

Marine Protected Areas: discussions and decisions in the CCAMLR context

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1. Introduction

This paper summarizes and provides a commentary on the discussions and recommendations of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) Workshop on Marine Protected Areas (MPAs), held 29 August to 1 September 2005 (Silver Spring, USA), and the subsequent decisions of the CCAMLR Scientific Committee and Commission meetings (24 October to 4 November 2005, Hobart, Australia) on further work to develop a system of MPAs for the Southern Ocean. These discussions and decisions have relevance for high seas marine protected area development worldwide, particularly with regard to the use of MPAs as a tool for both fisheries management and the conservation of marine biological diversity in areas beyond national jurisdiction.

The introductory sections of this paper provide background information to the issues under consideration, including the objectives and function of CCAMLR, and the existing provisions for MPA development within the CCAMLR context. The next sections summarize the major outcomes of the CCAMLR Workshop on MPAs, specifically with regard to MPA principles and practice, types of areas to be considered for protection, and types of scientific information required to assist with the identification of biophysical regions and the development of MPAs across the CCAMLR Convention Area. Finally, the paper considers the implications of this recent progress for future work within CCAMLR, and suggests ways in which this may contribute to wider discussions on high seas MPAs.

1.1 Major recommendations on MPAs adopted at the 2005 CCAMLR meetings

The 2005 CCAMLR Workshop on MPAs resulted in a series of recommendations to be provided as advice to the CCAMLR Scientific Committee (CCAMLR MPAs Workshop Report, 2005). This advice was successfully adopted at the 2005 Scientific Committee and Commission meetings, and established the terms of reference for CCAMLR Members to take further action to elaborate the principles, practical guidelines and scientific requirements for MPA development.

The major recommendations adopted by the Commission achieved the following:

- Clarification of the responsibilities of CCAMLR with regard to the development of MPAs in the Southern Ocean.

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- Recognition of: (i) the existing commitments of many, if not most, CCAMLR Members to the establishment of representative networks of MPAs, in respect of, for example, the World Summit on Sustainable Development (WSSD) and the Convention on Biological Diversity; (ii) the agreement of FAO to assist its members to achieve the WSSD target with respect to representative networks of MPAs and to develop technical guidelines for defining, implementing and testing MPAs; (iii) the obligations of all CCAMLR Members in respect of the Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol).
- Agreement on the need to take a holistic approach to MPA design and implementation throughout the Southern Ocean, and the need for collaboration at technical and policy levels within the Antarctic Treaty System as well as with relevant bodies including observers to CCAMLR, IGOs and NGOs, to achieve this.
- Recognition of the need for attention to be given to the protection of representative areas, scientific areas, and areas potentially vulnerable to impacts by human activities.
- Identification of key tasks needed in considering a system of protected areas to assist CCAMLR in achieving its broader conservation objectives.
- Agreement on the need for the establishment of a Steering Committee to co-ordinate and facilitate work towards developing a system of MPAs across the CCAMLR Convention Area, focusing on bioregionalisation of the Southern Ocean.
- Agreement to hold a workshop in 2007 to complete the initial bioregionalisation work and, if possible, to advise on the identification of candidate areas for protection.

1.2 Conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction

The conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction has received increasing attention in recent years, with growing agreement that MPAs should be considered as an integrated and flexible management tool for the oceans. High seas MPAs represent only one of the many available tools for conservation and sustainable use of biodiversity in marine areas beyond national jurisdiction. However, experience from their implementation within national waters suggests that MPAs can generate significant benefits in terms of maintenance and restoration of biodiversity and fish stocks, with the potential to complement conventional fisheries management practices.

At the 2002 World Summit on Sustainable Development (WSSD), governments agreed the specific objective to implement representative networks of MPAs by 2012, with the aim of conserving marine biodiversity and allowing sustainable use of marine resources (United Nations, 2002). In 2003 the Vth IUCN World Parks Congress recommended that at least 5 ecologically significant and globally representative high seas MPAs should be established by 2008 (IUCN, 2003), and although limited progress has been made towards this target, discussions on the subject have increased in international fora, most notably the Convention on Biological Diversity. Discussions at the 2004 UN Informal Consultative Process on Oceans and Law of the Sea (UNICPOLOS) revealed growing support for interim prohibition on high seas bottom trawling, and for an UNCLOS implementing agreement to enhance high seas biodiversity conservation. More recently, the UN Food and Agriculture Organisation (FAO) Committee on Fisheries (COFI) agreed that FAO should assist its members to achieve the WSSD target with respect to representative networks of MPAs, and recommended the development of technical guidelines for defining, implementing and testing MPAs (COFI, 2005). Evaluation and testing of MPAs in areas beyond national jurisdiction will improve our understanding of the role that these tools might play in conservation and management of the oceans.

1.3 Potential for recent CCAMLR work to contribute to wider discussions on high seas MPAs

Recent international conferences and meetings have underlined the need for improved legal frameworks, well-defined tools for protection, criteria for selection of candidate areas, and co-operation between relevant regulatory bodies. Of particular importance have been the discussions held at:

- UN General Assembly on the Law of the Sea (2004)
- Conference of the Parties to the Convention on Biological Diversity (COP VII, 2004)
- CBD Ad Hoc Open-Ended Working Group on Protected Areas, 1st Meeting (Montecatini, Italy, Jun 2005)
- First International Congress on Marine Protected Areas (IMPAC1) (Geelong, Australia, Oct 2005)
- European Bureau for Conservation and Development (EBCD) and IUCN Conference on Marine Biodiversity, Fisheries Management and Marine Protected Areas (European Parliament, Brussels, Nov 2005)
- International Marine Ecological Experts' Workshop (Ottawa, Canada, Dec 2005).

