



CCAMLR-SM-II/04

31 May 2013

Original: English

Agenda Item No. 3

COMMISSION

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

Delegations of New Zealand and the USA

(This paper introduces a revised version of the proposal contained  
in CCAMLR-XXXI/16 Rev. 1 of 29 October 2012)

---

This paper is presented for consideration by CCAMLR and may contain unpublished data, analyses, and/or conclusions subject to change.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.



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

Delegations of New Zealand and the United States

## Abstract

*The delegations of New Zealand and the United States propose the establishment by the Commission for the Conservation of Antarctic Marine Living Resources (Commission or CCAMLR) of a marine protected area (MPA) in the Ross Sea Region (“Ross Sea Region Marine Protected Area”). In recognition of the exceptional ecological value and scientific importance of the Ross Sea Region, our delegations propose to establish this MPA to conserve living marine resources; maintain ecosystem structure and function; protect vital ecosystem processes and areas of ecological significance; and establish reference areas that will promote scientific research. This proposal is consistent with Conservation Measure 91-04 (2011) and the scientific conclusions and processes, reviewed by the Scientific Committee, from which the United States and New Zealand developed their original MPA scenarios for the Ross Sea Region. This proposal was last submitted to CCAMLR as CCAMLR-XXXI/16 Rev. 1 on October 29, 2012, during the 31<sup>st</sup> Meeting of the Commission. Except where noted in strikethrough/bold, the text of the proposed Conservation Measure is the same as that submitted on October 29, 2012. The delegations of New Zealand and the United States appreciate the many comments received from other Members on proposals for a Ross Sea Region MPA, including at CCAMLR XXX, XXXI and intersessionally. We look forward to working together with Members in Bremerhaven to achieve consensus to establish this MPA.*

## Background

1. Since 2005, the Commission has undertaken significant scientific analyses and planning toward the implementation of MPAs in the Convention Area. These efforts have progressed in accordance with the decision at the 2002 World Summit on Sustainable Development to achieve a representative network of MPAs by 2012. The Commission’s MPA work is further supported by the recent decision of the 2012 United Nations Conference on Sustainable Development, which noted the importance of conserving, by 2020, 10 percent of coastal and marine areas, especially areas important for biodiversity and ecosystem services, through representative and well-connected systems of protected areas. The Commission recognizes MPAs for, among other attributes, their important role in facilitating research and monitoring of Antarctic marine living resources, contributing to sustained ecosystem structure and function, and maintaining the ecosystem’s ability to adapt to climate change<sup>2</sup>.
2. To conserve the significant marine biodiversity within the Convention Area, in 2010 the Commission endorsed the work program of its Scientific Committee to develop a system of

---

<sup>2</sup> CCAMLR Conservation Measure 91-04 (2011). General framework for the establishment of CCAMLR Marine Protected Areas.

CCAMLR MPAs. In 2011, to facilitate development of a system of MPAs, the Commission adopted Conservation Measure 91-04, which provides a general framework for the establishment of CCAMLR MPAs, including overarching MPA objectives, key elements and limitations of MPA conservation measures, and requirements for management and research and monitoring plans. CCAMLR MPAs provide a mechanism for carrying out the objectives of Article II consistent with Article IX(2).

3. The Ross Sea Region is among the most pristine natural regions in the world and of tremendous conservation and scientific value to current and future generations. The Ross Sea continental shelf is known to be one of the most productive areas of the Southern Ocean, generating abundant marine life, and is one of the few places in the world where the community of top-level predators remains intact. Recognizing these unique characteristics, New Zealand and the United States propose the establishment of the Ross Sea Region Marine Protected Area. The Ross Sea Region is among the best studied areas of high-latitude continental shelf in the Southern hemisphere. More than a half century of scientific study in the Ross Sea by CCAMLR Member scientists and others provides a robust scientific basis for this proposal. The existing high level of scientific understanding and information about the Ross Sea Region make it a uniquely desirable candidate for protection. The Ross Sea Region can serve as an extremely valuable scientific reference area for research and monitoring, particularly of long term climate and other environmental change, and for better understanding of ecosystem function and the effects of harvesting activities on marine living resources. The long time-series datasets of the region's geology, oceanography, climatology and biology further provide a robust scientific and environmental characterization of a region of tremendous ecological value, biological productivity and biodiversity.

