

# BLACKTIP SHARKS (2016)

*Carcharhinus sorrah*, *Carcharhinus tilstoni*, *Carcharhinus limbatus*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Western Australia, Northern Territory	North and West Coast	ONLF, WANCSF, JANSF, EGBSMNMF, KGBMF	Sustainable	Catch, mark recapture, <u>CPUE</u> , pup production
Northern Territory, Queensland	Gulf of Carpentaria	GOCIFFF, ONLF	Undefined	Catch
Queensland, New South Wales	East Coast	ECIFFF, OTLF	Sustainable	Catch, <u>MSY</u>

OTLF Ocean Trap and Line (NSW), ONLF Offshore Net and Line Fishery (NT), ECIFFF East Coast Inshore Fin Fish Fishery (QLD), GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery (QLD), WANCSF, JANSF, EGBSMNMF, KGBMF WA North Coast Shark Fishery, Joint Authority Northern Shark Fishery, Exmouth Gulf Beach Seine and Mesh Net Managed Fishery, Kimberley Gillnet and Barramundi Managed Fishery (WA)

## STOCK STRUCTURE

In the context of Australian fisheries, the Blacktip Shark species complex, part of the family Carcharhinidae (whaler sharks), comprises three species: *Carcharhinus tilstoni* (Australian Blacktip Shark), *C. limbatus* (Common Blacktip Shark) and *C. sorrah* (Spottail Shark). Whereas *C. tilstoni* and *C. sorrah* are distributed within Australian and Indo–West Pacific waters, respectively, *C. limbatus* is globally distributed in tropical and warm temperate waters. In Australian waters, genetic studies have identified two biological stocks of *C. tilstoni* (a Western stock extending from the western Northern Territory into northern Western Australia, and an Eastern stock extending from the Gulf of Carpentaria to the east coast of Queensland and New South Wales), three biological stocks of *C. limbatus* (one across Western Australia and the Northern Territory, one in the Gulf of Carpentaria, and one on the east coast of Queensland and New South Wales) and a single biological stock of *C. sorrah* across northern Australia[1]. Stock boundaries between the Western biological stocks of *C. tilstoni* and *C. limbatus* and those in the Gulf of Carpentaria are uncertain.

Currently, commercially caught size classes of *C. limbatus* and *C. tilstoni* can only be taxonomically differentiated by genetic analyses or precaudal vertebral counts (although recent evidence of hybridisation may affect the accuracy of these techniques[2,3]). Reliable species

differentiation is not practical during fishing operations. Although *C. sorrah* can be clearly distinguished from *C. tilstoni* and *C. limbatus*, it has only relatively recently been reported separately in commercial catch records from Northern Territory, Queensland and Western Australian fisheries. Because a suite of three species is grouped together for this assessment, all with differing stock structures, stocks have been assessed on the finest known scale—using the three biological stock areas identified for *C. limbatus*.

Here, assessment of stock status for the Blacktip Shark multispecies group is presented at the biological stock level—North and west coast, Gulf of Carpentaria, and East coast.

## STOCK STATUS

**East Coast** The Queensland shark stock assessment included 12 species or species complexes that are retained for sale on the Queensland east coast and included MSY estimates for *C. tilstoni* (143 t), *C. limbatus* (247 t) and *C. sorrah* (109 t)[7]. The results of this stock assessment indicate that the species complex has a combined MSY of 499.5 t[4]. This estimate is well above the total catch of Blacktip Sharks reported from the east coast in 2014–15 (165 t) and well above the long-term catch range of 120–311 t per financial year (2003–04 to 2014–15). The stock assessment report however acknowledged that there are a number of data limitations for Queensland fisheries, particularly with respect to the species identifications and the quantity and reliability of the available catch data.

Of significance, around 90 per cent of the Blacktip shark catch on the Queensland east coast is reported in a multispecies logbook category titled 'Blacktip Whalers and Graceful Shark'. Data from this catch category cannot be split into individual species and, as a consequence, it is difficult to determine how much of this catch consists of Graceful Sharks (*C. amblyrhynchoides*, although this level is likely to be low[8]). From an assessment perspective, the inclusion of the *C. amblyrhynchoides* data would still result in the total Blacktip Shark complex being below MSY. As total catch levels including the *C. amblyrhynchoides* data are below the combined MSY estimate, the Queensland component of this stock is unlikely to be recruitment overfished.

