ENDEAVOUR PRAWNS

Metapenaeus endeavouri, Metapenaeus ensis

Darren Roy (Department of Agriculture and Fisheries, Queensland), **James Larcombe** (Australian Bureau of Agricultural and Resource Economics and Sciences), **Mervi Kangas** (Department of Fisheries, Western Australia)

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Queensland	East Coast Otter Trawl Fishery (Red and Blue Endeavour Prawn)	ECOTF	Sustainable	Catch rate, catch, effort
Western Australia	Exmouth Gulf Prawn Managed Fishery (Blue Endeavour Prawn)	EGPMF	Sustainable	Catch, survey catch rate
Western Australia	North Coast Prawn Managed Fishery (Blue Endeavour Prawn)	KPMF, NBPMF, OPMF	Sustainable	Catch
Commonwealth	Northern Prawn Fishery (Blue Endeavour Prawn)	NPF	Sustainable	Spawning biomass, fishing mortality and catch
Commonwealth	Northern Prawn Fishery (Red Endeavour Prawn)	NPF	Undefined	
Western Australia	Shark Bay Prawn Managed Fishery (Blue Endeavour Prawn)	SBPMF	Sustainable	Catch
Commonwealth	Torres Strait Prawn Fishery (Blue Endeavour Prawn)	TSPF	Sustainable	Biomass, effort and catch

ECOTF East Coast Otter Trawl Fishery (QLD)
EGPMF Exmouth Gulf Prawn Managed Fishery (WA)
KPMF Kimberley Prawn Managed Fishery (WA)
NBPMF Nickol Bay Prawn Managed Fishery (WA)
NPF Northern Prawn Fishery (CTH)
OPMF Onslow Prawn Managed Fishery (WA)
SBPMF Shark Bay Prawn Managed Fishery (WA)
TSPF Torres Strait Prawn Fishery (CTH)

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, Blue Endeavour Prawns are increasing dominating catches further to the west.

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, with Red Endeavour Prawn represented in the East Coast Otter Trawl Fishery (less than 20 per cent of the catch [1]) and in the Northern Prawn Fishery (20–40 per cent of Northern Prawn Fishery harvest annually).

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 Fisheries (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

Northern Prawn Fishery (Blue Endeavour Prawn)

Blue Endeavour Prawn is assessed as part of the integrated bioeconomic model for the Northern Prawn Fishery (Commonwealth) Tiger Prawn sector [2]. Commercial catch of Endeavour Prawn is disaggregated into separate species using a model incorporating historical fishery-independent survey data [3]. Blue Endeavour Prawn is assessed using a biomass dynamic model, which estimated the spawner stock size at the end of 2015 to be at 77 per cent of the spawner stock size that would be required for maximum sustainable yield (S_{MSY}) [2]. This is above the limit reference point of 50 per cent ($0.5S_{MSY}$). As a result, the management unit is not considered to be recruitment overfished [4].

The commercial catch in recent years has not exceeded 400 tonnes (t) and in 2015 was 348 t, which is below the estimate of maximum sustainable yield (base-case estimate of 813 t) [2]. This level of fishing pressure is unlikely to cause the management unit to become recruitment overfished [4].

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

Northern Prawn Fishery (Red Endeavour Prawn)

No stock assessments have been attempted for Red Endeavour Prawn and there is currently no reliable assessment to confidently classify the status of this stock [4]. Catches over recent years have been quite low, compared with historical highs, and have not exceeded 300 t. This is most likely

related to a decrease in fishing effort directed at Tiger Prawn, rather than any indication of a decline in Red Endeavour Prawn biomass, as Red Endeavour Prawns are caught as a by-product species by effort directed at Tiger Prawns. There is insufficient information available to confidently classify the status of this stock.

On the basis of the evidence provided above, the Northern Prawn Fishery (Commonwealth) Red Endeavour Prawn management unit is classified as an **undefined stock**.

