

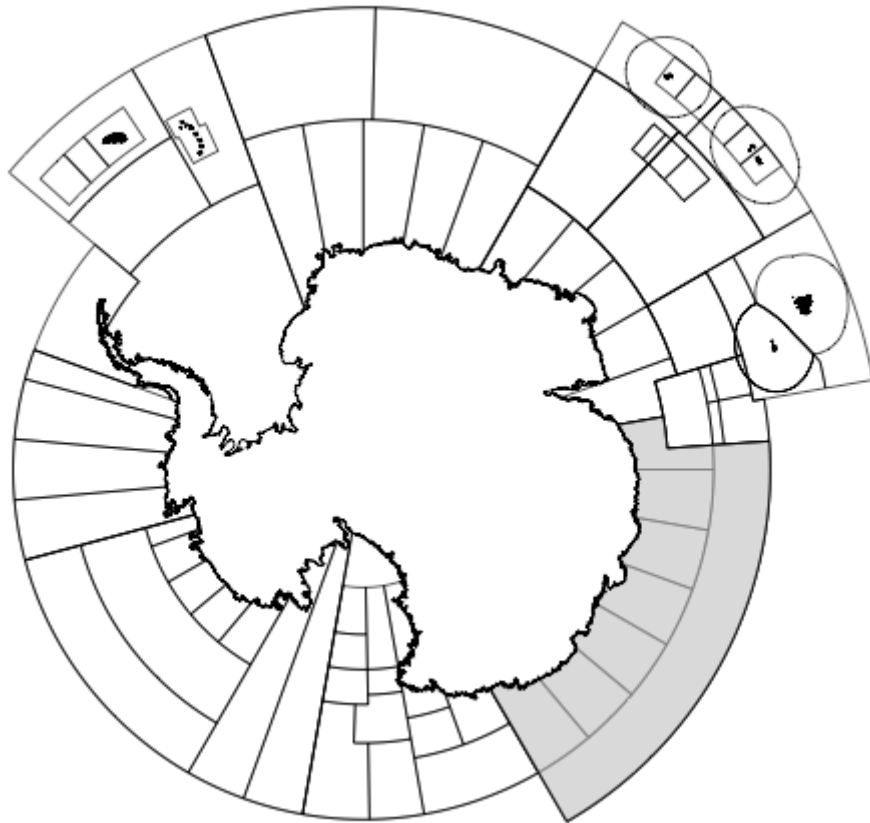


CCAMLR

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

Fishery Report 2016: Exploratory fishery for *Dissostichus* spp. in Division 58.4.1



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 2016: Exploratory fishery for *Dissostichus* spp. in Division 58.4.1

Introduction to the fishery

1. This report describes the exploratory longline fishery for toothfish (*Dissostichus* spp.) in Division 58.4.1. This fishery was first agreed by the Commission in 1999 (Conservation Measure (CM) 166/XVII) and licensed vessels have operated in this fishery since 2005, targeting primarily Antarctic toothfish (*Dissostichus mawsoni*).

2. The current limits on the exploratory fishery for *Dissostichus* spp. in Division 58.4.1 are described in CM 41-11. The precautionary catch limit for *Dissostichus* spp. in 2016 was 660 tonnes and this was applied to research fisheries at small-scale research units (SSRUs) including research blocks within those SSRUs (Figure1).

