

**FISHERY REPORT: EXPLORATORY FISHERY
FOR *DISSOSTICHUS* SPP. IN DIVISION 58.4.3b**

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FISHERY REPORT: EXPLORATORY FISHERY FOR *DISSOSTICHUS* SPP. IN DIVISION 58.4.3B

1. Details of the fishery

The longline fishery for *Dissostichus* spp. in Division 58.4.3 began as a new fishery in 1996/97 (CM 113/XV). Following the Commission's decision that high levels of IUU fishing for *Dissostichus* spp. in the Convention Area had rendered it unrealistic to consider this fishery as 'new' (CCAMLR-XVIII, paragraph 10.14), and 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 in 2000/01: exploratory trawl fisheries on BANZARE Bank (CM 203/XIX) and Elan Bank (CM 205/XIX); and exploratory longline fisheries outside areas of national jurisdiction on BANZARE Bank (CM 204/XIX) and Elan Bank (CM 206/XIX).

2. In 2001, the boundaries of Division 58.4.3 were rearranged on the basis of ecological considerations, and two new divisions were formed: Division 58.4.3a (Elan Bank) and Division 58.4.3b (BANZARE Bank) (see Figure 1). The Commission agreed to exploratory fisheries for *Dissostichus* spp. in each of these new divisions, outside areas of national jurisdiction. In 2007, the division was subdivided into 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. Since 2009/10, operations in this fishery have been limited to research fishing only, in accordance with CM 24-01.

3. In 2010/11, the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b was limited to research fishing conducted by one Japanese vessel using longlines only, and in accordance with CM 24-01 (CM 41-07). Environmental protection in this fishery is regulated by CMs 22-06, 22-07, 22-08 and 26-01.

4. One Member (Japan, one vessel) notified its intention to conduct research in the closed fishery for *Dissostichus* spp. in Division 58.4.3b in 2011/12 and the Working Group recommended a research catch limit of 41 tonnes for 2011/12. The analysis that led to this catch level was based on an initial biomass estimate using the catch rate-seabed area comparison method with a discount factor and a precautionary exploitation rate of 0.01 (main report, paragraphs 5.34).

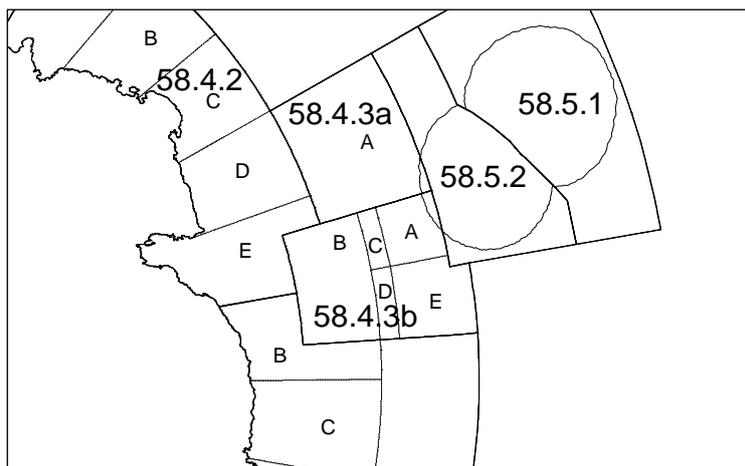


Figure 1: General map of Division 58.4.3b (BANZARE Bank). This division consists of SSRUs A to E.

1.1 Reported catch

5. Licensed longline vessels have fished the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b since 2003/04, and the target species is *D. mawsoni* although some catches of *D. eleginoides* have also been reported since 2005/06 (Table 1). In 2010/11, one Member (Japan) and one vessel participated in research fishing, and reported a total catch of 11 tonnes of *Dissostichus* spp.

Table 1: Catch history for *Dissostichus* spp. in Division 58.4.3b (source: STATLANT data for past seasons, and catch and effort reports for current season, WG-FSA-11/10 and 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		
2003/04	6	1	300	1	6	7	-	7
2004/05	5	4	300	<1	297	297	1015	1 312
2005/06	5	4	300	44	317	361	1903	2 264
2006/07	6	4	300	74	176	251	3226	3477
2007/08	6	4	200*	42	101	142	360	502
2008/09	6	2	120	15	89	104	610	714
2009/10	4	1	0 (72)**	2	12	14	171	185
2010/11	1	1	0 (15)**	2	9	11	***	11

* Includes 50 tonnes for research fishing.

** Research catch limit in brackets.

*** Not estimated.

1.2 IUU catch

6. Information on IUU activities indicated high levels of IUU fishing between 2004/05 and 2006/07, peaking with an estimated IUU catch of *Dissostichus* spp. of 3 226 tonnes in 2006/07 (approximately 10 times the catch limit at that time; Table 1). The IUU catch of *Dissostichus* spp. in 2010/11 was not estimated (SC-CAMLR-XXIX paragraph 6.5).

1.3 Size distribution of catches

7. Most *D. mawsoni* caught in the fishery ranged from 110 to 170 cm in length, with a broad mode at approximately 130–160 cm (Figure 2). *Dissostichus eleginoides* ranged from 50 to 180 cm in length, with a broad mode at approximately 80–130 cm (Figure 2), although it is likely some *D. eleginoides* were misidentified as *D. mawsoni* prior to 2006/07.