## **The Proposal**

4. This MPA proposal is consistent with Conservation Measure 91-04, the MPA planning domains endorsed by the Commission in 2011, and the Commission's precautionary approach to management. The Ross Sea Region MPA proposal is based on a substantial body of interdisciplinary research conducted by CCAMLR Members, consultations with scientists and stakeholders, and in-depth bilateral and multilateral discussions with other Members. The proposal is based on extensive scientific analyses presented by New Zealand and the United States since 2010<sup>3</sup>, which were reviewed by the Scientific Committee<sup>4</sup>.

## **Objectives**

5. The proposed Ross Sea Region MPA encompasses key areas of the Ross Sea Region marine environment that contribute to achieving the following conservation and science objectives:
  - i. to conserve ecological structure 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;

---

<sup>3</sup> SC-CAMLR-XXX/09, SC-CAMLR-XXX/10, WS-MPA-11/25, WG-EMM-10/11, WG-EMM-10/12 and WG-EMM-10/30.

<sup>4</sup> SC-CAMLR-XXX paragraph 5.45

- ii. to provide a reference area in which fishing is limited, to better gauge the ecosystem effects of climate change and fishing, and to provide other opportunities for better understanding the Antarctic marine ecosystem;
- iii. to promote research and other scientific activities (including monitoring) focused on marine living resources;
- iv. to protect a representative portion of benthic and pelagic marine environments;
- 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.

6. New Zealand and the United States recognize many CCAMLR Members' interests in the Ross Sea toothfish fishery, and 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. The proposal seeks to maximize the achievement of objectives related to scientific research, ecosystem protection, and conservation of marine living resources, where conservation includes rational use. The toothfish fishery will continue in areas outside the MPA, including in the main historical fishing areas around Mawson and Iselin Banks.

7. The MPA proposal does not reduce the total allowable catch of toothfish or other species in the Ross Sea Region. Instead toothfish fishing displaced by the MPA would be redistributed to areas outside the MPA. To achieve the redistribution of the catch, Conservation Measure 41-09 and Conservation Measure 41-10 would be amended when the MPA comes into force on 1 December 2014, such that catch limits outside the MPA within Subareas 88.1, 88.2A and 88.2B, deeper than 550 meters will be revised. The process for redistribution of the catch for the Ross Sea toothfish fishery would require referral by the Commission to WG-FSA and the Scientific Committee, which would in turn make recommendations to the Commission for consideration in 2014.

8. To further balance Members' scientific research, ecosystem protection, and fishing interests in the Ross Sea Region, our proposal includes zones designed to achieve protection and scientific objectives while still allowing some fishing activities to occur in certain zones within the MPA where these activities do not threaten – or are necessary for achievement of – the objectives of the MPA. Specifically, the MPA includes three zones – the General Protection Zone, the Special Research Zone, and the Spawning Protection Zone. Research fishing would be allowed in all zones of the MPA in accordance with Conservation Measure 24-01, except that research with anticipated catches exceeding 50 tonnes or the amounts specified in Annex 24-01/B must be agreed in advance by the Commission on advice from the Scientific Committee.

#### General Protection Zone

9. In the General Protection Zone (GPZ), research fishing is the only type of fishing permitted. Establishment of the GPZ is intended to achieve all ten of the specific conservation and science objectives listed in paragraph 5 above.

