WG-FSA

Informing the Working Group on Fish Stock Assessment about the revisions of the WSMPA proposal

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In 2016, the EU submitted document CCAMLR-XXXV/18 containing a draft Conservation Measure for establishing a MPA in the Weddell Sea (WSMPA) to CCAMLR 2016 (see map in Annex 1).

A revised draft WSMPA Conservation Measure has been submitted by the EU to CCAMLR 2018. The Annexes to this document contain the following extracts of this revised draft WSMPA Conservation Measure:

Annex 2:   Map of the revised WSMPA proposal to be presented to CCAMLR 2018;

Annex 3:   Detailed map (Statistical Subarea 48.6) of the revised WSMPA to be presented to CCAMLR 2018 with a draft table to be used in investigating the establishment of reference areas in Subarea 48.6 to enable comparisons between fished and unfished areas;

Annex 4:   Extract from the revised WSMPA Conservation Measure to be submitted to CCAMLR 2018: Weddell Sea Marine Protected Area – Management Plan;

Annex 5:   Extract from the revised WSMPA Conservation Measure to be submitted to CCAMLR 2018: Weddell Sea Marine Protected Area – Research and Monitoring Plan.

This document informs FSA about the main differences between the 2016 and the 2018 version of the draft WSMPA proposal.

1.   **Closing the gap on the eastern coast of the Antarctic Peninsula**

The 2016 WSMPA proposal consisted of two distinct geographical parts, which were separated by a gap on the eastern side of the Antarctic Peninsula (see Annex 1, Fig.1).

The 2018 WSMPA proposal now includes this area, thereby unifying the previously two separate parts into one coherent WSMPA. The reasons for doing so are:

a.   one of the main comments raised with respect to the 2016 WSMPA proposal was that there was only very limited flexibility as regards potential fisheries operations outside of the fisheries research blocks 48.6-3, 48.6-4 and 48.6- 5 agreed under CCAMLR CM 41-04. In order to achieve the agreed conservation targets also for adult Antarctic toothfish, the gap on the eastern side of the Antarctic Peninsula was closed, protecting additional habitat of adult Antarctic toothfish in Statistical Subarea 48.5.

b.   Under CCAMLR Conservation Measure 24-04, the area, where on 12 July 2017 a 5,800 km^2 section broke off the Larsen C Ice Shelf, has been designated for a period of 10 years as a Stage 2 Special Area for Scientific Study. By closing the gap, this Special Area for Scientific Study will be included in the WSMPA and will become part of the WSMPA General Protection Zone after the expiry of the 10 years. This ensures that this area will be subject to a more longer-lasting conservation, management and research and monitoring approach under CCAMLR.

2.   Adjustment of the habitat of adult Antarctic toothfish in Statistical Subareas 48.6 and 48.5

In the 2016 WSMPA proposal, the habitat of adult Antarctic toothfish was indicated as between 550m and 2300m.

However, subsequent analyses and modelling, as presented to SAM 2017 (Teschke et al. 2017) showed that the habitat of adult Antarctic toothfish in Statistical Subareas 48.6 and 48.5 was better expressed to range from 550m to 2100m. This depth range comprises the habitat of 90% of adult Antarctic toothfish in these areas.

3.   Establishment of scientific reference areas in Statistical Subarea 48.6

In accordance with paragraph 2 (iii) of CCAMLR Conservation Measure 91-04, one of the objectives of the WSMPA is the establishment of scientific reference areas for monitoring the effects of harvesting on Antarctic marine living resources.

In order to study the ecosystem effects of *D. mawsoni* fishing activities, Germany had considered that such reference areas would have to be established in the potential habitat of adult toothfish (water depths between 550 - 2100m) in Statistical Subarea 48.6. The reference areas should also contribute to the achievement of the Special Objectives of the WSMPA. In these reference areas, the General Protection Zone (GPZ) management requirements would apply.

Germany outlined these considerations at WG SAM 2018 and the CCAMLR Workshop on Spatial Management (WS-SM-18) with a view to seeking advice from both meetings as regards the design, selection, location, size and number of reference areas. The groups responded as follows:

WG-SAM-18 (see preliminary report §§ 8.3 - 8.4)

- "The Working Group recognised the need for reference areas (i.e. fished and unfished areas) as a tool for studying the effects of fishery on biodiversity. The Working Group noted that while it was unlikely to find a fished and an unfished area that are otherwise ecologically identical, this may not be necessary if there are gradients of the levels of historical fishing across otherwise comparable areas with which to examine potential impacts. It also noted that methods existed for estimating the historical fishing footprint in the Convention Area and that these could be updated to inform this process (WG-FSA-15/62 Rev. 1).

- The Working Group agreed that there was a range of criteria that could be used to identify appropriate reference areas and that these would depend on the specific objective of the comparisons. The Working Group recommended that the approach used in Figure 1 to categorise the information available relative to the selection of research areas in Division 58.4.1 could be a useful way to approach selection of reference areas."

WS-SM-18 (see preliminary report § 3.63)

- "the location and size of reference areas would depend on the scientific question/hypothesis and may involve areas inside or outside MPAs;

- investigations of the potential impact of longline fishing on benthic ecosystems (i.e. whether longlines cause physical disturbances on the benthic fauna) could be carried out within the existing research blocks in Subarea 48.6 by comparing fished areas (i.e. known longline tracks) with unfished areas between these tracks;

- large-scale unfished reference areas outside the existing fisheries research blocks might be used to answer other scientific questions, for example whether longline fishing for *D. mawsoni*

has wider trophic impacts. This could be accompanied by a statistical power analysis to determine that the sampling design would be able to detect such impacts;

- the most appropriate location and size of such reference areas should be determined based on a set of parameters specific to the question to be answered. These parameters could be compiled in form of a table (see example in Table 2) as a transparent decision-support tool to aid the establishment of the reference area by indicating the occurrence of these parameters/attributes (e.g. in terms of high, medium or low) within the investigated area."

Taking into account this very helpful and most welcome expert advice, Germany has further developed Table 2 attached to the WS-SM-18 report. The results of this work are at Annex 3 of this paper and were posted on 20 September 2018 on the WSMPA e-group on the CCAMLR website to enable comments from the e-group members.

4.   Changes to the WSMPA Management Plan and the WSMPA Research and Monitoring Plan

The revised draft WSMPA Management Plan and the revised draft WSMPA Research and Monitoring Plan are attached in Annex 4 and 5, respectively. The main changes compared to the 2016 versions of these plans are:

a.   in the Management Plan, a new paragraph 12 was inserted to harmonise the WSMPA proposal with CCAMLR Conservation Measure 24-04;

b.   the text of the individual paragraphs in both plans was, to the extent possible, harmonised with the text agreed by CCAMLR in Conservation Measure 91-05 (Ross Sea region marine protected area);

c.   slight textual changes and additions were made to both plans in order to reflect the outcome of the Workshop for the Development of a *D*. *mawsoni* Population Hypothesis for Area 48 held in Berlin (19 - 21 February 2018).

