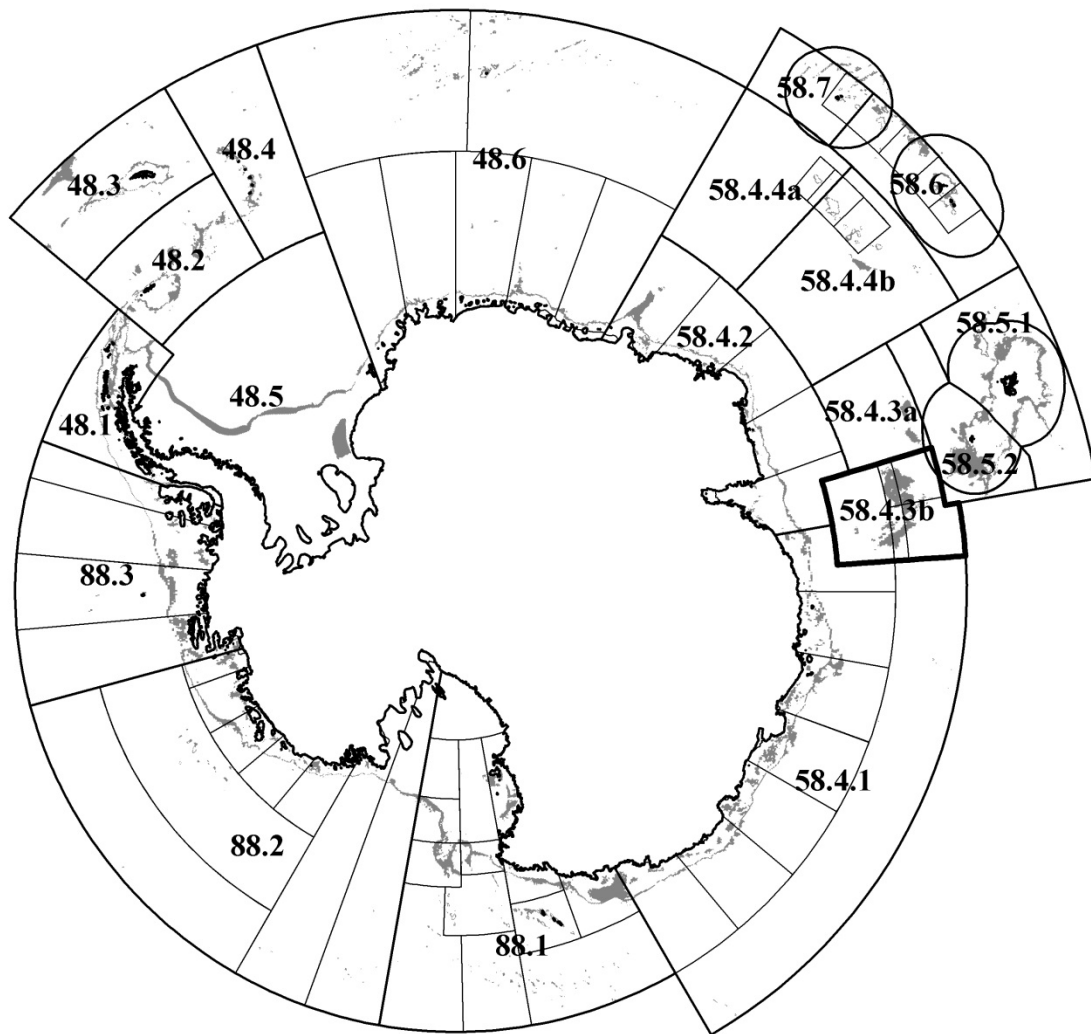


**Fishery Report 2014: Exploratory fishery
for *Dissostichus* spp. in Division 58.4.3b**



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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: Exploratory fishery for *Dissostichus* spp. in Division 58.4.3b

Introduction to the fishery

1. This report describes the exploratory longline fishery for toothfish (*Dissostichus* spp.) in Division 58.4.3b. The fishery in Division 58.4.3 began as a new fishery in 1997 (Conservation Measure (CM) 113/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), along with a renewed interest in this fishery, the fishery was reclassified as exploratory in 2000. That year, the Commission agreed on four exploratory fisheries for *Dissostichus* spp. in this region outside Australia's national jurisdiction: exploratory trawl fisheries on BANZARE Bank (CM 203/XIX) and Elan Bank (CM 205/XIX); and exploratory longline fisheries on BANZARE Bank (CM 204/XIX) and Elan Bank (CM 206/XIX).