Discussions on MPAs within CCAMLR have focused on many of the same issues, and have taken into account background information provided by experiences elsewhere. The recent progress by CCAMLR towards the development of a comprehensive MPA strategy for the Southern Ocean has important implications for discussions on high seas MPAs globally. It has highlighted an increasing political will to address the questions of how to protect marine living resources and biodiversity beyond areas of national jurisdiction. In addition, it has focused attention on how this might be achieved within the framework of a fisheries management organisation, acting in co-operation with a wider environmental protection framework and taking into account international commitments.

The positive outcomes from the 2005 CCAMLR MPAs workshop, and their subsequent adoption by the 2005 CCAMLR Scientific Committee and Commission meetings, indicate an increasing willingness by CCAMLR Members to take action to develop and test new approaches for establishing high seas MPAs that further CCAMLR objectives. The provision of information on CCAMLR activities may offer guidance and practical assistance to those working elsewhere towards the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction.

2. Background to issues under consideration

This section provides background information on the issues being considered in this paper, specifically with regard to:

- Southern Ocean biodiversity
- The objectives and function of CCAMLR
- Current provisions for MPAs in the CCAMLR context
- Discussions within CCAMLR leading to the 2005 Workshop on MPAs

2.1 Southern Ocean biodiversity

The marine fauna of the Southern Ocean has a high degree of endemism, as well as high species richness within some taxa. Benthic organisms have developed a variety of adaptations to extreme temperature conditions and the seasonal availability of food, forming unique and diverse communities including cold-water corals and seamount habitats. Primary productivity in the Southern Ocean is highly seasonal, and herbivores such as Antarctic krill are important components of the marine ecosystem as prey species. Predators include whales, seals, penguins and other seabirds, as well as fish and squid; many of these have been major targets for commercial exploitation, both historically and at the present time. The cumulative effect of

pressures including climate change, pollution, and the direct and indirect effects of fishing and other human activities, are the major threats to the Antarctic marine ecosystem (Clarke and Harris 2003).

2.2 Introduction to CCAMLR

The CCAMLR Convention was adopted in 1982, having been developed in response to increasing concerns over the possible effects of krill harvesting on the entire marine ecosystem, and the need for effective management and sustainable use of Antarctic marine living resources (Everson 1977, Kock 2000). The Convention applies to all Antarctic marine living resources, which are defined as: “the populations of fin fish, molluscs, crustaceans and all other species of living organisms, including birds, found south of the Antarctic Convergence” (CCAMLR, Article I). The objective of CCAMLR is “the conservation of marine living resources”, and for the purposes of the Convention, the term ‘conservation’ includes rational use (CCAMLR, Article II). The Convention establishes a Commission and a Scientific Committee to oversee its implementation.

Although CCAMLR is a distinct Treaty, it forms part of the Antarctic Treaty System (ATS). The ATS is defined as the Antarctic Treaty itself, together with its associated instruments: the Convention for the Conservation of Antarctic Seals (CCAS), the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) and the Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol), and the measures in force under these instruments. Parties enact domestic legislation to implement measures agreed under each instrument. This system provides the legal framework for a higher level of environmental protection, and a more robust framework for marine protected area development, than exists in any other high seas area.

CCAMLR covers a wider marine area than that of the Antarctic Treaty, extending from the continent to a line just north of an approximation of the oceanographic and ecological boundary formed by the Polar Front (Antarctic Convergence) (see Appendix 1). The vast majority of the CCAMLR Area falls on the high seas.¹ Both the Antarctic Treaty and CCAMLR specifically preserve the rights of States parties on the high seas.

CCAMLR’s ecosystem approach to management

The CCAMLR Convention defines the Antarctic marine ecosystem as “the complex of relationships of Antarctic marine living resources with each other and with their physical environment” (CCAMLR, Article I). CCAMLR’s ecosystem approach to marine living resource conservation and management is defined by three principles of conservation set out in Article II of the Convention, which set it apart from other fisheries management regimes. Any harvesting and associated activities in the CCAMLR area must be carried out in accordance with these principles:

- “(a) prevention of decrease in the size of any harvested population to levels below those which ensure its stable recruitment...
- (b) maintenance of the ecological relationships between harvested, dependent and related populations of Antarctic marine living resources and the restoration of depleted populations...

¹ Sub-Antarctic islands north of 60°S but within the CCAMLR area are an exception to this rule (for example, Île Kerguelen (France) and Heard Island and McDonald Island (Australia) shown in Appendix 1). These islands have Exclusive Economic Zones (EEZs) governed under their respective national jurisdictions, and are therefore not high seas areas. CCAMLR regulations still apply in these areas in addition to any EEZ regulations.

(c) prevention of changes or minimisation of the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades...”

