FIGURE 14.1 Area fished in the Western Deepwater Trawl Fishery, 2018–19 fishing season
## TABLE 14.1 Status of the Western Deepwater Trawl Fishery

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Deepwater bugs (Ibacus spp.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fishing mortality levels are unlikely to constitute overfishing. No reliable estimate of biomass.</td>
</tr>
<tr>
<td>Ruby snapper (Etelis carbunculus, Etelis sp.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fishing mortality levels are unlikely to constitute overfishing. Biomass likely to be above the limit reference point.</td>
</tr>
</tbody>
</table>

### Economic status

Estimates of NER are unavailable and gross value of production is confidential because of the low number of active vessels in the fishery. In 2018–19, an increase in catch per active vessel was balanced with an increase in effort per active vessel and higher fuel costs, indicating an uncertain trend in NER.

Note: NER Net economic returns.

<table>
<thead>
<tr>
<th>Fishing mortality</th>
<th>Not subject to overfishing</th>
<th>Subject to overfishing</th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass</td>
<td>Not overfished</td>
<td>Overfished</td>
<td>Uncertain</td>
</tr>
</tbody>
</table>

Trawl catch
Tamar Sarhan, AFMA
14.1 Description of the fishery

Area fished

The Western Deepwater Trawl Fishery (WDTF) operates in Commonwealth waters off the coast of Western Australia between the western boundary of the Southern and Eastern Scalefish and Shark Fishery in the south (115°08'E) and the western boundary of the North West Slope Trawl Fishery (NWSTF) in the north (114°E) (Figure 14.1). The boundary of the fishery has recently been changed to align more closely with the 200 m isobath. Effort in recent years has been localised in the area offshore and slightly south of Shark Bay in Western Australia.

Fishing methods and key species

Operators in the fishery use demersal trawl, and catch more than 50 species in waters seaward of a line approximating the 200 m isobath, in habitats ranging from temperate–subtropical in the south to tropical in the north. Catches in the WDTF were historically dominated by 6 commercial finfish species or species groups: orange roughy (*Hoplostethus atlanticus*), ores (*Oreosomatidae*), boarfish (*Pentacerotidae*), eteline snapper (*Lutjanidae: Etelinae*), apsiline snapper (*Lutjanidae: Apsilinae*) and sea bream (*Lethrinidae*). Between 2000 and 2005, deepwater bugs (*Ibacus* spp.) emerged as the most important target species. A wide variety of species have variably made up the catch since then, with deepwater bugs and ruby snapper (*Etelis* sp.) dominating recent catches. In 2018–19, ruby snapper made up nearly half the catch, but there was no reported catch of bugs.

Management methods

The fishery is managed under the same harvest strategy as the NWSTF (AFMA 2011; see Chapter 6).

Fishing effort

The number of vessels active in the fishery and total hours trawled have fluctuated from year to year. Notably, total hours trawled were relatively high for a brief period during the early 2000s when fishers targeted ruby snapper and then deepwater bugs. Total fishing effort has been variable but relatively low since then. Effort in 2018–19 (492 trawl-hours) was less than half that of 2017–18 (1,108 trawl-hours) (Table 14.2).

Catch

Catch in the WDTF has been variable, peaking at around 378 t in 1994–95 and then again at 347 t in 2001–02 (Figure 14.2). The peak in catch in the early to mid 1990s consisted mostly of orange roughy, whereas the peak in catch at the turn of the century consisted mostly of orange roughy, deepwater bugs and, to a lesser extent, ruby snapper.

Total catch, primarily comprising finfish and deepwater bugs, has been variable but relatively low in recent years compared with the early 2000s. Catch in 2018–19 was 53 t (Table 14.2), down from 102 t in 2017–18.
TABLE 14.2 Main features and statistics for the WDTF

<table>
<thead>
<tr>
<th>Fishery statistics a</th>
<th>2017–18 fishing season</th>
<th>2018–19 fishing season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock</td>
<td>TAC (t)</td>
<td>Catch (t)</td>
</tr>
<tr>
<td>Deepwater bugs</td>
<td>–</td>
<td>22</td>
</tr>
<tr>
<td>Ruby snapper</td>
<td>–</td>
<td>28</td>
</tr>
<tr>
<td>Total fishery</td>
<td>–</td>
<td>102</td>
</tr>
</tbody>
</table>

