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

CCAMLR-XXXIV/29 Rev. 1

29 October 2015

Original: English

COMMISSION

A proposal for the establishment of a Ross Sea Region Marine Protected Area

Delegations of New Zealand and the USA

EN

This paper is presented for consideration by CCAMLR and may contain unpublished data, analyses, and/or conclusions subject to change. Data in this paper shall not be cited or used for purposes other than the work of the CAMLR Commission, Scientific Committee or their subsidiary bodies without the permission of the originators and/or owners of the data.

CCAMLR-XXXIV/29 rev. 1
28 OCTOBER 2015

A PROPOSAL FOR THE ESTABLISHMENT OF A ROSS SEA REGION MARINE PROTECTED AREA

Delegations of New Zealand and the United States

CONSERVATION MEASURE 91-XX (2015)
Ross Sea Region Marine Protected Area

Species all
Area 88.1 and 88.2 A and B
Season all (commencing 1 December 2016)
Gear all

The Commission,

Desiring to implement Articles IX.1(f) and 2(g) of the CAMLR Convention, which provide that conservation measures, formulated on the basis of the best scientific evidence available, may designate the opening and closing of areas, regions or sub-regions for purposes of scientific study or conservation, including special areas for protection and scientific study;

Mindful that the objective of the Convention is the conservation of Antarctic marine living resources, where conservation includes rational use in accordance with the provisions of the Convention and the conservation principles in Article II;

Further mindful that the entire Convention Area continues to be subject to the conservation measures adopted by the Commission;

Recalling its endorsement in 2010 of the work program of the Scientific Committee to develop a representative system of Antarctic Marine Protected Areas (MPAs) with the aim of conserving marine biodiversity in the Convention Area to further the achievement of the objective of the Convention, and in accordance with the decision at the World Summit on Sustainable Development in 2002 to achieve a representative system of MPAs by 2012;

Acknowledging also the decision at the 2012 United Nations Conference on Sustainable Development noting the importance of conserving by 2020 areas important for biodiversity and ecosystem services, through representative and well-connected systems of protected areas;

Conscious of the important leadership role that CCAMLR plays internationally through its role in the conservation of Antarctic marine living resources and marine biodiversity, including through the on-going development of a representative system of CCAMLR MPAs;

Noting the agreement to progress work towards a representative system of MPAs within the Convention Area by 2012 and the identification of the Ross Sea Region as a priority area for conserving marine biodiversity;

Recognizing the adoption of Conservation Measure 91-04, which provides a general framework for the establishment of CCAMLR MPAs, as an important contribution toward achieving a representative system of CCAMLR MPAs;

Anticipating that establishment and ongoing management of CCAMLR MPAs will benefit from the exchange of information between CCAMLR and the Antarctic Treaty Consultative Meeting;

Recognizing also that the Ross Sea Region contains features of exceptional ecological value and scientific importance and that the Ross Sea shelf is one of the most productive areas of the Southern Ocean and one of the few places in the world that still has its full community of top-level predators;

Recognizing furthermore that the Ross Sea Region is among the best studied areas of high-latitude, continental shelf ocean in the Southern Hemisphere, with unique time-series data describing the region's geological, oceanographic, climatic, and ecological history, which offer rich opportunities for the study of climate change effects in the region;

Recognizing that establishment of CCAMLR MPAs can provide important opportunities to understand the ecosystem impacts of climate change separate from those of fishing;

Recognizing also that the establishment of zones provides a mechanism to achieve protection and scientific objectives while still allowing some fishing to occur in specific areas within MPAs;

Recalling that CCAMLR is an integral part of the Antarctic Treaty system, and that Article III(1)(c) of the Antarctic Treaty provides that, to the greatest extent feasible and practicable, scientific observations and results from Antarctica shall be exchanged and made freely available.

Noting the intention that when the MPA enters into force, the Commission, upon advice from the Scientific Committee and its Working Group on Fish Stock Assessment, would amend relevant conservation measures for the Ross Sea toothfish fishery such that fishing displaced by this MPA would be redistributed to areas outside of the MPA in the Ross Sea Region, including areas that currently have a zero catch limit;

Recognizing the importance of fishing vessels, as well as research vessels, as platforms for scientific research and data collection in the Ross Sea Region to inform fisheries management and ecosystem science;

Recognizing the importance of collaboration among CCAMLR Members in conducting research and monitoring to achieve the objectives of the MPA;

Noting that regular review of the MPA will be necessary to evaluate the design and implementation of the MPA and whether the objectives of the MPA are still relevant or being achieved, including whether the design of the MPA's Special Research Zone can be improved;

Recognizing that the specific objectives and conservation and management measures of the Ross Sea MPA are specific to this MPA;

hereby adopts the following in accordance with Articles II and IX of the Convention to establish an MPA in the Ross Sea Region for the purpose of achieving the conservation of Antarctic marine living resources, where conservation includes rational use:

1. The area defined in Annex 91-XX/A is designated as the Ross Sea Region Marine Protected Area (the MPA) pursuant to Conservation Measure 91-04. The provisions of Conservation Measure 91-04 apply to this MPA.

