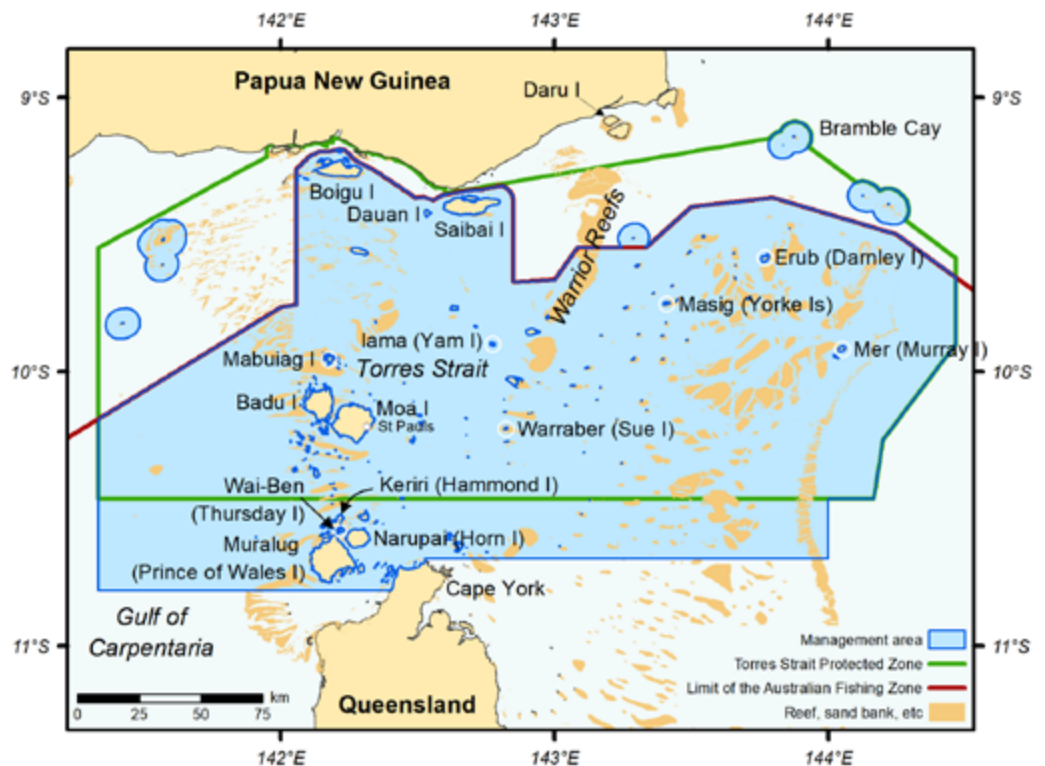


## Chapter 16

# Torres Strait Tropical Rock Lobster Fishery

I Butler, B D'Alberto, T Emery and H Tuyman

**FIGURE 16.1** Regional map showing the management area of the Torres Strait Tropical Rock Lobster Fishery



**TABLE 16.1** Status of the Torres Strait Tropical Rock Lobster Fishery

Biological status					
Stock	2020		2021		Comments
	Fishing mortality	Biomass	Fishing mortality	Biomass	
Tropical rock lobster ( <i>Panulirus ornatus</i> )					Fishing mortality is less than the recommended biological catch. Spawning stock biomass is above the target reference point.

**Economic status**

Economic status of the fishery is uncertain. Real GVP declined over the period 2010–11 to 2020–21, with the decline being driven by lower catch volumes. Although rock lobster prices increased in the early part of this period, supporting GVP, prices declined sharply after the onset of the COVID-19 pandemic in early 2020.

Note: **GVP** Gross value of production.

**Fishing mortality** ■ Not subject to overfishing ■ Subject to overfishing ■ Uncertain  
**Biomass** ■ Not overfished ■ Overfished ■ Uncertain

## 16.1 Description of the fishery

The Torres Strait Tropical Rock Lobster Fishery (TSTRLF) is commercially fished in the Torres Strait Protected Zone (TSPZ) by Australian and Papua New Guinean nationals. Australians hold Traditional Inhabitant Boat (TIB) licences or Transferable Vessel Holder (TVH) licences (see Chapter 14).

