

ENDEAVOUR PRAWNS (2023)

Metapenaeus endeavouri, *Metapenaeus ensis*



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Commonwealth	Northern Prawn Fishery (Blue Endeavour Prawn)	Sustainable	Spawning biomass, fishing mortality, catch
Commonwealth	Northern Prawn Fishery (Red Endeavour Prawn)	Sustainable	Spawning biomass, fishing mortality, catch
Commonwealth	Torres Strait Prawn Fishery (Blue Endeavour Prawn)	Undefined	Biomass, effort, catch
Western Australia	Exmouth Gulf Prawn Managed Fishery (Blue Endeavour Prawn)	Sustainable	Catch, survey catch rate
Western Australia	North Coast Prawn Managed Fishery (Blue Endeavour Prawn)	Sustainable	Catch

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Western Australia	Shark Bay Prawn Managed Fishery (Blue Endeavour Prawn)	Sustainable	Catch
Queensland	East Coast Otter Trawl Fishery (Red and Blue Endeavour Prawn)	Sustainable	Catch rate, catch, effort, effort-MSY

STOCK STRUCTURE

Endeavour Prawns includes two species, Blue Endeavour Prawn *Metapenaeus endeavouri*, and Red Endeavour Prawn *M. ensis* that are generally not distinguished in fisheries. Although the two species are caught in differing proportions in different regions.

Endeavour Prawn fisheries are located in Shark Bay, Exmouth Gulf, the north coast of Western Australia, the Gulf of Carpentaria, the Torres Strait and the east coast of Queensland. Little is known about the biological stock structure of the populations of Blue and Red Endeavour Prawns that make up these fisheries. The majority of catch reported in this chapter is Blue Endeavour Prawn. Red Endeavour Prawn represents less than 20% of the catch in the East Coast Otter Trawl Fishery [Turnbull and Atfield 2007] and between 20–40% in the Northern Prawn Fishery.

Here, assessment of stock status is presented at the management unit level—Northern Prawn Fishery (Blue Endeavour Prawn), Northern Prawn Fishery (Red Endeavour Prawn), Torres Strait Prawn Fishery (Blue Endeavour Prawn) (Commonwealth); Exmouth Gulf Prawn Managed Fishery (Blue Endeavour Prawn), North Coast Prawn Managed Fishery (Blue Endeavour Prawn), Shark Bay Prawn Managed Fishery (Blue Endeavour Prawn) (Western Australia); and East Coast Otter Trawl Fishery (Red and Blue Endeavour Prawn) (Queensland).

STOCK STATUS

East Coast Otter Trawl Fishery (Red and Blue Endeavour Prawn) Endeavour Prawns in the East Coast Otter Trawl Fishery management unit (Queensland) are not reported to the species level within commercial logbooks. Previous research indicates that harvest rates occur at a ratio of approximately 80:20 for Blue Endeavour Prawns and Red Endeavour Prawns respectively [Turnbull and Atfield 2007]. However, the recent assessment modelled these species collectively [Fox et al. 2023]. Based on data to December 2021, this assessment found that the stock underwent an historical decline between 1958 and 1997 falling to 34% of unfished biomass before rising steadily since. The 2021 biomass level was estimated to be between 54% and 87% (across the 95% credible interval), and most likely at 69% of unfished biomass. Current harvest levels are significantly lower than those reported prior to 2001 when an assessment concluded that the northern Endeavour Prawn stocks were fully exploited at 1,352 t [Turnbull and Gribble 2004]. Between 2017 and 2021, the annual catch rate (taken from high catching grids) increased while the catch has been variable with an average annual harvest of 395 t [Fox et al. 2023]. At 365 t the 2021–22 catch was only slightly below this average. The above evidence indicates that the biomass of this stock is unlikely to be depleted and recruitment is unlikely to be impaired.

