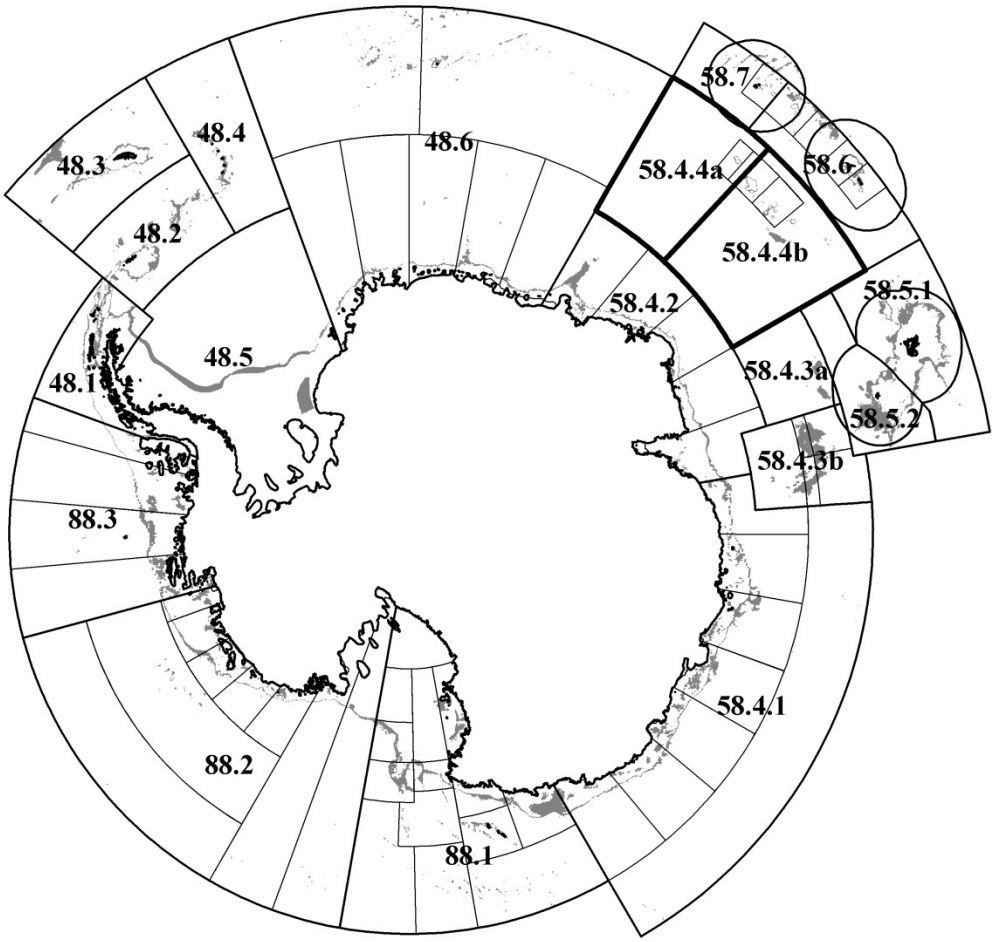
Fishery Report 2014: Closed fishery for *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b



Contents

The map on the cover page shows the management areas within the CAMLR Convention Area, the specific region related to this report is outlined in bold. Depths between 600 and 1 800 m (the 'fishable depths' for *Dissostichus* spp.) are shaded.

Throughout this report the CCAMLR fishing season is represented by the year in which that season ended, e.g. 2014 represents the 2013/14 CCAMLR fishing season (from 1 December 2013 to 30 November 2014).

Fishery Report 2014: Closed fishery for *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b

Introduction to the fishery

1. This report describes the exploratory longline fishery for toothfish (*Dissostichus* spp.) in Division 58.4.4. In 1995, Division 58.4.4 was subdivided into Division 58.4.4a (Ob Bank) and Division 58.4.4b (Lena Bank) (SC-CAMLR-XIV, Annex 5, paragraph 5.175). These divisions were managed as a single area and a catch limit for *Dissostichus* spp. applied to fishing north of 60°S, and in waters outside areas of national jurisdiction[1]. The longline fishery for *Dissostichus* spp. in Division 58.4.4[2] began as a new fishery in 1998 (Conservation Measure (CM) 138/XVI). Following the Commission's recognition that high levels of illegal, unreported and unregulated (IUU) fishing for *Dissostichus* spp. in the Convention Area had rendered it unrealistic to consider this fishery as 'new' (CCAMLR-XVIII, paragraph 10.14), the fishery was reclassified as exploratory in 1999.

