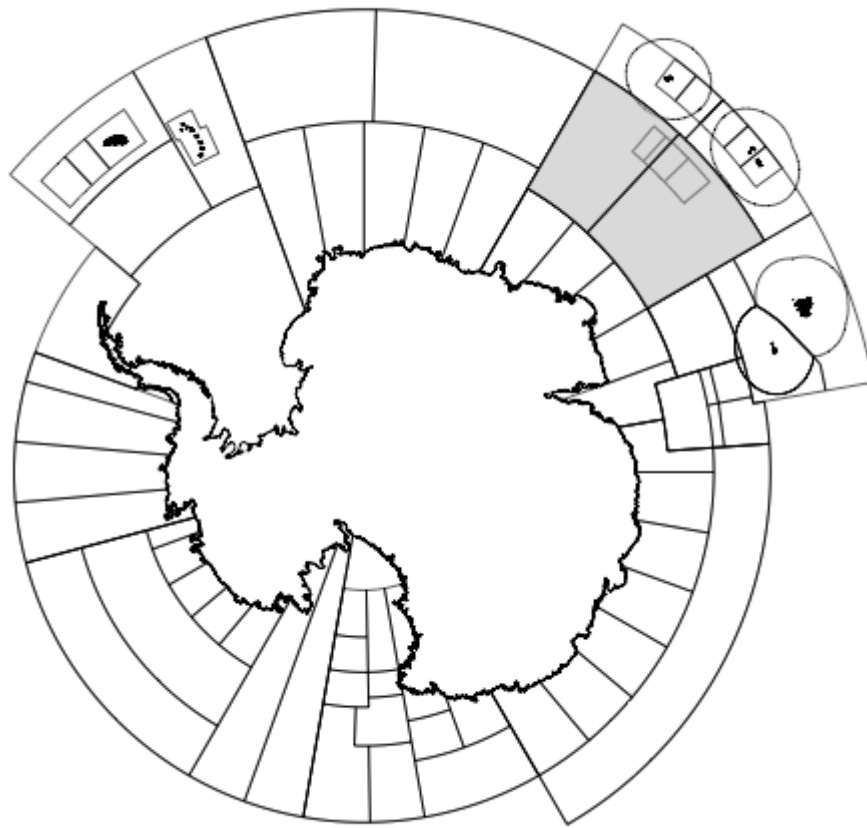




**Fishery Report 2016: Closed fishery for *Dissostichus* spp.
in Divisions 58.4.4a and 58.4.4b**

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 2016: Closed fishery for *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b

Introduction to the fishery

1. This report describes the exploratory longline fishery for toothfish (*Dissostichus* spp.) in Division 58.4.4. In 1995, Division 58.4.4 was subdivided into Division 58.4.4a (Ob Bank) and Division 58.4.4b (Lena Bank) (SC-CAMLR-XIV, Annex 5, paragraph 5.175). These divisions were managed as a single area and a catch limit for *Dissostichus* spp. applied to fishing north of 60°S, and in waters outside areas of national jurisdiction¹. The longline fishery for *Dissostichus* spp. in Division 58.4.4 began as a new fishery in 1998 (Conservation Measure (CM) 138/XVI). Following the Commission's recognition that high levels of illegal, unreported and unregulated (IUU) fishing for *Dissostichus* spp. in the Convention Area had rendered it unrealistic to consider this fishery as 'new' (CCAMLR-XVIII, paragraph 10.14), the fishery was reclassified as exploratory in 1999.

2. In 1999, the whole of Division 58.4.4 was further subdivided into small-scale research units (SSRUs) A, B, C and D.

3. Expressing concern regarding the low levels of stocks of *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b and the high levels of IUU fishing in that region (CCAMLR-XXI, paragraph 11.36), the Commission prohibited directed fishing for *Dissostichus* spp. in these divisions and closed the fishery in 2002 (CM 32-10). The Commission agreed that such prohibition shall apply at least until further scientific information is gathered and reviewed.

