

CCAMLR's Application of the Precautionary Approach¹

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Abstract.- Article II of the CCAMLR Convention sets out the principles of conservation under which all harvesting and associated activity in the Convention Area shall be conducted. The three principles are 1) prevention of population decline to levels which threaten stable recruitment of harvested species, 2) maintenance of ecological relationships between the harvested, dependent and related species, and 3) minimization of the risk of ecosystem changes that are not potentially reversible in 20-30 yrs. These principles form the basis for the application of the Precautionary Approach in the management of Antarctic fisheries.

To support the management decisions taken by the Commission in its attempts to meet the aims of Article II, the scientific bodies of CCAMLR - the Scientific Committee and its Working Groups - undertake annual assessments of population status and trends of both harvested and dependent species. The methods used to assess the effects of harvesting activities have become increasingly sophisticated in recent years. A framework has been developed under which long term annual yields are assessed against the objectives of protection of the spawning stock and provision for the requirements of dependent predators. These objectives are expressed in terms of probabilistic decision rules, including limit reference points adopted by the Commission, based on the advice of the Scientific Committee. This represents a more comprehensive treatment of uncertainty than previously achieved, as envisaged in the Precautionary Approach.

CCAMLR has also developed mechanisms for the precautionary management of new and developing fisheries. Since 1991, CCAMLR has included a specific provision in its regulatory instruments (conservation measures) for the rational and responsible control of the development of new fisheries in the Convention Area. In 1993 this was supplemented with a measure which defines exploratory fisheries and provides guidelines for their management. At its most recent meeting, the Commission acknowledged the need to consolidate these initiatives into a unified regulatory framework which would provide guidelines for the management of fisheries throughout their existence, whatever their stage of development.

Introduction

The signing of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) can be considered, in itself, as an application of the Precautionary Approach³ by the international community. In the mid 1970's serious concerns were raised about the future management of Antarctic marine living resources. Of particular concern was the expansion in harvesting of krill *Euphausia superba*, the conservation of which is considered to be fundamental to the maintenance of the Antarctic marine ecosystem and vital to the recovery of depleted whale populations. In addition, large scale exploitation of fish stocks had started at the end of the 1960's and there was already evidence of major stock decline. For example the catch of the marbled rock cod, *Notothenia rossii* declined from 400,000 tonnes in the

1969/70 season to 100,000 tonnes the following year, and zero from 1972/73 to 1974/75. The drop in catch was the result of declines in both fishing effort and catch per unit effort. Despite no directed fishing on this species for more than a decade, there has been no appreciable recovery of the stock abundance to former levels.

These concerns were addressed by the Antarctic Treaty nations in a series of international meetings which lead to the drafting and ultimately the signing of the Convention in May 1980. The Convention came into force in 1982. Since that time the Commission for the Conservation of Antarctic Marine Living Resources has met annually at its headquarters in Hobart, Tasmania. The Commission operates as a body which attempts to

¹ Amongst other texts, this paper draws on material in the CCAMLR document 'Understanding CCAMLR's Approach to Management' SC-CAMLR-XVI/BG/15, CCAMLR 1997.

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³ As elaborated by the FAO/Government of Sweden Technical Consultation on the Precautionary Approach to Capture Fisheries (Including Species Introductions), Lysekil, Sweden 6-13 June 1995.

