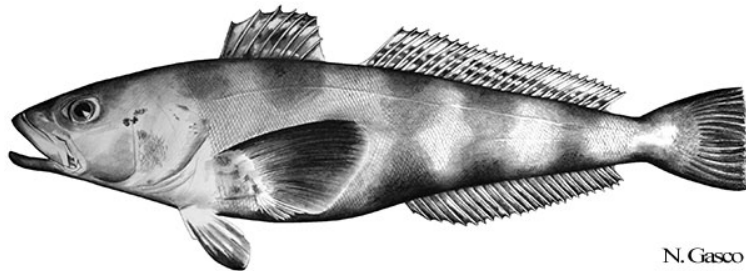


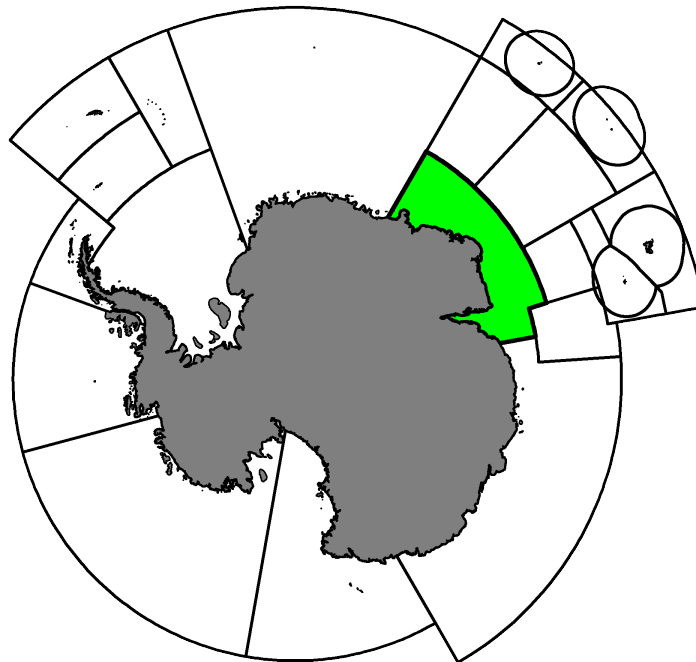
Fishery Report 2020: *Dissostichus mawsoni* in Division 58.4.2

CCAMLR Secretariat

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Antarctic Toothfish, *Dissostichus mawsoni* Norman, 1937.



Map of the management areas within the CAMLR Convention Area. Division 58.4.2, the region discussed in this report is shaded in green. Throughout this report, “2020” refers to the 2019/20 CCAMLR fishing season (from 1 December 2019 to 30 November 2020).

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1. Introduction to the fishery

1.1. History

This report describes the exploratory longline fishery for Antarctic toothfish (*Dissostichus mawsoni*) in Division 58.4.2. This fishery was first agreed by the Commission in 2000 and started as a trawl fishery for spiny icefish (*Chaenodraco wilsoni*), striped-eye rockcod (*Lepidonotothen kempfi*), Antarctic rockcod (*Trematomus eulepidotus*) and Antarctic silverfish (*Pleuragramma antarctica*) and an exploratory trawl fishery for toothfish (*Dissostichus* spp.) (Conservation Measure [186/XVIII](#)). In 2001 and 2002, the exploratory trawl fishery was also permitted in association with a new fishery for grenadier (*Macrourus* spp.). In 2003, the fishery for *Dissostichus* spp. in Division 58.4.2 changed to an exploratory longline fishery and since 2004 has targeted primarily *D. mawsoni*. Prior to 2017, this fishery was classified as an exploratory fishery for *Dissostichus* spp., however, in order to better align the target species with the assessment process the target species was specified as *D. mawsoni*, with any Patagonian toothfish (*D. eleginoides*) caught counting towards the catch limit for *D. mawsoni*.

1.2. Conservation Measures currently in force

The current limits on the exploratory fishery for *D. mawsoni* in Division 58.4.2 are described in Conservation Measure [41-05](#).

