

Chapter 27

Macquarie Island Toothfish Fishery

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FIGURE 27.1 Area of the Macquarie Island Toothfish Fishery, 2013

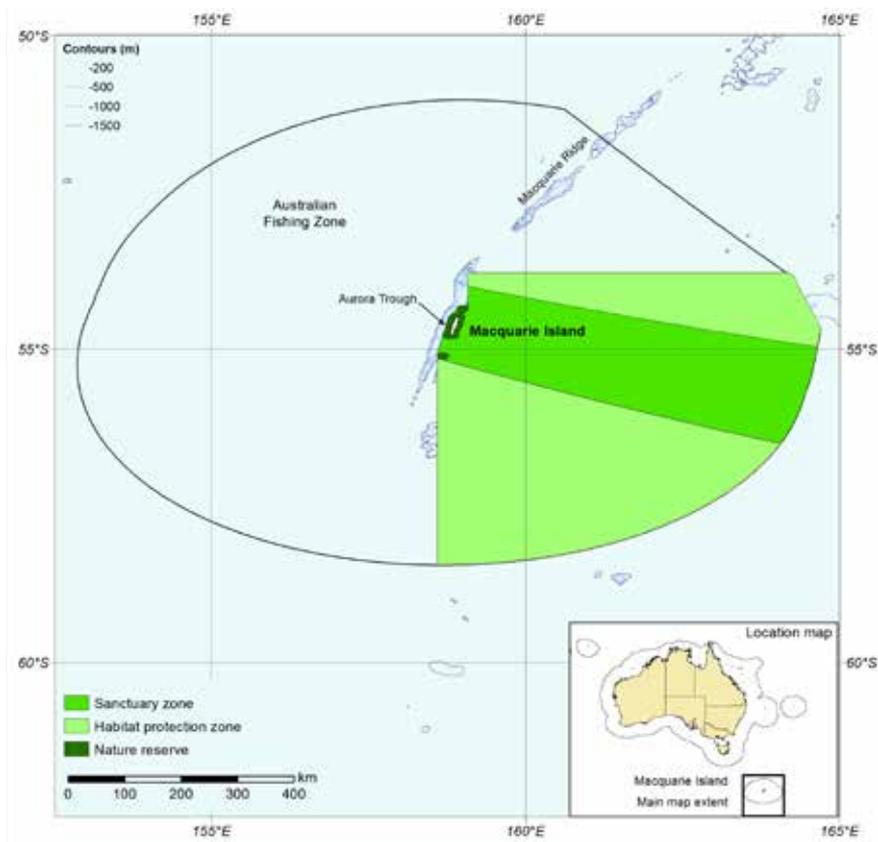


TABLE 27.1 Status of the Macquarie Island Toothfish Fishery

Status	2012		2013		Comments
	Fishing mortality	Biomass	Fishing mortality	Biomass	
Patagonian toothfish (<i>Dissostichus eleginoides</i>)					TACs are set in accordance with a precautionary harvest strategy. Most recent estimate of biomass is above the limit reference point.
Economic status	Estimates of NER are not available but were most likely positive in 2013–14 because the TAC for Patagonian toothfish was mostly caught.				

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

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

27.1 Description of the fishery

Area fished

Macquarie Island is a subantarctic island about 1500 km south of Tasmania (Figure 27.1). 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 27.1). The Macquarie Island Toothfish Fishery (MITF) is outside the area covered by the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR); however, the ecosystem-based management approach used by the 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. Byproduct is generally low and is regulated by a 50 t limit for any one species. The byproduct catch, primarily grenadier (*Macrourus carinatus*) 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). 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 there is a single stock of Patagonian toothfish around Macquarie Island (see 'Stock structure'), 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 certified as sustainable by the Marine Stewardship Council in May 2012.