Torres Strait Prawn Fishery (Blue Endeavour Prawn)

The most recent assessment [5] estimated that biomass in 2007 ranged from 71–85 per cent of the unfished (1967) level. The Torres Strait Prawn Fishery (Commonwealth) has an objective of maintaining biomass above the level associated with maximum sustainable yield (MSY; 28 per cent of unfished). MSY was estimated at approximately 1100 t and recent annual catches have been well below this level; catch in 2015 was 165 t and catches since 2007 have been below 500 t. The stock is not considered to be recruitment overfished [6]. Catch and effort levels, have been well below MSY and maximum sustainable effort estimates for more than 10 years [6]. This level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, the Torres Strait Prawn Fishery (Commonwealth) Blue Endeavour Prawn 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. There is no formal assessment for Blue Endeavour Prawns, which are a by-product species whose distribution partly overlaps with that of Brown Tiger (*Penaeus esculentus*) and Western King Prawns (*Melicertus latisulcatus*) and are caught when fishers are targeting these two species [7]. However, fishery-independent recruitment surveys of Brown Tiger and Western King Prawns also record the abundance of Blue Endeavour Prawns on these grounds, providing an annual recruitment abundance index expressed in terms of survey catch rate for this species. In 2015, the mean catch rate index for the Blue Endeavour Prawn (on Brown Tiger Prawn grounds) of 17 kg per hour was above the 10-year mean (2005–14) of 13.5 kg per hour. On the Western King Prawn grounds, the catch rate index of 20 kg per hour was well above the 10-year mean (2005–14) of 13 kg per hour. There has been no declining trend in the fishery-independent survey catch rates over the periods sampled in either of these fishing grounds. The above evidence indicates that the biomass of the stock is unlikely to be recruitment overfished.

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 [7] 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 2015 (397 t) was above the target catch range and the average catch over the past 15 years (201 t) [7], as a direct result of the higher recruitment and increased abundance observed. 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 [8] 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 current level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

On the basis of the evidence provided above, the Exmouth Gulf Prawn Managed Fishery (Western Australia) Blue Endeavour Prawn 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, as they are a minor bycatch species when targeting Banana Prawn or Brown Tiger and Western King Prawns. In the past 10 years (2005–14) the landings of Endeavour Prawn in these minor fisheries has been between 2 and 23 t. The total combined catch for all the fisheries in 2015 was 2 t.

Based on the evidence provided above, the North Coast Prawn Managed Fisheries (Western Australia) Blue Endeavour Prawn 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 minor retained species when targeting Brown Tiger or Western King Prawns. The landings in the past 10 years (2005–14) have been between 1 and 23 t. Landings in 2015 were 22 t; that is, within this range. The above evidence indicates that the biomass of this stock is unlikely to be recruitment overfished. The above evidence indicates that the current level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

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

East Coast Otter Trawl Fishery (Red and Blue Endeavour Prawn)

Since 1998, there has been a general upward trend in the nominal catch rate [9] for Endeavour Prawns (species combined, as they are not differentiated in commercial logbooks). Effort in this fishery stabilized in 2007, following management changes, marine park closures and the rising operational costs. The average annual catch rate for the past 5 years (2010–15) was 65 kg per day, which is 20 per cent higher than the long-term average (1990–2015). Current harvest levels are significantly lower than 2001 levels when an assessment concluded that Endeavour Prawns were fully exploited [10]. The above evidence indicates that the biomass of this stock is unlikely to be recruitment overfished.

The average annual commercial harvest of Endeavour Prawns in the past 5 years (2010–15) was 496 t, which is roughly half of the long-term average of 996 t for the period from 1990–2015. The fishing effort associated with 2015 catch (8069 days) was only 38 per cent of the long-term average of 21 158 fishing days. Current effort levels are below both E_{MSY} and E_{MEY} predictions for both the

northern (above latitude 16°S) and southern (latitude 16–22°S) parts of the fishery area [9]. This level of fishing pressure is unlikely to cause the stock to become recruitment overfished.

