

# Mangrove Jack (2018)

*Lutjanus argentimaculatus*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Western Australia	Western Australia	GDSMF, GDSMF    NDSMF    PFTIMF    PLF    PTMF    WL (NC, GC, WC), NDSMF, PFTIMF, PLF, PTMF, WL (NC    GC    WC)	Sustainable	Catch
Northern Territory	Northern Territory	ACL, CLF, DF, TRF	Undefined	Spawning stock biomass, fishing mortality
Queensland	East Coast Queensland	CRFFF, ECIFFF	Undefined	Catch, effort
Queensland	Gulf of Carpentaria	GOCDFTF, GOCIFFF	Recovering	Catch, effort, MSY
New South Wales	New South Wales	N/A	Negligible	

N/A Not Applicable (NSW), CLF Coastal Line Fishery (NT), DF Demersal Fishery (NT), TRF Timor Reef Fishery (NT), LFR Line Fishery (Reef) (QLD), ECIFFF East Coast Inshore Fin Fish Fishery (QLD), GOCDFTF Gulf of Carpentaria Developmental Fin Fish Trawl Fishery (QLD), GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery (QLD), GDSMF Gascoyne Demersal Scalefish Managed Fishery (WA), NDSMF Northern Demersal Scalefish Managed Fishery (WA), PFTIMF Pilbara Fish Trawl (Interim) Managed Fishery (WA), PLF Pilbara Line Fishery (WA), PTMF Pilbara Trap Managed Fishery (WA), ACL Aboriginal Coastal License (NT), WL (NC || GC || WC) Open Access in the North Coast, Gascoyne Coast and West Coast Bioregions (WA), GDSMF || NDSMF || PFTIMF || PLF || PTMF || WL (NC, GC, WC) Various Fisheries combined due to 3 boat rule (WA)

## STOCK STRUCTURE

Mangrove Jack are a long lived (> 50 years), late maturing species that can reach a length of over 1 m [Russell et al. 2003]. They are broadly distributed throughout the tropical and sub-tropical Indo-West Pacific [Allen 1985] and exhibit a biphasic life history pattern, where juveniles spend several years in freshwater and estuarine habitats before migrating offshore as they near

sexual maturity, and have been reported to a depth of at least 175 m [Pradella et al. 2013]).

The distribution of this species within Australian waters extends from approximately Perth, Western Australia, around the north of the continent to Sydney, New South Wales [Pember et al. 2005, Russell et al. 2003]. Genetic analyses indicate that Mangrove Jack consist of a single biological stock across its Australian range [Russell et al. 2003]. This level of mixing is consistent with a life history that involves offshore spawning by adults. However, Mangrove Jack experience moderate to high harvest rates in some Australian fisheries (particularly those targeting adults of this long-lived species) which can cause localised depletion. While juvenile fish have been shown to migrate from freshwater and estuarine habitats to offshore reef environments, often with a movement component of up to 335 km [Russell et al. 2003], once these ontogenetic movements have occurred there have been no reports of adult fish undertaking extensive movements, although studies are limited. As such, limited evidence of adult movement in combination with evidence of different stock status in different regions indicates that Mangrove Jack likely comprise separate management units.

Here, assessment of stock status is presented at the management unit level—Queensland Gulf of Carpentaria and East Coast Queensland; and at the jurisdictional level—Western Australia, Northern Territory and New South Wales.

## STOCK STATUS

**East Coast Queensland** There has been no stock assessment of this species in this management unit. There are commercial line and net fisheries in the area - the Coral Reef Finfish Fishery (CRFFF) and the East Coast Inshore Finfish Fishery (ECIFFF). Total catch from both in recent years was around 2 t [QDAF 2018]. There is a significant recreational fishery for this species but the Indigenous catch is considered to be low. Catch rates for the commercial net and line fishery are not considered to be reliable indicators of biomass because this species is not commercially targeted within this management unit.