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Effort in this fishery stabilised in 2007–08, following management changes, marine park closures and rising operational costs. Fishing effort deployed in the 2021–22 Endeavour Prawn catch (7,331 days) was below the long-term median of 9,076 fishing days (2000–22) and lower than the maximum effort of 28,045 fishing days in 2000–01. Trawl effort levels (2021–22) in the northern (above 16°S) and southern (16–22°S) sectors of the fishery (2,351 and 3,817 days) were well below the effort at maximum economic yield (EMEY) estimate of 10,250 days (northern sector) in the previous assessment; and slightly above the 3,230 days EMEY estimate, but below the 23,960 days of effort at maximum sustainable yield (EMSY) estimate (southern sector) [Wang et al. 2015]. While the recent assessment did not provide further EMSY estimates for the northern and southern sectors, these were combined and modelled as the whole stock wherein fishing mortality was found to be persistent at levels below fishing mortality at MSY (FMSY) [Fox et al. 2023]. The above evidence indicates that the current level of fishing pressure is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the multispecies East Coast Otter Trawl Fishery (Red and Blue Endeavour Prawn) (Queensland) management unit is classified as a **sustainable stock**.

**Exmouth
Gulf Prawn
Managed
Fishery
(Blue
Endeavour
Prawn)**

The Exmouth Gulf Prawn Managed Fishery (Western Australia) contributes the majority of the commercial landings of Blue Endeavour Prawns in Western Australia. Blue Endeavour Prawns are a secondary target species whose distribution partly overlaps with that of Brown Tiger and Western King Prawns and are caught when fishers are targeting these two species [Newman et al. 2023]. In 2018, the Harvest Strategy for the Exmouth Gulf Prawn Managed Fishery was modified to include Blue Endeavour Prawns [DPIRD 2018] with specific limit (≤ 4.5 kg/hr) and target (≥ 9 kg/hr) reference levels based on fishery-independent surveys for the spawning stock.

Multiple fishery-independent spawning stock and recruitment surveys are undertaken annually to monitor the abundance of Blue Endeavour Prawns, as well as Brown Tiger and Western King Prawns, the two main species targeted by the fishery. These surveys provide annual spawning stock and recruitment abundance indices expressed in terms of mean survey catch rates. In 2022, the mean survey catch rate for the Blue Endeavour Prawn spawning stock was 33.4 kg/hr, well above the target level (≥ 9 kg/hr). A secondary performance indicator is the annual recruitment survey catch rate, which indicates recruitment strength. Neither the spawning survey index or recruitment survey index exhibit a declining trend.

A preliminary catch prediction relationship has been developed for this species based on the mean annual recruitment index and landings since 2012, when Blue Endeavour Prawns began being retained more consistently due to improved markets. The recruitment catch rate index in 2022 of 17.0 kg/hr was above the 10 year mean (2012–21) of 14.9 kg/hr but within the catch rate index range of 4.4–43.2 kg/hr. The preliminary catch prediction for 2022 was 200–300 t and the landed catch of 269 t was within this range.

A target catch range is set at 120–300 t, based on historical catches between 1989 and 1998, a period when the stock was considered to be moderately exploited [Newman et al. 2023] and retention rates varied due to the abundance of the key target species (Brown Tiger and Western King Prawns) as well as market demand. Total catch in 2022 was within the target catch range and

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above the average catch over the past 15 years (196 t) [Newman et al. 2023]. In the Exmouth Gulf Prawn Managed Fishery management unit, a significant portion of the breeding biomass is protected by the Brown Tiger Prawn spawning closures [Kangas et al. 2015] and an additional portion of the Blue Endeavour Prawn biomass occurs inshore of the key fishing grounds for Brown Tiger Prawns, which are permanently closed. The above evidence indicates that the biomass of the stock is unlikely to be depleted and that the current level of fishing mortality is unlikely to cause the stock to become recruitment overfished.

