

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

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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 (Conservation Measure 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 (Conservation Measure 203/XIX) and Elan Bank (Conservation Measure 205/XIX); and exploratory longline fisheries outside areas of national jurisdiction on BANZARE Bank (Conservation Measure 204/XIX) and Elan Bank (Conservation Measure 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 2008/09, the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b was limited to Japanese, Spanish and Uruguayan vessels using longlines only, and no more than one vessel per country was permitted to fish at any one time (Conservation Measure 41-07). The precautionary catch limit for *Dissostichus* spp. in the fishery was 120 tonnes, with a limit of 30 tonnes in each of SSRUs A, C, D and E. SSRU B was closed to fishing. The catch limits for by-catch species were defined in Conservation Measure 33-03. The fishing season was from 1 May to 31 August 2009. Fishing was permitted outside the prescribed season provided that each vessel demonstrated its capacity to comply with the requirements for longline weighting outlined in Conservation Measure 24-02.

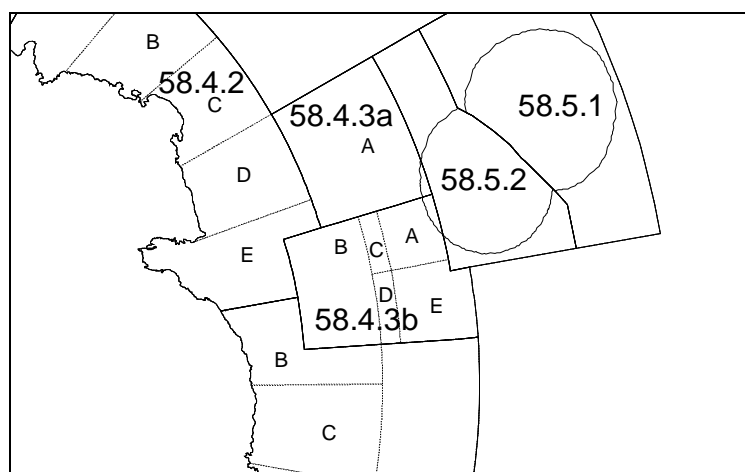


Figure 1: General map of Division 58.4.3b (BANZARE Bank). This division consists of SSRUs A to E.

## 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 2008/09, two vessels fished and reported a total catch of 104 tonnes of *Dissostichus* spp. SSRU D was closed on 27 January 2009 (catch limit for *Dissostichus* spp.: 30 tonnes; final reported catch: 31 tonnes). SSRU A was closed on 2 February 2009 (catch limit for *Dissostichus* spp.: 30 tonnes; final reported catch: 28 tonnes). SSRU E was closed on 7 February 2009 (catch limit for *Dissostichus* spp.: 30 tonnes; final reported catch: 45 tonnes). The fishery was closed on 9 February 2009 (catch limit for *Dissostichus* spp.: 120 tonnes; final reported catch: 104 tonnes).

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-09/5 Rev. 1 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	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

\* Includes 50 tonnes for research fishing.

## 1.2 IUU catch

5. Information on IUU activities indicated high levels of IUU fishing, and the estimated annual catch of *Dissostichus* spp. has ranged from 253 tonnes in 2003/04 to 2 544 tonnes in 2006/07 (8.5 times the catch limit). The IUU catch in 2008/09 was estimated at 610 tonnes of *Dissostichus* spp. (Table 1). The total removals of *Dissostichus* spp. in 2008/09 were estimated at 714 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.