2. At this time, the whole of Divisions 58.4.4 was further subdivided into small-scale research units (SSRUs) A, B, C and D.

3. Expressing concern regarding the low levels of stocks of *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b and the high levels of IUU fishing in that region (CCAMLR-XXI, paragraph 11.36), the Commission prohibited directed fishing for *Dissostichus* spp. in these divisions and closed the fishery in 2002 (CM 32-10). The Commission agreed that such prohibition shall apply at least until further scientific information is gathered and reviewed.

Reported catch

4. In 2008 and from 2010 onward, a catch limit has been allocated to research fishing only. Over the past 10 years, the reported catch peaked at 77 tonnes in 2008, which was below the research catch limit set for that year (Table 1).

5. Since 2008, a single Japanese-flagged longliner has conducted research fishing in accordance with a research plan submitted under CM 24-01.

6. In 2014, research fishing for *Dissostichus* spp. in Division 58.4.4b was conducted by Japan using longlines and the total reported catch so far is 16 tonnes taken in the allocated research blocks (SC-CAMLR-XXXI, Annex 7, paragraph 5.113).

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1 The South African EEZ at Prince Edward and Marion Islands extends into the northern part of Division 58.4.4a.

2 In 1995, Division 58.4.4 was subdivided into Division 58.4.4a (Ob Bank) and Division 58.4.4b (Lena Bank) (SC-CAMLR-XIV, Annex 5, paragraph 5.175).

Table 1: Catch history for *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b. Research catch limits are in brackets. (Source: STATLANT data for past seasons and catch and effort reports for current season, past reports for IUU catch.)

Season	Catch limit (tonnes)	Reported catch (tonnes)					Estimated IUU catch (tonnes)
		Division 58.4.4a		Division 58.4.4b		Total	
		D. mawsoni	*D. eleginoides*	*D. mawsoni*	*D. eleginoides*		
2004	closed	0	0	0	0	0	0
2005	closed	0	0	0	0	0	220
2006	closed	0	0	0	0	0	104
2007	closed	0	0	0	0	0	109
2008	closed (80)	0	18	<1	58	77	0
2009	closed	0	0	0	0	0	0
2010	closed (60)	0	9	0	50	59	80
2011	closed (53)	0	0	0	35	35	*
2012	closed (70)	0	0	0	28	28	*
2013	closed (50)	0	0	0	31	31	*
2014	closed (60)	0	0	0	16	16	*

* Not estimated.

Illegal, unreported and unregulated (IUU) fishing

7. IUU fishing in the Indian Ocean sector of the Convention Area remains an issue for the Commission.

8. In each season between 1998 and 2001, the estimated annual catch of *Dissostichus* spp. exceeded 1 000 tonnes. An estimated total of 7 196 tonnes of *Dissostichus* spp. has been removed by IUU fishing since the fishery began with >500 tonnes being removed since 2004 (Table 1). In 2010, the last year in which IUU catch was recorded, an estimated 80 tonnes was taken from Division 58.4.4a. However, since 2011, following the recognition of methodological issues in its assessment, no estimates of the IUU catch of *Dissostichus* spp. have been provided for this division (SC-CAMLR-XXIX, paragraph 6.5).

Data collection

9. Catch limits for CCAMLR's fisheries for Antarctic (*D. mawsoni*) and Patagonian toothfish (*D. eleginoides*) for the 'assessed' fisheries in Subareas 48.3, 88.1 and 88.2 and Division 58.5.2 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)). The management of these data-poor fisheries has been a major focus of attention in CCAMLR in recent years after the acknowledgement that commercial fishing by itself had resulted in too few data to develop a full assessment of the targeted stocks in these areas. 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 CM 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.

10. 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. In 2012 and 2013, CCAMLR put in place a more structured approach to setting catch limits, and spatially constraining research, in data-poor fisheries. This process attempts to use all available information combined with a regular review process to make progress while recognising the inherent uncertainties and data limitations in data-poor fisheries.

Biological data

11. The collection of biological data under CM 23-05 is conducted as part of the CCAMLR Scheme of International Scientific Observation. Observer sampling requirements for *Dissostichus* spp. in longline fisheries based on the data collection plan are described in WG-FSA-10/32 (SC-CAMLR-XXIX, Annex 8, paragraph 5.34; SC-CAMLR-XXIX, paragraph 3.187). In longline fisheries targeting *D. mawsoni* and *D. eleginoides*, biological data collection 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.