With this commitment to a precautionary, ecosystem approach for the conservation of marine living resources, the conservation and management measures developed and adopted under CCAMLR can be and have been used to support a range of MPA objectives that include not only conservation and rational use of marine living resources but also scientific studies, protection of marine species, and wider biodiversity and habitat conservation. Moreover, CCAMLR has a specific mandate to designate areas to support conservation or scientific study, including special areas for protection and scientific study (CCAMLR, Article IX-2(g)) (see Section 2.3).

Relationship of CCAMLR with the Antarctic Treaty and the Madrid Protocol

Several provisions of CCAMLR call for all CCAMLR Parties, whether or not Parties to the Antarctic Treaty, to respect the principles, purposes, provisions and measures adopted under that Treaty, including the special responsibilities of the Antarctic Treaty Consultative Parties for the protection and preservation of the environment of the Antarctic Treaty Area (CCAMLR, Article V-1 and V-2). Principles and responsibilities adopted under the Antarctic Treaty include those relating to the provisions of the Madrid Protocol. The CCAMLR Commission must also “take full account of any relevant measures or regulations established or recommended by the Consultative Meetings pursuant to Article IX of the Antarctic Treaty”, including measures regarding the facilitation of scientific research, and the preservation and conservation of living resources in Antarctica (CCAMLR, Article IX-5).

The Madrid Protocol’s Annex V on Area Protection and Management provides for the establishment, within a systematic environmental-geographical framework, of a series of Antarctic Specially Protected Areas (ASPAs), together with Antarctic Specially Managed Areas (ASMAs). However, one of the challenges facing MPA development in Antarctica is the difference in jurisdictional area between the Madrid Protocol and CCAMLR, and the related problem of harmonising protected area strategies between the two instruments. Any ASPA or ASMA with a marine component requires prior approval from CCAMLR before it can be designated under Annex V, and the CCAMLR Commission may also propose areas for designation. To date, the size and geographic distribution of marine ASPAs and ASMAs have been very limited, however there is scope for the system to be improved through better co-operation and co-ordination with CCAMLR, particularly in defining biophysical regions to assist with the identification of candidate MPAs across the Southern Ocean.

Wider legal framework: relationship of CCAMLR with other international instruments

The conservation obligations of CCAMLR to conserve marine living resources is strengthened by the requirements of other instruments to which most, if not all, of its members have subscribed, in particular the United Nations Convention on the Law of the Sea (UNCLOS). CCAMLR shares UNCLOS principles on the conservation of living resources and associated and dependent species, while defining them in more specific terms for CCAMLR Parties. UNCLOS outlines the responsibilities of all states to protect and conserve the marine environment and its natural resources (including on the high seas), and to co-operate with other states so that this may be achieved.

The Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement) (1995) elaborates on the general principles of UNCLOS with respect to conservation and management of relevant fish stocks, primarily beyond areas of national jurisdiction. Its objective is to ensure the long-term conservation and sustainable use of these stocks. Its general principles require, *inter alia*, a precautionary approach, impact assessment of fishing (and other activities and environmental factors) on an ecosystem basis, conservation of non-target species, the protection of marine biodiversity, and prevention or elimination of overfishing and excess fishing capacity. In implementing the precautionary approach, States are to protect habitats of special concern for non-target and associated or dependent species. The non-binding FAO Code of Conduct for

Responsible Fisheries reflects these same principles. Recent recommendations by the Food and Agriculture Organisation (FAO) Committee on Fisheries (COFI, 2005) highlight the benefits of MPAs to fisheries, emphasising the importance of further research into their potential role in fisheries management.

The Convention on Biological Diversity (CBD) (1992) commits Contracting Parties to prevent damage to areas outside national jurisdiction and to co-operate with other Parties, either directly or through other international organisations, for the conservation and sustainable use of biodiversity (CBD, Article 5) and to develop guidelines for the selection and establishment of protected areas (CBD, Article 8b).

This binding framework is reinforced by the non-binding commitments agreed at the World Summit on Sustainable Development (2002) on the maintenance or restoration of fish stocks by 2015, the maintenance of productivity and biodiversity in marine areas beyond national jurisdiction, and the establishment of representative networks of MPAs by 2012.

CCAMLR also co-operates with a number of other international organisations, including FAO, the International Whaling Commission (IWC), the Convention on International Trade in Endangered Species (CITES). Other RFMOs, particularly those covering neighbouring regions such as the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) and the South East Atlantic Fisheries Organisation (SEAFO), are also invited to participate in CCAMLR meetings.

CCAMLR Commission members have the opportunity to demonstrate leadership at the global level in the design and application of MPAs to support sustainable fisheries and wider biodiversity conservation goals. They can convert global commitments into practical, forward-looking and precautionary measures for application in the Convention area as provided in Antarctic legal instruments. Conversely, the experience of CCAMLR to date with area-based management measures, summarized below, can contribute to further development and application of these tools in other RFMOs and through global mechanisms.

2.3 Current provisions for MPAs in the CCAMLR context

Under the provisions of CCAMLR, a variety of area-based measures, including the designation of closed areas and special areas for protection, are available to be adopted by the Commission for the purposes of conservation, management and scientific study (CCAMLR, Article IX-2).

