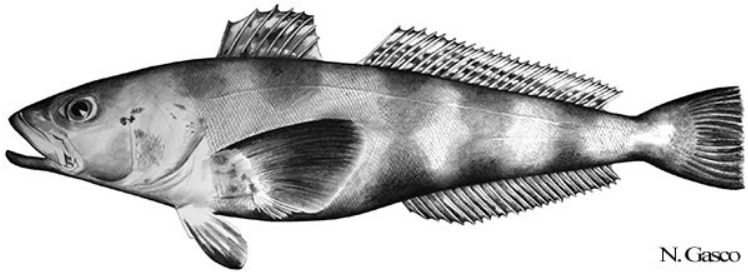
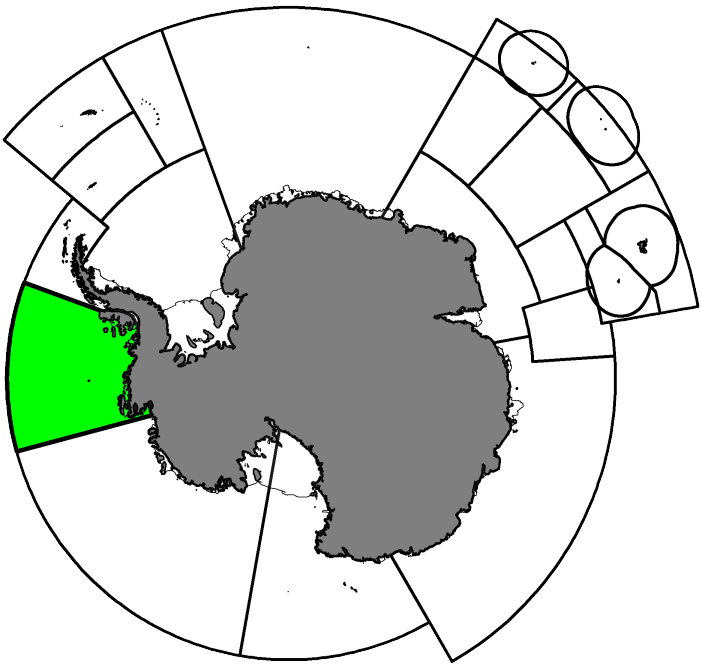
Fishery Report 2024: *Dissostichus mawsoni* in Subarea 88.3

CCAMLR Secretariat

07 April 2025



Antarctic Toothfish, *Dissostichus mawsoni* Norman, 1937.



Map of the management areas within the CAMLR Convention Area. Subarea 88.3, the region discussed in this report is shaded in green. Throughout this report, "2024" refers to the 2023/24 CCAMLR fishing season (from 1 December 2023 to 30 November 2024). Coastlines and ice shelves: UK Polar Data Centre/BAS and Natural Earth. Projection: EPSG 6932.

Contents

1. Introduction to the fishery

1.1. History

Research fishing for Antarctic toothfish (*Dissostichus mawsoni*) in Subarea 88.3 has been occasionally conducted by Chilean, New Zealand and Russian flagged vessels between 1998 and 2012. Since 2016 research fishing has been led by the Republic of Korea in Research Blocks (Fig. 1) in this Subarea, joined by New Zealand from 2017 to 2019 and by Ukraine since 2018.

1.2. Conservation Measures currently in force

Directed fishing for *Dissostichus* spp. in Subarea 88.3 is prohibited under Conservation Measure 32-02 until further scientific information is gathered and reviewed by the Scientific Committee and the Working Group on Fish Stock Assessment (WG-FSA). Research fishing in this area is regulated under Conservation Measures 24-01 and 24-05.