Queensland has introduced a number of measures that reduces the likelihood of Blacktip Sharks being fished above the combined 499.5 t MSY estimate. A precautionary 600 t total allowable commercial catch (TACC) limit was introduced in 2009 and applies to all sharks and rays retained for sale on the Queensland east coast. This TACC was introduced in 2009 in conjunction with an 'S' fishing symbol that significantly reduced the number of licenses able to target sharks in high quantities. Since the TACC was introduced, total shark catch on the Queensland east coast has ranged from 296–521 t and included between 119 and 203 t of Blacktip Shark (including *C. amblyrhynchoides*). This equates to approximately 17–22 per cent of the combined MSY estimate for this complex (499.5 t)[4].

Commercial catch records for the Ocean Trap and Line Fishery indicate that the annual reported commercial catch of Blacktip Sharks (comprising mostly *C. limbatus*) from New South Wales waters ranged from 13–66 t during the 10-year period spanning fiscal years from 1998–99 to 2007–08[9]. However, significant use of catch reporting categories 'Unspecified Sharks' (5–204 t) and 'Unspecified Whaler Sharks' (7–26 t) during that period suggest that these historical quantities are most probably underestimates. Since management intervention in this fishery in 2009, the tonnage of Blacktip Sharks caught has dropped substantially and the reliability of species-specific catch reporting has improved considerably. A total of 14 t of Blacktip Sharks was landed in New South Wales during the 2015 calendar year. The catch of Blacktip Sharks in the New South Wales Shark Meshing Program is negligible, at less than 1 t.

Collectively, these figures indicate that the overall catch of this species in New South Wales waters is insignificant in terms of impacting the East coast stock.

Overall the information provided by both jurisdictions indicates that the stock is not considered to be recruitment overfished and the level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, the East coast multispecies biological stock is classified as a **sustainable stock**.

### **Gulf of Carpentaria**

In 2014, the Queensland Department of Agriculture and Fisheries commissioned a scientific assessment of shark stocks. This assessment was completed by fisheries scientists from Animal Science Queensland and provides MSY estimates for *C. tilstoni* and *C. sorrah* in the Gulf of Carpentaria. This assessment produced qualified MSY estimates of 95 tonnes (t) for *C. tilstoni* and 29.4 t for *C. sorrah*[7]. This report however, also acknowledged that there are a number of data limitations for Queensland fisheries, particularly with respect to the species identifications and the quantity and reliability of the available catch data.

In 2015, 59 t of *C. tilstoni* and 22 t of *C. sorrah* were reported from the Gulf of Carpentaria Inshore Finfish Fishery (GOCIFFF). While this is below the above estimates, species-specific data for the fishery showed that *C. sorrah* catch (15–34 t) exceeded MSY twice over the past 10 years with the catch of *C. tilstoni* (59–130 t) exceeding MSY five times over the same period. A further estimated 42–125 t (2007–15) of Blacktip Sharks was reported from the GOCIFFF each year under the 'Blacktip Whaler Shark' catch category that includes Graceful Sharks (*C. amblyrhynchoides*). At present, catch reported in the 'Blacktip Whaler Shark' category cannot be differentiated into individual species. If this category includes a high percentage of Blacktip Sharks, then total Blacktip Shark catches may have exceeded MSY.

Queensland introduced changes to management of the net fishery at the beginning of the 2012 season, decreasing the total length of available net to fish the stock by two-thirds, to 9 km (from 27 km) in the offshore component of the fishery. Changes to the Queensland inshore fishery (within 7 nautical miles of the coast) also reduced the capacity for boats to target Blacktip Sharks. These measures are expected to have reduced fishing mortality of Blacktip Sharks.

The inability to assign more multispecies catch records to Blacktip Shark species makes it difficult to identify catch and effort trends for this species complex. Consequently, current catch levels and their impact on the biological stock is unknown, and there is insufficient information to confidently classify the status of this stock.