#### Special Research Zone

10. The Special Research Zone (SRZ) provides CCAMLR an opportunity to create an area to advance research to increase scientific understanding about the ecosystem effects of climate change distinct from fishing and continue to inform the science-based management of the Ross Sea toothfish fishery. Directed fishing for toothfish in the SRZ, in accordance with Conservation Measure 41-09, would be limited to 1450 tonnes for each fixed period of five fishing seasons with an increase in the required toothfish tagging rate to 3 fish per tonnes. The proposed level of ongoing fishing inside the SRZ is intended to: (i) maintain the continuity and integrity of the existing toothfish tagging program; and (ii) ensure the development of ecosystem-scale contrasts between a lightly fished area (the SRZ) and the main fishing grounds around Mawson and Iselin Banks. Under the tagging program, captured toothfish are tagged and released alive during normal fishing operations, and the rate at which fish are subsequently recaptured is the foundation of the toothfish stock assessment. The tagging program also provides important information on toothfish growth rates, movement patterns, and life cycle migrations (see WG-FSA-11/46).
11. The proposal is also designed to allow some flexibility for fishing vessels operating within the SRZ, recognizing that sea-ice conditions in the SRZ vary between fishing seasons. Establishment of a catch limit that provides for inter-annual flexibility during a fixed period of five fishing seasons would minimize lost opportunities to tag, release, and recapture toothfish in this zone. Unharvested portions of the catch limit would be rolled over to subsequent years within the five-season period, with a single-season maximum catch of 500 tonnes. Spreading the five-season 1450 tonnes catch limit between at least three seasons will help accomplish science objectives.
12. The United States and New Zealand further recognize that improved science outcomes in this zone will be achieved in the future through well-designed research fishing rather than by Olympic fishing alone and suggest that the Scientific Committee be encouraged to promote research proposals submitted under Conservation Measure 24-01 pursuant of research priorities for this zone.

#### Spawning Protection Zone

13. In the Spawning Protection Zone (SPZ), directed fishing for toothfish, in accordance with Conservation Measure 41-09, would only be permitted from 1 December to 31 March. Closing the toothfish fishery from 1 April to 30 November would prevent disruption of toothfish spawning activities thought to occur in winter in association with the seamounts in this area. By allowing toothfish fishing during the usual summer fishery, the SPZ would accommodate some of the displacement effects of limiting fishing elsewhere in the MPA. All other types of fishing activities, except research fishing, would be prohibited year round in the SPZ. Establishment of the SPZ is primarily intended to achieve objectives (iii), (iv), and (ix) in paragraph 5.

#### Management, Research and Monitoring

14. Consistent with Conservation Measure 91-04, the proposal also includes a management plan for the MPA and priority elements for scientific research and monitoring within it. The management plan provides further details regarding the specific science and conservation objectives of the MPA, as well as the administrative arrangements for achieving them. The priority elements for research and monitoring identify research priorities pursuant to the objectives of the MPA and monitoring activities designed to evaluate the extent to which these objectives are being achieved. Following approval of the MPA, the Commission, on the basis of advice from the Scientific Committee, would adopt a research and monitoring plan for the MPA, pursuant to Conservation Measure 91-04. The research and monitoring plan is being developed with input from CCAMLR Members in advance of the MPA entering into force on 1 December 2014.

## **Conclusion**

15. The adoption of a Ross Sea Region Marine Protected Area would mark a major marine conservation achievement and a significant contribution toward meeting the Commission's goal of developing a representative system of Antarctic MPAs with the aim of conserving marine biodiversity in the Convention Area.

16. The delegations of New Zealand and the United States appreciate the many comments received from other Members on proposals for a Ross Sea Region MPA, including at CCAMLR XXX, XXXI and intersessionally. We look forward to working together with Members in Bremerhaven to achieve consensus to establish this MPA.

## **CONSERVATION MEASURE 91-XX (2013)**

### **Ross Sea Region Marine Protected Area**

Species all

Area 88.1 and 88.2

Season all (commencing 1 December 2014)

Gear all

The Commission,

Recalling its endorsement 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, 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 marine biodiversity, including through the on-going development of a representative system of CCAMLR Marine Protected Areas;

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;

Noting the designation of a general framework for the establishment of CCAMLR MPAs as an important contribution toward achieving a representative system of CCAMLR MPAs;

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

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;

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 area 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

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. The MPA is designated to contribute to the following objectives:

- i) to conserve ecological structure and function throughout the Ross Sea Region at all levels of biological organization, by ~~prohibiting fishing in~~ **protecting** habitats that are important to native mammals, birds, fishes, and invertebrates;
- ii) to provide a reference area in which fishing is limited, to better gauge the ecosystem effects of climate change and fishing, and to provide other opportunities for better understanding the Antarctic marine ecosystem;
- iii) to promote research and other scientific activities (including monitoring) focused on marine living resources;
- iv) to protect a representative portion of benthic and pelagic marine environments;
- 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.