2. In 2001, the boundaries of Division 58.4.3 were reassigned based on ecological considerations, and two new divisions were formed: Division 58.4.3a (Elan Bank) and Division 58.4.3b (BANZARE Bank). The Commission agreed to exploratory fisheries for *Dissostichus* spp. in each of these new divisions. Since 2004, licensed longline vessels have fished in Division 58.4.3b for *Dissostichus* spp. targeting primarily Antarctic toothfish (*D. mawsoni*) with smaller catches of Patagonian toothfish (*D. eleginoides*).

3. In 2007, Division 58.4.3b was subdivided into small-scale research units (SSRUs) A (north of 60°S) and B (south of 60°S). In 2008, SSRU A was further subdivided into SSRUs A, C, D and E.

4. The current limits on the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b are described in CM 41-07. Since 2010, fishing in this division has been limited to research only, in accordance with CM 24-01, and the commercial catch limit set at 0 tonnes (Table 1). No fishing has taken place since 2012. The catches reported from in Division 58.4.3b include catch data from one vessel 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 vessel-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.

5. For 2015, no notifications were submitted for the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b.

Reported catch

6. Reported catches of *Dissostichus* spp. over recent seasons peaked in 2006 at 361 tonnes, exceeding the catch limit set for that year by 17%.

7. In 2014, no fishing took place in Division 58.4.3b.

Table 1: Catch history for *Dissostichus* spp. in Division 58.4.3b. Research catch limit is 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)
		<i>D. mawsoni</i>	<i>D. eleginoides</i>	Total	
2004	300	6	1	7	-
2005	300	297	0	297	1015
2006	300	317	44	361	1903
2007	300	173 ^q	39 ^q	212 ^q	3226
2008	200 ¹	101	42	142	360
2009	120	89	15	104	610
2010	0 (72)	12	2	14	171
2011	0 (15)	8	2	11	*
2012	0 (40)	4	5	9	*
2013	0	0	0	0	*
2014	0	0	0	0	*

¹ Includes 50 tonnes for research fishing.

^q Some catch data in these years is now quarantined, the following catch is not included in the reported catch table above:
2007 – vessel *Paloma V*, 35 tonnes *D. eleginoides* and 3 tonnes *D. mawsoni*.

* Not estimated.

Illegal, unreported and unregulated (IUU) fishing

8. IUU fishing in the Indian Ocean sector of the Convention Area remains an issue for the Commission. Estimates of IUU fishing in Division 58.4.3b indicate that >7 200 tonnes of *Dissostichus* spp. have been taken illegally since 2005 (Table 1). Extremely high levels of IUU fishing between 2005 and 2007 resulted in estimates of the total removals in this division being well in excess of the catch limits. In 2007, the estimated IUU catch of *Dissostichus* spp. of 3 226 tonnes was ten times greater than the catch limit set for that year. 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 *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.

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 estimate 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. 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 *D. mawsoni* and *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. The majority of *D. mawsoni* caught in Division 58.4.3b ranged from 100 to 175 cm with a single mode, in all seasons, at approximately 125–160 cm (Figure 1a). *Dissostichus eleginoides* comprised a much wider length range of 50–175 cm with a broad mode at approximately 80–130 cm (Figure 1b).