### Area fished, fishing methods and key species

The TSTRLF extends from Cape York to the northern border of the TSPZ (Figure 16.1). Most catch comes from the western and south-eastern parts of the fishery (AFMA 2013). Access to this fishery is shared by Australia and Papua New Guinea (PNG) under formal arrangements described in the Torres Strait Treaty (see Chapter 14).

The TSTRLF is based on a single species: tropical rock lobster (*Panulirus ornatus*). It is predominantly a dive-based, hand-collection fishery with few (if any) other species taken (occasional painted lobster – *P. versicolor*). Divers use surface-supplied air (hookah) or free-dive, and predominantly work from <6 m vessels (1 diver per vessel). Some lobsters are also collected at night on shallow reef flats by fishers using a light and handheld spear or scoop net.

Operators can use motherships (primary vessels; large catch-storage vessels) in conjunction with smaller fishing vessels (tenders) or operate fishing vessels individually. The TVH Sector predominantly uses hookah gear and operates using primary vessels with tenders. This allows these vessels to fish for a few days to several weeks. In contrast, TIB Sector operators predominantly work from small dinghies (<6 m long) and undertake short trips (1–2 days), departing from their local island communities.

## Management methods

In 2020–21, the TSTRLF was managed in accordance with a harvest strategy, under the Torres Strait Fisheries (Quotas for Tropical Rock Lobster [Kaiar]) Management Plan 2018, which specifies the use of a quota system, and the Torres Strait Fisheries (Tropical Rock Lobster) Management Instrument 2018.

The harvest strategy sets out the objectives for the TSTRLF, how the fishery is to be monitored, what data should be collected, and rules for determining a recommended biological catch (RBC) and the global total allowable catch (TAC) for each fishing season (AFMA 2019a). The global TAC is applied to the whole fishery and takes into account catch-sharing agreements between Australia and PNG. The harvest strategy has a limit reference point for biomass ( $0.32SB_{1973}$ ), a target reference point for biomass ( $0.65SB_{1973}$ ) and a target reference point for fishing mortality rate ( $F_{TARG} = 0.15$ ). The RBC, which informs TAC discussions, is determined by the harvest strategy, using an empirical harvest control rule (eHCR) that is generated by the average annual catch and catch-per-unit-effort (CPUE) over the past 5 years (Plagányi et al. 2019), and the results of the preseason survey. The harvest strategy also contains decision rules that are designed to maintain the stock at (or return it to) the target reference point for biomass ( $B_{TARG}$ ), maintain the stock above the limit reference point for biomass ( $B_{LIM}$ ) and implement rebuilding strategies if the stock falls below the  $B_{LIM}$  in 2 successive years (AFMA 2019a).

In addition to the management plan and harvest strategy, a range of longstanding input controls were in place for the most recent fishing season. These included a limited commercial fishing season (from 1 December to 30 September); a ban on the use of hookah gear between 1 December and 31 January, around specified new and full moon periods (known as moon-tide hookah closures); and gear restrictions that allowed lobsters to be collected by hand only or by handheld implements such as snares, scoop nets and spears.

The Protected Zone Joint Authority (PZJA) endorses a global TAC for the TSTRLF each fishing season based on recommendations from the various TSTRLF resource assessment and working groups. The global TAC is agreed to by Australia and PNG and implemented through annual catch shares. In addition to the TAC, other output controls include minimum size limits for commercially caught lobsters of 90 mm carapace length or 115 mm tail length, and a prohibition on the possession of tropical rock lobster meat that has been removed from any part of a tropical rock lobster, on any boat, unless that lobster was taken during traditional fishing.

The global TAC for 2020–21 was set at 623.5 t. Of this amount, 420.9 t was allocated to Australian fishers (TIB – 288 t; TVH – 147 t) and 109.1 t to cross-endorsed PNG fishers. The balance (93.5 t) was allocated to PNG fishers to fish exclusively in PNG waters (Table 16.2).

## Fishing activity

Fishing effort in the TSTRLF is reported as tender-days, which is the common unit of effort across both sectors (TIB and TVH). Reported fishing effort (available since 1994) for the TVH Sector reached a peak of 5,217 tender-days in 2003–04. In 2020–21, TVH effort was 1,621 tender-days, an increase from 1,267 tender-days in 2019–20 (Table 16.2).