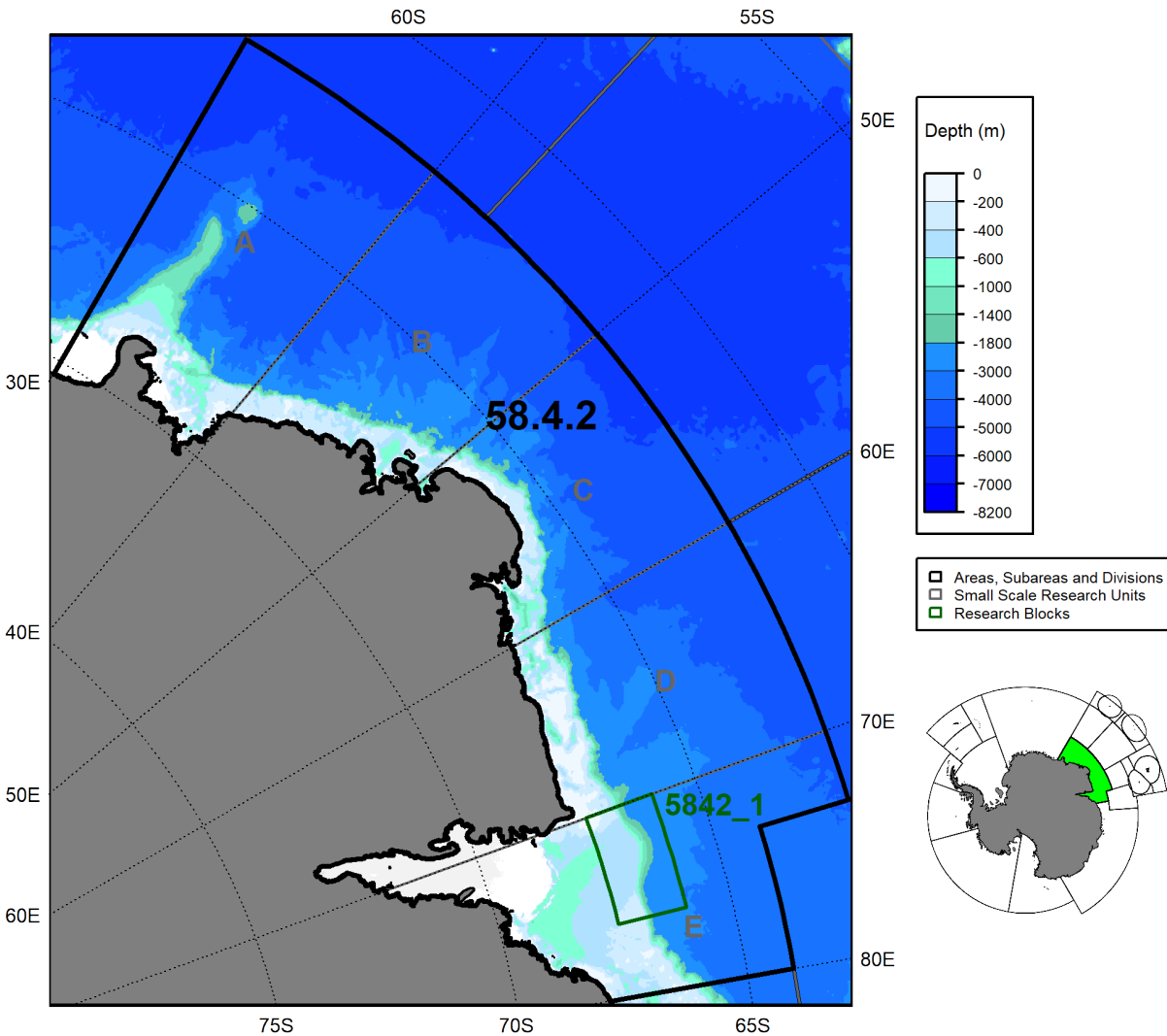


Figure 1: Location of Small Scale Research Units and Research Block in Division 58.4.2. The fishable depth range (600m-1800m) is highlighted in shades of green.

1.3. Active vessels

In 2020, 2 vessels participated in this fishery. For the 2021 fishing season, a total of 3 vessels notified their intention to participate in this fishery (2 from Australia; 1 from Japan).

1.4. Timeline of spatial management

In 2014, a Research Block (Fig. 1) was designated in Division 58.4.2 and catch limits applied. This Research Block was designed to ensure that research fishing occurred in those areas with a high probability of

recapturing tagged fish; fishing in this division is restricted to the Research Block only. Further details on research in this division are given in section 5.

2. Reported catch

2.1. Latest reports and limits

Reported catches of *Dissostichus* spp. are shown in Table 1. In this fishery, the catch of *D. mawsoni* reached a maximum of 216 tonnes in 2008. In 2020, 0 tonnes of *D. eleginoides* and 58 tonnes of *D. mawsoni* were caught.

