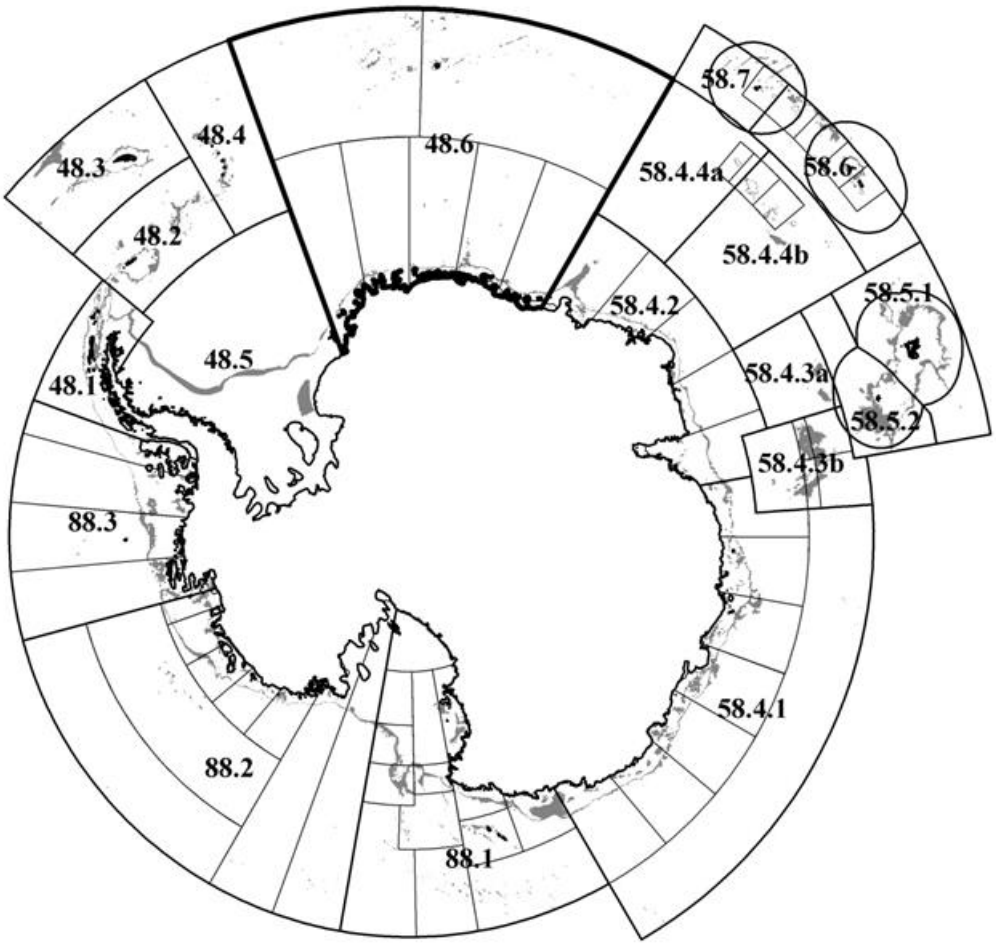
Fishery Report 2014: Exploratory fishery for *Dissostichus* spp. in Subarea 48.6



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).

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Introduction to the fishery

1. This report describes the exploratory longline fishery for toothfish (*Dissostichus* spp.) in Subarea 48.6. This fishery began as a new fishery in 1997 (Conservation Measure (CM) 114/XV). Following the Commission's decision 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 2000. Since 2004, licensed longline vessels have fished in Subarea 48.6 for *Dissostichus* spp., originally targeting primarily Patagonian toothfish (*Dissostichus eleginoides*), but more recently Antarctic toothfish (*D. mawsoni*) has dominated the catches.