Catch of Mangrove Jack in this management unit in the commercial line (1.5 t in 2016–17) and net (0.3 t in 2016–17) fisheries is stable and has been less than 5 t since 2009–10 [QDAF 2018]. The majority of catch is from the recreational fishery and is estimated at 49 t using data provided by the state wide recreational fishing survey 2013–14 [Webley et al. 2015]. Mangrove Jack is a popular recreational species in all habitats they occupy but considered to be difficult to target. The MLS is less than the size at maturity and preliminary fishery-dependent monitoring has documented a majority (> 90 per cent in 2017) of recreationally caught- fish are less than the size at maturity (L50 for females) [DAF unpublished data]. The impact of this on the stock is unknown. A portion of the biomass is not available to the fishery because of state marine parks and the Great Barrier Reef Marine Park (GBRMP) although the proportion protected has not been quantified. There is insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, the management unit is classified as an **undefined stock**.

**Gulf of Carpentaria** A previous assessment of Mangrove Jack for the Queensland Gulf of Carpentaria conducted using data up to 2009 estimated an MSY of 30 t for this management unit [O'Neill et al. 2011]. For eight years from 2003–04 to 2010–11 the Gulf of Carpentaria Developmental Fin Fish Fishery (GOCDFTF) harvest exceeded the 30 t MSY, and between 2006–07 and 2008–09 was more than twice MSY [QDAF 2018]. Since 2012–13, effort has been absent or very low in the GOCDFTF and harvest has been well below MSY each year. There was no commercial fishing in 2016–17. This reduction in effort for this management unit is due to a displacement of effort into Northern Territory by the small dual-endorsed fleet following implementation of management changes in both jurisdictions since 2011. The above evidence indicates that the biomass of this stock is likely to be depleted and that recruitment is likely to be impaired.

However, for the period 2011–12 to 2016–17, the indicators of low to zero fishing effort and harvest well below MSY suggest a recovering stock.

There has been no commercial fishing in the GOCDFTF since July 2016. The most recent catch in 2015–16 was only 13.5 t (56 fishing days) [QDAF 2018] compared to an MSY of 30 t. The new arrangements for the GOCDFTF set catch triggers which limit effort and ensure that the MSY of 30 t will not be exceeded. Observer data (2004–06) showed that approximately a third of the Mangrove Jack retained in the GOCDFTF are immature. Current bycatch reduction device (BRD) specifications for the GOCDFTF are in place to ensure < 10 per cent of catch is < 350 mm (the minimum legal size [MLS] for Mangrove Jack), although the MLS is less than the size at maturity. Catch in the net fishery, Gulf of Carpentaria Inshore Fin Fish Fishery (GOCIFFF), is limited to the recreational in possession limit (5) and there has been no catch recorded since 2012–13. The most recent recreational harvest estimate (2013–14) was 4 500 fish (approximately 8 t) using data provided by the state wide recreational fishing survey 2013–14 [Webley et al. 2015] but this was based on a small sample size. This evidence indicates that the fishing pressure on the stock over the recent five year period (2012–13 to 2016–17) has been low with effort less than 65 commercial fishing days, allowing for recovery of this stock. 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 management unit is classified as a **recovering stock**.

#### **New South Wales**

Stock status for the New South Wales stock is reported as negligible due to historically low catches in this jurisdiction, and because the stock has generally not been subject to targeted fishing. The New South Wales commercial catch in 2012–17 averaged less than 0.1 t per annum, and Mangrove Jack is not a major component of recreational landings. Fishing is unlikely to be having a negative impact on the stock.

#### **Northern Territory**

Mangrove Jack is a highly regarded fish in the Northern Territory but is one of the less common Lutjanids in this jurisdiction. Almost all Mangrove Jack caught by recreational fishers in the Northern Territory are harvested from estuarine and inshore habitats [West et al. 2012], whereas the majority of the commercial harvest (by the multi-species Timor Reef and Demersal Fisheries) occurs offshore.