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

**North Coast
Prawn
Managed
Fishery
(Blue
Endeavour
Prawn)**

Blue Endeavour Prawns are landed in low numbers in the North Coast Prawn Managed Fisheries, which is comprised of the Onslow, Nickol Bay, Broome and Kimberley Prawn Managed Fisheries. Blue Endeavour Prawns are a minor retained species when targeting Banana, or Brown Tiger and Western King Prawns. Permanent and temporal spatial closures implemented for the key target species in these fisheries provide added protection to Blue Endeavour Prawns. In the past 10 years (2012–21) the landings of Blue Endeavour Prawn in these minor fisheries combined have been between 2 and 15 t. The total combined catch for all the fisheries in 2022 was 4 t. The low level of catch of this species and the maintenance of these catches over time suggest that the biomass of this stock is unlikely to be depleted.

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

**Northern
Prawn
Fishery
(Blue
Endeavour
Prawn)**

Blue Endeavour Prawn is a by-product of fishing for Tiger Prawns, and so catches are linked to changes in effort targeting Tiger Prawns. Blue Endeavour Prawn is assessed as part of the integrated bio-economic model for the Northern Prawn Fishery (Commonwealth) Tiger Prawn sector [Deng et al. 2022]. Commercial catch of Endeavour Prawn is disaggregated into separate species using a model incorporating historical fishery-independent survey data [Venables and Dichmont 2004]. The stock assessment for the Tiger Prawn fishery uses a multispecies approach, with a weekly, sex- and size-structured population model for brown and Grooved Tiger Prawns, and a Bayesian hierarchical production model for Blue Endeavour Prawn [Punt et al. 2011]. This bio-economic stock assessment model provides annual estimates of MSY and MEY [Punt et al. 2010]. The model looks seven years ahead towards the MEY and MSY targets, using updated spawning/recruitment survey results, catch/effort data and fishery economic information, but dampens year-to-year effort changes that may arise from high recruitment variability or fishing constraints. Species-level components of MSY and MEY, based on estimated effort for each species, are taken from this overall model. Full stock assessments are undertaken every 2 years, with logbook data collected continuously in intervening years. In addition, annual fishery-independent monitoring in the Gulf of Carpentaria provides Prawn size data and indices of abundance by species that are input to the assessment [Kenyon et al. 2021]. The most recent Tiger Prawn fishery assessment covers catch and effort up to 2021 [Deng et al. 2022].

The base-case estimate of the size of the Blue Endeavour Prawn spawning stock at the end of 2021 as a proportion of spawning stock size at MSY

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(SB2021/SBMSY) was 0.65 (range across sensitivities 0.61–0.82). Further, the 5-year average of spawning stock size as a proportion of spawning stock size at MSY was 0.66 and above the agreed limit reference point (LRP) of 0.5SBMSY. The base-case estimate of the size of the spawning stock as a proportion of spawning stock size at MEY (SB2021/SBMEY) was 0.57 (range across sensitivities 0.52–0.76), a decrease from 0.86 in the last stock assessment [Deng et al. 2022].

Catch at MSY along the modelled path to the 7-year MSY target for Blue Endeavour Prawn was estimated to be 787 t [Deng et al. 2022], while catch at MEY along the path to the MEY target was estimated to be 659 t [Deng et al. 2022]. Effort in terms of MEY or MSY is not estimated for Blue Endeavour Prawn because this species is a by-product of targeting Tiger Prawns. Since 2002, annual catches have averaged around 280 t. Catch in 2021 was 266 t, up from 233 t in 2020 and both well below MEY and MSY and considered unlikely to drive stocks below the LRP [Butler et al. 2022].

A new Bayesian stock assessment approach has been developed specifically for Endeavour Prawns to better deal with the relatively low information about these by-product species [Zhou et al. 2023]. However, the results from the 2021 Tiger Prawn stock assessment for Blue Endeavour Prawn were considered acceptable by NPFRAAG for management. The 2021 Tiger Prawn assessment uses more recent data than the new Bayesian approach. Therefore, the 2021 Tiger Prawn assessment is used for status determination purposes for Blue Endeavour Prawns in 2022 [Butler et al. 2023].

