APPENDIX J

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

CONTENTS

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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.

3. In 2009/10, the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b was limited to research fishing conducted by Japanese, Korean, South African and Uruguayan vessels using longlines only, and no more than one vessel per country was permitted to fish at any one time (CM 41-07). The precautionary catch limit for *Dissostichus* spp. in the fishery was set to zero tonnes. An additional limit of 72 tonnes was set for research fishing between 1 December 2009 and 31 March 2010 within four designated sampling sectors (CM 41-07, Annex A, Figure 1). 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.

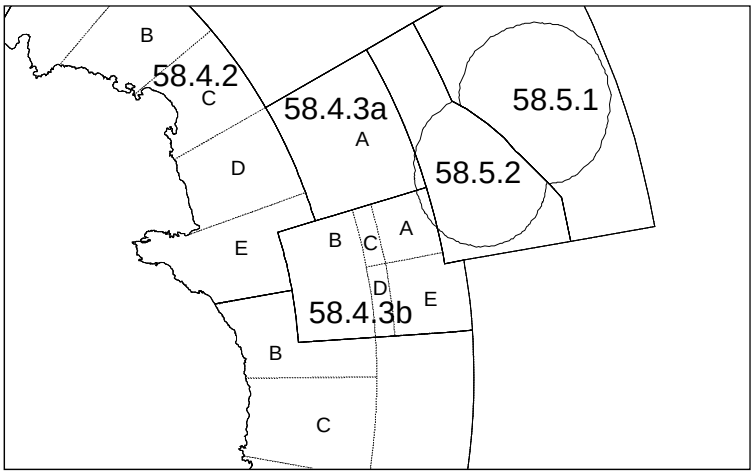

Figure 1: General map of Division 58.4.3b (BANZARE Bank). This division consists of SSRUs A to E.

1.1 Reported catch

4. 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 2009/10, one Member (Japan) and one vessel participated in research fishing. The vessel operated in the southeastern sampling sector and reported a total catch of 14 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-10/6 Rev. 1 and past reports for IUU catch).

Season	Regulated fishery						Estimated IUU catch (tonnes)	Total removals (tonnes)
	Effort (number of vessels)		*Dissostichus* spp.					
			Catch limit (tonnes)	Reported catch (tonnes)				
	Limit	Reported		*D. eleginoides*	*D. mawsoni*	Total		
2003/04	6	1	300	1	6	7	246	253
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	2293	2 544
2007/08	6	4	200*	42	101	142	247	389
2008/09	6	2	120	15	89	104	610	714
2009/10	4	1	72**	2	12	14	171	185

* Includes 50 tonnes for research fishing.
** Limit set for research fishing only.

1.2 IUU catch

5. 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 2 293 tonnes in 2006/07 (>7 times the catch limit at that time; Table 1). The IUU catch in 2009/10 was estimated at 171 tonnes of *Dissostichus* spp., resulting in total removals of *Dissostichus* spp. of 185 tonnes.

1.3 Size distribution of catches

6. 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.

