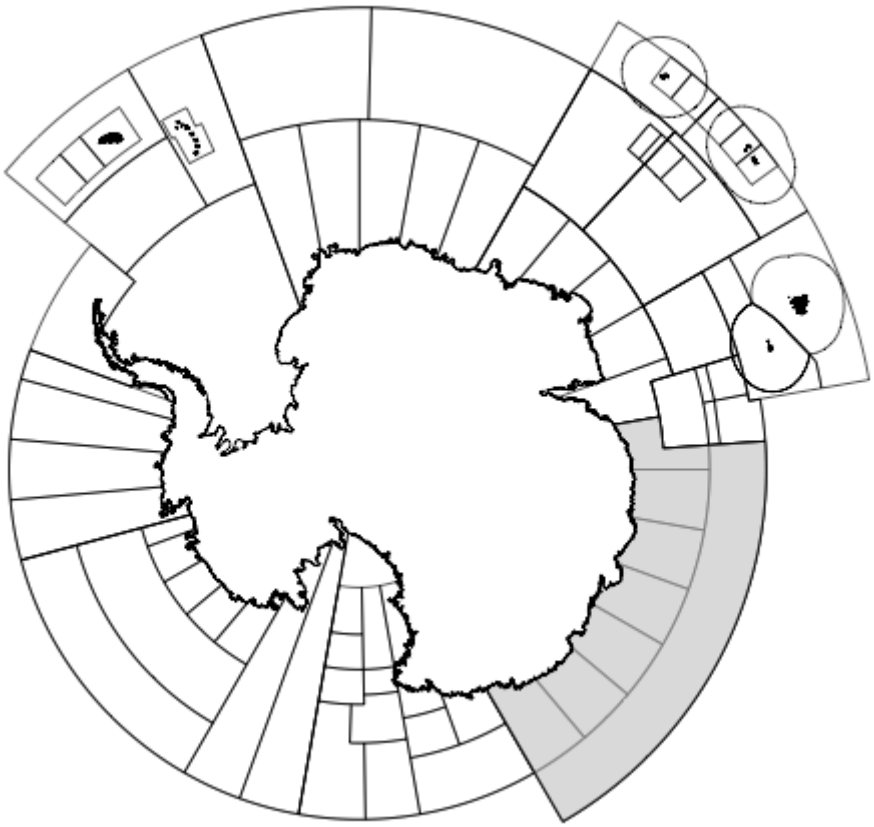
CCAMLR

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 2017: Exploratory fishery for *Dissostichus mawsoni* 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 2017: Exploratory fishery for *Dissostichus mawsoni* in Division 58.4.1

Introduction to the fishery

1. This report describes the exploratory longline fishery for Antarctic toothfish (*Dissostichus mawsoni*) in Division 58.4.1. Prior to 2017, this fishery was an exploratory fishery for *Dissostichus* spp., however, in order to better align the target species with the species that dominates the catch and tagging data, the target species was specified as *D. mawsoni*, with any Patagonian toothfish (*D. eleginoides*) caught counting towards the catch limit for *D. mawsoni.*

2. The current limits on the exploratory fishery for *D. mawsoni* in Division 58.4.1 are described in Conservation Measure (CM) 41-11. The precautionary catch limit for *Dissostichus* spp. in 2017 was 532 tonnes and this was applied to research fisheries at small-scale research units (SSRUs), including research blocks within those SSRUs (Figure1).