Length distributions of catches

12. The length-frequency distributions of *D. eleginoides* caught in this fishery are presented for all years in which the number of that species measured was more than 150 fish (Figure 1). These length-frequency distributions are unweighted (i.e. 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 differences 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 distribution of fishing.

13. Due to the low level of reported catch, and thus small numbers of length measurements (<150 fish) in each year/SSRU, the length-frequency distributions of *D. mawsoni* have not been presented here.

14. Length frequencies for *D. eleginoides* for each season in Divisions 58.4.4a and 58.4.4b are presented in Figure 1. The majority of *D. eleginoides* caught in the fishery during research fishing ranged from 50 to 150 cm with a broad mode in both divisions at approximately 60–90 cm (Figure 1).

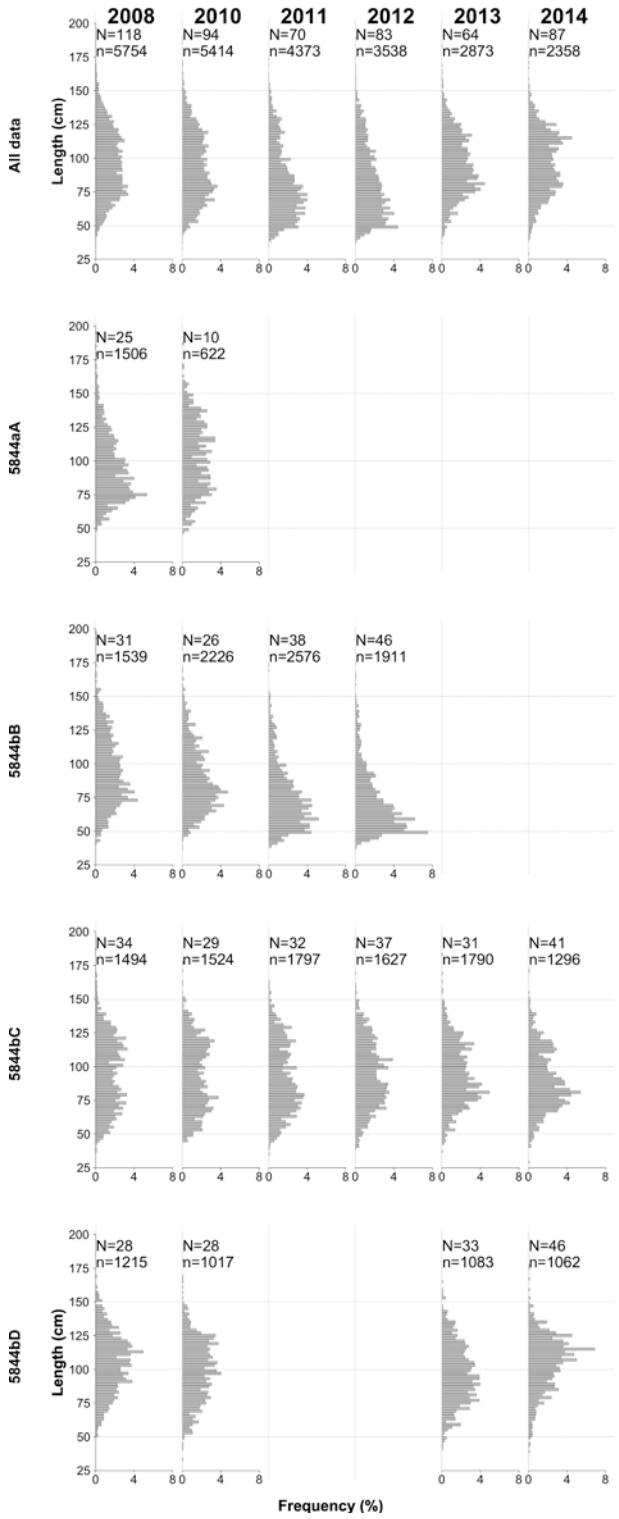

Figure 1: Annual length frequencies for *Dissostichus eleginoides* in Division 58.4.4. The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are provided. Note: length-frequency distributions are only presented for those years/SSRUs in which the number of fish measured was >150.

