

King Threadfin (2020)

Polydactylus macrochir



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Western Australia	Sustainable	Catch
Northern Territory	Northern Territory	Sustainable	Stock assessment, biomass estimate, fishing mortality, catch, catch rate
Queensland	East Coast	Sustainable	Catch, CPUE, length and age frequencies, mortality estimates
Queensland	Gulf of Carpentaria	Depleting	Catch, CPUE, length and age frequencies, mortality estimates

STOCK STRUCTURE

King Threadfin have numerous populations across northern Australia that are separated by 10–100s km or by large, coastal geographical features [Moore et al. 2011, Welch et al. 2010]. With the exception of the Gulf of Carpentaria, there is a lack of information on the degree to which this separation indicates separate biological stocks, and on boundaries between possible stocks.

Here, assessment of stock status is presented at the jurisdictional level—Western Australia and Northern Territory; at the biological stock level—Gulf of Carpentaria (Queensland); and the management unit level—East coast (Queensland).

STOCK STATUS

East Coast The East Coast Queensland management unit contains numerous genetic stocks

but stock boundaries are not clearly defined [Welch et al. 2010]. Catch and CPUE are not entirely reflective of biomass as extremes in climate conditions (drought and flood cycles) and changes in targeting and minimum size limits have occurred over the time series. However, catches and nominal CPUE increased from 1997–2015 (from 84–210 tonnes (t)), before spatial closures (Net Free Zones) in key areas came into effect in late 2015 [Whybird et al. 2018]. Year class strength (based on an analysis of age frequency) has been found to be positively correlated with spring and summer freshwater flows and coastal rainfall in the Fitzroy River region [Robins et al. 2005, Halliday et al. 2007, Halliday et al. 2008]. Catchability will respond rapidly to freshwater flows; however, biomass changes will only be observed in the fishery once fish are large enough to be susceptible to the fishing methods and harvestable under the size limits. Catch statistics have varied across the management unit. The central and southern areas experienced average or above average rainfall during the summers of 2009–10 to 2012–13, including some significant flood events. Benefits to catchability and potentially productivity from these events are no longer evident in the reported harvests and catches are declining. In north Queensland, the seasonal monsoon has been weak in recent years and therefore these catchments experienced below average summer rainfall. There was above average rainfall in 2018–19; however, this occurred very late in the season in January and will likely have little positive effect. Catch since 2016 has reduced in all east coast regions to around 51 t [QFISH 2020]. This indicates that there may have been reductions in biomass; however, the trend is likely related to freshwater flows and would therefore have varied across the management unit. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

The fine spatial scale of the genetic population structure, high discard mortality and size at transition to female (larger than legal size) make this species susceptible to overfishing [Welch et al. 2010, Moore et al. 2011]. However, fishing pressure on King Threadfin has substantially reduced in recent years. Compared to 2015 levels, the number of active commercial net operators in 2019 reduced from 162 to 105, and effort decreased from 4 090 to 1 442 fishing days [QFISH 2020]. The reduction occurred after Net Free Zones were introduced in late 2015 to exclude commercial net fishing, as well as associated licence reduction. A 14-week seasonal closure for targeting Barramundi also reduces fishing pressure for King Threadfin during some of the spawning season [Garrett 1992, Bibby et al. 1997]. Surveys of non-commercial fishing by Queensland residents (recreational, Indigenous and charter fisheries) indicates recreational harvest has increased by 82 per cent over the 2010–11 and 2013–14 Queensland domestic surveys [Webley et al. 2015]. The above evidence 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 East Coast (Queensland) management unit is classified as a **sustainable stock**.

Gulf of Carpentaria

Following two years of high catches in 2017 (236 t) and 2018 (248 t), the commercial harvest of King Threadfin from the Gulf of Carpentaria reduced to 145 t in the 2019 calendar year. This is lower than the previous ten-year average harvest (243 t) and near the historical minimum of 138 t in 2015 [QFISH 2020]. Nominal CPUE in 2019 (13 kg per 100 m net) was also below the 2009–18 average of 15 kg per 100m net. The implication of the increases in catch and CPUE in 2017 and 2018 on the biomass status is considered with caution due to changes in the fishery. The overseas market for swim bladders has changed targeting of the species and this is expected to have caused less discarding of this species and increased targeting. The reduction in the number of days fished per licence indicates that fishers are concentrating effort to optimal fishing times. Low flow is likely to negatively impact King Threadfin year class strength and catchability [Halliday et al. 2008]. Similar trends in catch and CPUE have been noted in other tropical inshore species in Australia (for

example, Barramundi), and were probably influenced by low seasonal flows from 2013 to 2015. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. For the period (2013–19) the biomass declined, but the stock is not yet considered to be recruitment impaired.