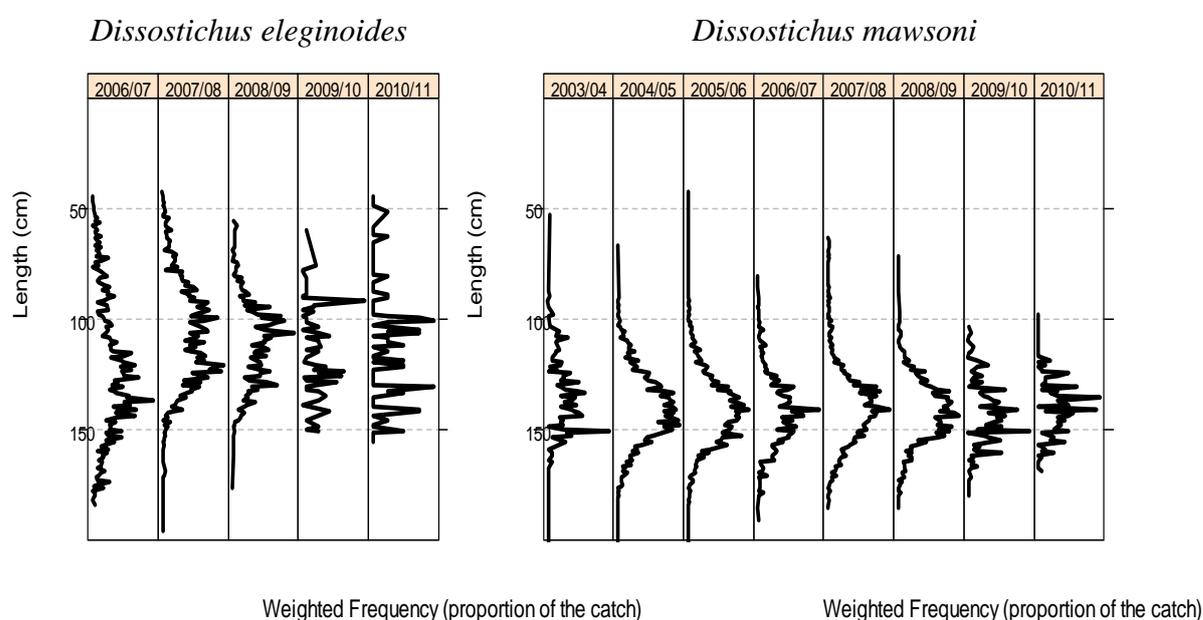


Figure 2: Catch-weighted length frequencies for *Dissostichus eleginoides* and *Dissostichus mawsoni* in Division 58.4.3b (source: observer and fine-scale data).

2. Stocks and areas

8. The most likely areas where *D. mawsoni* spawn are the Pacific Antarctic Ridge north of the Ross Sea and the Amundsen Ridge in the Amundsen Sea. In East Antarctica the most likely area of spawning is BANZARE Bank and nearly all *D. mawsoni* caught in the fishery in Division 58.4.3b are mature. Spawning occurs in winter and may extend into autumn or spring (WG-FSA-08/14).

9. The Working Group noted a single tag-recovery in Division 58.4.3b of a fish released in Division 58.4.1 confirms some level of linkage between these stocks.

3. Parameter estimation

3.1 Observations

10. A demersal trawl survey has been undertaken in this area in 1999, which caught only two fish of *Dissostichus* spp. in 40 shots taken across the area (SC-CAMLR-XVIII, Annex 5, paragraph 3.79; WG-FSA-99/69).

11. 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).

12. 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 in 2008/09, the starting position of research hauls was allocated by the Secretariat. In 2009/10, each vessel was allocated a sampling sector with 24 research haul locations. In 2010/11, research fishing was conducted in accordance with a research plan submitted under CM 24-01. The number of research hauls reported in fine-scale data are summarised in Table 2.

13. Vessels are also required to tag and release *Dissostichus* spp. at a rate of three fish per tonne of green weight caught, and a limit of 500 fish tagged per vessel applied until the end of 2006/07. A total of 1 177 *D. mawsoni* and 370 *D. eleginoides* (total 1 590 fish) have been tagged and released and 10 *D. mawsoni* and one *D. eleginoides* have been recaptured in this division (Table 3).

14. In 2010, the Commission required each vessel catching more than 2 tonnes of *Dissostichus* spp. in an exploratory fishery to achieve a minimum tag overlap statistic of 50% in 2010/11 and of 60% from 2011/12 onwards (Annex 41-01/C). The vessel fishing in Division 58.4.3b in 2010/11 achieved a tag overlap statistic greater than 50% (80 to 85%, Table 4).

Table 2: Research (R) and commercial (C) longline hauls reported by vessels operating in the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b (source: fine-scale data).

Season	Flag State	Vessel name	SSRU	Number of hauls		
				R	C	Total
2003/04	Australia	<i>Eldfisk</i>	-	13	6	19
2004/05	Chile	<i>Globalpesca II</i>	-	10	9	19
	Korea, Republic of	<i>Yeon Seong No. 829</i>	-	10	6	16
	Spain	<i>Arnela</i>	-	30	67	97
		<i>Galaecia</i>	-	20	8	28
2005/06	Chile	<i>Globalpesca I</i>	-	11		11
	Spain	<i>Galaecia</i>	-	21	47	68
		<i>Tronio</i>	-	6	63	69
2006/07	Uruguay	<i>Paloma V</i>	-	23	20	43
	Japan	<i>Shinsei Maru No. 3</i>	-	20	128	148
	Namibia	<i>Antillas Reefer</i>	-	18	32	50
	Spain	<i>Tronio</i>	-	20	17	37
	Uruguay	<i>Paloma V</i>	-	20	27	47

(continued)

Table 2 (continued)

Season	Flag State	Vessel name	SSRU	Number of hauls		
				R	C	Total
2007/08	Japan	<i>Shinsei Maru No. 3</i>	North 60°S	20	114	134
	Namibia	<i>Antillas Reefer</i>	North 60°S	20	6	26
	Uruguay	<i>Banzare</i>	North 60°S	10	7	17
2008/09	Japan	<i>Shinsei Maru No. 3</i>	A	10	18	28
		<i>Shinsei Maru No. 3</i>	E	10	8	18
	Uruguay	<i>Banzare</i>	D	10	16	26
		<i>Banzare</i>	E	10	13	23
2009/10	Japan	<i>Shinsei Maru No. 3</i>	Sector SE	24	0	24
2010/11	Japan	<i>Shinsei Maru No. 3</i>	-	24	0	24

Table 3: Number of individuals of *Dissostichus* spp. tagged and released (a) and tagging rates (b) reported by vessels operating in the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b since 2006/07, and total number of tagged fish released and recaptured (c) (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				
		2006/07	2007/08	2008/09	2009/10	2010/11
Australia	<i>Janas</i>		15 (9)			
Chile	<i>Globalpesca I</i>					
Japan	<i>Shinsei Maru No. 3</i>	112 (37)	346 (120)	126 (74)	60 (8)	62 (16)
Namibia	<i>Antillas Reefer</i>	49 (47)	13 (1)			
Spain	<i>Galaecia</i>					
	<i>Tronio</i>	81 (0)				
Uruguay	<i>Banzare</i>		43 (*)	230 (1)		
	<i>Paloma V</i>	47 (43)				

* 43 *Dissostichus* spp. (species not identified).

