Chapter 2
Bass Strait Central Zone Scallop Fishery

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FIGURE 2.1 Area of the Bass Strait Central Zone Scallop Fishery, 2012–13
TABLE 2.1 Status of the Bass Strait Central Zone Scallop Fishery

<table>
<thead>
<tr>
<th>Status</th>
<th>2011</th>
<th>2012</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biological status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial scallop (Pecten fumatus)</td>
<td></td>
<td></td>
<td>Western part of the fishery and two eastern beds were closed. No robust estimate of biomass; die-offs were reported in late 2010 and 2011.</td>
</tr>
<tr>
<td><strong>Economic status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Negative NER suggest that economic status can be improved.</td>
</tr>
</tbody>
</table>

Notes: NER Net economic returns.
Fishing mortality
- Not subject to overfishing
- Subject to overfishing
- Uncertain
Biomass
- Not overfished
- Overfished
- Uncertain

2.1 Description of the fishery

The Bass Strait Central Zone Scallop Fishery (BSCZSF) is predominantly a single-species fishery targeting aggregations (‘beds’) of commercial scallop using scallop dredges. The fishery operates in the central area of Bass Strait between the Victorian and Tasmanian scallop fisheries (Figure 2.1). Although the three fisheries are managed separately, the stocks are likely to be connected (Haddon et al. 2006; Woodburn 1990).

The fishery has a history of boom and bust, with the peaks (1982–83, 1994, 2003) becoming progressively smaller, interspersed with fishery-wide closures, the most recent being 2006 to 2008 (Figure 2.2). Substantial historical catches were reported in the western part of the fishery. However, since 2000, the fishery has been centred on the eastern region because of the higher costs of operating in the more remote western region and a lack of recent evidence of commercially viable beds in the west (Harrington & Semmens 2010).

The fishery reopened in 2009 under an agreed harvest strategy (AFMA 2007), which was updated for the 2012 season. The harvest strategy uses a spatial management approach, similar to that used in the Tasmanian Scallop Fishery, whereby a restricted area is opened to fishing while most of the fishery remains closed. In the current harvest strategy (AFMA 2012a), a restricted area of the fishery is opened to fishing provided that 40 per cent of known viable or prospectively viable areas (which must contain a total of at least 500 t) remain closed to ensure future recruitment. For an area to be classed as ‘viable’, one of the following conditions must be met:

- at least 80 per cent of scallops in the area must have a shell length of at least 90 mm
- the Scallop Resource Assessment Group (ScallopRAG) considers that, by the start of the season, 80 per cent of scallops in the area will have reached a shell length of at least 90 mm or be at least three years old.

A prospectively viable area is one where the criteria for a viable area are likely to be met during the season.
A total allowable catch (TAC) of 2500 t was set in 2009, of which 2426 t (97 per cent) was caught, following expansion of management boundaries to maintain catch rates. A TAC of 3000 t was set for the 2010 fishery. However, scallops were in poor condition for much of the season, and industry reported that a widespread die-off had occurred during the season. This resulted in only 2278 t (76 per cent of the TAC) being landed (Figure 2.2). There was limited interest in conducting a pre-season survey for 2011; this delayed the start of the season until a survey was completed and a TAC was set. The fishery opened in July 2011 with a TAC of 2000 t, although poor catch rates were reported in the open area (AFMA 2012b). A further die-off was reported to have occurred between the survey in January and the opening of the fishery in July, resulting in low catch rates. In response, most of the area opened in July 2011 was subsequently closed, and a larger area surrounding it was opened in August. Catch rates remained low (less than 200 kg/hour) in the new area. As a result, most vessels fished for only a short period in 2011, and only 484 t (24 per cent) of the 2000 t TAC was taken (AFMA 2012b).

A TAC (100 t) also exists for doughboy scallops (*Chlamys (Mimachlamys) asperrima*). However, this species has not been retained in recent years because of a lack of market. In 2012, 85 kg of doughboy scallops was caught, all of which were discarded.

