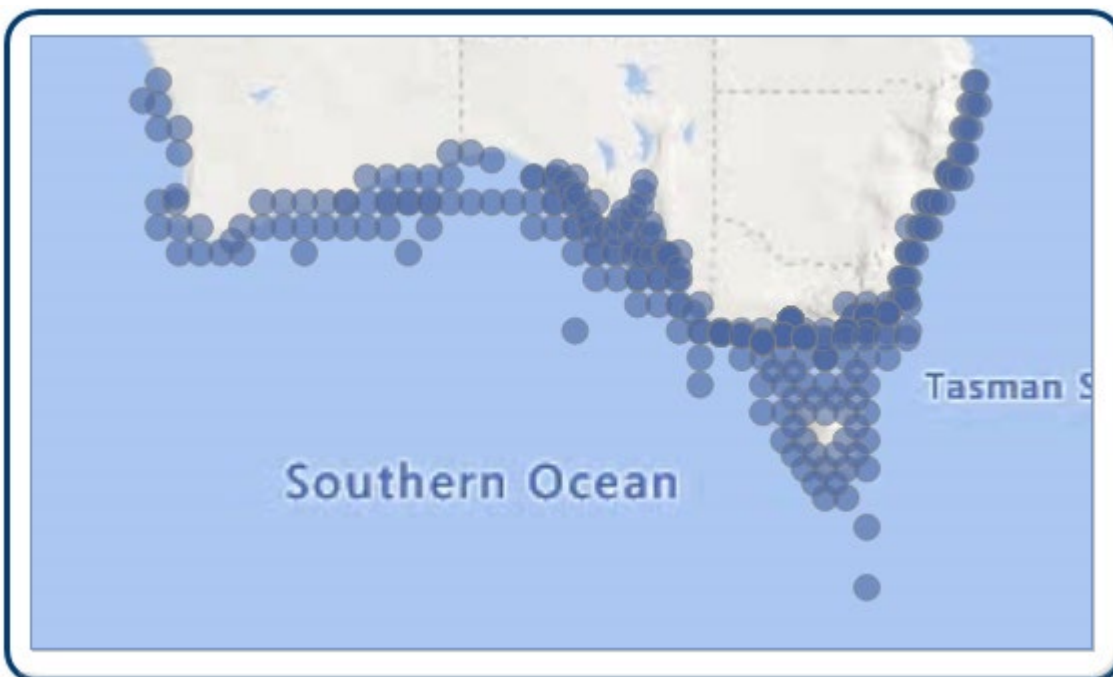
The above evidence indicates that the biomass of this stock is unlikely to be depleted, recruitment is unlikely to be impaired, and the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired. On the basis of the evidence provided above, the Southern Australia biological stock is classified as a **sustainable stock**.

BIOLOGY

Gummy Shark biology [Moulton et al. 1992, Peddemors 2015 ,Walker 2007, Walker 2010]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Gummy Shark	Southern: 16 years, 1 850 mm TL (25 kg total body mass) Eastern: 1000 mm TL	Southern: Females 1 105– 1 253 mm TL Males 950– 1 133 mm TL Eastern: 650-700 mm TL

DISTRIBUTION



Distribution of reported commercial catch of Gummy Shark

TABLES

Fishing methods	Commonwealth	New South	South	Tasmania	Victoria	Western

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Gummy Shark (2020)

		Wales	Australia			Australia
Charter						
Rod and reel						✓
Commercial						
Danish Seine	✓					
Demersal Gillnet	✓					
Demersal Longline	✓			✓		
Drifting longline				✓		
Dropline	✓					
Gillnet			✓	✓		✓
Hand Line, Hand Reel or Powered Reels				✓		
Hook and Line					✓	
Line		✓				
Longline (Unspecified)						✓
Net					✓	
Otter Trawl	✓	✓				
Traps and Pots					✓	
Trawl	✓					
Unspecified			✓	✓		
Various		✓				
Recreational						
Demersal Longline				✓		
Gillnet				✓		
Hook and Line		✓	✓	✓	✓	✓

Management Methods						
	Commonwealth	New South Wales	South Australia	Tasmania	Victoria	Western Australia
Charter						
Bag limits						✓
Licence (boat-based sector)						✓
Spatial closures						✓
Commercial						
Catch limits						✓

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Gummy Shark (2020)

Effort limits (individual transferable effort)						✓
Gear restrictions	✓	✓	✓	✓	✓	✓
Individual transferable quota	✓					
Limited entry	✓	✓	✓	✓	✓	✓
Processing restrictions	✓	✓	✓			✓
Size limit	✓	✓	✓	✓	✓	
Spatial closures	✓	✓		✓	✓	✓
Total allowable catch	✓					
Trip limits			✓	✓		
Recreational						
Bag limits		✓	✓	✓	✓	✓
Licence					✓	
Licence (boat-based sector)						✓
Possession limit					✓	
Size limit			✓	✓	✓	
Spatial closures				✓	✓	✓
Trip limits				✓		