The Integrated Monitoring Program's 2022 preseason recruitment surveys indicate low relative post-recruitment abundance for Blue Endeavour Prawn, the second lowest after 2004 seen in the data series (2003–22) [AFMA 2022].

The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, 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 (Blue Endeavour Prawn) (Commonwealth) management unit is classified as a **sustainable stock**.

**Northern
Prawn
Fishery
(Red
Endeavour
Prawn)**

Red Endeavour Prawn is caught as a by-product of effort directed at Tiger Prawns. Catches of Red Endeavour Prawn in recent years (155 t in 2022, 170 t in 2021 and 125 t in 2020) have been low compared with historical highs [Butler et al. 2023]. This is most likely related to the overall decline in fishing effort directed at Tiger Prawns, and area and time closures affecting areas where Red Endeavour Prawn were historically targeted, rather than being an indication of a fall in Red Endeavour Prawn biomass.

A new stock assessment approach has been developed specifically for Endeavour Prawns to better deal with the relatively low information about these by-product species [Zhou et al. 2023]. It was recently accepted by NPFRAAG [AFMA 2023]. For Red Endeavour Prawns, this assessment uses newly updated growth information [Zhou et al. 2022]. The new method uses a single stock Bayesian approach in a biomass dynamics model (surplus production model), using raw catch data up to 2020. The estimated median size of the Red Endeavour Prawn stock in 2020 as a proportion of stock size at MSY (B2020/BMSY) was 1.20. The estimate of median fishing mortality of the Red Endeavour Prawn stock in 2020

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as a proportion of fishing mortality at MSY (F2020/FMSY) was 0.21. Since then, catch has remained low and this level of fishing mortality is unlikely to cause the stock to become recruitment impaired [Butler et al. 2023].

The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, 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 (Red Endeavour Prawn) (Commonwealth) management unit is classified as a **sustainable stock**.

**Shark Bay
Prawn
Managed
Fishery
(Blue
Endeavour
Prawn)**

Blue Endeavour Prawns are landed in low numbers in the Shark Bay Prawn Managed Fishery, as they are a minor retained species when targeting Brown Tiger or Western King Prawns. The landings in the past 10 years (2012–21) have been between one and 23 t, with landings in 2022 remaining within this range (2 t). The low level of catch of this species and the maintenance of these catches over time provide evidence that the biomass of this stock is unlikely to be depleted.

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

**Torres
Strait
Prawn
Fishery
(Blue
Endeavour
Prawn)**

Blue Endeavour Prawns are mostly caught as byproduct when targeting Tiger Prawns. The last Blue Endeavour Prawn stock assessment was completed in 2009, using catch and standardised CPUE data to the end of 2007 and data from fishery-independent surveys [Turnbull et al. 2009]. There has been no updated assessment or CPUE standardisation since 2009. The 2009 assessment indicated that the Blue Endeavour Prawn biomass was around 80% of unfished biomass, and considerably higher than BMSY estimated to be 0.43B0. Since the 2009 assessment, effort in the fishery has been well below historic levels [Turnbull and Cocking 2022].

Nominal CPUE for Blue Endeavour Prawns has decreased by nearly 50% in recent years, from an average of 111 kg/day for 1992 to 2003 (range 87–149 kg/day) to an average of 57 kg/day for 2009 to 2021 (range 30–117 kg/day) [Turnbull and Cocking 2022]. Nominal CPUE further decreased from 60 kg/day in 2020 to 49 kg/day in 2021 [Turnbull and Cocking 2022].

Although declines in nominal CPUE are not conclusive evidence that the stock is depleted, they do raise concerns that warrant further investigation. Additionally, and because it relates to the utility of nominal CPUE, ABARES understands that the TSPF has changed its targeting practices in recent years to focus more heavily on the Tiger Prawn stock. This behaviour may also limit the utility of nominal CPUE as an index of abundance for the Blue Endeavour Prawn stock and add weight to the need for further investigation that demonstrates the state of the stock in relation to reference points.