**FIGURE 2.2** Catch and TAC of commercial scallop in the BSCZSF, 1977 to 2012

Notes: TAC Total allowable catch. Catches before establishment of the BSCZSF in 1986 are likely to include some catch from outside the central zone.
Source: Sahlqvist 2005
Pre-season surveys for the 2012 season were undertaken in May and June 2012, focusing on five beds (Areas 1–5; Figure 2.3) that were identified during a mid-season survey in November 2011. The surveys found that only one of the five beds (Area 4) met the harvest strategy requirement of less than 20 per cent of scallops being under 90 mm shell length (AFMA 2012a). Area 4 was estimated to have a very low density (5 kg/1000 m²; Table 2.2), and biomass was not estimated (Semmens 2012). The other four beds were in variable condition; results indicated that partial die-off events had occurred, or were occurring, in three beds (Areas 2, 3 and 5). The very low density in Area 4 (the only bed to meet the discard rate rules in the harvest strategy) meant that it would not be economically viable to fish, and industry representatives therefore recommended an alternative management approach for the 2012 season. The industry proposal was adjusted slightly and resulted in closure of two of the five known beds (Figure 2.3), together with the western part of the fishery (west of 146°E) and opening of the remainder of the fishery. A minimum size limit of 85 mm (reduced from 90 mm) was used to protect any juvenile beds found during the season, and a 2000 t TAC was set (AFMA 2012c). These management measures were not consistent with the harvest strategy control rules, which state that ‘only viable areas may be opened to fishing’ (AFMA 2012a). ScallopRAG noted that there were some fundamental concerns with the adoption of a less precautionary management approach. However, the approach would only be for one year; opportunistic surveys were an element of the original harvest strategy (AFMA 2007); and there was a need for additional information to that provided by the pre-season surveys (AFMA 2012d).

### Table 2.2 Summary of results from May and June 2012 surveys (areas shown in Figure 2.3)

<table>
<thead>
<tr>
<th></th>
<th>Area 1</th>
<th>Area 2</th>
<th>Area 3</th>
<th>Area 4</th>
<th>Area 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shots</td>
<td>48</td>
<td>40</td>
<td>48</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Area (km²)</td>
<td>147</td>
<td>61</td>
<td>92</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Mean (t)</td>
<td>5 887</td>
<td>1 868</td>
<td>2 368</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Average density (kg/1000 m²)</td>
<td>14</td>
<td>10</td>
<td>9</td>
<td>5</td>
<td>na</td>
</tr>
<tr>
<td>Discard rate (%)</td>
<td>25.1</td>
<td>31.3</td>
<td>23.0</td>
<td>13.9</td>
<td>na</td>
</tr>
</tbody>
</table>

Notes: na Not available.
Source: Recreated from Semmens 2012
The 2012 season opened on 22 August 2012, with vessels initially fishing one of the known beds (Area 1), but scallops were reported to be in poor condition and catch rates were low. Consequently, the majority of fishers with Tasmanian Scallop Fishery licences moved to the Tasmanian Scallop Fishery. A small number of vessels remained in the BSCZSF and reported finding some good-quality scallops later in the season (DPIPWE 2012). The BSCZSF closed on 31 January 2013 with 244 t (12 per cent) of the 2000 t TAC caught. Average trawl hours per vessel were less than half that of the 2011 season and were the lowest since the fishery reopened in 2009 (Table 2.3).

**FIGURE 2.3 Relative fishing intensity in the BSCZSF, 2012–13**
### Table 2.3 Main features and statistics for the BSCZSF

<table>
<thead>
<tr>
<th>Stock</th>
<th>2011 fishing season</th>
<th>2012 fishing season</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TAC (t)</td>
<td>Catch (t)</td>
</tr>
<tr>
<td>Commercial scallop</td>
<td>2 000 (+150) d</td>
<td>484</td>
</tr>
<tr>
<td>Doughboy scallop</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total fishery</strong></td>
<td>2 250</td>
<td>484</td>
</tr>
</tbody>
</table>

**Fishery-level statistics**

| Effort (dredge hours)        | 2 776               | 1 362               |
| Fishing permits              | 73                  | 66                  |
| Active vessels               | 12                  | 12                  |
| Observer coverage            | 0 (13 days at sea during surveys) | 0 (6 days at sea during surveys) e |
| Fishing methods              | Scallop dredge      |                     |
| Primary landing ports        | Victoria: Lakes Entrance, Port Welshpool, Port Welshpool, Bridport, Devonport, Bell Bay |
| Management methods           | Input controls: seasonal and area closures |
|                             | Output controls: TAC, quota SFRs with ITQs |
| Primary markets              | Domestic: fresh     |                     |
| Management plan              | Bass Strait Central Zone Scallop Fishery management plan 2002 (DAFF 2002; amended 2012) |

**Notes:**
- Fishery statistics are provided by fishing season, unless otherwise indicated. Real-value statistics are by financial year.
- Fishing season was 27 July 2011 to 31 December 2011.
- Fishing season was 22 August 2012 to 31 January 2013.
- A research quota also exists for commercial scallop (150 t in 2011 and 260 t in 2012).
- Institute for Marine and Antarctic Studies observers.

