King Threadfin (2018)

Polydactylus macrochir

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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Western Australia	Western Australia	KGBMF	Sustainable	Catch
Northern Territory	Northern Territory	BF	Sustainable	Catch, CPUE, length and age frequencies
Queensland	East Coast	ECIFFF	Sustainable	Catch, CPUE, length and age frequencies, mortality estimates
Queensland	Gulf of Carpentaria	GOCIFFF	Depleting	Catch, CPUE, length and age frequencies, mortality estimates

BF Barramundi Fishery (NT), ECIFFF East Coast Inshore Fin Fish Fishery (QLD), GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery (QLD), KGBMF Kimberley Gillnet and Barramundi Managed Fishery (WA)

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 unknown [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 have shown an

increasing trend from 1997–2015, when spatial closures (Net Free Zones) in key areas came into effect [QDAF 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 [Halliday et al. 2007, Halliday et al. 2008, Robins et al. 2005]. Catchability will respond rapidly; however, biomass changes will only be observed in the fishery once they are 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. Catches in the south increased in 2011 following the floods in this area and peaked three years later in 2014 at 54 t (this species is expected to recruit into the fishery at two to three years of age) [QDAF 2018]. The 2017 catch of 19 t in the southern region remains higher than any year prior to 2011. In central Queensland, average annual catch for 2016 and 2017 was (48 t) considerably lower than the previous 10 year average (81 t) due to the closure of a large area to net fishing [QDAF 2018]. In recent years, in north Queensland, the seasonal monsoon trough has been weak and therefore these catchments experienced below average summer rainfall. In 2016 and 2017 annual catches (average 32 t) in the northern region were half of the previous one year average (71 t) [QDAF 2018]. This indicates that there may have been changes to biomass; however, the trends appear to be related to freshwater flows and have therefore 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 [Moore et al. 2011, Welch et al. 2010]. However, estimates of total mortality for the Mary, Fitzroy and Brisbane Rivers in 2007–09 were very low (fishing mortality was less than natural mortality) [Moore 2011]. Fishing pressure in these areas has continued to increase and the estimates of mortality for species with variable annual recruitment may be unreliable. East coast catch and CPUE reduced in 2016 and 2017, from near historical high, after zones were introduced in late 2015 to exclude commercial net fishing as well as associated licence reduction. Compared to 2013 levels, the number of active commercial operators in 2017 is 43 per cent lower and fishing days 48 per cent lower [QDAF 2018]. A 14-week seasonal closure for targeting Barramundi reduced the fishing pressure for King Threadfin during some of the spawning season [Bibby et al. 1997, Garrett 1992]. Surveys of non-commercial fishing by Queensland residents (recreational, Indigenous and charter fisheries) has increased by over 80 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

In 2017, the commercial harvest of King Threadfin from the Gulf of Carpentaria was 236 t, following low 2013–15 catches (156 t average annual catch). Nominal CPUE (kg per 100 m net) increased from the historical low levels reported in 2013–15, following the same trends as catches [QDAF 2018]. These historical lows included levels prior to the introduction of net reels in the late 1990s which increased fishing power [Welch et al. 2002]. The implication of the increases in catch and CPUE in 2016 and 2017 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 [Bayliss et al. 2014], 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 (2013–15) the biomass declined, but the stock is not yet considered to be recruitment impaired [QDAF 2018].

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 2017 increased to 236 t, following the historical low level from 2013 to 2016 (155 t average) [QDAF 2018] despite the market for swim bladders causing changes in targeting [Bayliss et al. 2014]. Net fishing effort decreased from 96 operators undertaking 8 507 days in 1989 to 67 operators over 4 087 days in 2017. The lowest reported number of operators was 63 in 2015, whereas the lowest number of fishing days was 2 690 in 2013.

A population structure change appears to have occurred between studies on King Threadfin conducted in 1986–90 [Bibby et al 1997, Garrett 1992] and 2007–09 [Moore 2011]. The age and size structure in the more recent study was truncated, having a younger maximum age and changing sex when smaller and younger [Moore et al. 2011]. These changes were considered to be caused by fishing pressure [Moore et al. 2017], although differences in the selectivity of sampling methods, poor sample sizes and variable recruitment make the comparison of short time series of size and age frequencies uncertain. 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]. Contemporary age data is required to evaluate recent fishing mortality. 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

Commercial catch in the Barramundi Fishery has declined in recent years, but is still above the long-term (1983–2012) average [DPIR 2018]. Additionally, monitored stocks have a healthy size and age distribution and nominal catch per unit effort (CPUE) has increased substantially over the past 10 years, with the 2017 value being the highest value in the history of the fishery [DPIR 2018]. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the current 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 four years (2014–17), ranging from 19–25 tonnes (t), with a mean annual catch of 21.9 t. The recent catches from 2014–2017 are well below the average of 74.5 t for the 10 year period from 2004–13. This is due to low effort levels in the fishery [Newman et al. 2018] 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 ~7 t), and also by charter fishers but only in small quantities (< 0.5 t). 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