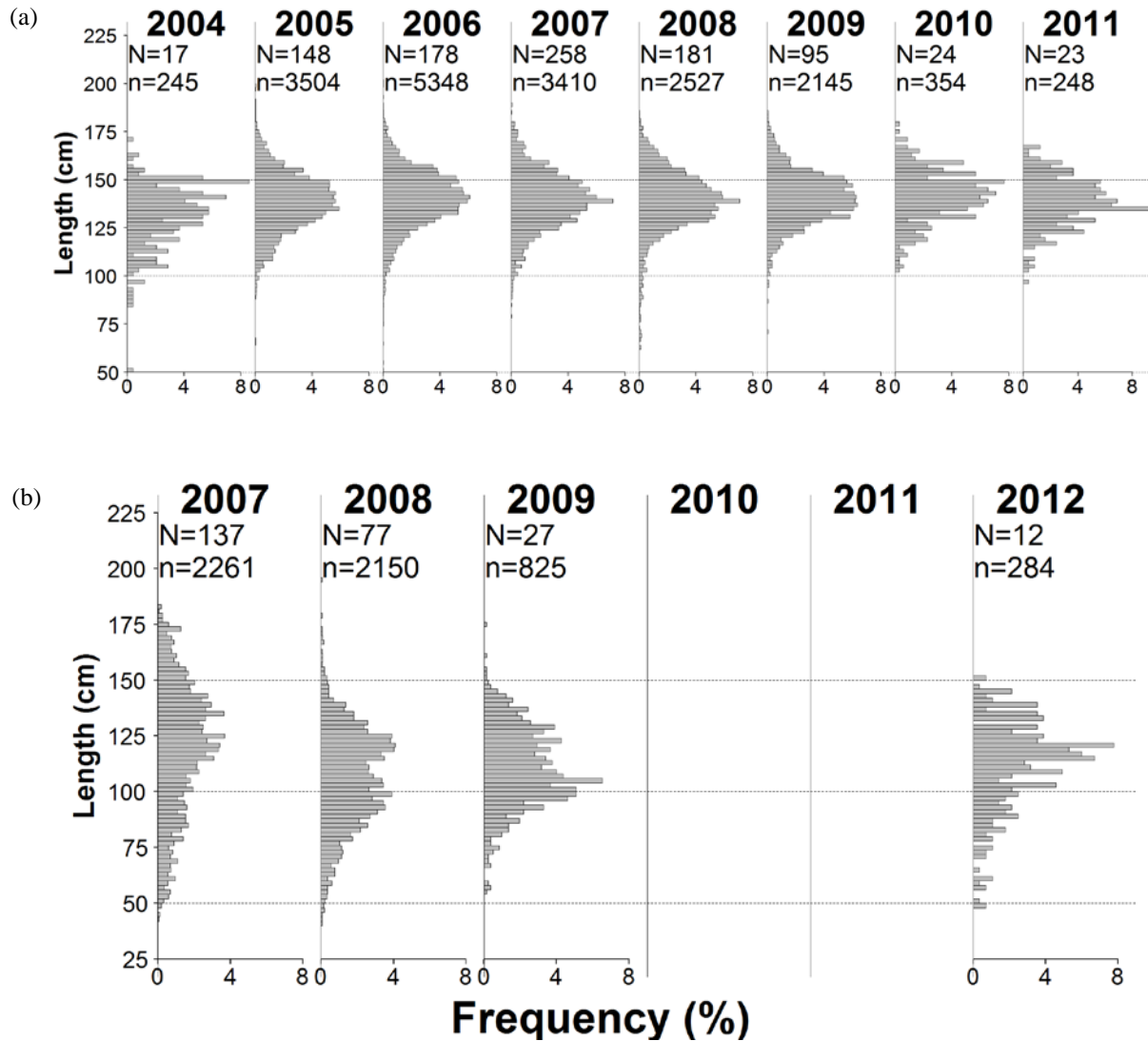


Figure 1: Annual length-frequency distributions of (a) *Dissostichus mawsoni* and (b) *D. eleginoides* caught in Division 58.4.3b. The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are provided. Note: length-frequency distributions are only presented for those years in which the number of fish measured was >150.

Tagging

14. 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 statistic¹ of 60% (Annex 41-01/C).

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).

