

# Dusky Whaler (2020)

*Carcharhinus obscurus*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Commonwealth, New South Wales	Eastern Australia	Sustainable	Catch
Commonwealth, Western Australia, Northern Territory	Western Australia	Recovering	Catch, CPUE, direct estimates of fishing mortality, demographic analysis, risk assessment

## STOCK STRUCTURE

Dusky Shark has a tropical to warm-temperate distribution and is found off the west, south and north coasts of Australia, mostly between latitude 18°S and 36°S [McAuley et al. 2007, Rogers et al. 2013a], and off the east coast, where the range of the species is currently undefined. Electronic and conventional tagging studies have shown Dusky Sharks move between South Australia and Western Australia [Huvneers et al. 2014, Rogers et al. 2013b, Simpfendorfer et al. 1999], and genetic analyses suggest there is restricted gene flow between Dusky Shark off eastern and western Australia [Geraghty et al. 2014]. Therefore, Dusky Shark in South Australian and Western Australian waters are considered to form a single biological stock (the Western Australia stock). This biological stock exhibits a high degree of ontogenetic segregation, with juveniles most common in temperate latitudes and adults in warmer northern latitudes [McAuley et al. 2007, McAuley et al. 2015].

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

## STOCK STATUS

**Eastern Australia** Dusky Whaler is taken as a non-target species by Commonwealth fishers in the Eastern Tuna and Billfish Fishery (ETBF). The species has been considered using ecological risk assessment methods and found to be at medium risk [AFMA 2018]. Catches in the ETBF have averaged around 1.8 tonnes (t) over the last 10 years. There was a small amount of catch (around 250kg) reported in the

Coral Sea Fishery in 2011.

In Queensland, species-specific reporting of Dusky Whaler only commenced in 2009 and only for a sub-component of the Queensland East Coast Inshore Net Fishery. The reported harvest since this time has averaged about 2 t per year.

In New South Wales, Dusky Whaler was not identified and reported at the species level in commercial catch logbooks until 2009. Observer data indicate that whaler sharks represent the second highest shark species catch in the New South Wales Ocean Trap and Line Fishery (15 per cent of overall catch) [Macbeth et al. 2009]. Historical catch of Dusky Whaler is therefore likely to have been around 7.5 t from 2000 to 2005, whereafter increased targeting of large whaler sharks led to three years of higher catch, peaking at approximately 30 t in 2006–07. Dusky Shark catch reduced to ~15 t in 2007–08 once fishers started differentiating some of the whaler sharks in preparation of the new species-specific logbook requirements, specific conditions and restrictions being implemented in the OTL fishery [Macbeth et al. 2009]. Since 2015, under 3 t of Dusky Whaler was landed each year by the OTL fishery in New South Wales. An annual catch of less than 1 t was reported by the New South Wales Shark Meshing Program.

Application of a new software package known as NeOGen [Blower et al 2019] enabled estimation of the total population of Dusky Sharks on the eastern Australian coastline to be approximately 35 000 individuals [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 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

The cross-jurisdictional Western Australia Dusky Whaler stock has components in waters of the Commonwealth, Western Australia and South Australia. This biological stock is most abundant in waters between north-west and southern Western Australia (to longitude 120°E). The carcharhinid species composition in South Australia's commercial multispecies, multi-gear and multi-sectoral Marine Scalefish Fishery (MSF) is not resolved in log-books. Onboard sampling showed carcharhinid catches by the MSF largely comprised juvenile Bronze Whalers (*C. brachyurus*) [Rogers et al. 2013a, SARDI unpublished data]. Presence of Dusky Whaler in catches in South Australian waters is seasonally and spatially variable [Jones 2008, Rogers et al. 2013a].

Catches of Dusky Whaler in Western Australia's Joint Authority Southern Demersal Gillnet and Demersal Longline Managed Fishery, and the West Coast Demersal Gillnet and Demersal Longline Fishery have historically consisted of neonate (young of the year) and one–two year old sharks. Collectively, these age classes accounted for 89 per cent of the observed catch during the 1990s [McAuley and Simpfendorfer 2003, Simpfendorfer et al. 2002]. The status of this stock was assessed using demographic modelling techniques, fishing mortality rates estimated from a tagging study in the 1990s, and contemporary catch and catch per unit effort data [McAuley et al. 2007, Simpfendorfer 2010]. A 2005 assessment confirmed that recorded catches of young juvenile sharks in the target fisheries have been sustainable since the mid-1990s. However, the assessment model also predicted that very low levels of fishing mortality (1–2 per cent per year) applied to sharks older than 10 years would result in recruitment overfishing [McAuley et al. 2007]. Previous assessments therefore concluded that the declining trend observed in the effective Dusky Whaler catch per unit effort (CPUE) series between the mid-1990s and 2004–05 indicated that

breeding biomass had been gradually depleted by low, but poorly quantified, levels of extraneous fishing mortality, including fisheries operating in other jurisdictions [Marshall et al. 2016, McAuley et al. 2015, Jones 2008, Rogers et al. 2013a]. The above evidence indicates that this stock was likely to be depleted and recruitment impaired. As a result, comprehensive measures to mitigate cryptic mortality of older Dusky Whalers within all Western Australian managed commercial fisheries, and to reduce catches of juveniles to below the levels determined to be sustainable in the mid-1990s, have been introduced since 2006–07. An increasing trend in the effective CPUE from 2006–12, suggests improved recruitment rates and a recovering stock [McAuley et al. 2015], indicating that current management arrangements are suitably precautionary to ensure that the biological stock continues to recover [McAuley et al. 2015].