2. Nothing in this conservation measure shall be interpreted or applied in a manner that prejudices the rights or obligations of any State under international law, including as reflected in the United Nations Convention on the Law of the Sea.

3. The MPA is designated to contribute to the following specific objectives, in line with Article II of the CAMLR Convention:

   i) to conserve natural ecological structure, dynamics, and function throughout the Ross Sea Region at all levels of biological organization, by protecting habitats that are important to native mammals, birds, fishes, and invertebrates;

   ii) to provide reference areas for monitoring natural variability and long-term change, and in particular a Special Research Zone, in which fishing is limited to better gauge the ecosystem effects of climate change and fishing, to provide other opportunities for better understanding the Antarctic marine ecosystem, to underpin the Antarctic toothfish stock assessment by contributing to a robust tagging program, and to improve understanding of toothfish distribution and movement within the Ross Sea Region;

   iii) to promote research and other scientific activities (including monitoring) focused on marine living resources;

   iv) to conserve biodiversity by protecting representative portions of benthic and pelagic marine environments in areas where fewer data exist to define more specific protection objectives;

   v) to protect large-scale ecosystem processes responsible for the productivity and functional integrity of the ecosystem;

   vi) to protect core distributions of trophically dominant pelagic prey species;

vii) to protect core foraging areas for land-based top predators or those that may experience direct trophic competition from fisheries;

viii) to protect coastal locations of particular ecological importance;

ix) to protect areas of importance in the life cycle of Antarctic toothfish; and

x) to protect known rare or vulnerable benthic habitats; and

xi) to promote research and scientific understanding of krill, including in the Krill Research Zone in the northwestern Ross Sea region.

4. Further details about the specific objectives in paragraph 3 and the features or areas within the Ross Sea Region MPA associated with those objectives are set forth in the MPA Management Plan (Annex 91-XX/B).

5. Research fishing activities within the MPA shall be conducted in accordance with Conservation Measure 24-01 and shall be consistent with the specific objectives of the MPA.

6~~5~~. The MPA shall be divided into the following ~~two~~ three zones, as defined in Annex 91-XX/A and further described in Annex 91-XX/B:

(i) the General Protection Zone, ~~and~~

(ii) the Special Research Zone, and

(iii) the Krill Research Zone.

Restricted, Prohibited, and Managed Activities

7~~6~~. Except as authorized under paragraphs 8~~7~~ and 9~~8~~, fishing activities are prohibited within the MPA.

~~7. Members may conduct scientific research that does not undermine the specific objectives in paragraph 3 and is in accordance with Conservation Measure 24-01, except that Members are prohibited from conducting research for which catches may exceed the amounts specified in Annex 24-01/B unless the specific research is agreed, in advance, by the Commission, on advice from the Scientific Committee. Members are encouraged to conduct research consistent with Annex 91-XX/C.~~

8. Members may conduct directed fishing for *Dissostichus* spp. in the Special Research Zone (SRZ) in accordance with Conservation Measure 41-09 subject to the following conditions:

(i) The base catch limit in the SRZ shall be 13% of the total catch limit for Statistical Subarea 88.1 and SSRUs 88.2 A and B, combined, established for that season.

(ii) The catch limit in the SRZ for the 2016/17 fishing season shall equal the base catch limit. In each following fishing season:

(a) If the fishery in the SRZ was not closed during the previous fishing season pursuant to paragraph 1 of Conservation Measure 31-02, the catch limit in the SRZ shall be the sum of the base catch limit and the unharvested portion of the catch limit in the SRZ established for the previous fishing season, but shall not exceed two times the base catch limit.