Fishing effort in the TIB Sector has been more difficult to estimate because the docket book system used to collect catch-and-effort data was voluntary up until 2017. Mandatory catch reporting, known as the Fish Receiver System, came into effect for all Torres Strait fisheries, except the Torres Strait Prawn Fishery, on 1 December 2017. This system requires all catch from the TSTRLF to be landed to a licensed fish receiver, accurately weighed and recorded. However, information about fishing method, area and effort (that is, days fished, number of fishers) remains voluntary. In 2020–21, 3,671 tender-days were reported in the TIB Sector, down from 3,773 tender-days in 2019–20 (Table 16.2).

Fishing effort for the PNG sector in Australian waters decreased from a peak of more than 2,200 tender-days in 2009–10 and has been zero since 2013–14 (Table 16.2). PNG fishers were unable to fish in Australian waters in the 2019–20 and 2020–21 fishing seasons due to the COVID-19 pandemic and subsequent closure of the Australian border.

**TABLE 16.2** Main features and statistics for the TSTRLF

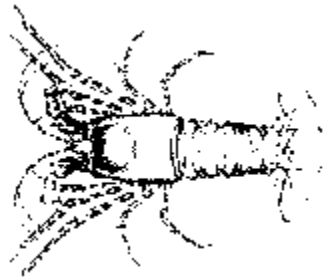
Fishery statistics a				2019–20 fishing season			2020–21 fishing season		
Stock	TAC (t)	Catch (t)	GVP (2019–20)	TAC (t)	Catch (t)	GVP (2020–21)			
Australian waters (TVH, TIB)	146.9 (TVH) 287.8 (TIB)	142.5 (TVH) 217.1 (TIB)	\$14.02 million	142.2 (TVH) 278.6 (TIB)	114.8 (TVH) 126.6 (TIB)	\$13.55 million			
Australian waters (PNG cross-endorsed) b	60	0	\$0	109.1	0	\$0			
PNG waters c	87.3	126.4	–	93.5	81.2	–			
Total	582.0	486.0	–	623.5	322.6	–			
Other spp.	n/a	0	n/a	n/a	0	n/a			
Total fishery	n/a	486.0	–	n/a	322.6	–			
Fishery-level statistics									
Effort d	TVH: 1,267 tender-days, 533 operation-days TIB: 3,773 tender-days PNG: 0 tender-days (in Australian waters) b			TVH: 1,621 tender-days, 631 operation-days TIB: 3,671 tender-days PNG: 0 tender-days (in Australian waters) b					
Fishing permits e	TVH: 12 licences, 33 tenders TIB: 466 PNG: 0 PNG cross-endorsed; hundreds of PNG dinghies and canoes fish from coastal villages in PNG waters			TVH: 12 licences, 33 tenders TIB: 438 PNG: 0 PNG cross-endorsed; hundreds of PNG dinghies and canoes fish from coastal villages in PNG waters					
Active vessels	TVH: 7 TIB: 267 PNG: 0 (cross-endorsed)			TVH: 7 TIB: 197 PNG: 0 (cross-endorsed)					
Observer coverage	0			0					
Fishing methods	Hand collection using handheld implements (snare, net or spear) on shallow reef flats at night; free-diving or use of hookah gear during the day								
Primary landing ports	Badu Island, Cairns, Iama (Yam) Island, Poruma (Coconut) Island, Thursday Island, Warraber (Sue) Island (Queensland); Daru (PNG)								
Management methods	Input controls: gear controls, seasonal closures, vessel length restriction Output controls: TAC, minimum size limit (>115 mm tail length or >90 mm carapace length)								
Primary markets	Domestic: live lobsters and frozen tails International: Hong Kong/China (live lobsters), United States (frozen tails)								
Management plan	Torres Strait Fisheries (Quotas for Tropical Rock Lobster [Kaiar]) Management Plan 2018								

**a** Fishery statistics are provided by fishing season, unless otherwise indicated. Fishing season is 1 December to 30 September, unless the TAC is reached before that time. Value statistics are by financial year. **b** PNG was unable to fish in Australian waters in the 2019–20 and 2020–21 fishing seasons due to the COVID-19 pandemic and subsequent Australian border closure. **c** Catch taken inside and outside the Torres Strait Protected Zone in the PNG part of the fishery from 1 December to 30 November. For the 2020–21 season, includes 68.17 t of catch from official PNG figures for the period 1 January 2021 to part of November 2021, and estimated catches (by TSTRLF Resource Assessment Group) for the remaining days in December 2020 and November 2021. **d** Tender-day is a day of fishing effort using a fishing tender or dory. **e** As at snapshot date 1 July 2021; includes primary boats and their tenders, as well as dinghies.