Reported catch

4. In 2008 and from 2010 onward, a catch limit has been allocated to research fishing only. Over the past 10 years, the reported catch peaked at 77 tonnes in 2008, which was below the research catch limit set for that year (Table 1).

5. From 2008 to 2016, a single Japanese-flagged longliner has conducted research fishing in accordance with a research plan submitted under CM 24-01. In 2015, one French-flagged vessel also conducted research fishing.

6. The total catch in Division 58.4.4b in 2016 was 42 tonnes (Table 1).

¹ The South African EEZ at Prince Edward and Marion Islands extends into the northern part of Division 58.4.4a.

Table 1: Catch history for *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b. Research catch limits are in brackets. (Source: STATLANT data for past seasons and catch and effort reports for current season, past reports for IUU catch.)

Season	Catch limit (tonnes)	Reported catch (tonnes)				Total	Estimated IUU catch (tonnes)
		Division 58.4.4a		Division 58.4.4b			
		<i>D. mawsoni</i>	<i>D. eleginoides</i>	<i>D. mawsoni</i>	<i>D. eleginoides</i>		
2004	closed	0	0	0	0	0	0
2005	closed	0	0	0	0	0	220
2006	closed	0	0	0	0	0	104
2007	closed	0	0	0	0	0	109
2008	closed (80)	0	18	<1	58	77	0
2009	closed	0	0	0	0	0	0
2010	closed (60)	0	9	0	50	59	80
2011	closed (53)	0	0	0	35	35	*
2012	closed (70)	0	0	0	28	28	*
2013	closed (50)	0	0	0	31	31	*
2014	closed (60)	0	0	0	27	27	*
2015	closed (35)	0	0	0	35	35	*
2016	closed (42)	0	0	<1	42	42	*

* Not estimated.

Illegal, unreported and unregulated (IUU) fishing

7. In each season between 1998 and 2001, the estimated annual catch of *Dissostichus* spp. exceeded 1 000 tonnes. An estimated total of 7 196 tonnes of *Dissostichus* spp. has been removed by IUU fishing since the fishery began with >500 tonnes being removed since 2004 (Table 1). In 2010, the last year in which IUU catch was recorded, an estimated 80 tonnes was taken from Division 58.4.4a.

8. IUU fishing activities were observed in Division 58.4.4a (Ob Bank) during 2008, 2009, 2010 and 2011. French surveillance information suggests that IUU activities have been persistent until 2014. IUU fishing activities were observed in Division 58.4.4b (Lena Bank) during each year from 2006 to 2011, however, given the history of IUU fishing activities in this division, it is possible that IUU activities do still occur, but were undetected from 2011 to 2016. Information from satellite surveillance trials indicated the presence of unidentified vessels in this division in 2016. 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

9. Catch limits for CCAMLR's fisheries for Antarctic (*Dissostichus 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.

10. 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 2012 and 2013, CCAMLR put in place a more structured approach to setting catch limits, and spatially constraining research, in data-poor fisheries. This process attempts to use all available information combined with a regular review process to make progress while recognising the inherent uncertainties and data limitations in data-poor fisheries.

Biological data

11. The collection of biological data under CM 23-05 is conducted as part of the CCAMLR Scheme of International Scientific Observation. Observer sampling requirements for *Dissostichus* spp. in longline fisheries based on the data collection plan are described in WG-FSA-10/32 (SC-CAMLR-XXIX, Annex 8, paragraph 5.34; SC-CAMLR-XXIX, paragraph 3.187). In 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

12. The length-frequency distributions of *D. eleginoides* caught in this fishery are presented for all years in which the number of that species measured was more than 150 fish (Figure 1). 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.

13. Due to the low level of reported catch, and thus small numbers of length measurements (<150 fish) in each year/SSRU, the length-frequency distributions of *D. mawsoni* have not been presented here.