(b) If the fishery in the SRZ was closed during the previous fishing season and the catch limit in the SRZ for that fishing season was exceeded, the Scientific Committee shall advise the Commission on any changes to the catch limit for the SRZ or any other action required to achieve the specific objectives of the MPA and ensure the integrity and viability of the Ross Sea toothfish stock assessment. In determining the need for this advice the Scientific Committee shall consider the normal variation in overall catch taken, occurring within standard operational practice, in any season, as the closure date and time is based on an estimate of when the catch limit for the SRZ will be reached. Where the Scientific Committee concludes that variation above the catch limit for the SRZ exceeds normal expectations, further advice shall be provided to the Commission.

(iii) *Dissostichus* spp. caught in the SRZ shall be tagged and released at a rate of at least three fish per tonne green weight. Tags shall include pop-up or implanted archival tags that shall be deployed based on advice from the Scientific Committee.

(iv) Each vessel fishing in the SRZ shall spatially distribute its sets based on advice from the Scientific Committee.

9~~8~~. Members may conduct directed fishing for Antarctic Krill (Euphasia superba) in the Krill Research Zone (KRZ) and the SRZ in accordance with Conservation Measure 51-04 and the specific objectives of the marine protected area in paragraph 3 of this Conservation Measure.

10~~9~~. Fishing vessels and vessels conducting scientific research activities on Antarctic marine living resources should avoid dumping or discharging wastes or other matter within the MPA. At a minimum, the provisions of Conservation Measure 26-01 shall apply within the MPA.

11~~0~~. Notwithstanding Conservation Measure 10-09, no fishing vessel may engage in transhipment[2] activities within the MPA, except in cases where vessels are involved in an emergency relating to safety of human life at sea or engaged in a search and rescue operation.

[2] Transhipment means the transfer of harvested marine living resources and any other goods or materials to or from fishing vessels.

Management Plan

12~~1~~. The management measures and administrative arrangements for achieving the specific objectives of the MPA are specified in the MPA Management Plan (Annex 91-XX/B).

Research and Monitoring Plan

13~~2~~. Priority elements for scientific research and monitoring associated with this MPA are identified in Annex 91-XX/C.

14~~3~~. A Research and Monitoring Plan shall be introduced to the Scientific Committee and Commission no later than at their next annual meeting after this MPA is agreed.

Reporting

15~~4~~. Unless otherwise agreed by the Commission, every five years Members shall submit to the Secretariat, for review by the Scientific Committee, a report on their activities conducted according to or related to the MPA Research and Monitoring Plan, including any preliminary results. These reports shall be compiled by the Secretariat and provided to the Scientific Committee no later than 6 months in advance of its annual meeting in 2021 and every 5 years thereafter. The Secretariat shall make these reports available in a timely manner to Members on the CCAMLR website.

16~~5~~. Notwithstanding paragraph 15~~4~~, Members are encouraged to submit to the Secretariat as they become available:

(i) data collected according or related to the MPA Research and Monitoring Plan, which shall be made available by the Secretariat to Members under normal rules and procedures for data access within CCAMLR.

(ii) published papers or reports of relevance to the Ross Sea Region MPA, which shall be made available by the Secretariat in a timely manner to Members on the CCAMLR website.

Review of the MPA

17~~6~~. Unless otherwise agreed by the Commission upon advice by the Scientific Committee, the Commission shall review this Conservation Measure at least every ten years to evaluate whether the specific objectives of the MPA are still relevant or being achieved and the delivery of the research and monitoring plan, taking into account the advice of the Scientific Committee and the reports submitted pursuant to paragraph 15~~4~~.

18~~7~~. The Commission, with due consideration of advice by the Scientific Committee may amend this Conservation Measure and its Annexes at any time, including based on the finding of the reviews specified in paragraph 17~~6~~.

Period of Designation of this Measure

19~~8~~. [The period of designation of this conservation measure is [50] years. If ~~T~~the Commission does not reach consensus ~~shall take a decision~~ to reaffirm or~~,~~ modify~~, or terminate~~ this MPA, or adopt a new MPA at its meeting in 20xx~~66~~, taking into account the results of reviews conducted in accordance with paragraph 17~~6~~.~~.~~ ~~T~~this conservation measure shall ~~remain in force until this decision enters into effect~~expire at the end of the 20xx/xx fishing seaon.]

Compliance and Monitoring

20~~19~~. CCAMLR Contracting Parties shall provide a copy of this Conservation Measure to all vessels licensed to fish in the CAMLR Convention Area.

21~~0~~. Members participating in the CCAMLR System of Inspection are encouraged to carry out surveillance and inspection activities within the MPA to verify compliance with this Conservation Measure and other applicable Conservation Measures.