Catch	Commonwealth	New South Wales	South Australia	Tasmania	Victoria	Western Australia
Charter						<0.5 t
Commercial	1801.98 t	22.4952 t	80.2698 t	7.6422 t	15.4608 t	348.341 t
Indigenous		Unknown	Unknown	Unknown	Unknown (No catch under permit)	Unknown but likely to be negligible
Recreational		Unknown	37.03 t (in 2013–14)	Unknown	Unknown	1693 individuals caught in 2017–18 (of which, 922 were kept, Ryan et al 2019). Shore-based catches are unknown

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.

Western Australia – Recreational (Management methods) A recreational fishing from boat licence is required for recreational fishing from a powered vessel in Western Australia.

New South Wales Data provided for New South Wales align with the 2018–19 fiscal year with all vessels active in the fishery included (irrespective of whether they reported landing this species). The New South Wales EGF, OTF and OTLF fish both the Southern Australian and Eastern Australian stocks.

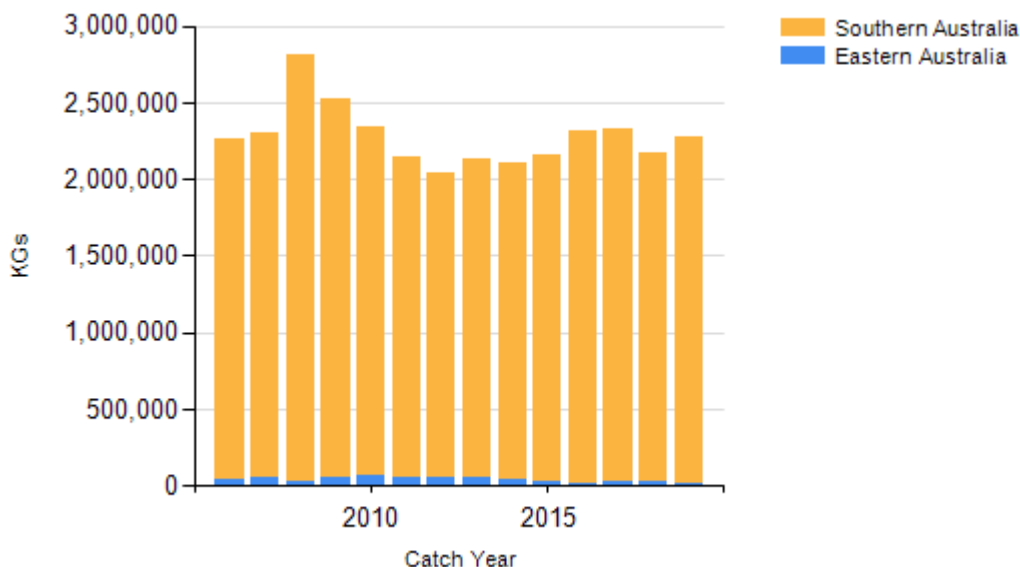
New South Wales – Indigenous (Management Methods)

<https://www.dpi.nsw.gov.au/fishing/aboriginal-fishing>

Victoria – Indigenous (Management Methods) A person who identifies as Aboriginal or Torres Strait Islander is exempt from the need to obtain a Victorian recreational fishing licence, provided they comply with all other rules that apply to recreational fishers, including rules on equipment, catch limits, size limits and restricted areas. Traditional (non-commercial) fishing activities that are carried out by members of a traditional owner group entity under an agreement pursuant to Victoria’s *Traditional Owner Settlement Act 2010* are also exempt from the need to hold a recreational fishing licence, subject to any conditions outlined in the agreement. Native title holders are also exempt from the need to obtain a recreational fishing licence under the provisions of the Commonwealth’s *Native Title Act 1993*.

