

BANANA PRAWNS (2018)

Penaeus indicus & Penaeus merguensis



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Commonwealth	Northern Prawn Fishery	NPF	Sustainable	Catch, CPUE, trigger limits
Western Australia	Exmouth Gulf Prawn Managed Fishery	EGPMF	Sustainable	Catch
Western Australia	Kimberley Prawn Managed Fishery	KPMF	Sustainable	Catch, catch projections
Western Australia	Nickol Bay and Onslow Prawn Managed Fisheries	NBPMF	Sustainable	Catch, catch projections, biomass dynamic model
Queensland	East Coast	ECIFFF, ECOTF, RIBTF	Sustainable	Catch, stock assessments

NPF Northern Prawn Fishery (CTH), ECIFFF East Coast Inshore Fin Fish Fishery (QLD), ECOTF East Coast Otter Trawl Fishery (QLD), RIBTF River and Inshore Beam Trawl Fishery (QLD), EGPMF Exmouth Gulf Prawn Managed Fishery (WA), KPMF Kimberley Prawn Managed Fishery (WA), NBPMF Nickol Bay Prawn Managed Fishery (WA)

STOCK STRUCTURE

In Australia the standard fish name Banana Prawn is a group name which refers to *Fenneropenaeus merguensis* and *Fenneropenaeus indicus* [Ferfante and Kensley 1997]. Both species have also been placed in the genus *Penaeus* with taxonomy still unsettled [Ma et al. 2011]. Here, only *Fenneropenaeus merguensis* is considered, and referred to as Banana Prawn. The biological stock structure of Banana Prawn is uncertain. There is some evidence that there may be separate biological stocks of Banana Prawn within the Northern Prawn Fishery (Commonwealth); however, the boundaries of the biological stocks are unknown [Yearsley et al. 1999]. Stocks in Western Australia and Queensland are widely separated, but it is not known whether these are completely independent stocks [Tanimoto et al. 2006].

Here, assessment of stock status is presented at the management unit level—Northern Prawn Fishery (Commonwealth); Exmouth Gulf Prawn Managed Fishery, Nickol Bay and Onslow Prawn Managed Fisheries, Kimberley Prawn Managed Fishery (Western Australia); and East Coast (Queensland).

STOCK STATUS

East Coast There appears to be no long-term trend in the annual Banana Prawn catch with total catches showing considerable variation between years. In more recent years, these fluctuations have become more pronounced with a record high total catch reported in 2011 (1374 t), followed by a record low total catch in 2012 (331 t) and the second-highest total catch in 2013 (1151 t). These fluctuations were reflected in the effort data with total annual effort peaking in 1998 at 14 858 days fished before declining to between 4 287 (2012) and 11 103 (2004) days fished over the 2000–17 period.

Environmental factors would more than likely have contributed to these fluctuations since rainfall and river flow rates are intimately linked to Banana Prawn recruitment rates and biomass availability [Tanimoto et al. 2006]. The most recent quantitative assessment of the East Coast (Queensland) management unit was based on catch-and-effort data from 1988–2004 and estimated an average annual MSY estimate of 802 t [Tanimoto et al. 2006]. Total commercial catch of Banana Prawns following 2013 has stabilized at a level below the MSY estimate; at 442–785 t [Tanimoto et al. 2006]. The above evidence indicates that the biomass of the management unit is unlikely to be depleted and that recruitment is unlikely to be impaired.

Recent ecological risk assessments found that there was a low risk of the management unit becoming recruitment overfished at 2009 effort levels [Pears et al. 2012, Jacobsen et al. 2018]. Since 2009, there has been a 7 per cent decrease in effort directed at Banana Prawn (days when Banana Prawn was caught), indicating that, despite an increase in fishing power in the East Coast Otter Trawl Fishery fleet (0.4–3.1 per cent per year) [O’Neill and Leigh 2007], fishing pressure on the management unit is not increasing. The above evidence indicates that the current level of fishing mortality is unlikely to cause the management unit to become recruitment impaired.

On the basis of the evidence provided above, the East Coast (Queensland) management unit is classified as a **sustainable stock**.