Closed Areas have to date been implemented only on a species-specific basis, and currently include certain statistical reporting areas or sub-areas in which directed fisheries for all fin-fish or for named species are prohibited (either year-round or seasonally), to allow stock recovery, prevent by-catch, protect spawning grounds, prevent unregulated fishing, or to allow time for scientific surveys to be carried out. However, none of these areas is closed to all types of fishing activity, and some regulations may only be in force for a limited number of seasons. Other conservation measures include closed seasons, catch and effort limits for particular species, restrictions on the number of vessels permitted to fish in each season, gear restrictions, limits on by-catch of other fish species, and measures to prevent by-catch of seabirds. In several sub-areas, fishing is prohibited in depths of less than 550 m in order to protect benthic habitats. Areas may also be closed immediately once catch limits or by-catch limits for fish or seabirds have been reached.

Small-Scale Research Units (SSRUs) are smaller divisions defined within some statistical areas on the basis of physical and geographical features including bathymetry, location of fisheries, distribution and abundance of target and by-catch species and the impact of sea-ice on fishing practices (CCAMLR, 2003). These are used to apply restrictions and research requirements for new and exploratory fisheries. For example, Conservation Measure 41-09 (2005) specifies catch limits for *Dissostichus* spp. in twelve SSRUs within sub-area 88.1 (Balleny Islands / Ross Sea). In four of these SSRUs, the catch limit is set at zero, thus effectively closing particular areas to fishing for these species. Similarly, fifteen Small-Scale Management Units (SSMUs) have been defined within Area 48 to facilitate management of

the krill fishery (CCAMLR, 2004). The precautionary catch limit in this region will be divided among the SSMUs with the aim of distributing fishing effort to reduce the potential for localised depletion of krill populations and effects on land-based predators. Examination of the krill catch by SSMU, and further monitoring of indicator species, will be valuable in providing information on whether and how the fishery overlaps with land-based predators.

The only areas to be given the title 'protected' under the provisions of CCAMLR are CCAMLR Ecosystem Monitoring Programme (CEMP) sites afforded special, additional protection. The CEMP monitors indicator predator and prey species at several sites to detect and record changes in stocks, and to distinguish between naturally occurring changes and those resulting from harvesting. CEMP sites may be given protected status under conservation measures, and as such require a permit for entry. Two CEMP sites have been afforded protection, one of which (Cape Shirreff) has also been designated as an ASPA under the Madrid Protocol. With the elaboration of management strategies in SSMUs, there may be potential for CEMP sites and protected areas to become more closely linked with monitoring in offshore areas. There is also scope for additional CEMP sites to be designated as ASPAs, and for further co-ordination between the two systems in terms of strategic area selection for the study and protection of land-based predators and their foraging areas.

Marine reserves within the CCAMLR area in which all fishing is prohibited have been designated in EEZs under national jurisdiction (for example the Heard and McDonald Islands Marine Reserve, designated by Australia in 2002), although no such reserves have yet been proposed for high seas areas within the CCAMLR area. Nevertheless, the experience within national jurisdiction may provide guidance for similar designations outside national jurisdiction, or adjoining existing EEZ MPAs.

The entire area covered by the Convention could be considered to have a level of protection similar to an IUCN Category IV (Habitat/Species Management) protected area, because of the level of management it provides. Individual statistical areas, sub-areas, SSRUs and SSMUs could also be regarded as MPAs in their own right given the various restrictions applied there, and their provisions demonstrate CCAMLR's experience with area-based conservation measures. Despite the availability of this range of protection and management tools, CCAMLR has not made any specific 'marine protected area' designations. No areas of fishing activity have been permanently closed to all types of living resource extraction.

However there is scope for areas to be afforded a wider range of protective measures on a more permanent basis, including IUCN category I (strictly protected) areas, to achieve further MPA objectives relating to ecosystem, habitat and biodiversity protection. The existing mechanism of attaching conservation measures to defined geographical management units is a useful starting point for further development of MPA tools and implementation systems. Recent discussions on the development of MPAs within the CCAMLR context have progressed this issue considerably.

2.4 Background to the CCAMLR Workshop on MPAs

Until recently, there had been very limited discussion of the potential for development of MPAs under CCAMLR, and little consideration of the responsibility of the Commission to address this issue. An Advisory Subgroup on Protected Areas was formed in 1992, in order to consider CEMP sites and CEMP protected areas, and to review ASPA and ASMA proposals, providing advice on these through the Working Group on Environmental Monitoring and Management (WG-EMM) to the Scientific Committee. However, it was not until 2004 that this group expanded its terms of reference to include the development and review of case studies relevant to proposals for different types of MPA, such as areas of exceptional biodiversity, and habitats such as seamounts with unique or diverse biological assemblages.

At the 2004 Meeting of the CCAMLR Commission, it was agreed that the Scientific Committee should address the issue of MPAs as a matter of priority. Discussions on MPAs within CCAMLR had previously focused mainly on procedures for development, review and adoption of MPAs in collaboration with the Antarctic Treaty, and formal consideration of how CCAMLR itself should address MPA development had not yet been undertaken. The agreement in

2004 to convene a workshop on MPAs was therefore a major step forward for Antarctic marine protection, as well as an important milestone in work towards high seas MPAs worldwide.

3. CCAMLR Workshop on MPAs: summary of discussions

The CCAMLR workshop on MPAs was held in Silver Spring, MD, USA, from 29 August to 1 September 2005. It was attended by delegates from Australia, Belgium, Chile, Japan, New Zealand, Russia, South Africa, Sweden, the United Kingdom, and the United States, as well as an invited expert from IUCN.

