

BANANA PRAWNS (2023)

Penaeus indicus & Penaeus merguensis



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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, CPUE, catch projections, biomass dynamics model
Western Australia	Nickol Bay and Onslow Prawn Managed Fisheries	Sustainable	Catch, CPUE, catch projections, biomass dynamics model
Queensland	East Coast	Sustainable	Catch, effort, catch rates, stock assessment, risk 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; Vance and Rothlisberg 2020 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 for Banana Prawns 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 Historically, commercial catches of Banana Prawn in the East Coast management unit have shown considerable interannual variation. There was a general increase in catch from a low of 364 tonnes (t) in 2000–01 to a peak of 1 263 t in 2010–11 (otter trawl, beam trawl and set pocket net combined catch). This was followed by a general decreasing trend in the combined catch between 2010–11 and 2021–22. Since 2000, nominal catch rates for the beam trawl sector gradually increased until 2011, then remained relatively stable. Otter trawl sector catch rates generally increased until 2013, then declined until 2016, and were less variable thereafter. Environmental factors have likely contributed to these fluctuations since rainfall and river flow rates are closely linked to Banana Prawn recruitment rates and biomass availability [Tanimoto et al. 2006]. An age-structured stock assessment model of the East Coast (Queensland) management unit estimated an average annual Maximum Sustainable Yield (MSY) of 802 t based on catch and effort data from 1988–2004 [Tanimoto et al. 2006]. The total commercial catch of Banana Prawns since 2013 has remained below the MSY estimate, ranging from 223 t to 782 t. Total harvest in 2021–22 was at the lower end of this range with a reported 223 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.

Since 2017, fishing pressure has been decreasing steadily in the beam trawl and otter trawl fishing sectors; the two main contributors of catch, responsible for 96% of the days fished. 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 was a 35% decrease in effort in 2022 (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 (1963–2022) 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 optimal conditions for Banana Prawn recruitment. Fishers tend to actively target this species in this fishery in years when its abundance is relatively high and aggregations are evident. In recent times, Banana Prawn catches in the upper end of the historical landings range occurred in 2012 and 2013, both years where summer rainfall was relatively high. Less than 1 t of Banana Prawns were landed in 2022 [Newman et al. 2023]. 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 Banana Prawn in Exmouth Gulf is unlikely to be depleted. 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 (a period when the fishery was considered sustainable) have been used as the basis for calculating target catch ranges. The target range in the Kimberley Prawn Managed Fishery (Western Australia) is 200–450 t [Newman et al. 2023], however, the recent costs of fishing in this remote fishery has resulted in a reduction in effort since 2009, 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 annually by the fleet. The total commercial catch for 2022 was 236 t, which was within the target catch range. Fishing effort for this year totalled 290 vessel days. 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.

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 has been well below the levels that provided the highest catches in the history of the fishery. Results based on a recent study involving the use of a preliminary state-space model applied to catch, standardised catch per unit effort (CPUE) data, and a summer rainfall index data for Banana Prawn in the Kimberley Prawn Managed Fishery indicates that fishing mortality in recent years (e.g., 2010–2021) have remained below FMSY, stock biomass has remained at or above BMSY, and catches over this period have typically been below MSY (DPIRD, unpublished data).

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

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**Nickol Bay
and Onslow
Prawn
Managed
Fisheries**

Historical commercial catch levels from 1989–98 (a period when the fishery was considered sustainable) have been used as the basis for calculating target catch ranges. The Banana Prawn target catch range for the Nickol Bay Prawn Managed Fishery is 40–220 t, and for Onslow Prawn Managed Fishery it is 2–90 t [DPIRD 2022a, DPIRD 2022b]. The annual commercial catch projection for Nickol Bay is estimated based on wet-season rainfall (December–March). The commercial catch projection for the 2022 fishing season was 20–40 t. Total commercial catch for 2022 was 42 t, above the projected catch range but within the target catch range. Three boats fished the Nickol Bay Prawn Managed Fishery in 2022, with a total effort of 62 boat days. Only one boat fished the Onslow Prawn Managed Fishery and as such, the fishing effort is confidential. Banana Prawn catch from the Onslow fishery was very low. Since 2012, very low effort has been expended in the Onslow fishery due to the construction of a gas facility and the associated wharf, dredging, and exclusion zones, which disrupted fishing activities during the most productive part of the season. Effort levels in the five years prior to 2012 were between 60 and 260 boat days annually.

