Chapter 26
Macquarie Island Toothfish Fishery

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FIGURE 26.1 Area of the Macquarie Island Toothfish Fishery, 2016
Chapter 26: Macquarie Island Toothfish Fishery

TABLE 26.1 Status of the Macquarie Island Toothfish Fishery

<table>
<thead>
<tr>
<th>Biological status</th>
<th>2015</th>
<th>2016</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patagonian toothfish (Dissostichus eleginoides)</td>
<td>Fishing mortality</td>
<td>Biomass</td>
<td>Fishing mortality</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Economic status</th>
<th>2015</th>
<th>2016</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimates of NER are not available but are likely positive between 2013–14 and 2016–17 because the TAC for Patagonian toothfish was mostly caught. NER most likely fell in 2015–16 because difficult operating conditions led to lower catch, despite an increase in the TAC and effort in that year. NER likely increased in 2016–17 because catch per longline day was slightly higher than the previous season.</td>
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Notes: NER Net economic returns. TAC Total allowable catch.

Fishing mortality | Not subject to overfishing | Subject to overfishing | Uncertain |
Biomass | Not overfished | Overfished | Uncertain |

26.1 Description of the fishery

Area fished

Macquarie Island is a subantarctic island about 1,500 km south of Tasmania (Figure 26.1). The island is a nature reserve in the Tasmanian reserve system and is included on the World Heritage List (UNESCO 1998). The waters within 3 nautical miles (nm) of the island are under Tasmanian jurisdiction, while waters between 3 nm and the 200 nm outer boundary of the Australian Fishing Zone are managed by the Australian Government. The south-eastern quadrant of the Macquarie Island region out to 200 nm is a marine reserve (Figure 26.1). The Macquarie Island Toothfish Fishery (MITF) is outside the area covered by the Convention on the Conservation of Antarctic Marine Living Resources; however, the ecosystem-based management approach used by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) has been adopted for the fishery, including comprehensive observer coverage and precautionary harvest control rules.

Fishing methods and key species

Historically, trawling was the main fishing method used in the MITF. In 2011, longlining was added as an approved fishing method (AFMA 2010). This followed a longlining trial over four seasons (2007 to 2010) that demonstrated longlining as an effective method for targeting Patagonian toothfish (Dissostichus eleginoides) and showed that mitigation methods could be implemented to minimise seabird interactions with longline gear (AFMA 2010). Since the 2010–11 season, toothfish in the MITF have been solely taken using longline, with the exception of a trial of pots in the 2013–14 fishing season. Bycatch is generally low and is regulated by a 50 t limit for any one species. The bycatch, primarily grenadier (Macrourus spp.) and violet cod (Antimora rostrata), has never exceeded the 50 t limit for any one species in a season.
Management methods

The harvest strategy for Patagonian toothfish is consistent with the precautionary approach of the CCAMLR and is considered more precautionary than the guidelines of the Commonwealth Fisheries Harvest Strategy Policy (HSP; DAFF 2007). For Patagonian toothfish, the reference points dictate that median escapement of the spawning biomass at the end of a 35-year projection period is 50 per cent of median pre-exploitation level and that the probability of the spawning biomass dropping below 20 per cent of its pre-exploitation median level is less than 10 per cent over the projection. The total allowable catch (TAC) was previously set separately for the two main areas (Aurora Trough and Macquarie Ridge). However, based on scientific advice that it is highly likely that there is a single stock of Patagonian toothfish around Macquarie Island (see ‘Stock structure’, below), the management plan was amended in January 2012 to merge the two areas, and a single TAC is now set for the entire fishery. The MITF was recertified as sustainable by the Marine Stewardship Council in July 2017.

Fishing effort

The effort in the fishery has been consistent over time, with one or two vessels active in the fishery every year since the fishery began in 1994.

<table>
<thead>
<tr>
<th>TABLE 26.2 Main features and statistics for the MITF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fishery statistics a</strong></td>
</tr>
<tr>
<td><strong>Stock</strong></td>
</tr>
<tr>
<td>Patagonian toothfish</td>
</tr>
<tr>
<td><strong>Fishery-level statistics</strong></td>
</tr>
<tr>
<td>Effort (longline days)</td>
</tr>
<tr>
<td>Fishing permits</td>
</tr>
<tr>
<td>Active vessels</td>
</tr>
<tr>
<td>Observer coverage b</td>
</tr>
<tr>
<td><strong>Fishing methods</strong></td>
</tr>
<tr>
<td>Primary landing ports</td>
</tr>
<tr>
<td>Management methods</td>
</tr>
<tr>
<td>Primary markets</td>
</tr>
</tbody>
</table>

a Fishery statistics are provided by fishing season, unless otherwise indicated. The 2016–17 fishing season was 15 April 2016 to 14 April 2017.

Real-value statistics are provided by financial year. b 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

Patagonian toothfish (*Dissostichus eleginoides*)

Stock structure

The Patagonian toothfish stock at Macquarie Island is considered to be distinct from other regional toothfish populations in the Southern Ocean (Appleyard et al. 2002). Genetic studies (for example, Appleyard et al. 2002) and toothfish tagging programs (for example, Williams et al. 2002) indicate that a single stock exists in the MITF area.