Fishery-level statistics

<table>
<thead>
<tr>
<th></th>
<th>2017–18 fishing season</th>
<th>2018–19 fishing season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort</td>
<td>100 days, 1,108.3 trawl-hours</td>
<td>53 days, 492.3 trawl-hours</td>
</tr>
<tr>
<td>Fishing permits</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Active vessels</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Observer coverage</td>
<td>6 days (6%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Fishing methods</td>
<td>Demersal trawl</td>
<td></td>
</tr>
<tr>
<td>Primary landing ports</td>
<td>Carnarvon, Fremantle (Western Australia)</td>
<td></td>
</tr>
<tr>
<td>Management methods</td>
<td>Input controls: limited entry (11 permits), gear restrictions</td>
<td>Catch controls: trigger limits for key commercial species</td>
</tr>
<tr>
<td>Primary markets</td>
<td>Domestic: Brisbane, Perth, Sydney—frozen, chilled Spanish, United States—frozen</td>
<td></td>
</tr>
<tr>
<td>Management plan</td>
<td>North West Slope Trawl Fishery and Western Deepwater Trawl Fishery: statement of management arrangements (AFMA 2012)</td>
<td></td>
</tr>
</tbody>
</table>

a Fishery statistics are provided by fishing season, unless otherwise indicated. Fishing season is 1 July to 30 June. Value statistics are provided by financial year.

Notes: GVP Gross value of production. TAC Total allowable catch. – Not applicable.

FIGURE 14.2 Total catch in the WDTF, 1992–93 season to 2018–19 season

Source: AFMA
14.2 Biological status

Deepwater bugs (*Ibacus* spp.)

**Stock structure**

The WDTF targets several species of deepwater bugs. Stock structure of these species is not known, and they are grouped into a single multispecies stock for determining stock status.

**Catch history**

The catch history of deepwater bugs in the WDTF is characterised by relatively low levels of catch in most years, with 4 years of relatively high catches between 2001–02 and 2004–05, peaking at 160 t in 2002–03 (Figure 14.3). Catch of deepwater bugs in recent years has been relatively localised (see Figure 14.1). No deepwater bugs were recorded for 2018–19, with 22 t reported in 2017–18 (Figure 14.3; Table 14.2).

**FIGURE 14.3** Deepwater bug catch in the WDTF, 1992–93 season to 2018–19 season

Source: AFMA
Stock assessment
A formal stock assessment for deepwater bugs has not been done, and little information is available with which to assess stock status. Relatively low levels of fishing effort, low levels of catch and sporadic targeting of key commercial species make it difficult to quantitatively assess stock status.

Stock status determination
No catch of deepwater bugs was reported in the WDTF in 2018–19. On this basis, the stock is classified as not subject to overfishing. Few empirical data are available to inform biomass status for this stock; as a result, the level of biomass of the stock is uncertain.

Ruby snapper (*Etelis* sp.)

Stock structure
Four species of *Etelis* are captured in the WDTF, although ruby snapper (*Etelis* sp.) is the most commonly captured. A recent taxonomic revision of ruby snapper revealed 2 morphologically similar species that are now recognised as *Etelis* sp. (ruby snapper) and *Etelis carbunculus* (pygmy ruby snapper) (Andrews et al. 2016; Wakefield et al. 2014; Williams et al. 2017). However, catches for these 2 species are currently reported as a single species, here referred to as ruby snapper (*Etelis* sp.). The stock structure of ruby snapper caught in the WDTF is uncertain. In the absence of clear information on biological stock structure, a single fishery-level stock is assumed for determining stock status.

Catch history
Catches of ruby snapper in the WDTF peaked in 2000–01 (around 80 t), with a smaller peak in 2008–09 (around 24 t). Catches were relatively small between 2010–11 and 2016–17, increasing to 28 t in 2017–18 and then declining to 21 t in 2018–19 (Figure 14.4).
Stock assessment

The only stock assessment for ruby snapper in the WDTF was published in 2002 (Hunter, Dichmont & Venables 2002). However, the reliability and accuracy of outputs from this assessment were weakened by the poor quality and limited quantity of data. The assessment identified biological characteristics that potentially increase the vulnerability of the species to overfishing: the species is relatively long-lived, has a slow growth rate and aggregates in restricted continental-shelf habitats. Hunter, Dichmont & Venables (2002) showed that fishing for ruby snapper in the WDTF was historically restricted to the area of the continental-shelf region from Shark Bay to North West Cape. Commercial catch-per-unit-effort has been highly variable—it was initially around 400 kg/h in January 1997, peaked at 900 kg/h in September 1997 and declined to less than 200 kg/h towards the end of the study period in mid 2001. Although Hunter, Dichmont & Venables (2002) could not conclusively identify the cause of the decline in catch rates, they concluded that it probably resulted from a combination of changes in stock abundance and fleet movements.

