Sandbar Shark (2020)

Carcharhinus plumbeus

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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia, Northern Territory	Western Australia	Recovering	Catch, CPUE , fishing mortality
Queensland, New South Wales	Eastern Australia	Sustainable	Catch, NeOGen genetic population estimate

STOCK STRUCTURE

Sandbar Shark (*Carcharhinus plumbeus*) occurs primarily off both the east and west coasts of Australia, from approximately latitude 17–32°S off the east coast, and latitude 13–36°S off the west coast [McAuley et al. 2007, Last and Stevens 2009]. The species is also encountered off the northern Australian coast, although in much lower numbers. In addition to genetic analysis that suggests limited gene flow between eastern and western Sandbar Shark stocks [Portnoy et al. 2010], there are limited recorded catches in the Gulf of Carpentaria and southern Australia. Thus, the species is considered to be represented by separate Eastern and Western biological stocks in Australian waters.

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

STOCK STATUS

Eastern Australia

In New South Wales, whaler sharks (*Carcharhinus* spp.), including Sandbar Shark, have historically not been adequately identified and reported at a species level in commercial catch data. However, observer data indicate that Sandbar Shark represents the largest single-species component of catches in the Ocean Trap and Line Fishery (New South Wales), at 35 per cent of the overall shark catch between 2008 and 2009 [Macbeth et al. 2009]. Since the introduction of new logbooks in 2009, fishers are required to report all landed sharks to species level with improved reliability of species identification following development of a species identification guide and at-sea education via an observer program

[Macbeth et al. 2018]. Since new management arrangements were introduced in 2013–14, catch has not exceeded 3.8 tonnes (t) per annum, with 3.64 t reported for the fiscal year 2018–19. Insufficient information is available to undertake a quantitative stock assessment of any whaler shark species in NSW [Rowling et al. 2010]. Therefore, a weight-of-evidence approach combining catch data and analysis of Effective Population Size has been used to determine stock status. In Queensland, Sandbar Shark are caught in negligible quantities (<1 t per year combined since 2011) across the net and line fishery components of the East Coast Inshore Fin Fish Fishery. A peak in combined harvest occurred in 2010 (1.6 t) with harvests not exceeding 0.6 t since then [QFISH 2020], contributing little to the overall eastern Australian harvest of the species. New software known as NeOGen [Blower et al 2019] has been developed which enabled calculation of the total population of Sandbar Sharks on the eastern Australian coastline to be approximately 105 000 individuals based on 476 genetic samples [Blower 2020]. Simulations at current fishing levels indicate observed fishery harvest volumes to be sustainable [Blower 2020]. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. The above 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, the Eastern Australia biological stock is classified as a **sustainable stock.**

Western Australia

In Western Australia, Sandbar Shark is targeted by the West Coast Demersal Gillnet and Demersal Longline Fishery, and is also taken in lesser quantities by the Joint Authority Southern Demersal Gillnet and Demersal Longline Managed Fishery [McAuley et al. 2015]. Sandbar Shark was also previously targeted by the Western Australian North Coast Shark Fishery [McAuley and Rowland 2012]. The Western Australia stock assessment uses current and historical data from all of these fisheries. Minor catches historically reported from the Offshore Net and Line Fishery (Northern Territory) are assumed to be from the Western Australia biological stock, as is an unquantified catch from the Memorandum of Understanding (Mou) Box Shark Fishery [Marshall et al. 2016]. Neither the historical Northern Territory catches nor those from the MoU Box Shark Fishery are explicitly included in assessments of the Western Australian stock.

Given the longevity of Sandbar Shark (30–40 years) and the age-specific nature of targeted fishing mortality (mostly between 2 and 10 years of age), a sufficiently long time-series of catch per unit effort data is not yet available for dynamic stock assessment modelling. Assessment of this stock has therefore been undertaken using empirically derived estimates of fishing mortality between 2001 and 2004, and demographic modelling techniques [McAuley et al. 2005, McAuley et al. 2007]. In addition, a risk-based weight of evidence (WoE) approach has been adopted 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]. Demographic modelling indicated that combined levels of fishing mortality in Western Australian targeted shark fisheries, non-target commercial fisheries and the recreational fishing sector became increasingly unsustainable between 2001 and 2004 (when catches peaked at 918 t) and had probably exceeded sustainable levels since 1997–98. These conclusions are supported by fishery-independent survey data that indicated declining breeding stock abundance between 2002 and 2005 [McAuley and Rowland 2012, McAuley et al. 2005].

Since 2010, Sandbar Shark catches have remained well below the levels that will allow a gradual recovery of the breeding stock [McAuley et al. 2015]. The expected reductions in recruitment from previously excessive exploitation of the breeding stock are likely to be ameliorated by significant reduction in targeted fishing effort. Therefore, although the breeding stock is considered to be close to the minimum acceptable limit (40 per cent of unfished biomass), current

levels of fishing are considered suitably precautionary to ensure the recovery of this biological stock [McAuley et al. 2015].

The recent WoE assessment estimated a "Medium" current risk level for the Sandbar Shark stock, with 62 per cent, 83 per cent and 99 per cent of the simulated current (2015–16) relative total biomass trajectories being above the target, threshold and limit biomass reference points, respectively, and biomass projections indicating continued stock rebuilding under current fishing and management settings [Braccini et al. 2018].

