

BANANA PRAWNS (2020)

Penaeus indicus & Penaeus merguensis



Ian Butler: Australian Bureau of Agricultural and Resource Economics and Science, **Ian Butler:** Australian Bureau of Agricultural and Resource Economics and Sciences, **Anthony Roelofs:** Department of Agriculture and Fisheries, Queensland, **Mervi Kangas:** Department of Primary Industries and Regional Development, Western Australia

STOCK STATUS OVERVIEW

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

STOCK STRUCTURE

In Australia the standard fish name Banana Prawn is a group name which refers to the White Banana Prawn, *Penaeus merguensis* and the Redleg Banana Prawn, *Penaeus indicus*. Both species have also been placed in the genus *Fenneropenaeus* with taxonomy still unsettled [Ferfante and Kensley 1997; Ma et al. 2011] and name usage is mixed among fisheries. White and Redleg banana prawns are often not distinguished in the catch in Australian fisheries. An exception to this is the Joseph Bonaparte Gulf area of the Northern Prawn Fishery (NPF), where populations of Redleg banana prawns are specifically targeted. The biological stock structure of Banana Prawn is uncertain. There is some evidence that there may be separate biological stocks of White Banana Prawn within the Northern Prawn Fishery (Commonwealth); however, the boundaries of the biological stocks are unknown [Yearsley et al. 1999]. Banana prawn fisheries 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 Commercial catches of Banana Prawn in the East Coast management unit have shown considerable inter annual variation. Since 2000, nominal catch rates for beam and otter trawl sectors have been gradually increasing, although catch rates were slightly lower in 2018-19 compared to 2016-17 [QFISH 2020]. Environmental factors 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]. A quantitative assessment of the East Coast (Queensland) management unit, based on catch and effort data from 1988–2004, estimated an average annual *MSY* estimate of 802 t [Tanimoto et al. 2006]. Total commercial catch of Banana Prawns since 2013 has stabilised at a level below the *MSY* estimate; at 442–785 t [QFISH 2020]. Total harvest in 2019 was at the lower end of this range at 449 t. 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]. Compared with 2009, there has been a 36 per cent decrease in effort in 2019 (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 (1963–2018) 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 in these years. Less than 1 t of Banana Prawns were landed in 2019 [Gaughan and Santoro 2020]. 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 2020] although, due to much reduced effort in this fishery in since 2009 as fishers cease fishing at higher catch rates due to cost of fishing so this target range is under review. The management unit operates under an upper limit effort cap of 1 500 vessel days (based on historical effort levels). Since 2009 less than 650 fishing days have been expended by the fleet. Annual commercial catch projections are generally 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 2020] but this relationship is not strong and can be influenced by the level of fishing effort. The commercial catch projection for the 2019 fishing season was 215–370 t. Total commercial catch for 2019 however, was only 97 t, well below the target catch range and projected catch range and this low catch was commensurate with only 174 vessel days of fishing by operators.

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 generally been maintained despite relatively low levels of effort compared with historical levels. Fishing effort (vessel days) in the past five years, and especially 2019 have 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 2008, following a marked reduction in the number of fishers harvesting the available stock. Catch rates prior to 2008 were on average 290 kg/fishing day whereas since 2009 the average catch rates have been 625 kg/fishing day. In 2019 the average catch rate was 556 kg/fishing day. 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 2020]. 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 2019 fishing season was 110–165 t. Total commercial catch for 2019 was 216 t, above the projected catch range but within the target catch range. Eight boats fished the Nickol Bay fishery in 2019,

with a total effort of 353 boat days. Only one boat fished the Onslow fishery with a total effort of 28 boat days, landing a low quantity of Banana Prawns. Since 2012, very low effort has been expended in the Onslow fishery as a result of disruption to fishing activities to the most productive part of this fishery due to the construction of a gas facility and associated wharf, dredging and exclusion zones with effort levels in the five years prior to 2012 between 60 and 260 boat days annually.

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 Primary Industries and Regional Development), 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 moderate wet-season rainfall and early good catch rates saw an increase in fishing effort in 2019 that had not been observed for the last 12 years. However effort was 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

Two species of Banana Prawns are managed in the Northern Prawn Fishery (Commonwealth) (NPF) (White Banana Prawn - *Penaeus merguensis* and Redleg Banana Prawn - *Penaeus indicus*). Here, we will report on White Banana Prawn (*Penaeus merguensis*), which make up the bulk of banana prawn catch in the NPF.

Recruitment of Banana Prawns in the 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 based on a weight-of-evidence approach.

The harvest strategy for White 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 facilitating 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 White 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.

The harvest strategy for White 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 ensuring an adequate spawning biomass for subsequent recruitment (based on an analysis of historical data [Dichmont et al. 2014]). Harvesting has been undertaken in accordance with this harvest strategy for almost a decade. During this period, White Banana Prawn annual recruitment (as evidenced by catches) has been maintained and continued a pattern of high natural variability from year-to-year.

Total reported commercial landings of White Banana Prawns were 4 439 tonnes (t) in 2018 and 5 592 t in 2019, with average catch around 4 647 t for the years 2010 to 2019. Consistency in landings indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

Effort expended on Banana Prawns (including minor targeting of *P. indicus*) in the Northern Prawn Fishery was 2 343 days in 2019 (2 555 days in 2018) across 52 vessels. This is slightly below the average for the most recent decade (~2600 days, with similar fleet size), and substantially below effort in previous decades which were well in excess of 4 000 days, but 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.