Torres Strait is a region experiencing environmental change due to climate change [Dutra et al. 2021, NESP ESCC Hub 2018], with potential implications for the productivity of fish stocks. As a significant period of time has passed since the stock assessment for Blue Endeavour Prawns, it will become increasingly difficult to assume, without an approved updated stock assessment, that

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productivity has remained stable and that the outcomes of the 2009 assessment remain valid.

Catches of Blue Endeavour Prawn in the TSPF over the recent decade have been quite low compared with historical highs and, with exception of 2019 (299 t), have not exceeded 200 t [D’Alberto et al. 2022]. Annual catches have decreased since then, reaching the lowest reported catch of 25 t in 2017. Reported catch was 61 t in 2021, up from 60 t in 2020.

On the basis of the evidence provided above, there is insufficient information available to confidently classify the status of this stock.

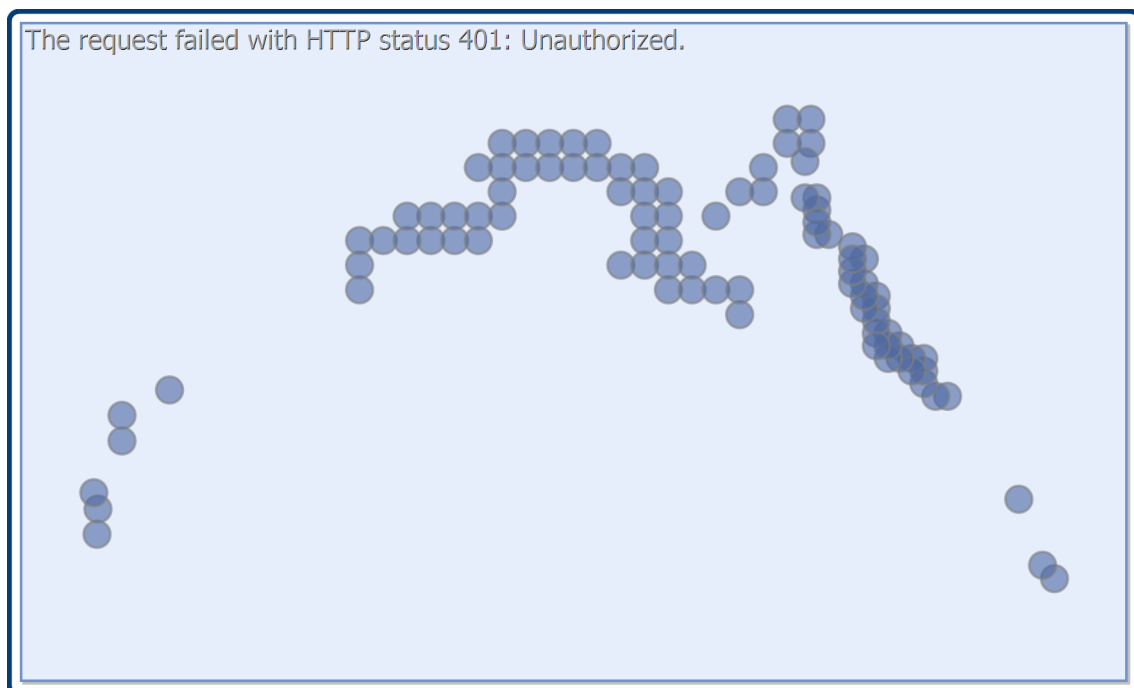
The Torres Strait Prawn Fishery (Blue Endeavour Prawn) (Commonwealth) management unit is classified as an **undefined stock**.