Notes: **GVP** Gross value of production. **n/a** Not applicable. **PNG** Papua New Guinea. **TAC** Total allowable catch. **TIB** Traditional Inhabitant Boat. **TVH** Transferable Vessel Holder. **–** Not available.

## 16.2 Biological status

### Tropical rock lobster (*Panulirus ornatus*)



Line drawing: Karina Hansen

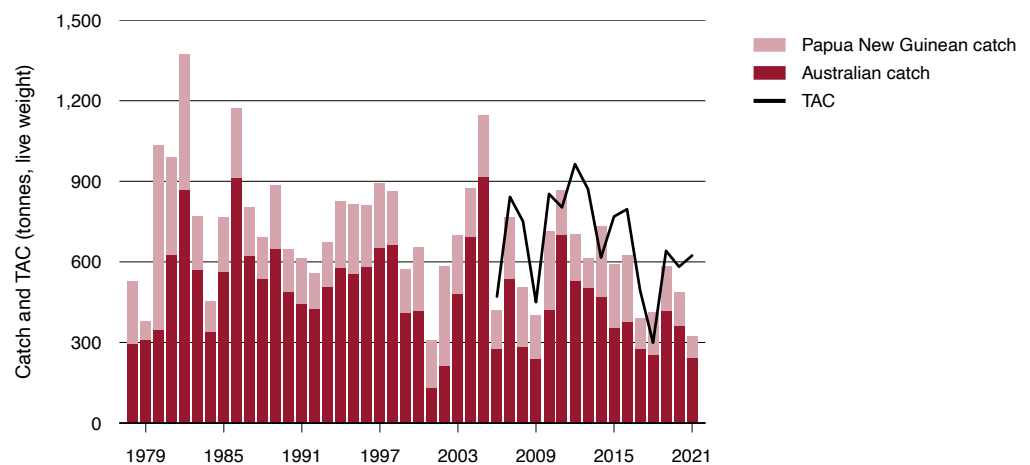
#### Stock structure

Although postlarval-stage lobsters are locally resident, tropical rock lobster populations in Torres Strait (managed under the PZJA), the Coral Sea (managed by the Australian Government) and Queensland waters (managed by the Queensland Government) are considered to comprise a single biological stock because of the mixing of larvae in the Coral Sea (Pitcher et al. 2005; Plagányi et al. 2018). Assessments presented here relate specifically to the part of the stock in Torres Strait. A single stock in the Torres Strait is assumed for status determination purposes.

#### Catch history

Total catch of tropical rock lobster since 1978 has fluctuated between 122 t and 932 t per year for the Australian sectors (TVH and TIB), and between 69 t and 685 t for PNG (Figure 16.2). The total catch from Australian waters in the 2020–21 fishing season was 241.4 t (126.6 t TIB and 114.8 t TVH), down from 359.6 t (217.1 t TIB and 142.5 t TVH) in 2019–20. The total estimated catch from PNG waters (inside and outside the TSPZ) in the 2020–21 fishing season was 81.2 t, down from 126.4 t in 2019–20.

**FIGURE 16.2** Catch and TAC of tropical rock lobster in the TSTRLF, 1978 to 2021



Notes: **TAC** Total allowable catch. The TAC became binding in the 2018–19 fishing season when the management plan was introduced.