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*Scallops being collected from dredge*

AFMA
2.2 Biological status

2.2.1 Commercial scallop

Stock assessment

There is no quantitative, model-based stock assessment for the BSCZSF; the current harvest strategy is dependent on industry-based surveys. These surveys have been conducted at the end of the fishing season or before opening of the next season, and have generally focused on areas with known beds or where beds had been found historically. The costs of surveying, together with the highly patchy distribution of scallops, make fishery-wide surveys impractical. As a result, surveys have been limited, and the extent of survey effort has been influenced by the nature of the fishing season—for example, poor fishing seasons generally result in limited participation in surveys. ABARES therefore continues to use a ‘weight of evidence’ approach to determine stock status, and not just survey results.

The commercial scallop stock was previously overfished—biomass was significantly reduced by 2005; only one known bed remained in the eastern region; and limited recruitment was occurring. Surveys conducted in 2008 to 2010 showed some recovery in the eastern region. New beds with small scallops were also found, indicating that some sporadic recruitment has occurred. However, the extent of recovery has not been quantified, and the reported recent die-offs have made such quantification more difficult. Commercially viable quantities of scallops were not detected during a survey in the western part of the fishery in 2009. This survey used experienced skippers and crew, together with knowledge from other operators and historical catch records, to target areas previously known to hold scallops. Three vessels were involved, conducting 151 tows over three days, during which only seven individual scallops were caught.

In 2012, the management arrangements opened most of the eastern part of the fishery (Figure 2.3), with the intention of giving fishers the opportunity to explore the area for new beds (AFMA 2012b). However, as noted above, at the start of the season the scallops were reported to be in poor condition, and catch rates were low. Consequently, most fishers with Tasmanian Scallop Fishery licences moved to the Tasmanian Scallop Fishery, while a small number of vessels remained in the BSCZSF. Fishing was concentrated on previously known beds, with low fishing effort and only 244 t being landed. Although some operators reported finding some good-quality scallops later in the season, the small landed catch indicates that no new large beds were found. This failure to detect new beds in the eastern part of the fishery, together with a failure to detect beds in the western part of the fishery in 2009, is concerning.
Chapter 2: Bass Strait Central Zone Scallop Fishery

The low catch taken over the past two years suggests that commercially viable quantities of scallops were not present in the open areas of the fishery, at least at the time those areas were open. Additionally, pre-season surveys and fishers operating during the season did not report finding large quantities of juvenile scallops. This is in contrast to previous years, when some recruitment was observed.

The management arrangements for the 2012 fishing season were potentially less precautionary than those specified in the harvest strategy; most of the eastern area of the fishery was open to fishing, whereas the current harvest strategy control rule states that ‘only viable areas may be opened to fishing’ (AFMA 2012a). For sedentary species such as scallops, previous studies have suggested that the approach of ‘most closed—little open’ increases the chances of long-term sustainability (Haddon et al. 2006). In contrast, the management approach in 2012 created a potential risk that fishing activity could be spread over large parts of the open area, disturbing multiple beds, rather than following the original intent of concentrating fishing activity in a small area (Haddon et al. 2006). The management approach adopted for the 2012 season closely resembled the management arrangements that were in place before the fishery was closed under the 2005 Ministerial Direction. ScallopRAG noted that there were some fundamental concerns with the adoption of a less precautionary management approach; however, there was a need for additional information to that provided by the pre-season surveys (AFMA 2012d).

The Commonwealth Fisheries Harvest Strategy Policy (HSP; DAFF 2007) defines a limit reference point as a point beyond which the risk to a stock, as the basis for a commercial fishery, is regarded as unacceptably high. The limit reference point is intended to reflect the point at which the risk to successful recruitment (or conversely, the risk of recruitment failure) is too high. The HSP requires that harvest strategies seek to maintain stocks at a biomass that produces maximum economic yield, and are above the limit reference point at least 90 per cent of the time. Although this is difficult to measure for scallops, particularly in the absence of a stock assessment or wide-area surveys, the substantial reduction in catch and effort since the fishery reopened, the poor survey results, limited evidence of recruitment, and reported die-offs may indicate that the scallop stock is at or beyond the limit reference point.