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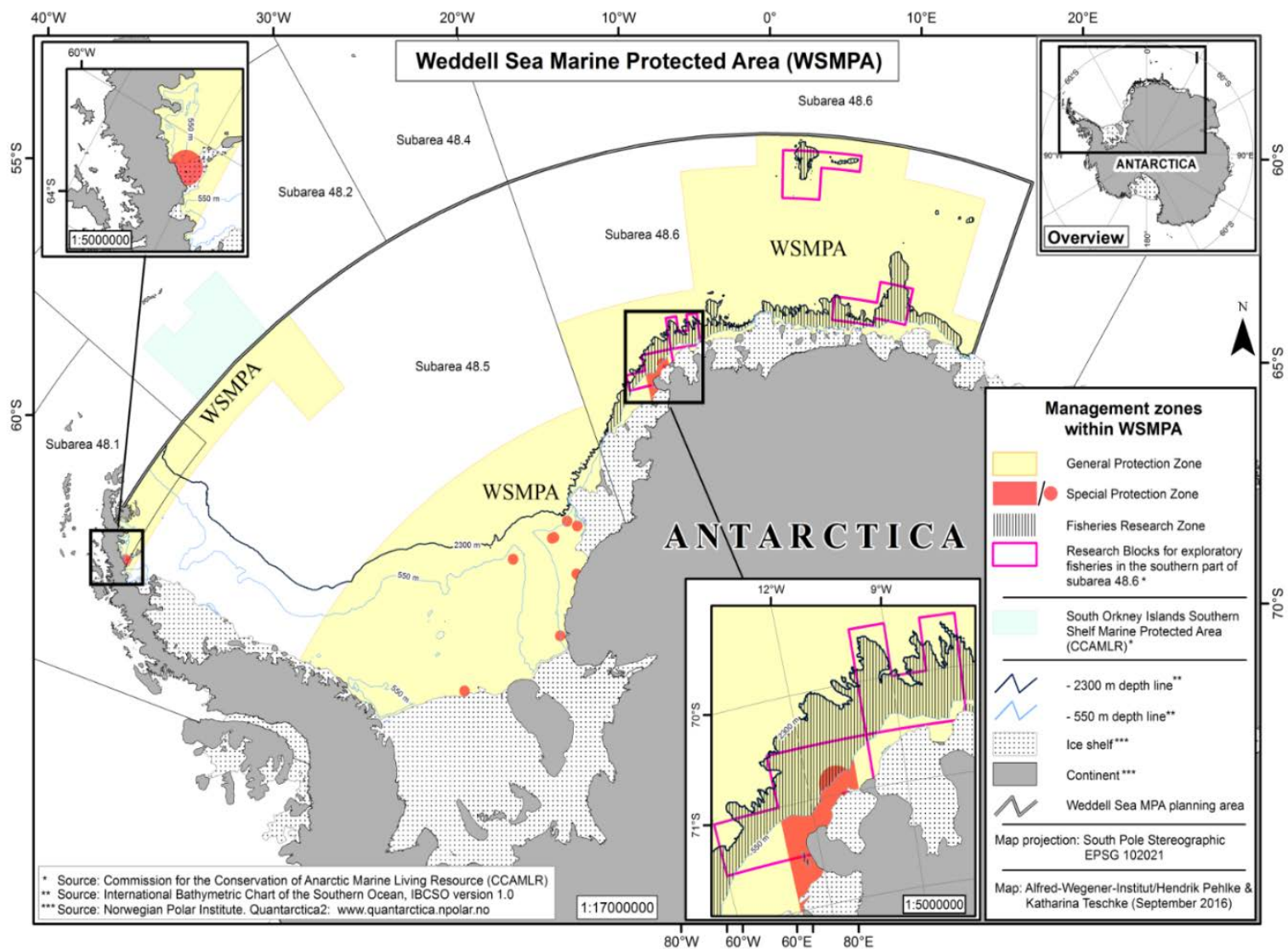
Fig 1: **Map of the draft WSMPA proposed to CCAMLR 2016**
(source: document CCAMLR-XXXV/18)
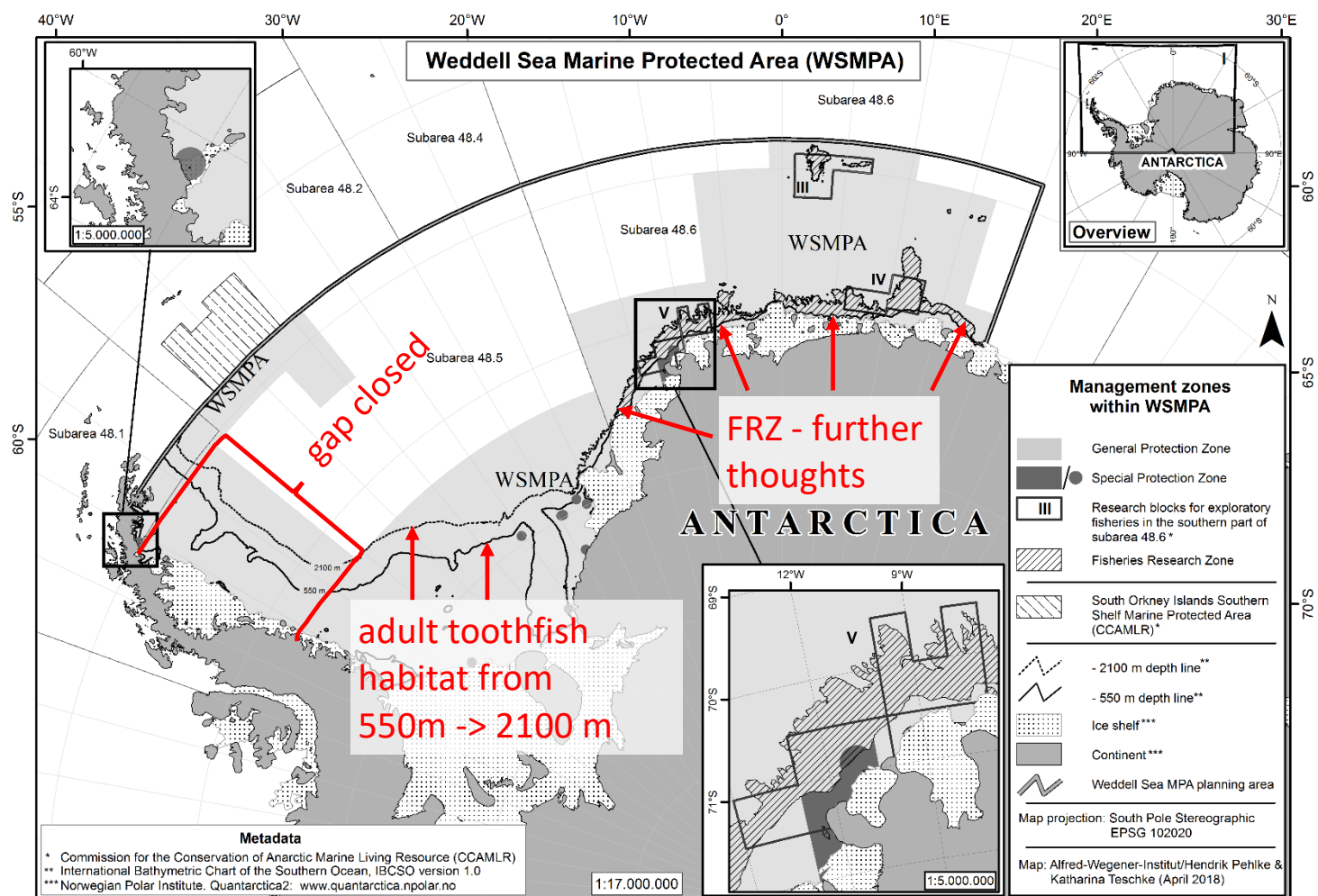
Fig. 2: **Map of the revised WSMPA proposal to be presented to CCAMLR 2018.**
The main changes compared to the 2016 version (see Fig. 1) are indicated in red.

A list of parameters has been developed - according to the advice of WG-SAM-18 (see preliminary report § 8.4) and WS-SM-18 (see preliminary report § 3.63) - to enable an evaluation of geographic areas and their suitability as reference area in Subarea 48.6. The reference areas outside the existing fisheries research blocks enable comparisons between fished and unfished areas in terms of potential effects longline fishing for *Dissostichus mawsoni* has e.g., on the food web and its different trophic levels.

