MORETON BAY BUGS (2020)

Thenus parindicus, Thenus australiensis, Thenus spp.

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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Commonwealth	Northern Prawn Fishery	Sustainable	Catch
Commonwealth	Torres Strait Prawn Fishery	Sustainable	Catch
Western Australia	Western Australia	Sustainable	Catch
Queensland	East Coast Otter Trawl Fishery	Sustainable	Catch, CPUE

STOCK STRUCTURE

Reef Bug (*Thenus australiensis*) and Mud Bug (*Thenus parindicus*) are known collectively as 'Moreton Bay Bugs'. Moreton Bay Bugs are distributed along the tropical and subtropical coast of Australia from northern New South Wales to Shark Bay in Western Australia [George and Griffin 1972]. No studies have been carried out on the biological stock structure of Australian Moreton Bay Bugs. The two species have overlapping distributions; may be trawled together; are undifferentiated in the catch; and are assessed together.

Given the uncertainty in biological stock structure, here assessment of stock status is presented at the management unit level—Northern Prawn Fishery, Torres Strait Prawn Fishery (Commonwealth) and East Coast Otter Trawl Fishery (Queensland); and the jurisdictional level—Western Australia.

STOCK STATUS

East Coast Otter Trawl

Moreton Bay Bugs are targeted in the East Coast Otter Trawl Fishery (Queensland) (Qld ECOTF) management unit. They are taken predominantly by

Fishery

two fleets, one fleet north of 22-° S trawling for prawns and one fleet south of 22° S trawling for scallops. No formal stock assessment has been conducted. The 2014–19 catch shows a slight increasing trend [QFISH 2020]. Standardised catch rates in both fleets increased between 2002 and 2013 and then declined before stabilising in recent years (2015 to 2019) [Helidoniotis 2020]. After 2014 the trend between the fleets diverged and the catch rate from the northern fleet declined while the southern fleet catch rate increased, suggesting that targeting of Moreton Bay Bug was more pronounced in the southern fleet [Helidoniotis 2020]. Since 2010, retention of berried female bugs has been allowed, which has probably contributed to the higher subsequent catch rates. On average 90 per cent of the east coast Moreton Bay Bug catch is taken from areas open to trawling in the Great Barrier Reef Marine Park (GBRMP) [Zeller et al. 2014]. Biophysical modelling estimated that in 2005 significant parts of the biomass (54 per cent of *T. australiensis*; and 45 per cent of *T. parindicus*) were within GBRMP trawl closures [Pitcher et al. 2007a]. Moreton Bay Bugs have a 45 day larval phase [Jones 1988]. It is likely that spawning adults in areas closed to fishing within GBRMP closures contribute recruits to other areas open to trawling. Recent ecological risk assessments have reported a low risk of the stock being recruitment overfished in the GBRMP [Pears et al. 2012], where harvesting pressure on the stock is greatest, and an intermediate risk of being classified as recruitment overfished south of the GBRMP [Jacobsen et al. 2018]. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

The number of days on which Moreton Bay Bugs were caught and the number of boats catching Moreton Bay Bugs declined from 2000 to 2010, and have been relatively stable since [QFISH 2020]. Stable effort in high abundance grids since 2010 indicates that fishing mortality in high biomass areas has not increased substantially. Extensive trawl closures in the GBRMP ensure that a significant proportion of the biomass is not subject to fishing mortality. Based on yield-per-recruit analysis, capture at ≥ 75 mm CW allows Moreton Bay Bugs to spawn before they enter the fishery [Courtney 1997]. Square-mesh cod end bycatch reduction devices (BRDs) were made mandatory in the Scallop Fishery in 2015, allowing juvenile Moreton Bay Bugs to escape trawl capture and reducing incidental fishing mortality [Courtney et al. 2008]. Moreton Bay Bugs are also known to survive discarding well [Hill et al. 1998]. 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 East Coast Otter Trawl Fishery (Queensland) management unit is classified as a **sustainable stock**.

Northern Prawn Fishery

Northern Prawn Fishery (Commonwealth) trawl surveys were used to estimate the biomass of Moreton Bay Bugs in the Gulf of Carpentaria, from which an estimate of acceptable biological catch was derived [Milton et al. 2010]. This assessment estimated the annual sustainable biological catch for Moreton Bay Bugs in the fishery at 1 887 tonnes (t) (95 per cent confidence interval 1 716–2 057 t). Annual commercial catches have remained well below this (catch peaked at 120 t in 1998). Catches were 35 t in 2018 and 36 t in 2019. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

Fishing mortality has been low in recent years, and ecological risk assessments [Griffiths et al. 2007] have indicated that the risk of stock depletion of Moreton Bay Bugs is low. A trigger catch limit of 100 t is also in place. If this limit is reached then additional analysis will be conducted to ensure that there are no sustainability concerns with the harvest level. Fishing mortality of juveniles is reduced by regulating the size at which Moreton Bay Bugs may be retained, and spawning potential is protected through prohibiting retention of egg bearing females. Catches have been low in recent years compared to estimates of acceptable biological catch. 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**.