15. To date, a total of 1 194 *D. mawsoni* and 357 *D. eleginoides* have been tagged and 10 *D. mawsoni* and one *D. eleginoides* have been recaptured in Division 58.4.3b (Tables 3a and 3b). In 2013 and 2014, no fishing occurred in Division 58.4.3b and thus no data on tagging was obtained (Table 2).

Life-history parameters

Data collection

16. 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

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

Table 2: Annual tagging rate, reported by vessel, operating in the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b. The tag-overlap statistics (CM 41-01) for *D. mawsoni* and *D. eleginoides* respectively are provided in brackets. Values for the tag-overlap statistic 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	
Australia	<i>Eldfisk</i>				6.4							
	<i>Janas</i>				(*, *)							
Chile	<i>Globalpesca I</i>		0									
	<i>Globalpesca II</i>	0.3	(-, -)									
Japan	<i>Shinsei Maru</i>			1								
	<i>No. 3</i>			(29, 36)	3.2	(49, 36)	3.2	(36, 21)	4.3	(55, *)	5.8	(*, *)
	<i>5.7</i>											
Korea, Republic of	<i>Yeon Seong</i>	0.1	(-, -)									
	<i>No.829</i>											
Namibia	<i>Antillas Reefer</i>			2.1								
	<i>Arnela</i>	0.9	(-, -)		0.6	(25, *)						
Spain	<i>Galaecia</i>	0.5	(-, -)									
Spain	<i>Tronio</i>		0.7	(-, -)								
	<i>1</i>											
Uruguay	<i>Banzare</i>		0.2	(-, -)	1	(65, -)						
	<i>Paloma V</i>		0.8	(-, -)	1.2	(*, 15)	4.5	(-, -)	3.6	(34, *)		
Required tagging rate		1	1	1	3	3	4	3	5	5	5	

Table 3: The number of individuals of (a) *Dissostichus mawsoni* and (b) *D. eleginoides* tagged 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
Australia	<i>Austral Leader</i> <i>Eldfisk</i> <i>Janas</i>				6 (1)						
Chile	<i>Globalpesca I</i> <i>Globalpesca II</i>	13 (0)									
Japan	<i>Shinsei Maru No. 3</i>			75 (0)	226 (0)	52 (0)	52 (0)	46 (0)	21 (0)		
Korea, Republic of	<i>Yeon Seong No. 829</i>	1 (0)									
Namibia	<i>Antillas Reefer</i>			2 (0)	12 (0)						
Spain	<i>Arnela</i> <i>Galaecia</i> <i>Tronio</i>	200 (1) 7 (0)	95 (0)								
Uruguay	<i>Banzare</i> <i>Paloma V</i>		38 (5)	81 (1)		229 (1)					
Total		221 (1)	171 (6)	154 (1)	244 (1)	281 (1)	52 (0)	46 (0)	21 (0)	0 (0)	0 (0)

(b)

Flag State	Vessel name	Season									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australia	<i>Austral Leader</i> <i>Eldfisk</i> <i>Janas</i>				9 (0)						
Chile	<i>Globalpesca I</i> <i>Globalpesca II</i>										
Japan	<i>Shinsei Maru No. 3</i>			37 (0)	120 (0)	74 (0)	8 (1)	16 (0)	30 (0)		
Korea, Republic of	<i>Yeon Seong No. 829</i>										
Namibia	<i>Antillas Reefer</i>			47 (0)	1 (0)						
Spain	<i>Arnela</i> <i>Galaecia</i> <i>Tronio</i>	6 (0) 4 (0)	2 (0)								
Uruguay	<i>Banzare</i> <i>Paloma V</i>		2 (0)			1 (0)					
Total		10 (0)	4 (0)	41 (0)	130 (0)	75 (0)	8 (1)	16 (0)	30 (0)	0 (0)	0 (0)

Stock assessment status

18. The results of an analysis of fine-scale catch and effort data indicated that intensive legal fishing in small areas, combined with high levels of IUU fishing, have resulted in the localised depletion of *Dissostichus* spp. in Division 58.4.3b and a severe decline in CPUE.