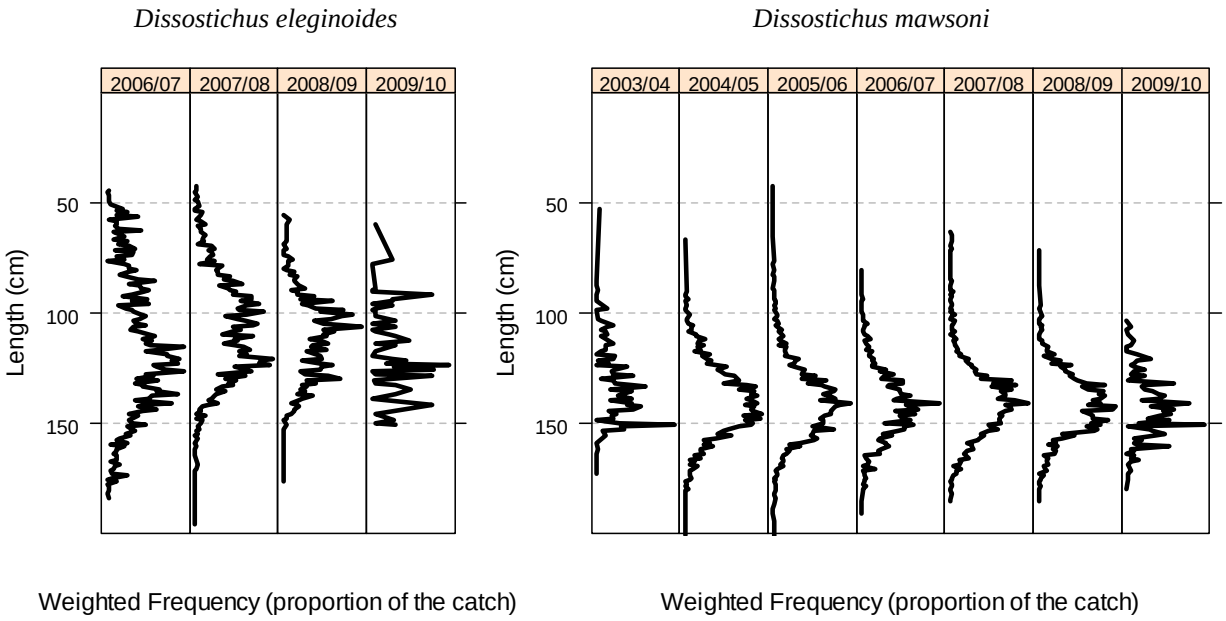

Figure 2: Catch-weighted length frequencies for *Dissostichus eleginoides* and *Dissostichus mawsoni* in Division 58.4.3b (source: observer, fine-scale and STATLANT data, and the length–weight relationships were taken from observations on *D. eleginoides* in Division 58.5.2 and *D. mawsoni* in Subarea 88.1).

2. Stocks and areas

7. 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).

8. 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

9. 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).

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 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. The number of research hauls reported in fine-scale data are summarised in Table 2.

12. 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 1 079 *D. mawsoni* and 346 *D. eleginoides* (total 1 468 fish) have been tagged and released and 10 *D. mawsoni* have been recaptured in this division (Table 3).

13. The Working Group noted that the vessel in Division 58.4.3b reached the target tagging rate of four tags per tonne of green weight, but achieved only a medium level of overlap in the size frequency of tagged fish with the overall size frequency of fish caught.

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	*Eldfisk*	-	13	6	19
2004/05	Chile	*Globalpesca II*	-	10	9	19
	Korea, Republic of	*Yeon Seong No. 829*	-	10	6	16
	Spain	*Arnela*	-	30	67	97
		Galaecia	-	20	8	28
2005/06	Chile	*Globalpesca I*	-	11		11
	Spain	*Galaecia*	-	21	47	68
		Tronio	-	6	63	69
	Uruguay	*Paloma V*	-	23	20	43
2006/07	Japan	*Shinsei Maru No. 3*	-	20	128	148
	Namibia	*Antillas Reefer*	-	18	32	50
	Spain	*Tronio*	-	20	17	37
	Uruguay	*Paloma V*	-	20	27	47
2007/08	Japan	*Shinsei Maru No. 3*	North 60°S	20	114	134
	Namibia	*Antillas Reefer*	North 60°S	20	6	26
	Uruguay	*Banzare*	North 60°S	10	7	17
2008/09	Japan	*Shinsei Maru No. 3*	A	10	18	28
		Shinsei Maru No. 3	E	10	8	18
	Uruguay	*Banzare*	D	10	16	26
		Banzare	E	10	13	23
2009/10	Japan	*Shinsei Maru No. 3*	Sector SE	24		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 2005/06, 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. NT – no tagging reported.

Flag State	Vessel name	Season				
		2005/06	2006/07	2007/08	2008/09	2009/10
Australia	*Janas*			15 (9)		
Chile	*Globalpesca I*	NT				
Japan	*Shinsei Maru No. 3*		112 (37)	346 (120)	126 (74)	60 (8)
Namibia	*Antillas Reefer*		49 (47)	13 (1)		
Spain	*Galaecia*	97 (2)				
	Tronio	38 (0)	81 (0)			
Uruguay	*Banzare*			43 (*)	230 (1)	
	Paloma V	40 (2)	47 (43)			

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

(b) Tagging rate (number of fish tagged per tonne of green weight caught) of *Dissostichus* spp. NT – no tagging reported.

Flag State	Vessel name	Season				
		2005/06	2006/07	2007/08	2008/09	2009/10
Australia	*Janas*			6.45		
Chile	*Globalpesca I*	NT				
Japan	*Shinsei Maru No. 3*		1.02	3.19	3.15	4.34
Namibia	*Antillas Reefer*		2.06	0.61		
Spain	*Galaecia*	0.66				
	Tronio	0.23	1.00			
Uruguay	*Banzare*			4.53	3.58	
	Paloma V	0.85	1.24			
Required rate		1	1	3	3	4

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

Season	Number tagged and released			Number recaptured		
	D. eleginoides	*D. mawsoni*	Total	*D. eleginoides*	*D. mawsoni*	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
Total	354	1131	1528	1	10	11

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

3.2 Fixed parameter values

14. None available for this fishery.

4. Stock assessment

15. 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.

