

**Fishery Report: Exploratory fishery for
Dissostichus spp. (TOT) in Division 58.4.2**

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Throughout this report the CCAMLR fishing season is represented by the year in which that season ended, e.g. 2012 represents the 2011/12 CCAMLR fishing season (from 1 December 2011 to 30 November 2012).

FISHERY REPORT: EXPLORATORY FISHERY FOR *DISSOSTICHUS* SPP. (TOT) IN DIVISION 58.4.2

1. Details of the fishery

1. The exploratory fishery for *Dissostichus* spp. in Division 58.4.2 was first agreed by the Commission in 2000. This was a trawl fishery which was permitted in association with a new fishery for *Chaenodraco wilsoni*, *Lepidonotothen kempfi*, *Trematomus eulepidotus* and *Pleuragramma antarcticum* (Conservation Measure (CM) 186/XVIII). The exploratory trawl fishery was also permitted in 2001 and 2002 in association with a new fishery for *Macrourus* spp. In 2003, the fishery for *Dissostichus* spp. in Division 58.4.2 changed to an exploratory longline fishery.

2. The limits on the exploratory fishery for *Dissostichus* spp. in Division 58.4.2 are described in CM 41-05. In 2012, the fishery was limited to Japanese, Korean, New Zealand, South African and Spanish vessels using longlines only. The precautionary catch limit for *Dissostichus* spp. was 70 tonnes, of which no more than 30 tonnes could be taken in small-scale research unit (SSRU) A and no more than 40 tonnes could be taken in SSRU E (Figure 1). The other SSRUs (B, C and D) were closed to fishing. The catch limits for by-catch species were defined in CM 33-03. Environmental protection in this fishery is regulated by CMs 22-06, 22-07, 22-08 and 26-01.

3. Three Members (Japan, South Africa and Spain) and a total of three vessels notified their intention to participate in the exploratory fishery for *Dissostichus* spp. in Division 58.4.2 in 2013.

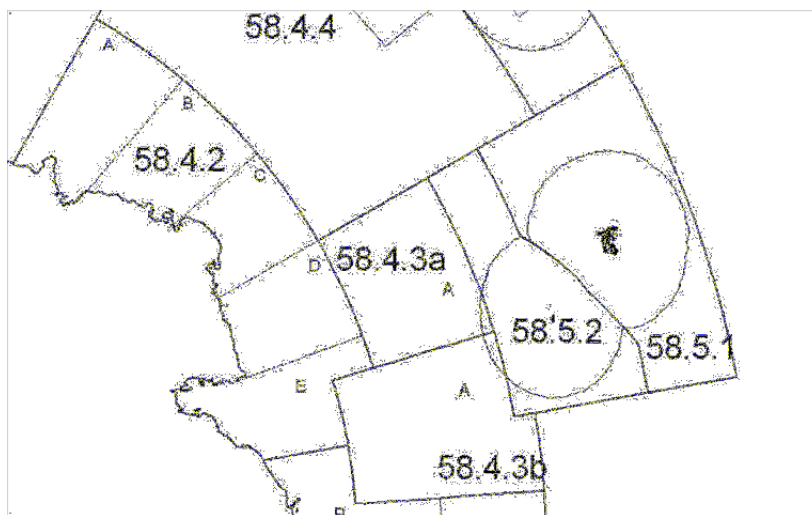


Figure 1: General map of Division 58.4.2 and location of SSRUs (A–E in that division).

1.1 Reported catch

4. Licensed longline vessels have fished the exploratory fishery for *Dissostichus* spp. in Division 58.4.2 since 2004, and the target species is *D. mawsoni* (Table 1). In 2012, two

vessels operated in the fishery and caught 53 tonnes of *Dissostichus* spp. in SSRU A (catch limit for *Dissostichus* spp.: 30 tonnes; final reported catch: 13 tonnes) and SSRU E (catch limit for *Dissostichus* spp.: 40 tonnes; final reported catch: 40 tonnes). SSRU E was closed on 3 March 2012.

Table 1(a): Catch history for *Dissostichus* spp. in Division 58.4.2. (Source: STATLANT data for past seasons, and catch and effort reports for current season, past reports for IUU catch.)