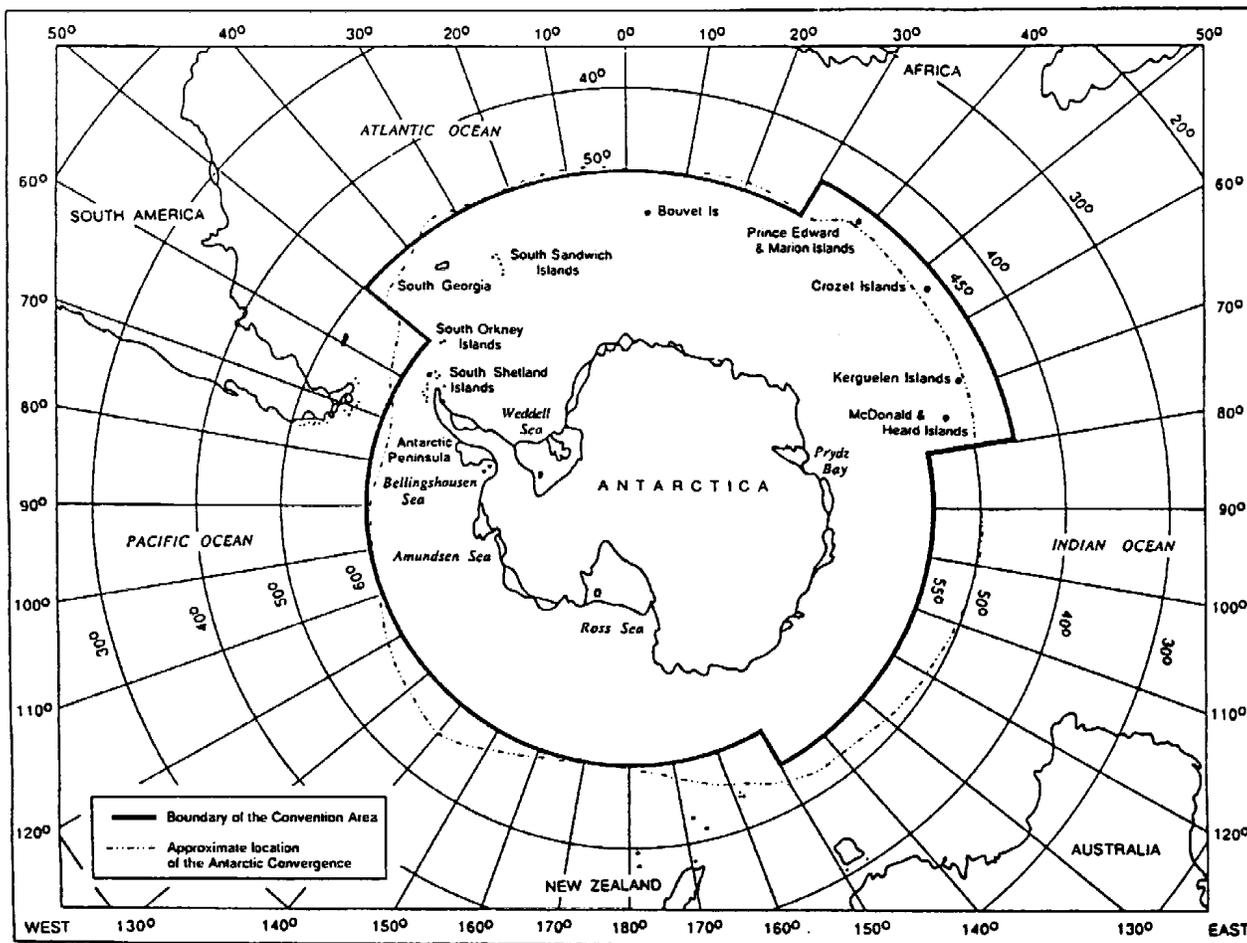


Figure 1. The Southern Ocean showing the boundary of the area covered by the Convention for the Conservation of Marine Living Resources.

come to agreement on issues which Members are then under obligation to implement. Decisions of the Commission on matters of substance, such as the setting of conservation measures, are taken by consensus. The major innovation of CCAMLR is that it is not only concerned with the regulation of harvesting activity, but has a mandate to conserve the ecosystem as a whole.

The Convention Area which CCAMLR seeks to regulate is essentially the Southern Ocean, which is bounded to the south by continental Antarctica and to the north by the Antarctic Convergence. The latter is located between 47 and 63 degrees south, depending on longitude and season. The administrative boundary of the Convention Area roughly follows the position of the Antarctic Convergence varying from 45° S in the Indian Ocean sector to 60° S in the Pacific Ocean Sector (Figure 1). The Convention Area contains a number of sovereign sub-Antarctic islands.