2. The current limits on the exploratory fishery for *Dissostichus* spp. in Subarea 48.6 are described in CM 41-04. From 2008 to 2013, the precautionary catch limit for *Dissostichus* spp. was set at 400 tonnes; 200 tonnes north of 60°S (small-scale research units (SSRUs) A and G) and 200 tonnes south of 60°S (SSRUs B–F). In 2014 it was increased to 538 tonnes and applied to research fisheries at SSRUs as follows: 28 tonnes for *D. eleginoides* and 170 tonnes for *D. mawsoni* in SSRUs A and G, 50 tonnes for *Dissostichus* spp. in SSRU D, 100 tonnes for *Dissostichus* spp. in SSRU E and 190 tonnes for *Dissostichus* spp. in SSRUs B and C. SSRU F was closed to exploratory research fishing.

3. In 2014, the fishery was limited to one Japanese and one South African flagged vessel using longlines only.

4. For 2015, a total of three vessels, one each from Japan, the Republic of Korea and South Africa, have notified their intention to participate in the exploratory fishery for *Dissostichus* spp. in Subarea 48.6.

Reported catch

5. Reported catches of *Dissostichus* spp. in Subarea 48.6 peaked at 392 tonnes in both 2010 and 2011, which was 98% of the catch limit set for that year (Table 1). The catches reported in Subarea 48.6 include catch data 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). Those years that include quarantined data are indicated with a superscript q and specific details are provided in the footnote to Table 1. 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.

6. So far in 2014, one vessel from Japan and one vessel from South Africa caught a combined total of 154 tonnes of *Dissostichus* spp. The northern SSRUs A and G had a reported catch of *D. eleginoides* and *D. mawsoni* of 9 and 95 tonnes respectively, while fishing in the southern SSRUs had only occurred in SSRUs D (reported catch of *Dissostichus* spp. of 50 tonnes).

Table 1: Catch history for *Dissostichus* spp. in Subarea 48.6. (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)
		D. mawsoni	*D. eleginoides*	Total	
2004	910	0	7	7	-
2005	910	2	49	51	-
2006	910	63	100	163	-
2007	910	34	78	112	-
2008	400	11	12	24	-
2009	400	92[q]	17	109	-
2010	400	242[q]	50	292	-
2011	400	317[q]	31[q]	348	*
2012	400	377	6	383	*
2013	400	275	15	291	*
2014	538	145	9	154	*

[q] Some catch data in these years is now quarantined, the following catch is not included in the reported catch table above:
2009 – vessel *In Sung No. 22*, 173tonnes *D. mawsoni*
2010 – vessel *In Sung No. 2*, 100 tonnes *D. mawsoni*
2011 – vessel *In Sung No. 7*, 42 tonnes *D. mawsoni* and 1 tonne *D. eleginoides.*

* Not estimated.

Illegal, unreported and unregulated (IUU) fishing

7. There is no information on which to derive an estimate of the level of IUU fishing in Subarea 48.6. In 2014 IUU fishing has been detected in SSRU 486D.

Data collection

8. Catch limits for CCAMLR's fisheries for *D. mawsoni* and *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.

9. 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. A collaborative research program has been undertaken by Japan and South Africa since 2013 to enhance data collection and analysis in this subarea (see for example WG-FSA-14/67).

10. In 2014, five research blocks were designated in Subarea 48.6 with catch limits applied to each research block (Figure 1). These research blocks were designed to ensure that research fishing occurred in those areas with the highest probability of recapturing tagged fish; fishing in this subarea is restricted to the research blocks only.

