

# Mangrove Jack (2020)

*Lutjanus argentimaculatus*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Western Australia	Sustainable	Catch, indicator species status
Northern Territory	Northern Territory	Sustainable	Spawning stock biomass, fishing mortality
Northern Territory, Queensland	Gulf of Carpentaria	Sustainable	Catch, effort, MSY
Queensland	East Coast Queensland	Undefined	Catch, effort
New South Wales	New South Wales	Negligible	

## 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 may 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 varying 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—East Coast Queensland and the Gulf of Carpentaria; and at the jurisdictional level—Western Australia, Northern Territory and New South Wales.

## STOCK STATUS

**East Coast Queensland** Mangrove Jack is taken as a minor by-product species in Queensland commercial line and net fisheries - the Coral Reef Finfish Fishery (CRFFF) and the East Coast Inshore Finfish Fishery (ECIFFF). Catch of Mangrove Jack in the commercial line (1.9 t in 2018–19) and net (1.1 t in 2018–19) fisheries is stable and has averaged 2.5 t in total since 2010–11 [QFISH 2020]. 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.

There is a significant recreational fishery for this species (average 62 t from 2000 to 2019) [Teixeira et al. 2021], but the Indigenous catch is considered to be low. 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** Mangrove Jack were exposed to foreign trawling activity between 1950 and 1990 [O'Neill et. al. 2011] with catches being slightly lower than contemporary harvests. During 2002–2011 the Gulf of Carpentaria Developmental Fin Fish Fishery (GOCDFTF) harvest averaged approximately 50 t which was considered higher than the 30 t MSY identified in a previous assessment [O'Neill et al. 2011]. Since 2012–13, effort has been absent or very low in the GOCDFTF but has increased to above 40 t in the Northern Territory Demersal Fishery (DF) in 2019. Mangrove Jack in the GOC have been previously considered to be recovering from overfishing due to the MSY being exceeded. The current assessment uses a modified catch-MSY model (developed by Martell and Froese [2013] and modified by Haddon et al. [2018]) and uses data from both Queensland and Northern Territory. The outputs from the model estimated that the 2019 biomass of Mangrove Jack in the GOC was 56 per cent of unfished levels [Saunders and Roelofs 2020] suggesting that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Similarly, the model estimated that the fishing mortality (0.1) in 2019 was well below the limit point indicating 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 management unit is classified as a **sustainable 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] and contemporary commercial catch data). There are no estimates of the Indigenous harvest of Mangrove Jack in the Northern Territory.
- The average annual commercial catch of Mangrove Jack in the Northern Territory for the decade spanning 2010–19 was 26 t. An assessment using catch data applied to a modified catch-MSY model (developed by Martell and Froese [2013] and modified by Haddon [2018]), estimated that the 2019 biomass of Mangrove Jack was 54 per cent of unfished levels [Saunders 2020] suggesting that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Similarly, the model estimated that the fishing mortality (0.08) in 2019 was well below the limit point indicating 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 the Northern Territory is classified as a **sustainable 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 as a component of the multispecies Northern Demersal Scalefish Managed Fishery (NDSMF) in the Kimberley management region of the North Coast Bioregion of Western Australia [Newman et al. 2020]. 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. 2018]. 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, with a threshold reference level of 30 per cent and a limit reference level of 20 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 at the threshold level in the NDSMF in 2017 [Newman et al. 2020]. 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 10 years (2010–19), ranging from 8.9–14.4 tonnes (t), with a mean annual catch of 10.9 t. The catch of Mangrove Jack in the NDSMF has been low and stable for the past 10 years (2010–19), ranging from 0.6–3.4 t, with a mean annual catch

of 1.4 t. The above evidence indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