The magnitude of the recreational harvest of this species is around 5 per cent of the commercial catch (derived from West et al. [2012] using a regional weight multiplier of 0.8 kg per fish, and contemporary commercial catch data). There are no estimates of the Indigenous harvest of Mangrove Jack in the Northern Territory. The lack of a long-term time series on recreational and Indigenous catches means that the assessment presented here is based on data from commercial logbooks.

The average annual commercial catch of Mangrove Jack in the Northern Territory for the decade spanning 2008–17 was 32 t. A preliminary assessment of this species using SimpleSA [NTG unpublished] indicates that the biomass of the stock is above the target biomass (at &ge; 50 per cent of 1983 biomass) but that fishing mortality rate from 2015–17 may have exceeded the target harvest rate (at 0.19 per annum). However, the level of uncertainty around these model outputs is too wide to make an informed judgement on the status of the stock. This uncertainty arises from the fact that Mangrove Jack is not actively targeted by the Timor Reef Fishery or the Demersal Fishery and because these fisheries have only scaled up in recent years. Hence, there is insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, Mangrove Jack in the Northern

Territory is classified as an **undefined stock**.

**Western  
Australia**

Mangrove Jack are landed primarily on the north-west coast of Western Australia as a component of the multispecies Pilbara Demersal Scalefish Fisheries (PDSF: which includes the Pilbara Fish Trawl (Interim) Managed Fishery; the Pilbara Trap Managed Fishery; and the Pilbara Line Fishery) in the Pilbara management region of the North Coast Bioregion; and the Northern Demersal Scalefish Managed Fishery (NDSMF) in the Kimberley management region of the North Coast Bioregion of Western Australia [Newman et al. 2018a]. Mangrove Jack are assessed on the basis of the status of several indicator species (including, for example, Red Emperor and Goldband Snapper in the Kimberley region) that represent the entire inshore demersal suite of species occurring at depths of 30–250 m [Newman et al. 2018b]. The major performance measures for these indicator species are estimates of spawning stock levels. The target level of spawning biomass is 40 per cent of the unfished level. The limit level is 30 per cent of the estimate of initial spawning biomass [DPIRD 2017]. Indicator species assessments using an integrated age structured model determined that the spawning biomass levels of each of the indicator species in the PDSF were either greater than the target level or between the target and the threshold level in 2015 (the year the last integrated assessment was undertaken). The spawning biomass levels of the indicator species were either greater than the target level or between the target level and the threshold level in the NDSMF in 2014 [Newman et al. 2018a]. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

The catch of Mangrove Jack in the PDSF has been low and stable for the past five years (2013–17), ranging from 8.8–12.3 tonnes (t), with a mean annual catch of 10.1 t. The catch of Mangrove Jack in the NDSMF has been low and stable for the past five years (2013–17), ranging from 0.6–1.7 t, with a mean annual catch of 1.3 t. 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, Mangrove Jack in Western Australia is classified as a **sustainable stock**.

**BIOLOGY**

**Mangrove Jack biology** [Pember et al. 2005, Piddocke et al. 2015, Russell et al. 2003]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Mangrove Jack	57 years, 1 019 mm FL	Male: ≥ 7 years, 450 mm F L Female: ≥ 8 years, 510 mm FL

**DISTRIBUTION**



Distribution of reported commercial catch of Mangrove Jack

**TABLES**

<b>Commercial Catch Methods</b>	<b>New South Wales</b>	<b>Northern Territory</b>	<b>Queensland</b>	<b>Western Australia</b>
Beach Seine		✓		
Demersal Longline		✓		
Dropline		✓		
Fish Trap		✓		✓
Hand Line, Hand Reel or Powered Reels				✓
Hook and Line		✓	✓	
Midwater Trawl		✓		
N/A	✓			
Net			✓	
Otter Trawl		✓		✓
Pelagic Gillnet		✓		
Trawl			✓	
Trolling		✓		
Unspecified				✓