Here, we present the different parameters that related to the suitability of reference areas to meet research objectives, and shortly describe for each parameter, which data and analyses we used in order to develop possible thresholds for each parameter. Finally, the suitability as reference area of five-degree-longitude sections from 20°W to 20°E (see Figure 3) was indicated by three ranks, i.e. high, medium or low (see Table A3-2). The areas per five-degree-longitude section that were actually included in the analyses were situated within the potential toothfish habitat (depth range: from 550 m to 2100 m) outside the existing fisheries research blocks.

Repeated accessibility

We used daily sea ice concentration maps from AMSR-E (2002 - 2011) and AMSR2 (since 2012) (Kaleschke et al. 2001, Spreen et al. 2008) to calculate mean repeated accessibility (RA) for the potential toothfish habitat per five-degree-longitude section. I.e. the probability that a respective area is navigable by vessels at a given time and again at least once within a defined time span (here the subsequent two years). A repeated investigation within two years after the first research activity is stipulated by the Working Group SAM (Anonymous 2016a, paragraph 3.26) for exploratory fishery as defined under Conservation Measure 21-02 (Anonymous 2016b) and logically requires a navigability respectively an accessibility within this time span.

Our analyses were applied to the data of the austral summer (Dec - Mar) from 2002 to 2018. Sea ice concentration (SIC) was used as proxy to describe an area as explorable: i.e. where SIC > 60 % the area is defined as inaccessible for vessels respectively unexplorable and where SIC <= 60 % the area is defined as accessible/explorable according to Parker et al. (2014). For more details on our statistical model, please see Pehlke et al. (2018).

Finally, the thresholds for the ranking of the sections was defined by means and standard deviations of repeated accessibility values (see Table A3-2).

Possibility of long-term analyses

The number of stations sampled during RV *Polarstern* expeditions of the past 20 years (1988 - 2018) was used as a proxy for logistically well-situated areas that may reflect the possibility of long-term analyses in the context of national Antarctic programmes. It is important to note here that in a first step only *Polarstern* expeditions were taken into account; but in a next step it would be useful to fill up the existing data set by further research vessels operated in Subarea 48.6. Data was extracted from the scientific data information system PANGAEA (https://www.pangaea.de/) on 28 August 2018 with the following configuration of data request:

(i)   Geographic search coverage: -62°, 20°, -80° and -61,
(ii)   Data range: 1988-01-01 (start date) and 2018-01-01 (end date),
(iii)   Parameter/Geocode (in the following order): Event label, latitude, longitude and temperature, water [°C].

Subsequently, duplicates regarding latitude and longitude were excluded from the data. This step reduced the data from more than 30 million to approx. 500.000 data points, and assured that sampling stations instead of data sets were considered (at one sampling stations several data sets can exist). Finally, the

total number of sampling stations per five-degree-longitude section were calculated and categorised (see Table A3-2).

Background information available on benthic ecosystems and food webs

To assess the background information available on benthic ecosystem and food webs we determined per five-degree-longitude section how many ecological conservation features - defined in the context of the WSMPA (see Teschke et al. 2018; Fig. 7B, C, G and H) - were studied in the Weddell Sea in the last decades (see Table A3-2).

Previous fishing effort

Data was extracted from the CCAMLR database on 23 September 2017. All data on *Dissostichus mawsoni* from Subarea 48.6 collected in the entire time range (i.e. in all seasons between 1998 and 2017) are included in the calculation. For each five-degree-longitude section we computed total catch per unit effort (CPUE) (in kg/1000 hooks), and noted additionally the frequency of fishing as background information. Based on mean and standard deviation of CPUE data we set possible thresholds for the ranking of the five-degree-longitude sections (see Table A3-2).

Contribution to specific objectives of the WSMPA

The contribution to specific objectives of the WSMPA per five-degree-longitude section was approximated by taking into account *(a)* the occurrence; *(b)* the target level and *(c)* the uniqueness of the environmental and ecological conservation features, which were used in our current WSMPA Marxan model (see Teschke et al. 2018; Fig. 7).

The Contribution Factor (CF) was calculated on a raster with a grid cell size of approx. 50 km².

Occurrence *O* of conservation feature *f* in grid cell *i* is given by

O[f,i] ε {0, 1} (1)

where *O* = 1 and *O* = 0 was defined as presence and absence of feature *f*, respectively.

Target level *T* for conservation feature *f* in grid cell *i* is given by

T[f,i] ε {0 < *T* <= 1} (2)

where *T* for conservation feature *f* was taken from the current WSMPA Marxan model (Scenario S_{Med}) (see Teschke et al. 2018; Tab. A4).

Uniqueness *U* for grid cell *i* in the WSMPA Planning Area that harbours *x* conservation features *f* is given by

$$\sum_{f=1}^{f=x} U_i = \left(\frac{A_{f,i}}{\sum_{i=1}^{i=n} A_f} \right) / 100$$ (3)

where

A = area as km² for all features, except of some ecological features where *A* = area as km² * corresponding weighting factor (see SC-CAMLR-XXXVI/BG/28 and SC-CAMLR-XXXV/BG/13 for details of weighting factor calculation).

Finally, CF in grid cell *i* is calculated by

$$[\sum_{f=1}^{f=x}(O_{f,i} \, x \, T_{f,i})] \, x \, [U_i] \tag{4}$$

where

$O_{f,i}$ = Occurrence of conservation feature *f*

$T_{f,i}$ = Target level of conservation feature *f*

U_i = Uniqueness of grid cell *i*.

Subsequently, the CF values of the grid cells per five-degree-longitude section was pooled, and the mean and standard deviations were used to develop thresholds for the ranking of the different sections (see Table A3-2).

*Similar benthic habitats and ecosystems*

The similarity of benthic habitats in the existing fisheries research blocks in Subarea 48.6 compared with currently unfished areas within the potential toothfish habitat was approximated by the benthic environmental analysis published by Douglass et al. (2014). First, the dominant geomorphological feature according to Douglass et al. (2014) was determined for the fished areas in each CCAMLR fisheries research block (i.e. 48.6_3, 48.6_4 and 48.6_5) (see Table A3-1). Then, the area (in km²) of each main geomorphological feature per five-degree-longitude section within the currently unfished potential toothfish habitat was calculated. Finally, the thresholds for the ranking of the sections was defined by means and standard deviations of area data (see Table A3-2). Regarding the threshold of the low rank, we have set the limit at 100 km² for research fishing box 48.6_3 and 48.6_4 (eastern part: 10°E-15°E). This area size seems to be still appropriate for comparisons with the existing fished areas (approx. half of all longlines have a length of ≤ 10 km).

Table A3-1: CCAMLR fisheries research blocks in Subarea 48.6 and their main geomorphological feature according to Douglass et al. (2014).

CCAMLR research block	Geomorphological feature
48.6_3	Seamount and Seamount Ridge
48.6_4 (eastern part: 10°E-15°E)	Margin Ridge
48.6_4 (western part: 5°E-10°E)	Upper Slope
48.6_5	Upper Slope

Table A3-2: Parameter and possible thresholds for evaluating geographic areas (i.e. five-degree-longitude sections) in CCAMLR Subarea 48.6 according to their suitability as research area. H = high, M = medium, L = low suitability as reference area. SD = standard deviation, mean = arithmetic mean, RA = Repeated Accessibility, CF = Contribution Factor.