On the basis of the evidence provided above, the Gulf of Carpentaria multispecies biological stock is classified as an **undefined stock**.

### **North and West Coast**

The North and west coast biological stock straddles two management jurisdictions: the Northern Territory, west of the Wessel Islands–Western Australian border; and Western Australia.

The most recent assessment for this biological stock utilised stock reduction analysis models, which rely on catch per unit effort data. The results from these models estimated that the current harvest rates for all species within the complex are less than 20 per cent of that required to reach maximum sustainable yield (MSY) and current pup production is approximately 80 per cent of unfished levels[4]. A mark-recapture study in the Northern Territory for all species of Blacktip Sharks supports the stock assessment results[5].

Although there is uncertainty in the species composition and magnitude of historical catches of Blacktip Sharks from Western Australia, these species have not been harvested in this jurisdiction since April 2009[6], allowing the biomass to increase.

The most recent assessment[4] estimates that biomass in 2011 was 80 per cent of the unfished 1970 level. The stock is not considered to be recruitment overfished.

On the basis of the evidence provided above, the North and west coast multispecies biological stock is classified as **a sustainable stock**.

## BIOLOGY

Blacktip Sharks biology[2,10–12]

Species	Longevity / Maximum Size	Maturity (50 per cent)
BLACKTIP SHARKS	Carcharhinus tilstoni: Females 15 years, males 13 years; 2 000 mm <u>TL</u> Carcharhinus limbatus: Maximum age unknown, 2 500 mm <u>TL</u> C. sorrah: Females 14 years, males 9 years; 1 600 mm <u>TL</u>	C. tilstoni: 5–6 years; females 1 350–1 400 mm, males 1 200 mm <u>TL</u> C. limbatus: males 1 800 mm, females unknown C. sorrah: 2–3 years; both sexes 900–950 mm <u>TL</u>

## DISTRIBUTION



Distribution of reported commercial catch of Blacktip Sharks

## TABLES

Commercial Catch Methods	New South Wales	Northern Territory	Queensland	Western Australia
Demersal Gillnet	✓			

Demersal Longline		✓		
Gillnet		✓	✓	
Hand Line, Hand Reel or Powered Reels	✓			
Line			✓	
Mesh Net	✓			
Otter Trawl	✓			
Setline	✓			
Various				✓

Fishing methods				
	New South Wales	Northern Territory	Queensland	Western Australia
<b>Commercial</b>				
Demersal Gillnet	✓			
Gillnet		✓	✓	
Hand Line, Hand Reel or Powered Reels	✓			
Line			✓	
Mesh Net	✓			
Otter Trawl	✓			
Setline	✓			
Various				✓
<b>Indigenous</b>				
Hand Line, Hand Reel or Powered Reels		✓	✓	
Spearfishing		✓		
<b>Recreational</b>				
Hand Line, Hand Reel or Powered Reels	✓	✓	✓	✓

Management Methods				
	New South Wales	Northern Territory	Queensland	Western Australia
<b>Commercial</b>				
Gear restrictions	✓		✓	✓
Limited entry	✓	✓	✓	✓

Spatial closures	✓		✓	✓
Total allowable catch	✓	✓	✓	
Total allowable effort		✓		✓
Vessel restrictions	✓	✓	✓	✓
<b>Indigenous</b>				
Bag limits	✓		✓	✓
Size limits	✓		✓	✓
<b>Recreational</b>				
Bag limits				✓
License				✓
Possession limit		✓		
Size limit	✓		✓	✓
Spatial closures	✓	✓	✓	✓
<b>Active Vessels</b>				
	<b>New South Wales</b>	<b>Northern Territory</b>	<b>Queensland</b>	
	217 Vessel in OTLF,	8 Vessel in ONLF,	85 License in ECIFFF, 29 License in GOCIFFF,	

OTLF Ocean Trap and Line(NSW)

ONLF Offshore Net and Line Fishery(NT)

ECIFFF East Coast Inshore Fin Fish Fishery(QLD)

GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery(QLD)

Catch	New South Wales	Northern Territory	Queensland	Western Australia
<b>Commercial</b>	7.5625t in OTLF,	48.3977t in ONLF,	262.975t in ECIFFF, 122.596t in GOCIFFF,	
<b>Indigenous</b>	Unknown	Unknown		Unknown
<b>Recreational</b>	Unknown but likely to be negligible	Unknown		0t

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**a Queensland – Indigenous** In Queensland, under the Fisheries Act 1994 (Qld), Indigenous

fishers in Queensland are able to use prescribed traditional and non-commercial fishing apparatus in waters open to fishing. Size and possession limits, and seasonal closures do not apply to Indigenous fishers. Further exemptions to fishery regulations may be applied for through permits.

