

**FISHERY REPORT: *DISSOSTICHUS ELEGINOIDES* CROZET ISLAND  
INSIDE THE FRENCH EEZ (SUBAREA 58.6)**

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## FISHERY REPORT: *DISSOSTICHUS ELEGINOIDES* CROZET ISLAND INSIDE THE FRENCH EEZ (SUBAREA 58.6)

### 1. Details of the fishery

The fishery for *Dissostichus eleginoides* operated in the French EEZ around the Crozet Islands in Subarea 58.6 (Figure 1).

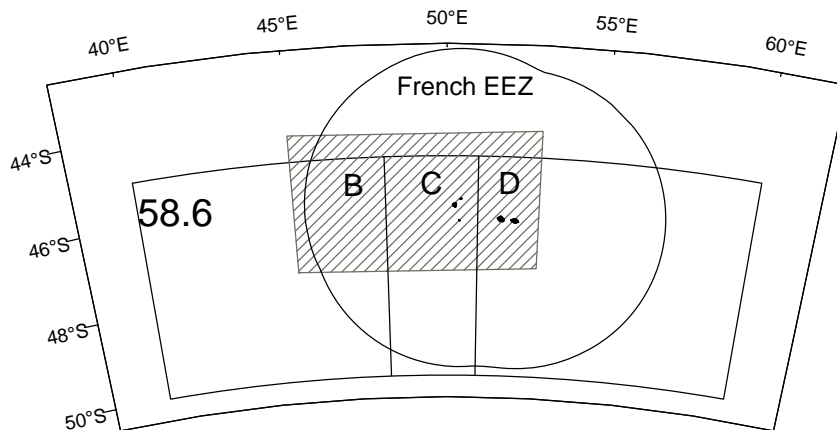


Figure 1: Map of Subarea 58.6 showing the location of the French EEZ, and SSRUs B, C and D established by CCAMLR.

#### 1.1 Reported catch

2. The catch limit of *Dissostichus eleginoides* set by France in its EEZ in Subarea 58.6 for the 2006/07 season (defined by France, 1 September 2006 to 31 August 2007) was 1 100 tonnes and was not reached as fishers showed little interest in fishing off Crozet (see below). The catch limit was allocated to seven longliners. The season's catch reported for this subarea to October 2007 was 333 tonnes. Reported historical catches in the fishery are shown in Table 1 including source of catch estimates (C2 and STATLANT). Fishing trials with trawlers have not been continued. In Subarea 58.6, the fishery has been conducted using longlines from 1996/97 to the present. The fishery was active all year. A high level of depredation on *D. eleginoides* catches from killer whales (*Orcinus orca*) is the main reason why fishers avoid the area.

Table 1: Catch history for *Dissostichus eleginoides* in the French EEZ in Subarea 58.6 (source: STATLANT data for past seasons, fine-scale data for current season, WG-FSA-07/10 Rev. 5 and past reports for IUU catch for the whole division).

Season	Reported catch (tonnes)	Estimated IUU catch (tonnes)	Total removals (tonnes)
1976/77	6	0	6
1977/78	370	0	370
1982/83	17	0	17
1986/87	488	0	488
1987/88	21	0	21
1993/94	56	0	56
1994/95	115	0	115
1995/96	3	7 875	7 878
1996/97	413	11 760	12 173
1997/98	787	1 758	2 545
1998/99	877	1 845	2 722
1999/00	1 017	1 430	2 447
2000/01	1 091	685	1 776
2001/02	1 158	720	1 878
2002/03	531	302	833
2003/04	537	380	917
2004/05	559	12	571
2005/06	775	55	830
2006/07	333	0	333

## 1.2 IUU catch

3. Details of the IUU catches attributed to Subarea 58.6 are given in Table 1. IUU fishing was first detected in 1996 and peaked at an estimated 11 760 tonnes in 1996/97. In recent seasons, IUU fishing occurs mainly outside the EEZ due to increased surveillance within the EEZ. In 2007, the IUU catch was estimated to be zero.

## 1.3 Size distribution of catches

4. In 2007, France resubmitted corrected catch, effort and length data to CCAMLR, using the CCAMLR formats. The Working Group thanked Prof. G. Duhamel and Mr N. Gasco (France) for preparing the data in CCAMLR format and resubmitting these data.