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

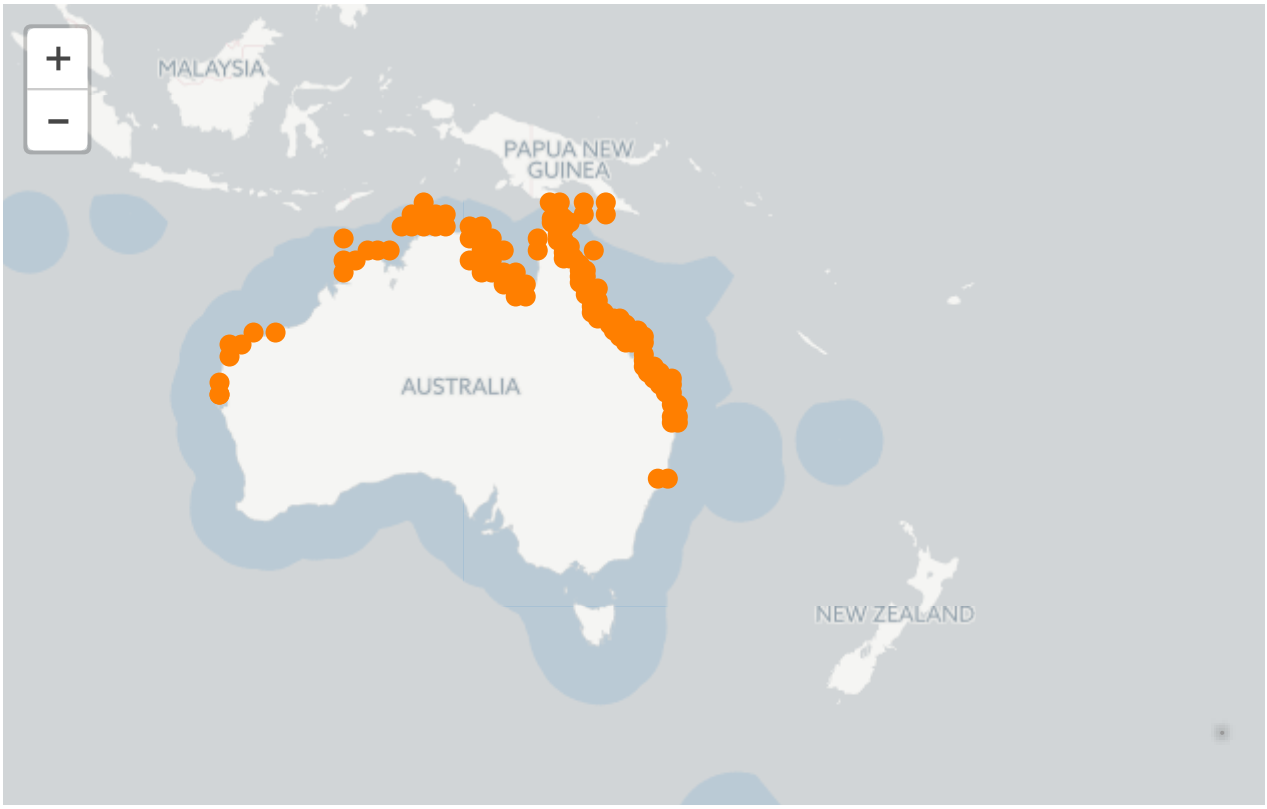
BIOLOGY

Red and Blue Endeavour Prawn biology [8,11–14]

Biology

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

DISTRIBUTIONS



Distribution of reported commercial catch of Red and Blue Endeavour Prawns

TABLES

Fishing methods

	Commonwealth	Western Australia	Queensland
Commercial			
Otter Trawl	✔		✔
Various		✔	
Indigenous			
Unspecified		✔	
Cast Net			✔
Recreational			
Unspecified		✔	
Cast Net			✔

Management methods

Method	Commonwealth	Western Australia	Queensland
Commercial			
Effort limits	✔	✔	✔
Gear restrictions	✔	✔	✔
Limited entry	✔	✔	✔
Spatial closures	✔	✔	✔
Temporal closures	✔	✔	✔
Vessel restrictions	✔	✔	✔
Indigenous			
Possession limit			✔
Recreational			
Possession limit			✔

Active vessels

	Commonwealth	Western Australia	Queensland
	53 in NPF, 24 in TSPF	6 in EGPMF, 10 in NBPMF, 18 in SBPMF	157 in ECOTF

ECOTF East Coast Otter Trawl Fishery (QLD)
EGPMF Exmouth Gulf Prawn Managed Fishery (WA)
NBPMF Nickol Bay Prawn Managed Fishery (WA)
NPF Northern Prawn Fishery (CTH)
SBPMF Shark Bay Prawn Managed Fishery (WA)
TSPF Torres Strait Prawn Fishery (CTH)

