

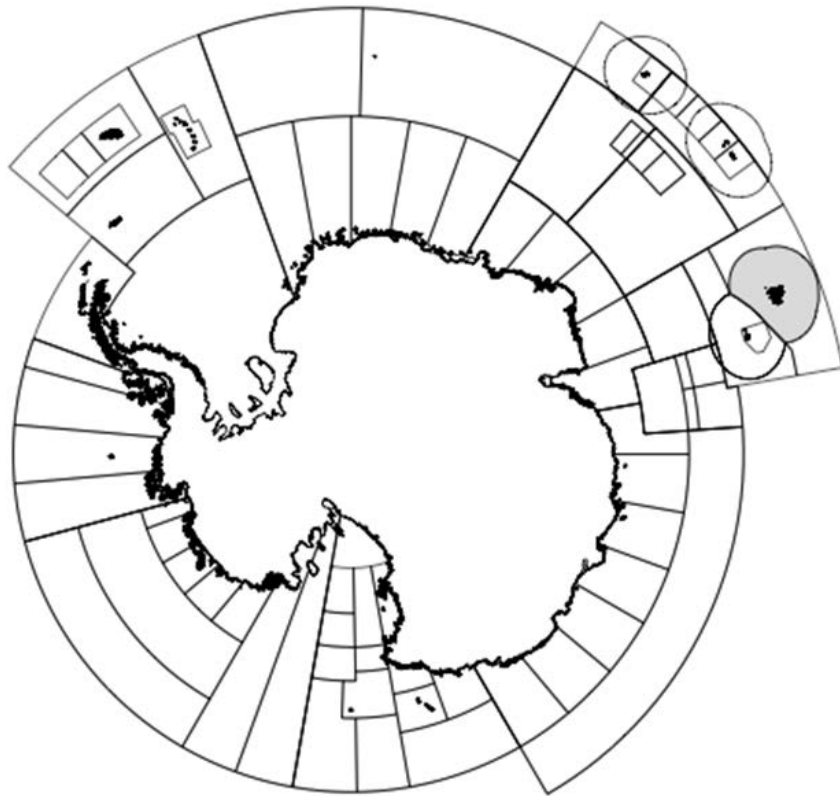


CCAMLR

Commission for the Conservation of Antarctic Marine Living Resources
Commission pour la conservation de la faune et la flore marines de l'Antarctique
Комиссия по сохранению морских живых ресурсов Антарктики
Comisión para la Conservación de los Recursos Vivos Marinos Antárticos

Fishery Report 2015: *Dissostichus eleginoides* Kerguelen Islands French EEZ (Division 58.5.1)

FISHERY REPORT



The map above shows the management areas within the CAMLR Convention Area, the specific region related to this report is shaded.

Throughout this report the CCAMLR fishing season is represented by the year in which that season ended, e.g. 2015 represents the 2014/15 CCAMLR fishing season (from 1 December 2014 to 30 November 2015).

Fishery Report 2015: *Dissostichus eleginoides* Kerguelen Islands, French EEZ (Division 58.5.1)

Introduction to the fishery

1. This report describes the licensed longline fishery for Patagonian toothfish (*Dissostichus eleginoides*) in the French Exclusive Economic Zone (EEZ) established in 1978 around the Kerguelen Islands in Division 58.5.1.
2. The fishery, targeting *D. eleginoides*, began as a trawl fishery in 1985 but targeting other species between 1979 and 1984 caught small amounts of toothfish as by-catch. Trawling continued to 2001 and intermittently in 2006 and 2010; a longline fishery began in 1992 and continues to the present (Duhamel et al., 2011). The fishery is active throughout the year with the exception of a summer closure period (1 February to either 1 or 15 March) which has been in place since 2004.
3. Within the French EEZs, fishing seasons, catch limits for target and by-catch species, as well as vessel licensing, are allocated by France. The season extends from 1 September to 31 August. French management measures, annually established by TAAF, specific to the EEZ, have restricted the longline fishery to waters outside the 12 n mile zone and no shallower than 500 m.
4. For the 2015 season, a catch limit set by France of 5 100 tonnes was allocated among seven longline vessels.

Reported catch

5. Reported catches of *D. eleginoides* are presented in Table 1. The total catch reported up to end of July 2015 was 2 884 tonnes. The highest reported catch of 7 758 tonnes was recorded in 1992.
6. The average (unstandardised) catch per hook decreased from 0.37 kg/hook in 2000 to 0.18 in 2004 and remained stable at 0.23 kg/hook since 2011.
7. Fishing effort in Division 58.5.1 is widely distributed throughout the French EEZ.

