Chapter 26
Heard Island and McDonald Islands Fishery

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FIGURE 26.1 Area of the Heard Island and McDonald Islands Fishery, 2012
26.1 Description of the fishery

The Australian external territory of Heard Island and McDonald Islands (HIMI) is in the southern Indian Ocean (Figure 26.1), within the area of competence of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). The islands and their surrounding territorial waters (out to 12 nautical miles [nm]) are a marine reserve closed to fishing and regulated under the Environment Protection and Management Ordinance 1987, administered by the Australian Antarctic Division (AAD) of the Australian Government Department of the Environment. An additional 1 nm buffer zone around the territorial waters of HIMI extends the area closed to fishing to 13 nm. Waters between 12 nm and 200 nm from HIMI are part of the Australian Fishing Zone (AFZ). The Heard Island and McDonald Islands Marine Reserve management plan 2005 (AAD 2005), made pursuant to the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), provides the management regime for the reserve.

Illegal, unreported and unregulated (IUU) fishing within the HIMI AFZ, almost exclusively targeting Patagonian toothfish (*Dissostichus eleginoides*), was a significant problem from the mid-1990s. However, following Australian surveillance and enforcement activities in the area (in cooperation with adjoining nations in the CCAMLR region, notably France), no IUU fishing vessels have been detected since 2004 inside the Australian Exclusive Economic Zone (EEZ) adjacent to HIMI or the French EEZ surrounding the Kerguelen Islands.

### Table 26.1 Status of the Heard Island and McDonald Islands Fishery

<table>
<thead>
<tr>
<th>Biological status</th>
<th>2011</th>
<th>2012</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mackerel icefish (<em>Champsococephalus gunnari</em>)</td>
<td>Fishing mortality</td>
<td>Biomass</td>
<td>Fishing mortality</td>
</tr>
<tr>
<td>Patagonian toothfish (<em>Dissostichus eleginoides</em>)</td>
<td>TACs are set in accordance with a precautionary harvest strategy. No commercial fishing was permitted in 2012.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic status</td>
<td>While not estimated, NER are likely to have been positive in 2010–11 and 2011–12 given that the TAC for Patagonian toothfish was mostly caught.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: NER Net economic returns. TAC Total allowable catch.

- Fishing mortality: Not subject to overfishing, Subject to overfishing, Uncertain
- Biomass: Not overfished, Overfished, Uncertain
The AAD, in collaboration with industry, regularly conducts fisheries-independent, random-stratified trawl surveys for both target species (mackerel icefish and Patagonian toothfish) to collect data on abundance. Harvest strategies for the target species are consistent with the precautionary approach of the CCAMLR and have been used to set catch limits since the mid-1990s. The harvest strategies developed for the HIMI Fishery (HIMIF) are considered more precautionary than the guidelines of the Commonwealth Fisheries Harvest Strategy Policy (DAFF 2007). The importance of the target species (especially mackerel icefish) as prey items in the subantarctic ecosystem is taken into account, and catch limits must be sufficiently precautionary to ensure that the abundance of these species meets the ecological needs of dependent species (e.g. seabirds and marine mammals). The fishery also has catch limits for bycatch species, such as deep-sea skates, unicorn icefish and grey rockcod. These are based on assessments of long-term annual yield, which were estimated using a generalised yield model in 1997 (Constable et al. 1998). The catch limit for grenadiers (Macrourus spp.), another bycatch species, is based on parameters determined from commercial and research data from the HIMIF. The catch limits are regularly reviewed by the CCAMLR and are considered precautionary. Mackerel icefish in the HIMIF was initially certified by the Marine Stewardship Council (MSC) in March 2006; the species was recertified in June 2011. Patagonian toothfish in the HIMIF was certified by the MSC in March 2012.