Exmouth Gulf Prawn Managed Fishery Banana Prawn landings are generally low (or zero) in this fishery, with historical landings (1963–2017) ranging from 0–74 t. Catches of banana prawns are related to the amount of rainfall in the region, with consecutive high rainfall years providing the optimal conditions for banana prawn recruitment. Fishers are active when abundance is higher and aggregations are evident. In recent times, banana prawn catches in the upper end of the historical landings range occurred in 2012 and 2013 which corresponded to relatively higher rainfall over the summer months these years. Less than 1 t of Banana Prawns were landed in 2017 [Gaughan and Santoro 2018]. Given the environmentally driven nature of Banana Prawn recruitment [Venables et al. 2011] and historical low landings for some years, the above evidence indicates that the biomass of the management unit is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the current level of fishing mortality is unlikely to cause the management unit to become recruitment impaired.

On the basis of the evidence provided above, the Exmouth Gulf Prawn Managed Fishery (Western Australia) management unit is classified as a **sustainable stock**.

**Kimberley
Prawn
Managed
Fishery**

Historical commercial catch levels from 1989–98 have been used as the basis for calculating target catch ranges, which represent a management aim. The target range in the Kimberley Prawn Managed Fishery (Western Australia) is 200–450 t [Gaughan and Santoro 2018] although, due to much reduced effort in this fishery in recent years, this target range is under review. Annual commercial catch projections are expected to be taken within a specific fishing season which is based on January and February rainfall levels in Kalumburu and Derby [Gaughan and Santoro 2018]. The commercial catch projection for the 2017 fishing season was 210–315 t. Total commercial catch for 2017 was 260 t, within the target catch range and projected catch range for 2017. The management unit operates under an upper limit effort cap of 1 500 vessel days (based on historical effort levels) and 747 vessel days were fished in 2017.

On the basis of annual trends in landings and effort since 1980 and, more recently, catch rates, the Banana Prawn stock is currently considered to be fished at a sustainable level. There has been no marked declining trend in landings across the entire time series and landings have been maintained despite relatively low levels of effort compared with historical levels. Fishing effort (vessel days) in the past five years has been well below the levels that provided the highest catches in the history of the fishery. Fishing mortality is estimated to be low, with a preliminary biomass dynamics model indicating around 760 days of fishing are required to achieve maximum sustainable yield (MSY) under average environmental conditions. The model estimated that levels of spawning stock biomass have been maintained at more than 50 per cent of unfished biomass levels.

There has been a marked increase in annual mean catch rates since about 2005, following a marked reduction in the number of fishers harvesting the available stock. Fishers are currently aiming to optimise returns by maximising their efficiency, with the majority fishing only when catch rates are high. Permanent closures have been introduced in all the major rainfall catchments, as well as temporal closures in two of the catchment areas (known as 'size management fish grounds') to protect smaller prawns and their habitats.

The above evidence indicates that the biomass of the management unit is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the current level of fishing mortality is unlikely to cause the management unit to become recruitment impaired.

On the basis of the evidence provided above, the Kimberley Prawn Managed Fishery (Western Australia) management unit is classified as a **sustainable stock**.

**Nickol Bay
and Onslow
Prawn
Managed
Fisheries**

Historical commercial catch levels from 1989–98 have been used as the basis for calculating target catch ranges, which represent a management indicator. The Banana Prawn target catch range for Nickol Bay is 40–220 t and for Onslow is 2–90 t [Gaughan and Santoro 2018]. Annual commercial catch projections, within which it is expected that catches should remain for the fishing season in Nickol Bay, are estimated based on wet-season rainfall (December–March). The commercial catch projection for the 2017 fishing season was 170–250 t. Total commercial catch for 2017 was 223 t, which was within the projected catch range and just above the target catch range. Seven boats fished the Nickol Bay fishery in 2017, with a total effort of 283 boat days. Only one boat fished the Onslow fishery with a total effort of five boat days, landing a low quantity of Banana Prawns whilst. Since 2012, very low effort has been expended in the Onslow fishery as a result of disruption to fishing activities and area access due to resource developments in the region with effort levels in the five years prior to 2012 being between 60 and 260 boat days.

On the basis of annual trends in landings and effort, and more recently from analysis of annual catch rates and the results of preliminary stock production

models and a biomass dynamics model (unpublished, Western Australia Department of Fisheries), the Banana Prawn stock in Nickol Bay is currently considered to be fished at a sustainable level. There has been no marked declining trend in overall landings across the entire time series despite very marked reductions in effort in most recent years. The high wet-season rainfall and higher catch projection for 2017 saw an increase in fishing effort on the last two years but at levels still well below historical levels. There has also been no decline in peak catch rates in recent years in the two main fishing grounds and estimates from the biomass dynamics model indicate a declining trend in fishing mortality due to lower fishing effort. Estimates from the biomass dynamics model also indicate high levels of spawning biomass in recent years relative to the estimated unfished level.