Season	Regulated fishery						Estimated IUU catch (tonnes)	Total removals (tonnes)
	Effort (number of vessels)		Catch limit (tonnes)	<i>Dissostichus</i> spp.				
	Limit	Reported		Reported catch (tonnes)				
				<i>D. eleginoides</i>	<i>D. mawsoni</i>	Total		
2003	1	1	500	<1	117	117	98	215
2004	-	1	500	<1	20	20	197	217
2005	8	4	780	1	125	126	86	212
2006	7	3	780	<1	163	164	192	356
2007	8	3	780	<1	124	124	288	412
2008	14	3	780	<1	216	217	0	217
2009	14	2	70	0	66	66	176	242
2010	8	1	70	0	93	93	432	525
2011	5	1	70	0	136	136	*	136
2012	5	2	70	0	53	53	*	53

* Not estimated

Table 1(b): Catch (tonnes) of *Dissostichus* spp. in Division 58.4.2 reported by SSRU. (Source: fine-scale data pro-rated by total reported catch in Table 1a.) SSRUs are as defined in CM 41-01.

Season	<i>D. eleginoides</i>					<i>D. mawsoni</i>				
	A	B	C	D	E	A	B	C	D	E
2003			<1		<1			17	16	84
2004					<1				5	14
2005			1		<1	62		15		48
2006					<1	4		4		156
2007	<1				<1	58				65
2008					<1	54		37		125
2009						5				61
2010						53				40
2011										136
2012						13				40

1.2 IUU catch

5. Information on IUU fishing indicated that over 1 400 tonnes of *Dissostichus* spp. had been taken during IUU fishing in Division 58.4.2 since 2003 (Table 1a). The total removal of *Dissostichus* spp. in 2010 was estimated at 525 tonnes and well in excess of the catch limit. The IUU catch of *Dissostichus* spp. in 2011 and 2012 was not estimated (SC-CAMLR-XXIX, paragraph 6.5).

1.3 Size distribution of catches

6. Length frequencies for *D. mawsoni* (TOA) for each season are presented in Figure 2. These length-frequency distributions of catches are unweighted and the interannual variability shown in the figure may reflect differences in the fished population but are also likely to be biased by changes in factors such as the characteristics/number of vessels in the fishery and the spatial and temporal distribution of fishing. A description of how length data are used in assessments is provided in the relevant section of this report. Most *D. mawsoni* caught in the fishery ranged from 50 to 175 cm in length (Figure 2). A distinct bimodal distribution was observed from 2003 to 2005, with broad modes at approximately 60–80 and 125–150 cm, while the distributions in following seasons have a mode at 125–160 cm. The detailed distribution of catches will have to be investigated in order to understand these changes.

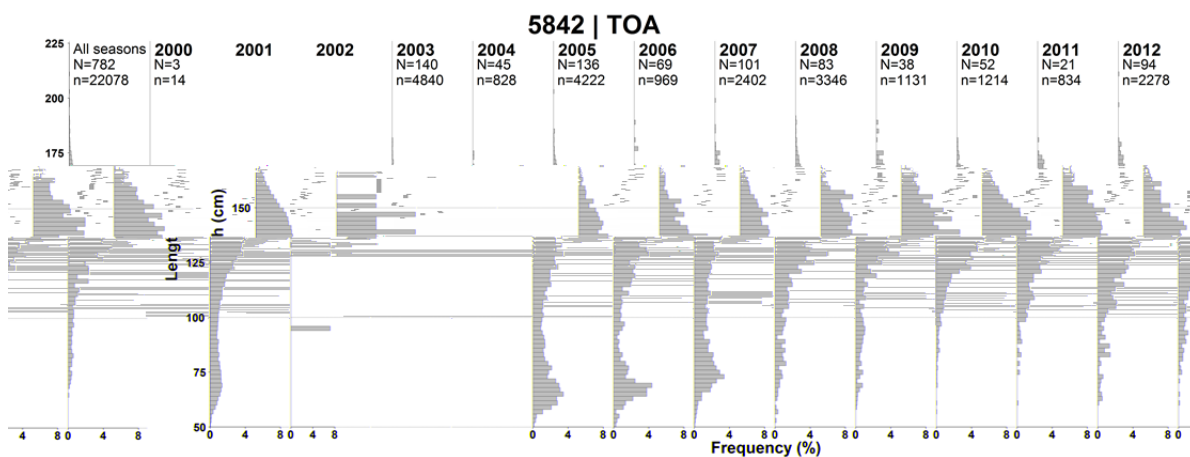


Figure 2: Length frequencies for *Dissostichus mawsoni* (TOA) in Division 58.4.2 from 2000 to present using observer data. The number of hauls (N) and the number of fish measured (n) in each year are given at the top of each panel.