**TABLE 26.2 Main features and statistics for the HIMIF**

<table>
<thead>
<tr>
<th>Stock</th>
<th>2010–11 fishing season</th>
<th>2011–12 fishing season</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TAC (t)</td>
<td>Catch (t)</td>
</tr>
<tr>
<td><strong>Mackerel icefish</strong></td>
<td>78</td>
<td>1</td>
</tr>
<tr>
<td><strong>Patagonian toothfish</strong></td>
<td>2 550</td>
<td>2 564 b</td>
</tr>
</tbody>
</table>

**Fishery-level statistics**

<table>
<thead>
<tr>
<th>Effort</th>
<th>78 trawl days</th>
<th>3 854 000 hooks</th>
<th>17 161 pots hauled</th>
<th>111 trawl days</th>
<th>4 449 825 hooks</th>
<th>0 pots hauled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing permits</td>
<td>4 quota SFR holders</td>
<td>4 quota SFR holders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active vessels</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observer coverage</td>
<td>100% vessel coverage</td>
<td>100% vessel coverage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fishing methods</td>
<td>Demersal longline, demersal trawl, midwater trawl, pot (fish trap)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary landing ports</td>
<td>Port Louis (Mauritius), Albany</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management methods</td>
<td>Input controls: limited entry, gear restrictions, temporal and spatial closures</td>
<td>Output controls: TAC and ITQs</td>
<td>Other: move-on provisions if bycatch thresholds are reached</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary markets</td>
<td>International: United States, Japan, China, eastern Europe—frozen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management plan</td>
<td>Heard Island and McDonald Islands Fishery management plan 2002 (AFMA 2002; amended 2012)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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a Fishery statistics are provided by fishing season, unless otherwise indicated. Season is 1 December to 30 November. Real-value statistics are by financial year.  
b There is provision in the HIMIF management plan for overcatch; 14 t was deducted from the quota for the 2011–12 season.  
c Research TAC  
d As in note b, 4 t was deducted from the quota for the 2012–13 season to take into account the overcatch of the previous year.  
e All vessels carry two observers on each trip.  
Notes: ITQ Individual transferable quota. SFR Statutory fishing right. TAC Total allowable catch.
26.2 Biological status

26.2.1 Mackerel icefish

Stock assessment

A random stratified trawl survey around HIMI in March–May 2012 assessed the abundance and age structure of the mackerel icefish stock (Nowara & Lamb 2012). The abundance of icefish was found to be twice the long-term average and nine times that of the 2011 survey. Although few mackerel icefish survive beyond 4+ years, five successive age classes were present in the 2012 survey (1+ to 5+ years) (Welsford 2012). The population was dominated by a strong 2+ year-class. Using a new length–weight relationship derived from the 4890 icefish measured during the 2012 survey, the stock assessment estimated the current biomass at 3987 t. This is substantially higher than the 2011 estimate of 983 t (Welsford 2011). A yield of 679 t was calculated for the 2012–13 fishing season, in accordance with the CCAMLR harvest strategy, excluding the 4+ and 5+ year-classes, which will not be available for harvest in the 2012–13 fishing season. A yield for the 2013–14 fishing season was calculated at 573 t. However, since a survey is planned in 2013, the yield for 2013–14 will be re-estimated based on results from that survey. The catch in the 2011–12 fishing season was taken during the survey—there was a zero commercial total allowable catch (TAC) because of the limit reference point that was adopted in 2011 (Figure 26.2). The management of the fishery provides for a zero commercial TAC when the estimated biomass is below 1000 t or when the estimated TAC is less than 100 t. In 2011, the TAC was estimated to be 78 t and although the limit reference point had not yet been implemented, industry chose not to fish outside of the surveys.
**Figure 26.2** Catch and TAC of mackerel icefish in the HIMIF, 1971–72 to 2011–12

Notes: TAC Total allowable catch. Catches in the 1970s were not made under the current management regulations.

**Stock status determination**

Given the harvest rate relative to the stock biomass estimate, the robust nature of the assessment and the inclusion of fisheries-independent data the stock is determined to be **not overfished** and **not subject to overfishing**. The adoption of a measure to prevent fishing during years when the biomass is estimated to be low adds a level of precaution and will allow the biomass to build through the growth of the dominant year-class.
26.2.2 Patagonian toothfish

Stock assessment

The 2011 assessment update for Patagonian toothfish used the integrated assessment model CASAL (Candy & Welsford 2011) and similar parameters to the 2009 assessment (Candy & Welsford 2009). The assessment includes abundance estimates obtained from the survey, standardised catch-per-unit-effort and catch-at-age proportions, as well as other fishery and biological data inputs. The major change from the previous assessment was the use of a new estimate of natural mortality ($M_0$) of 0.155 instead of 0.13. The result of this change is a lower estimate of initial biomass ($B_0$) but an increase in estimated mean recruitment. The spawning stock biomass was estimated to be at 63 per cent of unfished levels. A long-term yield of 2730 t satisfies the CCAMLR decision rules. This is an increase of 180 t over the 2009 projections, as a result of the increased recruitment estimate. Given the stability of the estimates from the model, the CCAMLR has agreed to set the TAC for two years, rather than undertake annual assessments. As a result, the TAC was set at 2730 t for both the 2011–12 and 2012–13 fishing seasons, and the assessment will be updated every two years; the next survey will be undertaken in 2013. Catch in the 2010–11 fishing season was slightly above the TAC (Figure 26.3), and the overcatch (14 t) was deducted from the 2011–12 TAC, in accordance with the management plan.