22~~1~~. For the purpose of monitoring traffic within the MPA, in accordance with Conservation Measure 10-04, Flag States must notify the Secretariat prior to entry of their fishing vessels into the MPA. The Flag State may permit or direct that such notifications be provided by the vessel directly to the Secretariat. Vessels conducting scientific research activities on Antarctic marine living resources in or transiting the area are encouraged to inform the Secretariat of their plans for intended passage through the MPA, and vessel details including name, Flag State, size, radio call sign and IMO number.

Cooperation with other States and Organizations

23~~2~~. The Commission shall draw this Conservation Measure to the attention of any State that is not a Party to the Convention, whose nationals or vessels operate in the Convention Area.

24~~3~~. The Commission shall communicate information about the MPA to the Antarctic Treaty Consultative Meeting, and shall encourage the Antarctic Treaty Consultative Meeting to take appropriate actions within its competence to contribute to the achievement of the specific objectives set forth in paragraph 3, particularly with regard to the designation and implementation of Antarctic Specially Protected Areas and Antarctic Specially Managed Areas in the Ross Sea Region and the management of human activities, including tourism activities.

25~~4~~. Members are encouraged to work together to actively engage:

(i) the International Maritime Organization with regard to ship traffic, vessel safety, and environmental protection issues, and

(ii) other international organizations,

to take complementary actions within their competence to contribute to the achievement of the specific objectives set forth in paragraph 3.

ANNEX 91-XX/A

ROSS SEA REGION MARINE PROTECTED AREA BOUNDARIES AND MAP, INCLUDING DEFINITIONS OF ZONES WITHIN THE MPA

1. The General Protection Zone is comprised of three areas (Figure 1).

   (i) The area bounded by a line starting where the meridian at 160~~59~~°E intersects the coastline, thence due north to 65°S, thence due east to 173°45'E, thence due south to 73°30'S, thence due east to 180°, thence due south to 76°S, thence due east to 170°W, thence due south to 76°30'S, thence due east to 164°W, thence due north to 75°S, thence due west to 170°W, thence due north to 72°S, thence due east to 150°W, thence due south to the coastline, and thence along the coastline to the starting point.

   (ii) The area bounded by a line starting at 62°30'S 163°E, thence due north to 60°S, thence due east to 168°E, thence due south to 62°30'S, and thence due west to the starting point.

   (iii) The area bounded by a line starting at 69°S 179°E, thence due north to 66°45'S, thence due east to 179°W, thence due south to 69°S, and thence due west to the starting point.

2. The Special Research Zone is bounded by a line starting at 180° 76°S, thence due north to 73°30'S, thence due east to 170°W, thence due south to 75°S, thence due east to 164°W, thence due south to 76°30'S, thence due west to 170°W, thence due north to 76°S, and thence due west to the starting point.

3. The Krill Research Zone is bounded by a line starting where the meridian at 150°E intersects the coastline, thence due north to 62°30'S, thence due east to 160°E, thence due south to the coastline, and thence along the coastline to the starting point.