Tagging

15. Since 2012, vessels have been required to tag and release *Dissostichus* spp. at a rate of five fish per tonne of green weight caught (Table 2). 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. Each vessel catching more than 10 tonnes of each species of *Dissostichus* is required to achieve a minimum tag-overlap statistic[3] of 60% (Annex 41-01/C).

16. In all years in which it has conducted research fishing, the *Shinsei Maru No. 3* exceeded the required tagging rate and in 2013 achieved a tagging rate of 7.5 fish per tonne with a tag-overlap statistic of 81% (Table 2).

17. To date, a total of 1 174 *D. eleginoides* have been tagged and 11 recaptured in both Divisions 58.4.4a and 58.4.4.b (Table 3).

Table 2: Annual tagging rate, reported by vessel, operating in the exploratory fishery for *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b. The tag-overlap statistics (CM 41-01) for *D. eleginoides* are provided in brackets.

Flag State	Vessel name	Season						
		2008	2009	2010	2011	2012	2013	2014
Japan	*Shinsei Maru No. 3*	3.6 (51–59)	-	6.1 (100)	5.3 (95)	6.1 (82)	7.5 (81)	5.9 (85)
Required tagging rate		3	3	3	3	5	5	5

Table 3: The number of individuals of *Dissostichus eleginoides* tagged in each year. The number of fish recaptured is provided in brackets.

Flag State	Vessel name	Season						
		2008	2009	2010	2011	2012	2013	2014
Japan	*Shinsei Maru No. 3*	280 (0)	-	300 (1)	189 (4)	172 (3)	233 (3)	159 (9)

Life-history parameters

Data collection

18. The life histories of *D. mawsoni* and *D. eleginoides* are characterised by slow growth, low fecundity and late maturity. Both *D. mawsoni* and *D. eleginoides* appear to have protracted spawning periods, taking place mainly in winter, but which may start as early as late autumn and extend into spring. However, as this is the period least accessible to fishing, and thus the collection of biological data, specific life-history traits for these species are limited (WG-FSA-08/14). The areas that are considered to be the most likely spawning grounds for *D. mawsoni* include the north of the Ross Sea associated with the Pacific–Antarctic Ridge (SSRUs 881B and C) and the Amundsen Ridge (SSRU 881E) in the Amundsen Sea. In the Cooperation Sea, *D. mawsoni* most likely spawn on BANZARE Bank

[3] The tag-overlap statistic estimates the similarity in size distributions of fish that are tagged and all fish caught by a vessel (Annex 41-01/C, footnote 3).

(Division 58.4.3b). *Dissostichus eleginoides* are thought to spawn in deep water around South Georgia Island (Subarea 48.3), Bouvet Island (Subarea 48.6) and on the Kerguelen Plateau (Divisions 58.5.1 and 58.5.2).

Parameter estimates

19. A sample of otoliths collected in 2008 has been aged and results reported in WG-FSA-11/16. Ages of 214 otoliths (of 3 013 fish sampled) ranged from 4 to 48 years for females and from 5 to 48 years for males. These ages may be overestimated by one year due to an interpretation issue concerning the location of the first annulus.

Stock assessment

20. Cumulative numbers of tags and recaptures (i.e. using all four tag-recaptures in 2011 from the pooled total of available fish tagged between 2008 and 2010) were used to generate a Petersen biomass estimate of 1 928 tonnes for Divisions 58.4.4a and 58.4.4b.

21. Generalised yield model (GYM) scenarios were run from 2010 and estimated the likely trajectory of a *D. eleginoides* stock that had been (i) at a median SSB of 20% SSB_0 in 2006 (when the fishery in Ob and Lena Banks was closed), or (ii) was at a median SSB of 20% in 2009. These scenarios were rerun in 2011 (including the catch of 35.4 tonnes taken in the most recent survey by the *Shinsei Maru No. 3*) to estimate status in 2011 and corresponding constant catch rates under which the stock was expected to recover to 50% B_0 within two decades from the date of the fishery closure (as in WG-FSA-10/42). Under the first scenario, the median current status was estimated to be 36.5% SSB_0 in 2010, and the corresponding precautionary research catch was 1.25% B_0, or 115 tonnes per year. Under the second scenario, the median status was estimated to be 23% SSB_0 in 2010, and the corresponding precautionary research catch was 0.074% B_0, or 58 tonnes per year. The Working Group noted that the actual current status of the stock was unknown, but these scenarios were thought to be conservative.