The terms of reference for the workshop were as follows:

- i) to review current principles and practices related to the establishment of MPAs;
- ii) to discuss how MPAs could be used to contribute to furthering the objectives of CCAMLR;
- iii) to consider proposals that are currently under development or in a conceptual phase that relate to MPAs in the Convention Area;
- iv) to discuss the types of scientific information that may be required for the development of MPAs to further the objectives of CCAMLR, including the identification of biophysical regions across the Convention Area.

3.1 Review of current principles and practice

Discussion of the broader principles of MPA development included consideration of background material providing information and guidance from MPA experiences elsewhere in the world. The workshop initially reviewed the concept of MPAs within the context of the objectives and obligations of CCAMLR and agreed that MPAs encompassed a range of mechanisms that could be used to help meet CCAMLR objectives. The basic objective of CCAMLR is established in Article II of the Convention as the conservation of Antarctic marine living resources (where conservation includes rational use). Article IX of the Convention further specifies the ways to give effect to this objective through the use of conservation measures, specifically including the opening and closing of areas, regions or sub-regions for the purposes of scientific study or conservation, including special areas for protection and scientific study. Although CCAMLR has used closed areas to support its precautionary approach to managing fin-fisheries, these have not been established for broader purposes relating to MPAs. However, the workshop recognized that this existing framework provides a useful starting point for the development of MPAs.

The potential benefits of MPAs for biodiversity conservation, minimization of impacts of harvesting on non-target species, and protection (including restoration) of stocks and life history stages of target species were noted, and the workshop recognized that CCAMLR had a particular responsibility for participating in international discussions on the use of MPAs to achieve such objectives. It was also recognized that many (if not most) CCAMLR Members have existing commitments to the establishment of representative networks of MPAs (for example in respect of the Convention on Biological Diversity, World Summit on Sustainable Development, World Parks Congress etc.). The need to develop a strategic approach to MPA design and implementation throughout the Convention Area was highlighted, as was the need for a harmonized regime for protection of the marine environment across the Antarctic Treaty System (that is, harmonized with measures taken under the Antarctic Treaty and in accordance with the Madrid Protocol on Environmental Protection). The meeting also recognized the strong need for collaboration at technical and policy levels to further develop the MPA concept in the Southern Ocean.

In relation to existing provisions under CCAMLR, it was agreed that the Convention Area as a whole would qualify as an IUCN Category IV protected area (Habitat/Species Management Area: protected area managed mainly for conservation through management intervention) (IUCN, 1994). Within this, additional protection, including strictly protected (IUCN category 1) MPAs where appropriate and necessary, would be established as required, in accordance with criteria to be developed and agreed.

The Heard Island and McDonald Islands (HIMI) Marine Reserve established by Australia in 2002 is an area under national jurisdiction within the CCAMLR area, but it provides a good example of the type of approach that might be used to establish MPAs in the high seas. The HIMI Marine Reserve (AAD, 2005), and the Australian experience with establishing its National Representative System of MPAs (NRSMPA), (ANZECC TFMPA, 1998), were agreed by the workshop to be valuable models for the identification and selection of MPAs. In particular, the principles of comprehensiveness, adequacy and representativeness (referred to as the CAR system), were agreed to have application for the development of MPAs in the Southern Ocean, together with the use of precautionary approaches, wide consultation with interest groups, flexible decision making and review procedures, and the capacity to designate areas for interim protection.

3.2 Types of areas to be considered for protection

Discussion of the types of areas to be considered for protection focused on the agreed conservation outcomes of maintenance of biological diversity and ecosystem processes. It was agreed that attention may need to be given to, *inter alia*, protection of:

- i) Representative areas;
- ii) Scientific areas to assist with distinguishing between the effects of harvesting and natural ecosystem changes, and to provide opportunities for understanding of the Antarctic marine ecosystem in areas not subject to human interference;
- iii) Areas potentially vulnerable to impacts by human activities, to mitigate those impacts and/or ensure sustainability of the rational use of marine living resources.

The inclusion of scientific areas for protection is particularly important to improve understanding of the function and effects of MPAs. Such areas may not be under any current threat, but their protection as reference areas will provide important data for use in further refining the procedures for selection and implementation of MPAs, both in the Southern Ocean and elsewhere.

It was also noted that some areas in the Southern Ocean may have predictable features that are critical to the function of local ecosystems, and that such areas would be appropriate to include in a system of protected areas.

These area types are consistent with the criteria defined in Annex V of the Madrid Protocol for areas to be designated as ASPAs. It was noted that protection for such areas would need to be indefinite, or sufficiently long-term to satisfy their objectives, and that this protection would be equivalent to that provided by IUCN category 1 protected areas. Such areas could be designated using the existing CCAMLR provisions for closed areas, and are termed 'Specially Protected Areas'. The need for the Commission to achieve satisfactory fishery outcomes in terms of sustainable rational use was also highlighted, and it is important that any process for establishing a system of protected areas has regard for this objective of the Commission.

The potential need for interim protection to be afforded to areas identified as candidate sites, but where more information is required before a conclusion on protection can be reached, was also recognized. Following the approach taken by Australia in the HIMI Marine Reserve, these areas are termed 'Conservation Zones'. This type of interim protection would be consistent with CCAMLR's precautionary approach, and would allow for fisheries exploration and scientific activity to be limited to levels necessary to obtain the required data. Interim protection may be short or long-term, but would be sufficient to ensure the protection of future options while data collection and decision processes are completed.