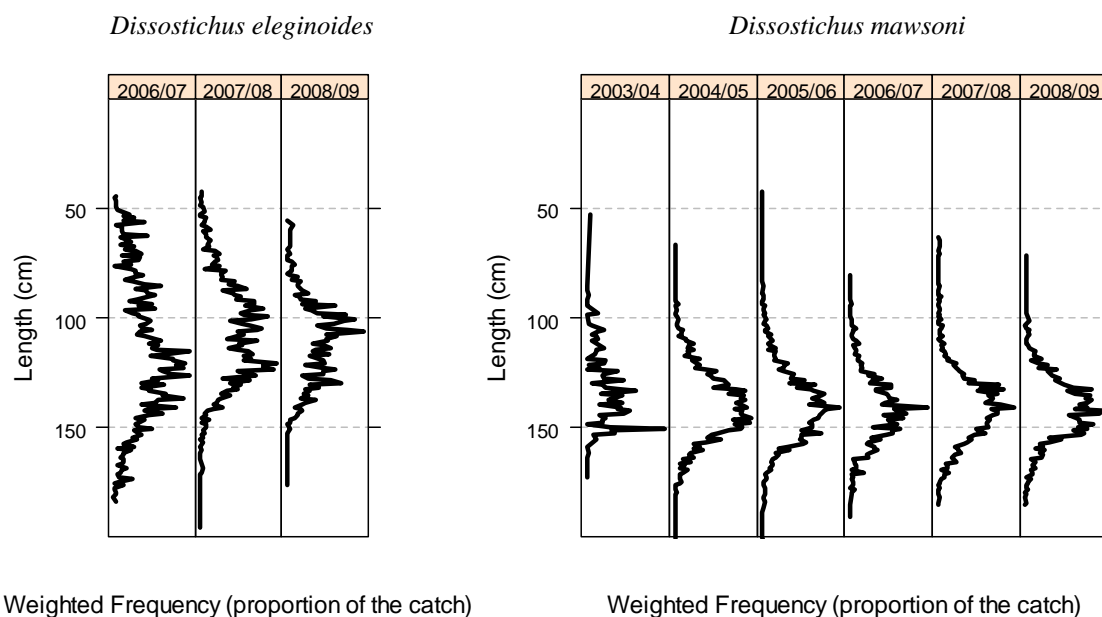


Figure 2: Catch-weighted length frequencies for *Dissostichus eleginoides* and *Dissostichus mawsoni* in Division 58.4.3b (source: observer, fine-scale and STATLANT data, and the length-weight relationships were taken from observations on *D. eleginoides* in Division 58.5.2 and *D. mawsoni* in Subarea 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 Conservation Measure 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 (see CCAMLR-XXVIII/BG/6). 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 tagging rates by vessels in this area have apparently been much lower than tagging rates by the same vessels in other areas in the past, however, all vessels reported tagging rates of three fish per tonne or above in 2008/09. The Working Group also noted that *D. eleginoides* tends to be tagged at a higher rate than *D. mawsoni* on particular vessels, and that some vessels tag small fish in higher proportion than they are represented in the catch (see main text, paragraphs 5.12 to 5.17).

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
		<i>Paloma V</i>	-	23	20	43
2006/07	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
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

Table 3: Number of individuals of *Dissostichus* spp. tagged and released and the tagging rate (fish per tonne of green weight caught) reported by vessels operating in the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b. The number of *D. eleginoides* is indicated in brackets. The total number of tagged fish recaptured to date in Division 58.4.3b is also included. (Source: observer data and catch and effort reports)

Season	Flag State	Vessel name	<i>Dissostichus</i> spp. tagged and released	
			Number of fish	Tagging rate
2003/04	Australia	<i>Eldfisk</i>	0	0
2004/05	Chile	<i>Globalpesca II</i>	13	(0)
	Korea, Republic of	<i>Yeon Seong No. 829</i>	1	(0)
	Spain	<i>Arnela</i>	206	(6)
2005/06	Spain	<i>Galaecia</i>	11	(4)
		<i>Globalpesca I</i>	0	0
	Spain	<i>Galaecia</i>	97	(2)
		<i>Tronio</i>	38	(0)
2006/07	Uruguay	<i>Paloma V</i>	40	(2)
	Japan	<i>Shinsei Maru No. 3</i>	112	(37)
	Namibia	<i>Antillas Reefer</i>	49	(47)
	Spain	<i>Tronio</i>	81	(0)
	Uruguay	<i>Paloma V</i>	47	(43)
2007/08	Australia	<i>Janas</i>	15	(9)
	Japan	<i>Shinsei Maru No. 3</i>	346	(120)
	Namibia	<i>Antillas Reefer</i>	13	(1)
	Uruguay	<i>Banzare</i>	43*	(0)*
2008/09	Japan	<i>Shinsei Maru No. 3</i>	126	(74)
	Uruguay	<i>Banzare</i>	230	(1)
Total number of fish tagged and released			1468* (346)*	
Total number of tagged fish recaptured in Division 58.4.3b			10 (0)	

\* 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 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:

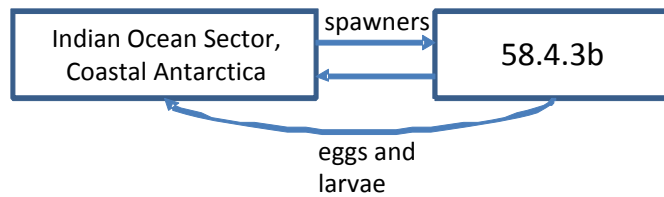
- (i) Scenario 1: spawning fish have a high turnover in Division 58.4.3b, moving freely within this division between SSRUs and areas outside each year.
- (ii) Scenario 2: spawning fish move sporadically to Division 58.4.3b, and then remain in the area, moving little across the area between years.
- (iii) 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).

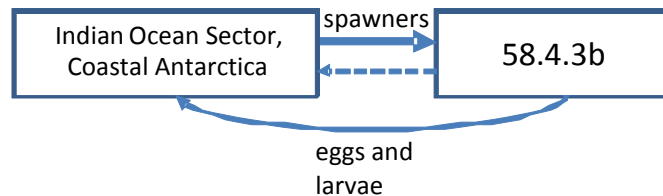
20. The Working Group recalled that it had agreed last year (SC-CAMLR-XXVII, Annex 5, paragraph 5.57) that:

- (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 main text, paragraph 5.56).

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

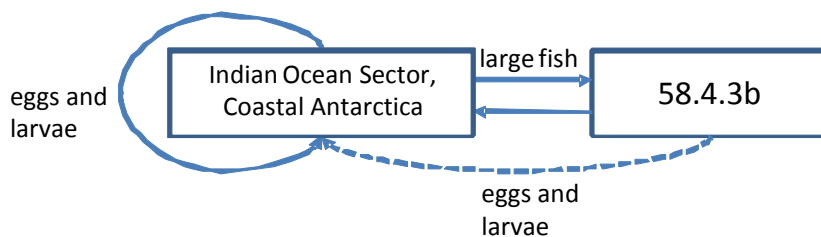


Figure 3: Diagram illustrating possible scenarios for the *Dissostichus mawsoni* stock on BANZARE Bank (Division 58.4.3b). Solid arrows indicate regular movements of fish, dashed arrows indicate sporadic movement of fish.

21. The Working Group then considered the data and analyses on CPUE, size distribution and tagging data 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 has 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).