Catch history

The catch of Patagonian toothfish in the MITF (Figure 26.2) has been variable over time and generally below, but close to, the TAC. Initial catches in the fishery were relatively high but decreased from 1999 to 2003, when the Aurora Trough was effectively closed to commercial fishing, and only a single vessel was permitted to fish to maintain the tagging program and conduct experimental acoustic surveys. Catch in the 2015–16 season was below the TAC as a result of a number of factors, including lost gear, and extreme weather and currents. In addition, fishers balanced their vessel time between the MITF and the Heard Island and McDonald Islands Fishery, where the TAC was substantially increased in 2015. Catch in the 2016–17 season was very near the TAC.

FIGURE 26.2 Catch and TAC of Patagonian toothfish in the MITF, 1994–95 to 2016–17

Note: TAC Total allowable catch.
Source: Australian Fisheries Management Authority
Stock assessment

In 2016, Stock Synthesis 3 software was used to assess the Patagonian toothfish stock (Day et al. 2016). This integrated two-area assessment fits to tag–recapture, length composition and age-at-length data. The assessment assumes a single stock in the MITF but with spatial structuring of fishing and movement between two areas (northern and southern), with recruitment to both areas. Using this assessment, 2016 female spawning biomass was estimated at 67 per cent of unfished levels ($SB_0$). Following the CCAMLR control rule (which uses a target of 50% $SB_0$ rather than 48% $SB_0$), a two-year TAC was calculated for the MITF for 2016–17 and 2017–18, which was robust to a wide array of catch distributions spread among the different fishing areas.

Stock status determination

The relatively high estimate of current female spawning biomass ($0.67SB_0$) and the robust nature of the assessment result in the stock being classified as not overfished. The conservative TAC-setting process, based on the application of precautionary CCAMLR control rules, and the maintenance of catch generally below the TAC result in the stock being classified as not subject to overfishing.

26.3 Economic status

Key economic trends

Latency can be variable in this fishery. In the 2014–15 fishing season, the TAC was fully caught with less effort than in the 2013–14 season. The TAC was not fully caught in 2015–16 (latency was 30 per cent), despite an increase in effort, indicating negative effects on catch from difficult operating conditions. Catch in 2016–17 returned to near TAC again as a result of improving conditions, indicating a rise in net economic returns from 2015–16. Catch per longline day remained within usual bounds at approximately 3.7 t in 2016–17 (3.5 t in 2015–16), although this compares with a catch per longline day of 6.0 t in 2014–15.

The estimated biomass of $0.67SB_0$ in 2016 is well above the targeted level of $0.50SB_0$. This high abundance is likely to result in lower fishing costs and improved profitability. Given that only one operator has fished in the MITF in recent years, it is also likely that individual profit-maximising decisions are aligned with optimum use of the resource, within the constraints of the fishery's precautionary objective.

Management arrangements

The harvest strategy for this fishery is conservative, reflecting the CCAMLR ecosystem-based management approach. Therefore, catch limits aim to maintain stock biomass at levels that are higher than recommended target reference points for other Commonwealth fisheries managed under the HSP.

Average vessel economic is likely to have improved since longlining was approved in 2011. The initial demersal longline trial in 2007 found a number of benefits of longline fishing compared with trawl fishing, including increased access to Patagonian toothfish in deeper waters and reduced levels of bycatch (AFMA 2010). These benefits are likely to have improved vessel-level productivity, moderating the negative effects of rough sea conditions experienced in recent years.
26.4 Environmental status

The MITF is included on the List of Exempt Native Specimens under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and has export approval until 9 October 2026. No additional recommendations apply under this exemption, beyond standard recommendations pertaining to reporting.

The ecological risk assessment process was completed to level 3 (Sustainability Assessment for Fishing Effects) for trawling and demersal longline for sharks and scalefish. No species was at high risk from trawling in the MITF (Zhou et al. 2009). The level 3 assessment for demersal longlining used data from 2007 to 2010 and is considered preliminary (Zhou & Fuller 2011). Two species—southern lantern shark (Etmopterus baxteri) and southern sleeper shark (Somniosus antarcticus)—had mean fishing mortality estimated to be slightly higher than the rates corresponding to the maximum number of fish that can be removed in the long term. However, the authors suggest that the level 3 assessment tends to be overly precautionary, and it is likely that the mortality rate was overestimated. This is supported by the low recorded catch for the two species (two southern lantern sharks and nine southern sleeper sharks) over the three years. Further analyses should take place as data become available. The MITF ecological risk management reports for trawling and demersal longline both outline how the Australian Fisheries Management Authority (AFMA) will continue to monitor bycatch, and interactions with protected species under the EPBC Act, in a manner consistent with CCAMLR principles (AFMA 2009, 2011).

All the catch in the MITF is now taken by longline. No seabird or marine mammal interactions were observed in the longline trial. AFMA publishes quarterly reports of logbook interactions with species protected under the EPBC Act on its website. In 2016, seven porbeagles (Lamna nasus) were hooked. Two were released alive and five were dead.
26.5 References


