

Macquarie Island Toothfish Fishery



Main features

STATUS

- Patagonian toothfish: not overfished and not subject to overfishing in Aurora Trough or Macquarie Ridge.

CURRENT CATCH

- Aurora Trough 2006–07: total allowable catch (TAC) 241 t.
- Macquarie Ridge: TAC 86 t (increase to 228 t triggered if catch-rate thresholds are met and maintained).

MANAGEMENT METHODS

- Management consistent with principles and conservation measures adopted by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and the Commonwealth Fisheries Harvest Strategy Policy.
- A reference point requires the spawning stock biomass to be above 50% of the unfished state.
- Harvest strategy in place since the late 1990s.

Background

Macquarie Island is a sub-Antarctic island about 1500 km south of Tasmania. The island is a nature reserve in the Tasmanian reserve system and is listed on the World Heritage list. The waters within 3 nm are under Tasmanian jurisdiction, whereas the Australian Government manages waters between 3 nm and the 200 nm outer boundary of the Australian Fishing Zone (AFZ). In November 1999, the south-eastern quadrant of the Macquarie Island region out to 200 nm was declared a marine park under the *National Parks and Wildlife Conservation Act 1975*. All extractive industries, including fishing, are prohibited within a central segment of the quadrant.

Apart from historical whaling and sealing, there was little fishing in the Macquarie Island AFZ until 1994. A single-vessel, exploratory demersal-trawl fishery targeting Patagonian toothfish (*Dissostichus eleginoides*) began in 1994–95, followed by a developmental fishery from 1996–97. The fishery was established in the Aurora Trough for the first two seasons, but a second set of grounds on Macquarie Ridge was discovered in 1996–97. Large catches of toothfish were initially taken from a very large aggregation on Macquarie Ridge, but such aggregations have not been found since, despite continued searching.

The Aurora Trough was effectively closed to commercial fishing from 1999 to 2003. Fishing during the closure was limited to surveys by the single licensed trawler to maintain tag release and recapture work and undertake experimental acoustic surveys in conjunction with research vessels. Commercial trawling in the Aurora Trough resumed in 2003–04, taking the 354 t TAC.

In the 2006–07 season, the licensed trawler fished in March and early April 2007, more than a month later than in previous seasons, and caught 237 t of the 241 t TAC in the Aurora Trough. It also tagged 482 toothfish and recaptured 108 (including tagged fish released in most seasons since 1996–97). The

mean weight of sampled fish continued to trend lower than in the previous two seasons (4.5 kg and 3.9 kg) to 2.5 kg. No trawling took place on the Macquarie Ridge grounds in 2006–07.

A longline trial began in August 2007, primarily on the Macquarie Ridge grounds. The vessel was to cover as much ground as possible and focus on areas not accessible to trawling. One longline-set was made in the Aurora Trough for comparison with trawling results. The longliner caught 79 t of the 86 t TAC and recovered two previously tagged toothfish, and released an additional 216 tagged toothfish.

The Sub-Antarctic Resource Assessment Group advises on the status of Patagonian toothfish and on other matters relevant to commercial fishing around Macquarie Island. The toothfish assessment is based on data from a continuing tag–recapture study initiated during the 1995–96 season. The assessment uses a model that includes the dynamics of tagged and untagged fish, daily tag releases, tag recaptures, total commercial catches, an estimate of natural mortality, and an estimate of the annual net recruitment from 1996 to 2006. The stock assessment is sensitivity-tested across a range of natural mortalities. There are separate assessments for the main fishing regions of Macquarie Island: Aurora Trough and Macquarie Ridge (outside Aurora Trough). The model will need to be reviewed in future years to include longlining activities and accommodate other variances identified in the 2006–07 fishing season.

A decision rule determines whether a commercial TAC will exist for Aurora Trough; if the rule is satisfied, a second rule determines the amount of the TAC. To meet the first rule, the estimated available biomass of toothfish must be greater than 66.5% (the reference limit) of the July 1995 available biomass (the reference biomass). The annual TAC is 10% of the current estimate of available biomass. Together, these rules are expected to allow at least 50% of the

spawning biomass to escape capture, consistent with the principle established by CCAMLR for toothfish.

The assessments indicate that toothfish biomass in Aurora Trough declined between 1994–95 and 1998–99, and then tended to increase until 2003–04. There appears to have been significant recruitment to the fishery in recent years, either through in situ reproduction and growth or through immigration. In the most recent assessment for Aurora Trough, the pretagging (1995–96) biomass estimate of 3390 t compares with an estimate at the end of the 2006–07 season of 7760 t. This is significantly higher than in previous years and is likely to result from a combination of an increase in the toothfish population through recruitment of smaller fish, changes to the assessment model, changes to the timing of fishing (one month later), and variability in recapture of tagged fish. The apparent increase would have led to a 776 t TAC for 2007–08; however, uncertainties about the toothfish assessment resulted in a more conservative TAC of 380 t.

For the Macquarie Ridge, the decision rule is essentially to set the TAC at 10% of the current estimate of available biomass, but with two scenarios for toothfish availability: that only ‘resident’ fish are available at a relatively low abundance; or that ‘transient’ fish are also available at a relatively high abundance (as was observed during the 1997 season). Each scenario has an associated TAC, set at 10% of the current best estimate of biomass available to the trawl fishery. The higher TAC is triggered if catch rates reach a threshold of an average 10 t/km² over three consecutive fishing days. Similarly, if the catch rates fall below 10 t/km² over three consecutive days, the TAC reverts to the lower TAC; the fishery ceases for the season if the lower TAC is exceeded.

There has been no significant Macquarie Ridge catch since 1997, when the large aggregation was found. No catch in 2006–07, and low tag returns in previous seasons, have meant that reliable biomass estimates have

not been possible. A conservative approach, assuming no recruitment and deducting one year’s fishing and natural mortality from the previous season’s estimate, has been used. The resulting 2007–08 TAC is 86 t, with a 228 t trigger TAC if catch-rate thresholds are met.

Macquarie Island has not been subject to the intensive illegal-fishing pressure experienced in the Heard Island and McDonald Islands region.

Two observers have been present on all voyages since 1997–98. No seabird or marine mammal interactions have been observed in the trawl sector between 2003 and 2007. No wildlife interactions were reported during the longline trial conducted in 2007. The bycatch of non-target species is approximately 11% of the catch by weight.

The Macquarie Island Toothfish Fishery has been approved as a Wildlife Trade Operation until 2010 under the *Environment Protection and Biodiversity Conservation Act 1999*.

Further reading

Pribac, F, Tuck, GN & Lamb, T 2006, *Abundance estimation and TAC setting for the Patagonian toothfish (Dissostichus eleginoides) at Macquarie Island: 2006*, Australian Antarctic Division report to the Sub-Antarctic Resource Assessment Group.