14. Length frequencies for *D. eleginoides* for each season in Divisions 58.4.4a and 58.4.4b are presented in Figure 1. The majority of *D. eleginoides* caught in the fishery during research fishing ranged from 50 to 150 cm with a broad mode in both divisions at approximately 60–90 cm (Figure 1).

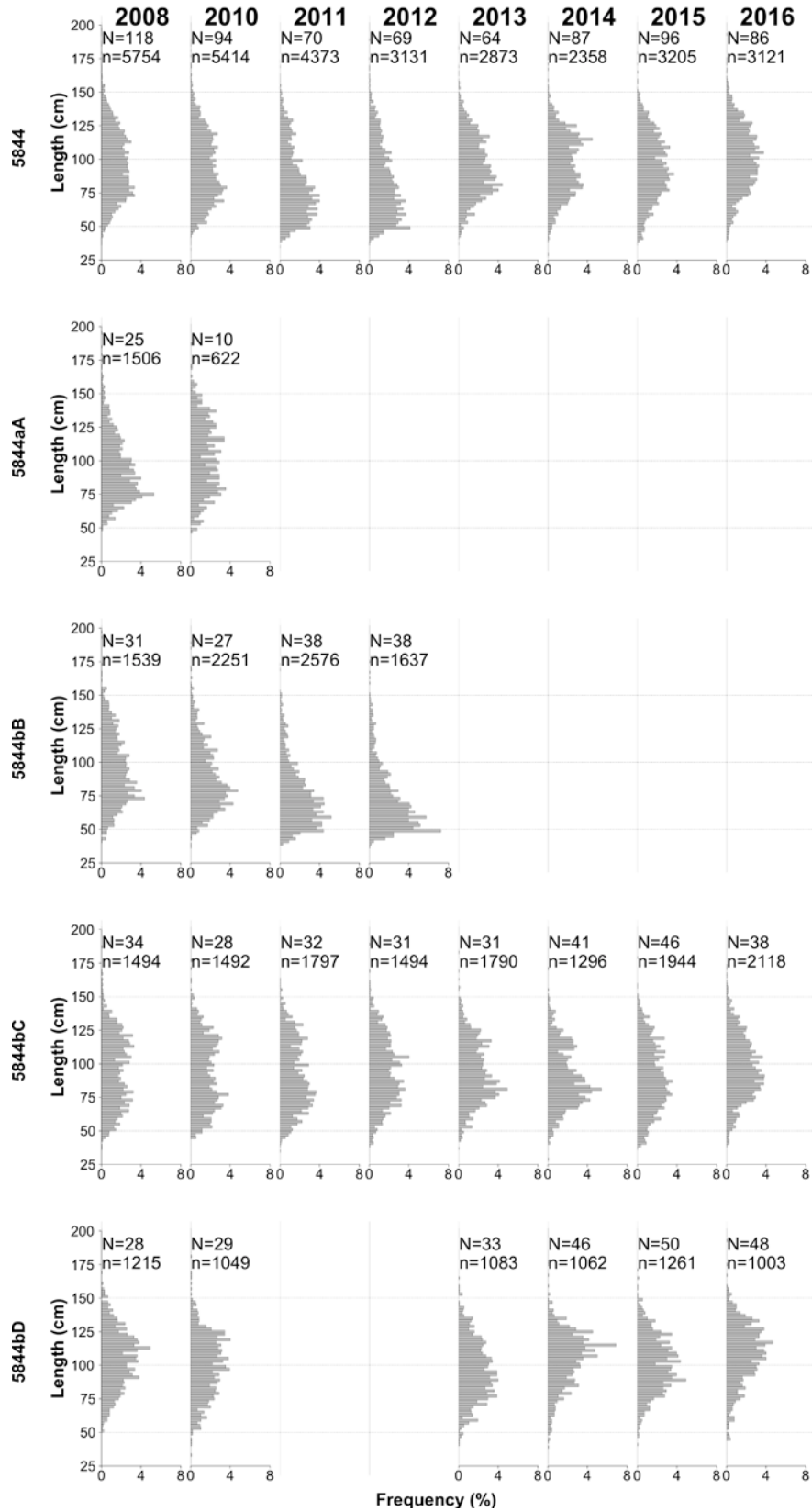


Figure 1: Annual length frequencies for *Dissostichus eleginoides* in Division 58.4.4. The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are provided. Note: length-frequency distributions are only presented for those years/SSRUs in which the number of fish measured was >150.