BIOLOGY

Red and Blue Endeavour Prawn biology [Courtney et al. 1989; Kailola et al. 1993; Keating et al. 1990; Kangas et al. 2015; Somers et al. 1987; Yearsley et al. 1999]

Species	Longevity / Maximum Size	Maturity (50 per cent)
ENDEAVOUR PRAWNS	1–2 years, 200 mm TL	~6 months Females 24–26 mm CL Males ~18 mm CL

DISTRIBUTION



Distribution of reported commercial catch of Red and Blue Endeavour Prawns

TABLES

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Fishing methods			
	Commonweal th	Queensland	Western Australia
Commercial			
Otter Trawl	✓	✓	✓
Recreational			
Cast Net		✓	
Unspecified			✓

Management Methods			
	Commonweal th	Queensland	Western Australia
Commercial			
Effort limits	✓	✓	✓
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 / possessi on limits		✓	
Gear restrictions		✓	
Seasonal or spatial closures		✓	

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Catch	Commonwealth	Queensland	Western Australia
Commercial	0 t	306.436 t	207.143 t
Indigenous	Unknown	Unknown	0 t
Recreational	Unknown	Negligible	0 t

Commonwealth – Commercial (catch). Catch is by calendar year. **TSPF** – Torres Strait Prawn Fishery. **NPF** – Northern Prawn Fishery.

Commonwealth – Indigenous (management methods). The Commonwealth Government does not manage non-commercial Indigenous fishing (with the exception of the Torres Strait). In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the states or territory immediately adjacent to those waters. In the Torres Strait both commercial and non-commercial Indigenous fishing is managed by the Torres Strait Protected Zone Joint Authority (PZJA) through the Australian Fisheries Management Authority (Commonwealth), Department of Agriculture Fisheries and Forestry (Queensland) and the Torres Strait Regional Authority. The PZJA also manages non-Indigenous commercial fishing in the Torres Strait.

Commonwealth – Recreational (fishing methods). The Commonwealth Government does not manage recreational fishing. Recreational fishing in Commonwealth waters is managed by the states or territory immediately adjacent to those waters, under their management regulations.

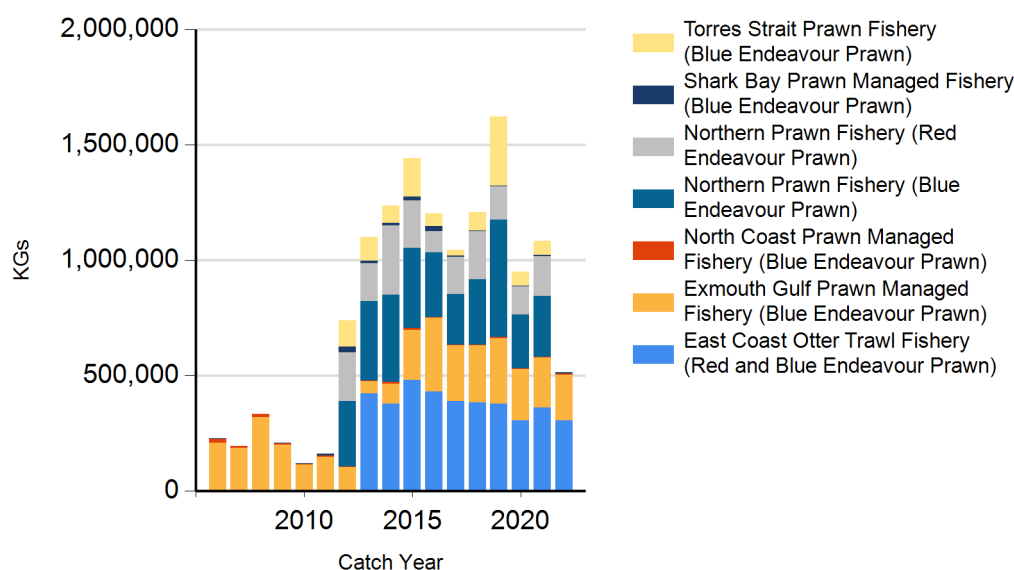
Queensland – Indigenous (management methods). for more information see <https://www.daf.qld.gov.au/business-priorities/fisheries/traditional-fishing>

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

Queensland – Commercial (Catch). Queensland commercial and charter data has been sourced from the commercial fisheries logbook program. Further information available through the [Queensland Fisheries Summary Report](#)

CATCH CHART

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Commercial catch of Red and Blue Endeavour Prawns - note confidential catch not shown

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