2. Stocks and areas

7. The Working Group noted that the two-stock ‘east and west’ hypothesis presented in WG-FSA-08/43 could also be simply a differential immature/mature distribution of animals of one stock, as is seen in the Ross Sea. It was agreed that even though the very low number of tag-returns might support a two-stock hypothesis, the sample size is currently so low that both hypotheses are equally plausible.

8. The most likely areas where *D. mawsoni* spawn are the Pacific–Antarctic Ridge (SSRU 881B/C) north of the Ross Sea and the Amundsen Ridge (SSRU 881E) in the Amundsen Sea. In the Cooperation Sea (Division 58.4.2) the most likely area of spawning is BANZARE Bank. Spawning occurs in winter and may extend into autumn or spring (WG-FSA-08/14).

9. The Working Group noted that the results in WG-FSA-08/43 and Figures 3 and 4 confirm the hypotheses that juvenile fish inhabit mostly the shelf, while larger fish live on the slope and pre-spawning fish are found either on their northward spawning migration or inhabit the deeper slope.

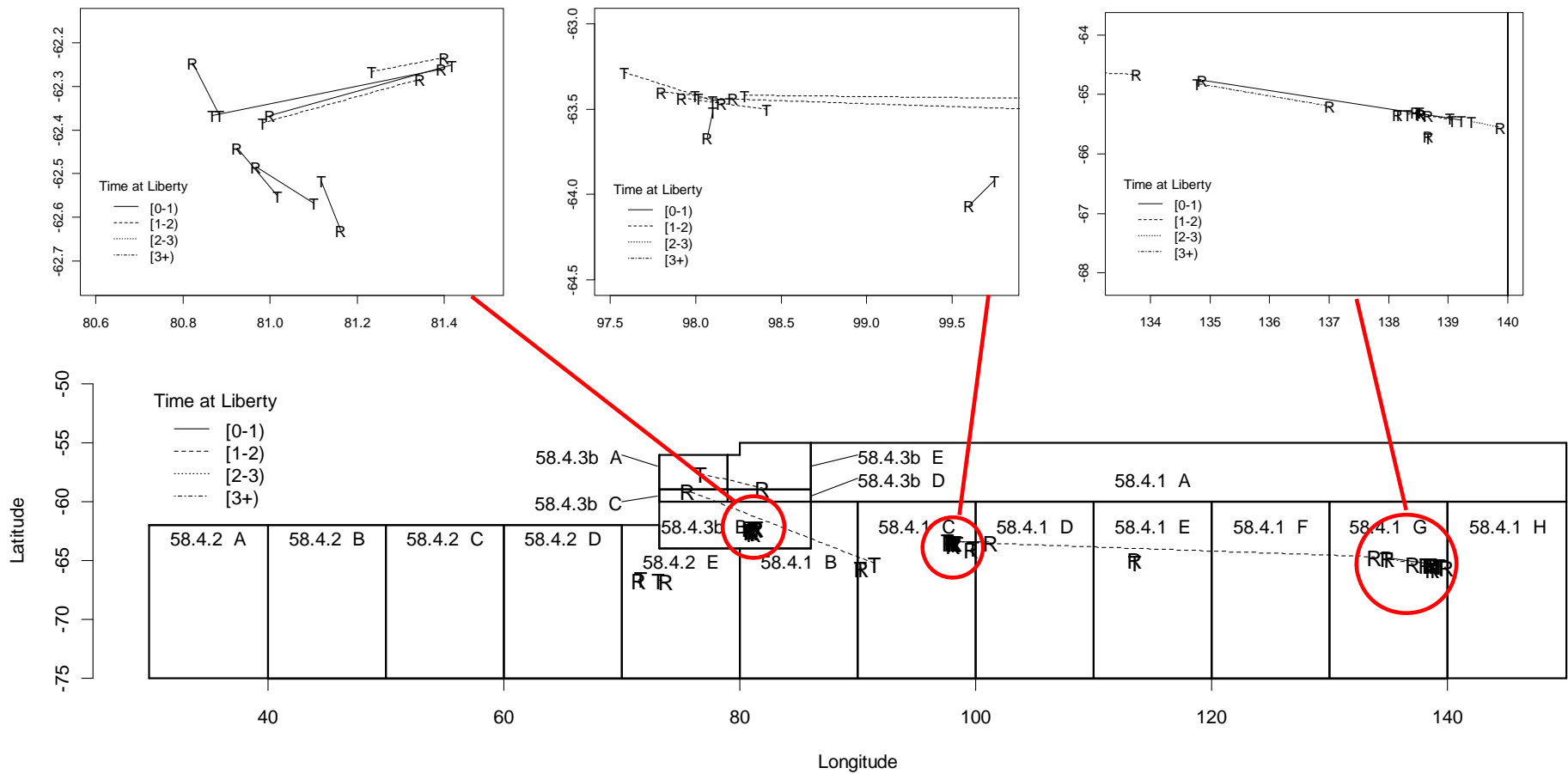


Figure 3: Plot of tag-recaptures of *Dissostichus mawsoni* in Divisions 58.4.1, 58.4.2 and 58.4.3b recorded between 2004 and 2010. 'T' indicates the release location and 'R' indicates the recapture location.