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

Flag State	Vessel name	Season				
		2006/07	2007/08	2008/09	2009/10	2010/11
Australia	<i>Janas</i>		6.4			
Chile	<i>Globalpesca I</i>					
Japan	<i>Shinsei Maru No. 3</i>	1.0	3.2	3.2	4.3	5.8
Namibia	<i>Antillas Reefer</i>	2.1	0.6			
Spain	<i>Galaecia</i>					
	<i>Tronio</i>	1.0				
Uruguay	<i>Banzare</i>		4.5	3.6		
	<i>Paloma V</i>	1.2				
Required rate		1	3	3	4	5

(c) Total number of tagged *Dissostichus* spp. released and recaptured in Division 58.4.3b.

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
2004/05	10	221	231	0	1	1
2005/06	4	171	175	0	6	6
2006/07	127	162	289	0	1	1
2007/08	130	244	417*	0	1	1
2008/09	75	281	356	0	1	1
2009/10	8	52	60	1	0	1
2010/11	16	46	62	0	0	0
Total	370	117	1590	1	10	11

* Includes 43 *Dissostichus* spp. (species not identified).

Table 4: Time series of the tag overlap statistic (CM 41-01) for *Dissostichus mawsoni* and *D. eleginoides* tagged in Division 58.4.3b. The statistic was implemented in 2010/11, 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.

Species	Flag State	Vessel name	2006/07	2007/08	2008/09	2009/10	2010/11
<i>D. mawsoni</i>	Japan	<i>Shinsei Maru No. 3</i>	29	48	36	55	85
	Spain	<i>Tronio</i>	65				
<i>D. eleginoides</i>	Japan	<i>Shinsei Maru No. 3</i>	36	36	21	29	80

3.2 Fixed parameter values

15. None available for this fishery.

4. Stock assessment

16. The catch limits in this fishery were agreed by the Commission based on advice provided by the Scientific Committee. Analysis provided in WG-FSA-07/44, based on fine-scale catch and effort data, indicates that CPUE data for BANZARE Bank show high levels of heterogeneity in catch and effort, making the production of a standardised CPUE series difficult. The Working Group concluded that the combination of high IUU and legal fishing focusing in small areas was resulting in a severe decline in CPUE, indicating unsustainable depletion of toothfish in the main areas where fishing data are available.

17. A random longline survey was carried out in this division by Australia in May 2008 (WG-FSA-08/57). The paper concluded that catch rates of *Dissostichus* spp. were very low, consistent with toothfish being depleted to low densities across the surveyed area. It also noted that only very large *Dissostichus* spp. were present in the area. The precision of the average catch rate was not reported in WG-FSA-08/57 but was further calculated during the 2007/08 Working Group meeting using the methods described in Candy (2004) which gave an approximate 95% confidence bound of between 17 and 60 kg/thousand hooks. This indicates that catch rates can be considered small relative to other areas such as Subarea 88.1.

18. The Working Group noted that only two of the three preferred fishing grounds in the area were covered by the random survey. However, the random nature of the survey implies the area was adequately covered. Japan noted it would have liked to see the third preferred fishing grounds surveyed and a larger number of stations sampled to provide a more robust estimate of biomass. The Working Group recommended that WG-SAM should look at how to design longline surveys and, in particular, how to deal with preferred fishing grounds, and how to reconcile datasets from different types of fishing gear.

19. The Working Group agreed in 2008 (SC-CAMLR-XXVII, Annex 5, paragraph 5.57) that:

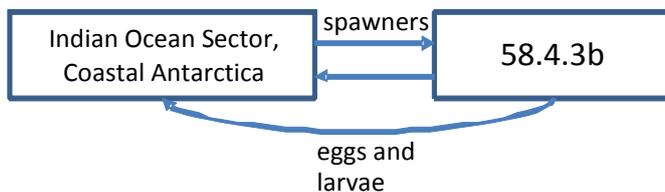
- (i) based on fishing information until 2006/07, the fisheries across BANZARE Bank show that the preferred fishing grounds were depleted in the Southern Area (adopted by WG-FSA-07, resulted in the closure of the Southern Area)
- (ii) based on the survey and fisheries across BANZARE Bank, there are very few fish apart from in the preferred fishing grounds
- (iii) the fish found in the preferred fishing grounds are large and likely spawning, there are no small fish and fish are male dominated (79%)
- (iv) in the survey, the fish are large and mostly male
- (v) spawning fish in East Antarctica have only been found on BANZARE Bank (WG-FSA-07/44 and SC-CAMLR-XXVII, paragraph 3.32).

20. In 2009, the Working Group considered three possible scenarios for the *D. mawsoni* stock on BANZARE Bank, based on existing knowledge (SC-CAMLR-XXVIII, Annex 5, paragraph 5.57):

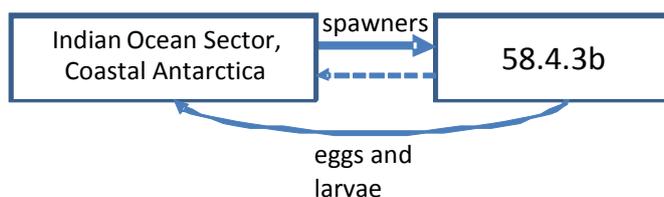
- (i) Scenario 1: spawning fish have a high turnover in Division 58.4.3b, moving freely within this division between SSRUs and areas outside each year.
- (ii) Scenario 2: spawning fish move sporadically to Division 58.4.3b, and then remain in the area, moving little across the area between years.
- (iii) Scenario 3: there is large turnover of large fish in Division 58.4.3b, but they represent only a fraction of the spawning stock that sustains the population in East Antarctica.