On the basis of annual trends in landings and effort, and more recently, analysis of annual catch rates and results from preliminary state space biomass dynamics models [DPIRD 2022a], 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. Standardised commercial catch rates, calculated using daily logbook data since 2008 do not exhibit a declining trend. Estimates from the biomass dynamics model indicate that since the mid-2000s, fishing mortality has generally remained at or below FMSY, and that spawning biomass has remained at or above BMSY since 2010 (through to 2021) DPIRD (unpublished data).

The above evidence indicates that the biomass of the management unit is unlikely to be depleted. 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 (NPF) (Commonwealth) (White Banana Prawn—*Penaeus merguianus* and Redleg Banana Prawn—*Penaeus indicus*). Here, we report on White Banana Prawn, which makes up the bulk of Banana Prawn catch in the NPF.

Recruitment of Banana Prawns in the NPF is highly variable. Annual yields are largely dependent on annual recruitment, which has a complex association with seasonal rainfall, oceanographic conditions and food availability [van der Velde et al. 2021; Turschwell et al. 2022]. As a result, a reliable stock–recruitment relationship has not been established and no formal stock assessment has been

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conducted for this stock. Status determination is based on a weight-of-evidence approach.

To determine whether next year’s catch could be predicted based on the most recent wet-season rainfall, the relationship between historical catch and rainfall was modelled. Unfortunately, large uncertainties remained because the model could not accurately predict catch levels in some years [Buckworth et al. 2013].

Harvest rates for White Banana Prawn in the fishery are high (more than 90% of available biomass) in some years [Buckworth et al. 2013], but the stock has so far been resilient to these levels of fishing pressure.

The harvest strategy for White Banana Prawns in the NPF is designed to perform effectively under conditions of substantial variation in biomass. The strategy facilitates the capture of larger, higher value prawns, while allowing for sufficient escapement to ensure adequate remaining spawning biomass, thereby preventing growth and recruitment overfishing. These goals are 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 in-season catch-rate thresholds [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 3,115 t in 2021 and 2,760 t in 2020 [Butler et al. 2022], with average catch around 3,995 t for the years 2012 to 2021. 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 2,454 days in 2021 (1,886 days in 2020) across 52 vessels. This is slightly below the average for the most recent decade (approximately 2,600 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.

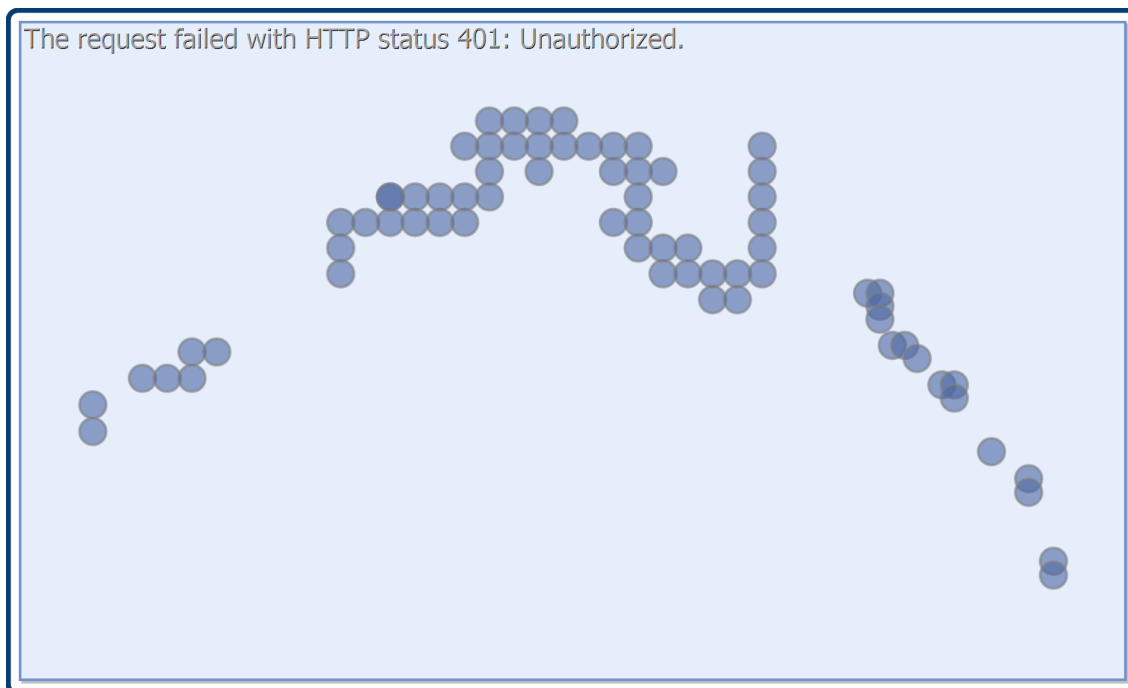
On the basis of the evidence provided above, the Northern Prawn Fishery (Commonwealth) management unit is classified as a **sustainable stock**.