Parameter	Rank	Thresholds	Description
Repeated accessibility	H	>= 51 % RA	>= mean + (0.5 * SD)
	M	44 - 50 % RA	[> mean - (0.5 * SD)] to [< mean + (0.5 * SD)]
	L	<= 43 % RA	<= mean - (0.5 * SD)
Possibility of long-term analyses	H	>= 3936 stations	>= mean + (0.5 * SD)
	M	1086 - 3935 stations	[> mean - (0.5 * SD)] to [< mean + (0.5 * SD)]
	L	<= 1085 stations	<= mean - (0.5 * SD)
Background information available on benthic ecosystems and food webs	H	> 7 ecological features	> mean + (0.5 * SD)
	M	6 - 7 ecological features	[> mean - (0.5 * SD)] to [< mean + (0.5 * SD)]
	L	<= 5 ecological features	<= mean - (0.5 * SD)
Previous fishing effort	H	<= 32 kg/1000 hooks	<= mean - (0.5 * SD)
	M	33 - 413 kg/1000 hooks	[> mean - (0.5 * SD)] to [< mean + (0.5 * SD)]
	L	>= 414 kg/1000 hooks	>= mean + (0.5 * SD)
Contribution to specific objectives of the WSMPA	H	>= 7.3 CF	>= mean + SD
	M	1.5 - 7.2 CF	[> mean - SD] to [< mean + SD]
	L	<= 1.4 CF	<= mean - SD
Similar benthic habitats to CCAMLR research block:			
• 48.6_3	H	>= 121 km^2	>= mean + (0.5 * SD)
	M	101 - 120 km^2	[> 100 km^2] to [< mean + (0.5 * SD)]
	L	<= 100 km^2	
• 48.6_4 (eastern part: 10°E-15°E)	H	>= 2615 km^2	[> mean - (0.5 * SD)] to [< mean + (0.5 * SD)]
	M	101 - 2614 km^2	[> 100 km^2] to [< mean + (0.5 * SD)]
	L	<= 100 km^2	
• 48.6_4 (western part: 5°E-10°E) and 48.6_5	H	>= 5539 km^2	>= mean + (0.5 * SD)
	M	3499 - 5538 km^2	[> mean - (0.5 * SD)] to [< mean + (0.5 * SD)]
	L	<= 3498 km^2	<= mean - (0.5 * SD)
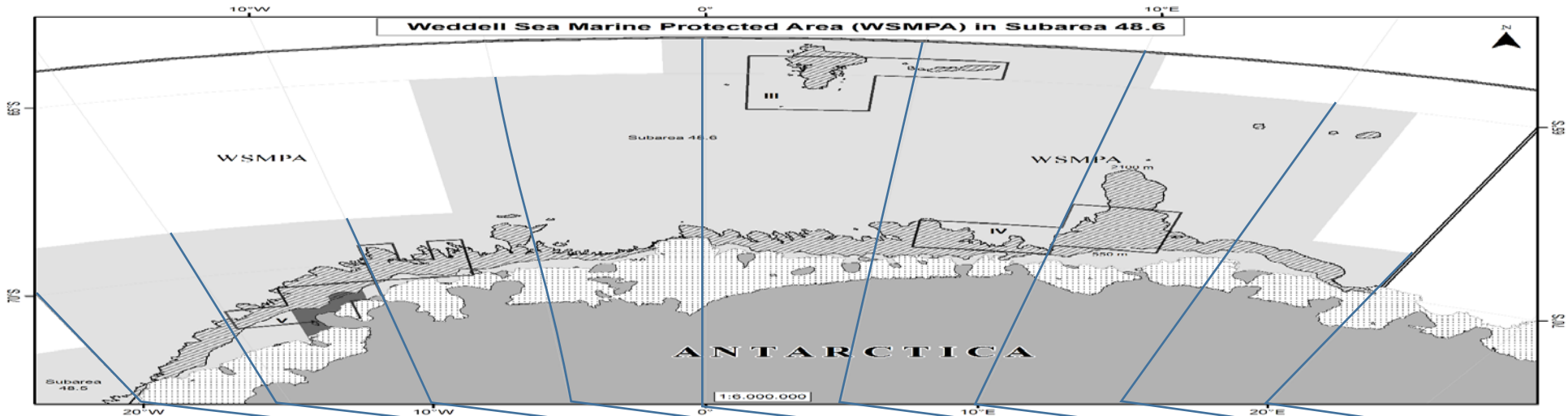
Parameter	20°W-15°W	15°W-10°W	10°W-05°W	05°W-0°	0°-05°E	05°E-10°E	10°E-15°E	15°E-20°E
Repeated accessibility	high	high	high	low	medium	medium	high	low
Possibility of long-term analyses	high	low	high	high	medium	low	low	low
Background information available on benthic ecosystems and food webs	high	low	medium	medium	high	medium	low	low
Previous fishing effort	high	low	high	high	high	high	low	high
Contribution to specific objectives of the WSMPA	medium	low	high	medium	medium	medium	high	medium
Similar benthic habitats to CCAMLR research block:								
• 48.6_3	low	low	low	low	low	low	low	high
• 48.6_4 (eastern part: 10°E-15°E)	low	low	low	low	low	low	high	medium
• 48.6_4 (western part: 5°E-10°E) and 48.6_5	high	medium	medium	low	high	high	low	medium

Figure 3: Draft table to be used in investigating the establishment of large-scale unfished reference areas outside the existing fisheries research blocks in Subarea 48.6 to enable comparisons between fished and unfished areas. For each parameter, the suitability as research area is indicated as high (green), medium (orange) or low (red). Upper map: blue lines = geographic five-degree-longitude sections, shaded area = WSMPA Fisheries Research Zone (FRZ), black lines = existing fisheries research blocks in Subarea 48.6 as set out in Conservation Measures 41-04.

Extract from the revised WSMPA Conservation Measure to be submitted to CCAMLR 2018

Weddell Sea Marine Protected Area – Management Plan (ANNEX 91-XX/B)

Purpose of the Management Plan

1.   The purpose of this Management Plan is to provide further details about the areas and features within the Weddell Sea Marine Protected Area (WSMPA) associated with the objectives in paragraph 3 of this conservation measure, as well as the management provisions and administrative arrangements for achieving them.

2.   This Management Plan, prepared in accordance with the provisions of Conservation Measure 91-04, shall determine the management of activities within the WSMPA as required and in accordance with paragraphs 6 - 12 of this conservation measure.

Weddell Sea Marine Protected Area - Management Zones

3.   The WSMPA includes three management zones designed to achieve the general and specific objectives of the WSMPA.

General Protection Zone (GPZ)

4.   The General Protection Zone (consisting of the light grey areas in ANNEX 91-XX/A Figure 1), is designed to provide protection of representative examples of pelagic and benthic ecosystems, biodiversity and habitats, including key species, top predators (including the juvenile, sub-adult and adult life stages of *Dissostichus mawsoni*), and higher productivity areas, and the environmental and ecological conditions supporting them. The GPZ is also designed to increase resilience to climate change, and to support research and monitoring to increase our understanding about the Antarctic ecosystems and the effects of climate change and human activities on these ecosystems. The GPZ areas between 550 m and 2100 m water depth in the Statistical Subarea 48.6 provide reference areas for studies to advance the understanding about the ecosystem effects of longline fishing.

5.   While contributing to the general objectives G 1, 3 and 4, the GPZ also aims at achieving the specific objectives S 1 – 4 and S 8, S 10 and S 11.

Special Protection Zone (SPZ)

6.   The Special Protection Zone (consisting of the dark grey areas in ANNEX 91-XX/A Figure 1) provides enhanced protection of known and potential vulnerable marine ecosystems, unique, rare or biodiverse and/or endemic habitats and features. The SPZ also provides scientific reference areas to monitor the natural variability and long-term changes on the Antarctic marine living resources, and to study effects of climate change and human activities on Antarctic ecosystems.

7.   While contributing to the general objectives G 2 and 4, the SPZ also aims at achieving the specific objectives S 5-7, S 9 and S 11.

Fisheries Research Zone (FRZ)

8.   The Fisheries Research Zone provides areas[1] to continue to inform the science-based management of the region's Antarctic toothfish stock (including population and life history hypotheses, biological parameters, ecological relationships, and variations in biomass and production of fish).