By-catch of fish and invertebrates

Fish by-catch

22. Catch limits for by-catch species groups (macrourids, rajids and other species) are defined in CM 33-03 and provided in Table 4. Within these catch limits, the total catch of by-catch species in any SSRU or combination of SSRUs, as defined in relevant conservation measures, shall not exceed the following limits:

- skates and rays (rajids) – 5% of the catch limit of *Dissostichus* spp. or 50 tonnes, whichever is greater
- *Macrourus* spp. – 16% of the catch limit of *Dissostichus* spp. or 20 tonnes, whichever is greater
- all other species combined – 20 tonnes.

23. 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 n miles away for a period of at least five days.

24. If the catch of *Macrourus* spp. taken by a single vessel in any two 10-day periods in a single SSRU exceeds 1 500 kg in a 10-day period and exceeds 16% of the catch of *Dissostichus* spp. in that period, the vessel shall cease fishing in that SSRU for the remainder of the season.

Table 4: Catch history for by-catch species (macrourids, rajids and other species), including catch limits and number of rajids released alive in Divisions 58.4.4a and 58.4.4b. Catch limits are for both divisions combined (see CM 33-03 for details). (Source: fine-scale data.)

Season	Macrourids		Rajids			Other species	
	Catch limit (tonnes)	Reported catch (tonnes)	Catch limit (tonnes)	Reported catch (tonnes)	Number released	Catch limit (tonnes)	Reported catch (tonnes)
2004	closed		closed			closed	
2005	closed		closed			closed	
2006	closed		closed			closed	
2007	closed		closed			closed	
2008	closed*	3	closed*	<1	0	closed*	1
2009	closed		closed			closed	
2010	closed*	1	closed*	<1	55	closed*	<1
2011	closed*	2	closed*	<1	73	closed*	1
2012	closed*	2	closed*	<1	0	closed*	<1
2013	closed*	2	closed*	<1	0	closed*	<1
2014	closed*	<1	closed*	<1	0	closed*	<1

* Research fishing permitted in accordance with CM 24-01.

25. The by-catch in Divisions 58.4.4a and 58.4.4b consisted predominantly of macrourids. Catches of by-catch species groups (macrourids, rajids and other species) reported in fine-scale data, their respective catch limits, and number of rajids released alive are summarised in Table 3. In 2013, 2 tonnes of macrourids were reported, which represents ~7% of the total catch of target and by-catch species combined.

Invertebrate by-catch including VME taxa

26. All Members are required to submit, within their general new (CM 21-01) and exploratory (CM 21-02) fisheries notifications, information on the known and anticipated impacts of their gear on vulnerable marine ecosystems (VMEs), including benthos and benthic communities such as seamounts, hydrothermal vents and cold-water corals. All of the VMEs in CCAMLR's VME Register are currently afforded protection through specific area closures, the locations and other details of which can be found in Annex 22-09/A.

27. There are no VMEs or VME Risk Areas designated in Division 58.4.4a and 58.4.4b.

Incidental mortality of birds and mammals

Incidental mortality reported

28. There have been no observed seabird or marine mammal mortalities reported from Divisions 58.4.4a and 58.4.4b.

Mitigation measures

29. The requirements of CM 25-02 '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 CM 24-02 and subject to a seabird by-catch limit.

30. No mitigation measures apply to this fishery as it is currently closed.

Ecosystem implications and effects

31. There is no formal evaluation available for this fishery.

Current management advice and conservation measures

32. The exploratory fishery for *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b is closed (CM 32-10). Directed fishing for *Dissostichus* spp. in these divisions is prohibited at least until further scientific information is gathered and reviewed by the Scientific Committee and WG-FSA.

33. The research plan for Division 58.4.4 is now in the biomass estimation/assessment development phase.

34. The advice resulting from WG-FSA in 2013 in respect of a proposal for research fishing in Divisions 58.4.4a and 58.4.4b is described in the WG-FSA-13 report (SC-CAMLR-XXXII, Annex 6, paragraphs 6.95 to 6.98), including the recommendations that:

(i) The catch limit for SSRU D, which has no stock assessment, was assigned by scaling-up the biomass estimated in SSRU C by the seabed analogy method. This resulted in a recommended catch limit of 35 tonnes for SSRU D. Accordingly, the total catch limit for combined SSRUs C and D is 60 tonnes.

(ii) The *Shinsei Maru No. 3* would first complete research sets in each grid square as in 2013, and then be able to fish anywhere within the research block until the research catch limit is reached.