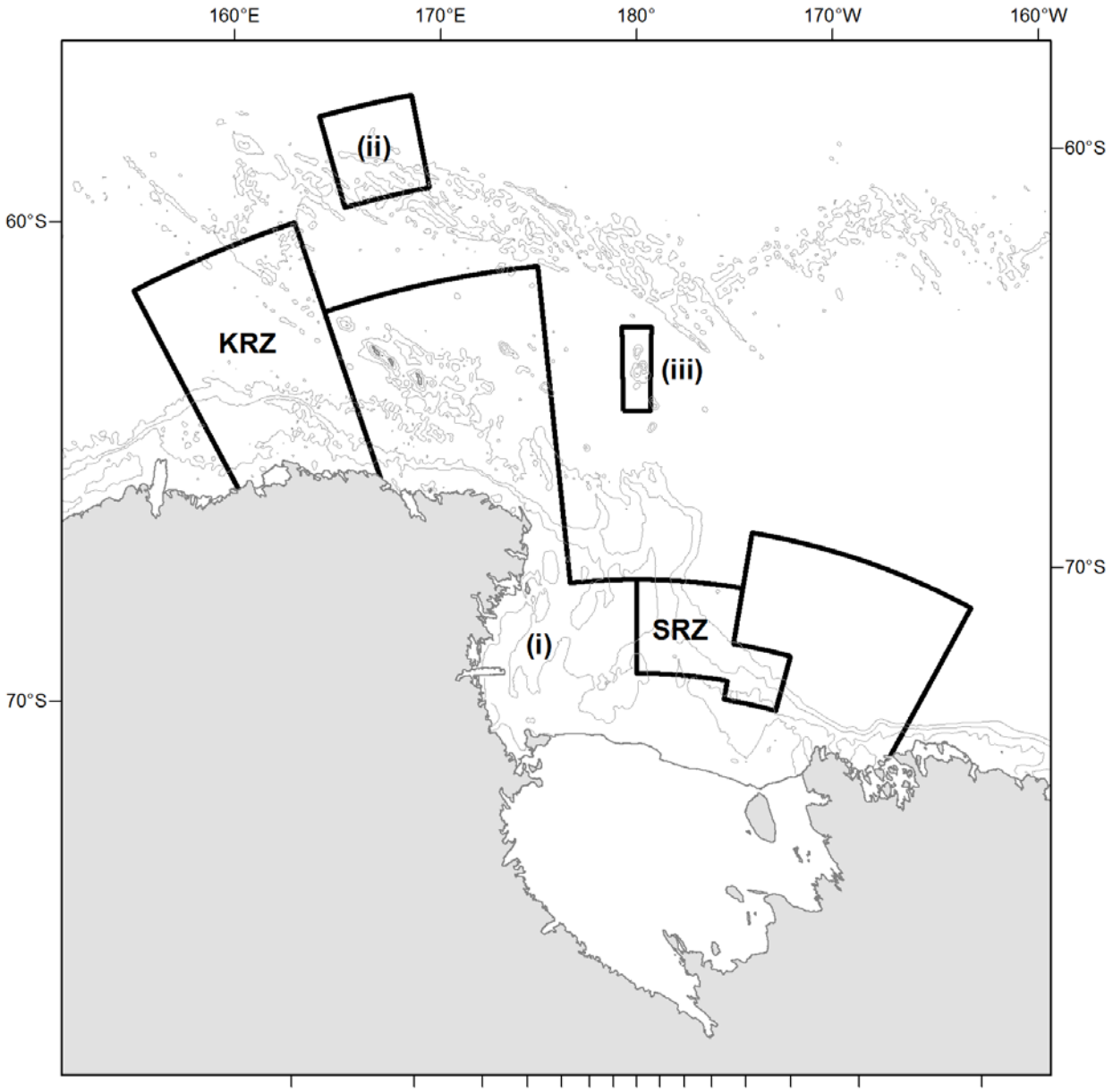

Figure 1. The Ross Sea Region Marine Protected Area, including the boundaries of the General Protection Zone, composed of areas (i), (ii), and (iii), ~~and~~ the Special Research Zone (SRZ), and the Krill Research Zone (KRZ). Depth contours are at 500 m, 1500 m, and 2500 m.

ROSS SEA REGION MARINE PROTECTED AREA MANAGEMENT PLAN

This management plan provides further details about the the features or areas within the Ross Sea Region MPA associated with the specific objectives in paragraph 3 of Conservation Measure 91-XX (2014), as well as the management measures and administrative arrangements for achieving them.

1. Specific objectives (with citations for additional information) are:

i) to conserve natural ecological structure, dynamics, and function throughout the Ross Sea Region, at all levels of biological organization, by protecting habitats that are important to native mammals, birds, fishes, and invertebrates (e.g., the habitats illustrated in SC-CAMLR- XXXIII/BG/23 Rev.1 Figure 1);

ii) to provide reference areas for monitoring natural variability and long-term change, and in particular a Special Research Zone, in which fishing is limited to better gauge the ecosystem effects of climate change and fishing, to provide other opportunities for better understanding the Antarctic marine ecosystem (e.g., by developing contrasts similar to that illustrated in SC-CAMLR- XXXIII/BG/23 Rev.1 Figure 2), to underpin the Antarctic toothfish stock assessment by contributing to a robust tagging program, and to improve understanding of toothfish distribution and movement within the Ross Sea Region;

iii) to promote research and other scientific activities (including monitoring) focused on marine living resources (e.g., by providing Annex 91-XX/C as a guidance document that scientists can leverage within their domestic funding processes);

iv) to conserve biodiversity by protecting representative portions of benthic and pelagic marine environments in areas where fewer data exist to define more specific protection objectives :

a. benthic bioregions (see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 3), and
b. pelagic bioregions(see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 4);

v) to protect large-scale ecosystem processes responsible for the productivity and functional integrity of the ecosystem (see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 5):

a. Ross Sea shelf front intersection with seasonal ice,
b. Polar front,
c. Balleny Islands and proximity,
d. Ross Sea polynya marginal ice zone, and
e. Eastern Ross Sea multi-year ice;