Tagging

15. 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. In exploratory fisheries in 2015, each vessel releasing more than 30 tagged fish of each species of *Dissostichus* is required to achieve a minimum tag-overlap statistic of 60% (Annex 41-01/C).

Table 2: Annual tagging rate, reported by vessel, operating in the exploratory fishery for *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b. The tag-overlap statistics (CM 41-01) for *D. eleginoides* are provided in brackets.

Flag State	Vessel name	Season							
		2009	2010	2011	2012	2013	2014	2015	2016
Japan	<i>Shinsei Maru No. 3</i>	-	6.1 (100)	5.3 (95)	6.1 (82)	7.5 (81)	5.9 (85)	6.4 (76)	5.2 (79)
France	<i>Saint André</i>							7.2 (82)	
	Required tagging rate	3	3	3	5	5	5	5	5

16. In all years in which it has conducted research fishing, the *Shinsei Maru No. 3* exceeded the required tagging rate and in 2013 achieved a tagging rate of 7.5 fish per tonne with a tag-overlap statistic of 81% (Table 2).

17. Since 2008, a total of 1 489 *D. eleginoides* have been tagged and 38 recaptured in both Divisions 58.4.4a and 58.4.4.b (Table 3).

Table 3: The number of individuals of *Dissostichus eleginoides* tagged in each year. The number of fish recaptured is provided in brackets.

Flag State	Vessel name	Season							
		2009	2010	2011	2012	2013	2014	2015	2016
Japan	<i>Shinsei Maru No. 3</i>	-	300 (1)	189 (4)	172 (3)	233 (3)	159 (9)	183 (10)	217(5)
France	<i>Saint André</i>							36 (3)	

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 and 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. A sample of otoliths collected in 2008 has been aged and results reported in WG-FSA-11/16. Ages of 214 otoliths (of 3 013 fish sampled) ranged from 4 to 48 years for females and from 5 to 48 years for males. These ages may be overestimated by one year due to an interpretation issue concerning the location of the first annulus.

Stock assessment

20. Cumulative numbers of tags and recaptures (i.e. using all four tag-recaptures in 2011 from the pooled total of available fish tagged between 2008 and 2010) were used to generate a Petersen biomass estimate of 1 928 tonnes for Divisions 58.4.4a and 58.4.4b.

21. Generalised yield model scenarios were run from 2010 and estimated the likely trajectory of a *D. eleginoides* stock that had been (i) at a median SSB of 20% SSB_0 in 2006 (when the fishery in Ob and Lena Banks was closed), or (ii) was at a median SSB of 20% in 2009. These scenarios were rerun in 2011 (including the catch of 35.4 tonnes taken in the most recent survey by the *Shinsei Maru No. 3*) to estimate status in 2011 and corresponding constant catch rates under which the stock was expected to recover to 50% B_0 within two decades from the date of the fishery closure (as in WG-FSA-10/42 Rev. 1). Under the first scenario, the median current status was estimated to be 36.5% SSB_0 in 2010, and the corresponding precautionary research catch was 1.25% B_0 , or 115 tonnes per year. Under the second scenario, the median status was estimated to be 23% SSB_0 in 2010, and the corresponding precautionary research catch was 0.074% B_0 , or 58 tonnes per year. The Working Group noted that the actual current status of the stock was unknown, but these scenarios were thought to be conservative.