A substantial proportion of the work undertaken by CCAMLR, including the drafting of the Convention, predates the formal application of the term Precautionary Approach to fishery management. There is consequently

no mention of the term in the CCAMLR documentation. Nevertheless, most, if not all of CCAMLR's resource management activities have been in accordance with the intent of the formalisation of the Precautionary Approach. In fact, it is probably fair to say that the CCAMLR experience has helped to shape much of the current thinking behind the Precautionary Approach.

After explaining briefly the basis for CCAMLR's approach to management, this paper focuses mainly on two aspects of CCAMLR's work which are of direct relevance to the Precautionary Approach. These are firstly the assessment of appropriate catch limits in accordance with the criteria laid out in the Convention, including the taking into account of uncertainty, and secondly the management of the development of new and exploratory fisheries in the Convention Area.

Principles of Conservation

The principles of conservation governing all harvesting and associated activity in the Convention Area are set out in Article II of the Convention. Paraphrasing, the three principles are

- (i) prevention of population decline to levels which threaten stable recruitment of harvested species,
- (ii) maintenance of ecological relationships between the harvested, dependent and related species, and
- (iii) minimization of the risk of ecosystem changes that are not potentially reversible in 20-30 yrs.

These guiding principles underpin the essential elements of CCAMLR's approach to management. They encompass both the Precautionary Approach, in that prudent foresight should be exercised in avoidance of the taking of decisions which have a high risk of long term adverse effects, and an ecosystem approach, in the adoption of precautionary catch limits aimed at ensuring that the effects of fishing on prey abundance are limited to a level which will be unlikely to have a major impact on predators. Article II also makes it clear that the Convention includes the idea of 'rational use' of resources. In accordance with the Precautionary Approach, whilst uncertainty should not result in a delay in establishing management measures, this does not imply that no fishing can take place until all potential impacts have been assessed and found to be negligible.

The CCAMLR Management Mechanism

In setting conservation measures, including catch limits, the 23 Members of the Commission are advised by the Scientific Committee. The work of this Committee is supported by two subsidiary Working Groups; one on ecosystem monitoring and management (WG-EMM) and the other on fish stock assessment (WG-FSA). CCAMLR places substantial emphasis on scientific advice when debating conservation measures and other resource management requirements.

CCAMLR agreed the first conservation measure at its third meeting in 1984; a mesh size regulation for fin-fish trawlers. The following year saw the first closure of a fishery; the trawl fishery for *Notothenia rossii* around South Georgia, which is still closed today. The measure governing this closure has no time limit, meaning that it remains in force until there is consensus to revoke it. In 1986 a conservation measure was agreed which provided a framework within which, in subsequent years, conservation measures could be adopted specifying limitations of catch, or 'equivalent' measures, for species upon which fisheries were permitted around South Georgia, the main focus of fishing activity in the 1970's and 1980's (Statistical Subarea 48.3, Atlantic sector of the Southern Ocean). This was a significant step forward, because it set the precedent for CCAMLR to agree on measures, including total allowable catches (TACs), to limit the scope of exploited fisheries within the Convention Area.

Since that time, the basic format of conservation measures has been to specify:

- the fishery to which the measure applies, specified by species, Subarea (FAO convention) and sometimes gear type;
- the season to which the measure would apply (usually either the period between the end of one Commission meeting and the end of the meeting the following year, or some shorter period within that time frame);
- the TAC for the season; and
- the requirements for reporting data to the CCAMLR Secretariat during the fishing season, to enable it to monitor the progress of the fishery and issue a notice informing all Members of the closure of the fishery when a TAC is reached.

The last of these provisions was added when it became clear that in some cases the actual catch was exceeding the TAC before CCAMLR was able to take action to close the fishery. In addition to the flag state responsibility to report catch and effort data from commercial fisheries, CCAMLR also receives information from the Scheme of International Scientific Observation (the observer program), and fishery independent surveys and other scientific work carried out by Member States.

