

Patagonian Toothfish (2023)

Dissostichus eleginoides



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Commonwealth	Heard Island and McDonald Islands	Sustainable	Spawning stock biomass, projected biomass
Commonwealth	Macquarie Island	Sustainable	Spawning stock biomass, projected biomass

STOCK STRUCTURE

Genetic studies have found that Patagonian Toothfish at Macquarie Island, and at Heard Island and the McDonald Islands, are two distinct biological stocks [Appleyard et al. 2002]. However, tagging and other data indicate that there is some level of exchange between the Heard Island and McDonald Islands stock and the Kerguelen Plateau stock [CCAMLR 2023]. The stock structure of toothfish on the Kerguelen Plateau is being further investigated in collaboration with French scientists so that population models of toothfish in the area can be refined and management can be improved across the Kerguelen Plateau [Péron et al. 2016; Ziegler 2021].

Here, assessment of stock status is presented at the management unit level—Heard Island and McDonald Islands; and at the biological stock level—Macquarie Island.

STOCK STATUS

Heard Island and McDonald Islands

The Heard Island and McDonald Islands Fishery (Commonwealth) (HIMIF) falls within the Convention Area of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). This international organisation was established to conserve and manage the Southern Ocean Antarctic ecosystem. CCAMLR employs precautionary harvest strategies that consider the role of target species within the larger ecosystem. For Patagonian Toothfish, the CCAMLR harvest strategy reference points require that the median escapement

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of the spawning biomass at the end of a 35-year projection period be 50% of median pre-exploitation level and that the probability of the spawning biomass dropping below 20% of the pre-exploitation median level is less than 10%. Although the HIMIF falls within the CCAMLR area, the HIMIF is an Australian territory and is fished by Australian vessels only.

The most recent assessment of HIMIF Patagonian Toothfish estimated that biomass in 2021 was 45% of pre-exploitation levels [Ziegler 2021; CCAMLR 2021a]. The management unit is not considered to be recruitment impaired. A catch limit of 3,010 tonnes (t), which meets the CCAMLR harvest strategy requirements, was recommended by CCAMLR for the 2021–22 and 2022–23 fishing seasons [CCAMLR 2021a, b]. After considering the catch limit adopted by CCAMLR, the time projected to reach the target level and a planned review of the CCAMLR decision rule, the Australian Fisheries Management Authority set the 2021–22 TAC at 2,760 t. The TAC in the 2020–21 fishing season was 3,030 t, with a catch of 3,019 t [Patterson and Tuynman 2022a]. This level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

Based on the evidence provided above, the Heard Island and McDonald Islands management unit is classified as a **sustainable stock**.

Macquarie Island

Macquarie Island is an Australian territory that lies adjacent to, but not within, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) area. Although not under CCAMLR jurisdiction, for consistency the Macquarie Island Toothfish Fishery (Commonwealth) is managed using the CCAMLR harvest strategy with the same decision rules used in the Heard Island and McDonald Islands Fishery (Commonwealth).

The most recent assessment of Macquarie Island Patagonian Toothfish, using a custom-designed model, estimated the 2020 female biomass at 85% of pre-exploitation levels [Hillary and Day 2021]. The biological stock is not considered to be recruitment impaired. The CCAMLR decision rules were used to calculate a catch limit of 635 t for the 2022–23 and 2023–24 fishing seasons. This ensures that the projected biomass is not below 50% after a 35-year projection period under that catch limit. The TAC for the 2020–21 fishing season was 555 t, with a catch of 539 t [Patterson and Tuynman 2022b]. This level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

Based on the evidence provided above, the Macquarie Island biological stock is classified as a **sustainable stock**.

BIOLOGY

Patagonian Toothfish biology [Collins et al. 2010; Welsford et al 2012]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Patagonian Toothfish	50 years, 2,000 mm TL	11–15 years (males), 12–17 years (females), 915 mm TL (males), 1,000+ mm TL (females)

DISTRIBUTION



Distribution of reported commercial catch of Patagonian Toothfish

TABLES

Fishing methods	Commonwealth
Commercial	
Demersal Longline	✓
Otter Trawl	✓

Management Methods	Commonwealth
Commercial	
Area restrictions	✓
Catch limits	✓
Individual transferable quota	✓