21. It further noted that due to their proximity, the fish on BANZARE Bank are likely to originate from the coastal areas of Antarctica in the Southern Indian Ocean. The Working Group noted that other plausible scenarios could be envisioned, however, it saw that the three scenarios captured useful alternative hypotheses for this division (Figure 3).

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

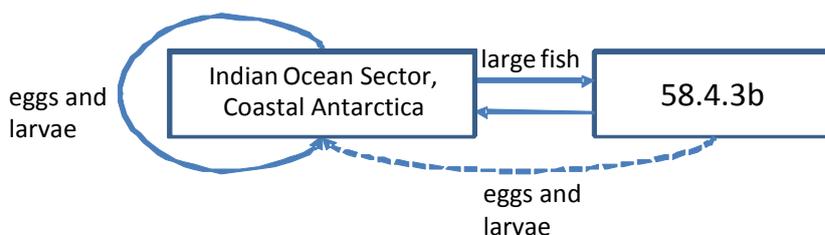


Figure 3: Diagram illustrating possible scenarios for the *Dissostichus mawsoni* stock on BANZARE Bank (Division 58.4.3b). Solid arrows indicate regular movements of fish, dashed arrows indicate sporadic movement of fish.

22. The Working Group then considered the data and analyses on CPUE, size distribution and tagging from Division 58.4.3b (SC-CAMLR-XXVIII, Annex 5, paragraph 5.60). The Working Group agreed that CPUE data indicated that:

- (i) depletion had occurred during fishing in Patch B in 2007/08 and Patch C in the 2008/09 season, but the results of the depletion analysis were ambiguous for Patch A and for Box C (see Figure 4 for location of grounds and patches);
- (ii) unstandardised CPUE for the whole of Division 58.4.3b had increased between 2003/04 and 2008/09 (Figure 5);
- (iii) CPUE is affected by factors such as gear and bait type, vessel, season, depth fished, species and area fished, and these have serious consequences for interpreting unstandardised CPUE (SC-CAMLR-X, Annex 6, paragraphs 7.107 to 7.121, SC-CAMLR-XI, Annex 5, paragraphs 6.143 to 6.166).

23. Scientific fishing undertaken by Japan in the southeast sector of four designated sampling sectors (CM 41-07, Annex A, Figure 1) during 2009 (WG-FSA-10/45) indicated that CPUE was lower than for previous seasons' catch rates from the northwestern sector.