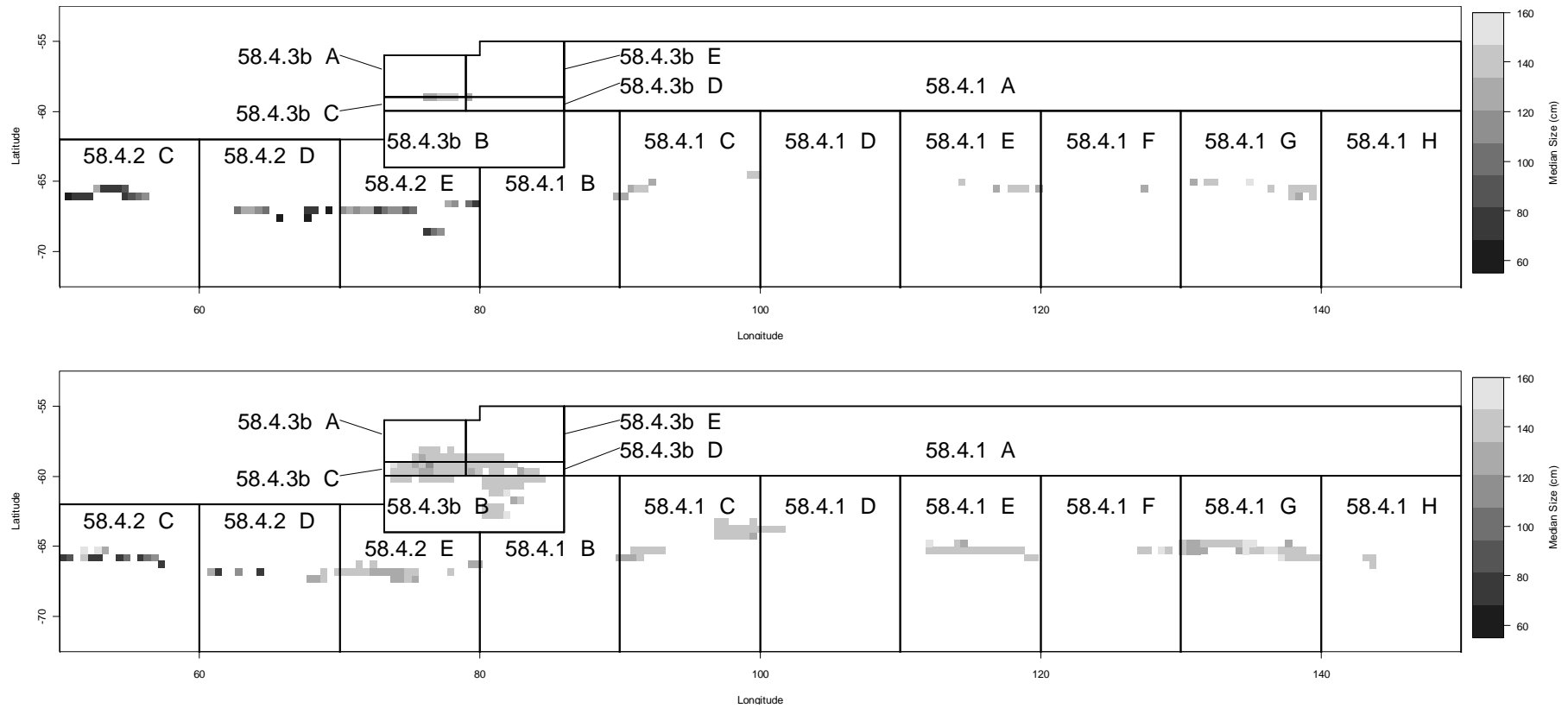


Figure 4: Plot of median lengths of *D. mawsoni* caught in Divisions 58.4.1, 58.4.2 and 58.4.3b between 2004 and 2009, aggregated into 0.5° latitude \times 0.5° longitude boxes. The upper panel shows data for fishing in depths shallower than 1 000 m, the lower panel for fishing in depths deeper than 1 000 m. Note: darker squares indicate smaller median length; lighter squares indicate larger median length.

3. Parameter estimation

3.1 Observations

10. Vessels operating in this fishery are required to conduct fishery-based research in accordance with CM 41-01. This includes the collection of detailed catch, effort and biological data (Annex 41-01/A), the setting of research lines (Annex 41-01/B) and participation in the tagging program (Annex 41-01/C).

11. Vessels, on first entry into an SSRU, are required to make 10 research longline hauls. The requirement for a further 10 research hauls during the course of fishing was removed in 2008 and since 2009 the starting position of research hauls has been allocated by the Secretariat. The number of research hauls reported in each SSRU are summarised in Table 2.

Table 2: Number of research longline hauls and total number of hauls (in brackets) reported by vessels operating in the exploratory fishery for *Dissostichus* spp. in Division 58.4.2. (Source: fine-scale data.) SSRUs are as defined in CM 41-01.

Season	Flag State	Vessel name	SSRU			
			A	C	D	E
2003	Australia	<i>Eldfisk</i>		21 (38)	16 (20)	20 (83)