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. **Tasmania – Indigenous (Management Methods)** In Tasmania, Indigenous people 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, Aborigines 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 Gummy Shark - note confidential catch not shown

References	
Gardner and Ward 2002	Gardner, MG and Ward, RD 2002, Taxonomic affinities within Australian and New Zealand <i>Mustelus</i> sharks inferred from allozymes, mitochondrial DNA and precaudal vertebrae counts, <i>Copeia</i> , 2002(2): 356–363.
Last and Stevens 2009	Last, PR and Stevens, JD 2009 <i>Sharks and rays of Australia</i> , CSIRO Publishing, Collingwood.
White and Last 2008	White, WT and Last, PR 2008, Description of two new species of gummy sharks, genus <i>Mustelus</i> (Carcharhiniformes: Triakidae), from Australian waters, in PR Last, WT White and JJ Pogonoski (eds), <i>Descriptions of new Australian chondrichthyans</i> , CSIRO Marine and Atmospheric Research paper 22, CSIRO Marine and Atmospheric Research, Canberra, 189–202.
Braccini et al. 2017	Braccini, M, Rensing, K, Langlois, T and McAuley, R 2017, Acoustic monitoring reveals the broad-scale movements of commercially-important sharks. <i>Marine Ecology Progress Series</i> , 577:121–129.
Braccini et al. 2018	Braccini, M, Blay, N, Hesp, A, and Molony, B 2018. Resource Assessment Report Temperate Demersal Elasmobranch Resource of Western Australia. Department of Primary Industries and Regional Development. Fisheries Research Report No. 294 Department of Primary Industries and Regional Development, Western Australia. 149 pp
Walker 1992	Walker, TI 1992, Fishery Simulation Model for Sharks Applied to the Gummy Shark, <i>Mustelus antarcticus</i> Gunther, from Southern Australian Waters. <i>Australian Journal of Marine and Freshwater Research</i> , 43.
Moulton, Walker and Sadlier 1992	Moulton, PL, Walker, TI and Sadlier, SR 1992, Age and growth studies of Gummy Shark, <i>Mustelus antarcticus</i> (Günther), and school shark, <i>Galeorhinus galeus</i> (Linnaeus), from southern-Australian waters, <i>Australian Journal of Marine and Freshwater Research</i> , 43: 1241–1267.
Punt, Thompson and Sporic 2016	Punt, A, Thomson, R and Sporic, M 2016, Gummy shark assessment update for 2016, using data to the end of 2015, report presented to the SharkRAG meeting, CSIRO Marine and Atmospheric Research, Hobart.
Rowling, Hegarty and Ives 2010	Rowling, K, Hegarty A and Ives M 2010, Gummy Shark (<i>Mustelus antarcticus</i>), in K Rowling, A Hegarty and M Ives (eds), <i>Status of fisheries resources in NSW 2008/09</i> , Industry and Investment New South Wales, Cronulla, 392.
Rogers et al. 2020	Rogers, P. J., Tsolos, A., and Boyle, M.K. 2020. South Australian Charter Boat Fishery Data Summary. Final Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2007/000847-6. 19 pp.
Steer et al. 2020	MA Steer, AJ Fowler, PJ Rogers, F Bailleul, J Earl, D Matthews, M Drew and A Tsolos (2020). Assessment of the South Australian Marine Scalefish Fishery in 2018. Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2017/000427-3. SARDI Research Report Series No. 1049. 213 pp.
Giri and Hall 2015	Giri, K and Hall, K 2015, South Australian Recreational Fishing Survey. Fisheries Victoria Internal Report Series No. 62.
VFA 2017	Victorian Fisheries Authority. 2017. Review of key Victorian fish stocks—2017. Victorian Fisheries Authority Science Report Series No. 1.
Walker 2007	Walker, TI 2007, Spatial and temporal variation in the reproductive biology of Gummy Shark <i>Mustelus antarcticus</i> (Chondrichthyes: Triakidae) harvested off southern Australia, <i>Marine and Freshwater Research</i> , 58: 67–97.
Walker 2010	Walker, TI 2010, Population biology and dynamics of the Gummy Shark (<i>Mustelus antarcticus</i>) harvested off southern Australia, PhD thesis, University of Melbourne.
VFA 2020	Victorian Fisheries Authority 2020, Review of key Victorian fish stocks — 2019. VFA Internal Report Series No. 7, May 2020.
Ryan et al. 2019	Ryan, K.L., Hall, N. G., Lai, E. K., Smallwood, C. B., Tate, A., Taylor, S. M. and Wise, B. S. (2019). Statewide survey of boat-based recreational fishing in Western Australia 2017/18. Fisheries Research Report No. 297, Department of Primary Industries and Regional Development, Western Australia
Braccini et al 2019	Braccini, M and Blay, N. 2019. Temperate demersal gillnet and demersal longline fisheries. In: <i>Status Reports of the Fisheries and Aquatic Resources of Western Australia 2018/19: The State of the Fisheries</i> eds. D.J. Gaughan and K. Santoro. Department of Primary Industries and Regional Development, Western Australia
Peddemors 2015	Peddemors V 2015. Gummy Shark (<i>Mustelus antarcticus</i>) In: Stewart J, Hegarty A, Young C, Fowler AM and Craig J (Eds). <i>Status of Fisheries Resources in NSW 2013-14</i> . NSW Department of Primary Industries, Mosman. pp. 169-171.