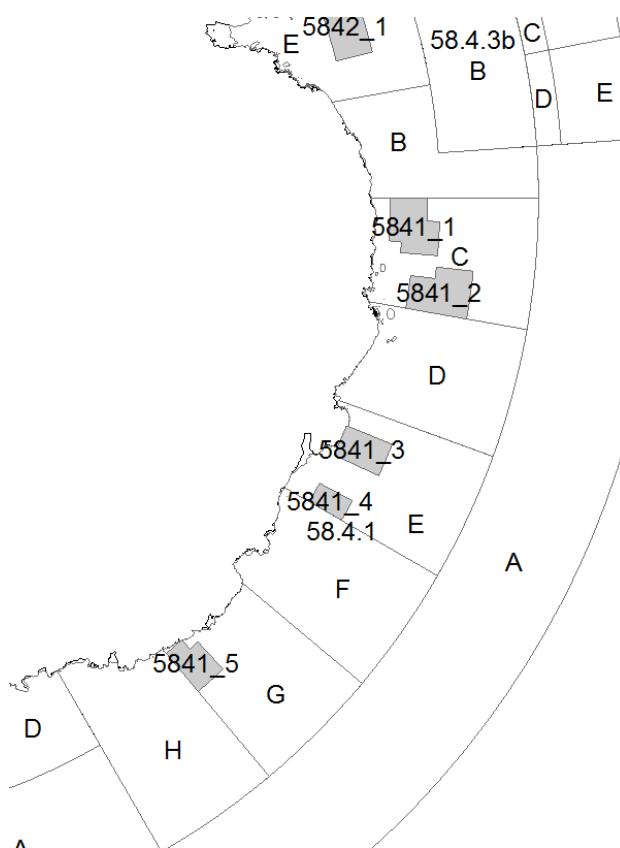


Figure 1: Location of research blocks in Division 58.4.1 in 2016.

3. In 2016, the fishery was limited to one vessel from each of Australia, France, Japan, the Republic of Korea and Spain; although Australia, Korea and Spain were the only Members that conducted research fishing during this season.

4. For 2017, a total of five vessels, one each from Australia, France, Japan, Korea and Spain, have notified their intention to participate in the exploratory fishery for *Dissostichus* spp. in Division 58.4.1.

Reported catches

5. Reported catches of *Dissostichus* spp. in Division 58.4.1 peaked at 634 tonnes in 2007, which exceeded the catch limit set for that year by 6%. The catch limit was again exceeded in 2009 and 2011 by 6% and 2% respectively (Table 1). The catches reported in Division 58.4.1 include catch data from particular vessels that CCAMLR has agreed should be quarantined as there is no confidence in the amount and/or the location of those catches (SC-CAMLR-XXXIII, paragraph 3.68). Those years that include quarantined data are indicated with a superscript q and vessel-specific details are provided in the footnote to Table 1. All ancillary data associated with these vessels (e.g. by-catch, tagging, observer data) is also quarantined and is not included in the data presented in this report.

Table 1: Catch history for *Dissostichus* spp. in Division 58.4.1. (Source: STATLANT data for past seasons and catch and effort reports for the current season, past reports for IUU catch.)

Season	Catch limit (tonnes)	Reported catch (tonnes)			Estimated IUU catch (tonnes)
		<i>D. mawsoni</i>	<i>D. eleginoides</i>	Total	
2005	600	479	1	480	*
2006	600	421	0	421	597
2007	600	513 ^q	0 ^q	634	626
2008	600	410	1	410	136
2009	210	162 ^q	0	162	152
2010	210	86 ^q	2	88	910
2011	210	113 ^q	0	113	*
2012	210	157	0	157	*
2013	210	48	0	48	*
2014	724	101	<1	101	*
2015	724	123	0	123	*
2016	660	400	2	402	*

^q Some catch data in these years is now quarantined, the following catch is not included in the reported catch table above:

2007 – vessel *Paloma V*, 94 tonnes *D. eleginoides* and 24 tonnes *D. mawsoni*

2009 – vessel *In Sung No. 22*, 60 tonnes *D. mawsoni*

2010 – vessel *In Sung No. 2*, 108 tonnes *D. mawsoni*

2011 – vessel *In Sung No. 7*, 101 tonnes *D. mawsoni*.

* Not estimated.

6. In 2016, the total catch of 402 tonnes in research fishing in this division (Table 1) was taken as follows: 80 tonnes in research block 5841_1, 43 tonnes in research block 5841_2, 75 tonnes in research block 5841_3, 12 tonnes in research block 5841_4, 35 tonnes in research block 5841_5 with an additional 25 tonnes in SSRU D, 86 tonnes in SSRU G and 47 tonnes in SSRU H associated with depletion experiments.

Illegal, unreported and unregulated (IUU) fishing

7. Illegal, unreported and unregulated (IUU) fishing activity was reported in Division 58.4.1 in 2006 with four IUU fishing vessel sightings, in 2007 when there were two to three IUU fishing vessel sightings, in both 2008 and 2009 when there was one IUU fishing vessel was sighted in each year. This increased to five IUU-listed vessels observed during

2010 followed by four IUU vessels, two using gillnet, one longliner and one refrigerated cargo vessel, in 2011. There were two IUU-listed vessels and one unknown vessel sighted in 2012 and three IUU-listed vessels reported in both 2014 and 2015. In 2014, one vessel that emitted an emergency distress signal was not located, but debris was sighted. No IUU vessel sightings were reported in 2016 although some gillnet was recovered during legal fishing operations. However, since 2011, following the recognition of methodological issues in its assessment, no estimates of the IUU catch of *Dissostichus* spp. have been provided for this division (SC-CAMLR-XXIX, paragraph 6.5).