9.   While contributing to the general objective G 4, the FRZ also aims at achieving the specific objective S 12.

Management activities

10.   Fishing activities within the WSMPA are prohibited except as authorized in paragraphs 13 and 15 of this management plan.

11.   Specific management provisions for the management zones are provided in paragraphs 13 (for the GPZ), 14 (for the SPZ) and 15 (for the FRZ).

12.   Within the WSMPA, areas can be designated as Special Areas for Scientific Study following ice shelf retreat or collapse in accordance with the provisions and procedures set out in CM 24-04. In such Special Areas for Scientific Study, the measures set out within CM 24-04 shall replace those set out in paragraph 13 for areas in the GPZ, or paragraph 14 for areas in the SPZ, or paragraph 15 for areas in the FRZ (as applicable to the location of the Special Area) for the period of their designation. At the end of designation of any such Special Area for Scientific Study, the management provisions set out in paragraphs 13 - 15 shall apply.

13.   Specific management provisions within the General Protection Zone are:

General Protection Zone		
Research fishing	(i)	Directed fishing for *Dissostichus* spp. within the GPZ is prohibited except as follows.
	(ii)	The Commission shall ensure that research fishing conducted in the GPZ is consistent with the WSMPA Research and Monitoring Plan (Annex 91-XX/C), which does not undermine the general and specific objectives of the WSMPA, and is in accordance with Conservation Measure 24-01 Annex B, with the following additional conditions:
		a. The catch for *Dissostichus* spp*.* irrespective of gear type is limited to 5 tonnes per vessel per year.
		b. Directed fishing for all other finfish taxa is prohibited.
	(iii)	Directed fishing for all non-finfish taxa including krill is prohibited.
Other research on Antarctic marine living resources	(i)	The use of any towed gear that interacts physically with the seafloor (e.g. beam/otter trawls, dredges, sledges) is limited to 1 square kilometer per vessel per season, subject to prior approval by the Commission.
	(ii)	Other research within the GPZ consistent with the general and specific objectives of the WSMPA and the RMP of this conservation measure (Annex 91-XX/C) is authorised by the Commission and will be coordinated on the basis of the annual progress reports in the context of the RMP (see paragraphs 9 - 11 in Annex 91-XX/C) to ensure that the activities are mutually supportive and do not hinder or disturb each other.

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[1] At the time of adoption of this conservation measure, three such research blocks (48.6_3, 48.6_4 and 48.6_5, identified by shaded boxes in ANNEX 91-XX/A Figure 1) had been agreed by CCAMLR and published in the schedule of Conservation Measures in force in the 2017/2018 season (ANNEX 41-04/A).

14.   Specific management provisions for activities within the Special Protection Zone are:

Special Protection Zone		
Research fishing	(i)	Fishing activities are prohibited.
Other research on Antarctic marine living resources	(i)	The use of towed gear that interacts physically with the seafloor (e.g. beam/otter trawls, dredges, sledges) is prohibited.
	(ii)	Other research within the SPZ consistent with the general and specific objectives of the WSMPA and the RMP of this conservation measure (Annex 91-XX/C) is authorised by the Commission and will be coordinated on the basis of the annual progress reports in the context of the RMP (see paragraphs 9 - 11 in Annex 91-XX/C) to ensure that the activities are mutually supportive and do not hinder or disturb each other.

15.   Specific management provisions for activities within the Fisheries Research Zone are:

Fisheries Research Zone		
Research fishing	(i)	The Commission shall ensure that research fishing conducted in the FRZ is in accordance with the provisions for research fishing set out for the GPZ (paragraph 13).
	(ii)	Directed fishing for *Dissostichus* spp. will be managed and organised by CCAMLR in accordance with established CCAMLR procedures and conservation measures, also considering the general and specific objectives of the WSMPA.
	(iii)	Directed fishing for all non-finfish taxa including krill is prohibited.
Other research on Antarctic marine living resources	(i)	Other research within the fished areas of the FRZ consistent with the general and specific objectives of the WSMPA and the RMP of this conservation measure (Annex 91-XX/C) is authorized by the Commission and will be coordinated on the basis of the annual progress reports in the context of the RMP (see paragraphs 9 - 11 in Annex 91-XX/C) to ensure that the activities are mutually supportive and do not hinder or disturb each other.

Management and Administrative Arrangements

16.   The responsibilities of the Commission include the following pursuant to this conservation measure:

(i)   ensure that future conservation measures do not compromise the objectives of the MPA, as set forth in paragraph 3 of this conservation measure;

(ii)   manage the WSMPA, including the assessment of activities to be carried out in the WSMPA according to paragraphs 6 – 12 of this conservation measure;

(iii)   authorize Research and Monitoring activities according to paragraphs 14 - 16 of this conservation measure, including any amendment of the Research and Monitoring Plan according to paragraph 16 of this conservation measure;

(iv)   communication on the WSMPA according to paragraphs 25 - 26 of this conservation measure, inter alia, to communicate with other Organisations to promote consistency of complementary initiatives, protection measures, or activities being pursued or managed by such Organisations, with this conservation measure, as appropriate;

(v)   consider advice from SC-CAMLR and SCIC relevant to the review the WSMPA according to paragraphs 19 - 21 of this conservation measure.

17. The responsibilities of the Scientific Committee include the following pursuant to this conservation measure:

    (i) review and provide advice to the Commission regarding proposals for research and monitoring in the WSMPA, noting whether the proposed research and monitoring is consistent with Annex 91-XX/C and the objectives of the WSMPA as identified in paragraph 3 of this conservation measure;

    (ii) review reports of research and monitoring activities that have been undertaken, and advise the Commission on issues related to the operationalization of the WSMPA Management Plan and Research and Monitoring Plan;

    (iii) advise the Commission on any recommended changes or adjustments, which may arise from new information pertinent to the design and/or management, including research and monitoring, of the WSMPA;

    (iv) recommend research designs to optimize contributions to the toothfish tagging program by vessels fishing in the Fishery Research Zone and review any research plans submitted under Conservation Measure 41-04, *inter alia*, with a view to gathering data for testing and verifying the stock and population hypotheses for *Dissostichus mawsoni* in statistical area 48;

    (v) provide recommendations and advice regarding the optimal use and equipping of fishing vessels to collect data needed to support research and monitoring being undertaken in the WSMPA;

    (vi) prepare an evaluation, based on available data and at least every 10 years following the establishment of the WSMPA, to ensure that research goals and the general and specific objectives of the WSMPA are being met; and

    (vii) prepare a report as a basis for each of the reviews of this conservation measure for the Commission according to paragraph 20 of this conservation measure.

18. The responsibilities of the Secretariat include the following:

    (i) warehouse, manage and disseminate information and data that are pertinent to the development, management, and review of the WSMPA (e.g. data collected during research and monitoring surveys);

    (ii) support Members' monitoring and compliance of activities within the WSMPA; and

    (iii) provide URLs on the CCAMLR website that link to the management plans, maps, and coordinates for Antarctic Specially Protected Areas (ASPAs) and Antarctic Specially Managed Areas (ASMAs) within or adjacent to the WSMPA.

19. The responsibilities of Members include the following:

    (i) when possible and practicable, participate in and cooperate in the conduct of research and monitoring consistent with activities outlined in Annex 91-XX/C;

    (ii) take action as appropriate based on advice from the Scientific Committee related to paragraph 17 above;

    (iii) report on activities undertaken in the WSMPA as set out in paragraphs 17 - 18 of this conservation measure and in Annex 91-XX/C, including provision of:

        a. catch, effort and biological data to the Secretariat in accordance with the catch and effort reporting systems in the Conservation Measures relevant to the activity;

        b. the results of those activities to the Scientific Committee for their review in accordance with the requirements in Conservation Measures relevant to those activities.