Recently, a stock assessment was conducted based on 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 “Medium” current risk level for the Dusky Whaler stock, with 46 per cent, 73 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].

The above evidence indicates that 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

**Dusky Shark biology** [Geraghty et al. 2013, 2016 McAuley et al. 2007, Simpfendorfer et al. 2002]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Dusky Whaler	Females > 40 years, 2 890 mm FL Males > 32 years, 3 560 mm TL (~2 920 mm FL)	Females 27–35 years, 2 540 mm FL (Western Australia)  Females 15.5 years, 2811 mm TL (Eastern Australia)

## DISTRIBUTION



Distribution of reported commercial catch of Dusky Shark

**TABLES**

<b>Fishing methods</b>	<b>Commonwealth</b>	<b>New South Wales</b>	<b>Northern Territory</b>	<b>South Australia</b>	<b>Western Australia</b>
<b>Commercial</b>					
Demersal Gillnet	✓				
Gillnet			✓		✓
Longline (Unspecified)			✓		✓
Pelagic Longline	✓				
Various		✓			
<b>Recreational</b>					
Hook and Line		✓	✓	✓	✓

<b>Management Methods</b>	<b>New South Wales</b>	<b>Northern Territory</b>	<b>South Australia</b>	<b>Western Australia</b>
<b>Charter</b>				
Bag limits				✓
Licence (boat-based sector)				✓
Size limits				✓

<b>Spatial closures</b>				✓
<b>Commercial</b>				
<b>Catch limits</b>				✓
<b>Effort limits</b>			✓	
<b>Effort limits (individual transferable effort)</b>				✓
<b>Gear restrictions</b>	✓	✓	✓	✓
<b>Limited entry</b>	✓		✓	✓
<b>Processing restrictions</b>		✓	✓	✓
<b>Quota</b>		✓		
<b>Size limit</b>				✓
<b>Spatial closures</b>	✓		✓	✓
<b>Recreational</b>				
<b>Bag limits</b>	✓		✓	✓
<b>Gear restrictions</b>			✓	✓
<b>Licence (boat-based sector)</b>				✓
<b>Size limit</b>				✓
<b>Spatial closures</b>				✓

<b>Catch</b>					
	<b>Commonwealth</b>	<b>New South Wales</b>	<b>Northern Territory</b>	<b>South Australia</b>	<b>Western Australia</b>
<b>Commercial</b>	0.1696 t	1.7827 t	0.162 t		155.883 t
<b>Indigenous</b>		Unknown	Undetermined but likely to be negligible	Unknown	Undetermined but likely to be negligible (Henry & Lyle 2003))
<b>Recreational</b>		Shore-based catches are undetermined but consist primarily of juveniles	Undetermined but likely to be negligible	Undetermined but likely to be negligible	1852 individuals caught in 2017–18 (of which, 66 were kept, Ryan et al 2019). Shore-based catches are unknown

**Commercial (catch)** Western Australian (state) and Eastern Australia biological stock is for Dusky Shark only. However, South Australian catches are reported as undifferentiated whaler sharks and are therefore not presented.

**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.

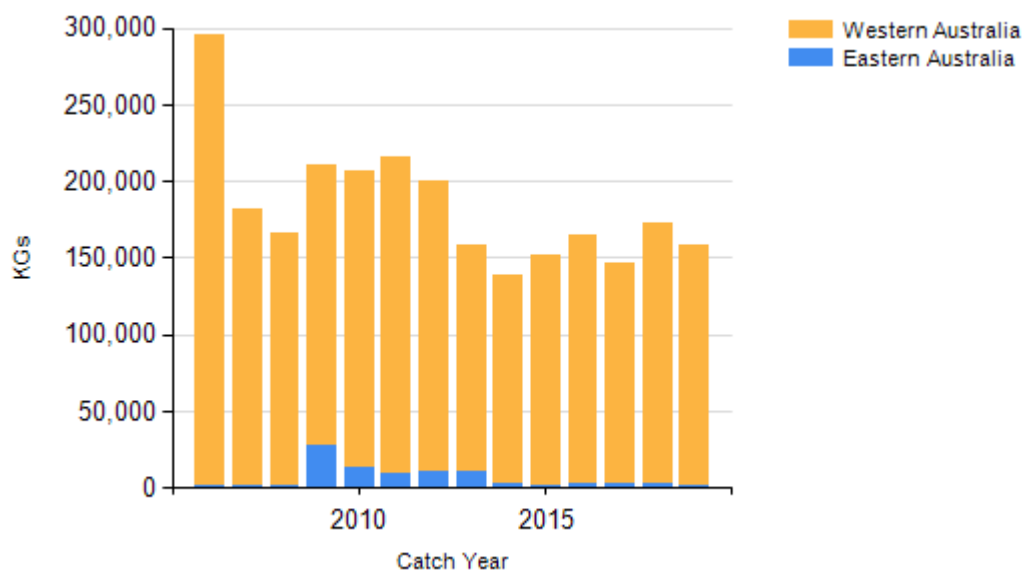
**New South Wales** commercial fisheries with less than seven active fishers are not presented due to the Privacy Act.

**New South Wales – Commercial (catch)** For the Ocean Trap and Line Fishery (New South Wales), only one business reported sufficient catch to suggest targeting.

**New South Wales – Indigenous (Management Methods)**

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

## CATCH CHART



Commercial catches of Dusky Shark - note confidential catch not shown

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