By-catch of fish and invertebrates

Fish by-catch

22. Catch of by-catch species groups (macrourids, rajids and other species) are 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 Divisions 58.4.4a and 58.4.4b. Catch limits are for both divisions combined (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)
2004	closed		closed			closed	
2005	closed		closed			closed	
2006	closed		closed			closed	
2007	closed		closed			closed	
2008	closed*	3	closed*	<1	0	closed*	1
2009	closed		closed			closed	
2010	closed*	1	closed*	<1	55	closed*	<1
2011	closed*	2	closed*	<1	73	closed*	1
2012	closed*	2	closed*	<1	0	closed*	<1
2013	closed*	2	closed*	<1	1	closed*	<1
2014	closed*	1	closed*	<1	7	closed*	<1
2015	closed*	4	closed*	<1	132	closed*	<1
2016	closed*	1	closed*	<1	84	closed*	<1

* Research fishing permitted in accordance with CM 24-01.

23. 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.

24. 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.

25. The by-catch in Divisions 58.4.4a and 58.4.4b consisted predominantly of macrourids. Catches of by-catch species groups (macrourids, rajids and other species) reported in fine-scale data, their respective catch limits, and number of rajids released alive are summarised in Table 4. In 2013, 2 tonnes of macrourids were reported, which represents ~7% of the total catch of target and by-catch species combined.

Invertebrate by-catch including VME taxa

26. 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, the locations and other details of which can be found in Annex 22-09/A.

27. There are no VMEs or VME Risk Areas designated in Divisions 58.4.4a and 58.4.4b.

Incidental mortality of seabirds and marine mammals

Incidental mortality reported

28. There have been no observed bird or mammal mortalities reported from Divisions 58.4.4a and 58.4.4b.

Mitigation measures

29. 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.

30. No mitigation measures apply to this fishery as it is currently closed.

Ecosystem implications and effects

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

Current management advice and conservation measures

32. The exploratory fishery for *Dissostichus* spp. in Divisions 58.4.4a and 58.4.4b is closed (CM 32-10). Directed fishing for *Dissostichus* spp. in these divisions is prohibited at least until further scientific information is gathered and reviewed by the Scientific Committee and the Working Group on Fish Stock Assessment (WG-FSA).

33. The research plan (Appendix 1) for Division 58.4.4 is now in the biomass estimation/assessment development phase.

Research plan for Division 58.4.4

Background

A1. After the catch prohibition in 2003, one survey was undertaken by the *Shinsei Maru No. 3* in 2008 in all small-scale research units (SSRUs) (5844aA, 5844bB, 5844bC and 5844bD) of the division. At its meeting in 2009, the Working Group on Statistics, Assessments and Modelling (WG-SAM-09) (SC-CAMLR-XXVIII, Annex 6) recommended consecutive research focusing on a tagging program for 3 to 5 years in order to estimate the recent stock status accurately in this division (SC-CAMLR-XXVIII, Annex 6, paragraph 2.34). According to the decision at CCAMLR-XXVIII (CCAMLR-XXVIII, paragraph 4.43), the first-year survey was conducted by the *Shinsei Maru No. 3* in 2010. Following the advice given at WG-SAM-10 that the area studied was too large to have adequate probability of recapture, and that research effort should be concentrated on a subset of the management area (SC-CAMLR-XXIX, Annex 4, paragraph 3.21), the survey was conducted in the central SSRUs 5844bB and 5844bC in 2011 and 2012. The killer whales (*Orcinus orca*) were observed in research block B in 2012, the target area has been moved from SSRUs 5844bB and 5844bC to SSRUs 5844bC and 5844bD to avoid the huge loss of catch by killer whale depredation since 2013 (CCAMLR-XXXI, paragraphs 5.44 to 5.46).

A2. The Division 58.4.4 research plan has transitioned from the effort-limited phase to the catch-limited phase (biomass estimation-assessment development phase), and in 2013 the Working Group on Fish Stock Assessment (WG-FSA-13) recommended the total catch limit for combined SSRUs 5844bC and 5844bD be 60 tonnes (SC-CAMLR-XXXII, Annex 6, paragraphs 6.94 to 6.97). The Working Group agreed that in 2014, the *Shinsei Maru No. 3* would first complete research sets in each grid square as in 2013, and then be able to fish anywhere within the research block until the research catch limit is reached (SC-CAMLR-XXXII, Annex 6, paragraph 6.98).