Sources: AFMA, PZJA

## Stock assessment

Tropical rock lobster stocks are assessed every 3 years, unless triggered sooner by the harvest strategy. The last assessment was in 2019 (AFMA 2019b), with the next planned for 2022. The statistical age-structured production model developed by Plagányi et al. (2009) estimated the 2019 spawning biomass to be approximately 4,467 t or 93% of the estimated unfished (1973) level ( $0.93SB_{1973}$ ) (Plagányi et al. 2020). This biomass is above the target reference point ( $0.65SB_{1973}$ ), and higher than the prior biomass estimate that occurred during a period of low recruitment (AFMA 2019b; Plagányi et al. 2020). Decision rules (that is, preseason survey trigger and/or biomass limit reference point trigger) did not trigger an early stock assessment in the most recent fishing season.

The RBCs generated through the stock assessments can be highly variable. As a result, RBC calculation is through the harvest strategy's eHCR methodology, which is used to generate a more conservative and less variable TAC from year to year that takes into consideration stock fluctuations. The eHCR-generated RBC for the 2020–21 fishing season was 623.5 t (AFMA 2020).

## Stock status determination

The latest stock assessment estimated biomass to be well above the target reference point (and therefore the limit reference point). The total catch of tropical rock lobster in 2020–21 was below both the RBC and TAC. As a result, this stock is classified as both **not overfished** and **not subject to overfishing**.

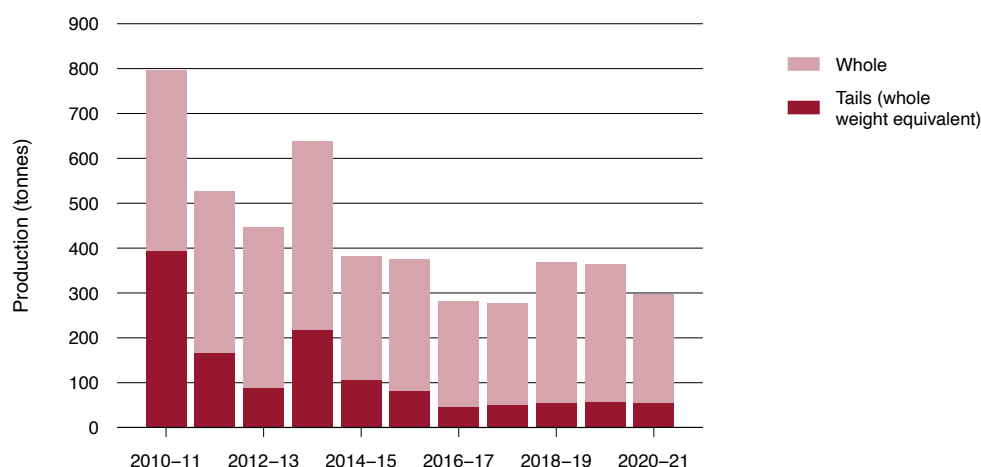
## 16.3 Economic status

### Key economic trends

Real gross value of production (GVP) of the TSTRLF declined over the period 2010–11 to 2020–21, with the decline being driven by lower catch volumes. Although rock lobster prices increased in the early part of this period, supporting GVP, prices declined sharply after the onset of the COVID-19 pandemic in early 2020.

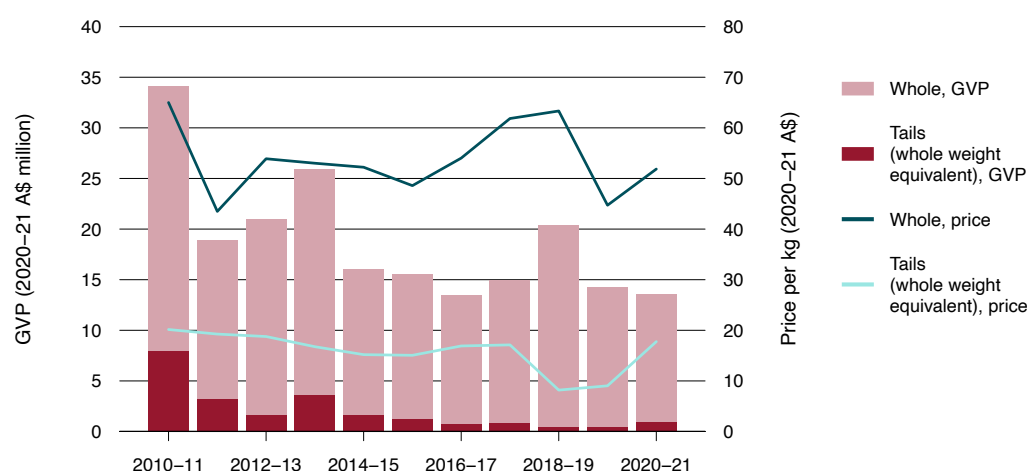
Catch in the fishery is landed as either whole lobster or lobster tails (Figure 16.13). Demand from the China market has driven favourable prices for live lobsters over the past decade, so the proportion of the catch sold as live lobsters has increased from 51% in 2010–11 to 81% in 2020–21. Since early 2020, the COVID-19 pandemic has led to reduced demand from China and less favourable prices for rock lobster (Mobsby et al. 2021). As a result, GVP for the fishery in 2019–20 and 2020–21 was significantly lower than GVP in 2018–19 (the pre-pandemic peak) (Figure 16.4).