16. 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.

17. 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.

18. The Working Group considered three possible scenarios for the *D. mawsoni* stock on BANZARE Bank, based on existing knowledge:

(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.

19. 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).

20. The Working Group recalled that it had 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).

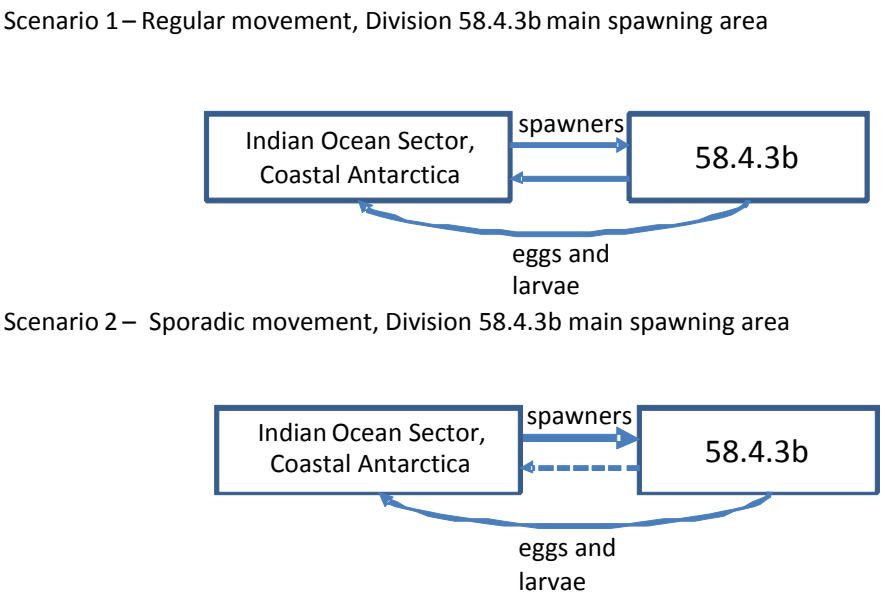

Figure 3: Diagram illustrating possible scenarios for the *Dissostichus mawsoni* stock on BANZARE Bank (Division 58.4.3b). Solid arrows indicate regular movements of fish, dashed arrows indicate sporadic movement of fish.

21. The Working Group then considered the data and analyses on CPUE, size distribution and tagging from Division 58.4.3b. 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).

22. 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. 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.