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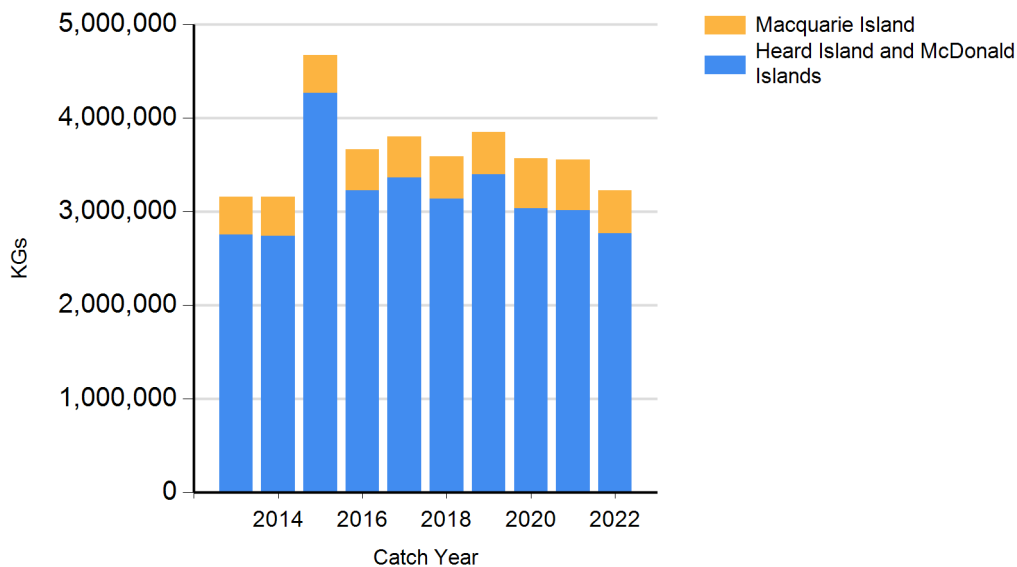
Catch	
	Commonwealth
Commercial	3228.28 t

Commonwealth – Recreational. There is no recreational fishing for Patagonian Toothfish. The Australian Government does not manage recreational fishing in Commonwealth waters. Recreational fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters, under its management regulations.

Commonwealth – Commercial (Catch). The most recent data available for the Heard Island and McDonalds Islands Fishery (HIMIF) are for the 2021–22 fishing season. The most recent data available for the Macquarie Island Toothfish Fishery (MITF) are for the 2021–22 fishing season.

Commonwealth – Indigenous. There is no Indigenous fishing for Patagonian Toothfish. The Australian Government does not manage non-commercial Indigenous fishing in Commonwealth waters, with the exception of the Torres Strait. In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters.

CATCH CHART



Commercial catch of Patagonian Toothfish - note confidential catch not shown

References	
Appleyard et al. 2002	Appleyard, SA, Ward, RD and Williams, R 2002, Population structure of Patagonian Toothfish around Heard, McDonald and Macquarie Islands, Antarctic Science, 14: 364–373.

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Welsford et al 2012	Welsford, DC, McIvor, J, Candy, SG and Nowara, GB 2012, The spawning dynamics of Patagonian toothfish in the Australian EEZ at Heard Island and the McDonald Islands and their importance to spawning activity across the Kerguelen Plateau, FRDC Project TRF 2010/064, Canberra.
Ziegler 2021	Ziegler, P 2021, Draft integrated stock assessment for the Heard Island and McDonald Islands Patagonian toothfish (<i>Dissostichus eleginoides</i>) fishery in Division 58.5.2, WG-FSA-2021/21, CCAMLR Working Group on Fish Stock Assessment, Hobart, 13–20 September 2021.
CCAMLR 2021a	Commission for the Conservation of Antarctic Marine Living Resources 2021a, Report of the Working Group on Fish Stock Assessment, WG-FSA-21, CCAMLR Working Group on Fish Stock Assessment, Hobart, 13–20 September 2021.
Patterson and Tuynman 2022a	Patterson, H and Tuynman, H 2022, Heard Island and McDonald Islands Fishery, in Patterson, H, Bromhead, D, Galeano, D, Larcombe, J, Timmiss, T, Woodhams, J and Curtotti, R (eds), Fishery status reports 2022, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.
CCAMLR 2021b	Commission for the Conservation of Antarctic Marine Living resources 2021b, Report of the fortieth meeting of the Scientific Committee, SC-CAMLR-40, CCAMLR Scientific Committee, Hobart, 11–16 October 2021.
Hillary and Day 2021	Hillary, R & Day, J 2021, Integrated stock assessment for Macquarie Island toothfish using data up to and including 2020, CSIRO Oceans and Atmosphere, Hobart.
Patterson and Tuynman 2022b	Patterson, H and Tuynman, H 2022b, Macquarie Island Toothfish Fishery, in Patterson, H, Bromhead, D, Galeano, D, Larcombe, J, Timmiss, T, Woodhams, J and Curtotti, R (eds), Fishery status reports 2022, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra.
Collins et al. 2010	Collins, MA, Brickle, P, Brown, J and Belchier, M 2010, Chapter Four – The Patagonian toothfish: Biology, Ecology and Fishery, <i>Advances in Marine Science</i> , 58: 227–300.
Péron et al. 2016	Péron, C, Welsford, DC, Ziegler, P, Lamb, TD, Gasco, N, Chazeau, C and Duhamel, G 2016, Modelling spatial distribution of Patagonian toothfish through life-stages and sex and its implication for the fishery on the Kerguelen Plateau, <i>Progress in Oceanography</i> , 141: 81–95.
CCAMLR 2023	Commission for the Conservation of Antarctic Marine Living Resources 2023, Stock annex 2022: <i>Dissostichus eleginoides</i> at Heard Island (Division 58.5.2), Hobart.