Extract from the revised WSMPA Conservation Measure to be submitted to CCAMLR 2018

Weddell Sea Marine Protected Area – Research and Monitoring Plan (ANNEX 91-XX/C)

Purpose of the Research and Monitoring Plan

1. The purpose of this Research and Monitoring Plan (RMP) is to support the implementation of the specific objectives and the review of the WSMPA. The RMP identifies and specifies the research pursuant to / consistent with the specific objectives of the WSMPA, and the monitoring in order to evaluate to which degree these specific objectives are being achieved (cf. Appendix 1). Research and monitoring provide data and information to evaluate the potentially adverse effects of specific activities and whether the management measures are being effective. Other research and monitoring activities, that are consistent with the specific objectives of the WSMPA but not explicitly outlined here, are encouraged.

Responsibilities for and participation in the implementation of the RMP

2. The responsibility for the WSMPA RMP lies with the Commission. Therefore, all Members are encouraged:

    (i)   to participate in the long-term development and implementation of the WSMPA RMP;

    (ii) to undertake research and monitoring governed by CCAMLR Conservation Measures as specified in this RMP.

3. Research and monitoring proposals according to paragraphs 14 - 16 of this conservation measure to be carried out in the WSMPA should be examined and reviewed by the relevant CCAMLR Working Groups with a view to:

    (i)   ensuring that the proposed research/monitoring is in accordance with and does not undermine the objectives of the WSMPA;

    (ii) establishing that the proposed research/monitoring is likely to increase our knowledge about the Antarctic marine living resources, habitats and the functioning of the ecosystems preserved by the WSMPA, including those which are used in a rational manner;

    (iii) streamlining proposals and activities into a coherent WSMPA RMP for final consideration and adoption by the Scientific Committee at its annual meeting at least one year in advance of any field work.

4. In the first 10 years after adoption of the WSMPA, CCAMLR will hold up to 4 international expert workshops to exchange information about any planned activities in the WSMPA to coordinate these activities (incl. identification of any gaps) in the implementation of the RMP and to prepare the WSMPA R&M reports and assessments (for details see timetable in Appendix 2).

5. The most important steps in the implementation of this RMP in the first 10 years after adoption of this conservation measure are outlined in Appendix 2.

Research and Monitoring relevant to the WSMPA

6.   Research will be conducted within this WSMPA in order to improve our knowledge of the Antarctic marine living resources, habitats and marine ecosystems in the WSMPA, including their natural variability and the direction in which they develop in the future. Such research will also help in assessing to what extend observed changes can be attributed to climate change and/or fishing activities (or other natural or anthropogenic changes, incl. combined effects).

7.   Monitoring will be conducted under this RMP in order to serve as a basis for:

   (i)   assessing whether the areas protected by the WSMPA are adequate to fulfill the specific objectives and to what extent the specific objectives are being met and have been achieved;

   (ii)   assessing the effectiveness and contributing to the review of the management provisions;

   (iii)   evaluating the contribution of the WSMPA to Article II (3) of the Convention.

Principal issues for Research and Monitoring in the WSMPA

8.   The research and monitoring activities in the WSMPA should seek to address the following questions. This guidance is not exhaustive and can be further elaborated, expanded or specified by CCAMLR, e.g. in the context of the international expert workshops foreseen in the first 10 years after adoption of this conservation measure.

   (i)   Is the WSMPA conserving an adequate proportion of all benthic and pelagic ecosystems, habitats and species?

   (ii)   Are the WSMPA boundaries adequate to achieve the specific objectives and does the WSMPA continue to adequately encompass the populations, features and areas included pursuant of the WSMPA objectives?

   (iii)   Has the WSMPA effectively contributed to the achievement of Article II (3) of the Convention?

   (iv)   What is the impact of specific anthropogenic activities on the WSMPA specific objectives?

   (v)   Are the ecosystems, habitats or species included in the WSMPA affected by climate change and/or fishing activities (or other natural changes or other anthropogenic effects)? Are there any combined effects?

   (vi)   Is there further information about the ecological importance of the habitats, processes, populations, life-history stages, or other features included and protected by the WSMPA?

   (vii)   Does the structure and function of the marine ecosystems protected by the WSMPA, including populations or subpopulations and life cycle stages of marine organisms that occur or forage inside the WSMPA, differ from those outside the WSMPA[2]?

   (viii) Can effects of research and exploratory fishing operations and/or climate change on the Antarctic marine living resources be observed in the WSMPA?

   (ix)   Do habitats or ecosystems where fishing is prohibited (e.g. in reference areas) differ from those in areas where fishing is allowed?

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[2] Where research and monitoring outside the WSMPA is necessary to assess the achievement of the specific objectives within the WSMPA, this research and monitoring, including their location, have to be specified.

(x)   Are WSMPA communities stable and resilient, especially ecosystems, habitats, populations or subpopulations and life cycle stages of key species (e.g. Antarctic krill, ice krill, Antarctic toothfish, Antarctic silverfish)?

(xi)   Are the WSMPA specific objectives being achieved and are they still valid?

Progress report in the context of the RMP

9.   Members should ensure that the data and results of the research and monitoring carried out by their scientists in the context of this WSMPA RMP will be submitted to the Secretariat.

10.   Members involved in the WSMPA research and monitoring activities are invited to deliver an annual R&M up-date to CCAMLR through WG-EMM. These up-dates should:

(i)   summarise the research and monitoring activities of the previous year and, as far as possible, the data and (preliminary) results obtained;

(ii)   outline the plans, goals and arrangements for research and monitoring activities to be carried out in the next year;

(iii)   recommend, if deemed necessary, actions to be taken by CCAMLR regarding the objectives, restricted and prohibited activities in the WSMPA and management of the WSMPA as set out in this conservation measure.

11.   In the fourth and the ninth year after adoption of the WSMPA (see Appendix 2), the annual R&M up-dates will be combined and extended into a WSMPA report in accordance with the format agreed at SC-CAMLR-XXXI (2012), § 5.33 and Annex 6, §§ 3.71 – 3.75.

Data usage, storage and accessibility in the context of the RMP

12.   The data and results obtained by the research and monitoring activities specified in this RMP will be taken into account when:

(i)   preparing the WSMPA report according to paragraphs 17 and 18 of this conservation measure;

(ii)   reviewing the WSMPA according to paragraphs 19 - 21 of this conservation measure;

(iii)   planning and implementing the research and monitoring activities in the subsequent cycle.

13.   All data resulting from research and monitoring activities will be handled in accordance with the Rules for Access and Use of CCAMLR Data and will be stored in a dedicated WSMPA Geographical Information System (WSMPA-GIS).

Appendix 1

Research[3] & Monitoring to assess the achievement of the specific objectives of the WSMPA

Pelagic conservation objectives

> 1. Protection of representative examples of pelagic and sea ice ecosystems and habitats, such as the unique, persistent open ocean areas associated with the Maud Rise submarine plateau, or the areas along the shelf ice edge in the eastern and southern part of the WSMPA with no or very low sea ice cover throughout the austral summer.