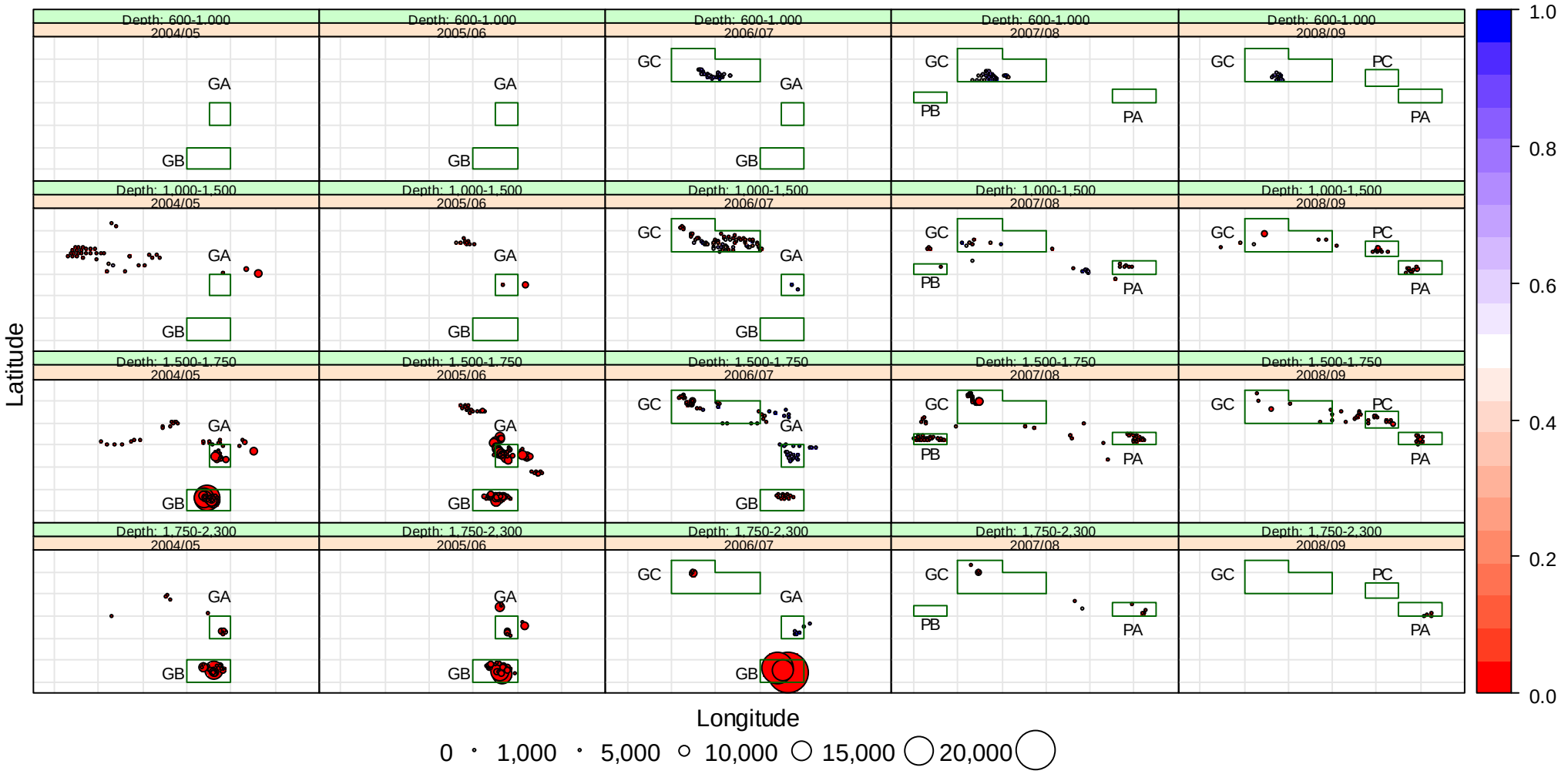

Figure 4: Bubbleplot showing total toothfish removals (kg) proportional to symbol size for individual longlines fished in BANZARE Bank, showing different panels for season and depth fished. Colour on a red-blue gradient represents *Dissostichus eleginoides* catch as a proportion of total catch (i.e. 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.

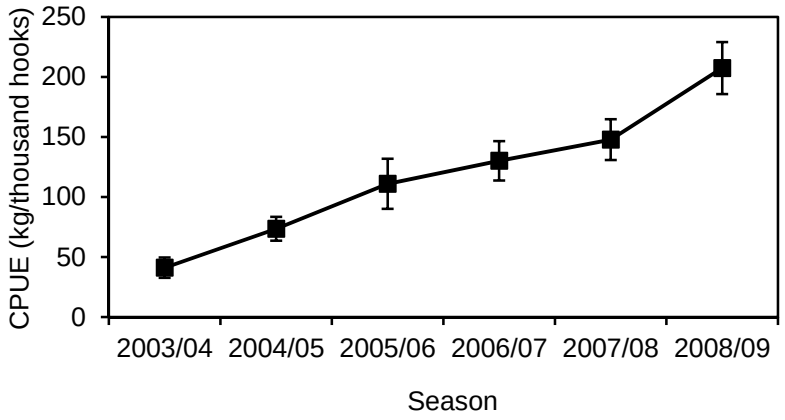

Figure 5: Unstandardised CPUE (kg/thousand hooks) of *Dissostichus* spp. in the exploratory longline fishery in Division 58.4.3b (source: fine-scale catch and effort data). Error bars: 95% confidence limits.

23. The Working Group also agreed that tagging data indicated that:

(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).

24. 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.

25. The Working Group agreed that size distribution data and maturity data indicated that:

(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.