The WDTF overlaps with Western Australian state-managed demersal fisheries that also target ruby snapper. Therefore, it is highly likely that these fisheries are exploiting the same stock of ruby snapper. Catch-curve and spawner per-recruit analyses using direct age data from 1997 and 2011 were used to assess the status of ruby snapper in Western Australian fisheries (Wakefield et al. 2020). Results indicated that in both 1997 and 2011 the stock was at approximately 60% of the unfished biomass level. Fishing mortality rates were relatively low for 1997 (0.04) and 2011 (0.05) compared with the estimated natural mortality rate of 0.11 per year, which suggests that the stock was not subject to overfishing during those periods.
Chapter 14: Western Deepwater Trawl Fishery

Stock status determination

There is no current or reliable indication of the maximum sustainable yield for this stock. As such, a weight-of-evidence approach based on catch and landing data since the 1992–93 fishing season (Figure 14.4), together with information published with the 2002 stock assessment and assessments undertaken for Western Australian state-managed fisheries (summarised above), has been used to determine stock status.

Although catches for 2017–18 and 2018–19 were relatively large for the fishery, it is unlikely that these catches would be sufficient to drive the stock into an overfished state. Additionally, catches of ruby snapper in the WDTF in the previous decade have commonly been zero. The assessment of the ruby snapper stock from the Western Australian state-managed fisheries indicates that the biomass of the stock was well above the Commonwealth's limit reference point of 0.2B, in both 1997 and 2011. On the basis of the information provided above, ruby snapper is classified as not overfished and not subject to overfishing.

14.3 Economic status

Key economic trends

Net economic returns (NER) are unavailable for the WDTF. The gross value of production of the fishery is confidential because of the low number of active vessels. Historically, fishing has been opportunistic in the fishery, and catch levels have been variable.

The WDTF is managed through input controls, including limited entry (permits), gear restrictions and catch trigger limits for key commercial species. The number of permits, active vessels, fishing effort and catch all decreased in the 2018–19 fishing season, suggesting decreased incentive to participate in the fishery.

When compared with 2017–18, the average catch per vessel increased by 56%; however, hours per active vessel spent fishing increased in 2018–19 at a slower rate, by 33%. Higher fuel prices are likely to have also increased the total operating cost for the fishery. Therefore, the trend in NER is uncertain.

Performance against economic objective

The fishery’s performance against the economic objective is uncertain. Historically, fishing has been opportunistic, with a range of species caught in low volumes, typically generating low overall value. Given these characteristics, low-cost management arrangements are appropriate. However, management structures may require review if catch begins to trend upwards.
14.4 Environmental status

The WDTF is included on the List of Exempt Native Specimens under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and is exempt from export controls until 18 December 2020.

The Western Trawl fisheries (NWSTF and WDTF) have been assessed to level 3 of the Australian Fisheries Management Authority (AFMA) ecological risk assessment (Zhou, Fuller & Smith 2009). No species were found to be at high risk at the current level of fishing effort.

In accordance with accreditation under the EPBC Act 1999 (see Chapter 1, 'Protected species interactions') AFMA publishes and reports quarterly on interactions with protected species on behalf of Commonwealth fishing operators to the Department of Agriculture, Water and the Environment (DAWE). No interactions with protected species listed under the EPBC Act were reported in the WDTF in 2019.

These reported interactions with protected species form a part of the ongoing monitoring by DAWE of the performance of fisheries within their accreditation under the EPBC Act.

14.5 References

AFMA 2011, Harvest strategy for the Western Deepwater Trawl Fishery and North West Slope Trawl Fishery, Australian Fisheries Management Authority, Canberra.

——2012, North West Slope Trawl Fishery and Western Deepwater Trawl Fishery: statement of management arrangements, Australian Fisheries Management Authority, Canberra.


Zhou, S, Fuller, M & Smith, T 2009, Rapid quantitative risk assessment for fish species in seven Commonwealth fisheries, report to the Australian Fisheries Management Authority, Canberra.