19. A random longline survey was carried out in this division by Australia in May 2008 (WG-FSA-08/57). The results of the survey indicated that catch rates of *Dissostichus* spp. were much lower than what had been reported for commercial fishing, between 17 and 60 kg/thousand hooks (95% confidence limits), and were consistent with toothfish being depleted to low densities across the surveyed area.

20. The results of the survey concluded that:

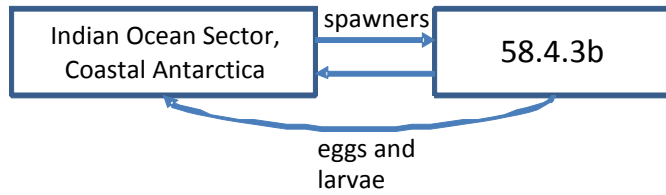
- (i) based on fishing information until 2007, the fisheries across BANZARE Bank show that the preferred fishing grounds were depleted in the Southern Area (adopted by WG-FSA-07, resulted in the closure of the Southern Area)
- (ii) based on the survey and fisheries across BANZARE Bank, there are very few fish apart from in the preferred fishing grounds
- (iii) there are no small fish found in the preferred fishing grounds; all are large, are dominated by males (79%) and are likely spawning
- (iv) in East Antarctica, spawning fish have only been found on BANZARE Bank (WG-FSA-07/44).

21. Due to their proximity, the fish on BANZARE Bank are likely to recruit from the coastal areas of Antarctica in the Indian Ocean sector. Three scenarios for the stock on BANZARE Bank (SC-CAMLR-XXVIII, Annex 5, paragraph 5.57) are illustrated in Figure 2.

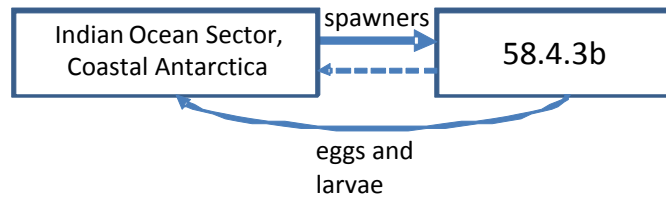
22. Exploratory longline fishing during 2007–2009 indicated that *D. eleginoides* was typically found in shallower waters than *D. mawsoni*, and that larger fish (predominantly female) were found deeper (WG-FSA-10/47). Based on the size distribution of catches, the study concluded that recruitment to BANZARE Bank is unlikely and that the population may consist primarily of adults migrating from other areas. The Working Group noted that this study only used data from a single vessel. However, the conclusions of the paper seemed consistent with previous work on the biology and ecology of toothfish in this area, such as that described in WG-FSA-08/57.

23. Although there has been no integrated stock assessment for this data-poor exploratory fishery, initial biomass estimates were undertaken using the catch rate and seabed area analogy method, as recommended by SC-CAMLR-XXX, Annex 5, paragraph 2.40(ii). Since this estimate was highly uncertain due to the inherent difficulty of CPUE standardisation and the assumption of a comparable reference area, a precautionary discount factor of 0.3 was applied, similar to that used for *D. mawsoni* in the Ross Sea in 1998 (SC-CAMLR-XXVII, Annex 5, paragraphs 4.58, 4.67 and 4.68). Using this approach, the precautionary biomass was estimated at 4 078 tonnes. Applying a precautionary exploitation rate of 0.01 (consistent with assuming that the current status of this potentially depleted stock is 30% B_0 under the generalised yield model (GYM) application described in WG-FSA-10/42 Rev. 1), resulted in a precautionary research catch limit of 41 tonnes.