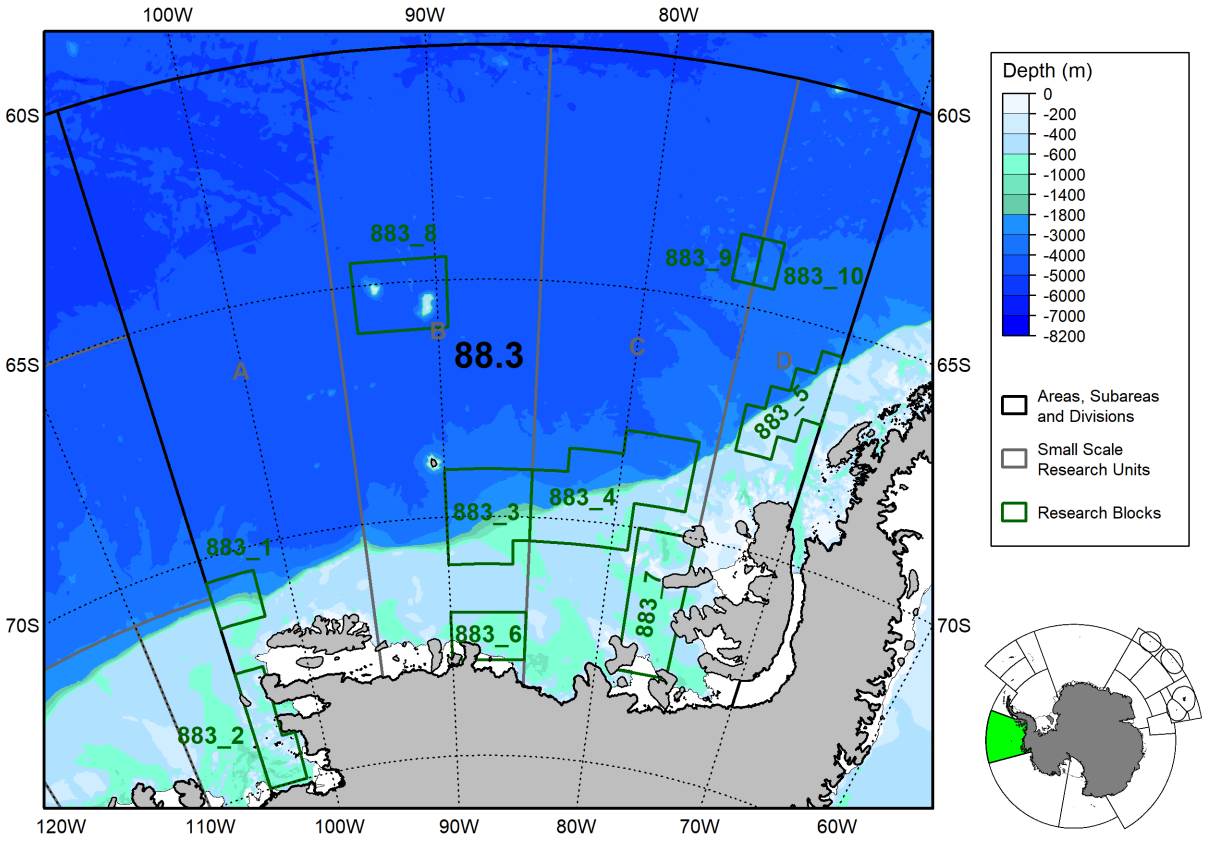


Figure 1: Location of the Research Blocks in Subarea 88.3. The fishable depth range (600m-1800m) is highlighted in shades of green. Coastlines and ice shelves: UK Polar Data Centre/BAS and Natural Earth. Bathymetry: GEBCO. Projection: EPSG 6932 (rotated).

1.3. Active vessels

In 2024, 2 vessels participated in this fishery.

1.4. Timeline of spatial management

Following a proposal from Korea to begin research fishing under Conservation Measure 24-01 in 2016 (WG-SAM-16/11), Research Blocks 1 to 5 were defined (Fig. 1). Additional Research Blocks (6-10) were proposed by New Zealand in 2017 (WG-FSA-17/40).

In 2024, WG-FSA-IMAF-2024/52 Rev. 1 presented a new 3-year research plan under Conservation Measure 24-01 by the Republic of Korea and Ukraine. The new plan proposed the removal of Research Blocks 5, 7, 8, 9, and 10 and the addition of two new Research Blocks (11 and 12, WG-FSA-IMAF-2024, paragraphs 4.180–4.181 and 4.183; SC-CAMLR-43 paragraph 3.108).

2. Reported catch

2.1. Latest reports and limits

The total catch reported from the research surveys that have been conducted in Subarea 88.3 is shown in Table 1. In this fishery, the catch of *D. mawsoni* reached a maximum of 129 tonnes in 2022. In 2024, 0 tonnes of *D. eleginoides* and 76 tonnes of *D. mawsoni* were caught.

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

Season	Number of vessels	Catch limit (tonnes)	*D. eleginoides*	*D. mawsoni*	Estimated IUU catch (tonnes)
2011	1	65	0	5	-
2012	1	65	0	4	-
2013	-	0	-	-	-
2014	-	0	-	-	-
2015	-	0	-	-	-
2016	1	171	0	106	-
2017	1	171	0	119	-
2018	1	245	0	39	-
2019	1	245	1	63	-
2020	2	254	0	96	-
2021	-		-	-	-
2022	2	254	0	129	-
2023	2	484	0	97	-
2024	2	466	0	76	-

Table 2: Catch and catch limits by Research Block in 2024 for *Dissostichus mawsoni* in Subarea 88.3. Source: Fine scale data.