Data collection

8. Catch limits for CCAMLR's fisheries for *D. mawsoni* and Patagonian toothfish (*D. eleginoides*) for the 'assessed' fisheries in Subareas 48.3, 88.1 and 88.2 and Division 58.5.2 are set using fully integrated assessments; more basic approaches are used for the 'data-poor' fisheries (in Subarea 48.6 and in Area 58 outside the exclusive economic zones (EEZs)). The management of these data-poor fisheries has been a major focus of attention in CCAMLR in recent years after the acknowledgement that commercial fishing by itself had resulted in too few data to develop a full assessment of the targeted stocks in these areas. CCAMLR has developed a framework for designing and undertaking research fishing designed to lead to an assessment of these toothfish stocks in the short to medium term, established under the provisions of CM 41-01. This research planning framework has three phases: prospecting phase, biomass estimation phase and assessment development phase, with a set of decisions and review for the progression between stages.

9. In order to obtain the data necessary for a stock assessment, catch limits for research fishing by commercial vessels are set at a level intended to provide sufficient information (including sufficient recaptures of tagged fish) to achieve a stock assessment within a time period of 3 to 5 years. These catch limits are also set so that they provide reasonable certainty that exploitation rates at the scale of the stock or research unit will not negatively impact the stock. Appropriate exploitation rates are based on estimates from areas with assessed fisheries and are not more than 3–4% of the estimated stock size. In 2014, five research blocks were designated in Division 58.4.1 with catch limits applied to each research block (Figure 1). These research blocks were designed to ensure that research fishing occurred in those areas with the highest probability of recapturing tagged fish; fishing in this division, other than the depletion experiment conducted by Spain, is restricted to the research blocks only. Further details on research in this division are given in Appendix 1.

Biological data

10. The collection of biological data under CM 23-05 is conducted as part of the CCAMLR Scheme of International Scientific Observation. In exploratory longline fisheries targeting *D. mawsoni* and *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. mawsoni* caught in this fishery are presented in Figure 2 for all years in which the number of that species measured was more than 150 fish. 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.

12. The majority of *D. mawsoni* caught in the Division 58.4.1 fishery ranged from 100 to 170 cm in length, with a relatively consistent broad mode at approximately 125–150 cm (Figure 2).

13. Length-frequency distributions of *D. eleginoides* have not been presented for Division 58.4.1 as the data from the only year in which more than 150 fish were reported measured is currently quarantined (see Table 1 footnote).

Tagging

14. Since 2012, vessels have been required to tag and release *Dissostichus* spp. at a rate of 5 fish per tonne of green weight caught (Table 2). The tag-overlap statistic estimates the representative similarity between the size distributions of those fish that are tagged by a vessel and of all the fish that are caught by that vessel. Each vessel catching more than 10 tonnes of each species of *Dissostichus* is required to achieve a minimum tag-overlap statistic of 60% (Annex 41-01/C).

15. Since 2005, a total of 8 731 *D. mawsoni* and 114 *D. eleginoides* have been tagged and 37 *D. mawsoni* and one *D. eleginoides* have been recaptured in Division 58.4.1 (Tables 3(a) and 3b). One *D. eleginoides* tagged in Division 58.4.1 was recaptured in Division 58.5.1 in 2016.

Life-history parameters

Data collection

16. The life histories of *D. mawsoni* and *D. eleginoides* are characterised by slow growth, low fecundity and late maturity. Both *D. mawsoni* and *D. 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. However, as this is the period least accessible to fishing, and thus the collection of biological data, specific life-history traits for these species are limited (WG-FSA-08/14). The areas that are considered to be the most likely spawning grounds for *D. mawsoni* include the north of the Ross Sea associated with the Pacific–Antarctic Ridge (SSRUs 881B–C) and the Amundsen Ridge (SSRU 881E) in the Amundsen Sea. In the Cooperation Sea, *D. mawsoni* most likely spawn on BANZARE Bank (Division 58.4.3b). *Dissostichus eleginoides* are thought to spawn in deep water around South Georgia Island (Subarea 48.3), Bouvet Island (Subarea 48.6) and on the Kerguelen Plateau (Divisions 58.5.1 and 58.5.2).