A3. The Scientific Committee endorsed the management advice provided by WG-FSA that the research fishing proposed by France and Japan proceed in this division with a catch limit of 25 tonnes in research block 5844b_1 and 35 tonnes in research block 5844b_2. It further requested that research activities be coordinated between France and Japan so that selectivity and catch rates can be standardised across the vessels and impacts of depredation be minimised (SC-CAMLR-XXXIII, paragraph 3.208).

Objective

- A4.1 To collect sufficient suitable data to undertake a tag-based assessment of the *Dissostichus* spp. stocks in Division 58.4.4 by 2018.
- A4.2 To collect length-frequency and other biological data from the common by-catch species.

Advice by the Scientific Committee

A5. Data have been collected in the past three years since the current research blocks (SSRUs 5844bC and 5844bD) were endorsed (CCAMLR-XXXI, paragraphs 5.44 to 5.46), and will be collected next year as part of a multi-year tag-recapture experiment undertaken jointly by France and Japan. The experiment was initiated and continued under the following advice by the Scientific Committee: SC-CAMLR-XXXI, paragraphs 9.21 to 9.24; SC-CAMLR-XXXII, paragraphs 3.222 to 3.224; and SC-CAMLR-XXXIII, paragraph 3.208. The locations of research blocks in this division are shown in Figure A1.

A6. In 2017, research will be carried out by the Japanese-flagged vessel *Shinsei Maru No. 3* and the French-flagged vessel *St André*.

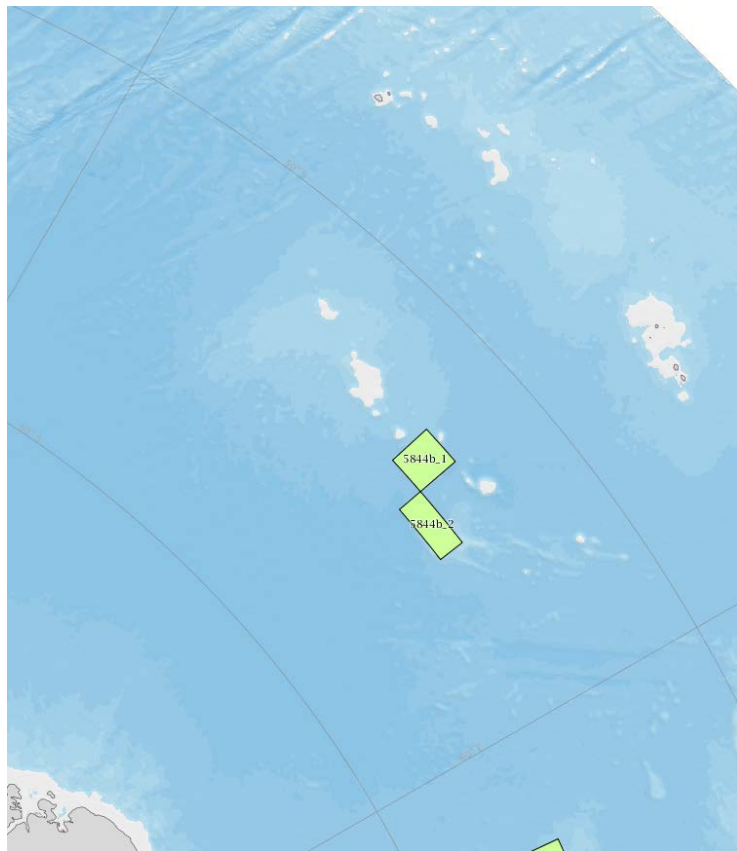


Figure A1: Location of research blocks in Division 58.4.4 in 2016.