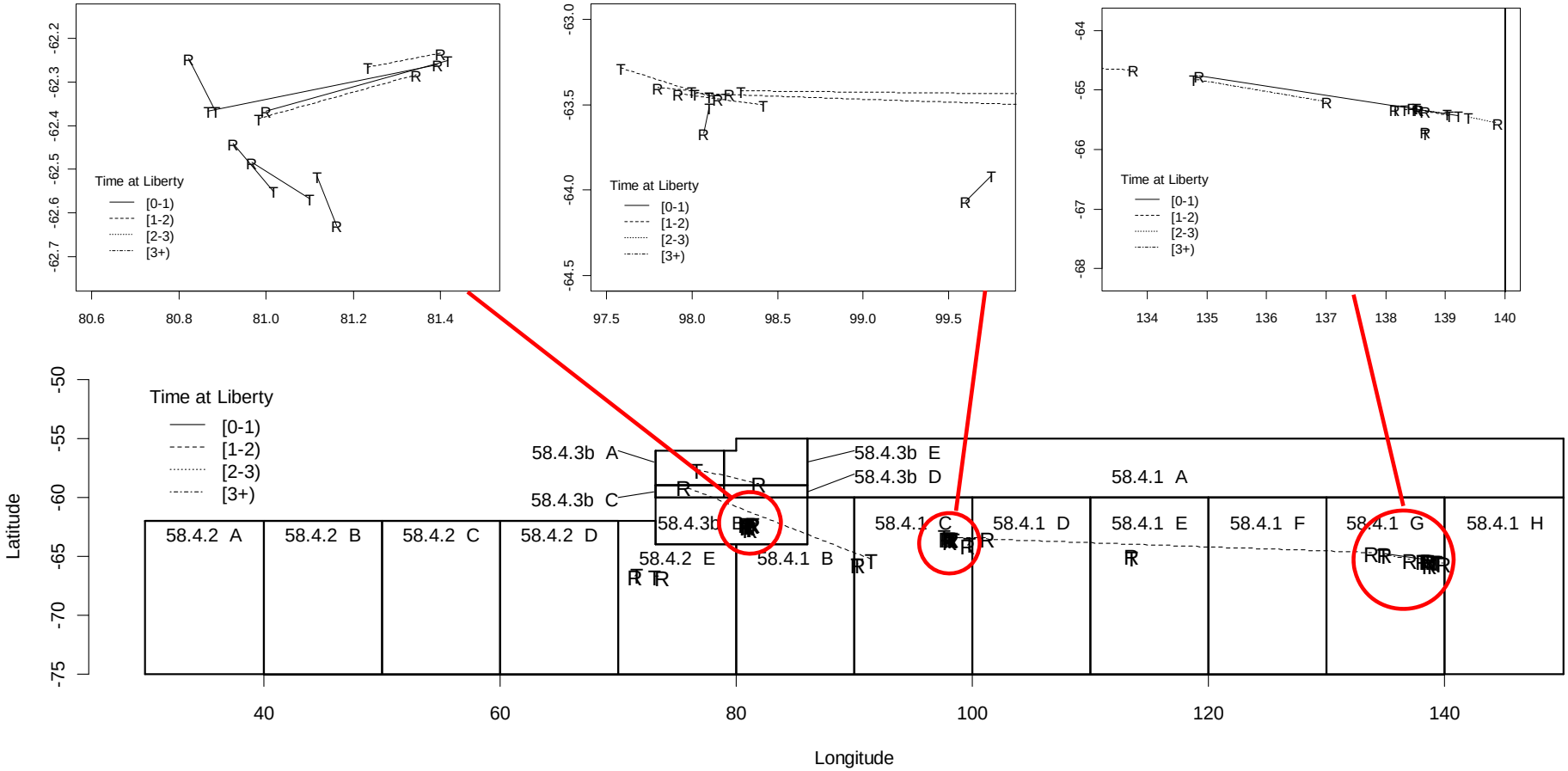

Figure 6: Plot of tag recaptures of *Dissostichus mawsoni* in Divisions 58.4.1, 58.4.2 and 58.4.3b recorded between 2003/04 and 2009/10. 'T' indicates the release location and 'R' indicates the recapture location.