CCAMLR's application of the Precautionary Approach extends not only to managing fisheries in the single species sense, but also to making explicit allowance for the requirements of dependent species, and the uncertainty in ecological relationships within the Antarctic ecosystem. Monitoring of key dependent species is carried out under the CCAMLR Ecosystem Monitoring Program (CEMP). CEMP has two central aims:

1. to detect and record significant changes in critical components of the ecosystem to serve as a basis for conservation, and
2. to distinguish between changes due to harvesting of commercial species and changes due to environmental variability.

To meet Aim 1, selected life history parameters such as abundance, distribution, feeding, reproduction, growth and condition are monitored for designated predator species, which are likely to reflect changes in the availability of harvested prey species, such as krill. Currently monitored species include crabeater and Antarctic fur seals, four species of penguins, the black browed albatross and two species of petrels. Monitoring is carried out by Member states at specially designated sites. To contribute towards Aim 2, prey species,

environmental factors and the links between these and predators are monitored. To mitigate against the difficulties imposed by the high level of complexity of the ecosystem, CCAMLR has adopted a strategic modeling approach. This uses computer simulation as a key tool in setting scientific priorities and developing management options. The aim is not to develop a comprehensive ecosystem model, but rather to develop simpler models for strategic purposes which capture important features of the ecosystem, whilst recognizing the multiple linkages which exist between components.

Taking uncertainty into account in resource assessment

In recent years the CCAMLR Working Groups have begun to utilize more sophisticated assessment methodologies, which include a more comprehensive treatment of uncertainty than previously achieved, as envisaged in the Precautionary Approach.

The method currently applied to krill (the krill yield model - Butterworth *et al* 1992) has its origins in an approach developed by Beddington and Cooke (1983). This approach derives a numerical factor (termed γ) which can be used to multiply a single estimate of biomass obtained from a survey before the onset of exploitation, to give an estimate of the potential annual sustainable yield. Given that a single biomass estimate is all that is available for krill in the Atlantic sector of the Southern Ocean, albeit from a survey undertaken after the onset of exploitation, this approach is appropriate. One essential feature of this approach is that the evaluation of potential yield is made on the basis of satisfying a risk criterion; in this case that, even under harvesting, the probability that spawning biomass falls below a level at which recruitment 'on average' might be impaired is kept small. The model is particularly sensitive to two key parameters; the natural mortality M and the variability in annual recruitment. Considerable effort has been directed at improving estimates of these parameters, mainly through the analysis of krill length data from research surveys.

CCAMLR has developed a three-part decision rule for determining the value of γ :

- (i) Choose γ_1 so that the probability of the spawning biomass dropping below 20% of its pre-exploitation median level over a 20 year harvesting period is 10%;
- (ii) Choose γ_2 so that the median escapement in the spawning biomass over a 20 year period is 75% of the pre-exploitation median level;
- (iii) Select the lower of γ_1 and γ_2 as the level of γ for the calculation of yield.

The first part of the decision rule considers krill only in the standard single species context. It aims to meet the requirement for stable recruitment in Article II by keeping the probability low of the spawning biomass dropping below a level at which the chance for successful recruitment might be impaired. The second part of the decision rule is a first attempt to give some explicit effect to the requirements under Article II to limit the effects on predators of harvesting their prey. Detailed modeling of how a fishery on a prey species might impact predators dependent on that species has yet to provide reliable quantitative results. This *ad hoc* approach is therefore being applied in the interim. Conventional fisheries management models suggest that if only single species considerations are pertinent then an appropriate target level for the ratio in part (ii) of the decision rule would be 50%. The best position for the predators might be no fishing at all on prey species (i.e. a ratio of 100%). 75% is therefore a compromise between these two levels. The third part of the decision rule involves the selection of whichever of γ_1 and γ_2 is limiting on the size of the yield.

Future development of this model is in two main areas. Firstly more data are becoming available to reduce the uncertainty in the input parameters and better understand the correlation between them. Secondly, and more importantly from the point of view of the ecosystem approach, is the refinement of krill/krill-predator models in order to provide a more scientifically defensible target krill escapement value.