High discard mortality, variable growth, late female maturity and size at transition to female (larger than legal size) make this species susceptible to overfishing [Moore 2011]. There has been no recent change to management in the Gulf of Carpentaria Inshore Fin Fish Fishery that would constrain the effort for this species. A 14-week temporal commercial closure does offer some protection as it coincides with most of the spawning season [Bibby et al. 1997, Garrett 1992]. The commercial catch in 2019 decreased to 145 t, following the high catches from 2017 to 2018 (242 t average) despite the market for swim bladders causing changes in targeting. Net fishing effort decreased from 96 operators undertaking 8 507 days in 1989 to 64 operators over 2 879 days in 2019. The lowest reported number of operators was 63 in 2015, whereas the lowest number of fishing days was 2 690 in 2013.

Population age structure changes appear to have occurred between studies of King Threadfin conducted in 1986–90 [Garrett 1992, Bibby et al 1997], 2007–09 [Moore 2011], and 2015–2019 [QDAF unpublished data]. The age and size structure in the more recent studies was truncated, having a younger maximum age and changing sex when smaller and younger [Moore et al. 2011; QDAF unpublished data]. Despite the downward trend in fishing effort, 2011 fishing mortality was estimated as 2.6 to 5.4 times the mortality for the 2007–09 period, and 2 to 3.5 times natural mortality [Moore et al. 2017]. Moore et al. [2017] considered fishing pressure the likely cause of age and mortality changes, although variable recruitment and sampling differences make the comparison of mortality estimates problematic. The above evidence indicates that the current level of fishing mortality is likely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the Gulf of Carpentaria (Queensland) biological stock is classified as a **depleting stock**.

Northern Territory

Knowledge of the genetic stock structure of King Threadfin in Northern Territory (NT) waters is limited. Welch et al. [2010] detected two different stocks in the NT from two locations sampled (i.e. Chambers Bay and Blue Mud Bay). Finer-scale sampling conducted in Queensland and Western Australia revealed stocks separated by distances of tens to hundreds of kilometres or by large, coastal geographical features [Welch et al. 2010, Moore et al. 2011]. The existence of multiple biological stocks in these states suggests that the stock structure of King Threadfin in the NT is likely to be more complex than currently described.

In addition to genetic traits, the year class strength (i.e. productivity) of King Threadfin is affected by freshwater flow and coastal rainfall [Halliday et al. 2008]. Therefore, differences in these environmental drivers between adjacent catchments (as is evident in the NT; BOM 2020) may over-ride genotypic differences in productivity between neighbouring stocks.

Given uncertainties regarding the actual number of biological stocks of King Threadfin in NT waters, and current management arrangements for this species [as a single management unit], the assessment presented here was undertaken at the jurisdictional level.

The most recent assessment of King Threadfin in the Northern Territory (using data to the conclusion of 2019) indicated that the stock was impacted by high fishing pressure in the late 1970s and early 1980s, falling to 47 per cent of the unfished (1950) biomass [Grubert and Saunders, unpublished]. However, there has been a strong recovery since that time, with the annual biomass as a proportion of virgin biomass exceeding 60 per cent for the last two decades,

reaching 98 per cent by the end of 2019. The above evidence indicates that the biomass of the stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

The current (2019) fishing mortality rate, as a proportion of fishing mortality at maximum sustainable yield (MSY), was estimated at 16 per cent, roughly one sixth of the rate required to achieve MSY [Grubert and Saunders unpublished]. The standardised catch per unit effort (CPUE) in 2019 was also at a historical high, following a significant increase in this indicator over the last decade (noting that this trend may in part be driven by an increase in targeting of King Threadfin). The above evidence indicates that the current level of fishing pressure is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, King Threadfin in the Northern Territory is classified as a **sustainable stock**.