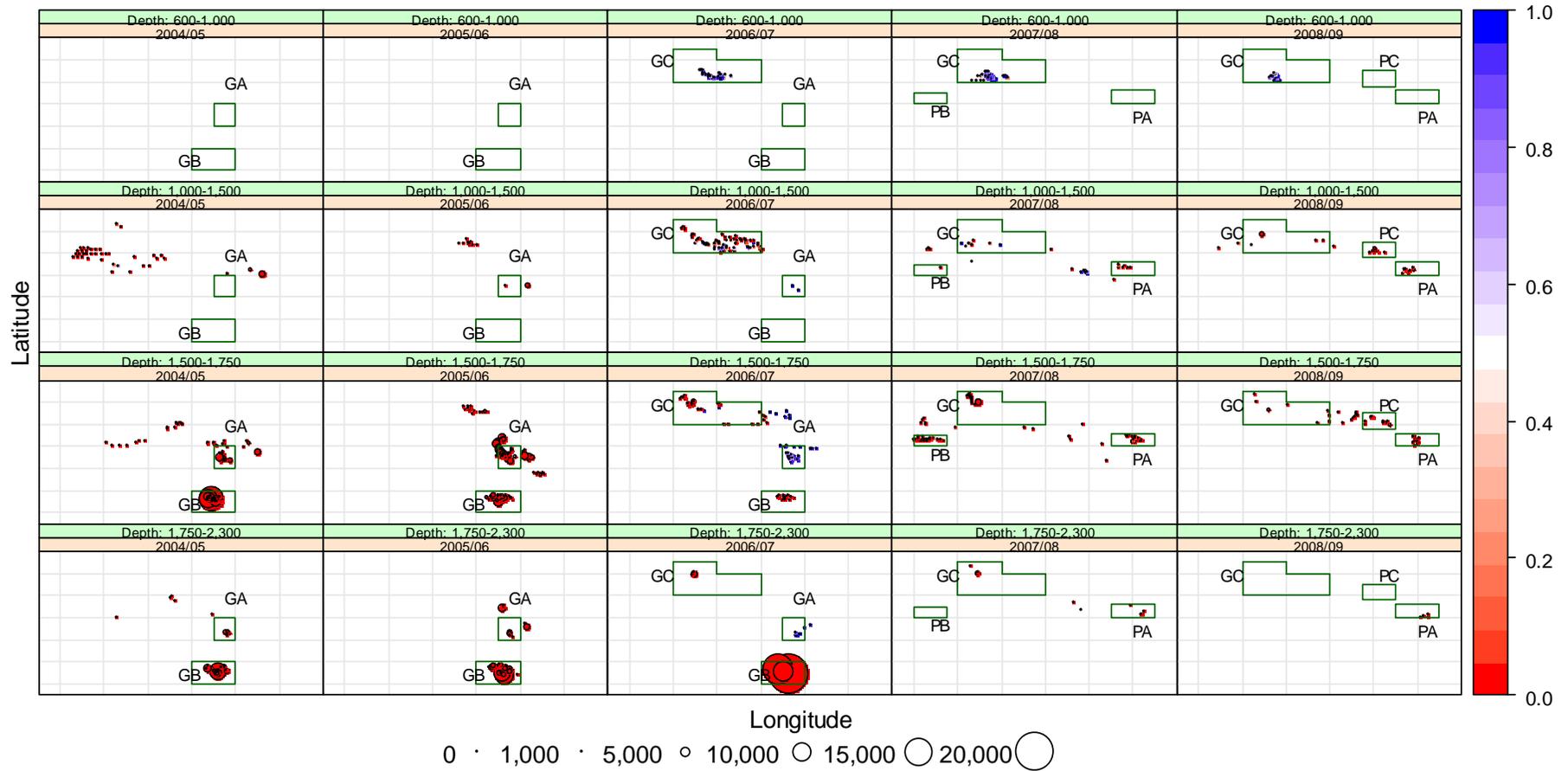


Figure 4: Bubbleplot showing total toothfish removals (kg) proportional to symbol size for individual longlines fished in BANZARE Bank, showing different panels for season and depth fished. Colour on a red-blue gradient represents *Dissostichus eleginoides* catch as a proportion of total catch (i.e. blue – *D. eleginoides*, red – *D. mawsoni*). Also shown are Grounds A–C defined in McKinlay et al. (2008) and Patches A–C defined in WG-FSA-09/44, and the seasons in which they were analysed.

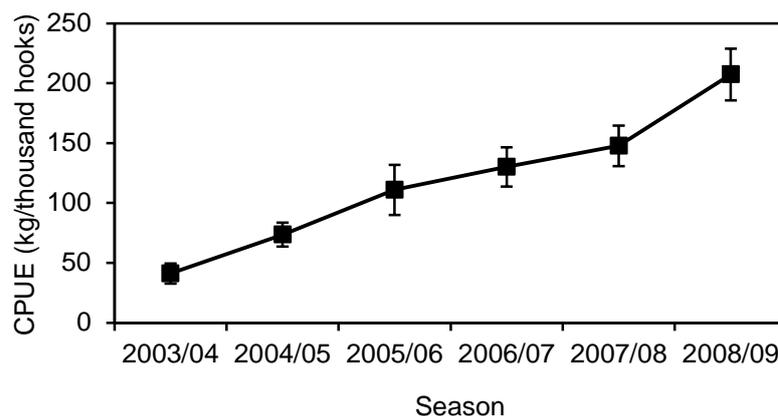


Figure 5: Unstandardised CPUE (kg/thousand hooks) of *Dissostichus* spp. in the exploratory longline fishery in Division 58.4.3b (source: fine-scale catch and effort data). Error bars: 95% confidence limits.

CPUE rates observed in the survey were lower than those observed for commercial fishing. The Working Group noted that this indicated that the abundance of fish in the survey area was low, and that higher CPUE observed in previous seasons may be a reflection of the aggregated nature of commercial fishing, whereby fishers aggregate to areas where catch rates are highest, but that other factors – such as removals by IUU fishing – could also be contributing to these results. It was noted by the Working Group that the sampling design undertaken for this research was not submitted for review by any SC-CAMLR Working Group, and that future research plans should be reviewed by WG-FSA.

24. In 2009, the Working Group also agreed that tagging data indicated that (SC-CAMLR-XXVIII, Annex 5, paragraph 5.61):

- (i) of 10 recaptured *D. mawsoni* in Division 58.4.3b, nine were released in Division 58.4.3b and one was released in Division 58.4.1 (Figure 6). The one recaptured *D. eleginoides* was released in Division 58.4.3b (Figure 7)
- (ii) large movements of fish have been observed for fish at liberty for two years or more, and tend to be from the east to the west in coastal Antarctica, or from the coast to BANZARE Bank
- (iii) stocks of *D. mawsoni* are likely to be distinct at the scale of ocean basins (see also citation of Smith and Gaffney, 2005).

25. Exploratory longline fishing during 2007–2009 indicated *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. The Working Group recommended that authors of such reviews should consider collaborating to synthesize current knowledge.