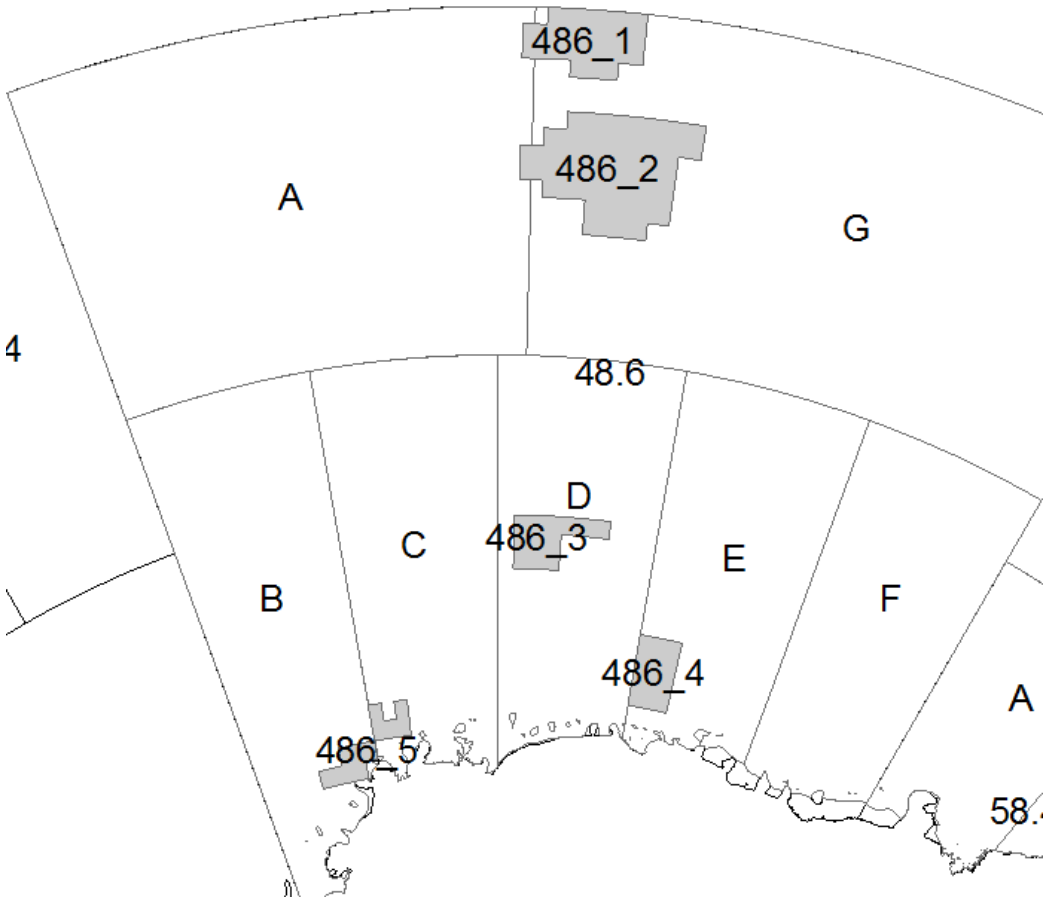

Figure 1: Location of research blocks in Subarea 48.6.

Biological data

11. The collection of biological data under CM 23-05 is conducted as part of the CCAMLR Scheme of International Scientific Observation. In exploratory 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 the catches of *D. mawsoni* and *D. eleginoides* for each season across the entire subarea and in each SSRU are presented in Figure 2 and indicate a consistent difference in modal size between the two species. 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. The majority of *D. mawsoni* caught in the Subarea 48.6 fishery ranged from 120 to 180 cm in total length, with a relatively consistent broad mode at approximately 130–160 cm (Figure 2a).

14. *Dissostichus eleginoides* exhibits a much wider length distribution with the majority ranging from 60 to 150 cm in total length (Figure 2b). A shifting mode is evident throughout the time series with length distribution skewed towards smaller fish early in the time series and towards larger fish in more recent seasons (Figure 2b).

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[1] of 60% (Annex 41-01/C).

16. To date, a total of 6 028 *D. mawsoni* and 1 230 *D. eleginoides* have been tagged and 71 *D. mawsoni* and 24 *D. eleginoides* have been recaptured in Subarea 48.6 (Tables 3a and 3b). All of the fish that have been recaptured in Subarea 48.6 were also tagged in that subarea.

[1] 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).