<b>Fishing methods</b>	<b>Northern Territory</b>	<b>Queensland</b>	<b>Western Australia</b>
<b>Charter</b>			
Hook and Line	✓	✓	✓
Spearfishing		✓	
<b>Commercial</b>			

Beach Seine	✓		
Fish Trap	✓		✓
Hand Line, Hand Reel or Powered Reels			✓
Hook and Line	✓	✓	
Midwater Trawl	✓		
Net		✓	
Otter Trawl	✓		✓
Trawl		✓	
Unspecified			✓
<b>Indigenous</b>			
Hook and Line	✓	✓	✓
<b>Recreational</b>			
Hook and Line	✓	✓	✓
Spearfishing		✓	
<b>Management Methods</b>			
	<b>Northern Territory</b>	<b>Queensland</b>	<b>Western Australia</b>
<b>Charter</b>			
Bag limits			✓
Gear restrictions		✓	
Limited entry			✓
Passenger restrictions			✓
Possession limit		✓	✓
Size limit		✓	✓
Spatial closures		✓	
Spatial zoning			✓
<b>Commercial</b>			
Bycatch limits		✓	
Gear restrictions	✓	✓	✓
Limited entry	✓	✓	✓
Quota		✓	
Size limit		✓	✓
Spatial closures	✓	✓	✓
Spatial zoning	✓		✓
Temporal closures			✓

<b>Vessel restrictions</b>	✓		✓
<b>Recreational</b>			
<b>Bag limits</b>			✓
<b>Gear restrictions</b>	✓	✓	✓
<b>Licence (Recreational Fishing from Boat License)</b>			✓
<b>Possession limit</b>	✓	✓	✓
<b>Size limit</b>	✓	✓	✓
<b>Spatial closures</b>	✓	✓	✓
<b>Vessel limits</b>	✓		

<b>Active Vessels</b>	<b>Northern Territory</b>	<b>Queensland</b>	<b>Western Australia</b>
	14 LICENCES in CLF, 8 LICENCES in DF, 5 LICENCES in TRF, 12 LICENCES in ACL,	17 Licences in ECIFFF, 46 Licences in CRFFF,	4 in GDSMF, &3 in PFTIMF, 6 in PLF, &3 in PTMF, 34 in Charter, &3 in WL (NC    GC    WC), 6 in NDSF,

**CLF** Coastal Line Fishery(NT)

**DF** Demersal Fishery(NT)

**TRF** Timor Reef Fishery(NT)

**LFR** Line Fishery (Reef)(QLD)

**ECIFFF** East Coast Inshore Fin Fish Fishery(QLD)

**GDSMF** Gascoyne Demersal Scalefish Managed Fishery(WA)

**PFTIMF** Pilbara Fish Trawl (Interim) Managed Fishery(WA)

**PLF** Pilbara Line Fishery(WA)

**PTMF** Pilbara Trap Managed Fishery(WA)

**ACL** Aboriginal Coastal License(NT)

**Charter** Tour Operator(WA)

**WL (NC || GC || WC)** Open Access in the North Coast, Gascoyne Coast and West Coast Bioregions(WA)

**NDSF** Northern Demersal Scalefish Fishery(WA)

<b>Catch</b>	<b>New South Wales</b>	<b>Northern Territory</b>	<b>Queensland</b>	<b>Western Australia</b>
<b>Charter</b>				1.72 t
<b>Commercial</b>		0.0014t in ACL, 0.056t in CLF.	1.482t in CRFFF. 0.345t	10.7645t in GDSMF

		23.7646t in DF, 28.845t in TRF,	in ECIFFF, 0t in GOCDFFTF, 0t in GOCIFFF,	NDSMF    PFTIMF    PLF    PTMF    WL (NC, GC, WC),
<b>Indigenous</b>		Unknown	Unknown	Unknown
<b>Recreational</b>		3 t (2009/10)	8.32 t (GOC), 48.58 t (EC) (2013–14)	2.24 t ± 0.593 se