Parameters / indicators to assess the achievement of the above mentioned objective[4]:

- sea ice concentration and thickness (incl. polynyas) as an indicator for sea ice ecosystems and habitats and unique, persistent open ocean areas
- abiotic indicators for primary production in pelagic and open water areas
- abundance / biomass of zooplankton (meso- and macro-zooplankton, micronekton) as biotic indicator for primary production in pelagic and open water areas
- abundance / biomass of adult and larvae of Antarctic krill, ice krill and Antarctic silverfish as indicator for the distribution of mid-trophic level key pelagic species
- size of penguin colonies as indicator for production in the pelagic, open water areas they use for foraging

Location / areas / zones:

- inside and outside the WSMPA (see footnote 6 above) - indicators for sea ice ecosystems and habitats and unique, persistent open ocean areas; abiotic indicators for primary production
- selected areas of the WSMPA (e.g. around Maud Rise or in front of Filchner ice shelf) in comparison with data from outside the WSMPA; biotic indicators

Research and monitoring to assess the achievement of the above mentioned objective:

- research based on the indicators (mentioned above) on pelagic and sea ice ecosystems and habitats protected by the WSMPA to improve the knowledge of their protection and representativeness to those outside of the WSMPA (see footnote 6 above)
- improvement of models to better predict sea ice concentration and thickness, sea water temperature, salinity, dissolved oxygen, inorganic nutrients and chlorophyll-a concentration in the WSMPA

> 2. Protection of Antarctic krill (*Euphausia superba*), ice krill (*Euphausia crystallorophias*) and Antarctic silverfish (*Pleuragramma antarctica*) as key species of mid-trophic level in the Antarctic food web as well as important areas / habitats for their life cycle, e.g. spawning/nursery areas.

Parameters / indicators to assess the achievement of the above mentioned objective:

- abundance and biomass of adult and larvae of Antarctic krill, ice krill and Antarctic silverfish as indicator for the distribution of key species in the Antarctic food web

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[3] Research in accordance with paragraphs 14 -16 of this conservation measure

[4] Unless stated otherwise, the baseline for these assessments will be the data and information contained in the scientific background document for the WSMPA (*reference to be inserted*).

Location / areas / zones:

- selected areas of the WSMPA (e.g. around Maud Rise or in front of Filchner ice shelf)

Research and monitoring to assess the achievement of the above mentioned objective:

- in situ research into the ecology and population dynamics of Antarctic krill, ice krill and Antarctic silverfish
- life cycle analyses of Antarctic krill, ice krill and Antarctic silverfish with specific focus on identifying important areas / habitats for these species, e.g. spawning/nursery areas, and how they could be protected

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3. Protection of essential habitats for top predators such as flying seabirds, penguins and seals.

Parameters / indicators to assess the achievement of the above mentioned objective:

- development of emperor (*Aptenodytes forsteri*) and Adélie (*Pygoscelis adeliae*) penguin colonies as indicator for the productiveness in their foraging areas
- development of flying seabird colonies, including changes of feeding and foraging areas
- development of seal reproduction sites on sea ice
- changes in the distribution, abundance and important feeding areas (hotspots) of seals and penguins

Location / areas / zones:

- selected areas of the WSMPA, e.g. foraging areas around penguin and flying seabird colonies or the Filchner overflow region as an important feeding area (hotspots) for seals

Research and monitoring to assess the achievement of the above mentioned objective:

- regular surveys and remote sensing observations of the flying seabird and emperor and Adélie penguin colonies protected by the WSMPA
- research, including remote sensing, aerial photography and observations of underwater-vocalisation with acoustic hydrophones into the seal populations and reproduction sites protected by the WSMPA

Benthic conservation objectives

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4. Protection of representative examples of benthic ecosystems and habitats such as the ecologically important sponge associations on the shelf in the eastern and southern part of the WSMPA.

Parameters / indicators to assess the achievement of the above mentioned objective:

- distribution, composition and abundance of meio- and macrobenthic assemblages (incl. important sponge and suspension feeding communities) as an indicator to ensure that representative examples are protected by the WSMPA

Location / area / zone:

- selected areas within the WSMPA (e.g. on the eastern and southern shelf areas of the WSMPA) in comparison with selected areas outside the WSMPA (see footnote 3 above)

Research and monitoring to assess the achievement of the above mentioned objective:

- Surveys on benthic communities with quantitative, semi-quantitative and non-invasive methods, within and outside of the WSMPA

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5. Protection of the integrity and life cycles of unique and diverse suspension feeding assemblages, particularly large benthic sponge associations, and thereby maintaining the associated benthic communities as efficient sources for recolonization.

Parameters / indicators to assess the achievement of the above mentioned objective:

- (1) distribution, abundance and composition of suspension feeding assemblages
- (2) distribution, abundance and composition of other meio- and macrobenthic assemblages

Location / area/ zone:

- (1) selected areas on the eastern and southern shelf areas of the WSMPA
- (2) selected areas of the WSMPA

Research and monitoring to assess the achievement of the above mentioned objective:

- Benthic surveys with quantitative, semi-quantitative or non-invasive methods
- research into recolonization sources and strategies

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6. Protection of rare and unique shallow (surface to -150 m water depth) sea floor areas with high habitat heterogeneity and species richness in order to preserve the ecological function of these areas as "stepping stones" and sources for recolonization for associated communities and species.

Parameters / indicators to assess the achievement of the above mentioned objective:

- distribution, composition and abundance of macrobenthos in shallow sea floor areas in order to detect any changes in habitat heterogeneity and species turnover over time

Location / areas/ zones:

- 'Hillman' area of the Norsel bank

Research and monitoring to assess the achievement of the above mentioned objective:

- Observations (benthic surveys) with non-invasive techniques/ methods
- Research on whether and how these rare and unique shallow sea floor areas are biogeographically connected to other similar areas within and outside of the WSMPA (see footnote 6 above).

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7. Protection of spawning areas and nesting sites of demersal fish species including areas where fish have been observed exhibiting parental care.

Parameters / indicators to assess the achievement of the above mentioned objective:

- location and number of spawning areas and nesting sites of demersal fish to ensure their adequate protection

Location / areas/ zones:

- selected areas of the WSMPA

Research and monitoring to assess the achievement of the above mentioned objective:

- surveys of the seafloor of the WSMPA with non-invasive systems in order to observe existing and to identify additional spawning areas and nesting sites of demersal fish

Pelagic and / or benthic conservation objectives

> 8. Protection of higher productivity areas to support key ecosystem processes and functional integrity of the ecosystems.

Parameters / indicators to assess the achievement of the above mentioned objective:

- sea ice concentration and thickness (incl. polynyas, sea water temperature, salinity, dissolved oxygen, inorganic nutrients and chlorophyll-a concentration) as abiotic primary production indicators to assess the development and the protection of higher productivity areas in the pelagic realm
- abundance / biomass of zooplankton (meso- and macro-zooplankton, micronekton) as biotic primary production indicator to assess the development and the protection of higher productivity areas in the pelagic realm
- abundance / biomass of adult and larvae of Antarctic krill, ice krill and Antarctic silverfish as indicator of higher productivity areas in the pelagic realm
- size and population development of colonies and foraging areas of top predators (flying seabirds, penguins and seals) as indicator to assess the development and the protection of higher productivity areas in the pelagic realm
- distribution, composition and abundance of important sponge and suspension feeding communities as an indicator to assess the development and the protection of higher productivity areas in the benthic realm
- distribution, abundance, biomass and stock size of top predators (e.g. Antarctic toothfish) as indicator to assess the development and the protection of higher productivity areas in the benthic realm

Location / areas/ zones:

- the whole WSMPA - abiotic and biotic primary production indicators
- selected areas of the WSMPA - above mentioned biological indicators

Research and monitoring to assess the achievement of the above mentioned objective:

- research based on field studies and modelling of the higher productivity areas protected by the WSMPA and the support they provide to key ecosystem processes and functional integrity of the ecosystems in the WSMPA

> 9. Protection of marine ecosystems and habitats vulnerable to the effects (including cumulative effects) of climate change, fishing and other human activities and critical to the function of local ecosystems, in order to maintain and/or enhance resilience and adaptive capacity.

Parameters / indicators to assess the achievement of the above mentioned objective:

- distribution of indicator species (e.g. penguins and seals as top predators; Antarctic krill, ice krill and Antarctic silverfish in the pelagic realm; Antarctic toothfish and important sponge and suspension feeding communities for the benthic realm) for marine ecosystems and habitats

vulnerable to the effects (including cumulative effects) of climate change, fishing and other human activities and critical to the function of local ecosystems

Location / areas/ zones:

- Selected areas of the WSMPA, e.g. areas with benthic three-dimensional suspension feeder communities in the eastern and southern part of the WSMPA or marine areas important for the foraging and life cycle of top predators.