The catches reported in Division 58.4.2 include catch data from particular vessels that CCAMLR has agreed should be quarantined as there is no confidence in the amount and/or the location of those catches (SC-CAMLR-XXXIII, paragraph 3.68). All ancillary data associated with these vessels (*e.g.* by catch, tagging, observer data) is also quarantined and is not included in the data presented in this report.

Table 1. Catch (tonnes) and effort history for *Dissostichus* spp. in this fishery. Source: Fine scale data and past estimates for IUU catch (-: no IUU estimate available; q: catch data currently quarantined).

Season	Number of vessels	Catch limit (tonnes)	<i>D. eleginoides</i>	<i>D. mawsoni</i>	Estimated IUU catch (tonnes)
2003	1		0	112	-
2004	1	500	0	20	197
2005	4	780	1	125	86
2006	3	780	0	164	192
2007	3	780	0	124	288
2008	3	780	0	216	0
2009	2	70	0	19 (q: 47)	176
2010	1	70		0 (q: 93)	432
2011	1	70		0 (q: 136)	-
2012	2	70	0	53	-
2013	1	70	0	4	-
2015	1	35		10	-
2017	2	35		35	-
2018	2	42	0	42	-
2019	2	50	0	50	-
2020	2	60	0	58	-

Table 2: Catch and catch limits by Research Block in 2020 for *Dissostichus mawsoni* in Division 58.4.2. Source: Fine scale data.

Research Block	Catch limit	Catch (% of catch limit)
5842_1	60	58 (96.7%)

2.2. By-catch

Catch limits for by-catch species groups (macrourids, skates (Rajids) and other species) are defined in Conservation Measure [33-03](#) and provided in Table 3.

The by-catch in Division 58.4.2 consists predominantly of macrourids (Table 3).

Table 3. Reported catch and catch limits for by-catch species (*Macrourus* spp., Rajids and others) in this fishery (see Conservation Measure 33-03 for details). Source: fine-scale data.

Season	<i>Macrourus</i> spp.		Rajids			Other catch	
	Catch Limit (tonnes)	Reported Catch (tonnes)	Catch Limit (tonnes)	Reported Catch (tonnes)	Number Released	Catch Limit (tonnes)	Reported Catch (tonnes)
2003	0	12	0	<1	0	0	<1
2004	80	<1	50	<1	0	100	<1
2005	124	19	50	3	3	60	2
2006	124	4	50	<1	0	60	<1
2007	124	7	50	<1	0	60	<1
2008	124	12	50	<1	0	60	<1
2009	20	<1 q	50	0	0	40	<1 q
2010	20	<1 q	50	<1	7	40	<1 q
2011	20	<1 q	50	0	0	40	<1 q
2012	20	<1	50	0	0	40	<1
2013	20	<1	50	0	0	20	<1
2015	20	<1	50	0	0	20	<1
2017	6	1	2	0	0	6	<1
2018	7	5	2	<1	1	7	<1
2019	8	2	3	<1	2	8	<1
2020	10	2	3	<1	3	10	<1

2.3. Vulnerable marine ecosystems (VMEs)

All Members are required to submit, within their general new (Conservation Measure 21-01) and exploratory (Conservation Measure 21-02) fisheries notifications requirements, information on the known and anticipated impacts of their gear on vulnerable marine ecosystems (VMEs), including benthic communities and benthos such as seamounts, hydrothermal vents and cold-water corals. All of the VMEs in CCAMLR’s VME Registry are currently afforded protection through specific area closures.

There are no VMEs or VME Risk Areas designated in Division 58.4.2.

2.4. Incidental mortality of seabirds and marine mammals

There has been no observed incidental mortality of birds reported by vessels in Division 58.4.2 in this fishery.

There has been no observed incidental mortality of mammals reported by vessels in Division 58.4.2 in this fishery.

The requirements of Conservation Measure 25-02, including the ‘Minimisation of the incidental mortality of seabirds in the course of longline fishing or longline fishing research in the Convention Area’ apply to this fishery. There is an exemption to the requirement for night setting by achieving the sink rates described in Conservation Measure 24-02 and subject to a bird by-catch limit.

The risk level for birds in the fishery in Division 58.4.1 is category 2 (average to low) (SC-CAMLR-XXX, Annex 8, paragraph 8.1).