The krill yield model has been generalized in order to explore its applicability to finfish fisheries in the Convention Area (the Generalized Yield (GY) model - Constable and de la Mare 1996). The same decision rule is applied, although the period of the simulation (20 years in the case of krill) may be varied depending on the generation time of the species being studied. Also for some species, such as the Patagonian toothfish *Dissostichus eleginoides*, a large predatory fish, the escapement criterion in part (ii) of the decision rule is not applicable because they are not an important prey species. Under these circumstances this criterion has been modified to maintain populations at the level likely to give the 'greatest net annual increment', conventionally assumed to be around 50% of the unexploited level. The computer program which implements the GY model allows the user to include a wide range of expressions of uncertainty in input parameters. One innovation in the model, compared to its predecessor, is that recruitment can be specified explicitly (with uncertainty), enabling the effects of given catch levels to be evaluated even though there have been no direct estimates of absolute abundance for the whole stock.

Prior notification and management of new and exploratory fisheries

Another important component of the CCAMLR management mechanism, which is directly relevant to the Precautionary Approach, is the controls placed on the development of new and exploratory fisheries in the Convention Area. In 1991 a conservation measure with indefinite duration was adopted, which defines what the Commission understands by New Fisheries, and specifies the criteria under which such fisheries will be allowed to develop (Appendix 1). In essence, no fishing activity on a species in a management area, using a particular gear type, which has not been fished before, can proceed without prior notification to the Commission. The Commission must be notified by the Member(s) intending to undertake New Fisheries in the Convention Area at least three months in advance of its next regular meeting to allow the proposal to be considered.

There is no specific mechanism within the New Fisheries measure by which the Commission can reject a proposal for new fishing activity. This could be done by adopting a separate conservation measure explicitly closing the fishery in question, before it has even opened, but in practice this is unlikely to happen, because such a measure would have to be agreed by consensus. The notification procedure does, however, provide an element of early warning of expansion of fishing within the Convention Area and affords the Commission the opportunity to comment on the planned activity. Among other things, the Commission would normally comment on the proposed harvesting method, the intended level of catch, the limit on and distribution of fishing effort, measures to avoid impacts on non-target species and the intended mechanism for the collection of data and information needed for the assessment of the future potential of the fishery. Once a plan for initiating a New Fishery has been approved by the Commission, it is embodied in the provisions of a separate conservation measure for the following season, which restricts fishing activity to the terms specified in the plan.

Two years after the adoption of the New Fisheries conservation measure, recognizing the need to control the *development* as well as the *initiation* of new fishing activity, the Commission adopted a measure covering Exploratory Fisheries (Appendix 2). This measure is of a similar form in that it first defines what the Commission understands by the term Exploratory Fisheries, and then goes on to explain what is required in terms of notification of the intent to enter such a fishery, and the preparation of data collection and fishery operations plans.

The Exploratory Fisheries measure is considerably more prescriptive than the New Fisheries measure. This

partly reflects the development of thinking within the Commission in the period between the meetings at which they were each adopted. However, both of these measures were designed with the intent that they would enable CCAMLR to control and monitor the initiation and development of new fishing activity in the Convention Area in the spirit of the Precautionary Approach. The control mechanism aims to prevent fisheries from expanding faster than the acquisition of information necessary for the development of management advice.