5. Data from the longline fishery cover the period 1996/97 to the current season (Figure 2). Most *D. eleginoides* caught by longline range from 40 to 130 cm in length, with a mode at approximately 70–80 cm at the beginning of the series, and 55–70 cm in recent seasons.

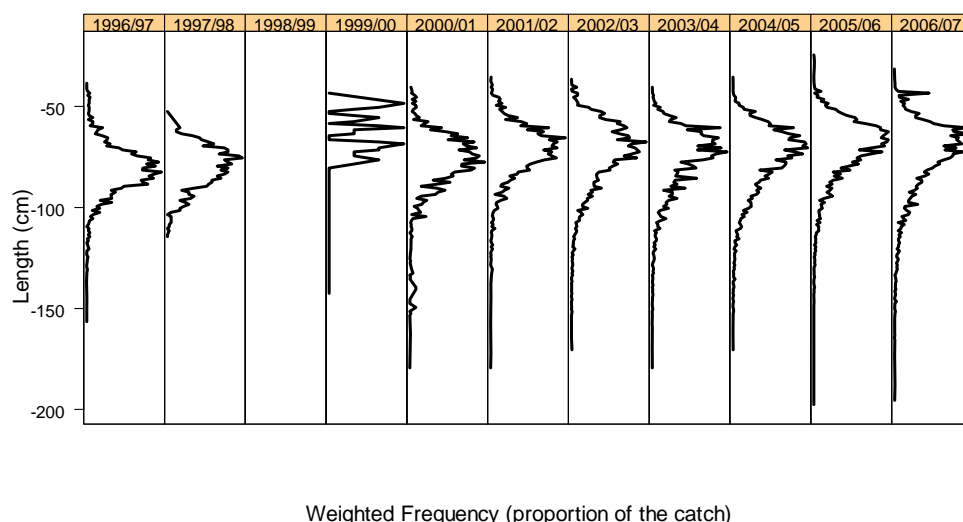


Figure 2: Catch-weighted length frequencies for *Dissostichus eleginoides* caught by longline in the French EEZ in Subarea 58.6 (source: fine-scale and STATLANT data, and the length–weight relationship was taken from observations on *D. eleginoides* in Subarea 58.7).

## 2. Stocks and areas

6. Tagging experiments at Heard Island (Division 58.5.2) (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 still unknown. So far, 677 fish have been tagged from commercial longliners at Crozet. Twenty-seven tagged fish were recaptured: 22 from French tagging and five from tagging at Heard Island.

## 3. Summary of the longline fishery

7. WG-FSA summarised the C2 data for Subarea 58.6 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 0.27 kg/hook in 1997 to 0.08 kg/hook in 2007. Table 3 summarised the effort by month and year from the longline fishery from 1997 to 2007.

Table 2: Number of sets by month and year (C2 data).

Season	Month											Total	
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct		Nov
1996/97	0	0	0	0	0	0	0	0	0	0	2	67	69
1997/98	8	0	0	0	0	0	0	0	0	0	0	0	8
1998/99	0	0	0	0	0	0	0	0	0	9	4	0	13
1999/00	9	23	26	22	53	16	30	125	75	0	53	25	457
2000/01	72	175	43	73	37	0	0	86	48	41	32	4	611
2001/02	19	32	99	170	135	150	144	87	0	87	58	63	1044
2002/03	118	116	42	32	102	87	0	43	0	104	0	26	670
2003/04	30	42	205	50	18	40	87	74	46	27	0	49	668
2004/05	0	27	253	0	0	47	155	52	22	64	10	94	724
2005/06	30	86	271	0	39	132	160	0	8	86	0	68	880
2006/07	54	0	199	73	18	78	60	161	19	0	0	0	662
Total	340	501	1138	420	402	550	636	628	218	418	159	396	5806

Table 3: Number of records extracted (sets), catch by SSRU (catch, tonnes), number of vessels (vessels) mean catch per set (tonnes/set), mean catch per hook (kg/hook) and mean depth fished (m), 1997–2007.