vi) to protect core distributions of trophically dominant pelagic prey species (see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 6):

a. Antarctic krill,
b. Crystal krill, and
c. Antarctic silverfish;

vii) to protect core foraging areas for land-based top predators or those that may experience direct trophic competition from fisheries:

a. Adelie penguins(see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 7),
b. Emperor penguins(see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 7),

c. Weddell seals(see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 8), and
d. Type C killer whales(see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 8);

viii) to protect coastal locations of particular ecological importance (see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 9):

a. southern Ross Sea shelf persistent winter polynya,
b. recurrent coastal polynyas,
c. Terra Nova Bay,
d. Victoria Coast platelet ice formation zone, and
e. Pennell Bank polynya;

ix) to protect areas of importance in the life cycle of Antarctic toothfish (see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 10):

a. Subadult toothfish settlement areas on the Ross Sea shelf,
b. Dispersal corridors for maturing toothfish, and
c. Adult toothfish feeding areas on the Ross Sea slope;

x) to protect known rare or vulnerable benthic habitats (see SC-CAMLR-XXXIII/BG/23 Rev.1 Figure 11):

a. Balleny Islands and adjacent seamounts,
b. Admiralty seamount,
c. Cape Adare slope,
d. Southeast Ross Sea slope,
e. McMurdo Sound, and
Scott Seamount and adjacent underwater features; and

xi) to promote research and scientific understanding of krill, including in the Krill Research Zone in the northwestern Ross Sea region.

MPA Zones

2. The Ross Sea Region MPA includes ~~two~~ three zones that are designed to achieve specific protection and scientific objectives while allowing some fishing to occur within the MPA. The General Protection Zone (GPZ, identified by areas (i)-(iii) in Figure 1) is designed to provide representative protection of different habitats and bioregions, to mitigate or eliminate a number of specifically identified potential ecosystem threats from fishing, and to support existing and future scientific research and monitoring. The Special Research Zone (SRZ in Figure 1), in addition to contributing to representative protection and specific pelagic protection objectives, includes an important fishing area on the continental slope and is designed to serve as a scientific reference area to advance research to increase scientific understanding about the ecosystem effects of external forces like fishing and climate change and continue to inform the science-based management of the Ross Sea toothfish fishery. The Krill Research Zone (KRZ in Figure 1) is designed to- investigate life history hypotheses, biological parameters, ecological relationships, and variations in biomass and production of Antarctic krill. The specific objectives pertinent to each zone in the MPA are described in Table 1 below.

Table 1. Specific objectives to be achieved within each zone of the Ross Sea Region MPA. (Note that objectives (i) and (iii) are not identified with reference to any particular zone or geographic location because they are objectives for the entire MPA.)

Zone (see Annex 91-XX/A, Figure 1)	Geographic location	Specific objectives (see Annex 91-XX/B, paragraph 1)
GPZ (i)	Balleny Islands and vicinity	(iv), (v)c, (vi)a and c, (vii), (viii)b, (x)a and b
	Continental shelf	(ii), (iv), (v)a and d, (vi), (vii), (viii), (ix)a and b, (x)e
	Continental slope	(ii), (iv), (v)a and d, (vi), (vii) a and b, (ix)c, (x)c and d
	Eastern Ross Sea	(ii), (iv), (v)a d and e, (vi), (vii)a and b
GPZ (ii)	Seamounts associated with Pacific Antarctic Ridge	(iv), (v)b
GPZ (iii)	Scott Seamount	(iv), (x)f
SRZ	Continental shelf and slope	(ii), (v)a, and d, (vi), (xi)
KRZ	Northwestern Ross Sea region	(iv), (viii), (xi)

Management and Administrative Arrangements

3. Responsibilities of the Commission include the following:

   (i) consider advice from SC-CAMLR and SCIC relevant to reviews of the Conservation Measure establishing the MPA;

   (ii) ensure that future Conservation Measures do not compromise the objectives of the MPA, as set forth in paragraph 3 of this Conservation Measure;

   (iii) communicate with other organizations to promote consistency of complementary initiatives, protection measures, or activities being pursued or managed by such organizations, with this Conservation Measure, as appropriate; and

   (iv) agree to scientific research activity to be conducted in the MPA as required in paragraph 5~~7~~ of this Conservation Measure.