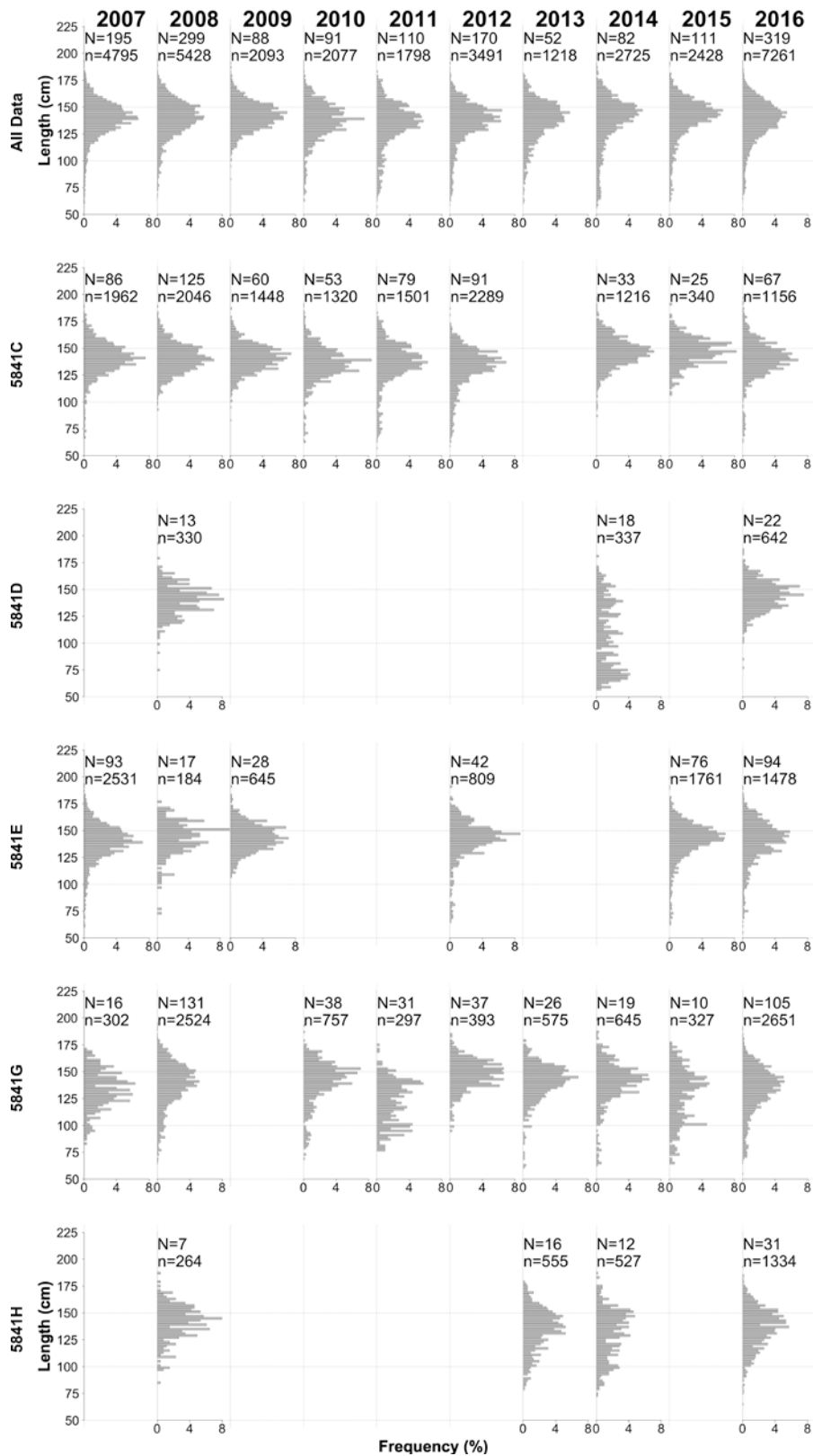


Figure 2: Annual length-frequency distributions of *Dissostichus mawsoni* caught in Division 58.4.1 (top panel) and in each SSRU (lower panels). The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are provided. Note: length-frequency distributions are only presented for those years/SSRUs in which the number of fish measured was >150.

