APPENDIX K

FISHERY REPORT: *DISSOSTICHUS ELEGINOIDES* KERGUELEN ISLANDS (DIVISION 58.5.1)

CONTENTS

FISHERY REPORT: *DISSOSTICHUS ELEGINOIDES*
KERGUELEN ISLANDS (DIVISION 58.5.1)

1. Details of the fishery

The fishery for *Dissostichus eleginoides* operated in the French EEZ around the Kerguelen Islands in Division 58.5.1 (Figure 1).

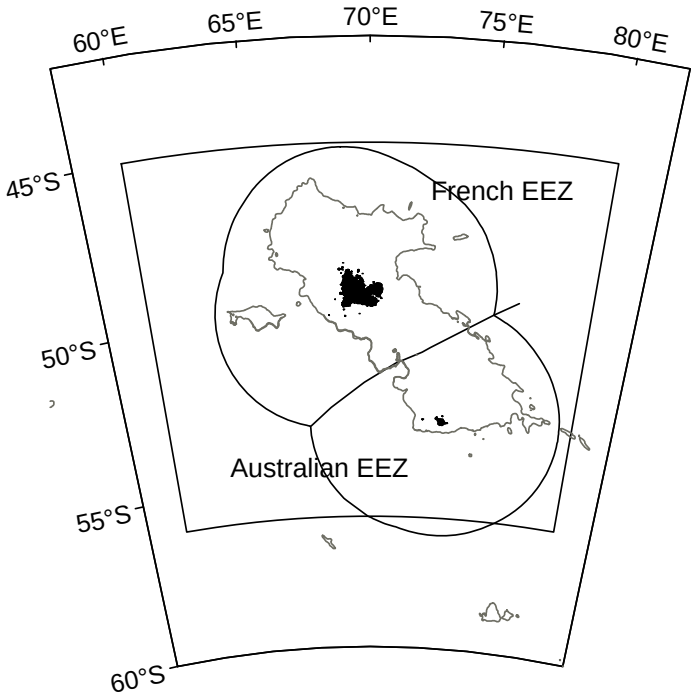

Figure 1: Map of Division 58.5.1 showing the location of the French EEZ, and the adjacent Australian EEZ in Division 58.5.2.

1.1 Reported catch

2. The catch limit of *D. eleginoides* set by France in its EEZ in Division 58.5.1 for the 2007/08 season (defined by France: 1 September 2007 to 31 August 2008) was 5 000 tonnes, and was allocated to longliners. The season's catch reported for this division up to August 2008 was 2 853 tonnes. Reported historical catches from 1988 in the fishery are shown in Table 1. The fishery began in 1984/85 as a trawl fishery targeting *D. eleginoides*, however, trawling targeting other species between 1979 and 1984 caught small amounts of toothfish as by-catch. Trawling continued to the 2000/01 season; a longline fishery began in 1991/92 and continues to the present. The fishery is active throughout most of the year.

Table 1: Reported catch for *Dissostichus eleginoides* in the French EEZ in Division 58.5.1 and estimated IUU catch in Division 58.5.1 (source: STATLANT data for past seasons, fine-scale data for current season are incomplete, WG-FSA-08/10 Rev. 2 and past reports for IUU catch for the whole division).

Season	Reported catch (tonnes)			Estimated IUU catch (tonnes)	Total extraction (tonnes)
	Longline	Trawl	Total		
1987/88	0	892	892	0	892
1988/89	0	1 311	1 311	0	1 311
1999/90	0	1 243	1 243	0	1 243
1990/91	26	2 982	3 008	0	3 008
1991/92	679	7 079	7 758	0	7 758
1992/93	243	3 354	3 597	0	3 597
1993/94	749	4 632	5 381	0	5 381
1994/95	1 467	4 129	5 596	0	5 596
1995/96	1 233	3 478	4 710	833	5 543
1996/97	1 048	4 012	5 059	6 094	11 153
1997/98	1 747	2 967	4 714	7 156	11 870
1998/99	2 062	2 669	4 730	1 237	5 967
1999/00	3 046	3 093	6 139	2 600	8 739
2000/01	2 593	2 153	4 747	4 550	9 297
2001/02	3 976	178	4 154	6 300	10 454
2002/03	5 291	0	5 291	5 518	10 809
2003/04	5 171	0	5 171	536	5 707
2004/05	5 073	0	5 073	268	5 341
2005/06	4 911	254	5 156	144	5 300
2006/07	5 201	0	5 201	404	5 605
2007/08	2 853	0	2 853	489	3 342