FIGURE 26.3 Catch and TAC of Patagonian toothfish in the HIMIF, 1994–95 to 2011–12.

Notes: TAC Total allowable catch.
Stock status determination
Given the high spawning stock biomass, the precautionary TAC and the robust nature of the assessment (which includes fisheries-independent data), the stock is classified as **not overfished** and **not subject to overfishing**.

### 26.3 Economic status

#### 26.3.1 Key economic trends

The TAC for Patagonian toothfish has been fully caught in recent years, indicating that positive net economic returns (NER) are likely to have been generated for this species. Since Patagonian toothfish constituted, on average, more than 90 per cent of the fishery’s annual gross value of production over the past decade, this implies that NER are likely to be positive for the fishery as a whole. Mackerel icefish was not targeted in the 2010–11 and 2011–12 fishing seasons, with only a research TAC set in 2011–12.

Given the small number of operators in the fishery, it is likely that individual profit-maximising decisions are more aligned with optimum use of the resource than in a fishery with a large number of operators. With a small number of operators holding property rights in the fishery, holders of statutory fishing rights have an incentive to maintain the long-term productive capacity of the resource so as to maintain the market value of their quota entitlement.

#### 26.3.2 Management arrangements

A harvest strategy, consistent with the principles of the CCAMLR, is in place for this fishery. The primary management control uses individual transferable quotas (ITQs), in conjunction with input controls. The use of ITQs provides the best chance of achieving maximum efficiency, subject to a precautionary harvest strategy and strict operational constraints on vessels. Given the low levels of quota latency, positive NER are likely to be generated in the fishery in a manner that is consistent with the conservative ecological objectives.

### 26.4 Environmental status

The HIMIF is exempt from export controls under the EPBC Act until 9 May 2017. Recommendations associated with this exemption include continuing to investigate Patagonian toothfish in the wider Kerguelen area, building on the cooperative work that has been developed over the past several years, and ensuring that this cooperative work is taken into consideration for toothfish assessments and management actions. Australia continues to work with France on toothfish stocks on the Kerguelen Plateau. For example, in 2011, a joint population status assessment in both EEZs on the Kerguelen Plateau was presented to the CCAMLR (Candy et al. 2011), and a workplan for ongoing cooperative work to improve toothfish stock assessments was agreed.

There were three ecological risk assessments in the HIMIF by gear type (demersal trawl, midwater trawl and demersal longline). The Level 3 assessment for all gear types found that fishing mortality was generally low for all non-target fish species, and that no species was at high risk (Zhou et al. 2009). Ecological risk management for all gear types focuses on how the Australian Fisheries Management Authority (AFMA) will continue to monitor interactions with bycatch and protected species in a manner consistent with CCAMLR principles (AFMA 2009a, 2009b, 2009c).
AFMA publishes quarterly reports of logbook interactions with threatened, endangered and protected (TEP) species on its website. In the HIMI longline fishery in 2012, one southern giant petrel (*Macronectes giganteus*) collided with the mainline but survived, and two were hooked (one dead, one alive). One unclassified giant petrel was hooked and was observed to be dead. In addition, one cape petrel (*Daption capense*) flew into the hauling room but was alive, and a common diving petrel (*Pelecanoides urinatrix*) was noted to be dead after it collided with the vessel. Two southern elephant seals (*Mirounga leonina*) were hooked—one was released alive, but the other was wrapped in the line and found to be dead; another southern elephant seal became wrapped in the line but released itself. In the trawl fishery, 12 cape petrels, 2 black-browed albatrosses (*Thalassarche melanophris*) and 1 white-chinned petrel (*Procellaria aequinoctialis*) flew into the warp wires but were noted to be alive. A common diving petrel was found on the vessel covered in grime; it was cleaned and flew away.

## 26.5 Literature cited


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