Research Block	Catch limit	Catch (% of catch limit)
883_1	13	2 (15.4%)
883_3	38	38 (100%)
883_4	38	32 (84.2%)
883_5	8	0 (0%)
883_6	43	5 (11.6%)

2.2. By-catch

Catch limits for by-catch species groups (*Macrourus* spp., skates and rays, and other species) are defined in Conservation Measure 33-03 and provided in Table 3.

If the by-catch of any one species is equal to, or greater than, 1 tonne in any one haul or set, then the fishing vessel must move at least 5 nautical miles away for a period of at least five days (Conservation Measure 33-03).

Skates thought to have a high probability of survival are released at the surface in accordance with Conservation Measure 33-03.

Table 3. Reported catch and catch limits for by-catch species (*Macrourus* spp., skates and rays, and others) in this fishery. see CM 33-03 for details. -: no fishing. Source: fine-scale data.

Season	*Macrourus* spp.		Skates and rays			Other catch	
	Catch Limit (tonnes)	Reported Catch (tonnes)	Catch Limit (tonnes)	Reported Catch (tonnes)	Number Released	Catch Limit (tonnes)	Reported Catch (tonnes)
2016	39.2	3	12.25	<1	0	39.2	1
2017	39.2	7	12.25	<1	0	39.2	<1
2018	39.2	7	12.25	<1	0	39.2	<1
2019	39.2	5	12.25	<1	197	39.2	2
2020	43	11	16	<1	69	43	<1
2021		-		-	-		-
2022	38.4	4	11.5	<1	494	38.4	2
2023	33	8	9.7	<1	389	33	2
2024	33	6	9.5	<1	131	33	<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. For research fisheries notified under Conservation Measure 24-01, exemptions from specific Conservation Measures can be made, as recorded each year under Conservation Measure 24-05. All of the VMEs in CCAMLR's VME Registry are currently afforded protection through specific area closures.

The proponents of this research indicated that CCAMLR standard methods for the identification of VMEs will be applied on board during the survey (WG-FSA-2021/34).

There are no VMEs or VME Risk Areas designated in Subarea 88.3.

2.4. Incidental mortality of seabirds and marine mammals

There have been no reported bird or mammal mortalities reported by vessels from Subarea 88.3 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.

3. Illegal, Unreported and Unregulated (IUU) fishing

There are no records of illegal, unreported and unregulated (IUU) fishing activities in Subarea 88.3.

4. Data collection

4.1. Data collection requirements

The collection of biological data 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. Summary of available data

Both the vessel's crew and observers collect fishing effort, catch, and by-catch information.

Following Conservation Measure 22-07, vessels participating in this fishery must report the occurrence of VME indicator organisms on hauled lines. To do so, the vessel's crew observe lines in segments (1000-hook sections or 1200m sections, whichever is the shorter) and report the number of VME indicator units (either one litre of those VME indicator organisms that can be placed in a 10-litre container, or one kilogram of those VME indicator organisms that do not fit into a 10-litre container). Depending on the number of VME indicator units landed, vessels must immediately report and potentially cease fishing in the area (termed a Risk Area) until further review of the data is completed (see Conservation Measure 22-07). Based on the portion of the line monitored, observers further identify VME indicator organisms to the lowest taxonomic level possible.

The vessel's crew report total catch of non-VME by-catch (mostly fishes) by coarse taxonomic groups given the taxonomic expertise required to discriminate similar species. Observers collect biological information on toothfish and by-catch specimens at a finer taxonomic resolution, as well as data on individual specimens such as size and maturity.

Summaries of data reported to CCAMLR for the past five years are given in Tables 4 and 5.

Table 4. Summary of VME indicator taxa by-catch, by-catch of other species and biological data reported by vessels crew and observers in each of the last five seasons. By-catch records correspond to the number of observations of total weight and count of individuals for each taxon identified. Observers may take further biological measurements on toothfish and by-catch taxa. Taxonomic identification may occur at different levels. -: no fishing.