1.2 IUU catch

3. Details of the IUU catches attributed to Division 58.5.1 are given in Table 1. IUU fishing was first detected in 1996 and in some years IUU catches have exceeded legal catches, resulting in a high level of total removals (>10 000 tonnes per season). There has been a sharp decline in IUU fishing since 2002/03 as a result of increased surveillance within the EEZ.

1.3 Size distribution of catches

4. Data from the trawl fishery cover the period from 1990/91 to 1997/98 (Figure 2). Most *D. eleginoides* caught by trawl range from 40 to 120 cm in length, with a mode at approximately 60–70 cm. A smaller mode at approximately 40–50 cm is evident in 1994/95.

5. Data from the longline fishery cover the period 1995/96 to the current season (Figure 3). Most *D. eleginoides* caught by longline range from 40 to 120 cm in length, with a mode at approximately 80–100 cm at the beginning of the series, and 60–80 cm in recent seasons.

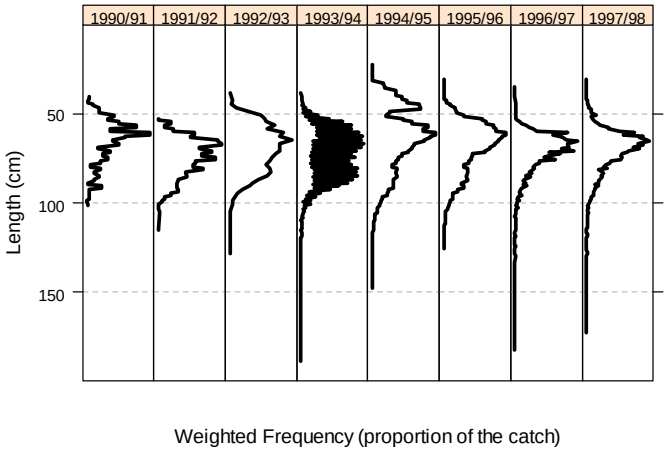

Figure 2: Catch-weighted length frequencies for *Dissostichus eleginoides* caught by trawl in the French EEZ in Division 58.5.1 (source: fine-scale and STATLANT data, and the length–weight relationship was taken from observations on *D. eleginoides* in Division 58.5.2).

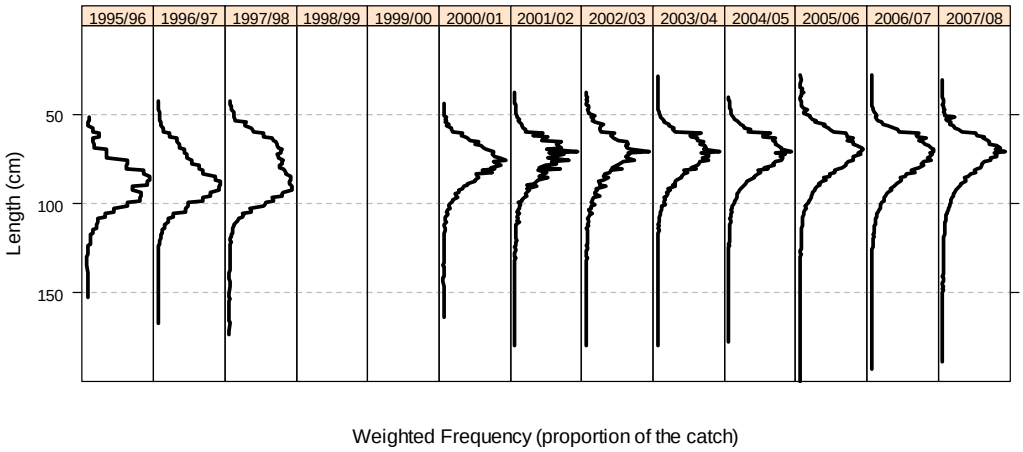

Figure 3: Catch-weighted length frequencies for *Dissostichus eleginoides* caught by longline in the French EEZ in Division 58.5.1 (source: fine-scale and STATLANT data, and the length–weight relationship was taken from observations on *D. eleginoides* in Division 58.5.2).