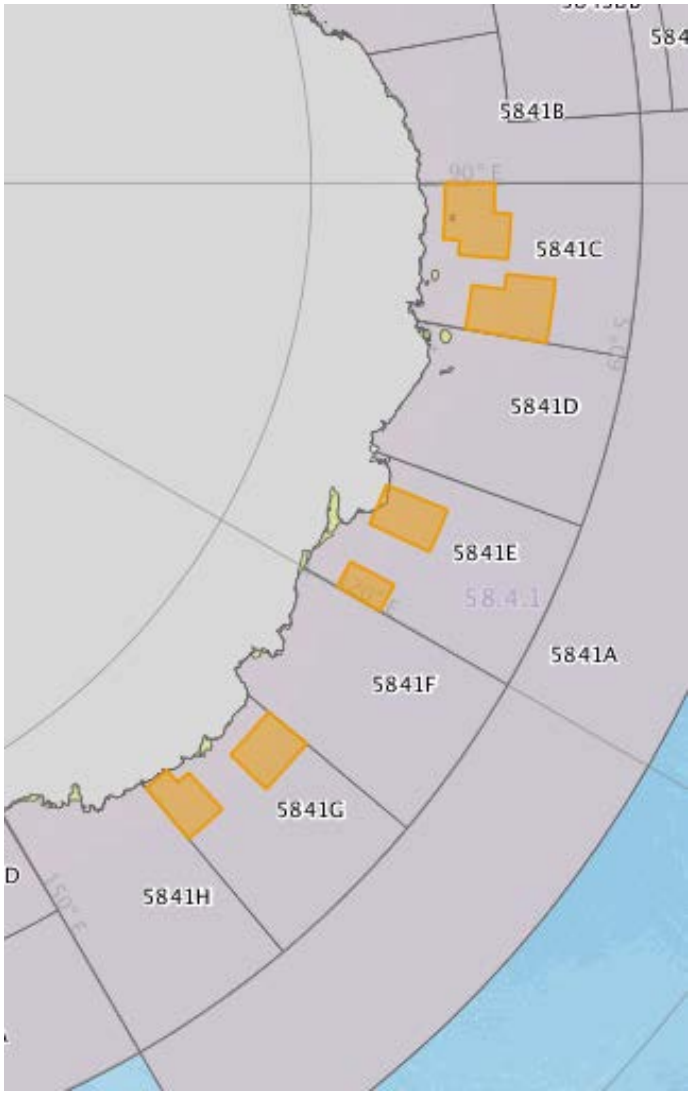


Figure 1: Location of research blocks in Division 58.4.1.

3. In 2017, the fishery was limited to one vessel from each of Australia, France, Japan, the Republic of Korea and Spain; however, Australia, Korea and Spain were the only Members that conducted research fishing during this season.

4. For 2018, a total of six vessels, two from Australia and one each from France, Japan, Korea and Spain, have notified their intention to participate in the exploratory fishery for *D. mawsoni* in Division 58.4.1.

Reported catches

5. Reported catches of *D. mawsoni* 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)
		D. mawsoni	*D. eleginoides*	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	*
2017	660	207	2	209	*

[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 2017, the total catch of 209 tonnes in research fishing in this division (Table 1) was taken from the research blocks shown in Figure 1.

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 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).

8. CCAMLR-XXXVI/28 Rev. 2 provided detailed information on fishing activities of IUU-listed vessels from Division 58.4.1 in 2014 following Operation Sparrow II conducted by Spain. The vessels reported catch for insurance purposes and took an estimated 792 tonnes. The IUU vessels *Asian Warrior* (*Kunlun*), *Zemour 2* (*Yongding*) and *Zemour 1* (*Songhua*) have a long history of operating together in the Convention Area, usually supported by a reefer vessel, and have likely undertaken similar fishing activities every year since they were first sighted in the Convention Area.

9. Based on the unprecedented availability of information from IUU vessels in Division 58.4.1, including catch data and video footage of fishing operations, the 2017 meeting of the Working Group on Fish Stock Assessment (WG-FSA-17) agreed that this data be analysed in order to evaluate toothfish catch per unit effort (CPUE) (by weight and number), bycatch species and size compositions, temporal variation in the spatial distribution of IUU activity, the temporal and spatial distribution of authorised fishing vessels in relation to available IUU activity to review the potential impacts of IUU removals on previous research conducted in the region and the relationship between reported IUU vessel sightings and actual levels of removals.