Season	Sets	Catch (tonnes)				Number vessels	Catch/set (tonnes/set)	Catch /hook (kg/hook)	Mean depth (m)
		SSRU B	SSRU C	SSRU D	Total				
1996/97	69	-	61.2	14.3	75.5	1	1.1	0.27	1138
1997/98	8	-	12.1	-	12.1	1	1.5	0.26	1115
1998/99	13	-	25.2	3.8	29.0	1	2.2	0.16	1388
1999/00	457	1.8	656.4	339.6	997.9	6	2.2	0.26	1130
2000/01	611	-	577.7	473.8	1051.5	6	1.7	0.23	1083
2001/02	1044	3.8	876.1	411.9	1291.8	7	1.2	0.16	977
2002/03	670	17.8	411.7	109.9	539.4	6	0.8	0.09	1255
2003/04	668	119.2	216.2	193	528.3	7	0.8	0.11	1122
2004/05	724	215.9	188.2	230.2	634.3	7	0.9	0.12	1158
2005/06	880	108.3	241.7	402.8	752.9	8	0.9	0.14	989
2006/07	662	41.2	196.5	95.7	333.4	7	0.5	0.08	1065
Total	5806	508.0	3463.0	2275.0	6246.2	13			

8. The effort was mainly in SSRUs C and D until 2004, and then became as important in SSRU B in more recent years.

9. Depredation has an impact on the catch landed from each line. Depredation was assumed to not have been present before 2001, have increased linearly to 2003, and have been constant since. Roche et al. (2007) estimated that the depredation over 2002/03 and 2003/04 was 333 tonnes for a landed catch of 991 tonnes. This implies a depredation rate of 25%.

10. The C2 data were used to estimate standardised CPUE indices for the longline fishery for 2000 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, 1.34 for the years 2003–2007, and a linear interpolation between 1 and 1.34 for the years 2001 and 2002. Estimated CPUE indices assuming depredation (adjusted) and without depredation (unadjusted) are given in Table 4 and Figure 3. In general, CPUE indices declined between 2000 and 2003, and have remained relatively stable since, although there was a slight decline in 2007. The inclusion of depredation had a small impact on the trend in the CPUE indices,

and had the effect of reducing the rate of decline between 2000 and 2003. The Working Group noted that analyses in the WG-FSA-06 report contained an error in the data for 2006, and that this is the reason for the change in the indices for 2006.

Table 4: CPUE indices unadjusted and adjusted for depredation.

Year	Unadjusted			Adjusted		
	Index	95% CIs	CV	Index	95% CIs	CV
2000	2.93	(2.40–3.58)	0.10	2.36	(1.94–2.89)	0.10
2001	1.75	(1.54–1.98)	0.06	1.54	(1.36–1.74)	0.06
2002	1.38	(1.26–1.51)	0.05	1.33	(1.22–1.46)	0.05
2003	0.57	(0.51–0.63)	0.05	0.61	(0.55–0.68)	0.05
2004	0.78	(0.70–0.87)	0.05	0.84	(0.76–0.94)	0.05
2005	0.78	(0.71–0.86)	0.05	0.84	(0.76–0.93)	0.05
2006	0.87	(0.80–0.96)	0.05	0.94	(0.86–1.03)	0.05
2007	0.47	(0.42–0.52)	0.05	0.50	(0.45–0.56)	0.05

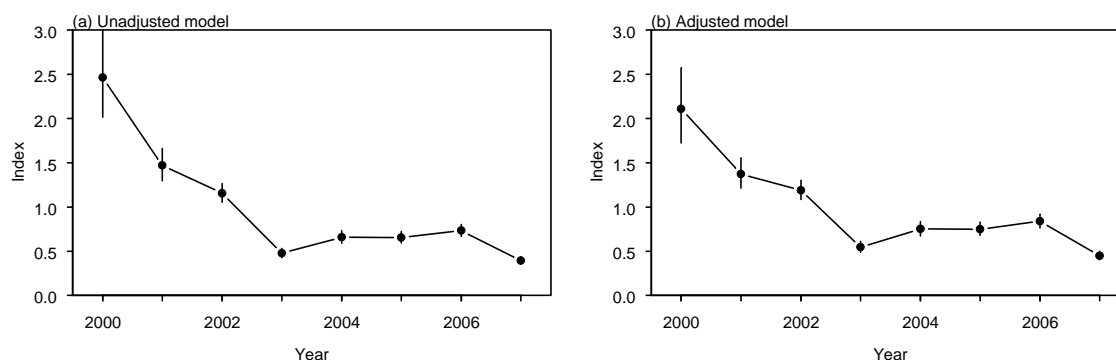


Figure 3: Estimated relative CPUE indices assuming no depredation (unadjusted) and depredation (adjusted).