Table 2: Annual tagging rate, reported by vessel, operating in the exploratory fishery for *Dissostichus* spp. in Division 58.4.1. The tag-overlap statistics (CM 41-01) for *D. mawsoni* and *D. eleginoides* respectively are provided in brackets. Values for the tag-overlap statistic are not calculated for catches of less than 10 tonnes (2007–2014) or less than 30 fish tagged (since 2015) (*). - indicates that no fish were tagged.

Flag State	Vessel name	Season							
		2009	2010	2011	2012	2013	2014	2015	2016
Australia	<i>Antarctic Discovery</i>								5.1 (94, *)
Japan	<i>Shinsei Maru No. 3</i>		3.1 (57,*)						
Korea,	<i>Hong Jin No. 701</i>			4.5(70, -)	5.2 (89, -)				
Republic of	<i>Insung No. 1</i>	3.8 (19, -)							
	<i>Insung No. 3</i>					9.5 (*, -)			
	<i>Kingstar</i>							5.1 (91, -)	5.0 (86, *)
Spain	<i>Tronio</i>			3.1 (52, -)		5.2 (68, *)	5.3 (76, *)		5.1 (82, *)
Uruguay	<i>Banzare</i>	3.4 (36, -)							
Required tagging rate		3	3	3	5	5	5	5	5

Table 3: The number of individuals of (a) *Dissostichus mawsoni* and (b) *D. eleginoides* tagged in each year. The number of fish recaptured by each vessel/year is provided in brackets.

(a)

Flag State	Vessel name	Season							
		2009	2010	2011	2012	2013	2014	2015	2016
Australia	<i>Antarctic Discovery</i>								247 (3)
Japan	<i>Shinsei Maru No. 3</i>		263 (2)						
Korea, Republic of	<i>Hong Jin No. 701</i>			180 (2)	812 (0)				
	<i>Insung No. 1</i>	418 (2)							
	<i>Insung No. 3</i>					29 (0)			
Spain	<i>Kingstar</i>							624 (3)	1138 (5)
	<i>Tronio</i>			232 (2)		227 (0)	522 (6)		618 (2)
Uruguay	<i>Banzare</i>	176 (0)							
Total		594 (2)	263 (2)	412 (4)	812 (0)	256 (0)	522 (6)	624 (3)	2003 (10)

(b)

Flag State	Vessel name	Season							
		2009	2010	2011	2012	2013	2014	2015	2016
Australia	<i>Antarctic Discovery</i>								16 (0)
Japan	<i>Shinsei Maru No. 3</i>		12 (1)						
Korea, Republic of	<i>Hong Jin No. 701</i>			0 (0)	0 (0)				
	<i>Insung No. 1</i>	0 (0)							
	<i>Insung No. 3</i>					0 (0)			
Spain	<i>Kingstar</i>							0 (0)	5 (0)
	<i>Tronio</i>			0 (0)		4 (0)	12 (0)		8 (0)
Uruguay	<i>Banzare</i>	0 (0)							
Total		0 (0)	12 (1)	0 (0)	0 (0)	4 (0)	12 (0)	0 (0)	29 (0)

Parameter estimates

17. There are no specific life-history parameters for either *D. mawsoni* or *D. eleginoides* in this division; the parameters used in assessed fisheries can be found in the ‘Stock assessment’ appendices of the relevant Fishery Reports.

Stock assessment status

18. There has been no integrated stock assessment for this data-poor exploratory fishery. Research in this fishery is in the biomass estimation phase and includes depletion experiments and tag-based research (details of ongoing and proposed research can be found in Appendix 1).

By-catch of fish and invertebrates

Fish by-catch

19. Catch limits for by-catch species groups (macrourids, rajids and other species) are defined in CM 33-03 and provided in Table 4. Within these catch limits, the total catch of by-catch species in any SSRU or combination of SSRUs, as defined in relevant conservation measures, shall not exceed the following limits:

- skates and rays (rajids) – 5% of the catch limit of *Dissostichus* spp. or 50 tonnes, whichever is greater
- *Macrourus* spp. – 16% of the catch limit of *Dissostichus* spp. or 20 tonnes, whichever is greater
- all other species combined – 20 tonnes.