Illegal, unreported and unregulated (IUU) fishing

8. Illegal, unreported and unregulated (IUU) fishing was first detected in this region in 1996 and in some years IUU catches have exceeded legal catches, resulting in total removals exceeding 10 000 tonnes in some seasons.
9. Estimates of IUU catch in Division 58.5.1 are presented in Table 1. Due to increased surveillance, IUU fishing has virtually been eliminated inside the French EEZ at Kerguelen. There were no official reports of IUU fishing in the French EEZ in Division 58.5.1 but in

2010, an estimated 22 tonnes was illegally removed from the fishery. However, following the recognition of methodological issues in its assessment, no estimates of the IUU catch of *Dissostichus* spp. have been provided since 2011 (SC-CAMLR-XXIX, paragraph 6.5).

Table 1: Catch history of *Dissostichus eleginoides* in the French EEZ at Kerguelen Island (Division 58.5.1) and estimated IUU catch in tonnes. (Source: STATLANT data for past seasons, fine-scale data for the current season.)

Season	Reported catch (tonnes)			Estimated IUU catch (tonnes)
	Longline	Trawl	Total	
1988	0	892	892	
1989	0	1311	1311	0
1990	0	1243	1243	0
1991	26	2982	3008	0
1992	679	7079	7758	0
1993	243	3354	3597	0
1994	749	4632	5381	0
1995	1467	4129	5596	0
1996	1233	3478	4710	833
1997	1048	4012	5059	6094
1998	1747	2967	4714	7156
1999	2062	2669	4730	1237
2000	3046	3093	6139	2600
2001	2593	2153	4747	4550
2002	3976	178	4154	6300
2003	5291	0	5291	5518
2004	5171	0	5171	536
2005	5073	0	5073	268
2006	4911	245	5156	144
2007	5201	0	5201	451
2008	4850	0	4850	720
2009	5238	0	5238	0
2010	4915	235	5151	22
2011	5235	0	5235	*
2012	4903	0	4903	*
2013	5377	0	5377	*
2014	5326	0	5326	*
2015**	2884	0	2884	*

* Not estimated.

** Data up to end of July 2015.

Data collection

Biological data

10. The collection of biological data is conducted as part of the CCAMLR Scheme of International Scientific Observation. In longline fisheries targeting *D. eleginoides*, biological data collection includes representative samples of length, weight, sex and maturity stage as well as collection of otoliths for age determination of the target and most frequently taken by-catch species.

Length distributions of catches

11. The length-frequency distributions of *D. eleginoides* caught in this fishery from 2006 to 2015 are presented in Figure 1 (only commercial longline considered). The majority of *D. eleginoides* caught by longline range from 50 to 100 cm in length, with a single strong mode for all seasons at approximately 70–80 cm. These length-frequency distributions are unweighted (i.e. they have not been adjusted for factors such as the size of the catches from which they were collected). The interannual variability exhibited in the figure may reflect differences in the fished population but is also likely to reflect changes in the gear used, the number of vessels in the fishery and the spatial and temporal distribution of fishing.

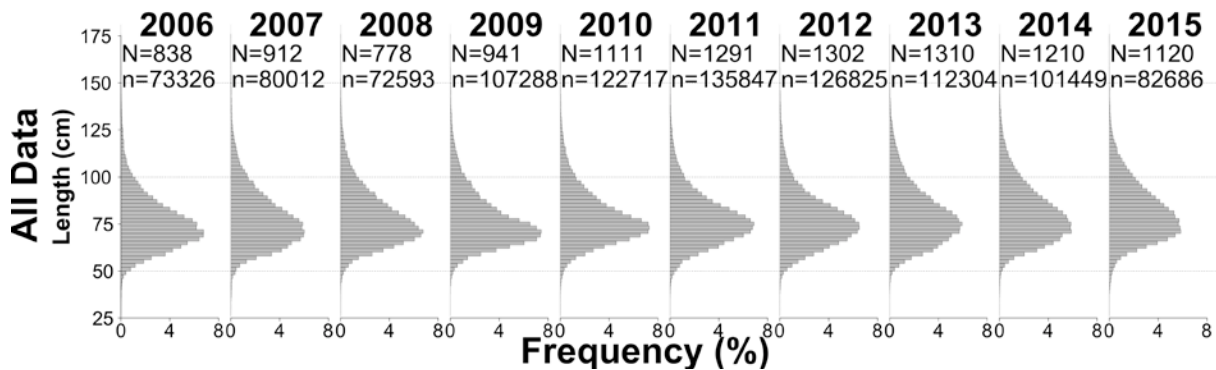


Figure 1: Annual length-frequency distributions of *Dissostichus eleginoides* caught in the French EEZ at the Kerguelen Islands in Division 58.5.1 from 2006 to 2015. The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are provided.