(a)

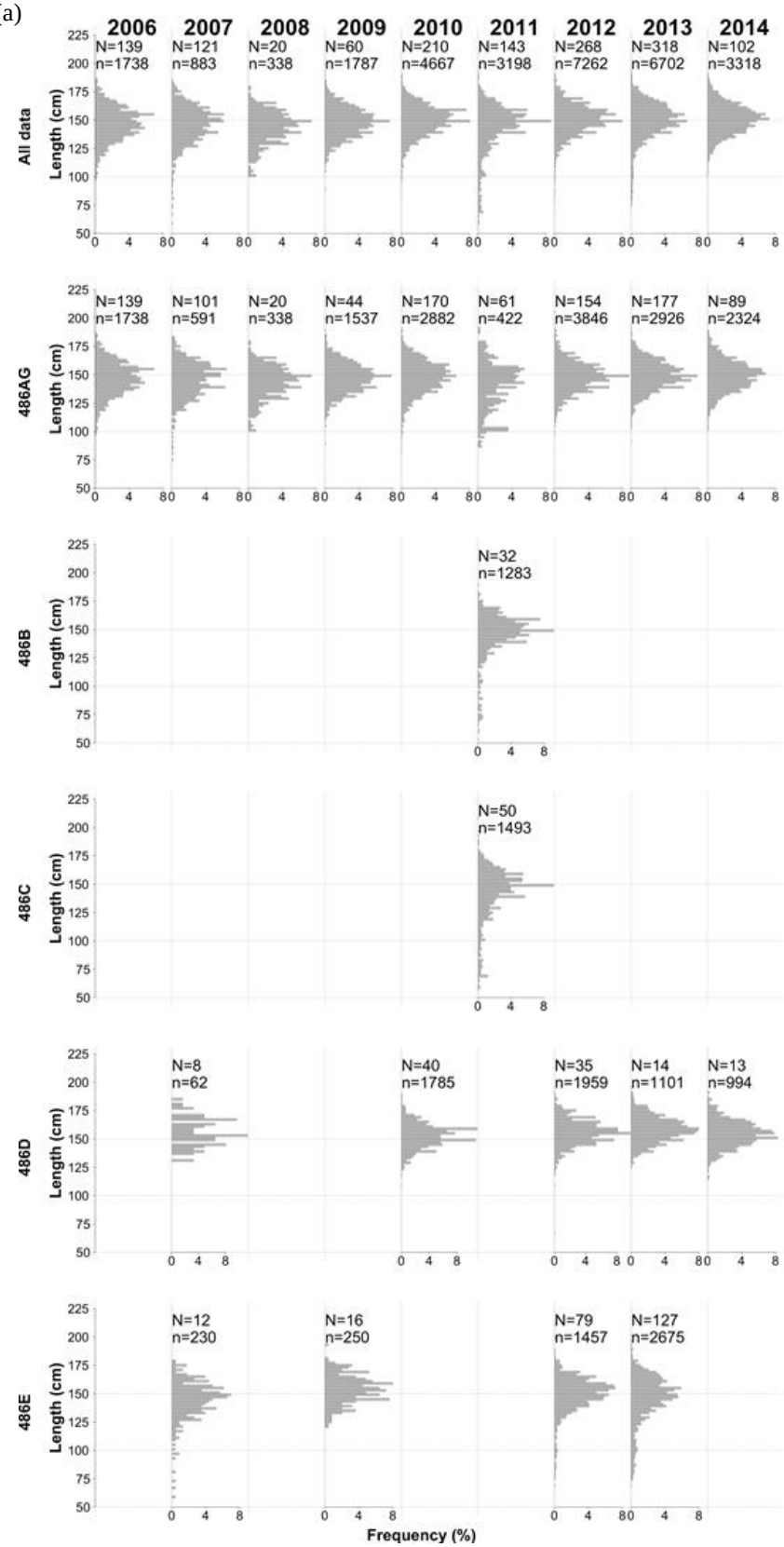

Figure 2: Annual length-frequency distributions of: (a) *Dissostichus mawsoni* caught in Subarea 48.6 and those caught in each SSRU (lower panels). The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are provided. Note: length-frequency distributions are only presented for those years/SSRUs in which the number of fish measured was >150.