Data collection

10. Catch limits for CCAMLR's fisheries for *D. mawsoni* and *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.

11. 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

12. 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

13. 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.

14. 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).

15. 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).

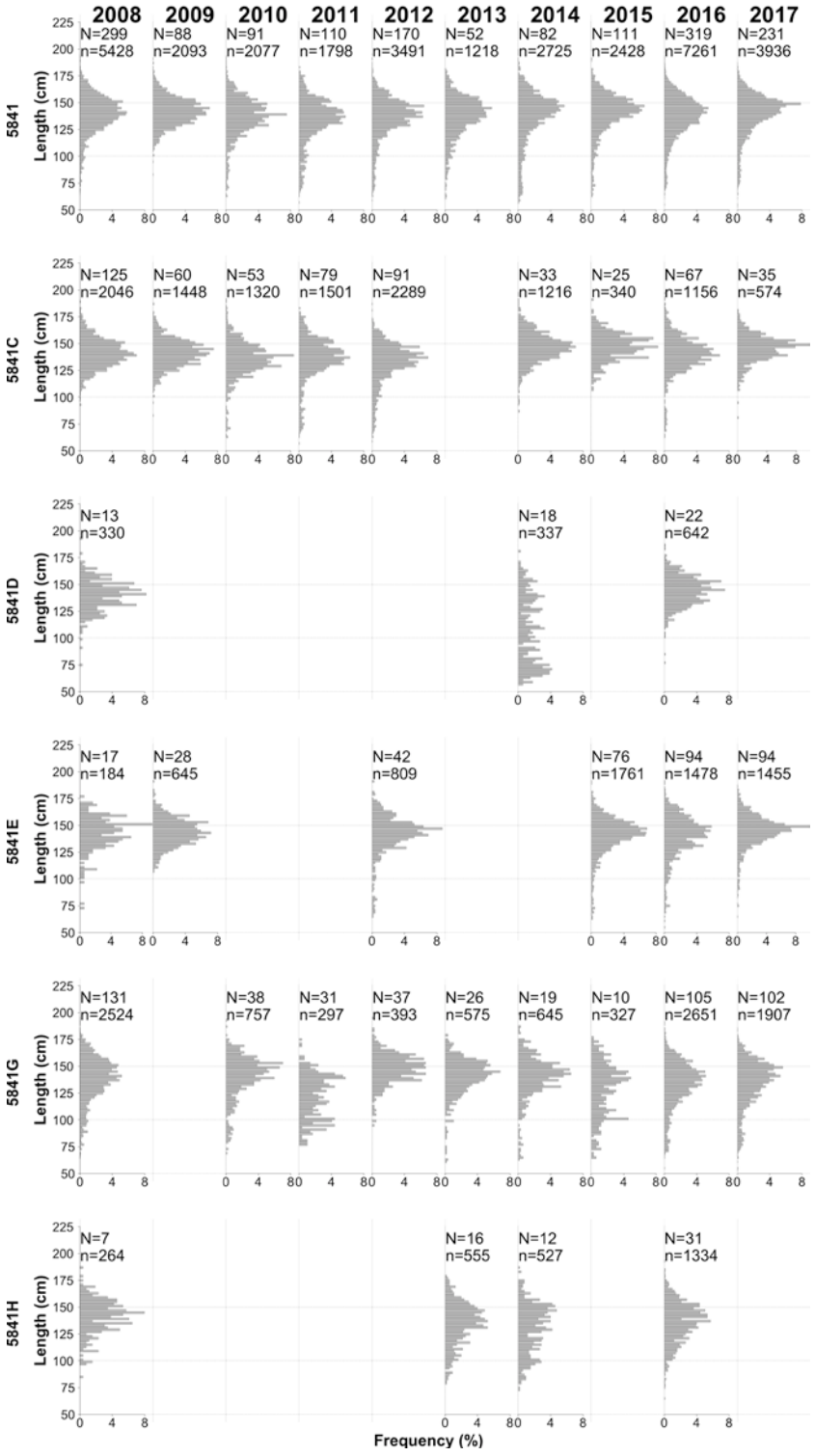


Figure 2: Annual length-frequency distributions of *Dissostichus mawsoni* caught in Division 58.4.1 (top panel) and in each SSRU (lower panels). The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are provided. Note: length-frequency distributions are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

Tagging

16. 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).