2004	Australia	<i>Eldfisk</i>			10 (18)	19 (28)
2005	Chile	<i>Globalpesca II</i>	20 (22)			8 (8)
	Korea, Republic of	<i>Bonanza No. 707</i>	15 (53)	0 (18)		
	New Zealand	<i>Janas</i>	15 (17)			20 (27)
2006	Spain	<i>Arnela</i>				13 (20)
	Chile	<i>Globalpesca I</i>	8 (8)	4 (4)		19 (35)
	Korea, Republic of	<i>Insung No. 2</i>				20 (42)
2007	Spain	<i>Galaecia</i>				19 (21)
	Korea, Republic of	<i>Insung No. 1</i>	10 (19)			2 (2)
		<i>Jung Woo No. 2</i>	16 (38)			
2008	Namibia	<i>Antillas Reefer</i>				19 (55)
	Korea, Republic of	<i>Insung No. 1</i>	20 (27)	10 (15)		
	Namibia	<i>Antillas Reefer</i>	20 (22)			
2009		<i>Paloma V</i>				20 (46)
	Japan	<i>Shinsei Maru No. 3</i>	*5 (5)			10 (15)
	Korea, Republic of	<i>Insung No. 22</i>				10 (21)
2010	Korea, Republic of	<i>Insung No. 2</i>	10 (10)			10 (47)
2011	Korea, Republic of	<i>Insung No. 7</i>				10 (22)
2012	Korea, Republic of	<i>Hong Jin No. 701</i>				31 (73)
	South Africa	<i>Koryo Maru No. 11</i>	13 (22)			

* SSRU closed while vessel undertaking research hauls.

12. Since 2012, vessels have been required to tag and release *Dissostichus* spp. at a rate of five fish per tonne of green weight caught. Prior to this time, vessels were required to tag and release at a rate of three fish per tonne of green weight, and a limit of 500 fish tagged per vessel applied until the end of 2007. A total of 2 608 *D. mawsoni* and 36 *D. eleginoides* have been tagged and released, and two recaptures (both *D. mawsoni*) have been reported from that division (Table 3).