2. Stocks and areas

6. *Dissostichus eleginoides* occurs throughout the Kerguelen Islands Shelf, from shallow waters (<10 m) to at least 2 000 m depth. As fish grow, they move to deeper waters, and are recruited to the trawl fishery on the slopes of the shelf and subsequently to the longline fishery in deeper waters. A general east–west deep-sea movement of adult fish occurs and spawning is restricted to the westerly zone early in winter each year (Lord et al., 2006). Tagging experiments at Heard Island (Division 58.5.2) (Williams et al., 2002; WG-FSA-07/48 Rev. 1) show long-distance movements of sub-adult/adult fish between zones (Heard to Kerguelen and also Crozet) but the proportion of exchange between stocks is unknown.

3. Parameter estimations

3.1 Summary of the longline fishery

7. WG-FSA summarised the C2 data for Division 58.5.1 during its 2007 meeting. Table 2 provides a summary of the reported catches by year and nationality for longline vessels. The average (unstandardised) catch per hook has decreased from 0.36 kg/hook in 1997 to 0.20 kg/hook in 2007. Table 3 summarises the effort by month and year from the longline fishery from 1994/95 to 2007/08.

Table 2: Longline fishery: number of records extracted (sets), catch (tonnes) by nation, number of vessels, mean catch per set, mean catch per hook and mean depth fished (source: C2 data).

Season	Sets	Catch (tonnes)			No. of vessels	Catch/set (tonnes/set)	Catch/hook (kg/hook)	Mean depth (m)
		France	Ukraine	Total				
1994/95	388	-	302	302	2	0.8	0.03	518
1995/96	1 221	-	812	812	2	0.7	0.06	481
1996/97	719	-	628	628	3	0.9	0.36	473
1997/98	1 177	121	808	929	3	0.8	0.31	499
1998/99	622	513	327	840	3	1.4	0.26	600
1999/00	769	2 992	-	2 992	5	3.9	0.37	1 110
2000/01	862	2 589	-	2 589	5	3.0	0.33	1 083
2001/02	1 688	4 087	-	4 087	9	2.4	0.27	920
2002/03	3 105	5 457	-	5 457	7	1.8	0.20	1 026
2003/04	3 087	5 104	-	5 104	8	1.7	0.18	1 054
2004/05	3 086	5 022	-	5 022	7	1.6	0.19	1 034
2005/06	2 697	4 699	-	4 699	7	1.7	0.19	1 166
2006/07	2 797	5 350	-	5 350	7	1.9	0.21	1 225
2007/08	1403	2 853	-	2 853	7	2.0	0.23	1 237
Total	23 621	38 786	2 878	41 664				

Table 3: Number of sets by month and year in the longline fishery.

Season	Month												Total
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
1994/95	0	0	0	0	0	0	0	0	0	0	117	271	388
1995/96	284	357	326	93	0	0	0	0	0	0	0	161	1 221
1996/97	126	54	108	54	0	0	0	0	0	0	104	273	719
1997/98	322	301	309	82	0	0	0	0	0	0	39	124	1 177
1998/99	117	62	98	171	94	0	0	0	0	2	47	31	622
1999/00	53	70	69	39	68	83	78	8	0	0	132	169	769
2000/01	24	43	97	90	44	45	52	10	0	36	217	204	862
2001/02	73	183	94	62	176	176	91	70	0	250	370	143	1 688
2002/03	199	268	265	198	291	275	417	164	193	217	391	227	3 105
2003/04	296	345	0	304	285	300	294	150	37	290	477	309	3 087
2004/05	265	371	0	429	257	302	254	64	0	367	517	260	3 086
2005/06	160	351	3	401	184	269	231	37	0	264	513	284	2 697
2006/07	146	419	186	130	337	296	249	29	0	408	395	202	2 797
2007/08	291	411	92	153	227	111	74	44	-	-	-	-	1 403
Total	2 356	3 235	1 647	2 206	1 963	1 857	1 740	576	230	1 834	3 319	2 658	23 621