3. Illegal, Unreported and Unregulated (IUU) fishing

Two illegal, unreported and unregulated (IUU)-listed vessels were detected in Division 58.4.2 in 2006 and 2007. One IUU-listed fishing vessel was sighted in 2009 and two IUU-listed vessels were sighted in 2010. IUU fishing activities were not detected again until 2015. However, IUU fishing activities may still have occurred in the region between 2010 and 2014, but may not have been detected. However, since 2011, following the recognition of methodological issues in its assessment, no estimates of the IUU catch of *Dissostichus* spp. have been provided (SC-CAMLR-XXIX, paragraph 6.5).

4. Data collection

4.1. Data collection requirements

The collection of biological data under Conservation Measure 23-05 as part of the CCAMLR Scheme of International Scientific Observation (SISO) includes representative samples of length, weight, sex and maturity stage, as well as collection of otoliths for age determination of the target and most frequently taken by-catch species.

4.2. Length frequency distributions

The length frequency distributions of *D. mawsoni* caught in this fishery are shown in Figure 2. These length frequency distributions are unweighted; they have not been adjusted for factors such as the size of the catches from which they were collected. The interannual variability exhibited in the figure may reflect changes in the fished population but is also likely to reflect changes in the gear used, the number of vessels in the fishery and the spatial and temporal distributions of fishing.

The majority of *D. mawsoni* caught in the Division 58.4.2 fishery ranged from 50 to 175cm in length, with a relatively consistent broad mode at approximately 140cm (Fig. 2). In some years, a distinct bimodal distribution is observed and is likely to be as a result of vessels fishing in shallower water on the shelf.

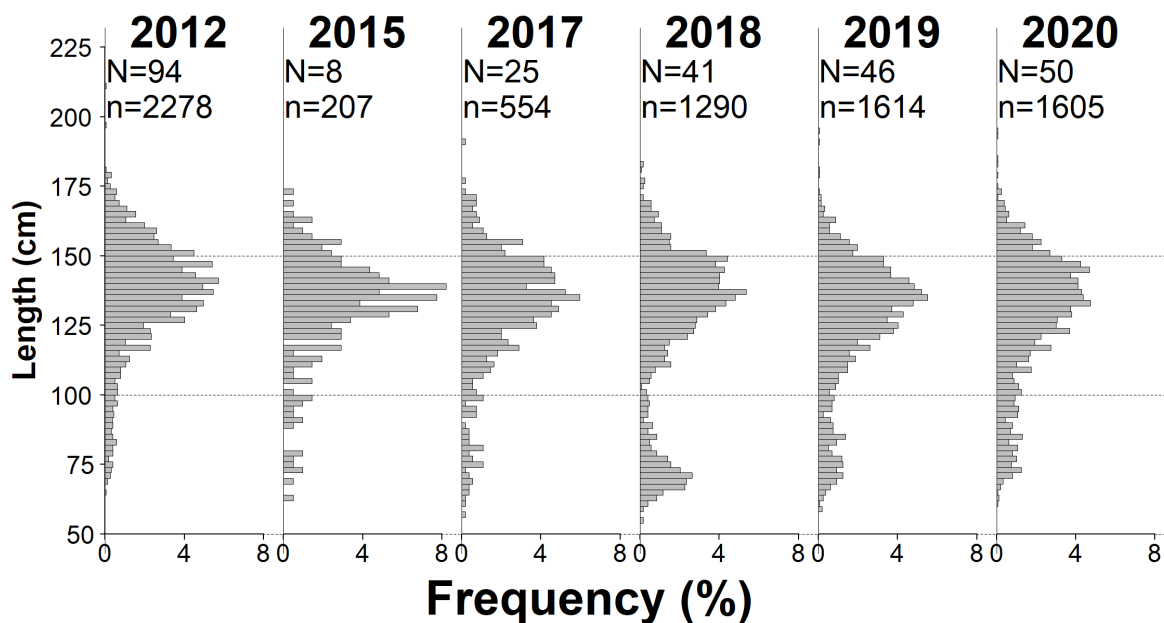


Figure 2. Annual length frequency distributions of *Dissostichus mawsoni* caught in Division 58.4.2. The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are indicated. Note: length frequency distributions are only shown where more than 150 fish were measured.

4.3. Tagging

Since 2012, vessels have been required to tag and release *Dissostichus* spp. at a rate of 5 fish per tonne of green weight caught. The tag-overlap statistic estimates the representative similarity between the size distributions of those fish that are tagged by a vessel and of all the fish that are caught by that vessel (Table 4). Each vessel catching more than 10 tonnes of each species of *Dissostichus* is required to achieve a minimum tag-overlap statistic of 60% (Annex 41-01/C).