Table 4: Catch history for by-catch species (macrourids, rajids and other species), including catch limits and number of rajids released alive, in Division 58.4.1. 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)
2005	96	17	50	0	-	60	1
2006	96	15	50	0	-	60	1
2007	96	28 ^q	50	0	-	60	2
2008	96	36	50	0	-	60	1
2009	33	3 ^q	50	0	-	60	<1
2010	33	5 ^q	50	0	-	60	<1
2011	33	3 ^q	50	0	-	60	<1
2012	33	2	50	0	-	60	<1
2013	33	5	50	0	-	60	<1
2014	116	6	50	0	-	100	<1
2015	116	2	50	0	-	100	<1
2016	105	49	50	<1	21	100	2

^q Quarantined data (see paragraph 5).

20. If the by-catch of any one species is equal to, or greater than, 1 tonne in any one haul or set, then the fishing vessel must move at least 5 n miles away for a period of at least five days.
21. If the catch of *Macrourus* spp. taken by a single vessel in any two 10-day periods in a single SSRU exceeds 1 500 kg in a 10-day period and exceeds 16% of the catch of *Dissostichus* spp. in that period, the vessel shall cease fishing in that SSRU for the remainder of the season.
22. The by-catch in Division 58.4.1 consists predominantly of macrourids (Table 4).

Invertebrate by-catch including VME taxa

23. All Members are required to submit, within their general new (CM 21-01) and exploratory (CM 21-02) fisheries notifications, information on the known and anticipated impacts of their gear on vulnerable marine ecosystems (VMEs), including benthos and benthic communities such as seamounts, hydrothermal vents and cold-water corals. All of the VMEs in CCAMLR's VME Register are currently afforded protection through specific area closures.
24. There are two VMEs in SSRU 5841H (identified through a national research program); the locations and other details can be found in Annex 22-09/A. There have been no VME Risk Areas designated in Division 58.4.1.

Incidental mortality of seabirds and marine mammals

Incidental mortality

25. Since 2005 when two southern giant petrels (*Macronectes giganteus*) and three sooty shearwaters (*Puffinus griseus*) were reported injured or killed, there have been no observed incidental mortalities of birds in Division 58.4.1.
26. There have been no observed incidental mortalities of mammals in Division 58.4.1.

Mitigation measures

27. 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. There is an exemption to the requirement for night setting by achieving the sink rates described in CM 24-02 and subject to a bird by-catch limit.
28. The risk level for birds in the fishery in Division 58.4.1 is category 2 (average to low) (SC-CAMLR-XXX, Annex 8, paragraph 8.1).

Ecosystem implications and effects

29. There is no formal evaluation available for this exploratory fishery.

Current management advice and conservation measures

30. The limits on the exploratory fishery for *Dissostichus mawsoni* in Division 58.4.1 in 2017 are defined in CM 41-11 and are summarised in Table 5.

Table 5: Limits on the exploratory fishery for *Dissostichus mawsoni* in Division 58.4.1 (CM 41-11).

Element	Limit in force
Access	Fishing for <i>Dissostichus mawsoni</i> in Division 58.4.1 shall be limited to the exploratory longline fishery by Australia, France, Japan, Republic of Korea and Spain. The fishery shall be conducted by one (1) Australian, one (1) French, one (1) Japanese, one (1) Korean and one (1) Spanish flagged vessel using longlines only.
Catch limit	The total catch of <i>Dissostichus mawsoni</i> in Division 58.4.1 in 2017 shall not exceed a precautionary catch limit of 532 tonnes applied as follows: SSRU A – 0 tonnes SSRU B – 0 tonnes SSRU C Research block 5841_1 – 80 tonnes SSRU C Research block 5841_2 – 81 tonnes SSRU D – 0 tonnes SSRU E Research block 5841_3 – 233 tonnes SSRU E Research block 5841_4 – 13 tonnes SSRU F – 0 tonnes SSRU G Research block 5841_5 – 35 tonnes SSRU G Research block 5841_6 – 90 tonnes SSRU H – 0 tonnes.
Season	1 December to 30 November
Fish by-catch	Regulated by CM 33-03
Bird mitigation	In accordance with CM 25-02. Limit of three (3) birds per vessel during daytime setting
Observers	At least two (2) scientific observers, one of whom shall be appointed in accordance with the CCAMLR Scheme of International Scientific Observation
Data	Daily catch and effort reporting (CM 23-07) and haul-by-haul catch and effort data (CM 23-04) For the purpose of CM 23-07 and 23-04, the target species is <i>Dissostichus mawsoni</i> (any <i>Dissostichus eleginoides</i> caught shall be counted towards the overall catch limit for <i>Dissostichus mawsoni</i>) and ‘by-catch species’ are defined as any species other than <i>Dissostichus</i> spp. Biological data reported by the CCAMLR scientific observer
Research	Fishery-based research as agreed by the Scientific Committee and in accordance with CM 41-01, including the collection of detailed catch, effort and biological data (Annex 41-01/A) and tagging (Annex 41-01/C). Toothfish tagged at a rate of at least 5 fish per tonne of green weight caught
Environmental protection	Regulated by CMs 22-06, 22-07, 22-08 and 26-01