8. Depredation has an impact on the catch landed from each line. Depredation was assumed to not have been present before 2001, to have increased linearly to 2003, and to have been constant thereafter. Roche et al. (2007) estimated that the depredation over 2002/03 and 2003/04 was 348 tonnes for a landed catch of 10 900 tonnes. This implies a depredation rate of 3%.

9. The C2 data were used to estimate standardised CPUE indices for the longline fishery from 1999 to 2007. In addition, standardised CPUE indices, assuming depredation, were also estimated by adjusting the C2 catches by a factor of 1 for the years before 2001, 1.031 for the years 2003–2007, and a linear interpolation between 1 and 1.031 for the years 2001 and 2002. Estimated CPUE indices assuming depredation (adjusted) and without depredation (unadjusted) are given in Table 4 and Figure 4. In general, CPUE indices declined between 1999 and 2003, and have remained relatively stable since. The inclusion of depredation had a minimal impact on the trend in the CPUE indices.

Table 4: CPUE indices unadjusted and adjusted for depredation.

Year	Unadjusted			Adjusted		
	Index	95% CIs	CV	Index	95% CIs	CV
1999	2.36	(1.79–3.11)	0.14	2.31	(1.75–3.04)	0.14
2000	1.56	(1.45–1.67)	0.03	1.52	(1.42–1.63)	0.03
2001	1.28	(1.20–1.36)	0.03	1.26	(1.19–1.34)	0.03
2002	0.96	(0.92–1.01)	0.03	0.96	(0.92–1.01)	0.03
2003	0.75	(0.71–0.78)	0.02	0.76	(0.72–0.79)	0.02
2004	0.72	(0.69–0.75)	0.02	0.73	(0.70–0.76)	0.02
2005	0.70	(0.67–0.73)	0.02	0.71	(0.67–0.74)	0.02
2006	0.79	(0.75–0.82)	0.02	0.80	(0.76–0.83)	0.02
2007	0.75	(0.71–0.78)	0.03	0.75	(0.72–0.79)	0.03

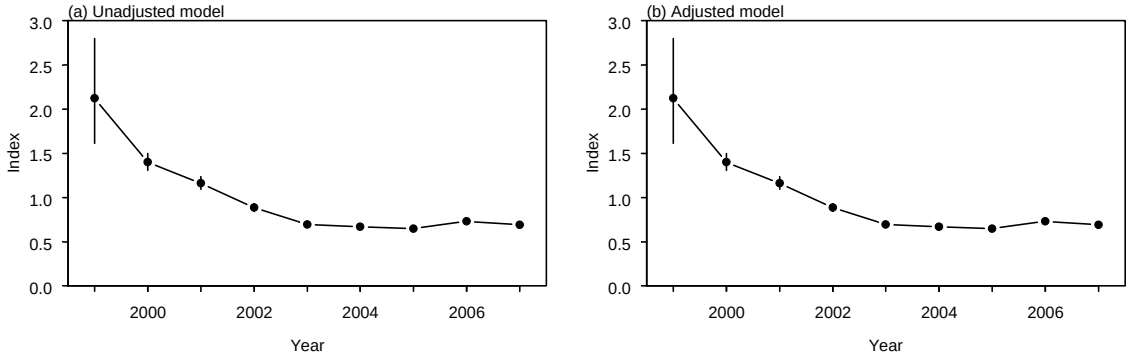

Figure 4: Estimated relative CPUE indices assuming no depredation (unadjusted) and depredation (adjusted).

3.2 Biological parameters

10. No biological parameters (except size-at-first-maturity, see WG-FSA-05/27) are available for Division 58.5.1. It is likely that the parameters used in the stock assessment for Heard Island will be valid for the Kerguelen stock (growth curve, natural mortality).