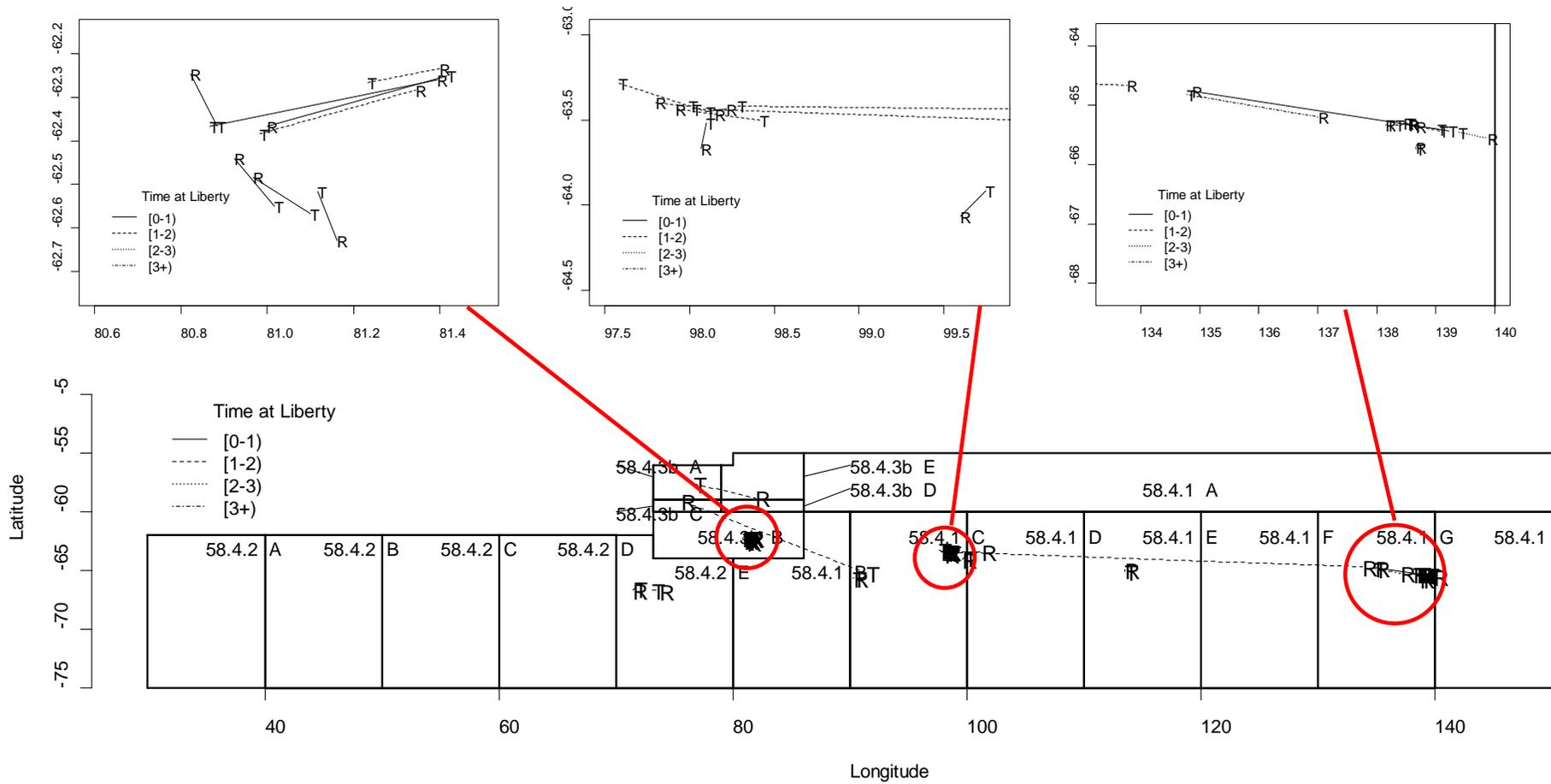


Figure 6: Plot of tag recaptures of *Dissostichus mawsoni* in Divisions 58.4.1, 58.4.2 and 58.4.3b recorded between 2003/04 and 2009/10. 'T' indicates the release location and 'R' indicates the recapture location.

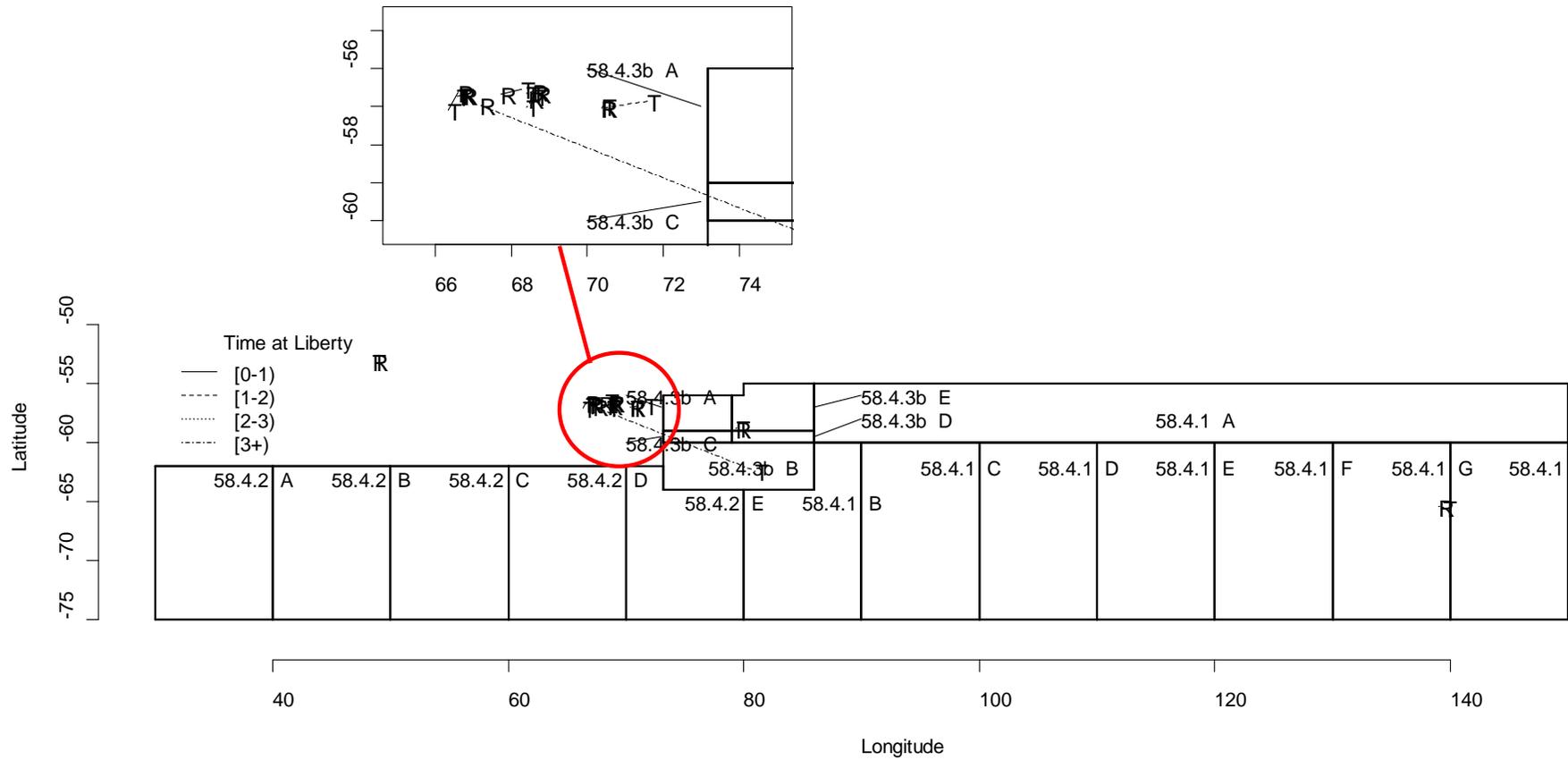


Figure 7: Plot of tag recaptures of *Dissostichus eleginoides* in Divisions 58.4.1, 58.4.2 and 58.4.3b recorded between 2003/04 and 2009/10. 'T' indicates the release location and 'R' indicates the recapture location.