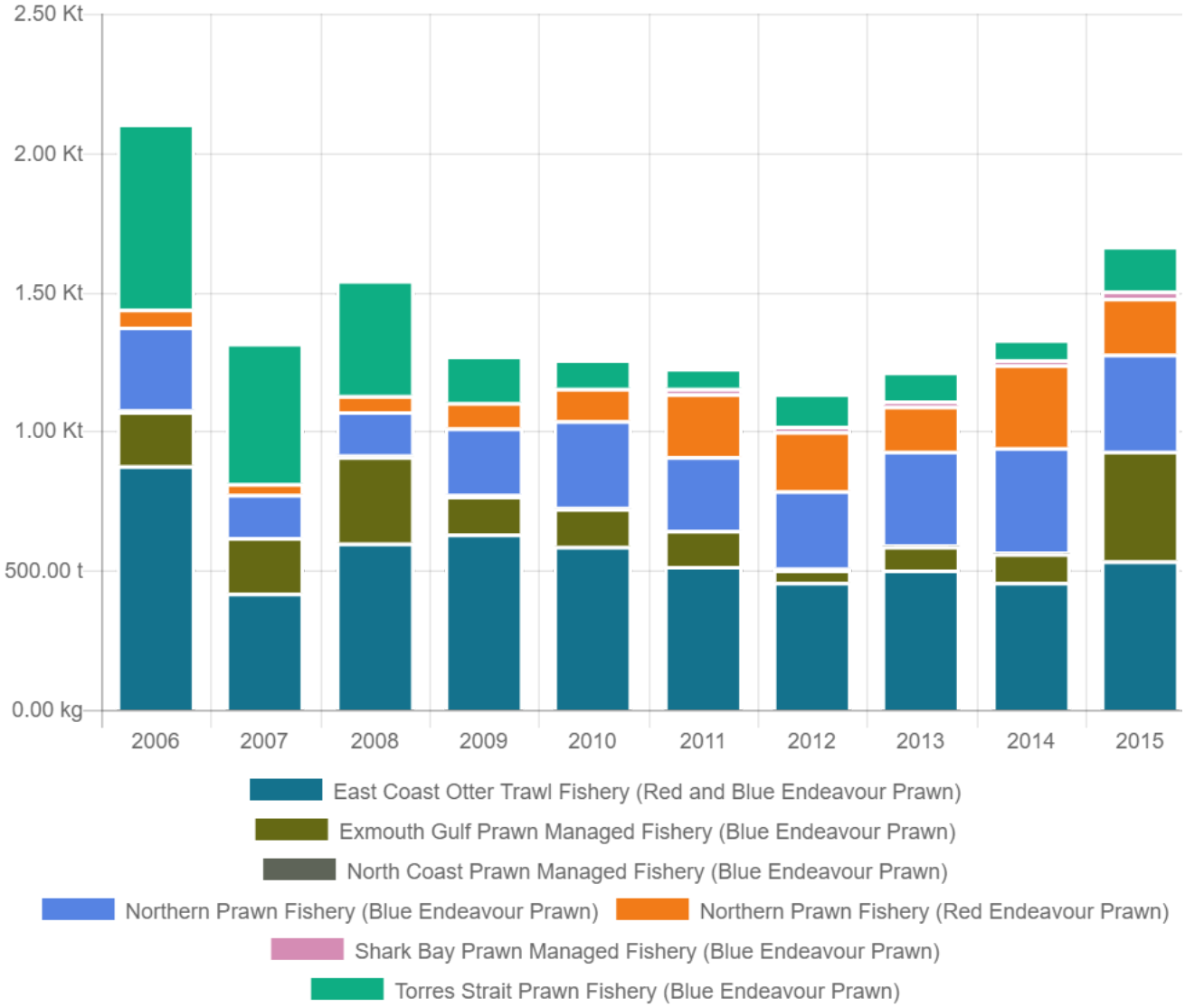
Catch

	Commonwealth	Western Australia	Queensland
Commercial	554.00t in NPF, 165.90t in TSPF	396.69t in EGPMF, 565.00kg in KPMF, 151.00kg in NBPMF, 511.00kg in OPMF, 22.40t in SBPMF	540.33t in ECOTF
Indigenous		0t	Negligible
Recreational		0t	Negligible