**FIGURE 16.3** Volume of whole lobster and lobster tails in the Australian sectors of the TSTRLF, 2010–11 to 2020–21



Notes: Lobster tail production has been converted to whole weight.

**FIGURE 16.4** Real GVP and price for whole lobster and lobster tails (whole-weight equivalent) in the TSTRLF, 2010–11 to 2020–21



Notes: **GVP** Gross value of production. 'Real' indicates that value has been adjusted for inflation.

### Performance against economic objective

The economic status of the TSTRLF is uncertain because traditional economic fisheries indicators are inappropriate when assessing against broader socio-economic objectives that apply to Torres Strait fisheries. Like other Torres Strait fisheries, the TSTRLF is managed against objectives that differ from those of solely Australian Government-managed fisheries. The TSTRLF management objectives (PZJA 2015) are relevant to economic performance but have a broader focus on social and cultural factors. They include the objectives of:

- maintaining fishing mortality at a level below the level that produces maximum sustainable yield ( $F_{MSY}$ ), accounting for all sources of fishing mortality
- in accordance with the Torres Strait Treaty, protecting the traditional way of life and livelihood of traditional inhabitants, particularly in relation to their traditional fishing for tropical rock lobster
- providing for optimal use, cooperative management with Queensland and PNG, and catch sharing with PNG
- monitoring interactions between the prawn and lobster fisheries
- maintaining appropriate controls on fishing gear allowed in the fishery, to minimise impacts on the environment
- promoting economic development in the Torres Strait area, with an emphasis on providing the framework for commercial opportunities for traditional inhabitants, and ensuring that the opportunities available to all stakeholders are socially and culturally appropriate for Torres Strait, and the wider Queensland and Australian communities
- optimising the value of the fishery.

## 16.4 Environmental status

### EPBC Act approvals

The TSTRLF was accredited under part 13 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 7 January 2019. The TSTRLF also has export approval under part 13A of the Act until 4 December 2023. As part of the approval, it was recommended that the Australian Fisheries Management Authority (AFMA) continue to work with the PZJA and the Department of Climate Change, Energy, the Environment and Water (DCCEEW) to implement changes to the *Torres Strait Fisheries Act 1984*, to allow reporting requirements to apply to all fishing sectors in the fishery. This includes reporting catch – for example, discards and catch-and-effort data, including the location of fishing activity.



## Ecological risk assessments

A scale, intensity, consequence analysis (SICA) for the TSTRLF in 2007 identified that one or more species within the target species category may be at moderate or higher risk from the direct impact of fishing (Furlani et al. 2007), requiring either direct management of identified risks or further risk assessment. Habitats and communities were also assessed in 2007, all of which were found to be at low risk from the direct impact of fishing. There have been no further risk assessments undertaken for the fishery.

## Ecological risk management

In managing the ecological risks identified for its fisheries, AFMA implements ecological risk management (ERM) strategies for species identified as being at high risk. Fishery-specific ERM strategies can be found on the AFMA website.

## Threatened, endangered and protected species interactions

In accordance with accreditation under the EPBC Act (see Chapter 1), AFMA publishes and reports quarterly on interactions with protected species on behalf of Commonwealth fishing operators to DCCEEW. No interactions with species protected under the Act were reported in the TSTRLF during 2021.

Reported interactions with protected species form part of the ongoing monitoring by DCCEEW of the performance of fisheries within their accreditation under the EPBC Act.

## 16.5 References

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