#### 4. Stock assessment

11. No formal stock assessment has been carried out for Subarea 58.6.

##### 4.1 Research requirements

12. The Working Group encouraged the estimation of biological parameters for Crozet, and the development of a stock assessment for this area. The Working Group encouraged France to continue its tagging program in Subarea 58.6.

## 5. By-catch

### 5.1 By-catch removals

13. By-catch removals from the longline fishery for *D. eleginoides* are detailed in Table 5. In order of importance, macrourids (*Macrourus carinatus*), rajids (*Raja taaf*) and morids (*Antimora rostrata*) form the bulk of the by-catch. Only the last species is fully discarded, the others being partly or totally processed.

Table 5: Catch history for by-catch species (macrourids, rajids and *Antimora rostrata*) taken in the longline fishery for *Dissostichus eleginoides* in the French EEZ in Subarea 58.6 (Source: fine-scale data).

Season	Macrourids reported catch (tonnes)	Rajids reported catch (tonnes)	<i>Antimora rostrata</i> reported catch (tonnes)
1998/99	1	3	0
1999/00	97	31	12
2000/01	99	6	0
2001/02	184	24	9
2002/03	155	91	18
2003/04	117	79	56
2004/05	131	117	61
2005/06	157	178	32
2006/07	90	83	38

### 5.2 Assessments of impact on affected populations

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

### 5.3 Mitigation measures

15. The Working Group recommended that areas with high by-catch rates should be avoided.

## 6. By-catch of birds and mammals

16. 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-XXVI, Annex 6, Part II, Table 7).

17. 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 Crozet (Subarea 58.6). Data for 1998/99, 1999/2000, and for the period 2001/02 to 2003/04 are from SC-CAMLR-XXIII, Annex 5, Table 7.11. Data for 2004/05 are from SC-CAMLR-XXIV, Annex 5, Table 7, data for 2005/06 are from SC-CAMLR-XXV, Annex 5, Appendix D, Tables 4 and 5 and data for 2006/07 are from SC-CAMLR-XXVI, Annex 6, Part II, Table 6.

	CCAMLR season								
	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Extrapolated mortality	1 326*	360*	-	1 243*	720*	281 242* 39 <sup>†</sup>	242	235	313
Mortality rate	0.741*	0.186*	-	0.167*	0.109*	0.071* <sup>†</sup> 0.015 <sup>†</sup>	0.047	0.036	0.065

\* Reported by captains

<sup>†</sup> Corrected data

18. No mammals have been reported as by-catch in Subarea 58.6.

## 6.1 Mitigation measures

19. 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 25.5% of hooks set. This level of observer effort will be continued in 2007/08;
- (iv) the discarding of hooks and the use of black lines are prohibited.

## 7. Harvest controls and management advice

### 7.1 Conservation measures

20. Various national conservation and fisheries enforcement measures (in addition to those agreed by CCAMLR) are in force, such as:

- annual catch limit and limitation of number of longliners (seven)
- obligatory logbooks
- allocation of fishing effort (not more than two longliners simultaneously per 0.5° latitude x 1° longitude rectangle)
- one French observer on board each licensed vessel

- minimum depth limit (500 m)
- minimum legal size (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**

21. The Working Group encouraged the estimation of biological parameters for Crozet, and the development of a stock assessment for this area. The Working Group encouraged France to continue its tagging program in Subarea 58.6.

22. The Working Group recommended that avoidance of zones of specific high by-catch abundance should also be considered.

23. No new information was available on the state of fish stocks in Subarea 58.6 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.

24. 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.

## **Reference**

Roche, C., C. Guinet, N. Gasco and G. Duhamel. 2007. Marine mammals and demersal longline fishery interactions in Crozet and Kerguelen Exclusive Economic Zones: an assessment of depredation levels. *CCAMLR Science*, 14: 67–82.