Uncertainty remains about the stock structure of scallops across the three jurisdictions. Both the Victorian and Tasmanian scallop fisheries have been closed in recent years: the Victorian Scallop Fishery was closed from 2010–11 to 2012–13, and the Tasmanian Scallop Fishery was closed from 2009 to 2011. The Tasmanian Scallop Fishery was opened on 29 August 2012, but paralytic shellfish poisoning was detected in November 2012, and the fishery was subsequently closed.

The recruitment and recovery dynamics of Bass Strait scallops are also unclear, particularly in terms of the degree to which stock depletion may influence recruitment variation. In considering the economic conditions in the BSCZSF in recent years (discussed below), statistics indicate that the current stock is not supporting a viable commercial fishery.
Stock status determination

The level of uncertainty around the biomass status of scallops has increased in recent years. Because of the spatial limitations in survey coverage, indications of low scallop abundance in the areas surveyed, limited evidence of recruitment and reported die-offs, the stock remains classified as uncertain with respect to biomass status in 2012. There are concerns that, despite the signs of a lack of rebuilding (low density of beds and some beds experiencing die-offs), a potentially less precautionary management approach than that specified in the harvest strategy was adopted. The level of fishing effort and catch in 2012 was low, in response to the lack of commercially viable quantities of scallops detected during surveys and fishing in 2012. However, given the indications of low biomass, the stock is classified as uncertain with regard to the level of fishing mortality.

If indicators of biomass status (catch, effort, surveys [size and density], recruitment) do not improve in 2013, this could indicate a deterioration in biomass and a lack of rebuilding. In such a situation, the stock could be considered to be overfished, and careful consideration would need to be given to the future level of fishing mortality and the appropriate management arrangements.

2.3 Economic status

2.3.1 Key economic trends

In 2011, an economic survey was conducted of the BSCZF for the 2009–10 and 2010–11 financial years (George et al. 2012). The timing of fishing seasons means that in some cases the financial year may span two fishing seasons (Table 2.4). The estimated real net economic returns (NER), including management costs, were negative in both years at −$1.1 million (2011–12 dollars; George et al. 2012). These results are comparable to those from the last survey, for the 1997–98 and 1998–99 financial years, when real NER were −$1.6 million and −$1.0 million, respectively (Galeano et al. 2001).

<table>
<thead>
<tr>
<th>TABLE 2.4</th>
<th>BSCZF season dates and days of overlap with financial years, 2009 to 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial year</td>
<td>Season (Number of days)</td>
</tr>
<tr>
<td>2008–09</td>
<td>1 June – 31 December</td>
</tr>
<tr>
<td>2009–10</td>
<td>1 April – 31 December</td>
</tr>
<tr>
<td>2010–11</td>
<td>27 June – 31 December</td>
</tr>
<tr>
<td>2011–12</td>
<td>22 August 2012 – 31 January 2013</td>
</tr>
<tr>
<td>2012–13</td>
<td>22 August 2012 – 31 January 2013</td>
</tr>
</tbody>
</table>
Comparison of the fishery’s gross value of production (GVP) before and after the most recent closure (2006 to 2008) reveals a considerable increase immediately following the closure (Figure 2.4). Before the closure, the real GVP was $0.5 million in 2004–05 and $0.2 million in 2005–06 (2011–12 dollars). Since the fishery’s reopening, higher GVPs of $1.3 million and $3.9 million were achieved in 2008–09 and 2009–10, respectively (noting that 2008–09 only captures the first month of the 2009 season). In 2010–11, the GVP fell to $2.9 million as a result of poor quality scallops and low beach prices. In 2011–12, the GVP fell further to $1.0 million as a result of a 76 per cent reduction in the catch volume, despite the increase in unit value.

**Figure 2.4** Real GVP and real prices received for catch in the BSCZSF, by financial year, 2002–03 to 2011–12

Notes: GVP Gross value of production. Overlap between seasons and financial years (Table 2.3) should be taken into account in interpreting this figure, fishery closure was for 2006 to 2008 calendar years.

### 2.3.2 Management arrangements

The BSCZSF harvest strategy was developed following the Australian Government’s Securing our Fishing Future program in 2006, which removed 22 licences from the fishery. The harvest strategy was implemented in 2009, following three years (2006 to 2008) with a zero TAC.

The harvest strategy was revised for the 2012 (AFMA 2012e) season and is expected to be revised again after release of the report for a project led by the Institute for Marine and Antarctic Studies: *Establishing fine-scale industry based spatial management and harvest strategies for the commercial scallop fishery in South East Australia*.