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; greater than 240 mm TL; approximately 38 mm CL	White Banana Prawn (<i>P. merguensis</i>): approximately 6 months; 120–150 mm TL; greater than 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			
	Commonweal th	Queensland	Western Australia
Commercial			
Beam Trawl		✓	
Otter Trawl	✓	✓	✓
Recreational			
Cast Net		✓	✓
Unspecified			✓

Management Methods			
	Commonweal th	Queensland	Western Australia
Commercial			
By-catch reduction devices	✓	✓	
Effort limits	✓	✓	✓

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Effort limits (individual transferable effort)		✓	
Gear restrictions	✓	✓	✓
Harvest Strategy		✓	
Limited entry	✓	✓	✓
Processing restrictions		✓	
Seasonal or spatial closures	✓	✓	
Spatial closures	✓	✓	✓
Temporal closures	✓	✓	✓
Vessel restrictions	✓	✓	
Recreational			
Bag limits			✓
Bag/possession limits		✓	
Boat limits		✓	
Gear restrictions		✓	
Licence			✓
Seasonal or spatial closures		✓	

Catch	Commonwealth	Queensland	Western Australia
Commercial	0 t	217.848 t	254.153 t
Indigenous		Unknown	Unknown
Recreational		Unknown	Unknown

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Commonwealth – Commercial catch. Catch is for calendar year 2021. 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.

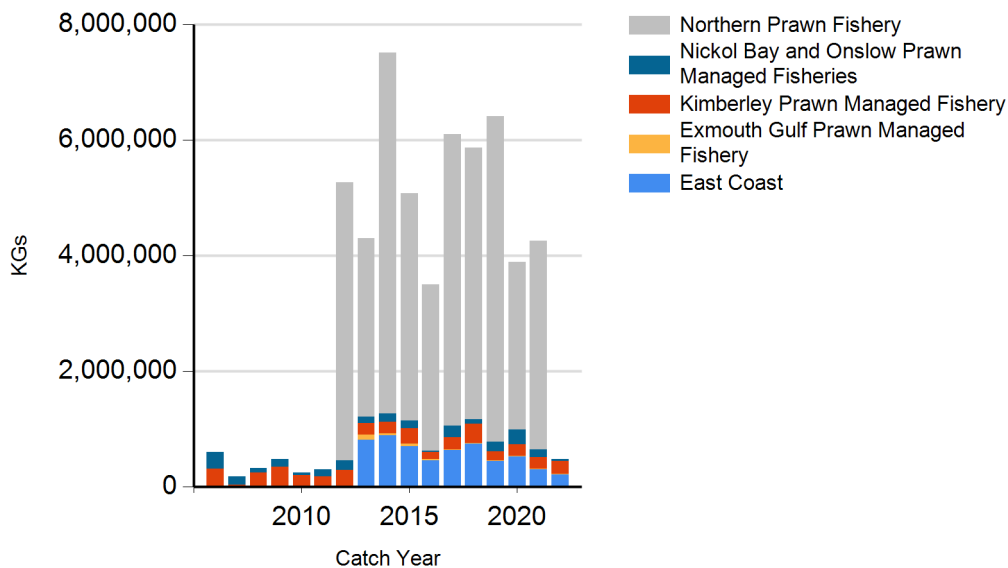
Commonwealth – Indigenous. The Australian Government does not manage non-commercial Indigenous fishing in Commonwealth waters, with the exception of the Torres Strait. In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those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

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

Queensland. Queensland available through the Queensland Fisheries Summary Report <https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/queensland-fisheries-summary-report>.

Queensland – Commercial (Management Methods) Harvest strategies available at: <https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/harvest-strategy>.

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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