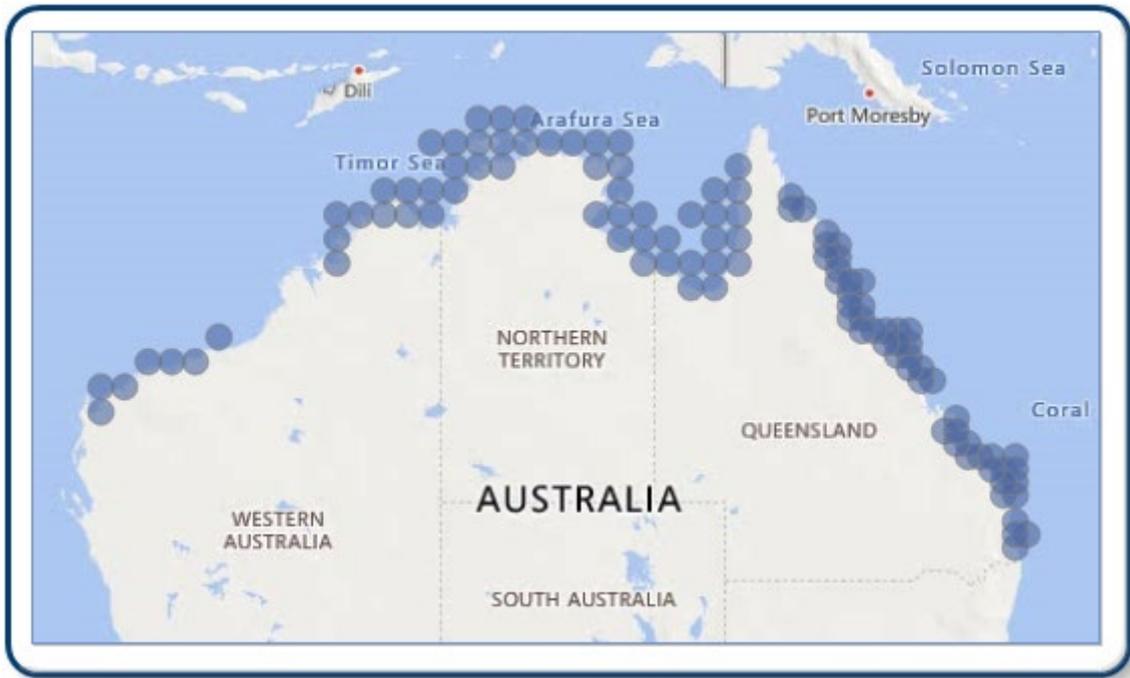
On the basis of the evidence provided above, the Northern Prawn Fishery (Commonwealth) management unit is classified as a **sustainable stock**

BIOLOGY

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

Species	Longevity / Maximum Size	Maturity (50 per cent)
BANANA PRAWNS	White Banana Prawn (<i>P. merguensis</i>): 1–2 years; > 240 mm TL; ~38 mm CL	White Banana Prawn (<i>P. merguensis</i>): ~6 months; 120–150 mm TL; >25 mm CL

DISTRIBUTION



Distribution of reported commercial catch of BANANA PRAWNS

Confidentiality prevents the display of spatial data for some fisheries.

TABLES

Fishing methods	Commonwealth	Queensland	Western Australia
Commercial			
Beam Trawl		✓	
Net		✓	
Otter Trawl	✓	✓	✓
Recreational			
Cast Net		✓	✓
Unspecified			✓

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		✓	

Catch			
	Commonwealth	Queensland	Western Australia
Commercial	5592 t	461.634 t	324.698 t
Indigenous	Unknown	Unknown	Unknown
Recreational	Unknown	Unknown	Unknown

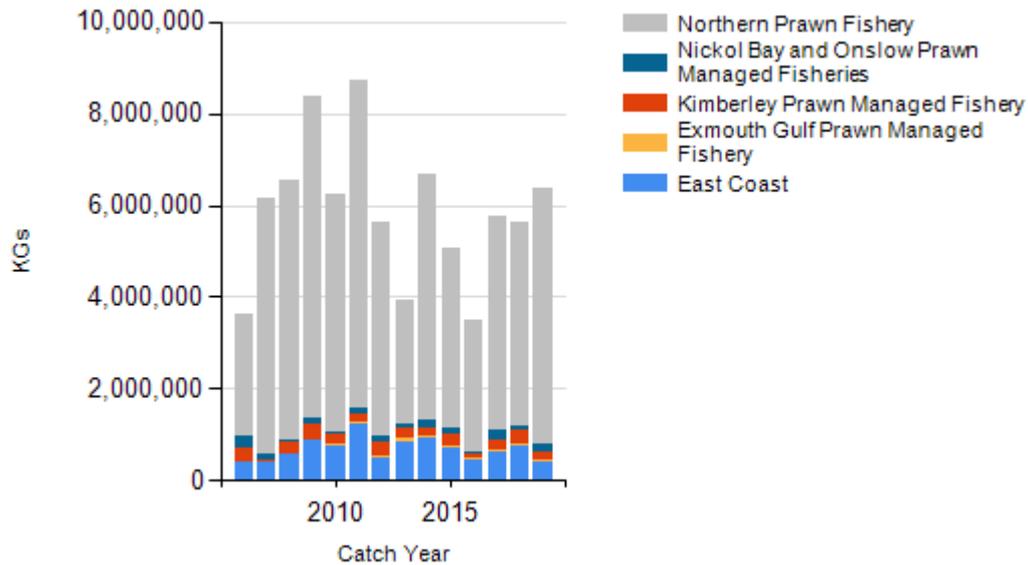
Commonwealth – Commercial catch Commercial catch in the NPF is only for White Banana Prawns (*P. merguensis*)

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

CATCH CHART



Commercial catch of BANANA PRAWNS - note confidential catch not shown

Commonwealth Northern Prawn Fishery catch is for White Banana Prawns (*P. merguensis*) only

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