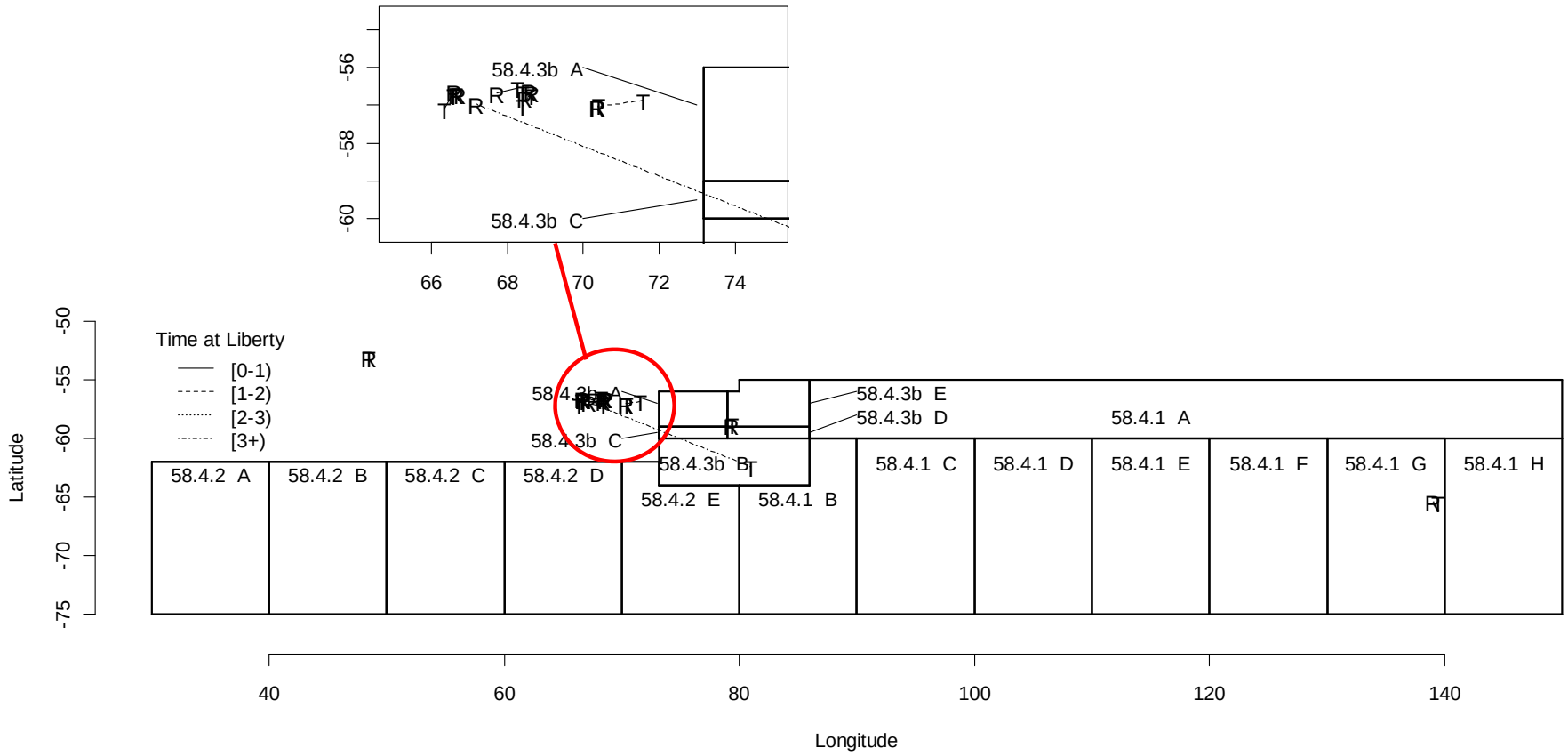

Figure 7: Plot of tag recaptures of *Dissostichus eleginoides* in Divisions 58.4.1, 58.4.2 and 58.4.3b recorded between 2003/04 and 2009/10. 'T' indicates the release location and 'R' indicates the recapture location.