A large number of notifications for New and Exploratory fisheries, principally for toothfish (*D. eleginoides* and *D. mawsoni*) longline fisheries, were considered by the Commission at its meetings in 1996 and 1997. Advice was received from the Scientific Committee regarding appropriate precautionary catch levels and the limitation and distribution of fishing effort. There was clearly very little information on which to base this advice and much had to be gleaned from experience in other parts of the Southern Ocean. Precautionary catch limits were calculated on the basis of adjustments for seabed area, use of the GY model with input parameters selected as most appropriate for the area under consideration, and allowances for any information about recent catch history, including estimates of illegal and unreported catches. As a further precautionary measure, yields calculated in this way were reduced by multiplying them by an arbitrary discount factor. In 1997, the values applied were 0.45 for *D. eleginoides* and 0.3 for *D. mawsoni*, the latter reflecting the greater degree of uncertainty in the life history parameters of that species. The scientific view was that this calculation method was the best available given existing information, but the Scientific Committee emphasized that the precautionary limits estimated did not imply that such quantities of fish would necessarily be available for capture. In 1997, conservation measures specifying, *inter alia*, precautionary catch limits, season length, effort limitations and the requirement to carry CCAMLR designated scientific observers and satellite vessel monitoring transponders were adopted to apply to each new or exploratory fishery in the 1997/98 season. In addition a general measure specifying provisions for the distribution of fishing effort over as large a geographical and bathymetric range as possible, and a data collection plan, applicable to all new and exploratory fisheries was adopted. The results of the new and exploratory fisheries undertaken in the 1997/98 season will be analysed at the 1998 meeting of WG-FSA and advice for TACs and other management measures revised accordingly.

The New and Exploratory Fisheries conservation measures (Appendices 1 and 2) are currently under review, because although the intentions of the Commission in agreeing these two measures are reasonably clear,

their practical application is not without its problems. For example, there are no guidelines in the New Fisheries measure on how a fishery should be conducted during its first year of operation and how information should be collected and made available to CCAMLR. This has led to a wide range of interpretations amongst the Members of CCAMLR and a varying degree on detail in notifications submitted to the Commission. Considerably more guidance on notification requirements is included in the Exploratory Fisheries measure, but there is no formal relationship between this and the New Fisheries measure, nor clear understanding of how a fishery should progress from one stage to the next. A further deficiency of the present system is that there is no formal mechanism for the re-opening of fisheries which have been closed, nor for the resumption of those which have lapsed for reasons other than closure.

In recognition of these deficiencies, and the need to address the inter-relationship of all stages of fishery development, the Commission at its meeting in November 1997 requested Members to examine this matter before the next meeting. What is needed is essentially a unified regulatory framework which sets out guidelines for the assessment and regulation of fisheries at all stages of development. These guidelines should include agreed biological reference points for overfishing, as envisaged in the Precautionary Approach. The framework should be designed to meet two criteria: on the one hand to be sufficiently comprehensive to provide guidelines for the management of all existing and potential fisheries, and on the other to be adequately flexible to allow the Commission to adopt measures tailored to the specific needs of individual fisheries, on a case by case basis.

Other Examples of CCAMLR's Application of the Precautionary Approach

There are a number of other areas where CCAMLR has been pro-active in promoting the Precautionary Approach. Most notable amongst these are various measures aimed at the protection of non-target species, including bycatch limits, technical measures and season limitations to reduce incidental mortality of seabirds in longline and trawl fisheries, and a ban on the use of plastic packaging bands, in which marine mammals can become entangled, for bait boxes and other uses. CCAMLR has also taken steps in recent years to improve the transparency of its scientific work through the validation of models and computer programs used by the working groups and the establishment of a peer reviewed journal, *CCAMLR Science* for the publication of articles concerned with the conservation and rational utilization of Antarctic marine living resources.

Illegal and Unregulated Fishing

In practice, despite the good intentions of the New and Exploratory conservation measures, new fishing activity has been able to develop in an unregulated and uncontrolled manner in the Convention Area. For example, CCAMLR has been unable to control the 'gold rush' style expansion of the demersal longline fishery for toothfish in the Indian Ocean sector of the Southern Ocean. Despite the existence of measures restricting the level and distribution of fishing effort, there has been an unprecedented increase in unregulated fishing in this area over the last few years. CCAMLR has a System of Inspection under which Members can designate Inspectors. However, enforcement of CCAMLR conservation measures is largely a matter of flag state control - i.e. the Members must monitor the activities of vessels flying their flags, and impose sanctions on those found to be transgressing regulations that have been agreed by CCAMLR. There is a wide range of issues to be considered here, including the re-flagging of vessels to non-CCAMLR states, which are outside the scope of this paper. However, it is clear that if CCAMLR's intentions in adopting measures in accordance with the Precautionary and Ecosystem Approaches are to achieve their aims, some means of ensuring a much higher level of compliance will have to be found. A very useful first step was taken at the 1997 Commission meeting, which adopted a conservation measure that requires all Contracting Parties to the Convention to licence their vessels when they are operating in the Convention Area.