Table 3: Number of individuals of *Dissostichus* spp. (a) tagged and released and (b) tagging rates reported by vessels operating in the exploratory fishery for *Dissostichus* spp. in Division 58.4.2 since 2007, and (c) total number of tagged fish released and recaptured. (Source: observer data and catch and effort reports.)

(a) Number of individuals of *Dissostichus* spp. tagged and released. The number of *D. eleginoides* is indicated in brackets.

Flag State	Vessel name	Season					
		2007	2008	2009	2010	2011	2012
Japan	<i>Shinsei Maru No. 3</i>			60 (1)			
Korea, Republic of	<i>Hong Jin No. 701</i>						203 (0)
	<i>Insung No. 1</i>	88 (0)	248 (0)				
	<i>Insung No. 2</i>				291 (0)		
	<i>Insung No. 7</i>					408 (0)	
	<i>Insung No. 22</i>			217 (7)			
Namibia	<i>Jung Woo No. 2</i>	74 (0)					
	<i>Antillas Reefer</i>	86 (0)	48 (1)				
	<i>Paloma V</i>		377 (9)				
South Africa	<i>Koryo Maru No. 11</i>						66 (3)

(b) Tagging rate (number of fish tagged per tonne of green weight caught) of *Dissostichus* spp.

Flag State	Vessel name	Season					
		2007	2008	2009	2010	2011	2012
Japan	<i>Shinsei Maru No. 3</i>			3.1			
Korea, Republic of	<i>Hong Jin No. 701</i>						5.0
	<i>Insung No. 1</i>	4.4	3.0				
	<i>Insung No. 2</i>				3.1		
	<i>Insung No. 7</i>					3.0	
	<i>Insung No. 22</i>			4.6			
Namibia	<i>Jung Woo No. 2</i>	1.9					
	<i>Antillas Reefer</i>	1.3	5.4				
	<i>Paloma V</i>		3.0				
South Africa	<i>Koryo Maru No. 11</i>						5.2
Required rate		3	3	3	3	3	5

(c) Total number of tagged *Dissostichus* spp. released and recaptured in Division 58.4.2.

Season	Number tagged and released			Number recaptured		
	<i>D. eleginoides</i>	<i>D. mawsoni</i>	Total	<i>D. eleginoides</i>	<i>D. mawsoni</i>	Total
2005	14	328	342			
2006	1	135	136			
2007	0	248	248			
2008	10	663	673			
2009	8	269	277	0	1	1
2010	0	291	291	0	1	1
2011	0	408	408			
2012	3	266	269			
Total	36	2608	2644	0	2	2

13. Vessels catching more than 2 tonnes of *Dissostichus* spp. in an exploratory fishery were required to achieve a minimum tag-overlap statistic¹ of 50% in 2011 and 60% from 2012 onwards (Annex 41-01/C). The vessels fishing in Division 58.4.2 in 2012 achieved a tag-overlap statistic of 48% to 78% (Table 4).

Table 4: Time series of the tag-overlap statistic (CM 41-01) for *Dissostichus mawsoni* and *D. eleginoides* tagged in Division 58.4.2. The statistic was implemented in 2011, and comparative values were calculated for previous seasons. Values were not calculated for total catches of less than 2 tonnes (*) and length data were aggregated by 10 cm length intervals. Only vessels fishing in CCAMLR fisheries in 2012 are listed in the table.

Species	Flag State	Vessel name	Season					
			2007	2008	2009	2010	2011	2012
<i>D. mawsoni</i>	Japan	<i>Shinsei Maru No. 3</i>			36			
	Korea, Republic of	<i>Hong Jin No. 701</i>						78
		<i>Jung Woo No. 2</i>	29					
<i>D. eleginoides</i>	South Africa	<i>Koryo Maru No. 11</i>						48
	Japan	<i>Shinsei Maru No. 3</i>			*			
	Korea, Republic of	<i>Jung Woo No. 2</i>	*					
	South Africa	<i>Koryo Maru No. 11</i>						*

3.2 Fixed parameter values

14. None available for this fishery.

4. Stock assessment

15. There is no stock assessment for this data-poor exploratory fishery.

5. By-catch of fish and invertebrates

5.1 By-catch removals

16. Catches of by-catch species groups (macrourids, rajids and other species) reported in each season, their respective catch limits, and number of rajids cut from lines and released alive are summarised in Table 5. The by-catch in this fishery consists predominantly of macrourids (up to 28 tonnes per season). Catches of rajids of up to 3 tonnes per season have been reported.