ECOTF East Coast Otter Trawl Fishery (QLD)
EGPMF Exmouth Gulf Prawn Managed Fishery (WA)
KPMF Kimberley Prawn Managed Fishery (WA)
NBPMF Nickol Bay Prawn Managed Fishery (WA)
NPF Northern Prawn Fishery (CTH)
OPMF Onslow Prawn Managed Fishery (WA)
SBPMF Shark Bay Prawn Managed Fishery (WA)
TSPF Torres Strait Prawn Fishery (CTH)

a Commonwealth – Recreational 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.
b Queensland – Commercial (management methods) Recreational fishers are permitted to catch Endeavour Prawn, but are unlikely to catch them in large amounts due to the distribution of this species group.
c Commonwealth – Indigenous 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.
d Queensland – Indigenous In Queensland, under the Fisheries Act 1994 (Qld), indigenous fishers are entitled 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. Full exemptions to fishery regulations may be applied for through permits.

CATCH CHART



Commercial catch of Red and Blue Endeavour Prawns

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

- There is typically a high proportion of bycatch, relative to retained product, in otter trawl fisheries. Post-release survival of bycatch species is variable [15].
- The use of bycatch reduction devices is mandatory in all Australian tropical prawn trawl fisheries. Use of turtle excluder devices (TEDs) in the Northern Prawn Fishery (Commonwealth) reduced turtle bycatch from 5700 individuals per year before 2001 to around 30 per year after 2001 [16]. The introduction of TEDs in the Western Australian prawn trawl fisheries in 2003 reduced turtle bycatch by more than 95 per cent [17].
- Spatial closures afford some protection to the marine environment from the physical effects of trawling. In Queensland, the Great Barrier Reef Marine Park (GBRMP) occupies 63 per cent of the East Coast Otter Trawl Fishery (Queensland) (ECOTF) [18], 34 per cent of which is open to trawling [9]. However, effort is highly aggregated, occurring within only a small fraction of the open area. In Western Australia, extensive permanent and temporary closures result in the fleet operating in only seven per cent of the Shark Bay region, less

than 30 per cent of the Exmouth Gulf, and less than three per cent of the north coast region. Fishing operations are restricted to areas of sand and mud, where trawling has minimal long-term physical impacts [19–22]. The Northern Prawn Fishery (Commonwealth) (NPF) also uses a system of closures (spatial and seasonal) to manage the fishery, as well as other input controls (for example, limited entry, gear restrictions). A total of 2.1 per cent of the total managed area of the fishery is subject to permanent closures, while 8.3 per cent is subject to seasonal closures [23]. The Torres Strait Prawn Fishery (Commonwealth) also employs spatial and temporal closures which are used to protect small prawns, but also important habitat areas for breeding populations of turtles [24].

- An assessment of trawl-related risk in the GBRMP found that the ECOTF posed no more than an intermediate risk of overfishing some species assemblages exposed to trawling [25].
- Interactions with species protected under the *Environment Protection and Biodiversity Conservation Act 1999*, such as sea snakes and seabirds, are routinely monitored.
- The NPF has been certified by the Marine Stewardship Council since November 2012.

ENVIRONMENTAL EFFECTS ON ENDEAVOUR PRAWNS

- Nursery grounds (such as seagrass beds) are important for maintaining Endeavour Prawn stocks in the Northern Prawn Fishery (Commonwealth). Management strategies therefore involve the closure of significant nursery areas to trawling to protect stocks [26].
- Prawn distribution can be driven by environmental factors. For example, in a study on the distribution of Endeavour Prawns in the Gulf of Carpentaria, Blue Endeavour Prawns were found to be most abundant in the south-eastern gulf and shallower parts of the western gulf, where sediments were either sand or muddy sand [27]. The highest abundance of Red Endeavour Prawn was in the north-eastern gulf and in deeper areas of the western gulf, where sediments were more than 60 per cent mud [28]. However, in Torres Strait, Blue Endeavour Prawns were equally abundant on all substrate types [12].

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