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 27.2 Main features and statistics for the MITF

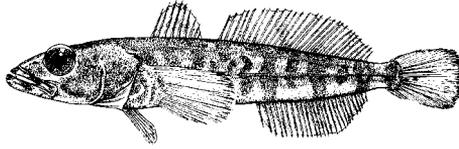
Fishery statistics a		2012–13 fishing season			2013–14 fishing season		
Stock	TAC (t)	Catch (t)	Real value (2011–12)	TAC (t)	Catch (t)	Real value (2012–13)	
Patagonian toothfish	455	332 b	Confidential	415	405	Confidential	
Fishery-level statistics							
Effort (longline days)	89			72			
Fishing permits	2 quota SFR holders			2 quota SFR holders			
Active vessels	1			1			
Observer coverage c	100% vessel coverage			100% vessel coverage			
Fishing methods	Demersal longline, demersal trawl						
Primary landing ports	New Zealand, Tasmania (Australia)						
Management methods	Input controls: limited entry, gear restrictions, closures Output controls: TACs, ITQs						
Primary markets	International: United States, Japan—frozen						
Management plan	Macquarie Island Toothfish Fishery Management Plan 2006 (amended 2012)						

a Fishery statistics are provided by fishing season, unless otherwise indicated. The 2013–14 fishing season was 1 May 2013 to 30 April 2014. Real-value statistics provided by financial year. b Operational problems in retrieving the gear were reported to have prevented the full TAC from being taken. c All vessels carry two observers on each trip.

Notes: ITQ Individual transferable quota. SFR Statutory fishing right. TAC Total allowable catch.

27.2 Biological status

Patagonian toothfish (*Dissostichus eleginoides*)



Line drawing: FAO

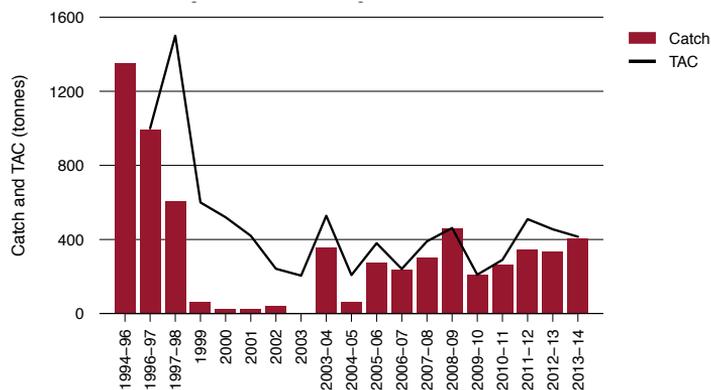
Stock structure

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, Wayte & Fay 2013; 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 27.2) has been variable over time and generally below, but close to, the TACs. 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.

FIGURE 27.2 Catch and TAC of Patagonian toothfish in the MITF, 1994–96 to 2013–14



Note: TAC Total allowable catch.

Stock assessment

In 2013, Stock Synthesis 3 software was used to assess the Patagonian toothfish stock (Wayte & Fay 2013). 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, the estimated current spawning biomass (2013) was 69 per cent of the unfished spawning biomass. A single TAC was calculated for the MITF under the CCAMLR control rule, 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 spawning biomass ($0.69SB_0$) 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 catch being below the TAC, result in the stock being classified as **not subject to overfishing**.

27.3 Economic status

Key economic trends

In recent years, rough sea conditions and operational issues have constrained operations in the MITF. The 33 per cent quota latency in the 2011–12 fishing season came mainly from the Macquarie Ridge area where fishers experienced rough operating conditions. Similarly, reported operational problems in retrieving gear resulted in 27 per cent of TAC remaining uncaught in the 2012–13 fishing season. Improved sea conditions in the 2013–14 fishing season allowed fishers to catch 98 per cent of the TAC. This suggests that profitability is likely to be positive for the fishery.

The estimated biomass of $0.69SB_0$ in 2012 is well above the targeted 50 per cent. Under more benign operating conditions, this higher abundance would be expected to result in higher catch rates and profitability. Sea conditions in 2011–12 and 2012–13 are likely to have reduced profitability, requiring additional fishing time and effort to meet the TAC and increasing the cost of fishing.

Given the small number of operators in the fishery, it is 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 performance is likely to have improved since longlining was approved in the Macquarie Ridge sector in 2011. The initial precautionary demersal longline trial in 2007 found a number of benefits, 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.

27.4 Environmental status

The MITF is included as a high-seas fishery under the List of Exempt Native Specimens under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) until 7 April 2016. There were no additional recommendations 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. 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 lanternshark (*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 threatened, endangered and 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 threatened, endangered and protected species under the EPBC Act on its website. No interactions with protected species were recorded for the 2013 calendar year or the 2013–14 fishing season.

27.5 Literature cited

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Processing toothfish
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