**Western
Australia**

King Threadfin is landed in the Kimberley Gillnet and Barramundi Managed Fishery (KGBMF) of Western Australia. The catch of King Threadfin in the KGBMF has been low and stable for the past six years (2014–19), ranging from 18–25 tonnes (t), with a mean annual catch of 21.0 t. The recent catches from 2014–2019 are well below the average of 81.8 t for the 10-year period from 2004–13. This is due to low effort levels in the fishery [Newman et al. 2020] following the removal of two fishing licences from the Broome coast area. The Broome coast area has been closed to commercial fishing since late 2013. This commercial closure in the principal landing area for King Threadfin catches, in association with their rapid growth rates, is likely to have substantially increased the spawning stock biomass of this species. King Threadfin are landed by recreational fishers (estimated catch 3 t), and also by charter fishers but only in negligible quantities. The above evidence indicates the biomass of this stock is unlikely to be depleted and that the recruitment is unlikely to be impaired. Furthermore, the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

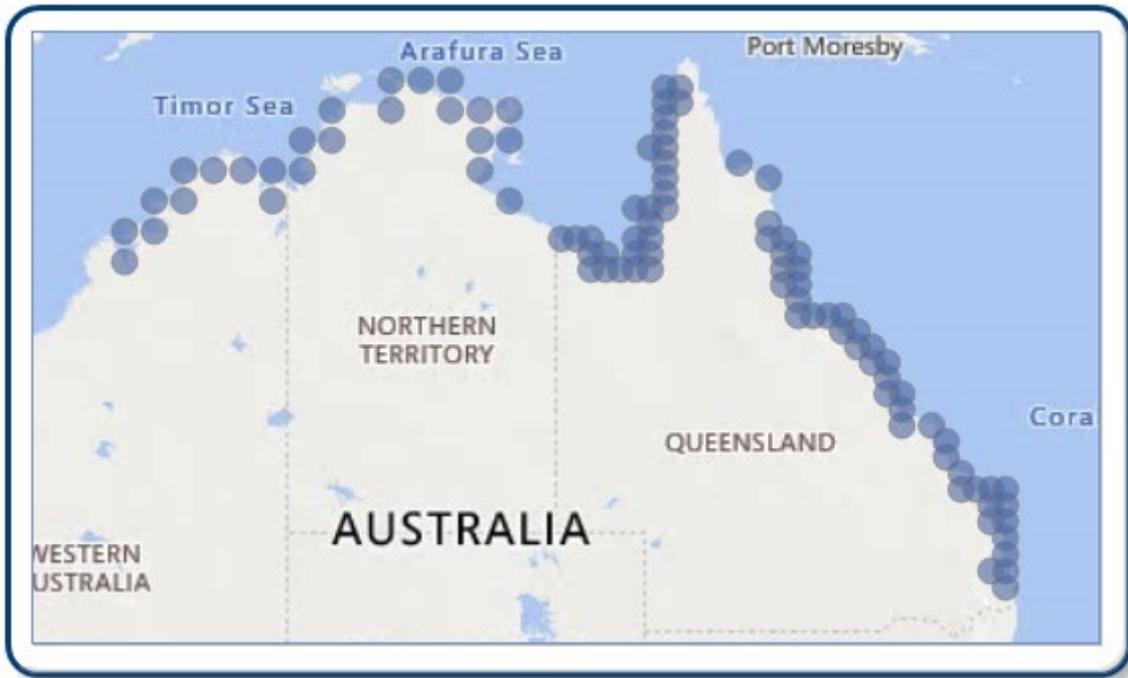
On the basis of the evidence provided above, King Threadfin in Western Australia is classified as a **sustainable stock**.

BIOLOGY

King Threadfin biology [Welch et al. 2010]

Species	Longevity / Maximum Size	Maturity (50 per cent)
King Threadfin	22 years, 1 600 mm TL	Males 2 years, 610 mm TL Females 6 years, 1 000 mm TL

DISTRIBUTION



Distribution of reported commercial catch of King Threadfin

TABLES

Fishing methods			
	Northern Territory	Queensland	Western Australia
Charter			
Hook and Line	✓	✓	✓
Commercial			
Gillnet	✓		✓
Line		✓	
Net		✓	
Recreational			
Hook and Line	✓	✓	✓
Spearfishing		✓	