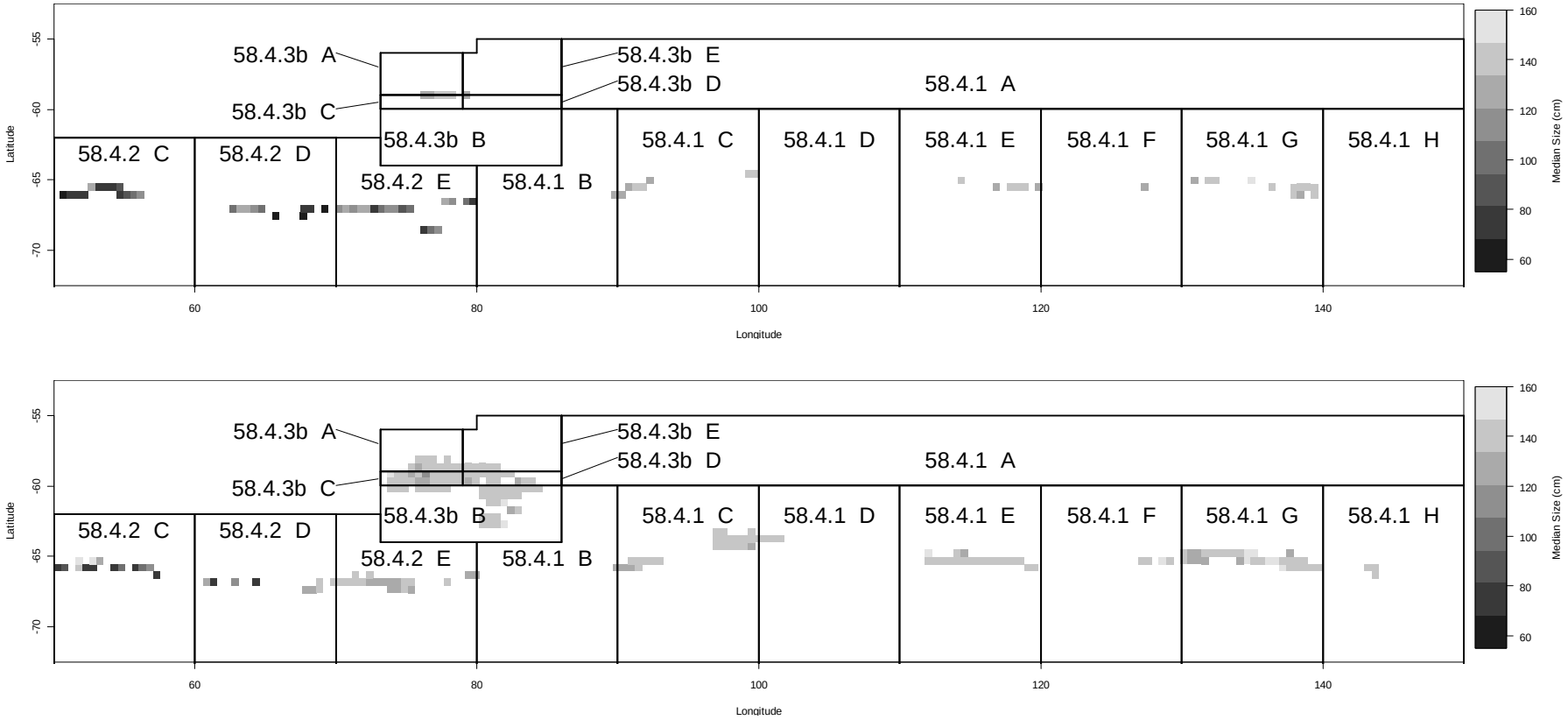

Figure 8: Plot of median lengths for longlines sampled in Divisions 58.4.1, 58.4.2 and 58.4.3b between 2003/04 and 2008/09, aggregated into 0.5° latitude × 0.5° longitude boxes. The upper panel shows data for fishing in depths shallower than 1 000 m, the lower panel for fishing in depths deeper than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

26. The Working Group 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.

27. 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. 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.

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

5. By-catch of fish and invertebrates

5.1 By-catch removals

29. 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 4. 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.

30. Analyses of catch rates of macrourids and rajiformes presented in WG-FSA-07/44 indicate that they are highly variable. Attempts to analyse the population characteristics of the main by-catch groups were impossible due to a lack of reporting of biological data by observers from vessels that caught substantial amounts of by-catch (Table 5).

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)
2003/04	159	0	50	0	-	20	0
2004/05	159	7	50	6	-	20	0
2005/06	159	8	50	1	-	20	0
2006/07	159	17	50	3	1267	20	1
2007/08	80	7	50	1	157	20	1
2008/09	80	4	50	1	102	80	0
2009/10	80	2	50	0	22	20	0

Table 5: By-catch reported in C2 data from BANZARE Bank (Division 58.4.3b) showing total weight (kg) of by-catch species by Flag State and vessel for seasons 2003/04–2006/07. Shaded cells show instances where catch of a species/group was reported in the C2 dataset, but no biological data was reported in the observer data. AUS – Australia; CHL – Chile; ESP – Spain; JPN – Japan; KOR – Republic of Korea; NAM – Namibia; URY – Uruguay.