Table 4. Annual tagging rate (number of fish tagged per tonne of total catch), reported by vessels operating in this exploratory fishery. The tag-overlap statistics (CM 41-01) for *D. mawsoni* and *D. eleginoides* respectively are provided in brackets (NC: Tag-overlap statistic is Not Calculated for less than 30 fish tagged; -: no fish were tagged).

Flag State	Vessel name	Fishing Season						
		2012	2013	2015	2017	2018	2019	2020
Australia	Antarctic Chieftain				5.1 (77.2,NC)	5.1 (93.1,NC)	5.6 (83.3,NC)	
France	Le Saint Andre			5.2 (88.4,-)		6 (83.2,-)	5.3 (72.9,-)	5.6 (87.4,-)
Japan	Shinsei Maru No. 3		5.7 (NC,NC)					
Republic of Korea	Hong Jin No. 701	5 (77.4,-)						
Republic of Korea	Kingstar			8.5 (86.3,-)	5.5 (81.8,-)			
South Africa	Koryo Maru No. 11	5.2 (52.9,NC)						

To date in this area, 3701 *D. mawsoni* have been tagged and released (12 have been recaptured; Table 5), and, 39 *D. eleginoides* have been tagged and released (0 have been recaptured; Table 6).

Table 5. Number of *D. mawsoni* tagged in recent fishing Seasons. The number of fish recaptured by each vessel in each Season is provided in brackets.

Flag State	Vessel name	Fishing Season						
		2012	2013	2015	2017	2018	2019	2020
Australia	Antarctic Chieftain					140 (0)	170 (0)	222 (3)
France	Le Saint Andre				76 (0)	85 (0)	88 (5)	100 (2)
Japan	Shinsei Maru No. 3		20 (0)					
Republic of Korea	Hong Jin No. 701	203 (0)						
Republic of Korea	Kingstar			82 (0)	110 (0)			
South Africa	Koryo Maru No. 11	63 (0)						
	Total	266 (0)	20 (0)	82 (0)	186 (0)	225 (0)	258 (5)	322 (5)

Table 6. Number of *D. eleginoides* tagged in recent fishing Seasons. The number of fish recaptured by each vessel in each Season is provided in brackets.

Flag State	Vessel name	Fishing Season						
		2012	2013	2015	2017	2018	2019	2020
Australia	Antarctic Chieftain					1 (0)	0 (0)	1 (0)
France	Le Saint Andre				0 (0)	0 (0)	0 (0)	0 (0)
Japan	Shinsei Maru No. 3		1 (0)					
Republic of Korea	Hong Jin No. 701	0 (0)						
Republic of Korea	Kingstar			0 (0)	0 (0)			
South Africa	Koryo Maru No. 11	3 (0)						
	Total	3 (0)	1 (0)	0 (0)	0 (0)	1 (0)	0 (0)	1 (0)

5. Research

5.1. Status of the science

Catch limits for CCAMLR's fisheries for *D. mawsoni* and *D. eleginoides* for the 'assessed' fisheries are set using fully integrated assessments; more basic approaches are used for the 'data-poor' fisheries (in Subarea 48.6 and in Area 58 outside the exclusive economic zones (EEZs)). CCAMLR has developed a framework for designing and undertaking research fishing designed to lead to an assessment of these toothfish stocks in the short to medium term, established under the provisions of Conservation Measure 41-01. This research planning framework has three phases: prospecting phase, biomass estimation phase and assessment development phase, with a set of decisions and review for the progression between stages.

In order to obtain the data necessary for a stock assessment, catch limits for research fishing by commercial vessels are set at a level intended to provide sufficient information (including sufficient recaptures of tagged fish) to achieve a stock assessment within a time period of 3 to 5 years. These catch limits are also set so that they provide reasonable certainty that exploitation rates at the scale of the stock or research unit will not negatively impact the stock. Appropriate exploitation rates are based on estimates from areas with assessed fisheries and are not more than 3-4% of the estimated stock size.

Spanish and Australian scientists are working on the age and growth estimates of Antarctic toothfish within divisions 58.4.1 and 58.4.2 from 2015 and 2017 respectively. During 2019, Korean scientists have joined this collaborative work (WG-FSA-19/47).

In 2018, an initial stock assessment model was developed for Antarctic toothfish in Divisions 58.4.1 and 58.4.2 (WG-FSA-18/58 rev1) but deemed to be unsuitable to provide management advice on catch limits.