4. Stock assessment

11. No formal stock assessment has been carried out for Division 58.5.1.

12. During the 2006 survey, 639 fish were tagged and 3 703 fish were tagged from the longline fishery so far. During the 2007/08 season, 99 tagged fish were caught on longlines, 76 French tags and 23 Australian tags. A cooperative work between France and Australia has been conducted (May 2008, Paris, see Member's Activities Report) on analyses of catch, effort and other data to be used to progress understanding of fish stock and fishery dynamics for Divisions 58.5.1 and 58.5.2.

4.1 Research requirements

13. The Working Group encouraged the estimation of biological parameters for the Kerguelen Islands area. The Working Group encouraged the development of a stock assessment for this area, and also encouraged cooperative work in the intersessional period between France and Australia on analyses of catch and effort data and other data that could be used to progress understanding of fish stocks and fishery dynamics for Divisions 58.5.1 and 58.5.2. The Working Group encouraged France to continue its tagging program in Division 58.5.1.

14. The Working Group noted the results from the POKER survey in 2006 presented in WG-FSA-07/16, including estimates of biomass, distribution and length frequencies for toothfish and important by-catch species such as *Lepidonotothen squamifrons*, *Macrourus carinatus*, *Bathyraja eatonii* and *B. irrasa*. The Working Group encouraged France to use these data and previously published biological parameters to develop assessments for these species.

5. By-catch

5.1 By-catch removals

15. By-catch removals from the fishery for *D. eleginoides* are detailed in Table 5. In order of importance, macrourids (*M. carinatus*), rajids (*B. eatonii* and *B. irrasa*) and morids (*Antimora rostrata*) form the bulk of the by-catch. Only the latter species is fully discarded, the others are partly or totally processed. Local geographic distributions differ from one species to another.

Table 5: Catch history for by-catch species (macrourids, rajids and *Antimora rostrata*) taken in the fishery for *Dissostichus eleginoides* in the French EEZ in Division 58.5.1 (source: fine-scale data).

Season	Macrourids			Rajids			*Antimora rostrata*		
	Reported catch (tonnes)			Reported catch (tonnes)			Reported catch (tonnes)		
	Longline	Trawl	Total	Longline	Trawl	Total	Longline	Trawl	Total
1997/98	12	0	12	12	7	19	0	0	0
1998/99	37	0	37	42	6	48	1	0	1
1999/00	162	2	164	120	26	146	1	0	1
2000/01	97	0	97	116	261	377	0	0	0
2001/02	452	0	452	537	0	537	2	0	2
2002/03	769	0	769	924	0	924	10	0	10
2003/04	939	0	939	1134	0	1134	12	0	12
2004/05	779	0	779	974	0	974	47	0	47
2005/06	686	0	686	597	0	597	54	0	54
2006/07	782	0	782	546	0	546	56	0	56
2007/08	453	0	453	230	0	230	45	0	45

5.2 Assessments of impact on affected populations

16. No stock assessments of individual by-catch species were undertaken.

5.3 Mitigation measures

17. The Working Group recommended that, where possible, areas with high by-catch rates should be avoided.

6. By-catch of birds and mammals

18. Seabird mortality of white-chinned (*Procellaria aequinoctialis*), grey (*P. cinerea*), northern giant (*Macronectes halli*) and southern giant (*M. giganteus*) petrels was reported this year (SC-CAMLR-XXVII, Annex 6, paragraphs 2.7 to 2.11 and Table 3).

19. Details of seabird by-catch in 2006/07 are reported in SC-CAMLR-XXVI, Annex 6, Part II, paragraphs 14 and 15 and Tables 3 to 7. Details for 2001/02, 2002/03 and 2003/04 are reported in SC-CAMLR-XXIII, Annex 5, paragraphs 7.16 to 7.34. Details for 2000/01 and 2004/05 are reported in SC-CAMLR-XXIV, Annex 5, paragraphs 7.5 to 7.13. Details of seabird by-catch in 2005/06 are reported in SC-CAMLR-XXV, Annex 5, Appendix D, paragraphs 14 to 16 and Tables 4 to 8.