The above evidence indicates that the biomass of the management unit is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the current level of fishing mortality is unlikely to cause the management unit to become recruitment impaired.

On the basis of the evidence provided above, the Nickol Bay and Onslow Prawn Managed Fisheries (Western Australia) management unit is classified as a **sustainable stock**.

Northern Prawn Fishery

Recruitment of Banana Prawns in the Northern Prawn Fishery (Commonwealth) (NPF) is highly variable and thought to be largely determined by seasonal environmental conditions, particularly rainfall [Venables et al. 2011]. As a result, a reliable stock–recruitment relationship has not been established and no formal stock assessment has been conducted for this stock. Status determination is therefore on a weight-of-evidence approach.

The harvest strategy for Banana Prawns in the NPF is designed to facilitate the capture of larger prawns, while allowing for sufficient escapement to ensure adequate remaining spawning biomass, thereby preventing growth and recruitment overfishing and providing higher returns by minimising the capture of small prawns. This is achieved by controlling the timing of the fishing season (which impacts prawn size) and the length of the season, the end of which is determined using catch-rate thresholds [Dichmont et al. 2014]. The harvest strategy is designed to perform effectively under conditions of substantial variation in biomass, which are largely environmentally-driven. Although fishing mortality is thought to have been high for Banana Prawns in some years [Zhou et al. 2007], the species has shown resilience to fishing pressure, with strong subsequent recruitment following historical high levels of catch.

In 2017, total reported commercial landings were 4 662 tonnes (t), close to the average catch of the preceding 10 years (2008–17). These catch levels indicate that the biomass available in 2017 was close to the 10 year average. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired [Larcombe et al. 2018].

The harvest strategy for Banana Prawns causes the closure of the season when catch rates fall below a trigger level that is associated with permitting sufficient prawns to escape to ensure an adequate spawning biomass for subsequent recruitment (based on an analysis of historical data [Dichmont et al. 2014]). Harvesting of Banana Prawns has been undertaken in accordance with this harvest strategy for almost a decade. During this period, Banana Prawn annual recruitment (as evidenced by catches) has been maintained and continued a pattern of high natural variability from year-to-year.

Effort expended on Banana Prawns in the Northern Prawn Fishery in 2017 was 2 304 vessel days with a fleet of some 50 vessels. This is below the average for the most recent decade (with a fleet of some 50 vessels) and substantially below effort in previous decades which were well in excess of 4 000 days and with a

substantially larger fleet.

The above evidence indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired [Larcombe et al. 2018].

On the basis of the evidence provided above, the Northern Prawn Fishery (Commonwealth) management unit is classified as a **sustainable stock**.

BIOLOGY

Banana Prawn biology [Huber 2003, Tanimoto et al. 2006, Yearsley et al. 1999]

Species	Longevity / Maximum Size	Maturity (50 per cent)
BANANA PRAWNS	1–2 years; > 240 mm TL	~6 months; 120–150 mm CL

DISTRIBUTION



Distribution of reported commercial catch of BANANA PRAWNS

TABLES

Commercial Catch Methods	Commonwealth	Queensland	Western Australia
Beam Trawl		✓	
Net		✓	
Otter Trawl	✓	✓	✓

Fishing methods	Commonwealth	Queensland	Western Australia
Commercial			
Beam Trawl		✓	
Net		✓	

Otter Trawl	✓	✓	✓
Indigenous			
Cast Net		✓	
Recreational			
Cast Net		✓	✓
Management Methods			
	Commonwealth	Queensland	Western Australia
Charter			
Gear restrictions		✓	
Possession limit		✓	
Spatial closures		✓	
Commercial			
Effort limits	✓		
Gear restrictions	✓	✓	✓
Limited entry	✓	✓	✓
Spatial closures	✓	✓	✓
Temporal closures	✓	✓	✓
Vessel restrictions	✓	✓	
Recreational			
Bag limits			✓
Gear restrictions		✓	
Licence			✓
Possession limit		✓	
Spatial closures		✓	
Active Vessels			
	Commonwealth	Queensland	Western Australia
	53 Vessels in NPF,	21 in ECIFFF, 160 in ECOTF, 45 in RIBTF,	<3 in EGPMF, 11 in KPMF, 7 in NBPMF,