Tagging

12. Within the French EEZ, vessels are required to tag and release toothfish at a rate of 1 fish per tonne of green weight caught throughout the season.

13. Tagging commenced in 2006 and to date, a total of 39 017 *D. eleginoides* have been tagged in the longline catches in the French EEZ in Division 58.5.1, of which 4 016 have been recaptured (Table 2). Only few tagged fish have been recovered outside the Kerguelen EEZ (nine in the Crozet EEZ). An additional 200 fish, which were tagged in the Australian EEZ at Heard Island (Division 58.5.2), have been recaptured in Division 58.5.1.

14. The tagging program undertaken by France in its EEZ in Division 58.5.1 has achieved a similar tag-recapture rate to the tagging program undertaken by Australia in Division 58.5.2, which indicates that tagged fish move mainly short distances, but some fish make longer forays around the slope, as well as long-distance movements outside the division. Fish from the tagging program at Heard Island (Division 58.5.2) have also shown movement of sub-adult/adult fish between zones (Heard to Kerguelen and also Crozet), but the proportion of exchange between stocks is relatively small (Williams et al., 2002; WG-FSA-07/48 Rev. 1).

Table 2: The number of individuals of *Dissostichus eleginoides* tagged and recaptured in each season in the French EEZ in Division 58.5.1 (*: incomplete data).

Year	Tagged	Recaptured										Total
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	
2006	414	0	4	3	4	0	1	1	2	0	0	15
2007	2263		24	76	84	73	51	39	29	14	11	401
2008	2479			18	106	88	84	59	44	28	11	438
2009	4521				49	135	155	117	107	59	27	649
2010	5019					30	137	143	130	85	42	567
2011	5378						43	244	236	154	84	761
2012	4987							55	207	180	133	555
2013	5607								63	213	144	420
2014	5400									44	135	179
2015*	2949										31	31
Total	39017											4016

Life-history parameters

Data collection

15. The life history of *D. eleginoides* is characterised by slow growth, low fecundity and late maturity. *Dissostichus eleginoides* appear to have protracted spawning periods, taking place mainly in winter, but which may start as early as late autumn and extend into spring. The areas that are considered to be the most likely spawning grounds for *D. eleginoides* at Kerguelen Islands are the western deep sectors, including Skiff Bank.

16. *Dissostichus eleginoides* occur throughout the Kerguelen Islands shelf, from shallow waters (<10 m) to depths of at least 2 000 m. As fish grow, they move to deeper water and are recruited to the trawl fishery on the shelf slopes at the start of the fishery and subsequently to the longline fishery in deeper waters. On the Kerguelen Plateau (Divisions 58.5.1 and 58.5.2), a general east–west deep-sea movement of adult fish occurs and spawning is restricted to the westerly zone during the early winter (Lord et al., 2006).

Parameter estimates

17. There are no specific recent life-history parameters for *D. eleginoides* in the French EEZ. However, the metapopulation of the Indian Ocean sector has been validated by Appleyard et al. (2004) and thus it is likely that the parameters used in the stock assessment for Heard Island, such as growth rate and natural mortality, would be valid for the stock in Division 58.5.1. Age-specific data from Kerguelen otolith sampling are available since 2015.