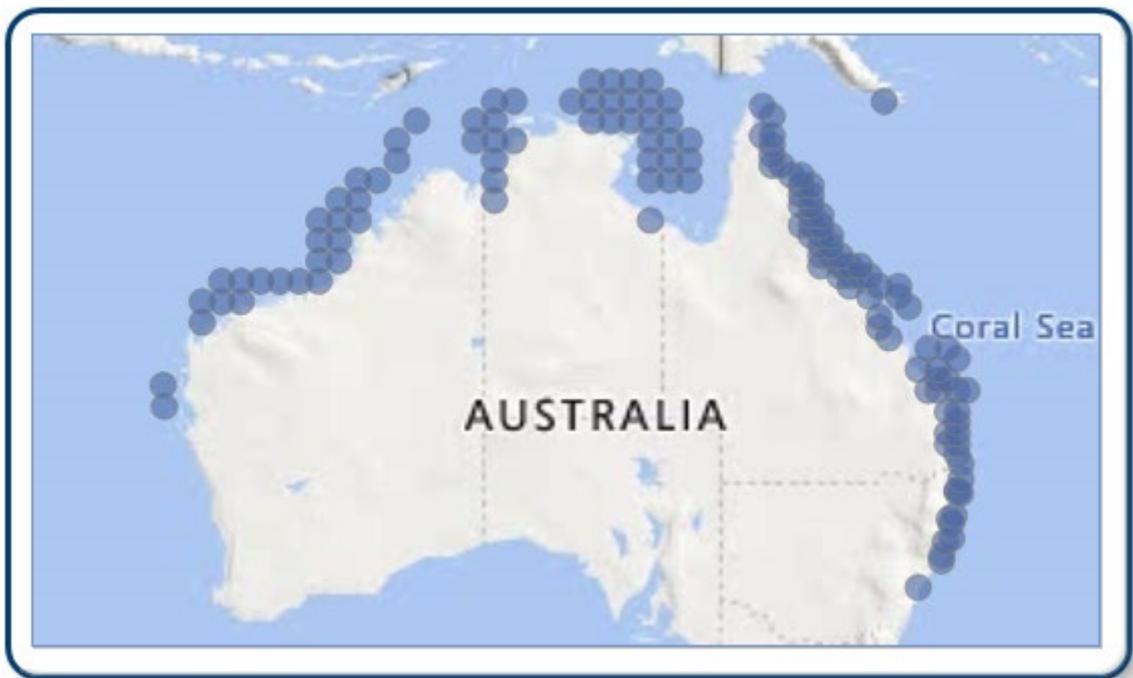
On the basis of the evidence provided above, Mangrove Jack in Western Australia is classified as a **sustainable stock**.

## 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

Fishing methods	New South Wales	Northern Territory	Queensland	Western Australia
<b>Charter</b>				
Hook and Line		✓	✓	
Rod and reel				✓
Spearfishing			✓	✓
<b>Commercial</b>				
Bottom Trawls		✓		
Cast Net		✓		
Fish Trap		✓		✓

Gillnet		✓		
Hand Line, Hand Reel or Powered Reels				✓
Handline		✓		
Line			✓	
Net			✓	
Otter Trawl				✓
Trawl			✓	
Various	✓			
<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			✓
Vessel limits	✓		
<b>Commercial</b>			
Bycatch limits		✓	
Gear restrictions	✓	✓	✓
Limited entry	✓	✓	✓
Quota		✓	
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	✓	✓	✓
Vessel limits	✓		

Catch				
	New South Wales	Northern Territory	Queensland	Western Australia
Charter		2 t		2 t
Commercial	0.0934 t	56.2845 t	2.9228 t	13.5231 t
Indigenous		Unknown	Unknown	Unknown
Recreational		0.9 t (2016)	Unknown (GOC), 49 t (EC) (2019-20)	2 t (2017/18)

**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 2017–31 August 2018. These data are derived from those reported in Ryan et al. [2019]. Shore based catches of Mangrove Jack are not known.

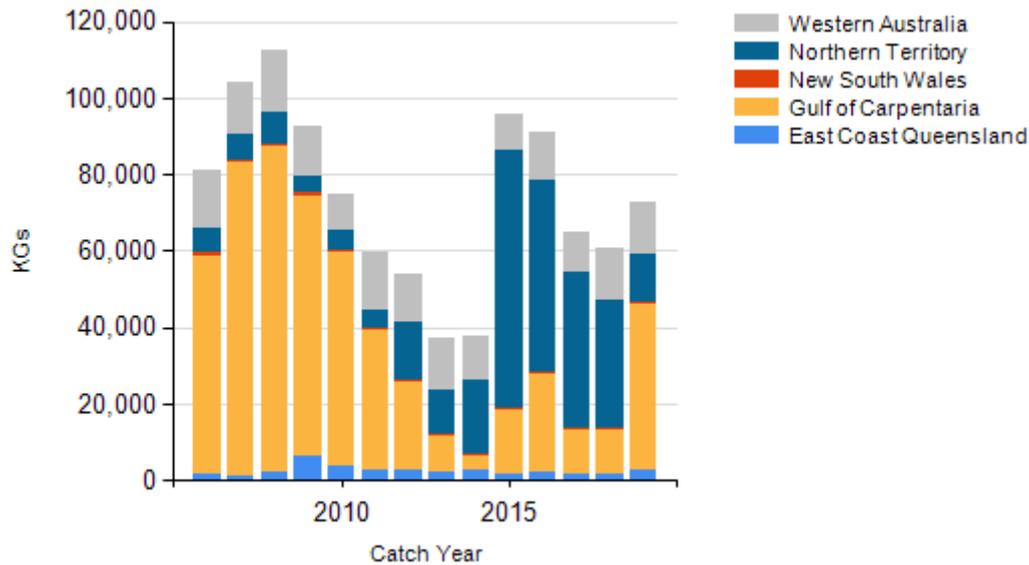
**Western Australia – Recreational (management methods)** A Recreational Fishing from Boat License is required for the use of a powered boat to fish or to transport catch or fishing gear to or from a land-based fishing location.

**Western Australia – Indigenous (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.

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

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

## CATCH CHART



Commercial catch of Mangrove Jack - note confidential catch not shown

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