Table 6: Total extrapolated incidental mortality of seabirds and observed mortality rates (birds/thousand hooks) in longline fisheries in the French EEZ at Kerguelen (Division 58.5.1). Data are from SC-CAMLR-XXVII, Annex 6, Table 3.

	Season							
	2000/01*	2001/02*	2002/03*	2003/04*	2004/05	2005/06	2006/07	2007/08
Estimated by-catch	1 917	10 814	13 926	3 666	4 387	2 352	1 944	1 224
By-catch rate	0.0920	0.9359	0.5180	0.2054	0.1640	0.0920	0.0798	0.0585

* The number of observed hooks has not been collected and the values given are from the total number of hooks set.

20. No marine mammals have been reported as by-catch in Division 58.5.1.

21. Ad Hoc WG-IMAF assessed the level of risk of incidental mortality of seabirds in Division 58.5.1 as category 5 (high) (SC-CAMLR-XXVI/BG/31).

6.1 Mitigation measures

22. Details of mitigation measures applied in 2005/06 are reported in SC-CAMLR-XXV, Annex 5, Appendix D, paragraph 14. Details of mitigation measures implemented in 2004 are reported in SC-CAMLR-XXIII, Annex 5, paragraphs 7.35 to 7.45. Current measures include:

(i) line-weighting regimes as specified in Conservation Measure 25-02 are applicable to French autoliners;

(ii) at least two streamer lines meeting the CCAMLR specifications are compulsory. Some vessels use up to seven streamer lines;

(iii) in 2006/07 all vessels had observers on board who observed 24.6% of hooks set. This level of observer effort continued in 2007/08;

(iv) the discarding of hooks and the use of black lines are prohibited.

23. New conservation measures 2008/09:

(i) Introduction of an action plan –

The plan contains action details for the following five elements:

- prescription of conservation measures
- regulatory instruments
- education and training
- data collection
- research and development.

(ii) Prolongation of the fishing closure for the 2008/09 season –

There will be an additional closure in Division 58.5.1 from 1 February to 10 March 2009 (closure in the 2007/08 season: from 15 February to 15 March 2008) in order to cover the most sensitive time for white-chinned petrels.

(iii) Improvement to streamer lines –

Modifications were made in the latter part of the 2007/08 season to use multiple streamer lines and to increase the aerial coverage of the lines.

(iv) Implementation of the Brickle curtain –

The introduction mid-season of a requirement to use a haul mitigation device considerably reduced captures.

7. Harvest controls and management advice

7.1 Conservation measures

24. Various national conservation and fisheries enforcement measures are in force in addition to those agreed by CCAMLR. The national measures include:

- annual fishing season closure (February)
- annual catch limit and limitation of number of longliners (seven)
- compulsory logbooks
- allocation of fishing effort (not more than one longliner per 0.5° latitude x 1° longitude rectangle)
- one French observer on board each licensed vessel
- minimum fishing depth limit (500 m)
- minimum legal size for toothfish (60 cm)
- mitigation measures for the reduction of bird mortality
- landings occur at one place (Réunion Island)
- skates to be cut off if not processed (started December 2006)
- port inspection.

7.2 Management advice

25. The Working Group encouraged the estimation of biological parameters for Kerguelen and encouraged the development of a stock assessment for this area. It also encouraged cooperative work in the intersessional period between France and Australia on analysis of catch and effort data and other data that could be used to progress understanding of fish stocks and fishery dynamics for Divisions 58.5.1 and 58.5.2 and Subarea 58.6. The Working Group encouraged France to continue its tagging program in Division 58.5.1.

26. The Working Group recommended that avoidance of fishing in zones of specific high rates of abundance in by-catch should also be considered.

27. No new information was available on the state of fish stocks in Division 58.5.1 outside areas of national jurisdiction. The Working Group therefore recommended that the prohibition of directed fishing for *D. eleginoides*, described in Conservation Measure 32-13, remain in force.

28. The Working Group noted that France had made significant progress in mitigating by-catch, including area/season closures (SC-CAMLR-XXVI, Annex 6, paragraph II.23). It noted that the CPUE analysis would probably be robust to these changes so long as detailed haul-by-haul data continued to be available.

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