Data source	Data class	Variable	2020	2021	2022	2023	2024
Vessel crew	VME	line segments	935	-	1395	1723	1245
		VME indicator units >5 and <10	0	-	0	0	0
		VME indicator units >10	0	-	0	0	0
	by-catch	taxa identified	14	-	12	17	12
		records	253	-	369	423	342
Observer	VME	line segments	276	-	817	1364	1244
		taxa identified	6	-	3	9	6
		weight or volume measurements	19	-	3	27	20
	toothfish	specimens examined	2186	-	3700	3593	2936
		length measurements	2186	-	3700	3593	2936
		weight measurements	2165	-	3700	3593	2829
		sex identifications	2156	-	3700	3592	2935
		maturity stage identifications	2144	-	3678	3575	2894
		gonad weight measurements	2141	-	3678	3583	2835
		otolith samples	1158	-	1153	2235	1805
	by-catch	specimens examined	951	-	1494	4939	1493
		taxa identified	16	-	15	14	11
		length measurements	455	-	800	3814	1143
		weight measurements**	951	-	1494	4939	1493
		standard length measurements*	0	-	360	0	235
		wingspan measurements*	2	-	16	244	6
		pelvic length measurements*	2	-	16	244	6
		snout to anus measurements*	686	-	1047	2574	897
		sex identifications**	909	-	1115	4456	1448
		maturity stage identifications**	905	-	1107	3055	1314
		gonad weight measurements**	14	-	207	17	13
		otolith samples**	321	-	400	320	302

*: Species-dependent records
**: Voluntary records

Table 5. Summary of biological data for predominant by-catch groups reported by observers (from random subsets of lines) in each of the last five seasons. Taxonomic identification may occur at different levels. -: no fishing.

By-catch group	Variable	2020	2021	2022	2023	2024
Macrourus spp.	specimens examined	686	-	1046	2574	899
	taxa identified	3	-	4	3	3
	length measurements	191	-	356	1507	618
	weight measurements**	686	-	1046	2574	899
	snout to anus measurements*	686	-	1046	2574	897
	sex identifications**	676	-	946	2574	899
	maturity stage identifications**	675	-	945	2042	835
	gonad weight measurements**	14	-	119	2	12
	otolith samples**	321	-	400	175	193
Skates and rays	specimens examined	2	-	15	188	6
	taxa identified	1	-	1	1	1
	length measurements	2	-	15	186	4
	weight measurements**	2	-	15	188	6
	wingspan measurements*	2	-	15	188	6
	pelvic length measurements*	2	-	15	188	6
	sex identifications**	2	-	15	188	6
	maturity stage identifications**	2	-	10	36	6
	gonad weight measurements**	0	-	0	0	0
Other fish	specimens examined	261	-	429	2121	521
	taxa identified	11	-	8	9	6
	length measurements	260	-	429	2121	521
	weight measurements**	261	-	429	2121	521
	standard length measurements*	0	-	360	0	233
	sex identifications**	229	-	154	1638	483
	maturity stage identifications**	227	-	152	977	472
	gonad weight measurements**	0	-	88	15	1
	otolith samples**	0	-	0	145	109

*: Species-dependent records
**: Voluntary records

The counts of by-catch taxa reported above (Table 5) correspond to specimens that have been individually sampled by observers. These are a subset of all the specimens counted by observers and are generally identified at a more precise taxonomic level. The figures below (Figs. 2 and 3) display the distribution of the most frequently examined by-catch taxa in time and space. It is important to note that observers sample a random subset of lines and do not individually examine all taxa; as such these figures are more representative of the distribution of biological observations than the catch of these taxa or their spatial distribution. At a coarse taxonomic level, the total catch of by-catch species groups is provided in section 2.2 above.