Conclusion

CCAMLR has clearly been a front runner in the development and adoption of management measures which conform to the philosophy of the Precautionary Approach. This is a particularly laudable achievement in the context of an international organisation with 23 Members and a system which requires decisions to be taken by consensus. However it is equally clear that CCAMLR faces major problems in the implementation and enforcement of its conservation measures, particularly with regard to the regulation and control of the expansion of new fishing activity in the Convention Area. The Commission has been quick to recognise this and applied itself to solving the problem at its meeting in November 1997. New initiatives adopted at that meeting include the requirement for Contracting Parties to licence their flag vessels when operating in the Convention Area, a resolution to establish, by the end of the Commission meeting in November 1998, an automated vessel monitoring system on such licenced vessels, with the exception of the krill fishery, and a scheme

to promote compliance by non-contracting party vessels with CCAMLR conservation measures. It will be necessary to build on these initiatives in subsequent years if CCAMLR is to achieve its aims.

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Appendix 1

CONSERVATION MEASURE 31/X^{1,2} Notification that Members are Considering Initiating a New Fishery

The Commission,

Recognising that in the past, Antarctic fisheries have been initiated in the Convention Area before sufficient information was available upon which to base management advice,

Noting that in recent years new fisheries have started without adequate information being available to evaluate either the fishery potential or the possible impacts on the target stocks or species dependent on them,

Believing that without prior notification of a new fishery, the Commission is unable to fulfil its function under Article IX, hereby adopts the following Conservation Measure in accordance with Article IX of the Convention:

1. A new fishery, for the purposes of this Conservation Measure, is a fishery on a species using a particular fishing method in a statistical subarea for which:
 - (i) information on distribution, abundance, demography, potential yield and stock identity from comprehensive research/surveys or exploratory fishing have not been submitted to CCAMLR;
 - or
 - (ii) catch and effort data have never been submitted to CCAMLR;
 - or
 - (iii) catch and effort data from the two most recent seasons in which fishing occurred have not been submitted to CCAMLR.
2. A Member intending to develop a new fishery shall notify the Commission not less than three months in advance of the next regular meeting of the Commission, where the matter shall be considered. The Member shall not initiate a new fishery pending the process specified in paragraphs 4 and 5 below.
3. The notification shall be accompanied by as much of the following information as the Member is able to provide:
 - (i) the nature of the proposed fishery including target species, methods of fishing, proposed region and any minimum level of catches that would be required to develop a viable fishery;
 - (ii) biological information from comprehensive research/survey cruises, such as distribution, abundance, demographic data and information on stock identity;
 - (iii) details of dependent and associated species and the likelihood of them being affected by the proposed fishery; and
 - (iv) information from other fisheries in the region or similar fisheries elsewhere that may assist in the valuation of potential yield.
4. The information provided in accordance with paragraph 3, together with any other relevant information, shall be considered by the Scientific Committee, which shall then advise the Commission.
5. After its review of the information on the proposed new fishery, taking full account of the recommendations and the advice of the Scientific Committee, the Commission may then take such action as it deems necessary.

¹ Except for waters adjacent to the Kerguelen and Crozet Islands.

² Except for waters adjacent to the Prince Edward Islands.