3. The MPA shall be divided into the three zones defined in Annex 91-XX/A:

- (i) the General Protection Zone,
- (ii) the Special Research Zone, and
- (iii) the Spawning Protection Zone.

#### Restricted, Prohibited, and Managed Activities

- 4. Except as authorized under paragraphs 5, 6, and 7, fishing activities are prohibited within the MPA.
- 5. Members may conduct scientific research that does not undermine the objectives in paragraph 2 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.

6. Members may conduct directed fishing for *Dissostichus spp.* in the Special Research Zone in accordance with Conservation Measure 41-09 subject to the following conditions:
  - (i) the total catch of *Dissostichus spp.* in the Special Research Zone shall not exceed 1450 tonnes in each fixed five-year period beginning in the ~~2013/14~~**2014/15** season;
  - (ii) the total catch of *Dissostichus spp.* in the Special Research Zone shall not exceed 500 tonnes in any one season;
  - (iii) the total catch of *Dissostichus spp.* taken in the Special Research Zone during any one season shall be considered as part of the annual catch limit established for SSRUs 88.1H, I and K;
  - (iv) *Dissostichus spp.* shall be tagged at a rate of at least three fish per tonne green weight caught in the Special Research Zone; and
  - (v) catches of *Dissostichus spp.* in excess of 1450 tonnes during any fixed-five year period shall be deducted from the catch limit in the Special Research Zone for the next fixed five-year period.
7. Members may conduct directed fishing for *Dissostichus spp.* within the Spawning Protection Zone in accordance with Conservation Measure 41-09, except that fishing shall only be permitted from 1 December to 31 March. The total catch shall be considered as part of the annual catch limit established for SSRUs 88.1A, B, C and G in Conservation Measure 41-09.
8. 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.
9. Notwithstanding Conservation Measure 10-09, no fishing vessel may engage in transshipment<sup>5</sup> 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.

#### Management and Administrative Arrangements

10. The specific objectives and the features or areas within the Ross Sea Region associated with the objectives, as well as the management measures and administrative arrangements for achieving the objectives of the MPA are specified in the MPA Management Plan (Annex 91-XX/B).
11. The Commission, with due consideration of advice by the Scientific Committee may, at any time, amend this Conservation Measure and its Annexes.

---

<sup>5</sup> Transshipment means the transfer of harvested marine living resources and any other goods or materials to or from fishing vessels.

12. 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 objectives of the MPA are still relevant or being achieved, taking into account the advice of the Scientific Committee and the reports submitted pursuant to paragraph 18.
13. CCAMLR Contracting Parties shall provide a copy of this Conservation Measure to all vessels licensed to fish in the CAMLR Convention Area.
14. The Commission shall take a decision to reaffirm or modify this MPA or adopt a new MPA at its meeting in ~~2063~~**2064**. This conservation measure shall remain in force until this decision enters into effect.

#### Compliance and Monitoring

15. 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.
16. 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.

#### Research and Monitoring Plan

17. Priority elements for scientific research and monitoring associated with this MPA are identified in Annex 91-XX/C. Based on these priority elements, a Research and Monitoring Plan shall be introduced to the Commission in 2013.
18. Unless otherwise agreed by the Commission, 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 submitted to and compiled by the Secretariat in ~~2018~~ **2019** and every 5 years thereafter. The Secretariat shall provide the reports to the Scientific Committee no later than 6 months prior to the ~~2023~~ **2024** Commission Meeting and every 10 years thereafter.

#### Cooperation with other States and Organizations

19. 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.

20. 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 objectives set forth in paragraph 2, 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.

21. 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 objectives set forth in paragraph 2.