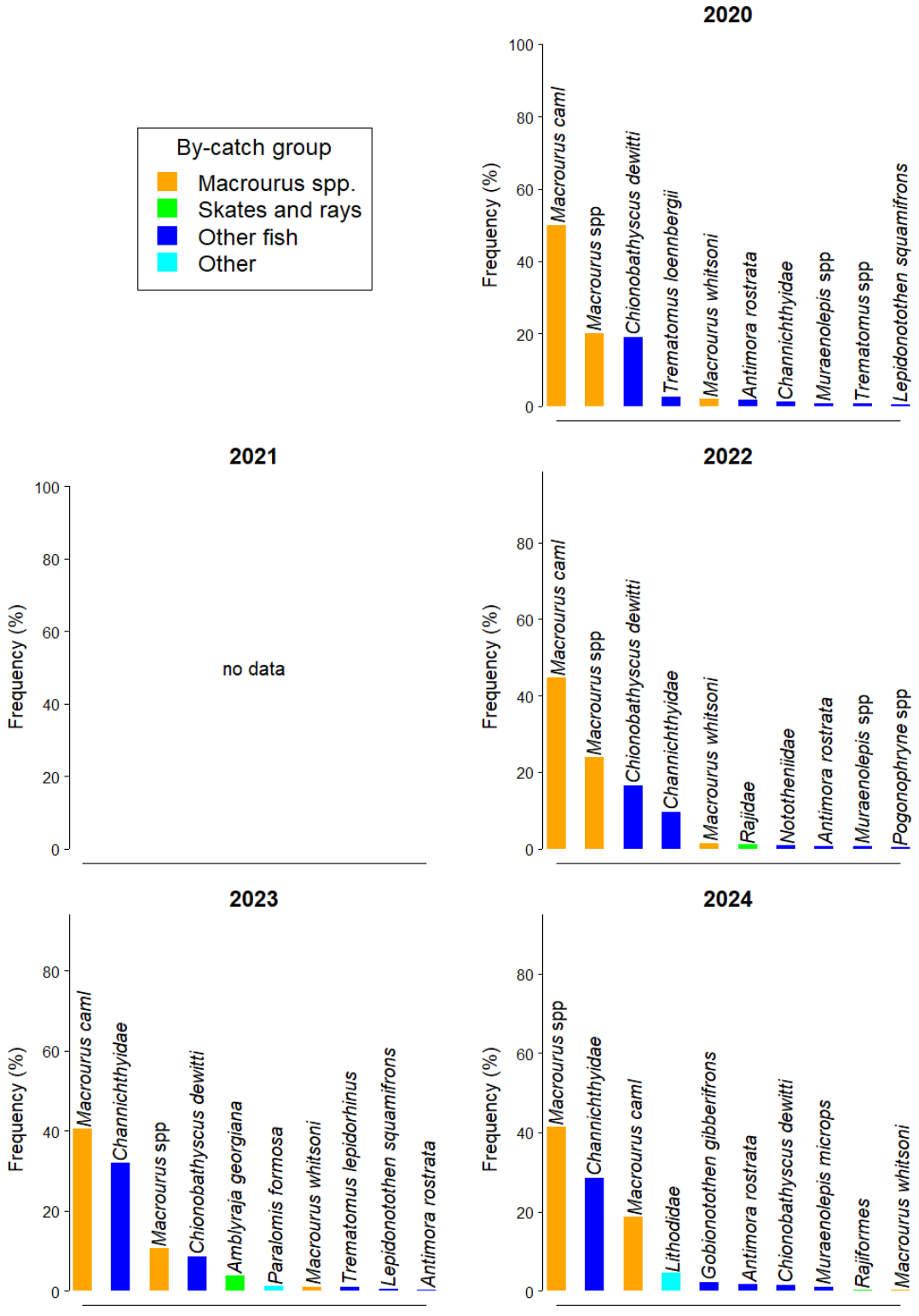


Figure 2. Relative frequencies of the most commonly examined by-catch taxa in each of the last five seasons, from the observer data (unweighted raw counts of individually examined specimens). Taxonomic identification may occur at different levels.