Research plan summary for Division 58.4.1

Background

A1. Exploratory fishing for toothfish (*Dissostichus* spp.) in Divisions 58.4.1 began in 2003. However, robust stock assessment and catch limits according to CCAMLR decision rules remain to be determined for this division. Accordingly, the current exploratory Antarctic toothfish (*Dissostichus mawsoni*) fishery in this division has been identified as 'data-poor'. In 2011, research blocks were designated in areas where previous tag releases had been focussed. Research plans are generally focussed in these areas, to facilitate the development of local biomass estimates. All Members notifying to fish in Division 58.4.1 submitted a research plan, based on CM 24-01, Annex 24-01/A, format 2.

A2. In 2015, proposals to conduct research in Division 58.4.1 were presented in multiple research plans by Australia (commenced 2015/16), France (commencing 2016/17), Japan (commencing 2016/17), Republic of Korea (commenced 2012/13) and Spain (commenced 2012/13).

A3. Following requests from the 2016 meeting of the Working Group on Statistics, Assessments and Modelling (WG-SAM-16) one consolidated research plan was presented by all proponents of research in Divisions 58.4.1 and 58.4.2 to the 2016 meeting of the Working Group on Fish Stock Assessment (WG-FSA-16). The updated research proposal, including the research plans of Australia, France, Japan, Korea and Spain, was presented in WG-FSA-16/29 Rev. 1, which described that continuation of standardised longline surveys, in conjunction with fish tagging, biological measurements, ageing and genetic approaches will be used to develop stock assessments and inform the necessary considerations of spatial structure, biomass and connectivity of toothfish populations. Environmental data from conductivity, temperature and depth (CTD) loggers, benthic video cameras (BVC) and archival tags will contribute to models of toothfish habitat use. These models will inform spatial management approaches for toothfish, and the conservation of representative areas of benthic biodiversity. Additional outcomes include improving our understanding of trophic relationships and ecosystem function through a stable isotope study; providing information on the distribution, relative abundance, and life histories of by-catch species; and mapping of the bathymetry of fishable areas.

Advice by the Scientific Committee

A4. In 2016 the Scientific Committee considered the advice of WG-FSA on research in Divisions 58.4.1 and 58.4.2 and:

- (i) agreed that the research plan in WG-FSA-16/29 Rev. 1 is appropriate to achieve the research objectives and endorsed the recommendation from WG-FSA-16 (SC-CAMLR-XXXV, Annex 7, paragraph 4.118) that the new proposed research block 5841_6 be opened on an interim basis, with results to be reviewed by WG-SAM and WG-FSA in 2017 (Figure A1)

- (ii) recommended that the catch limits for these divisions remain unchanged for 2017 and supported the initial catch allocation scheme developed by the research proponents (Table A1 using the vessels in Table A2)
- (iii) agreed that Members shall confirm whether they intend to pursue research by SC CIRC by 1 January 2017. If any Members are not able to confirm that they will pursue research, their allocation will be evenly redistributed amongst the other notifying Members that have confirmed they will pursue research. If any Members have not commenced research fishing by 28 February 2017, their allocation will also be evenly redistributed amongst the other Members that have commenced research fishing, or in another way agreed by all of these other Members.

Table A1: Proposed initial allocation and total research catch limits for research plans in Divisions 58.4.1 and 58.5.2 in 2017 (from SC-CAMLR-XXXV, Table 7). AUS – Australia; ESP – Spain; FRA – France; KOR – Republic of Korea using the vessels identified in Table A2.