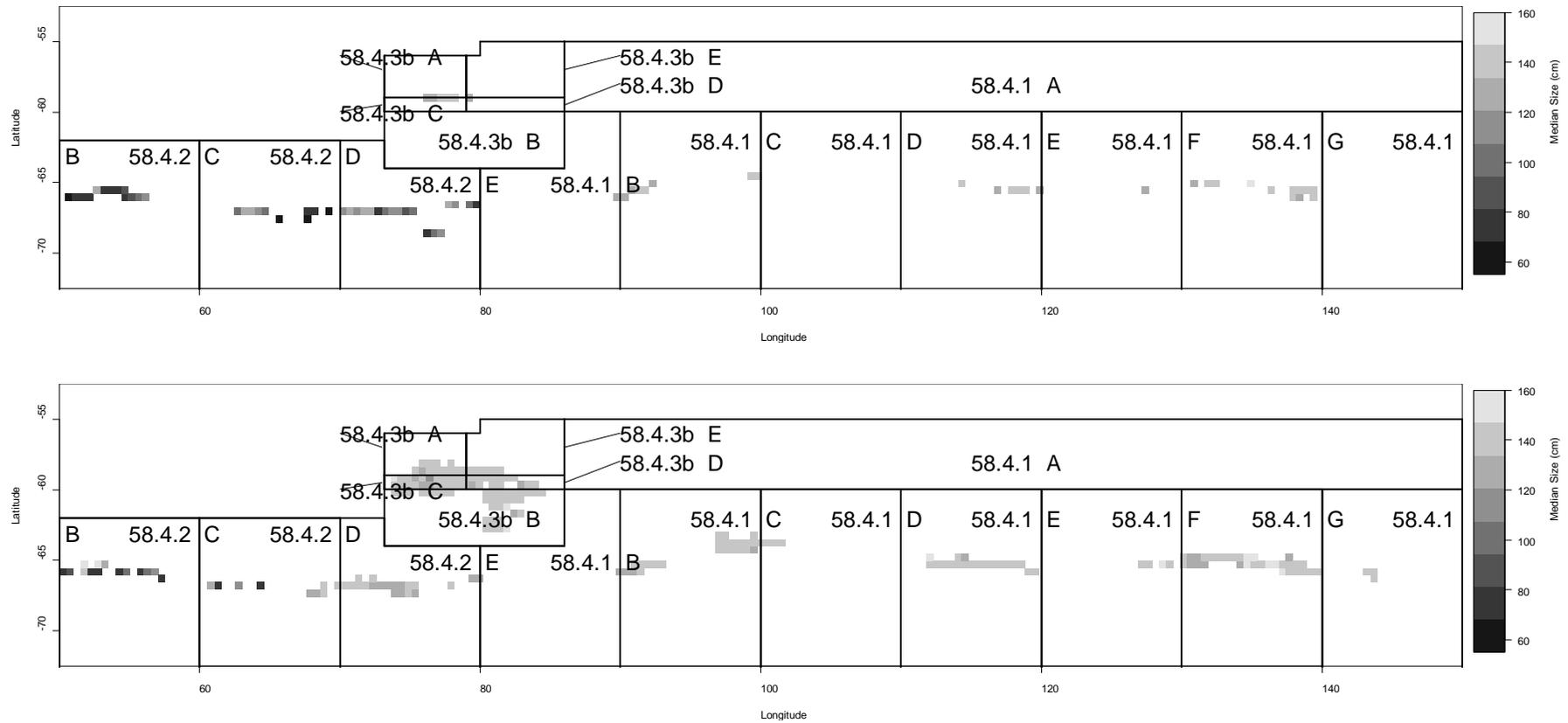


Figure 8: Plot of median lengths for longlines sampled in Divisions 58.4.1, 58.4.2 and 58.4.3b between 2003/04 and 2008/09, aggregated into 0.5° latitude \times 0.5° longitude boxes. The upper panel shows data for fishing in depths shallower than 1 000 m, the lower panel for fishing in depths deeper than 1 000 m. Note darker squares indicate smaller median length; lighter squares indicate larger median length.

26. The Working Group agreed that size distribution data and maturity data indicated that (SC-CAMLR-XXVIII, Annex 5, paragraph 5.62):

- (i) there is no evidence of recruitment of small (<60 cm) *D. mawsoni* in Divisions 58.4.1, 58.4.2 and 58.4.3b (Figure 8)
- (ii) *D. mawsoni* are likely to move throughout Divisions 58.4.1, 58.4.2 and 58.4.3b
- (iii) smaller fish are found in the western area of Division 58.4.2 and in waters shallower than 1 000 m, and larger fish deeper than 1 000 m.

27. The Working Group noted that the observed size distribution and location of tag recaptures of *D. mawsoni* from Subarea 58.4 suggested a life history pattern that was analogous to that proposed for *D. mawsoni* in the Ross Sea by Hanchet et al. (2008). Hence the size distribution of *D. mawsoni* on BANZARE Bank would be expected to be similar to that in the north of the Ross Sea.

28. The Working Group noted that the development of this hypothetical lifecycle for the Ross Sea had been useful in understanding population dynamics in this region (SC-CAMLR-XXVIII, Annex 5, paragraph 5.64). The Working Group encouraged Members to develop a similar detailed review of data to develop a hypothetical lifecycle for *D. mawsoni* in the Indian Ocean sector of the Convention Area for Subarea 58.4, including consideration of oceanographic features in the area.

29. The Working Group noted that analysis of otoliths would assist in understanding population dynamics of *D. mawsoni* in this area.

30. Because Peterson biomass estimates from tag recaptures were not available for this area, the Working Group estimated initial biomass using the catch rate and seabed area comparison 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 of assuming 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 and 4.67 to 4.68). Using this approach, the precautionary biomass was estimated at 4078 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 GYM application described in WG-FSA-10/42 Rev. 1) resulted in a precautionary research catch limit of 41 tonnes. The Working Group stressed that the actual status of the stock is unknown, but thought these assumptions to be precautionary.

5. By-catch of fish and invertebrates

5.1 By-catch removals

31. Catches of by-catch species groups (macrourids, rajids and other species) reported in fine-scale data, 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 17 tonnes per season). Catches of rajids have reached 6 tonnes per season.