Management Methods			
	Northern Territory	Queensland	Western Australia
Charter			
Bag limits			✓
Gear restrictions	✓		
Limited entry	✓		✓
Passenger restrictions	✓		✓
Possession limit	✓		
Spatial	✓	✓	✓

closures			
Spatial zoning	✓	✓	✓
Temporal closures	✓		
Commercial			
Gear restrictions	✓	✓	✓
Limited entry	✓	✓	✓
Mesh size regulations	✓		
Size limit		✓	
Spatial closures	✓	✓	✓
Spatial zoning	✓	✓	✓
Temporal closures	✓	✓	
Vessel restrictions	✓	✓	✓
Recreational			
Bag limits			✓
Gear restrictions	✓		
Licence (Recreational Fishing from Boat License)			✓
Possession limit	✓	✓	
Size limit		✓	
Spatial closures	✓	✓	✓
Spatial zoning	✓	✓	
Temporal closures	✓		

Catch	Northern Territory	Queensland	Western Australia
Charter	1.5 t		< 1 t
Commercial	237.749 t	213.121 t	16.1186 t
Indigenous	Unknown	Unknown	Unknown
Recreational	9 t (2010)	58 t (East Coast); 34 t (GOC) (2013–14)	3 t (2017/18)

Western Australia – Recreational (Catch) Boat-based recreational catch is from 1 September 2017–31 August 2018. These data are derived from those reported in Ryan et al. [2019]. It is important to note that catches of King Threadfin are underestimated as shore-based fishers were out of scope of the survey. Shore based catches of King Threadfin are not known.

Western Australia – Recreational (management methods) A Recreational Fishing from Boat Licence is required for the use of a powered boat to fish or to transport catch or fishing gear to or from a land-based fishing location.

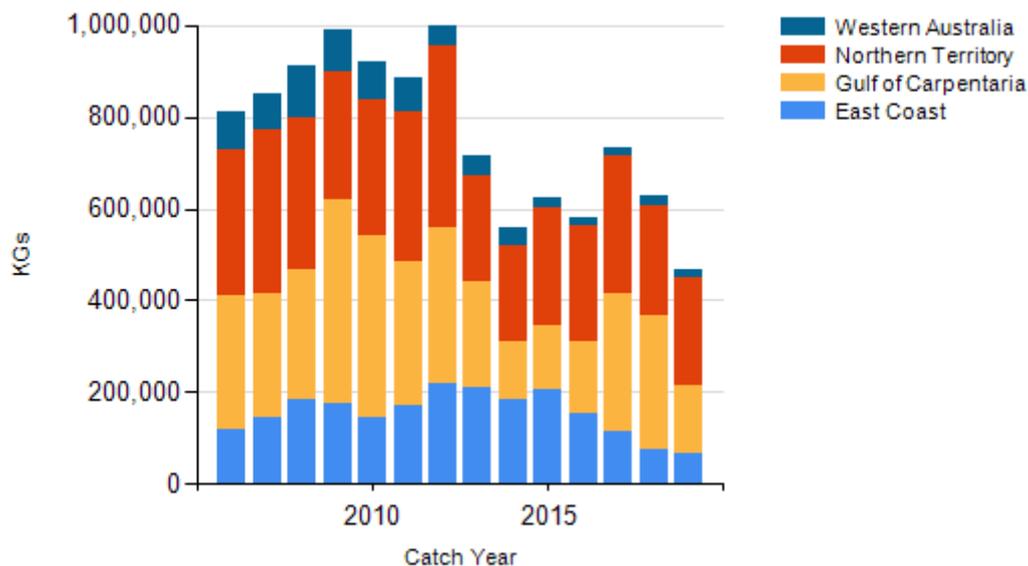
Western Australia – Indigenous (management methods) Subject to application of Section 211 of the *Native Title Act 1993* (Cth), and the exemption from a requirement to hold a recreational fishing licence, the non-commercial take by Indigenous fishers is covered by the same arrangements as that for recreational fishing.

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

Northern Territory – Charter (management methods) In the Northern Territory, charter operators are regulated through the same management methods as the recreational sector but are subject to additional limits on license and passenger numbers.

Northern Territory – Indigenous (management methods) The *Fisheries Act 1988* (NT), specifies that "...without derogating from any other law in force in the Territory, nothing in a provision of this Act or an instrument of a judicial or administrative character made under it limits the right of Aboriginals who have traditionally used the resources of an area of land or water in a traditional manner from continuing to use those resources in that area in that manner".

CATCH CHART



Commercial catch of King Threadfin

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