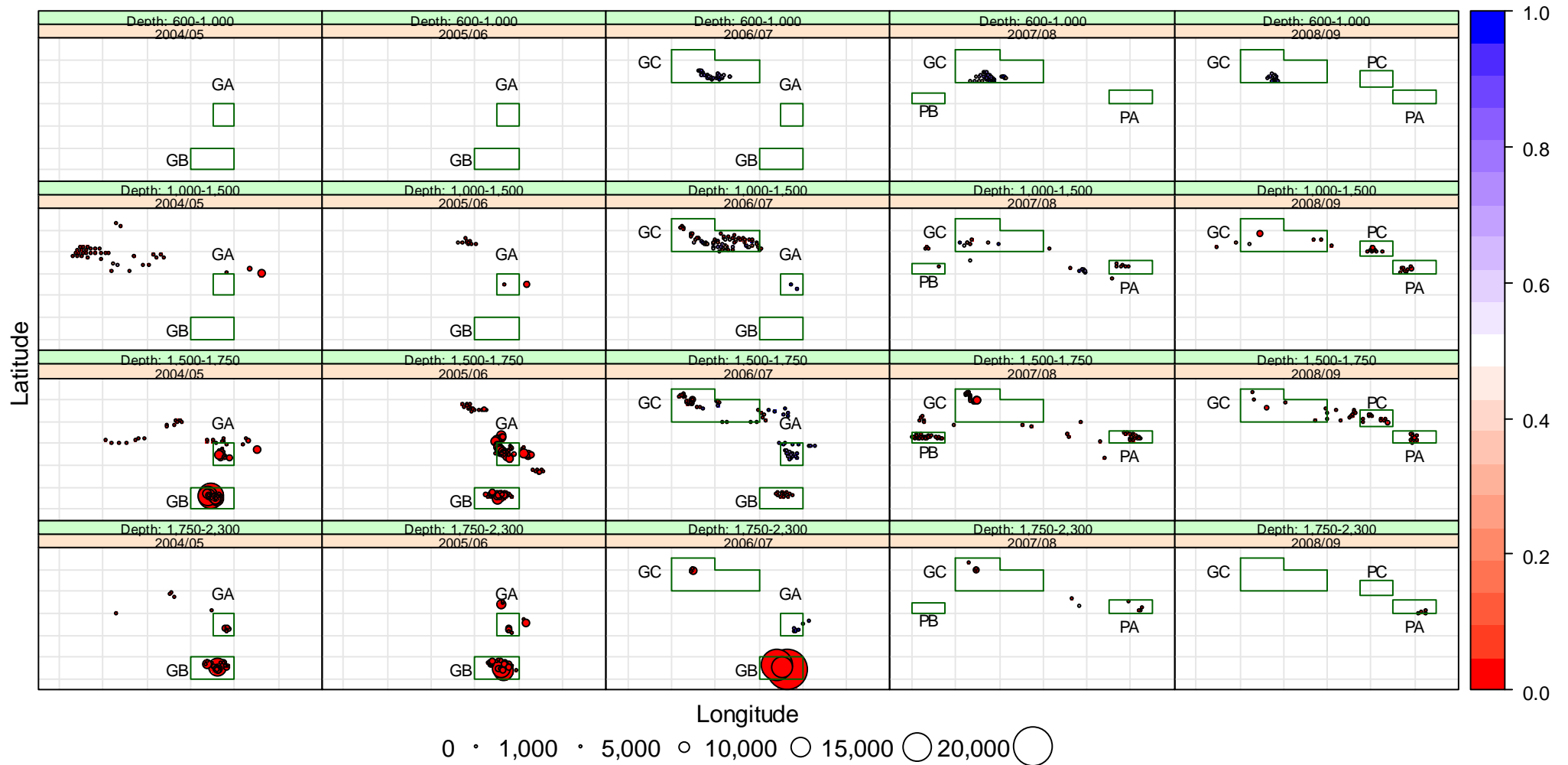


Figure 4: Bubbleplot showing total toothfish removals (kg) proportional to symbol size for individual longlines fished in BANZARE Bank, showing different panels for season and depth fished. Colour on a red-blue gradient represents Patagonian toothfish catch as a proportion of total catch (i.e. blue –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

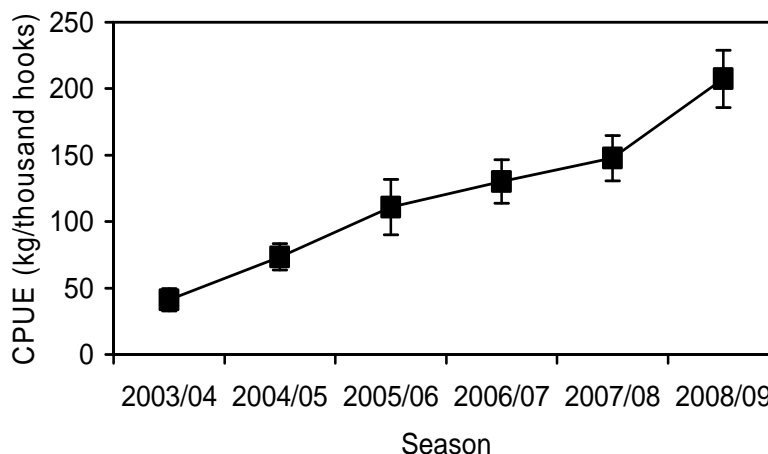


Figure 5: Unstandardised CPUE (kg/thousand hooks) of *Dissostichus* spp. in the exploratory longline fishery in Division 58.4.3b (source: fine-scale catch and effort data). Error bars: 95% confidence limits.

22. The Working Group also agreed that tagging data indicated that:
- (i) of 10 tags recaptured in Division 58.4.3b, nine were released in Division 58.4.3b and one was released in Division 58.4.1 (Figure 6);
  - (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).
23. The Working Group further 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 7);
  - (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.