N/A Not Applicable (NSW), CLF Coastal Line Fishery (NT), DF Demersal Fishery (NT), TRF Timor Reef Fishery (NT), LFR Line Fishery (Reef) (QLD), ECIFFF East Coast Inshore Fin Fish Fishery (QLD), GOCDFFTF Gulf of Carpentaria Developmental Fin Fish Trawl Fishery (QLD), GOCIFFF Gulf of Carpentaria Inshore Fin Fish Fishery (QLD), GDSMF Gascoyne Demersal Scalefish Managed Fishery (WA), NDSMF Northern Demersal Scalefish Managed Fishery (WA), PFTIMF Pilbara Fish Trawl (Interim) Managed Fishery (WA), PLF Pilbara Line Fishery (WA), PTMF Pilbara Trap Managed Fishery (WA), ACL Aboriginal Coastal License (NT), WL (NC || GC || WC) Open Access in the North Coast, Gascoyne Coast and West Coast Bioregions (WA), GDSMF || NDSMF || PFTIMF || PLF || PTMF || WL (NC, GC, WC) Various Fisheries combined due to 3 boat rule (WA),

**Western Australia** Active Vessels data is unreportable as there were fewer than three vessels operating in Pilbara Fish Trawl Interim Managed Fishery and Pilbara Trap Managed Fishery.

**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]. Shore based catches of Mangrove Jack are not known.

**Western Australia – Recreational (management methods)** A Recreational Fishing from Boat License 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.

**Northern Territory** Recreational Catch from West et al. [2012].

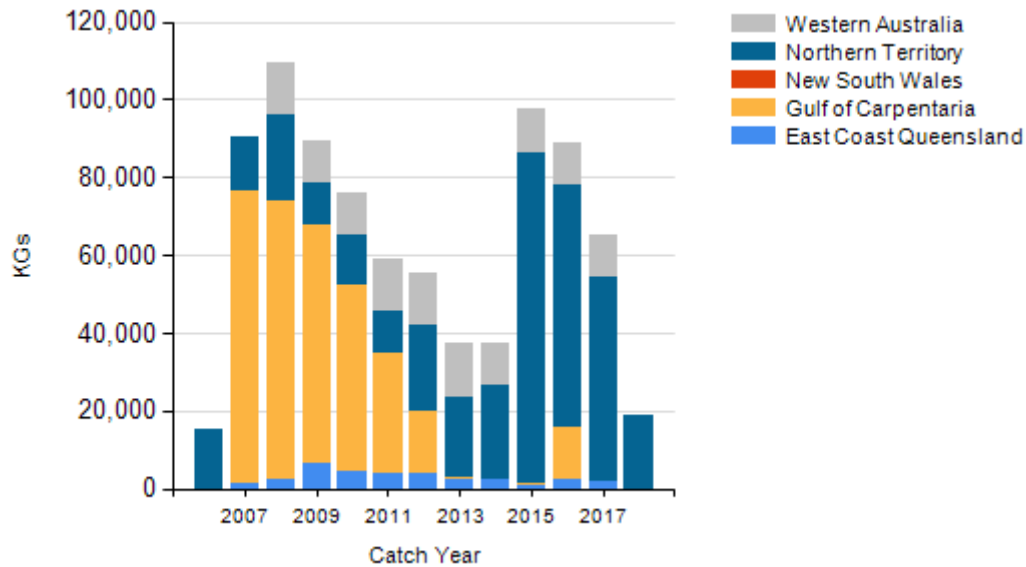
**Queensland** Commercial catch from 1 July 2016–30 June 2017.

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

**Queensland – Indigenous** Under the *Fisheries Act 1994* (Qld), Indigenous fishers in Queensland are entitled 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.

## CATCH CHART





Commercial catch of Mangrove Jack - note confidential catch not shown

## EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

### ENVIRONMENTAL EFFECTS on Mangrove Jack

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