**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 159°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 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 69°45'S 179°30'E, thence due north to 67°10'S, thence due east to 176°15'W, thence due south to 69°45'S, and thence due west to the starting point.
  - (iii) The area bounded by a line starting at 66°S 170°W, thence due north to 63°20'S, thence due east to 163°45'W, thence due north to 60°S, thence due east to 150°W, thence due south to 63°20'S, thence due west to 160°W, thence due south to 66°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 76°S, and thence due west to the starting point.
3. The Spawning Protection Zone is bounded by a line starting at 159°E 65°S, thence due north to 60°S, thence due east to 173°45'E, then due south to 62°50'S, thence due east to 179°30'E, thence due south to 66°07'S, thence due west to 173°45'E, thence due north to 65°S, and thence due west to the starting point.

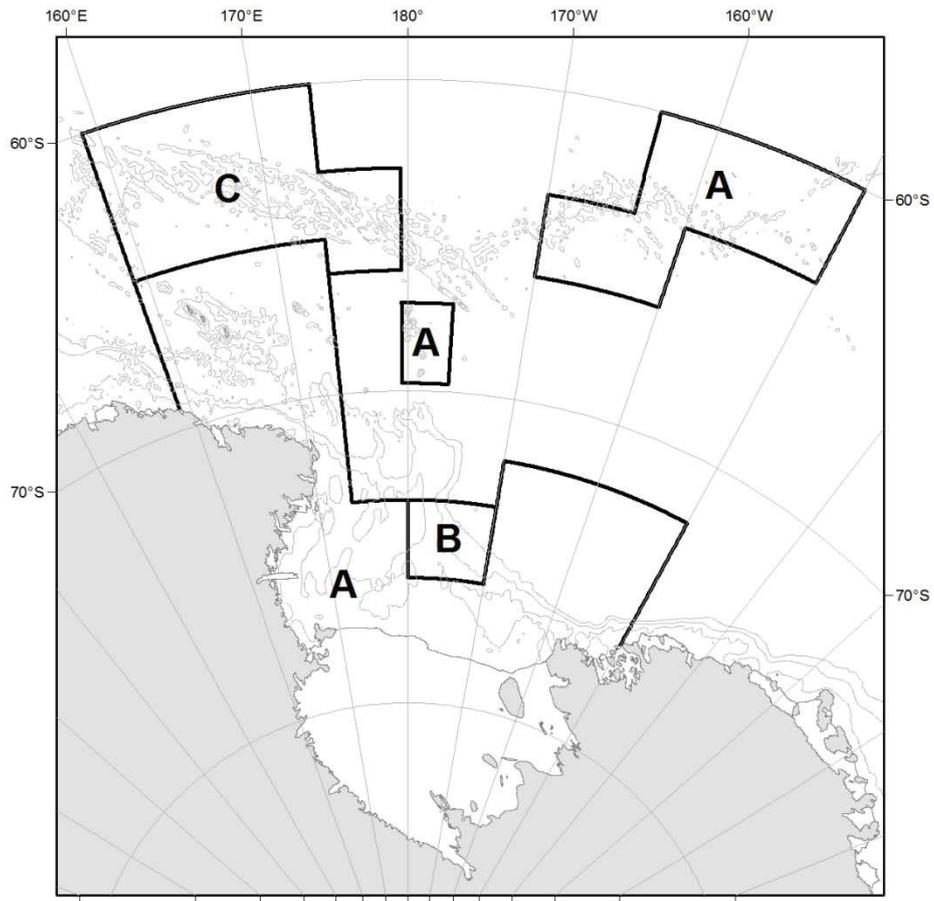


Figure 1. The Ross Sea Region Marine Protected Area, including the boundaries of the General Protection Zone (A), the Special Research Zone (B), and the Spawning Protection Zone (C). Depth contours are at 500 m, 1500 m, and 2500 m.

## ROSS SEA REGION MARINE PROTECTED AREA MANAGEMENT PLAN

This management plan provides further details about the specific objectives and the features or areas within the Ross Sea Region MPA associated with the objectives in paragraph 2 of Conservation Measure 91-XX (~~2012~~2013), as well as the management measures and administrative arrangements for achieving them.