Torres Strait Prawn Fishery

No formal stock assessment exists for Moreton Bay Bugs in the Torres Strait Prawn Fishery (TSPF) management unit. Assessment of seabed and associated biodiversity in the Torres Strait [Pitcher et al. 2007b, Turnbull and Rose 2007] estimated the 2007 Moreton Bay (Reef) Bug biomass at 124 t, only 19 per cent of which was located within the area exposed to prawn trawling (based on the 2005 footprint of the fishery using vessel monitoring system data). The biomass of Mud Bugs was estimated to be 151 t with only 18 per cent of biomass being located in areas exposed to prawn trawling. With the decline in fishing effort in recent years, fishing mortality is also likely to have declined. Fishing mortality of juveniles is reduced by regulating the size at which Moreton Bay Bugs may be retained, and spawning potential is protected through prohibiting retention of egg bearing females. Research has found that Mud Bug egg production is maintained at the minimum size limit of 75 mm carapace width [Courtney 2002].The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

The Torres Strait assessment of seabed and associated biodiversity [Pitcher et al. 2007b] indicated that Moreton Bay Bugs are unlikely to have been exposed to high levels of fishing pressure in the Torres Strait Protected Zone. In 2017–19 the annual catch of Moreton Bay Bugs averaged 12 t, which is estimated to be less than 6 per cent of available biomass, most of which inhabits extensive areas outside of fished areas. Trawl operations in the TSPF cover only a small proportion—approximately 20 per cent [Turnbull and Rose 2007]—of the Torres Strait Protected Zone. Lower fishing effort has resulted in further reduction in spatial coverage of the fishery in recent years. 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 Torres Strait Prawn Fishery (Commonwealth) management unit is classified as a **sustainable stock**.

Western Australia

No formal stock assessment exists for Moreton Bay Bugs in Western Australia. Moreton Bay Bugs are not targeted in Western Australia, but are landed as occasional byproduct species of prawn and scallop trawl fisheries, so fishing effort directed at them is low. At 10 t in 2019, the combined Western Australian fisheries landings of Moreton Bay Bugs are low, but within the historical catch range. Combined fishery landings have been at or below 10 t eight out of ten years since 2009. The spatial coverage of Western Australian fisheries that retain Moreton Bay Bugs is limited, compared with the large area across which Moreton Bay Bugs are distributed in north-western Western Australia. Substantial Moreton Bay Bug biomass is protected within the extensive network of fishery closures in place from Shark Bay to Napier Broome Bay [Gaughan and Santoro (eds) 2020]. The above evidence indicates that the biomass of this stock is unlikely to be depleted, that recruitment is unlikely to be impaired, and that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

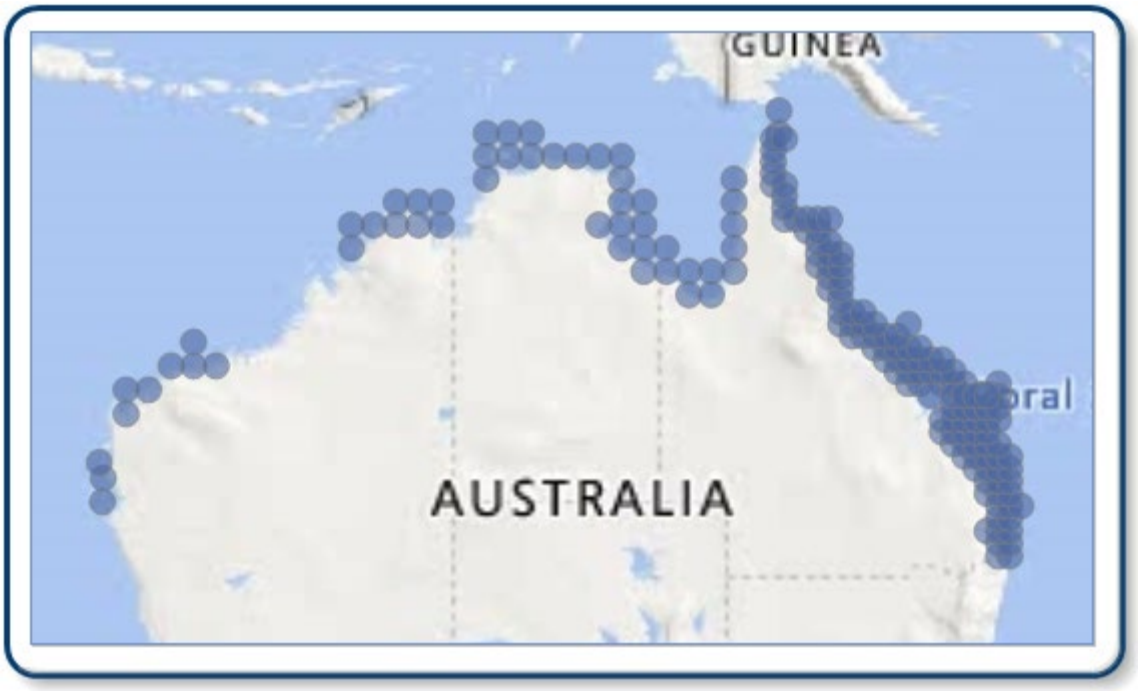
On the basis of the evidence provided above, Moreton Bay Bug in Western Australia is classified as a **sustainable stock**.