4. Responsibilities of the Scientific Committee include the following:

   (i) pursuant to paragraph 5~~7~~ of this Conservation Measure, review and provide advice to the Commission regarding proposals for research in the Convention Area, noting whether the proposed research is consistent with Annex 91-XX/C and the specific objectives of the MPA as identified in paragraph 3 of the Conservation Measure;

   (ii) pursuant to paragraph 15~~4~~ of this Conservation Measure, review reports of research activities that have been undertaken, and advise the Commission on issues identified in Annex 91-XX/C paragraph 5;

(iii) recommend research designs to optimize contributions to the toothfish tagging program by vessels fishing in the Special Research Zone and review any research plans submitted under Conservation Measure 24-01;

(iv) provide recommendations and advice regarding the optimal use and equipping of fishing vessels to collect data needed to support the MPA; and

(v) evaluate, based on available data and at least every five years following the establishment of the MPA, the implementation of the SRZ to ensure that research objectives are being met. Catch limits specified in paragraph 9~~8~~(ii)(a) of this Conservation Measure will be reviewed in accordance with paragraph 17~~6~~ of the Conservation Measure.

5. 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 MPA (e.g., data collected during research surveys);

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

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

6. Responsibilities of Members include the following:

(i) when possible, participate in and cooperate to conduct research and monitoring consistent with activities outlined in the Research and Monitoring Plan;

(ii) implement advice from the Scientific Committee related to paragraph 4(iv) above; and

(iii) submit reports to the Secretariat on their research activities pursuant to paragraph 15~~4~~ of this Conservation Measure.

PRIORITY ELEMENTS FOR SCIENTIFIC RESEARCH AND MONITORING IN SUPPORT OF THE ROSS SEA REGION MARINE PROTECTED AREA

This Annex identifies priorities for scientific research[3] pursuant to the specific objectives of the Ross Sea Region MPA and monitoring to evaluate the extent to which these objectives are being achieved. Other research that is consistent with the specific objectives of the MPA but not explicitly outlined here, is encouraged.

The Scientific Research and Monitoring Plan will be an open, transparent, and standardized framework under which all Members interested collect, access, and analyze data including relevant indicators and parameters. The data will be used as a basis to evaluate the effectiveness of the MPA.

The data collected by any Member shall be standardized where appropriate and made available directly or via the Secretariat consistent with CCAMLR rules of Data Access and Use. The timeline for establishing baseline data needed to evaluate the effectiveness of the MPA will be included in the Scientific Research and Monitoring Plan.

1. Research and monitoring undertaken in accordance with the Research and Monitoring Plan should seek to address the following questions:

   - Do the MPA boundaries continue to adequately encompass the priority populations, features and areas included pursuant of the MPA objectives?
   - What are the ecosystem roles of the identified habitats, processes, populations, life-history stages, or other priority features?
   - How are the priority features potentially affected by fishing, climate change, environmental variability, or other impacts?
   - Does the structure and function of the marine ecosystem differ between areas inside the MPA and areas outside the MPA, or do the populations or subpopulations of marine organisms that occur or forage inside the MPA differ from those that occur or forage outside the MPA?

2. The MPA objectives fall into three main categories: representativeness, threat mitigation, and scientific reference areas. Research associated with the MPA should seek to address these categories as follows:

   - Representativeness - Research and monitoring to assess whether the MPA is protecting an adequate proportion of all benthic and pelagic environments in the Ross Sea Region.
   - Threat mitigation - Research and monitoring to assess the extent to which threats to the achievement of Article II (3) and the specific objectives of this MPA are being effectively avoided or mitigated by the MPA, in locations where the risk of ecosystem impacts from harvesting activities may otherwise be high.

[3] In accordance with Article VI of the CAMLR Convention.

- Scientific reference areas - Research and monitoring where the MPA provides opportunities to examine Antarctic marine ecosystems where no or limited fishing has taken or is taking place, to understand, for example, the effects of fishing, environmental variability, and climate change on Antarctic marine living resources.

3. In addition, understanding the life histories of target species is important to achieve the aims of CCAMLR, including within and adjacent to areas affected by the MPA. Research and monitoring to improve scientific understanding of target species in the area of the MPA – for example understanding toothfish distribution and movement within the Ross Sea region and assessing potential stock linkages with the Amundsen Sea region – are therefore included in the Research and Monitoring Plan.

4. The Scientific Research and Monitoring Plan shall be updated as and when information and data become available, but no less than every 10 years following the reviews conducted pursuant to paragraph 17 of this Conservation Measure. To facilitate updates of the Scientific Research and Monitoring Plan, members should collaborate to provide:

- baseline data,
- measurable criteria and indicators of the performance of the MPA, and
- data on present or future threats to achieving the objectives of the MPA.