(continued)

(b)

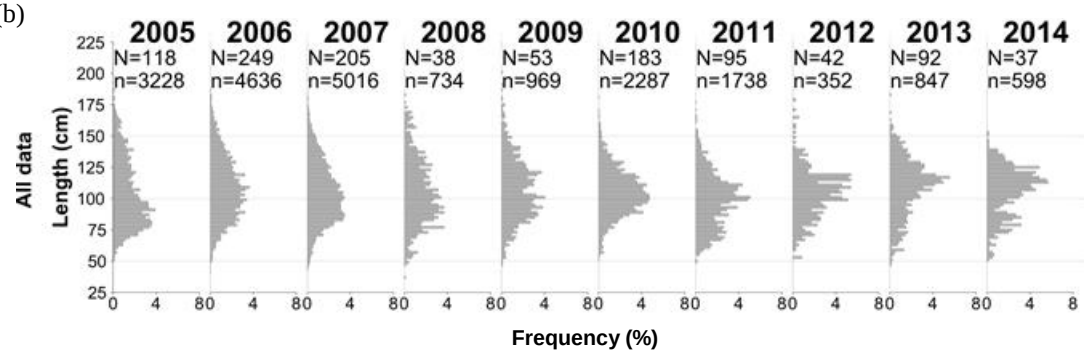

Figure 2 (continued): Annual length-frequency distributions of: (b) *D. eleginoides* caught in Subarea 48.6. The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are provided. Note: length-frequency distributions are only presented for those years/SSRUs in which the number of fish measured was >150.

Table 2: Annual tagging rate, reported by vessel operating in the exploratory fishery for *Dissostichus* spp. in Subarea 48.6. The tag-overlap statistics (CM 41-01) for *Dissostichus mawsoni* and *D. eleginoides* respectively are provided in brackets. Values for tag-overlap statistics are not calculated for catches of less than 10 tonnes (*).

Flag State	Vessel name	Season									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Japan	*Shinsei Maru No. 3*	1.2	1.1	1 (33, 34)	1.1 (31, 44)	3.6 (65, 26)	3.1 (68, 42)	3 (95, -)	5.1 (85, *)	5.6 (78, *)	5.2 (85, *)
Korea, Republic of	*Bonanza No. 707*	2.2									
	Hong Jin No. 701							4 (84, *)			
	Insung No. 1						3.2 (-, 34)				
	Jung Woo No. 2			3 (*, *)							
Norway	*Froyanes*			1.6 (*, *)							
South Africa	*Koryo Maru No. 11*							3.1 (*, 82)	5.2 (72, *)	5.7 (68, *)	4.9 (77, -)
Required tagging rate		1	1	1	1	3	3	3	5	5	5

Table 3: The number of individuals of (a) *Dissostichus mawsoni*, and (b) *D. eleginoides* tagged in each year. The number of fish recaptured by each vessel/year is provided in brackets.

(a)

Flag State	Vessel name	Season									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Japan	*Shinsei Maru No. 3*		2 (0)	23 (0)	15 (0)	327 (2)	560 (1)	594 (1)	1225 (14)	969 (10)	692 (13)
Korea, Republic of	*Bonanza No. 707*	5 (0)									
	Hong Jin No. 701							441 (0)			
	Insung No. 1						0 (2)				
	Jung Woo No. 2			4 (0)							
Norway	*Froyanes*			10 (0)							
South Africa	*Koryo Maru No. 11*							10 (0)	651 (19)	442 (5)	58 (4)
Total		5 (0)	2 (0)	37 (0)	15 (0)	327 (2)	560 (3)	1045 (1)	1876 (33)	1 411 (15)	750 (17)

(b)

Flag State	Vessel name	Season									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Japan	*Shinsei Maru No. 3*	57 (0)	169 (3)	76 (2)	14 (0)	65 (0)	38 (4)		14 (0)	130 (2)	55 (2)
Korea, Republic of	*Bonanza No. 707*										
	Hong Jin No. 701							52 (1)			
	Insung No. 1						310 (3)				
	Jung Woo No. 2			15 (0)							
Norway	*Froyanes*			1 (0)							
South Africa	*Koryo Maru No. 11*							79 (0)	57 (1)	94 (6)	0 (0)
Total		57 (0)	169 (3)	92 (2)	14 (0)	65 (0)	348 (7)	131 (1)	71 (1)	224 (8)	55 (2)

Life-history parameters

17. 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–C) and the Amundsen Ridge (SSRU 881E) in the Amundsen Sea. In the Cooperation Sea, *D. mawsoni* most likely spawn on BANZARE Bank (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

18. There are no specific life-history parameters for either *D. mawsoni* or *D. eleginoides* in this subarea; the parameters used in assessed fisheries can be found in the 'Stock assessment' appendices of the relevant Fishery Reports.