NPF Northern Prawn Fishery(CTH)

ECIFFF East Coast Inshore Fin Fish Fishery(QLD)

ECOTF East Coast Otter Trawl Fishery(QLD)

RIBTF River and Inshore Beam Trawl Fishery(QLD)

EGPMF Exmouth Gulf Prawn Managed Fishery(WA)

KPMF Kimberley Prawn Managed Fishery(WA)

NBPMF Nickol Bay Prawn Managed Fishery(WA)

Catch	Commonwealth	Queensland	Western Australia
Commercial	4662t in NPF,	11.7238t in ECIFFF, 645.481t in ECOTF, 123.744t in RIBTF,	260.037t in KPMF, 222.543t in NBPMF,
Indigenous	Unknown	Unknown	Unknown
Recreational	Unknown	Unknown	Unknown

NPF Northern Prawn Fishery (CTH), ECIFFF East Coast Inshore Fin Fish Fishery (QLD), ECOTF East Coast Otter Trawl Fishery (QLD), RIBTF River and Inshore Beam Trawl Fishery (QLD), EGPMF Exmouth Gulf Prawn Managed Fishery (WA), KPMF Kimberley Prawn Managed Fishery (WA), NBPMF Nickol Bay Prawn Managed Fishery (WA),

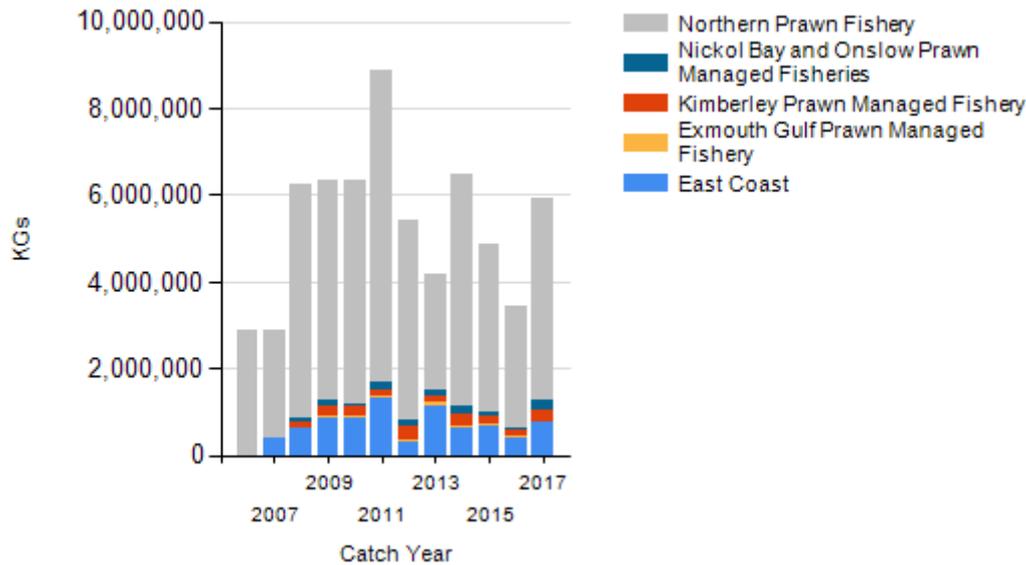
Commonwealth – Recreational and Indigenous Subject to the defence that applies under Section 211 of the *Native Title Act 1993* (Cth), and the exemption from a requirement to hold a recreational fishing licence, the non-commercial take by indigenous fishers is covered by the same arrangements as that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

Commonwealth – Recreational The Australian Government does not manage recreational fishing in Commonwealth waters. Recreational fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters, under its management regulations.

Commonwealth – Indigenous The Australian Government does not manage non-commercial Indigenous fishing in Commonwealth waters, with the exception of the Torres Strait. In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters.

Queensland – Indigenous In Queensland, under the *Fisheries Act 1994* (Qld), Indigenous fishers 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 can be obtained through permits.

CATCH CHART



Commercial catch of BANANA PRAWNS - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on BANANA PRAWNS

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