Research and monitoring to assess the achievement of the above mentioned objective:

- combining the results of:

  (1) research (incl. habitat suitability modelling) to further identify those marine ecosystems and habitats, which are critical to the function of local ecosystem and most vulnerable to the effects (including cumulative effects) of climate change, fishing and other human activities

  (2) research into the resilience and adaptive capacity of those marine ecosystems and habitats identified under (1)

  (3) research to identify the areas protected by the WSMPA, where climate change, fishing and other human activities are expected to have the most severe effects (e.g. the Filchner overflow zone)

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10. Protection of Antarctic toothfish (*Dissostichus mawsoni*) as a top predator including, as far as possible, all life history stages and their habitats.

Parameters / indicators to assess the achievement of the above mentioned objective:

- (1) distribution, abundance, biomass, proportion of mature fish and stock size of Antarctic toothfish as part of the data collection / monitoring requirements for the exploratory toothfish fisheries in the FRZ (as reference for a fished area)
- (2) dedicated data collection / monitoring for toothfish in the GPZ
- (3) distribution, abundance and biomass of early life history (larvae, pelagic juveniles) stages of Antarctic toothfish.

  All data collected will also be used to test and verify the *Dissostichus mawsoni* population and stock hypotheses developed by CCAMLR for statistical area 48.

Location / area / zone:

- (1) Fisheries Research Zone (FRZ)
- (2) within selected areas of the GPZ, which CCAMLR will identify and approve
- (3) within selected slope and shelf areas of the WSMPA
- (4) within selected areas outside the WSMPA (see footnote 3 above) in order to contribute to the testing and verification of the *Dissostichus mawsoni* population and stock hypotheses developed by CCAMLR for statistical area 48

Research and monitoring to assess the achievement of the above mentioned objective:

- research with traditional methods (e.g. longline surveys, trawls), vertical longlines and new underwater observatory methods (e.g. electronic tags) on the ecology and the population composition / dynamics of Antarctic toothfish to allow comparison of fished and unfished areas within the WSMPA

- autecological research on individual Antarctic toothfish specimens (e.g. via analyses of otoliths and/or electronic pop-up GPS tagging) to reveal their life history characteristics and identify migration routes and spawning grounds

Research objectives

11. Provision of scientific reference areas to monitor the natural variability and long-term changes on Antarctic marine living resources and to study the effects of climate change and human activities on Antarctic ecosystems.

Parameters / indicators to assess the achievement of the above mentioned objective:

- key oceanographic parameters and climate change indicators (temperature, direction and velocity of water masses will be measured in the Filchner Overflow Area as indicators to study the effects of climate change in this region of the WSMPA)
- abundance and biomass of adult and larvae of Antarctic krill, ice krill and Antarctic silverfish as indicator for the natural variability and long-term changes on key Antarctic marine living resources in the pelagic realm
- data on top predators (e.g. Antarctic toothfish) and other parameters (to be determined) within and outside the FRZ to study the effects of fishing on Antarctic ecosystems and food chains.

Location / areas/ zones:

- Areas in the GPZ and SPZ

Research and monitoring to assess the achievement of the above mentioned objective:

- in situ observation, supported by modelling, of the natural variability and long-term changes on the Antarctic marine living resources based on key oceanographic parameters and climate change indicators in the Filchner Overflow area
- comparative studies on effects of climate change and human activities on Antarctic marine living resources and the Antarctic ecosystems within and outside of the scientific reference areas and the FRZ established by/ in the WSMPA

12. Provision of areas for fisheries research in the form of a dedicated Fisheries Research Zone to enhance the understanding of the fish stocks, to test and verify the stock and population hypotheses developed by CCAMLR for *Dissostichus mawsoni* in statistical area 48, and to study the effects of fishing activities

Parameters / indicators to assess the achievement of the above mentioned objective:

- distribution, abundance, biomass, length composition and stock size of adult Antarctic toothfish as part of the data collection / monitoring requirements for the exploratory toothfish fisheries
- distribution, abundance, biomass, length composition of Antarctic toothfish life stages (eggs, juvenile, sub-adult)
- genome composition, genetic characteristics and ecophysiological adaptations of selected Antarctic toothfish specimens (all life stages)
- composition of benthic ecosystems (especially macrobenthic suspension feeders)in fished and unfished areas

Location / area/ zone:

- fished and unfished (reference) areas in the Fisheries Research Zone (FRZ) and the General Protection Zone (GPZ)
- comparative studies outside the WSMPA and in other Statistical Subareas of area 48

Research and monitoring to assess the achievement of the above mentioned objective:

- Fisheries-based research in accordance with Conservation Measures 41-04 as well as the Research Plan and Tagging Program described in Conservation Measure 41-01, Annex 41-01/B and Annex 41-01/C respectively
- Comparative genomic, genetic and ecophysiological analyses of Antarctic toothfish specimens (all life stages) caught inside and outside the WSMPA
- Benthic surveys, e.g. with imaging equipment

The most important steps in the operationalization of the WSMPA Research and Monitoring Plan   **Appendix 2**

	1 year	2 year	3 year	4 year	5 year	6 year	7 year	8 year	9 year	10 year
Jan					*POLARSTERN cruise with 20 CCAMLR experts* for research and monitoring activities					*POLARSTERN cruise with 20 CCAMLR experts* for research and monitoring activities
Feb	*1st CCAMLR International R&M expert WS* - review of who is doing what, where and when in terms of research and monitoring in the context of the WSMPA			*CCAMLR to prepare 1st WSMPA report*					*CCAMLR to prepare 2nd WSMPA report*	*CCAMLR to compile info and start preparing documentation for WSMPA review*
Mar										
Apr				*2nd CCAMLR International R&M expert WS* - review of R&M activities and of draft WSMPA report - preparation of 1st *POLARSTERN* cruise with CCAMLR experts					*3rd International CCAMLR R&M expert WS* - review of R&M activities and of draft WSMPA report - assessment of achievement of General and Specific Objectives - planning for 2nd *POLARSTERN* cruise with	*4th International CCAMLR R&M expert WS* - finalisation of draft assessment report concerning achievement of General and Specific Objectives; - review of draft scientific documentation for WSMPA review

	1 year	2 year	3 year	4 year	5 year	6 year	7 year	8 year	9 year	10 year
									CCAMLR experts to fill R&M gaps	
May										
Jun										
Jul	Annual national R&M up-dates to EMM	Annual national R&M up-dates to EMM	Annual national R&M up-dates to EMM	Annual national R&M up-dates to EMM WSMPA report to EMM	Annual national R&M up-dates to EMM	Annual national R&M up-dates to EMM	Annual national R&M up-dates to EMM	Annual national R&M up-dates to EMM	Annual national R&M up-dates to EMM WSMPA report to EMM	Annual national R&M up-dates to EMM Scientific WSMPA review documentation to EMM
Aug										
Sep										
Oct	Reporting to SC-CAMLR	Reporting to SC-CAMLR	Reporting to SC-CAMLR	WSMPA report to SC-CAMLR	Reporting to SC-CAMLR	Reporting to SC-CAMLR	Reporting to SC-CAMLR	Reporting to SC-CAMLR	WSMPA report to SC-CAMLR	Scientific WSMPA review documentation to SC-CAMLR Overall WSMPA review documentation to Commission *CCAMLR review of WSMPA*
Nov										
Dec				*POLARSTERN cruise with 20 CCAMLR experts* for research and monitoring activities					*POLARSTERN cruise with 20 CCAMLR expert* for research and monitoring activities	