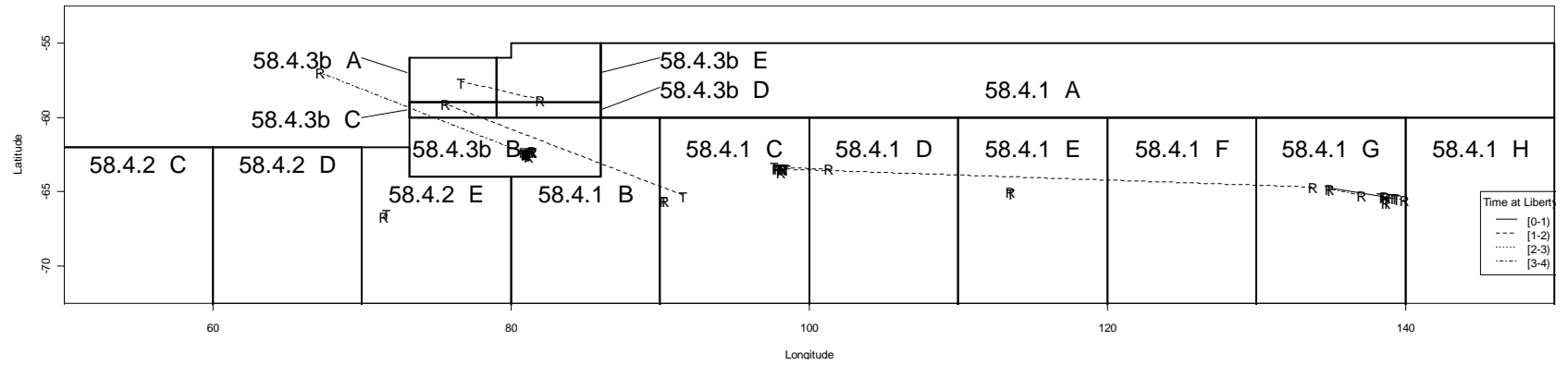


Figure 6: Plot of tag recaptures in Divisions 58.4.1, 58.4.2 and 58.4.3b recorded between 2003/04 and 2008/09. 'T' indicates the release location and 'R' indicates the recapture location.