5.2. Research plans

5.2.1. Background Exploratory fishing for toothfish (*Dissostichus* spp.) in Division 58.4.2 began in 2003. However, a robust stock assessment and catch limits according to CCAMLR decision rules remain to be determined for this Division. Accordingly, the current exploratory Antarctic toothfish (*Dissostichus mawsoni*) fishery in this Division has been identified as 'data-poor'. In 2014, a Research Block was designated in this Division. Research plans are generally focussed in Research Block, to facilitate the development of local biomass estimates. All Members notifying to fish in Division 58.4.2 submitted a research plan, based on Conservation Measure 24-01, Annex 24-01/A, format 2.

In 2019, Australia, France, Japan, the Republic of Korea and Spain collaborated on a multi-member research plan on the *Dissostichus mawsoni* exploratory fishery in East Antarctica (Divisions 58.4.1 and 58.4.2) (WG-FSA-19/44).

5.2.2. Objectives Standardised longline surveys, in conjunction with fish tagging, biological measurements, ageing and genetic approaches will be used to develop stock assessments and inform the necessary considerations of spatial structure, biomass and connectivity of toothfish populations in this area. Environmental data from conductivity, temperature and depth (CTD) loggers, benthic video cameras (BVC) and archival tags will contribute to models of toothfish habitat use. These models will inform spatial management approaches for toothfish, and the conservation of representative areas of benthic biodiversity. Additional outcomes include improving the understanding of trophic relationships and ecosystem function through a stable isotope study; providing information on the distribution, relative abundance, and life histories of by catch species; and mapping of the bathymetry of fishable areas.

The 2019 multi-member research plan (WG-FSA-19/44) aims to achieve five objectives:

Objective 1: Provide an assessment of the status and productivity of toothfish stocks in Divisions 58.4.1 and 58.4.2.

Objective 2: Identify the spatial distributions of toothfish, important habitats and vulnerable marine ecosystems (VME) in order to inform spatial management approaches.

Objective 3: Identify the spatial and depth distributions of bycatch species, and inform bycatch mitigation measures.

Objective 4: Improve the understanding of trophic relationships and ecosystem function to assist the development of ecosystem-based fisheries management approaches.

Objective 5: Evaluate the effect of standardised sampling design on the estimation of toothfish biomass and biological parameters.

5.3. Advice by the Scientific Committee

In 2016, the Scientific Committee considered the advice of WG-FSA on research in Divisions 58.4.1 and 58.4.2 and agreed that the research plan in WG-FSA-16/29 Rev. 1 is appropriate to achieve the research objectives.

In 2017, the Scientific Committee recommended that the catch limits for these divisions remain unchanged for 2018 and supported the catch allocation scheme developed by the research proponents in 2016.

In 2019, the Commission agreed that the research plan was appropriate to achieve the research objectives in 58.4.2, with a catch limit of 50 tonnes in Research Block 5842_1.

6. Stock status

6.1. Summary of current status

As a data-limited fishery, this fishery does not have such estimates.

6.2. Assessment method

Stock biomass and catch limits in data-limited fisheries are estimated using the [trend analysis](#).

6.3. Year of last assessment, year of next assessment

Research plans for data-limited fisheries are reviewed annually.

7. Climate Change and environmental variability

A recent summary of the potential impacts of climate change on Southern Ocean fisheries ([FAO 2018](#)) highlights the following key points:

The Antarctic region is characterized by complex interaction of natural climate variability and anthropogenic climate change that produce high levels of variability in both physical and biological systems, including impacts on key fishery taxa such as Antarctic krill.

The impact of anthropogenic climate change in the short-term could be expected to be related to changes in sea ice and physical access to fishing grounds, whereas longer-term implications are likely to include changes in ecosystem productivity affecting target stocks.

There are no resident human populations or fishery-dependent livelihoods in the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) Area, therefore climate change will have limited direct implications for regional food security.

The institutional and management approach taken by CCAMLR, including the ecosystem-based approach, the establishment of large marine protected areas, and scientific monitoring programmes, provides measures of resilience to climate change.

There is no formal evaluation of the impacts of climate change and environmental variability available for this particular fishery.

Additional Resources

- Fishery Summary: [pdf](#), [html](#)
- Species Description: [pdf](#), [html](#)
- Trend Analysis: [pdf](#), [html](#)
- [Fisheries Documents Browser](#)