Division	SSRU	Research block	AUS	ESP	FRA	JPN	KOR	2017 catch limit (tonnes)
58.4.1	C	5841_1	-	-	26.5	26.5	26.5	80
	C	5841_2	40.5	40.5	-	-	-	81
	E	5841_3	30.0	30.0	60.5	73.5	38.5	233
	E	5841_4	-	-	13.0	-	-	13
	G	5841_5	-	-	-	-	35.0	35
	G	5841_6	45.0	45.0	-	-	-	90
58.4.2	E	5842_1	35.0	-	-	-	-	35
Total			150.5	115.5	100.0	100.0	100.0	567

Table A2: Vessels proposing to take part in research in Division 58.4.1 in 2017.

Vessel name	Flag	Information
<i>Antarctic Chieftain</i>	Australia	www.ccamlr.org/en/node/83684
<i>St André</i>	France	www.ccamlr.org/en/node/75730
<i>Shinsei Maru No 3</i>	Japan	www.ccamlr.org/en/node/75733
<i>Tronio</i>	Spain	www.ccamlr.org/en/node/75760
<i>Kingstar</i>	Korea, Republic of	www.ccamlr.org/en/node/84031

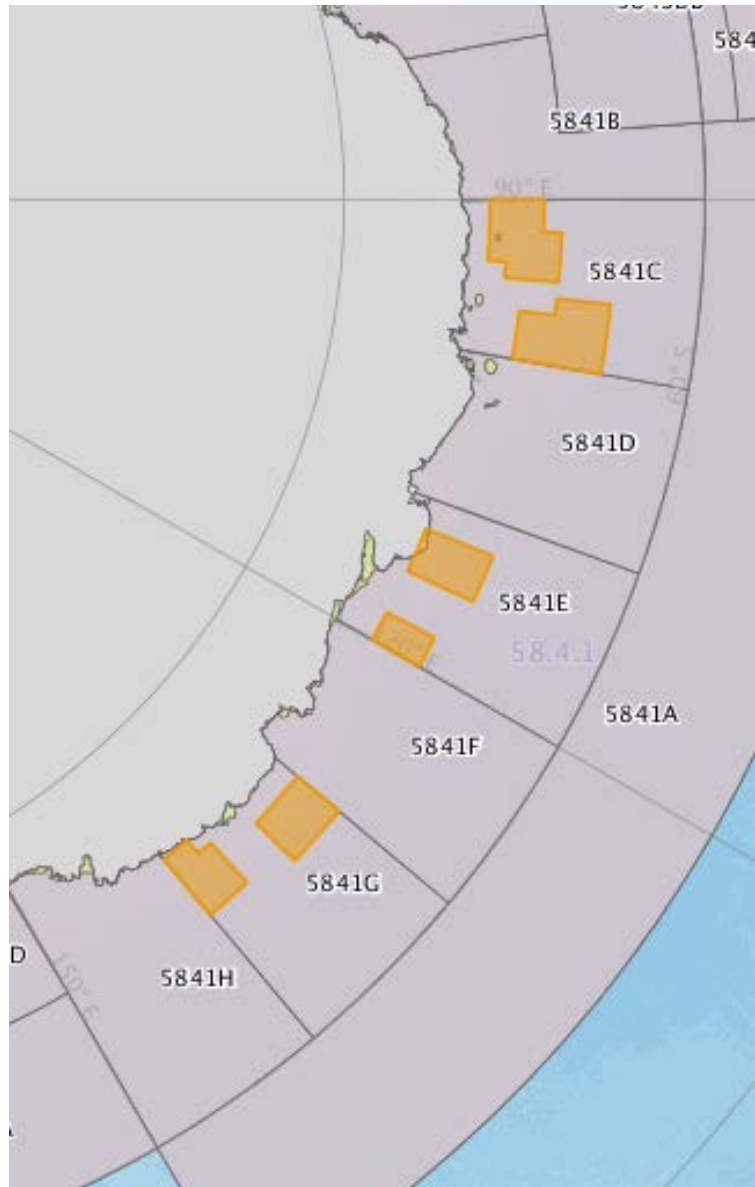


Figure A1: Location of research blocks in Division 58.4.1 in 2017.