17. 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

18. 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).

Parameter estimates

19. 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

20. 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).

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 *Dissostichus 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							
		2010	2011	2012	2013	2014	2015	2016	2017
Australia	*Antarctic Discovery*							5.1 (94, *)	5.5 (86, *)
Japan	*Shinsei Maru No. 3*	3.1 (57, *)							
Korea,	*Hong Jin No. 701*		4.5(70, -)	5.2 (89, -)					
Republic of	*Insung No. 3*				9.5 (*, -)				
	Kingstar						5.1 (91, -)	5.0 (86, *)	5.2 (89, *)
Spain	*Tronio*		3.1 (52, -)		5.2 (68, *)	5.3 (76, *)		5.1 (82, *)	5.1 (65, *)
Tagging Rate		3	5	5	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							
		2010	2011	2012	2013	2014	2015	2016	2017
Australia	*Antarctic Discovery*							247 (3)	51 (1)
Japan	*Shinsei Maru No. 3*	263 (2)							
Korea, Republic of	*Hong Jin No. 701*		180 (2)	812 (0)					
	Insung No. 3				29 (0)				
	Kingstar						624 (3)	1138 (5)	695 (7)
Spain	*Tronio*		232 (2)		227 (0)	522 (6)		618 (2)	324 (6)
Total		263 (2)	412 (4)	812 (0)	256 (0)	522 (6)	624 (3)	2003 (10)	1070 (14)

(b)

Flag State	Vessel name	Season							
		2010	2011	2012	2013	2014	2015	2016	2017
Australia	*Antarctic Discovery*							16 (0)	8 (0)
Japan	*Shinsei Maru No. 3*	12 (1)							
Korea, Republic of	*Hong Jin No. 701*		0 (0)	0 (0)					
	Insung No. 3				0 (0)				
	Kingstar						0 (0)	5 (0)	0 (0)
Spain	*Tronio*		0 (0)		4 (0)	12 (0)		8 (0)	5 (0)
Total		12 (1)	0 (0)	0 (0)	4 (0)	12 (0)	0 (0)	29 (0)	29 (0)

By-catch of fish and invertebrates

Fish by-catch

21. Catch limits for by-catch species groups (macrourids, rajids and other species) are defined in CM 33-03 and provided in Table 4.

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
2017	85	26	28	0	31	85	2

[q] Quarantined data (see paragraph 5).

22. 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.

23. 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.

24. The by-catch in Division 58.4.1 consists predominantly of macrourids (Table 4).

Invertebrate by-catch including VME taxa

25. 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.

26. 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

27. 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.

28. There have been no observed incidental mortalities of mammals in Division 58.4.1.

Mitigation measures

29. The requirements of CM 25-02 'Minimisation of the incidental mortality of seabirds 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.

30. 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

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

Current management advice and conservation measures

32. The limits on the exploratory fishery for *D, mawsoni* in Division 58.4.1 in 2017 are defined in CM 41-11: www.ccamlr.org/measure-41-11-2017.

Appendix 1

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, a 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 (commenced 2016/17), Japan (commenced 2016/17), Republic of Korea (commenced 2012/13) and Spain (commenced 2012/13). This research has continued in 2016 and 2017 and is proposed for 2018.

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 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 1).

A5. In 2017, the Scientific Committee recommended that the catch limits for these divisions remain unchanged for 2018 and supported the catch allocation scheme developed by the research proponents in 2016.

A6. The Commission also agreed that Members shall confirm whether they intend to pursue research by SC CIRC by 1 January 2018. 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 2018, 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.