Stock assessment status

19. There has been no integrated stock assessment for this data-poor exploratory fishery.

By-catch of fish and invertebrates

Fish by-catch

20. 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.

Table 4: Catch history for by-catch species (macrourids, rajids and other species), catch limits and number of rajids released alive in Subarea 48.6. Catch limits are for the whole fishery (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	146	0	100	0	-	120	0
2005	146	6	100	0	-	120	0
2006	146	10	100	0	-	120	3
2007	146	13	100	0	-	120	2
2008	62	1	100	0	-	140	0
2009	64	5	100	0	-	140	2
2010	64	10	100	0	-	140	1
2011	64	8	100	0	-	140	1
2012	64	6	100	0	2	140	1
2013	64	18	100	0	-	140	2
2014	86	2	100	0	-	120	0

21. 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.

22. 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.

23. The by-catch in Subarea 48.6 consists predominantly of macrourids with 2 tonnes being reported in so far in 2014 (Table 4).

Invertebrate by-catch including VME taxa

24. 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.

25. There are no VMEs or VME Risk Areas designated in Subarea 48.6.

Incidental mortality of birds and mammals

Incidental mortality

26. There have been no observed seabird or marine mammal mortalities in Subarea 48.6.

Mitigation measures

27. 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.

28. The risk level for seabirds in this fishery in Subarea 48.6 is category 1 (low) south of 55°S, and category 2 (average to low) north of 55°S (SC-CAMLR-XXX, Annex 8, paragraph 8.1).

Ecosystem implications and effects

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

Current management advice and conservation measures

30. The limits on the exploratory fishery for *Dissostichus* spp. in Subarea 48.6 for the forthcoming season are defined in CM 41-04 and summarised in Table 5.

Table 5: Limits on the exploratory fishery for *Dissostichus* spp. in Subarea 48.6 in force (CM 41-04).

Element	Limit in force
Access	Fishing for *Dissostichus* spp. in Subarea 48.6 shall be limited to the exploratory longline fishery by Japan, Republic of Korea and South Africa. The fishery shall be conducted by Japanese, Korean and South African flagged vessels using longlines only. No more than one vessel per country shall fish at any one time. For the purpose of this fishery, the area open to fishing is defined by the research blocks in Annex 41-04/A (also shown in Figure 1 of this report).
Catch limit	The total catch of *Dissostichus* spp. in Subarea 48.6 in 2015 shall not exceed a precautionary catch limit of 538 tonnes, applied as follows: Research blocks 48.6_1 and 48.6_2 *Dissostichus eleginoides* 28 tonnes Research block 48.6_2 *Dissostichus mawsoni* 170 tonnes Research block 48.6_3 *Dissostichus* spp. 50 tonnes Research block 48.6_4 *Dissostichus* spp. 100 tonnes Research block 48.6_5 *Dissostichus* spp. 190 tonnes
Season	1 December to 30 November
Fish by-catch	Regulated by CM 33-03
Seabird mitigation	In accordance with CM 25-02
Observers	At least two (2) scientific observers, one of whom shall be appointed in accordance with the CCAMLR Scheme of International Scientific Observation
Data	Daily and five-day catch and effort reporting (CM 23-07) Haul-by-haul catch and effort data (CM 23-04) Biological data reported by the CCAMLR scientific observer (CM 23-05)
Research	Fishery-based research in accordance with agreed research plans, including the collection of detailed catch, effort and biological data (Annex 41-01/A) and tagging (Annex 41-01/C) Toothfish tagged at a rate of at least five fish per tonne of green weight caught
Environmental protection	Regulated by CMs 22-06, 22-07, 22-08 and 26-01 No offal discharge