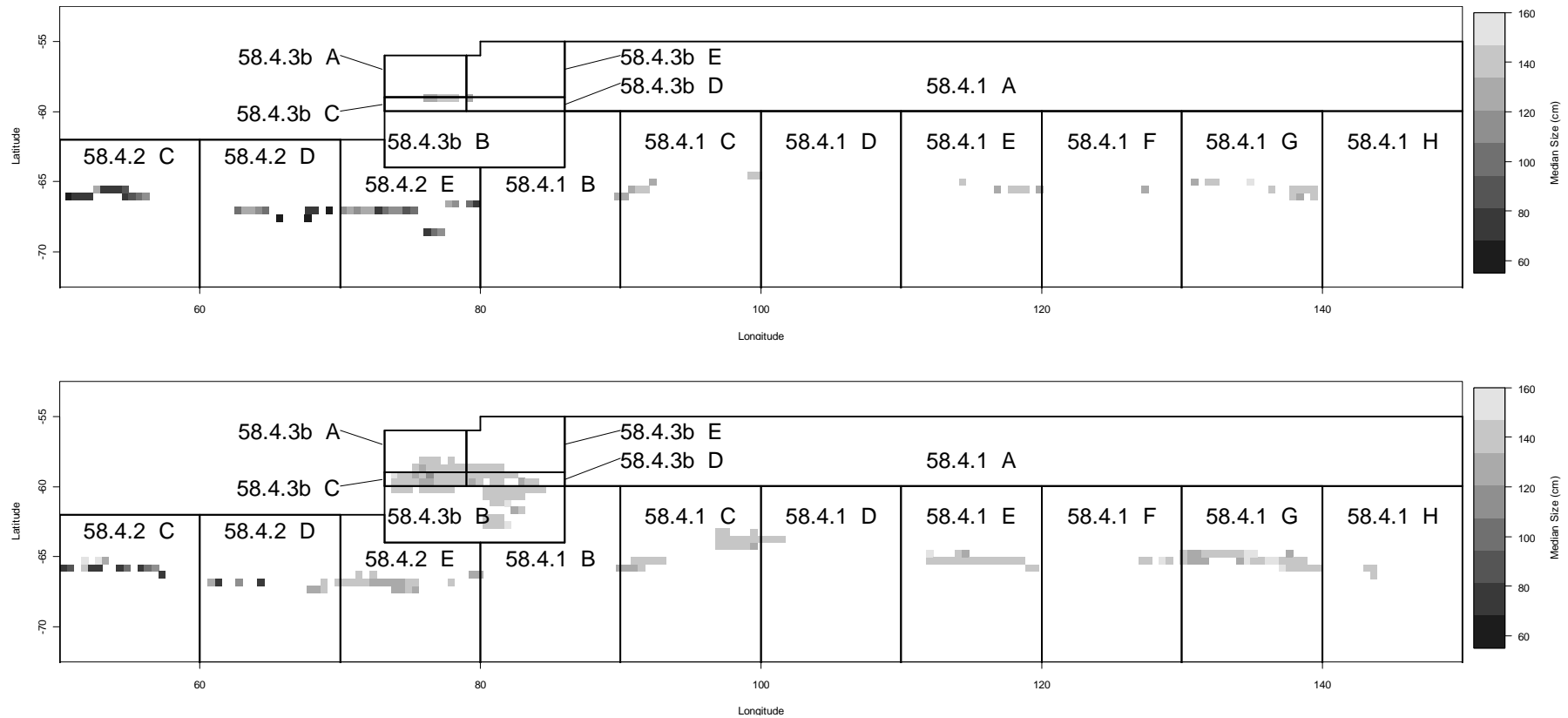


Figure 7: Plot of median lengths for longlines sampled in Divisions 58.4.1, 58.4.2 and 58.4.3b between 2003/04 and 2008/09, aggregated into 0.5° latitude x 0.5° longitude boxes. The upper panel shows data for fishing in depths shallower than 1 000 m, the lower panel for fishing in depths deeper than 1 000 m. Note darker squares indicate smaller median length; lighter squares indicate larger median length.

24. 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 (Figure 8).

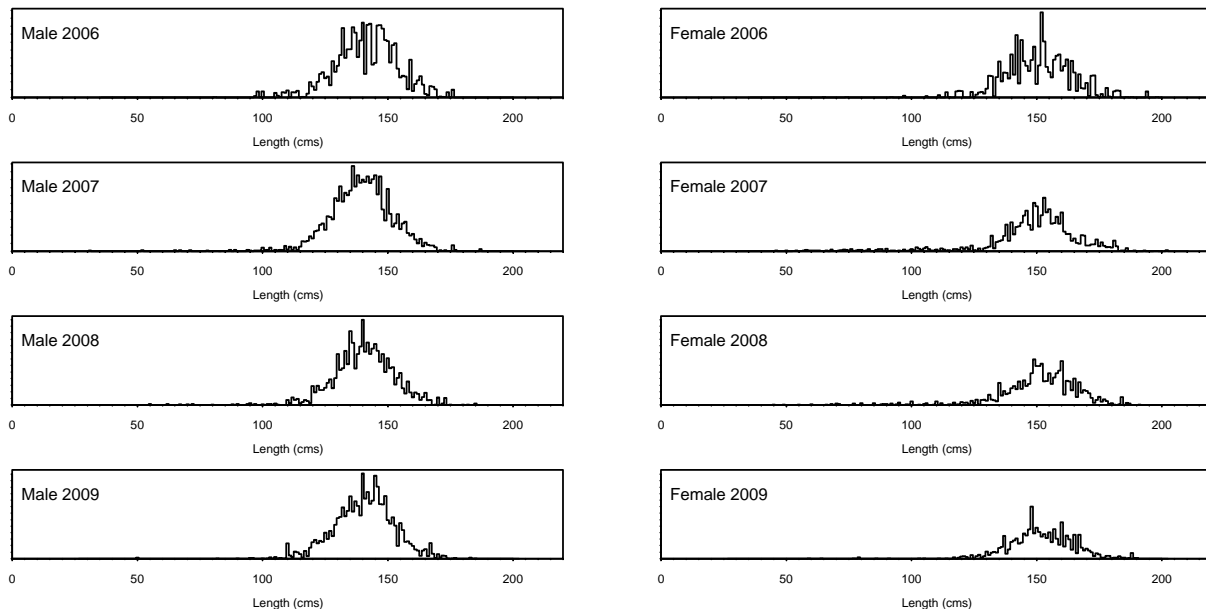


Figure 8: Scaled length frequency of male and female *Dissostichus mawsoni* in the north fishery of the Ross Sea (WG-FSA-09/36), for the years 2006–2009.

25. 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.

26. 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

27. 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.

28. 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 Conservation Measure 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

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.

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

## 5.2 Assessment of impacts on affected populations

29. 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).