**b Indigenous** Subject to the defence that applies under Section 211. of the Native Title Act 1993 (Cth), and the exemption from a requirement to hold a recreational fishing licence, the non-commercial take by indigenous fishers is covered by the same arrangements as that for recreational fishing.

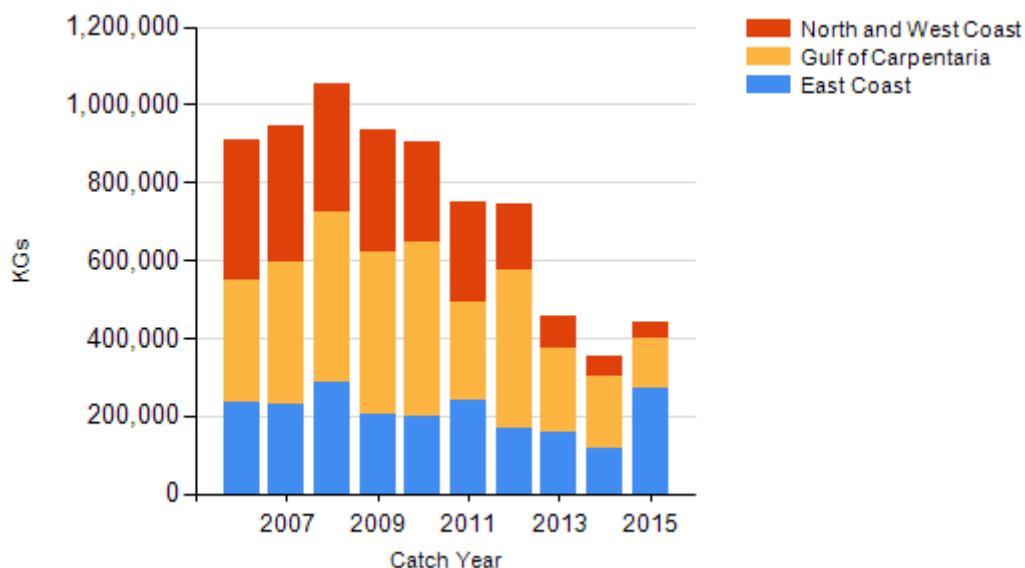
**c Western Australia – Commercial (Fishing methods)** No commercial fishing has occurred in the Western Australia jurisdiction since April 2009.

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

**e New South Wales – Indigenous** Aboriginal Cultural Fishing Interim Access Arrangement - allows an Aboriginal 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

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## CATCH CHART



Commercial catch of Blacktip Sharks - note confidential catch not shown

## EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

- Pelagic gillnets and longlines are not intended to come into contact with the seabed, and, under normal circumstances, they have no impact on benthic habitats. Demersal gillnets contact the seabed but are generally set away from any benthic structures (for example, reefs, sponges or mangroves) that could be damaged by them, or cause damage to them. The physical characteristics of these gears and the way in which they are fished are also selective for the target species and size classes.
- However, these fishing methods do interact with threatened, endangered and protected (TEP) species. Although reported interactions are low, the impact on the populations of most TEP species is either unknown[13–19] or assessed as negligible to low[14]. Longline fishing on the east coast has been shown to have the potential to threaten the long-term viability of the east coast population of Grey Nurse Shark (*Carcharias taurus*)[20].

## ENVIRONMENTAL EFFECTS on BLACKTIP SHARKS

- The impact of environmental factors on biological stocks of Blacktip Sharks is unknown. These species are adapted to a range of environmental conditions and are therefore likely to be resilient to environmental changes.

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