The need for interim, precautionary action under existing instruments, and also through voluntary state actions has been highlighted at recent international meetings on high seas marine protection, in particular during discussions at the recent International Marine Ecological Experts' Workshop (Ottawa, Canada, 2005). This is a particularly important concept for global high seas protection strategies, to allow for the maintenance of future

options while approaches to protection are refined and agreed, and possible new legal mechanisms are considered.

An additional category of 'Fisheries Closed Areas' would remain available for the designation of closed areas specifically for achieving fisheries objectives. These would be considered separately by the respective working groups of the Scientific Committee, although full co-operation and co-ordination with any work to develop Specially Protected Areas or Conservation Zones would be essential to achieve a comprehensive system of protection and management. This concept is particularly relevant in highlighting the importance of a co-ordinated approach to addressing both fisheries management and biodiversity conservation objectives in high seas areas.

3.3 Scientific information required for the development of MPAs and identification of biophysical regions

During the Workshop, consideration was given to the types of scientific information that would be required for the development of a system of MPAs within the Convention Area, and in particular to assist with the identification of biophysical regions. Specific biological and physical data types, as well as information on existing and potential pressures, were identified using experience from similar studies undertaken in the Southern Ocean and elsewhere. It was agreed that a workshop would be held in 2007, with the aim of advising on a bioregionalisation of the Southern Ocean and potential areas for protection. To this end, it was recommended that a Steering Committee be established to direct work towards this goal. Key tasks to be undertaken include the following:

- Collation of existing data on coastal provinces, including benthic and pelagic features and processes
- Determination of the analyses required to facilitate a bioregionalisation, including the use of empirical, model and expert data
- Development of a broad-scale bioregionalisation of the Southern Ocean, based on existing datasets
- Delineation of fine-scale biogeographic provinces within regions, where possible
- Establishment of a procedure for identifying areas for protection to further the conservation objectives of CCAMLR.

This process relates primarily to the identification of representative areas for protection, however additional scientific data may be required to select and define areas for the protection of scientific and vulnerable areas, as well as areas requiring interim protection. Ideally, work towards the identification of these different area types should proceed in parallel, resulting in a comprehensive evaluation of candidate areas for protection to achieve different objectives.

The scientific information identified by the Workshop for use in this process included data types used in development of the HIMI Marine Reserve, and also in the proposed Prince Edward Islands (PEI) Marine Reserve currently being developed by South Africa. Both physical and biological data can be used to delineate important patterns, areas in which important processes occur, and areas where pressures may be arising now or in the future. Physical data include bathymetry, geological features, climate, ice conditions, and oceanographic characteristics such as temperature, salinity, currents and upwelling areas. Biological data include primary and secondary production, distribution of benthic and pelagic species (including birds and mammals), and habitat features. Additional information on fishing patterns, by-catch, pollution and other human activities would also help to identify existing or potential pressures.

4. Bioregionalisation of the Southern Ocean

The bioregionalisation process identified by the CCAMLR MPAs Workshop will be one of the fundamental steps towards developing a systematic network of MPAs in the Southern Ocean. It will also have significance as a test case for similar approaches to be taken in other high seas areas. Bioregionalisation studies have been undertaken elsewhere at a national level, however such studies have not yet been undertaken for areas on the scale of the Southern Ocean, or for areas outside national jurisdiction. If successful, the studies undertaken for the Southern Ocean may provide valuable experience on approaches to MPA selection within a large, high seas region, and also on the best ways to facilitate international co-operation on such projects.

The following sections provide some background to the concept of bioregionalisation, and outline some of the requirements for further work on this process.

4.1 Background to the concept of bioregionalisation

Bioregionalisation is identified in the CCAMLR MPAs Workshop Report (2005) as:

“...a process to classify marine areas from a range of data on environmental attributes. The process results in a set of bioregions, each reflecting a unifying set of major environmental influences which shape the occurrence of biota and their interaction with the physical environment”.

(adapted from: Interim Biogeographic Regionalisation for Australia (IBRA) 1997).

Bioregionalisation is one of a range of processes that can provide a framework for decision support purposes. It can offer a scientific basis for further decisions on the design of protected area systems, particularly relating to the selection of representative areas. However, it does not provide a complete mechanism by which an MPA system can be designed, and there is a need for elaboration of further procedures for selection, area design and implementation.

Bioregionalisation studies have already been employed in the Southern Ocean for the development of management plans for the HIMI Marine Reserve and the PEI Marine Reserve currently under proposal by South Africa. For the HIMI Marine Reserve, analysis of physical and biological data, together with consideration of the ecology of these areas, identified thirteen biophysical units within the HIMI EEZ (Meyer *et al*, 2000). Using this information, the Australian NRSMPA principles (comprehensive, adequate and representative) and established selection criteria were used to define the reserve configuration. South Africa has drawn on the Australian approach in its development of the PEI Marine Reserve, collating existing spatial information and identifying important physical and biological patterns and processes to inform the design of the reserve.