30. *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**

31. None available for this fishery.

### **5.4 Mitigation measures**

32. In 2008, the Commission agreed that during the Year-of-the-Skate (CCAMLR-XXVII, paragraph 4.55):

- (i) all skates should be brought on board or alongside the hauler to be correctly identified, scanned for tags and for their condition to be assessed;
- (ii) all skates that are likely to survive if released (condition 3 or 4) should be released by cutting the snood as close to the hook as possible or cutting the snood and removing the hook from the skate, providing this does not further injure the skate;
- (iii) all skates which are dead or with life-threatening injuries (condition 1 or 2 in the logbook) should be retained by the vessels;
- (iv) skates released alive should be doubled-tagged (i.e. two tags per skate) at a rate of one skate in every five skates caught in exploratory fisheries, up to a maximum of 500 skates per vessel;
- (v) tagged skates should be identified to species, measured before they are released and that, where possible, tagging experiments be undertaken to compare different tag types and estimate tag-shedding rates;
- (vi) the tagging program will be coordinated by the Secretariat, which will be the repository for skate tagging kits;
- (vii) when skates are caught on a line, they should be randomly sampled by observers at a rate of three skates per thousand hooks for the purpose of collecting biological measurements;
- (viii) skates should not be sacrificed for biological sampling, and female maturity stage should only be recorded if the skate is dead or has sustained life-threatening injuries (conditions 1 and 2);
- (ix) all live skates which are part of the biological sampling, which have not sustained life-threatening injuries, should be handled with care and released after biological information has been recorded, if they are still suitable for release (i.e. still in condition 3 or 4).

## 6. By-catch of birds and mammals

### 6.1 By-catch removals

33. 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 Division 58.4.3b (from SC-CAMLR-XXVIII, Annex 7, Table 4).

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

\* Per vessel during daytime setting.

34. No marine mammal interactions or mortalities were observed in 2008/09.

35. WG-IMAF 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

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

## 7. Ecosystem implications/effects

37. No evaluation available for this fishery.

## 8. Harvest controls and management advice

### 8.1 Conservation measures

38. The limits on the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b are defined in Conservation Measure 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 2008/09 (Conservation Measure 41-07) and advice to the Scientific Committee for 2009/10.

Element	Limit in force	Advice for 2009/10
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 120 tonnes outside areas of national jurisdiction, and catch limits for each SSRU was as follows: A – 30 tonnes; B – 0 tonnes; C – 30 tonnes; D – 30 tonnes; E – 30 tonnes.	review
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 Conservation Measure 24-02.	Same period and conditions
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	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 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 three 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.	Carry forward
Environmental protection	Regulated by CMs 26-01, 22-06 and 22-07. Fishing prohibited in depths shallower than 550 m.	Carry forward

## 8.2 Management advice

39. In 2006 the Scientific Committee noted several features of exploratory *Dissostichus* spp. fisheries in the southern Indian Ocean (Subarea 58.4) which gave cause for concern as to the status of the resource in this area, and the lack of a scientific basis for setting catch limits (SC-CAMLR-XXV, paragraphs 4.184 to 4.192). In its management advice for this and other exploratory fisheries, the Scientific Committee requested urgent consideration by Members of methods for collecting data and of assessing these stocks. The Working Group recalled that the five-day catch and effort reporting system used in this fishery is not well suited to the monitoring of catch limits below 100 tonnes, and recommend that the Scientific Committee consider this matter further (main text, paragraphs 3.14 and 3.15).

40. The Working Group requested submissions by Members on stock structure, biological parameters (e.g. growth, length–weight relationship, maturity), recruitment and methods for assessment of these stocks.

41. The Working Group was unable to provide management advice on catch limits in this division, but recommended that all other aspects of Conservation Measure 41-01 be carried forward if a catch limit is set in 2009/10.
42. The Working Group agreed that measures in the research and data collection plans, including the requirement to tag toothfish at the rate of three toothfish per tonne and the requirement for research hauls as used in 2008/09, be retained for the exploratory fisheries in Subareas 48.6 and 58.4.
43. The Working Group reiterated its recommendation from last year that the relative merits of the different views on harvest strategies for toothfish in new and exploratory fisheries be evaluated using simulations. It recommended that such work be submitted to WG-SAM for review of the simulation methodologies before submitting the outcomes to WG-FSA for consideration.

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