BIOLOGY

Moreton Bay Bug biology [Courtney 1997, Jones 1988]

Species	Longevity / Maximum Size	Maturity (50 per cent)
MORETON BAY BUGS	~7 years T. australiensis: Males 106 mm CW, Females 124 mm CW T. parindicus: Males 87 mm CW, Females 103 mm CW	T. australiensis: Female 82 mm CW T. parindicus: Female 75 mm CW

DISTRIBUTION



Distribution of reported commercial catch of Moreton Bay Bugs

TABLES

Fishing methods			
	Commonwealth	Queensland	Western Australia
Commercial			
Otter Trawl	✓		✓
Trawl		✓	
Recreational			
Diving		✓	
Traps and Pots		✓	
Unspecified			✓

Management Methods			
	Commonwealth	Queensland	Western Australia
Commercial			
Effort limits	✓	✓	✓
Gear restrictions		✓	

Limited entry	✓	✓	✓
Retention of females with eggs prohibited	✓		
Size limit	✓	✓	
Spatial closures	✓	✓	✓
Vessel restrictions	✓	✓	✓
Recreational			
Size limit		✓	

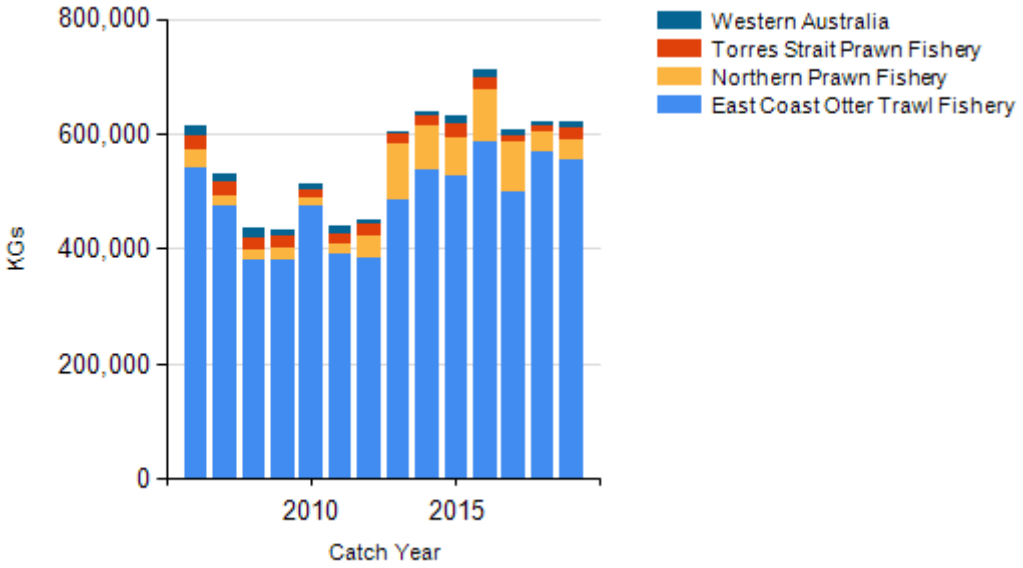
Catch			
	Commonwealth	Queensland	Western Australia
Commercial	55.371 t	555.262 t	11.7589 t
Indigenous		No catch	No catch
Recreational		Unknown	No catch

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.

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.

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

CATCH CHART



Commercial catch of MORETON BAY BUGS - note confidential catch not shown

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