Table 5: Catch history for by-catch species (macrourids, rajids and other species), catch limits and number of rajids released alive in Division 58.4.3b. 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)
2003/04	159	<1	50	<1	-	20	0
2004/05	159	7	50	6	-	20	<1
2005/06	159	8	50	1	-	20	<1
2006/07	159	17	50	3	1267	20	1
2007/08	80	7	50	1	157	20	2
2008/09	80	4	50	1	102	80	<1
2009/10	80	2	50	<1	22	20	<1
2010/11	-	1	-	<1	-	-	<1

5.2 Assessment of impacts on affected populations

32. The current by-catch limit for *Macrourus* spp. was estimated in 2003 using the precautionary approach adopted for krill (SC-CAMLR-XXII, Annex 5, paragraphs 5.250 to 5.252; van Wijk et al., 2003), where the estimate of B_0 was taken from the trawl survey in 1999 (van Wijk et al., 2000).

33. *Macrourus* spp. and *Raja taaf* were very common by-catch species during the survey conducted in May 2008, summarised in WG-FSA-08/57, indicating that previous by-catch records of rajids from the Northern Area of the division are 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 both males and females have a median size-at-maturity of 755 and 795 mm respectively (total length). The majority of the catch ranged between 400 and 900 mm, indicating that juvenile females may be more vulnerable to longline gear.

5.3 Identification of levels of risk

34. None available for this fishery.

5.4 Mitigation measures

35. In 2008, the Commission agreed to the Year-of-the-Skate, and the protocol in CCAMLR-XXVII, paragraph 4.55, was implemented.

36. In 2009, the Commission agreed that the Year-of-the-Skate should be extended to 2009/10 in order to allow for sufficient data to be collected for preliminary assessments to be made in the future (see SC-CAMLR-XXIX, Annex 8, paragraphs 6.14 to 6.21).

37. During WG-FSA-10 it was concluded that the Year-of-the-Skate had been a success overall and had met its objectives to enhance data collection and improve tagging in order to

develop assessments (SC-CAMLR-XXVI, Annex 5, paragraphs 6.34 and 6.35). Based on conclusions reported in WG-FSA-10/25 for data in Subareas 88.1 and 88.2 and review of data across all exploratory areas and divisions during the meeting, the Working Group concluded that data collection rates for skates could return to standard levels for these species in 2010/11 until further notice, and the mandatory skate tagging requirements could be removed from the relevant conservation measures. However, the requirement for all skates to be brought on board or alongside the hauler to be correctly identified, scanned for tags and for their condition to be assessed should be made mandatory, and the Working Group recommended that CM 33-03 be revised accordingly. Continued scanning for tags by crew and observers is imperative to enable updates to be made to preliminary assessments of skates in the future.

6. By-catch of birds and mammals

6.1 By-catch removals

38. There have been no observed seabird mortalities in the past three seasons in Division 58.4.3b (Table 6).

Table 6: Seabird by-catch limit, observed mortality rate and total estimated mortality of seabird by-catch in Subarea 58.4, including Division 58.4.3b.

Season	By-catch limit (number of birds)	Mortality rate (birds/thousand hooks)	Total estimated mortality (number of birds)
2003/04	3*	0	0
2004/05	3*	0	0
2005/06	3*	0.0002	2
2006/07	3*	0	0
2007/08	3*	0	0
2008/09	3*	0	0
2009/10	3*	0	0
2010/11	3*	0	0

* Per vessel during daytime setting.

39. No marine mammal interactions or mortalities were observed in 2010/11.

40. In 2011, as in previous years, WG-IMAF agreed the risk level of seabirds in this fishery in Division 58.4.3b is category 3 (average) (SC-CAMLR-XXX, Annex 8).

6.2 Mitigation measures

41. 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

42. No evaluation available for this fishery.

8. Harvest controls and management advice

8.1 Conservation measures

43. The limits on the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b are defined in CM 41-07. The limits in force and the Working Group's advice to the Scientific Committee for the forthcoming season are summarised in Table 7.

Table 7: Limits on the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b in force (Conservation Measure 41-07) and advice to the Scientific Committee for 2011/12.

Element	Limit in force	Advice for 2011/12
Access	No more than one vessel per country at any one time.	Carry forward
Catch limit	Precautionary catch limit for <i>Dissostichus</i> spp. was zero tonnes outside areas of national jurisdiction.	Carry forward
Season	1 May to 31 August, with fishing permitted outside the prescribed season provided that each vessel demonstrated its capacity to comply with the requirements for longline weighting outlined in CM 24-02.	Carry forward
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.	Carry forward
	Limit of three (3) seabirds per vessel fishing outside the prescribed season.	Carry forward
Observers	At least one scientific observer appointed in accordance with the CCAMLR Scheme of International Scientific Observation.	Carry forward
Data	Daily and five-day catch and effort reporting	Carry forward
	Haul-by-haul catch and effort data	Carry forward
	Biological data reported by the CCAMLR scientific observer.	Carry forward
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	Carry forward
	Toothfish tagged at a rate of at least five fish per tonne green weight caught.	Carry forward
Environmental protection	Regulated by CMs 22-06, 22-07, 22-08 and 26-01.	Carry forward

8.2 Management advice

44. The Working Group recommended that Members undertaking tag-based research in data-poor fisheries under CM 24-01 be required to evaluate and report the effects of their fishing gear on fish condition and injury status, as in WG-FSA-11/13 Rev. 1 and 11/14 and Figures 1 and 4, and modify their research design and/or choice of fishing gear configuration

accordingly to ensure that the requirements of an effective tagging program are met. Where particular gear types are incapable of capturing sufficient fish suitable for tagging, alternate sampling tools should be used.

45. The Working Group recommended that the proposed research using the *Shinsei Maru No. 3* on BANZARE Bank proceed in 2012, limited to 48 sets in locations shown in Figure 3, with a catch limit of 40 tonnes, subject to the recommendations in paragraphs 5.27 to 5.32 above.

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