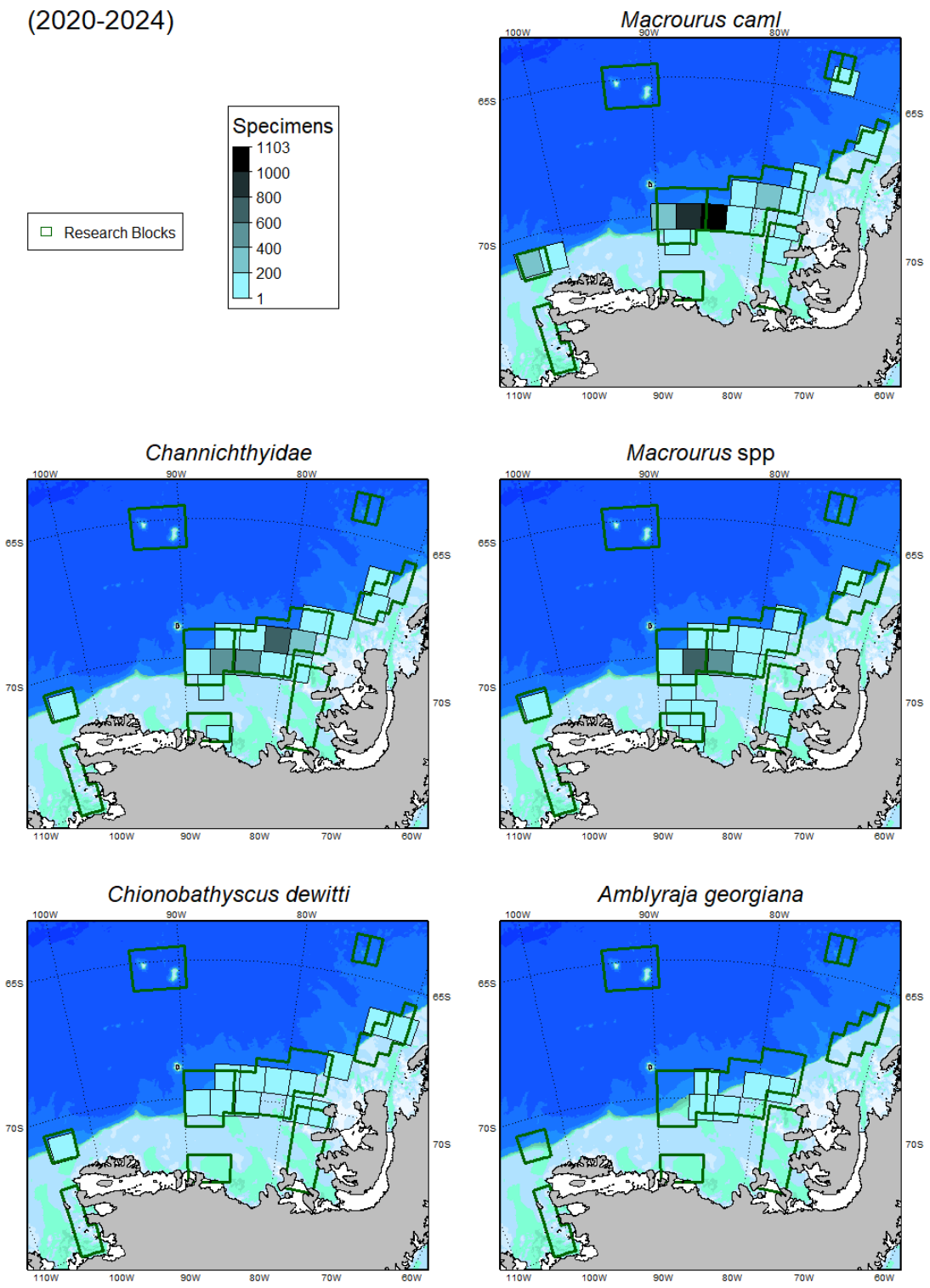


Figure 3. Spatial distribution of the most commonly examined by-catch taxa across the last five seasons, from the observer data (unweighted raw counts of individually examined specimens in each cell). The data were aggregated using equal area (100 km x 100 km) cells. Taxonomic identification may occur at different levels. Refer to Figure 1 for more details on the boundaries shown. Coastlines and ice shelves: UK Polar Data Centre/BAS and Natural Earth. Bathymetry: GEBCO. Projection: EPSG 6932 (rotated).

4.3. Length frequency distributions

The length frequency distributions of *D. mawsoni* caught during research activities are shown in Figure 4. 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 during research fishing ranged from 50 to 175cm with two broad modes at approximately 60cm and 150cm.