### 2.3.3 Performance against economic objective

The HSP requires that harvest strategies pursue the economic objective of maximising NER. Negative NER in the BSCZSF in 2009–10 and 2010–11 suggest that this objective has not been met. Indications of low stock size and recent reported die-offs are likely to be influencing the economic performance of the fishery.
The HSP recommends that, to meet the economic objective, harvest strategies should be designed to achieve a target biomass level associated with maximum economic yield (B_{MEY}). The historical pattern of depletion in the fishery suggests that fishing may influence future stock levels. However, the uncertainty surrounding the connectivity with other stocks (Victoria and Tasmania) and the variable nature of scallop stocks imply that a biomass-based MEY target may not be appropriate.

The BSCZSF 2012 harvest strategy (AFMA 2012e) includes an objective to maximise the economic returns to the Australian community, but does not explicitly specify an MEY target, biomass based or otherwise. It asserts that having an active fishery each year is not an objective of the harvest strategy; however, ensuring ongoing viability of the fishery can be viewed in the context of the overarching economic objective of the HSP.

The development of an appropriate economic target for the BSCZSF harvest strategy, consistent with the intent of the HSP, remains a key issue for this fishery. As noted by Haddon (2011), it might be inappropriate to base such a target on biomass. However, any economic target would need to have an explicit link to the objective of maximising NER to the Australian community. A harvest strategy may also need to consider how TAC settings affect the economics of operating in the fishery and possible impacts on beach prices. Further management strategy evaluation using recent economic data (George et al. 2012) may provide insights into an appropriate economic target for the fishery. The implementation of an appropriate target should help the fishery improve its economic status.

2.4 Environmental status

The BSCZSF was accredited against Parts 10, 13 and 13A of the Environment Protection and Biodiversity Conservation Act 1999 in April 2013. The accreditation was accompanied by several recommendations, including that the observer program be reviewed; that the Australian Fisheries Management Authority (AFMA) ensure improvements to the monitoring and analysis of bycatch and byproduct; and that issues identified in a draft report examining stock structure of commercial scallop in Bass Strait be considered.

Haddon et al. (2006) suggested that the habitat impacts from scallop dredges are low at the scale of the fishery, since fishers target areas of soft sediment and high scallop abundance to optimise economic returns. The authors were unable to detect impacts on physical habitat from a scallop dredge using single-beam acoustic surveys between 2003 and 2004. They suggested that this may be due to the naturally dynamic habitat in the region, driven by large tidal currents and heavy seas, or that the level of fishing was below that required to adversely affect the habitat.

A Level 2 (Productivity Susceptibility Analysis) ecological risk assessment considered 142 species. Of these, the targeted scallops and 25 bycatch species were categorised as high risk (Hobday et al. 2007). The Residual Risk Assessment on the high-risk species, which takes into account the mitigating effect of management measures, suggested that four invertebrate species that are discarded may be at high risk: King Island crassatella (Eucrassatella kingicola), southern blue-ringed octopus (Hapalochlaena maculosa), pebble crab (Bellidilia undecimspinosa), and black and white seastar (Luidia australiae) (AFMA 2009). Twenty-eight habitats were also assessed, none of which were categorised as being at high risk (Hobday et al. 2007). The current management arrangements, along with only a restricted area of the fishery being open to fishing since 2009, limit potential impacts on habitat and bycatch species.

AFMA publishes quarterly reports of logbook interactions with threatened, endangered and protected species on its website. There were no reported interactions in the BSCZSF in 2012.
Chapter 2: Bass Strait Central Zone Scallop Fishery

2.5 Literature cited


———2012b, Draft minutes, 19th meeting of the Scallop Resource Assessment Group (ScallopRAG), 1–2 February, Hobart, AFMA, Canberra.

———2012c, Draft minutes, special meeting of the Scallop Management Advisory Committee (ScallopMAC) and Scallop Resource Assessment Group (ScallopRAG), 22 June 2012, Canberra, AFMA, Canberra.

———2012d, Meeting summary, teleconference of the Bass Strait Central Zone Scallop Resource Assessment Group (ScallopRAG), 6 July 2012, Canberra, AFMA, Canberra.


Chapter 2: Bass Strait Central Zone Scallop Fishery


Semmens, JM 2012, *2012 May/June BSCZSF surveys*, presentation to combined ScallopRAG–ScallopMAC meeting, Tasmanian Aquaculture and Fisheries Institute, Taroona, Tasmania.