1. Specific objectives (with citations for additional information) are:
  - i) to conserve ecological structure and function throughout the Ross Sea Region, at all levels of biological organization, by ~~prohibiting fishing in~~ **protecting** habitats that are important to native mammals, birds, fishes, and invertebrates (e.g., the habitats illustrated in SC-CAMLR-XXX/9 Figure 1);
  - ii) to provide a reference area in which fishing is limited, to better gauge the ecosystem effects of climate change and fishing, and to provide other opportunities for better understanding the Antarctic marine ecosystem (e.g., by developing contrasts similar to that illustrated in SC-CAMLR-XXX/9 Figure 2);
  - 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 protect a representative portion of benthic and pelagic marine environments (see Figure 1 and Figure 2 in WG-EMM-10/30):
    - a. benthic bioregions, and
    - b. pelagic bioregions;
  - v) to protect large-scale ecosystem processes responsible for the productivity and functional integrity of the ecosystem (see WS-MPA-11/25 Figure 2a):
    - 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 WS-MPA-11/25 Figure 2b):
    - 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 (see WS-MPA-11/25 Figures 2c and 2d):
    - a. Adelie penguins,
    - b. Emperor penguins,
    - c. Weddell seals, and
    - d. Type C killer whales;

- viii) to protect coastal locations of particular ecological importance (see WS-MPA-11/25 Figure 2f):
  - 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 WS-MPA-11/25 Figure 2e):
  - a. Subadult toothfish settlement areas on the Ross Sea shelf,
  - b. Dispersal corridors for maturing toothfish,
  - c. Adult toothfish feeding areas on the Ross Sea slope,
  - d. Northwestern *D. mawsoni* spawning areas, and
  - e. Northeastern *D. mawsoni* spawning areas;
- x) to protect known rare or vulnerable benthic habitats (see WS-MPA-11/25 Figure 2f):
  - a. Balleny Islands and adjacent seamounts,
  - b. Admiralty seamount,
  - c. Cape Adare slope,
  - d. Southeast Ross Sea slope,
  - e. McMurdo Sound, and
  - f. Scott Seamount and adjacent underwater features.

## Management and Administrative Arrangements

2. 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 2 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 of this Conservation Measure.
3. Responsibilities of the Scientific Committee include the following:
  - (i) pursuant to paragraph 5 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 objectives of the MPA as identified in paragraph 2 of the Conservation Measure; and
  - (ii) pursuant to paragraph 18 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) to 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.

4. Responsibilities of the Secretariat include the following:

- (i) warehouse and manage 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.

5. 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; and
- (ii) submit reports to the Secretariat on their research activities pursuant to paragraph 18 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<sup>6</sup> pursuant to the 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 objectives of the MPA but not explicitly outlined here, is encouraged.

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 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.
  - Scientific reference areas - Research and monitoring where the MPA provides opportunities to examine Antarctic marine ecosystems free from or with limited human impact, to understand, for example, the effects of fishing, environmental variability, and climate change on Antarctic marine living resources.
3. The Research and Monitoring Plan will be organized geographically, as follows:
  - Ross Sea continental shelf
  - Ross Sea continental slope

---

<sup>6</sup> In accordance with Article VI of the CAMLR Convention.

- Balleny Islands and vicinity
- Northern Ross Sea region and seamounts

4. 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.

5. The Scientific Committee will evaluate results arising from research and monitoring activities and advise the Commission on:

- 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 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	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

Type of Research	Ross Sea continental shelf	Ross Sea continental slope	Balleny Islands and vicinity	Northern Ross Sea Region and seamounts	Priority elements
	✓	✓			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
				✓	First 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 pre-recruit 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 fished vs. unfished slope and seamount habitats to monitor effects of fishing on Antarctic toothfish and demersal fishes
	✓	✓	✓	✓	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
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

Type of Research	Ross Sea continental shelf	Ross Sea continental slope	Balleny Islands and vicinity	Northern Ross Sea Region and seamounts	Priority elements
					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