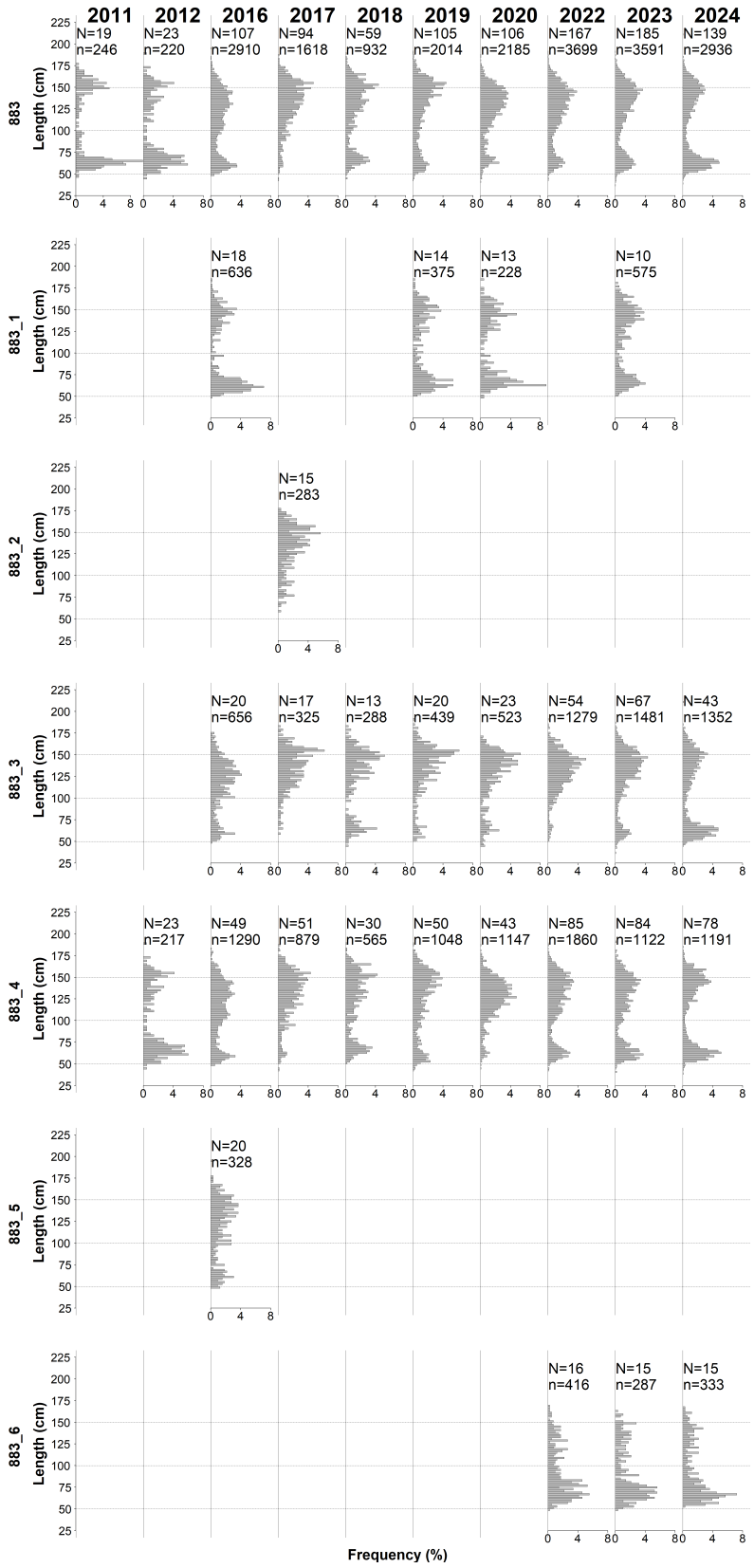


Figure 4. Annual length frequency distributions of *D. mawsoni* caught in Subarea 88.3 and its Research Blocks. The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are indicated. Note: length frequency distributions are only shown where more than 150 fish were measured in a given season/area.

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.

To date in this area, 3937 *D. mawsoni* have been tagged and released (30 have been recaptured, 28 of which were released in this area; Table 6), and, 6 *D. eleginoides* have been tagged and released (0 have been recaptured).

Table 6. Number of *Dissostichus mawsoni* tagged and recaptured in the area for each fishing Season.

		Recaptured						
Season	Tagged	2019	2020	2022	2023	2024	2025	Total
2005	8							
2011	30							
2012	63							
2016	566	1						**1**
2017	597	1	1					**2**
2018	203	2	2	1	1			**6**
2019	342		4	1				**5**
2020	495			4		1		**5**
2022	668			1	1	3	1	**6**
2023	512				2	1		**3**
2024	453							
Total	**3937**							**28**

5. Research

5.1. Status of the science

There were a total of 95 research hauls and 131 tagged fish as part of surveys conducted by Chilean, New Zealand and Russian flagged vessels up to 2012. This level of research activities meant that there was insufficient data to assess the toothfish stock in this Subarea. The previous surveys were restricted by sea-ice. However, as the ice concentration in the west of the Antarctic is reducing, this led the Republic of Korea to propose a multi-year research plan for Subarea 88.3 starting in 2016.

New Zealand (in 2017) and Ukraine (in 2018) joined the Republic of Korea in these research efforts.

In 2019, an integrated research proposal for *Dissostichus* spp. in Subarea 88.3 was submitted by the Republic of Korea, New Zealand and Ukraine (WG-SAM-2019/02).

In 2021, an updated research proposal was submitted by the Republic of Korea and Ukraine (WG-FSA-2021/34).

In 2022, the Republic of Korea and Ukraine reported on the progress and continuation of their research proposal (WG-FSA-2022/26). WG-FSA-2022/27 and WG-FSA-2022/28 presented analyses of diet composition, feeding strategy and spatial diet variations of Antarctic toothfish. *Chionobathyscus dewitti*, Macrouridae and Mollusks were found to be dominant prey items, and diet was found to differ between slope and shelf areas, reflecting the different prey assemblages between these areas. Also, a genetic study using microsatellite markers (WG-FSA-2022/29 Rev. 1) reported a higher genetic diversity in the Ross Sea region than other areas within Area 88.

In 2023, the Republic of Korea and Ukraine reported on the progress and continuation of their research proposal (WG-SAM-2023/23 and WG-FSA-2023/20 Rev. 1). WG-FSA-2023/25 presented analyses of diet

composition and feeding strategy of Antarctic toothfish, and WG-FSA-2023/32 Rev. 1 investigated molecular and morphological traits of 338 individuals of macrourids collected in Subareas 88.1 and 88.3 between 2021 and 2022.