Stock assessment status

18. Three biomass survey cruises (named POKER 1, 2 and 3) have been conducted during 2006 (Duhamel and Hautecoeur, 2009), 2010 and 2013 (see WG-FSA-14/07) respectively to estimate biomass and recruitment of *D. eleginoides* on the whole shelf and surrounding banks (100–1 000 m). Such cruises are planned to be conducted again in the future.
19. Cooperative work between France and Australia on analyses of catch, effort and other data (survey, tagging) to be used to progress understanding of fish stocks and fishery dynamics for Divisions 58.5.1 and 58.5.2 is ongoing (see WG-SAM-11/20, WG-SAM-15/37).
20. The results of biomass surveys have been included in a CASAL stock assessment model (WG-FSA-11/28, 12/09, 14/36 Rev. 1 and 15/68).
21. WG-FSA-15/68 presented an updated stock assessment of *D. eleginoides* at Kerguelen Islands (Division 58.5.1 inside the French EEZ), which included recommendations from WG-FSA-14 and the first ageing data and growth curve from the area. Preliminary results of a sexed model were also presented at the meeting, showing less female than males were caught in the deep longline fishery. This result was in line with habitat modelling of the plateau (WG-FSA-14/42).
22. WG-FSA-15 recommended further work on growth estimation with inter-laboratory comparisons of fish age estimates from otoliths and to further explore the sex-based model. It recommended also to investigate the use of a uniform-log prior for B_0 , the use of a lognormal prior for year-class strength (YCS), double-normal plateau selectivity ogives and the application of YCS variability in stock projections.
23. No new information was available on the state of fish stocks in Division 58.5.1 outside areas of national jurisdiction and thus the prohibition of directed fishing for *D. eleginoides*, described in CM 32-13, shall remain in force for 2016.

By-catch of fish and invertebrates

Fish by-catch

24. Catch limits for by-catch (macrourids, rajids and other species) inside the French EEZ are set by France. Primary by-catch species from the longline fishery in the French EEZ in Division 58.5.1 are the macrourid *Macrourus carinatus*, rajid skates (*Bathyraja irrasa* and *Bathyraja eatonii*) and blue antimora (*Antimora rostrata*). The latter species is fully discarded, while the others are partly or totally retained. The spatial distribution of by-catch indicates specific areas of higher catch rates that differed between species (WG-FSA-10/34).
25. The catch histories for by-catch species over the past 10 seasons are provided in Table 3.

Assessments of impact on affected populations

26. No stock assessments of individual by-catch species are presently undertaken, but biomass of a part of the stocks is now available from the biomass surveys (POKER 1, 2, 3) and could help in the future.

Table 3: 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.) (2015: partial data, to end July 2015.)

Season	Macrourids	Rajids		<i>Antimora rostrata</i>
	Reported catch (tonnes)	Reported catch (tonnes)	Number released alive	Reported catch (tonnes)
2005	779	974	-	47
2006	686	597	-	54
2007	782	546	1954	56
2008	816	376	3593	68
2009	957	415	3432	45
2010	887	456	2	58
2011	860	437	535	52
2012	690	433	15878	26
2013	728	308	12455	67
2014	750	68	39727	72
2015	405	7	27092	51

Mitigation measures

27. WG-FSA recommended that, where possible, areas with high by-catch rates should be avoided, particularly those shown in WG-FSA-09/43. A plan of action to avoid high-concentration areas of by-catch has been proposed to the longliners during 2010 and results will be further analysed. The requirement for rajids to be ‘cut-off’ at the surface has been in force since 2014.

Incidental mortality of seabirds and marine mammals

Incidental mortality

28. CCAMLR mitigation measures are in force in the French EEZ. A summary of the historic bird mortality by longline in the French EEZ in Division 58.5.1 since 2007 is presented in Table 4. The three most common species injured or killed in the fishery were white-chinned petrel (*Procellaria aequinoctialis*), grey petrel (*P. cinerea*) and northern giant petrel (*Macronectes halli*). Night-setting requirements have been highly effective in removing the previously high levels of albatross mortality.

29. In 2015, there were 12 bird mortalities observed inside the French EEZ in Division 58.5.1, all of which were *P. aequinoctialis* (Table 4).

30. The level of risk of incidental mortality of birds in Division 58.5.1 is category 5 (high) (SC-CAMLR-XXX, Annex 8, paragraph 8.1).

31. There have been no reports of incidental mortalities of mammals since 2007.

Table 4: Number of birds killed and injured in the longline fishery of the French EEZ in Division 58.5.1.

Season	<i>Procellaria aequinotialis</i>	<i>Procellaria cinerea</i>	<i>Macronectes halli</i>
2007	59	10	4
2008	271	15	5
2009	111	6	2
2010	63	15	6
2011	49	8	10
2012	41	5	1
2013	18	2	6
2014	4	0	2
2015	8	0	4

Mitigation measures

32. The requirements of CM 25-02 'Minimisation of the incidental mortality of birds in the course of longline fishing or longline fishing research in the Convention Area' apply to this fishery. France has applied the CCAMLR mitigation measures for the last three seasons and these will continue for the upcoming fishing season.