	Flag State										Total
	AUS	CHL		ESP			JPN	KOR	NAM	URY	
Vessel number:	1	1	2	1	2	3	1	1	1	1	
By-catch species											
Antimora rostrata (ANT)	-	-	14	13	120	75	519	4	10	38	793
Bathyraja mccaini (BAM)	-	-	-	-	-	-	-	810	-	-	810
Bathyraja spp. (BHY)	-	-	-	-	-	-	-	-	-	1 395	1 395
Macrourus spp. (GRV)	131	40	478	1 955	5 337	4139	-	663	-	10 384	23 126
Somniosus microcephalus (GSK)	-	-	-	-	300	-	-	-	-	-	300
Channichthyidae (ICX)	-	-	-	2	-	-	-	-	4	-	6
Invertebrata (INV)	-	7	-	-	-	-	-	-	-	10	17
Lithodes spp. (KCX)	-	-	-	-	-	20	13	-	-	-	33
Lithodidae (KCZ)	-	-	-	-	-	-	-	-	-	13	13
Lampris immaculatus (LAI)	-	-	15	-	-	-	-	-	-	-	15
Muraenolepis spp. (MRL)	-	1	-	-	4	2	67	-	-	-	73
Notothenia squamifrons (NOS)	-	-	-	-	-	-	234	-	17	-	251
Octopodidae (OCT)	-	1	-	-	-	-	-	-	-	-	1
Rajiformes (RAJ)	-	42	-	-	-	-	-	-	-	-	42
Salilota australis (SAO)	-	-	-	-	-	-	-	-	-	35	35
Raja Georgiana (SRR)	-	-	-	-	4 328	1	-	-	-	-	4 328
Raja spp. (SRX)	114	-	365	533	-	319	-	-	1 452	354	3 137
Macrourus whitsoni (WGR)	-	-	-	-	-	-	7 764	-	671	-	8 435

5.2 Assessment of impacts on affected populations

31. 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).

32. *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

33. None available for this fishery.

5.4 Mitigation measures

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

35. 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 main report, paragraphs 6.14 to 6.21).

36. 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

37. 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

* Per vessel during daytime setting.

38. No marine mammal interactions or mortalities were observed in 2009/10.

39. WG-IMAF did not meet in 2010, however, in 2009 it assessed the risk level of seabirds in this fishery in Division 58.4.3b as category 3 (average) (SC-CAMLR-XXVIII, Annex 7, Table 14 and Figure 2).

6.2 Mitigation measures

40. 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

41. No evaluation available for this fishery.

8. Harvest controls and management advice

8.1 Conservation measures

42. 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 2009/10 (Conservation Measure 41-07) and advice to the Scientific Committee for 2010/11.

Element	Limit in force	Advice for 2010/11
Access	No more than one vessel per country at any one time.	Carry forward
Catch limit	Precautionary catch limit for *Dissostichus* spp. was zero tonnes outside areas of national jurisdiction, and an additional catch limit of 72 tonnes for research fishing.	Review
Season	1 December to 31 March, 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.	Revert to 1 May to 31 August with research fishing allowed outside the season
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 fishing outside the prescribed season.	Carry forward Carry forward
Observers	At least one scientific observer appointed in accordance with the CCAMLR Scheme of International Scientific Observation.	Carry forward
Data	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 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)	Carry forward
	Toothfish tagged at a rate of at least four fish per tonne green weight caught.	Carry forward
	Skates tagged at a rate of at least one skate per five skates caught, up to a maximum of 500 skates per vessel.	Remove requirement
Environmental protection	Regulated by CMs 22-06, 22-07, 22-08 and 26-01.	Carry forward

8.2 Management advice

43. The vessel in Division 58.4.3b had only a medium level of overlap in the size frequency of tagged fish with the overall size frequency of fish caught (main report, Table 12). The Working Group recommended that the issue of achieving compliance with the tagging requirements of CM 41-01, Annex C, be considered by SCIC.

44. The Working Group noted that the sampling design undertaken for the proposed research in Division 58.4.3b was not submitted for review by any SC-CAMLR working group, and recommended that future research plans be reviewed by WG-FSA.

45. WG-FSA-10/47 reported on the distribution and population structure of *Dissostichus* spp. on BANZARE Bank, determined from data arising from exploratory longline fishing during 2007 to 2009. Results indicated *D. eleginoides* was typically found in shallower waters than *D. mawsoni*, and that larger fish (predominantly female) were found deeper. 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 synthesise current knowledge.

46. The Working Group recommended that the catch limits for Division 58.4.3b be retained for 2010/11. The Working Group could not reach consensus on advice for additional catch for research fishing.

47. The Working Group noted that a research plan was being developed which could provide advice in the future (main report, paragraphs 5.1 to 5.12).

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