On a larger scale, a comprehensive bioregionalisation study was undertaken for Australia's EEZ waters in its Interim Marine and Coastal Regionalisation (IMCRA, 1998), which has contributed to the ongoing development of Australia's NRSMPA. The aim is to include within the NRSMPA the full range of ecosystems across each identified bioregion. This example, and others, are likely to contribute significantly to the development of a bioregionalisation process for the Southern Ocean.

4.2 Requirements for further work on this process

However, the unique nature of the Antarctic marine environment may necessitate the development of novel approaches in addition to those used elsewhere. In particular, the sparseness of data (especially biological information) is likely to influence the feasibility of certain types of analysis. Appropriate methods will need to be developed to take into account these special considerations.

The CCAMLR Workshop highlighted the need for a procedure to identify areas for protection within the bioregionalisation framework, however this has not yet been elaborated. Further work to assist in the identification of candidate areas might include the use of selection criteria, and the definition of other procedures by which areas can be selected to form part of a representative system.

A large amount of work has been carried out by various other organisations, agencies and nations on defining criteria for the selection of MPAs (see Dearden and Topelko (2005) for a summary of relevant criteria systems). Criteria are used to ascertain the extent to which stated objectives are met by a particular site, and can be used to choose objectively between, or prioritize, candidate sites. The application of criteria in this way is a valuable tool with which the process of MPA selection can be standardized. The recent International Marine Ecological Experts' Workshop (Ottawa, 2005) discussed this issue in detail and identified a series of science-based criteria for identifying ecologically and biologically significant areas. Further international discussions on the definition and use of selection criteria are likely to provide important input into this aspect of CCAMLR's future work.

4.3 Involvement of collaborators from outside CCAMLR on proposed bioregionalisation work

The CCAMLR Workshop recognized the need for external expertise in developing a bioregionalisation work program, and particularly noted the value of co-operation with the Committee on Environmental Protection (CEP), an advisory body established under the Madrid Protocol. The importance of obtaining input from external experts was also highlighted, and this will be particularly relevant when considering whether and how methodologies used elsewhere might be adapted for use in the Southern Ocean context. Useful experience can be drawn from bioregionalisation studies undertaken elsewhere by national programs and also by international organizations such as IUCN. Other potential collaborators include the Scientific Committee on Antarctic Research (SCAR), the Scientific Committee on Oceanic Research (SCOR), and CCAMLR observers including IGOs and NGOs.

The involvement of outside experts will have the additional advantage of allowing wider international co-operation on this issue, thus broadening experience on high seas MPAs worldwide, and facilitating the sharing of practical knowledge with others working to develop similar systems elsewhere.

5. Implications for future work

5.1 Priorities for future work within CCAMLR

The key tasks described in Section 3.3 focused mainly on the development of a bioregionalisation for the Southern Ocean. However, work on other aspects of MPA development must also proceed in parallel, to assist and enhance this process.

In addition to the identification of representative areas, it is important that CCAMLR works towards the selection of other area types as listed in Section 3.2. The selection of scientific areas may be dependent on specific knowledge of a particular area, and protection may need to be tailored according to the requirements of ongoing scientific work, or of research questions relating to the function and effects of MPAs. Vulnerable areas may also be selected according to specific knowledge of threatening activities or other pressures, and data on the location of unique or fragile habitats and species where available. There is particular scope for further work to identify potentially vulnerable areas such as seamounts, though directed research. The availability of interim protection for such areas will be an important tool in allowing further data collection.

Related to this, it is important for CCAMLR to further define the tools and procedures to be used for the establishment of MPAs. Although three protected area categories have been recommended, based on the existing provisions for closed areas (see Section 3.2), there is a need to elaborate specific provisions and regulations for each area type. This may include addition provisions for zoning of areas, to allow a range of permitted activities and levels of protection to be defined.

Experience elsewhere, for example with the HIMI and PEI Marine Reserve proposals, has shown that wide consultation with appropriate interest groups and stakeholders is key to the development of an effective protected area management plan. CCAMLR must develop a

system to allow flexible decision-making and review procedures, to ensure that protection is designed with the maximum input and support.

5.2 Scope for improved links with the Madrid Protocol

In view of the special relationships between CCAMLR and the wider Antarctic Treaty System, it is important that CCAMLR takes a leading role in the development of MPAs, in co-operation with the other instruments of the Antarctic Treaty System. In particular, there is a need for well-defined processes to select and designate MPAs within the institutional frameworks of both CCAMLR and the Madrid Protocol. This may require further clarification of how the marine ASPA and ASMA categories can contribute to CCAMLR objectives, and fit into the suite of available MPA tools.

It is important that those who take part in CCAMLR Commission discussions on this issue maintain a dialogue with those who take part in relevant discussions at Antarctic Treaty Consultative Meetings to ensure coordinated use of all available MPA tools. Dialogue and coordination is needed both at the national level, and between the advisory and decision-making bodies of the Antarctic Treaty and CCAMLR.

The establishment of a Steering Committee to direct further work relating to bioregionalisation of the Southern Ocean will be an important step towards this harmonization of approaches to MPA development across the Antarctic Treaty System. The Committee will include members from both CCAMLR and the CEP, thus employing expertise from both sides. This type of joint approach is a crucial precedent for the way in which high seas MPA development might operate elsewhere, under the jurisdiction of both a fisheries management organisation and a wider conservation instrument.