The above evidence indicates that the biomass of this stock is likely to be depleted and that recruitment is likely to have been impaired. However, available indicators suggest a recovering stock. The current level of fishing mortality should allow the stock to recover from its recruitment impaired state.

On the basis of the evidence provided above, the Western Australia biological stock is classified as a **recovering stock**.

BIOLOGY

Sandbar Shark biology [Geraghty et al. 2013, McAuley et al. 2007, McAuley et al. 2006]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Sandbar Shark	30–40 years, 1 660 mm FL, 2 150 mm TL	Females: 16.2 years, 1 360 mm FL Males: 13.8 years, 1 270 mm FL

DISTRIBUTION

Distribution of reported commercial catch of Sandbar Shark

TABLES

Fishing methods	

	New South Wales	Northern Territory	Queensland	Western Australia
Charter				
Rod and reel				✓
Commercial				
Gillnet		✓		✓
Line			✓	
Longline (Unspecified)				✓
Net			✓	
Otter Trawl	✓			
Various	✓			
Recreational				
Hook and Line	✓	✓	✓	✓

Management Methods				
	New South Wales	**Northern Territory**	**Queensland**	**Western Australia**
Charter				
Bag limits				✓
Gear restrictions			✓	
Licence (boat-based sector)				✓
Possession limit			✓	
Size limit			✓	
Spatial closures			✓	✓
Commercial				
Catch limits				✓
Effort limits	✓			
Effort limits (individual transferable effort)				✓
Gear restrictions	✓	✓	✓	✓
Limited entry	✓		✓	✓
Possession restrictions			✓	
Processing restrictions	✓	✓	✓	✓
Quota		✓		
Spatial	✓	✓	✓	✓

closures				
Total allowable catch			✓	
Vessel restrictions	✓	✓	✓	
Recreational				
Bag limits	✓			✓
Gear restrictions	✓	✓	✓	✓
Licence (boat-based sector)				✓
Possession limit		✓	✓	
Size limit			✓	
Spatial closures			✓	✓

Catch				
	New South Wales	Northern Territory	Queensland	Western Australia
Charter				0.14 t
Commercial	3.64331 t	0.042 t	15.272 t	32.19 t
Indigenous	Unknown but likely to be negligible	Unknown but likely to be negligible	Unknown but likely to be negligible	Unknown but likely to be negligible
Recreational	Unknown but likely to be negligible	Unknown but likely to be negligible	Unknown but likely to be negligible	42 individuals caught in 2017–18 (of which, 27 were kept, Ryan et al 2019). Shore-based catches are unknown

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

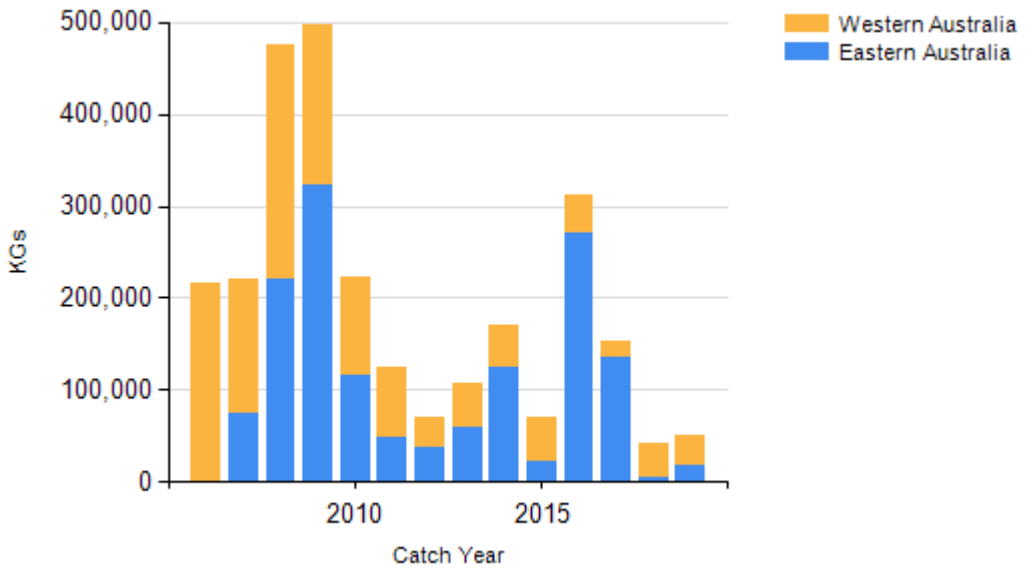
Queensland – Indigenous (management methods) for more information see https://www.daf.qld.gov.au/business-priorities/fisheries/traditional-fishing

New South Wales – Indigenous (Management Methods)
https://www.dpi.nsw.gov.au/fishing/aboriginal-fishing

New South Wales commercial fisheries with less than seven active fishers are not presented due to the Privacy Act.

Recreational and Indigenous (catch) Given the offshore distribution of Sandbar Shark, near-shore catches are likely to be negligible.

CATCH CHART



Commercial catch of Sandbar Shark - note confidential catch not shown

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