17. The Working Group noted that the reported catch of macrourids in the fishery in 2005 was relatively higher (22% of the catch of *Dissostichus* spp.) when fishing was concentrated in SSRU A, than in other seasons (2–10% of the catch of *Dissostichus* spp.) when fishing was concentrated in SSRU E.

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).

Table 5: Catch history for by-catch species (macrourids, rajids and other species), catch limits and number of rajids released alive in Division 58.4.2. 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)
2003	250	12	250	0	-	100	1
2004	80	1	50	0	-	100	<1
2005	124	28	50	3	3	60	2
2006	124	4	50	0	-	60	1
2007	124	7	50	0	-	60	<1
2008	124	12	50	0	-	60	1
2009	20	1	50	0	-	40	<1
2010	20	4	50	0	7	40	<1
2011	20	<1	50	0	-	40	<1
2012	20	1	50	0	-	40	<1

5.2 Assessment of impacts on affected populations

18. None available for this fishery.

5.3 Identification of levels of risk

19. None available for this fishery.

5.4 Mitigation measures

20. Catch limits for by-catch species groups (macrourids, rajids and other species) are provided in CM 33-03.

6. Incidental mortality of birds and mammals

6.1 Incidental mortality reported

21. There have been no observed seabird or marine mammal mortalities in Division 58.4.2.

6.2 Identification of levels of risk

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

6.3 Mitigation measures

23. CM 25-02 applies to this fishery and in recent years has been linked to an exemption for night setting in CM 24-02 and subject to a seabird by-catch limit. Offal and other discharges are regulated under CM 26-01.

7. Ecosystem implications/effects

24. No evaluation available for this fishery.

8. Harvest controls and management advice

8.1 Conservation measures

25. The limits on the exploratory fishery for *Dissostichus* spp. in Division 58.4.2 are defined in CM 41-05. The limits in force and the Working Group's advice to the Scientific Committee for the forthcoming season are summarised in Table 6.

Table 6: Limits on the exploratory fishery for *Dissostichus* spp. in Division 58.4.2 in force (CM 41-05) and advice to the Scientific Committee for 2013.

Element	Limit in force	Advice for 2013
Catch limit	Precautionary catch limit for <i>Dissostichus</i> spp. was 70 tonnes, and catch limits for each SSRU was as follows: A – 30 tonnes; B – 0 tonnes; C – 0 tonnes; D – 0 tonnes; E – 40 tonnes.	Carry forward
Season	1 December to 30 November	Same period
By-catch	Regulated by CM 33-03	Carry forward
Mitigation	In accordance with CM 25-02, except paragraph 5 if requirements of CM 24-02 are met. Limit of three (3) seabirds per vessel during daytime setting.	Carry forward
Observers	At least two (2) scientific observers, one of whom shall be appointed in accordance with the CCAMLR Scheme of International Scientific Observation.	Carry forward
Data	Daily and five-day catch and effort reporting Haul-by-haul catch and effort data Biological data reported by the CCAMLR scientific observer.	Carry forward Carry forward Carry forward
Research	Fishery-based research in accordance with 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). Toothfish tagged at a rate of at least five fish per tonne green weight caught.	Carry forward Carry forward
Environmental protection	Regulated by CMs 22-06, 22-07, 22-08 and 26-01.	Carry forward

8.2 Management advice

26. The advice of WG-FSA in respect of research plans for exploratory fisheries in this Division (and Division 58.4.1) are presented in the main text, paragraphs 5.58 to 5.82. The Scientific Committee noted this advice (SC-CAMLR-XXXI, paragraphs 3.142 to 3.145) and agreed that fishing should only occur in the research blocks in SSRUs D, E and G as shown in Figure 5.



Figure 5: Research blocks for proposed research in Divisions 58.4.1 and 58.4.2 in 2013.