Scenario 1 – Regular movement, Division 58.4.3b main spawning area



Scenario 2 – Sporadic movement, Division 58.4.3b main spawning area



Scenario 3 – Regular movement, only large fish move to Division 58.4.3b

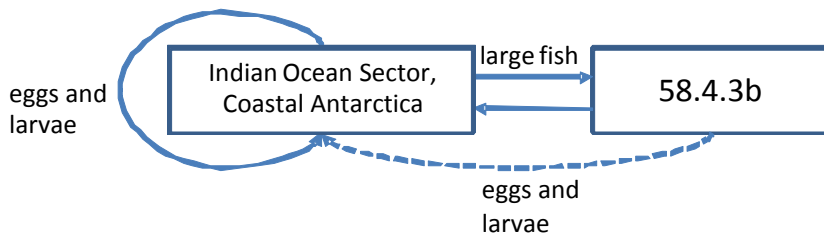


Figure 2: Diagram illustrating possible scenarios for the *Dissostichus mawsoni* stock on BANZARE Bank (Division 58.4.3b). Solid arrows indicate regular movements of fish, dashed arrows indicate sporadic movement of fish.

By-catch of fish and invertebrates

Fish by-catch

24. 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 Division 58.4.3b. 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	159	<1	50	<1	-	20	0
2005	159	7	50	6	-	20	<1
2006	159	8	50	1	-	20	<1
2007	159	10 ^q	50	3	1 267	20	1
2008	80	7	50	1	157	20	2
2009	80	4	50	1	102	20	<1
2010	80	2	50	<1	22	20	<1
2011	-	1	-	<1	-	-	<1
2012	-	1	-	<1	-	-	<1
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-

^q Quarantined data (see paragraph 4).

25. 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.

26. 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.

27. Macrourids dominated the by-catch of the fishery in Division 58.4.3b with as much as 17 tonnes, 11% of the catch limit, caught in 2007.

28. *Macrourus* spp. and *Raja taaf* were very common by-catch species during the survey conducted by Australia in May 2008, summarised in WG-FSA-08/57, indicating that previous by-catch records of rajids from the northern area of the division were likely to be *R. taaf*. The sex-specific size at maturity of *R. taaf* was estimated based on individuals caught in the survey, indicating that males and females have a median total length at maturity of 75.5 and 79.5 cm respectively. The majority of the catch ranged between 40 and 90 cm, indicating that juvenile females may be more vulnerable to longline gear.

Invertebrate by-catch including VME taxa

29. 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.

30. There are no VMEs or VME Risk Areas designated in Division 58.4.3b.

Incidental mortality of birds and mammals

Incidental mortality reported

31. Since 2006, when one white-chinned petrel (*Procellaria aequinoctialis*) was killed, there have been no observed incidental mortalities of seabirds in Division 58.4.3b.
32. No marine mammal interactions or mortalities were observed in 2014.

Mitigation measures

33. 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.
34. The risk level for seabirds in this fishery in Division 58.4.3b is category 3 (average) (SC-CAMLR-XXX, Annex 8, paragraph 8.1).

Ecosystem implications and effects

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

Current management advice and conservation measures

36. The limits on the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b are defined in CM 41-11. The limits in force are summarised in Table 5.

Table 5: Limits on the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b in force (CM 41-07).

Element	Limit in force
Access	No more than one vessel per country at any one time using longlines only
Catch limit	Precautionary catch limit for <i>Dissostichus</i> spp. of 0 tonnes outside areas of national jurisdiction.
Season	1 May to 31 August
By-catch	Regulated by CM 33-03
Seabird mitigation	In accordance with CM 25-02, Limit of three (3) seabirds per vessel fishing outside the prescribed season

(continued)

Table 5 (continued)

Element	Limit in force
Observers	At least one (1) scientific observer appointed in accordance with the CCAMLR Scheme of International Scientific Observation
Data	Daily and five-day catch and effort reporting Haul-by-haul catch and effort data Biological data reported by the CCAMLR scientific observer
Research	Fishery-based research in accordance with Annex 41-07/A and CM 41-01, including the collection of detailed catch, effort and biological data (Annex 41-01/A), setting of research hauls (Annex 41-01/B) and tagging (Annex 41-01/C), and CM 24-01. Toothfish tagged at a rate of at least five fish per tonne green weight caught
Environmental protection	Regulated by CMs 22-06, 22-07, 22-08 and 26-01