5.3 Funding considerations

The achievement of an MPA network in the CCAMLR Convention Area will rely heavily on the availability of adequate funding. In the short term there is an urgent need for financing of work towards bioregionalisation of the Southern Ocean, and the convening of a workshop on this topic. Further financing of the development and implementation of high seas MPAs will also need to be addressed in the medium to long term. The sources of such funding could be varied, and might include governments, international and regional bodies, private companies and NGOs. In 2005, Belgium established a special fund within CCAMLR specifically to contribute to furthering the process of establishing MPAs in the CCAMLR Convention Area.

6. CCAMLR contributions to wider discussion on high seas MPAs and conservation of marine biodiversity beyond national jurisdiction

Continuing work by CCAMLR on MPAs will be an important contribution towards global debates on high seas marine protection, in particular towards further FAO work on MPA development and fisheries management, and the commitment to establish representative networks of MPAs by 2012 as set out by the World Summit on Sustainable Development. It is hoped that progress within CCAMLR will also be of interest to forthcoming international meetings discussing various aspects of protection and management in the high seas.

There is significant potential for concepts and models currently being developed by CCAMLR to be used in high seas MPA development elsewhere, and to provide guidance for ongoing international discussions on the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. They may also be adapted for use by other RFMOs within the context of their own mandates. While many other RFMOs do not yet have the legal frameworks necessary to implement protected areas, nor the mandate to take an ecosystem approach to protection and management of marine living resources, CCAMLR can provide an important model for how these might be achieved.

6.1 Relevance of CCAMLR developments to work undertaken in CBD context on MPAs beyond national jurisdiction

The seventh meeting of the Conference of the Parties to the Convention on Biological Diversity (COP VII, Kuala Lumpur, 2004) agreed that there is an urgent need for international cooperation to improve conservation and sustainable use of biodiversity in marine areas beyond national jurisdiction, including through the establishment of further marine protected areas, consistent with international law and based on scientific information. COP VII also established an *Ad Hoc* Open-ended Working Group on Protected Areas (PAWG), whose objectives include working towards the establishment and maintenance of marine protected areas by 2012 to form part of representative systems, and to contribute to the objectives of the CBD in reducing the current rate of biodiversity loss.

The first meeting of PAWG (Montecatini, Italy, June 2005) discussed options for co-operation on the establishment of MPAs in areas beyond national jurisdiction, and produced a series of recommendations on how this might be achieved. It was agreed that the establishment of marine protected areas beyond the limits of national jurisdiction could benefit from ecological criteria for the identification of areas for protection, and that there is a need for co-operation among various forums for the establishment of MPAs. A major outcome from this Working Group was the agreement to hold a workshop for scientific experts to review and assess existing ecological criteria and biogeographical classification systems, and to initiate work on the development of a set of scientifically rigorous ecological criteria that could be used to identify potential sites for marine protected areas beyond the limits of national jurisdiction.

The International Marine Ecological Experts' Workshop (Ottawa, Canada, December 2005) concentrated on the identification of criteria for "ecologically and biologically significant areas" (EBSAs) in need of higher levels of protection. The need for clear criteria to identify areas of special value or vulnerability was widely supported. This has direct relevance to the current work of CCAMLR, and as this work progresses it would be useful to maintain an exchange of information between those working in the CCAMLR context and experts developing criteria systems elsewhere. Given its existing legal frameworks and current progress towards the identification of candidate MPAs, the Southern Ocean may provide a useful test case for the application of criteria that have been developed elsewhere.

7. Conclusions

This paper has summarized the recent advances made by CCAMLR on the development of a comprehensive MPA system for the Southern Ocean. It has highlighted many of the unique characteristics of the Antarctic situation in terms of its system of governance and approaches to fisheries management, but has also demonstrated the similarities of this area with other high seas regions. The recent progress made within the Antarctic context should encourage other international bodies to consider similar action, and to co-operate where possible to allow for the greatest exchange of information and best-practice experience. Through its unique position both within the Antarctic Treaty System and among RFMOs, CCAMLR has an important role to play in developing MPA tools and contributing to wider experience on their development and function.

MPAs are a focus for co-operation and co-ordination in areas outside national jurisdiction, and can be used to achieve a suite of objectives ranging from fisheries management to biodiversity conservation and scientific study. In order to achieve maximum benefits, it is important to ensure that high seas MPAs (both within the CCAMLR area and elsewhere) are implemented within, and contribute to, a wider framework of ecosystem and precautionary approaches to fisheries management. MPAs are only one of a range of available tools for fisheries management, and must be appropriately applied in relation to other measures.

CCAMLR is uniquely positioned to test a variety of MPA tools in the Southern Ocean, in conjunction with its existing fisheries management frameworks. Furthermore, it already has the institutional frameworks necessary to undertake further research into the potential role of MPAs in conservation and sustainable use of marine biodiversity, especially in areas beyond national jurisdiction. Developments under CCAMLR can thus contribute significantly to the practical implementation of global commitments established by UNCLOS, the UN Fish Stocks

Agreement and FAO Code of Conduct, the Convention on Biological Diversity, the World Summit on Sustainable Development and the UN General Assembly.

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Appendix 1: Map of Antarctica and the Southern Ocean showing the boundaries of the Antarctic Treaty Area and the CCAMLR Area, and the approximate position of the Polar Front