5~~4~~. The Research and Monitoring Plan will be organized geographically, as follows:

- Ross Sea continental shelf
- Ross Sea continental slope
- Balleny Islands and vicinity
- Northern Ross Sea region and seamounts
- Northwestern Ross Sea region

6~~5~~. Priority research and monitoring activities are identified in Table 1. Members are encouraged, as far as possible, to collaborate and repeat the types of activities identified in Table 1.

7~~6~~. The Scientific Committee will evaluate results arising from research and monitoring activities and, pursuant to paragraph 17~~6~~ of this Conservation Measure, advise the Commission on:

- the design and implementation of the Special Research Zone and Krill Research Zone, including relevant catch limits;
- the degree to which the specific objectives of the MPA are being achieved;
- the degree to which the specific objectives are still relevant in different areas of the MPA; and
- what management actions may be required to improve the achievement of the specific objectives for this MPA.

Table 1. Priority elements for scientific research and monitoring associated with the Ross Sea Region Marine Protected Area

Type of Research	Ross Sea continental shelf	Ross Sea continental slope	Balleny Islands and vicinity	Northern Ross Sea Region and seamounts	Northwestern Ross Sea region	Priority elements
Ecosystem	✔	✔	✔	✔	✔	Directed studies to address biological and ecological questions related to species demography and life history
	✔	✔	✔			Monitoring and research on pinnipeds and seabirds, including studies of reproductive biology and success as well as diets and foraging dynamics
	✔	✔	✔	✔	✔	At-sea surveys or censuses to estimate the distribution and abundance of marine mammals, seabirds, fishes and invertebrates
	✔	✔	✔		✔	Acoustic surveys to map distribution and abundance of Antarctic silverfish and krill, including dedicated research on silverfish in Terra Nova Bay
	✔	✔	✔			Radio and archival tagging, remote sensing and shore-based population censuses of marine mammals and seabirds
	✔	✔	✔		✔	Ecosystem modelling, informed by diet and stable isotope sampling of key trophic components
	✔	✔				Targeted sampling of Ross Sea shelf and slope communities with focus on middle trophic level organisms
	✔				✔	Investigate oceanographic drivers of phaeocystis- vs. diatom-dominated production and consequences for higher-level trophic ecosystem function
				✔		Vessel-based surveys of demersal fish and benthic communities of Pacific-Antarctic fracture zone
				✔		Repeat surveys of Admiralty and Scott seamounts
Fisheries	✔					Continued annual survey for sub-adult toothfish in southern Ross Sea shelf; see SC-CAMLR-XXX/7
	✔	✔		✔		Focused tag deployments and/or electronic archival or acoustic tags to examine/ validate toothfish life-cycle, abundance, movement and behavioural hypotheses
		✔		✔		Paired stratified surveys of slope habitats with contrasting local exploitation rates to monitor effects of fishing on Antarctic toothfish and demersal fishes

	Type of Research	Ross Sea continental shelf	Ross Sea continental slope	Balleny Islands and vicinity	Northern Ross Sea Region and seamounts	Northwestern Ross Sea region	Priority elements
		✔	✔	✔	✔		Surveys and sampling to investigate life history hypotheses and biological parameters, including stock structure, of Antarctic toothfish
				✔			Targeted surveys to investigate the importance of the Balleny Islands as a potential nursery area for Antarctic silverfish and Antarctic toothfish
					✔		Winter surveys to improve knowledge of spawning and eggs/larvae/early life stages of Antarctic toothfish
						✔	Surveys and sampling to investigate life history hypotheses, biological parameters, ecological relationships, and variation-s in biomass and production of Antarctic krill
	Climate change / oceanography	✔	✔	✔	✔	✔	Meteorological and oceanographic research, including satellite remote sensing, to characterize physical properties and dynamics of phytoplankton and zooplankton.
		✔	✔	✔	✔	✔	Sea-ice remote sensing (type, concentration and extent)
		✔	✔		✔		Long-term monitoring of benthic ecosystem function
		✔	✔	✔			Development and validation of high resolution circulation model of the Ross Sea shelf and slope (e.g. ROMS), including resolving effects of sea-ice (especially polynyas), ice shelf cavity, cross-shelf exchange and deep bottom-water formation in the Ross Sea. Addition of biological model
		✔	✔				Investigate deep bottom water formation (relevant to global oceanic circulation), slope water intrusion and cross-shelf nutrient exchange