Commercial Catch Methods	Northern Territory	Queensland	Western Australia
Beach Seine	✓		
Gillnet	✓		✓
Hook and Line	✓	✓	
N/A		✓	
Net		✓	
Pelagic Gillnet	✓		

Fishing methods			
	Northern	Queensland	Western

	Territory		Australia
Charter			
Hook and Line		✓	
Commercial			
Gillnet	✓		✓
Hook and Line		✓	
Net		✓	
Indigenous			
Hook and Line	✓	✓	
Spearfishing	✓	✓	
Traps and Pots	✓	✓	
Various			✓
Recreational			
Hook and Line	✓	✓	✓
Spearfishing		✓	

Management Methods			
	Northern Territory	Queensland	Western Australia
Charter			
Bag limits			✓
Limited entry	✓		✓
Passenger restrictions			✓
Possession limit	✓		
Spatial closures		✓	✓
Spatial zoning		✓	✓
Commercial			
Gear restrictions	✓	✓	✓
Limited entry	✓	✓	✓
Size limit		✓	
Spatial closures	✓	✓	✓
Spatial zoning	✓	✓	✓
Temporal closures	✓	✓	
Vessel restrictions	✓	✓	✓
Recreational			
Bag limits			✓
Licence (Recreational Fishing			✓

from Boat License)			
Passenger restrictions	✓		
Possession limit	✓	✓	
Size limit	✓	✓	
Spatial closures	✓	✓	✓
Spatial zoning		✓	
Temporal closures	✓		

Active Vessels			
	Northern Territory	**Queensland**	**Western Australia**
	14 LICENCES in BF,	121 in ECIFFF, 67 in GOCIFFF,	4 in KGBMF, 4 in Charter,

BF Barramundi Fishery(NT)

ECIFFF East Coast Inshore Fin Fish Fishery(QLD)

GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery(QLD)

KGBMF Kimberley Gillnet and Barramundi Managed Fishery(WA)

Charter Tour Operator(WA)

Catch			
	Northern Territory	**Queensland**	**Western Australia**
Charter			0.05 t
Commercial	296.916t in BF,	98.234t in ECIFFF, 235.832t in GOCIFFF,	20.518t in KGBMF,
Indigenous	Unknown	Unknown	Unknown
Recreational	1.5 t	Included in recreational estimate	7.50 t ± 2.26 se

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Western Australia – Recreational (Catch) Boat-based recreational catch is from 1 September 2015–31 August 2016. These data are derived from those reported in Ryan et al. 2017. 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.

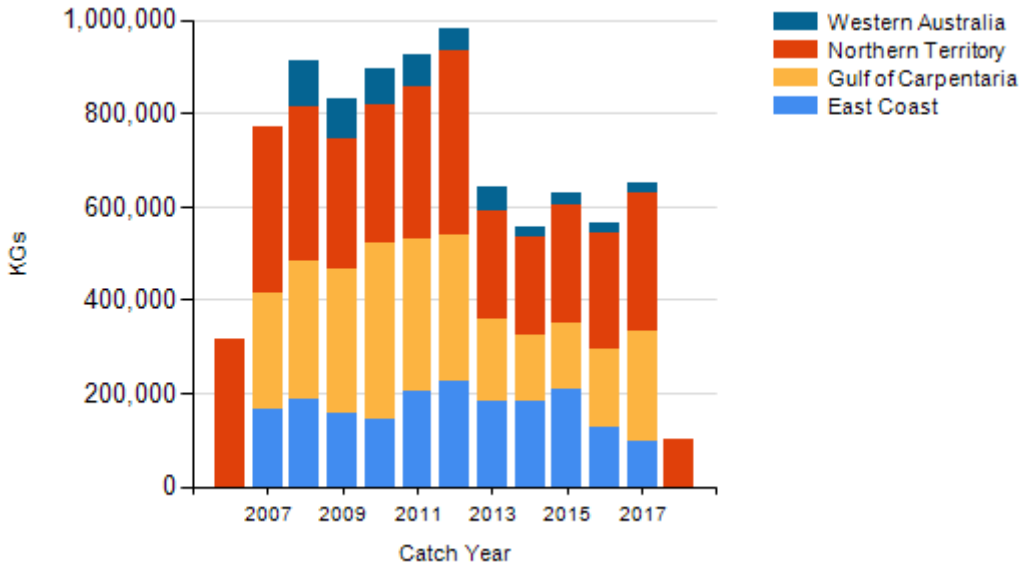
Western Australia – Indigenous Subject to the defence that applies under Section 211 of the *Native Title Act 1993* (Cth), and the exemption from a requirement to hold a recreational fishing licence, the non-commercial take by Indigenous fishers is covered by the same arrangements as that for recreational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

Queensland – Recreational (catch) Survey of Queensland residents only from August 2013–October 2014 [Webley et al 2015].

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

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on King Threadfin

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