In 2024, a study on diet composition and feeding strategy of Antarctic toothfish in Area 88 (WG-FSA-IMAF-2024/42) confirmed *D. mawsoni* is an opportunistic predator with a narrow niche and a trophic level of around 4.25. This was also consistent with a comparison with Divisions 58.4.1 and 58.4.2 using metabarcoding analysis (WG-FSA-IMAF-2024/43). Genetic work, adding to previous genetic studies in the area showed a shared gene pool due to high gene flow during the larval phase, weak but significant differentiation was detected between some population pairs (WG-FSA-IMAF-2024/54). This was also consistent with the stock structure in the area (WG-FSA-IMAF-2024/62). WG-FSA-IMAF-2024/59 reported on trials of electronic monitoring in the research plan and the Working Group and the Scientific Committee agreed to develop an electronic monitoring workplan (WG-FSA-IMAF-2024, paragraphs 4.169–4.179).

5.2. Research plans

5.2.1. Background This research plan aims to establish the first stock assessment for Antarctic toothfish in Subarea 88.3, thereby enhancing ecosystem understanding and participating in the development of ecosystem-based fisheries management approaches.

5.2.2. Objectives The research proposal (WG-FSA-IMAF-2024/52 Rev. 1) aims at achieving four objectives:

- Providing an assessment of the stock status of Antarctic toothfish,
- Improving the understanding of biology of Antarctic toothfish including abundance, distribution and stock structure,
- Identifying information on by-catch species,
- Improving the understanding of trophic relationships and ecosystem changes.

5.3. Advice by the Scientific Committee

The advice from the Scientific Committee in 2016 on this research proposal is presented in SC-CAMLR-XXXV, paragraphs 3.255 and 3.256. The Scientific Committee recommended that the catch limits and priority for each Research Block should be as in 2016 should ice conditions allow.

In 2017, the Scientific Committee recommended that the catch limits for the Korean and New Zealand joint research plan in Subarea 88.3 be endorsed for 2018 (Table 5 and SC-CAMLR-XXXVI, paragraph 3.142).

In 2019, the Scientific Committee endorsed the Research proposal as described in [WG-SAM-19/02] (SC-CAMLR-38 paragraphs 4.59 to 4.61).

In 2020, the Scientific Committee and the Commission did not reach consensus on this research proposal (CCAMLR-39 paragraphs 5.32 and 5.33).

In 2021, the Scientific Committee endorsed the Research proposal as described in WG-FSA-2021/34, with an updated sampling rate requirement for by-catch species of 30 specimens per species per line, or the entire catch for a line if this was less than 30 specimens (SC-CAMLR-40 paragraphs 3.107).

In 2022, the Scientific Committee endorsed (SC-CAMLR-41, paragraph 4.8) the Research proposal as described in WG-FSA-2022/26.

In 2024, the Scientific Committee endorsed the Research proposal (SC-CAMLR-43, paragraph 3.108) as described in WG-FSA-IMAF-2024/52 Rev. 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

In 2022, the Commission recognised that climate change is already having effects in the Convention Area (CCAMLR-41, paragraph 6.3) and agreed that it needed to act urgently to prepare for, and adapt to, the effects of climate change on the marine ecosystems within the Convention Area (CCAMLR-41, paragraph 6.5). The Commission noted (CCAMLR-41, paragraph 6.4) that the Scientific Committee had incorporated climate change into its advice (SC-CAMLR-41, paragraph 7.8) and through discussions at the SC-Symposium (SC-CAMLR-41, Annex 11) had also added climate change to the work plans and terms of reference of its Working Groups (SC-CAMLR-41, paragraph 7.14). The Commission adopted (CCAMLR-41, paragraph 6.28) Resolution 36/41.

In 2023, the Scientific Committee held a workshop on Climate Change (WS-CC-2023) which made recommendations regarding monitoring and management actions CCAMLR could progress to document and track the effects of climate change in the Convention Area. The recommendations were incorporated into the workplan of the Scientific Committee. Further, the Scientific Committee recommended that summaries of evidence for changes in stock assessment parameters or processes that could be due to the effects of environmental variability or climate change be developed for all fisheries (SC-CAMLR-42, paragraph 2.149).

In 2024, Members developed such summaries, in the form of tables, for fisheries in Subarea 48.3, Divisions 58.5.1 and 58.5.2 and in the Ross Sea region.

Additional Resources

- Fishery Summary: pdf, html
- Species Description: pdf, html
- Trend Analysis: pdf, html
- Fisheries Documents Browser