33. Additional measures will also be applied (WG-IMAF-11/10 Rev. 1), including:

- (i) changes to the bird exclusion device to ensure it is effective in all weather conditions
- (ii) closure of fishing areas and quota allocation reduction to vessels that have high by-catch rates
- (iii) education and training will be strengthened by regular meetings between TAAF and fishing masters of vessels with high by-catch
- (iv) data will continue to be collected and submitted using CCAMLR standard methods and forms
- (v) a demographic study on the white-chinned petrel will be undertaken at Kerguelen Islands, as well as the continued population counts of white-chinned petrels on the Kerguelen archipelago.

Ecosystem implications and effects

34. There is no formal evaluation available for this fishery, but fishery observers collect information about benthic taxa, including those considered as vulnerable marine ecosystem (VME) taxa.

Current management advice and conservation measures

35. In addition to those CCAMLR conservation measures that are applied in this fishery, various national conservation and fisheries enforcement measures are applicable, such as:

- annual fishing season closure (February and half of March)
- annual catch limit and limitation on the number of longline vessels allowed to operate in the fishery (seven)
- allocation of fishing effort permitting not more than one longliner simultaneously per 0.5° latitude × 1° longitude rectangle
- obligatory vessel logbooks
- one French observer on board each licensed vessel
- minimum fishing depth limit of 500 m
- minimum legal size limit for *D. eleginoides* of 60 cm
- mitigation measures for the reduction of bird mortality
- a single catch landings site at Réunion Island
- unless retained for commercial processing, all skates are to be released alive
- mandatory port inspection.

36. The limits in force and the advice of WG-FSA to the Scientific Committee for the forthcoming season are:

- (i) WG-FSA-15 agreed that model R1 with fixed YCS as described in WG-FSA-15/68 could be used to provide management advice for the fishery in the French EEZ in Division 58.5.1 for 2016. Although the long-term precautionary yield was not calculated, the catch limit set for 2016 by France of 5 300 tonnes satisfied the CCAMLR decision rules
- (ii) no new information was available on the state of fish stocks in Division 58.5.1 outside areas of national jurisdiction and thus the prohibition of directed fishing for *D. eleginoides*, described in CM 32-02, shall remain in force for 2016

- (iii) further work on growth estimation and other biological parameters for *D. eleginoides* in Division 58.5.1 (French EEZ) are to be estimated to improve the stock assessment for this area
- (iv) update estimations of whale depredation (WG-FSA-06/63) using methods like the comparative catch-per-unit-effort (CPUE) analysis from WG-FSA-14/10 and include these estimates in the stock assessment
- (v) France is to continue its tagging program in Division 58.5.1
- (vi) France is to continue its effort to reduce bird by-catch
- (vii) zones of specific high by-catch should also be avoided.

References

- Appleyard, S.A., R. Williams and R.D. Ward. 2004. Population genetic structure of Patagonian toothfish in the West Indian Ocean sector of the Southern Ocean. *CCAMLR Science*, 11: 21–32.
- Duhamel, G. and M. Hautecoeur. 2009. Biomass, abundance and distribution of fish in the Kerguelen Islands EEZ (CCAMLR Statistical Division 58.5.1). *CCAMLR Science*, 16: 1–32.
- Duhamel G., P. Pruvost, M. Bertignac, N. Gasco and M. Hautecoeur. 2011. Major fisheries events in the Kerguelen Islands: *Notothenia rossii*, *Champscephalus gunnari*, *Dissostichus eleginoides*. Current distribution and status of stocks. In: Duhamel, G. and D. Welsford (Eds). *The Kerguelen Plateau: marine ecosystem and fisheries*. Société française d'ichtyologie, Paris: 275–286.
- Lord, C., G. Duhamel and P. Pruvost. 2006. The Patagonian toothfish (*Dissostichus eleginoides*) fishery in the Kerguelen Islands (Indian Ocean sector of the Southern Ocean). *CCAMLR Science*, 13: 1–25.
- Williams, R., G.N. Tuck, A.J. Constable and T. Lamb. 2002. Movement, growth and available abundance to the fishery of *Dissostichus eleginoides* Smitt, 1898 at Heard Island, derived from tagging experiments. *CCAMLR Science*, 9: 33–48.