Appendix 2

CONSERVATION MEASURE 65/XII^{1,2} Exploratory Fisheries

The Commission,

Recognising that in the past, some Antarctic fisheries had been initiated and subsequently expanded in the Convention Area before sufficient information was available upon which to base management advice, and

Agreeing that exploratory fishing should not be allowed to expand faster than the acquisition of information necessary to ensure that the fishery can and will be conducted in accordance with the principles set forth in Article II,

hereby adopts the following Conservation Measure in accordance with Article IX of the Convention:

1. For the purposes of this Conservation Measure, exploratory fisheries are defined as follows:
 - (i) an exploratory fishery shall be defined as a fishery that was previously classified as a 'new fishery', as defined by Conservation Measure 31/X;
 - (ii) an exploratory fishery shall continue to be classified as such until sufficient information is available:
 - (a) to evaluate the distribution, abundance, and demography of the target species, leading to an estimate of the fishery's potential yield,
 - (b) to review the fishery's potential impacts on dependent and related species, and
 - (c) to allow the Scientific Committee to formulate and provide advice to the Commission on appropriate harvest catch levels, as well as effort levels and fishing gear, where appropriate.
2. To ensure that adequate information is made available to the Scientific Committee for evaluation, during the period when a fishery is classified as exploratory:
 - (i) the Scientific Committee shall develop (and update annually as appropriate) a Data Collection Plan, which will identify the data needed and describe the actions necessary to obtain the relevant data from the exploratory fishery;
 - (ii) each Member active in the fishery shall annually (by the specified date) submit to CCAMLR the data specified by the Data Collection Plan developed by the Scientific Committee;
 - (iii) each Member active in the fishery or intending to authorise a vessel to enter the fishery shall annually prepare and submit to CCAMLR by a specified date a Research and Fisheries Operations Plan for review by the Scientific Committee and the Commission;
 - (iv) prior to any Member authorising its vessels to enter an exploratory fishery that is already in progress, that Member shall notify the Commission not less than three months in advance of the next regular meeting of the Commission, and the Member shall not enter the exploratory fishery until the conclusion of that meeting;
 - (v) if the data specified in the Data Collection Plan have not been submitted to CCAMLR for the most recent season in which fishing occurred, continued exploratory fishing by the Member which failed to report its data shall be prohibited until the relevant data have been submitted to CCAMLR and the Scientific Committee has been allowed an opportunity to review the data;
 - (vi) fishing capacity and effort shall be limited by a precautionary catch limit at a level not substantially above that necessary to obtain the information specified in the Data Collection Plan and required to make the evaluations outlined in paragraph 1(ii);
 - (vii) the name, type, size, registration number, and radio call sign of each vessel participating in the exploratory fishery shall be registered with the CCAMLR Secretariat at least three months in advance of starting fishing each season; and
 - (viii) each vessel participating in the exploratory fishery shall carry a scientific observer to ensure that data are collected in accordance with the agreed Data Collection Plan, and to assist in collecting biological and other relevant data.
3. The Data Collection Plan to be formulated and updated by the Scientific Committee shall include, where appropriate:
 - (i) a description of the catch, effort, and related biological, ecological, and environmental data required to undertake the evaluations described in paragraph 1(ii), and the date by which such data are to be reported annually to CCAMLR;
 - (ii) a plan for directing fishing effort during the exploratory phase to permit the acquisition of relevant data to evaluate the fishery potential and the ecological relationships among harvested, dependent, and related populations and the likelihood of adverse impacts; and
 - (iii) an evaluation of the time-scales involved in determining the responses of harvested, dependent and related populations to fishing activities.
4. Research and Fisheries Operations Plans to be prepared by Members participating or intending to participate in the exploratory fishery shall include as much of the following information as the Member is able to provide:

- (i) a description of how the Member's activities will comply with the Data Collection Plan developed by the Scientific Committee;
- (ii) the nature of the exploratory fishery, including target species, methods of fishing, proposed region and maximum catch levels proposed for the forthcoming season;
- (iii) biological information from comprehensive research/survey cruises, such as distribution, abundance, demographic data, and information on stock identity;
- (iv) details of dependent and related species and the likelihood of them being affected by the proposed fishery; and
- (v) information from other fisheries in the region or similar fisheries elsewhere that may assist in the evaluation of potential yield.

¹ Except for waters adjacent to the Kerguelen and Crozet Islands.

² Except for waters adjacent to the Prince Edward Islands.