ANNEX E

REPORT OF THE MEETING OF THE WORKING GROUP FOR THE DEVELOPMENT OF APPROACHES TO CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES (WG-DAC)

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The Commission's Working Group for the Development of Approaches to Conservation of Antarctic Marine Living Resources (WG-DAC), chaired by Australia, met on 9 October 1989.

2. The Commission had agreed at CCAMLR-VII that the Working Group should communicate intersessionally concerning the future direction of its work (CCAMLR-VII, paragraph 150). Accordingly the Convener circulated a discussion paper (WG-DAC-89/3) proposing that the development of approaches to conservation for new and developing fisheries, other than krill, would be a suitable task for the Working Group to address at this year's meeting. It had also been agreed at CCAMLR-VII that some questions formulated by the Working Group should be directed to the Scientific Committee (CCAMLR/VII, paragraphs 140 to 141).

3. Two papers were submitted in response to the Convener's discussion paper, WG-DAC-89/4 and WG-DAC-89/5. These papers are attached as Appendices 1 and 2.

4. In presenting its paper (WG-DAC-89/5), Norway suggested that the general objectives of CCAMLR as set out in Article II of the Convention require an approach to fishery management basically different from that presently being applied in most regions of the world. Although multi-species models are being developed successfully in many regions, single species management systems will probably still be applied in the CCAMLR Convention Area for several years. An effective 'ecosystem approach' is still far away.

5. Norway also suggested that the development of an ecosystem conservation strategy in the Antarctic context requires extensive research, and that it is essential that the Commission draw on the expertise of the Scientific Committee and its subsidiary bodies to outline required scientific tasks and areas of immediate priority. In this context attention was drawn to:

(a) the scientific resources necessary to obtain the data required to implement an appropriate strategy; and

(b) the resources necessary to enforce conservation measures.

It was suggested that if lack of data prevents a more comprehensive conservation strategy, the introduction of precautionary conservation measures on an interim basis should be considered.

6. Norway also drew attention to the importance of exploratory fishing in allowing an evaluation of stock abundance and its composition, but noted that to prevent possible excessive catches, exploratory fishing needs to be conducted under some kind of control. Norway stressed the importance of some issues mentioned in the Convener's discussion paper where the advice of the Scientific Committee would be required and suggested that the Working Group specify questions that should be addressed by the Scientific Committee at its 1990 Meeting.

7. The Australian paper (WG-DAC-89/4) addressed the question of approaches to conservation of new and developing fisheries. The paper drew on submissions to the Working Group at CCAMLR-VII to derive a list of factors relating to the viability of fisheries and the maintenance of the Antarctic marine ecosystem which must be reconciled for the objectives of the Convention to be achieved. These are:

(a) the objectives of fishing operations;

(b) conservation of target species;

(c) maintenance of the relevant ecosystem;

(d) the objectives of other activities in that ecosystem; and

(e) the cost and feasibility of assessing the extent to which the various objectives are being met.

8. Australia suggested that the Commission should be notified of an impending fishery so that it may conduct a preliminary evaluation of the fishery, and formulate approaches to conservation before the fishery develops beyond the exploratory phase. In making this evaluation, Australia suggested that the Commission would need to have and consider the following information:

(a) the proposed fishing operation, including target species, methods of fishing, proposed region, and any minimum level of catches that would be required to develop a viable fishery;

(b) details of the stock size and general distribution, abundance and demography of the target species;

(c) a description of the components of the 'apparent' ecosystem which encapsulates the proposed fishery, highlighting those species at the primary level and their likelihood of

being affected in some way by the proposed fishery, including summaries of current applicable scientific knowledge; and

(d) a review of other fisheries that may have similar effects on the same or related components of the Antarctic marine ecosystem as the proposed fishery.

9. This paper suggested that the Commission's aim in considering this information would be to investigate an 'upper level' below which commercial development of the proposed fishery could begin. In addressing this question the Commission would need the advice of the Scientific Committee on two key questions:

(a) the types of information that are required to evaluate the potential yield of stocks; and

(b) the measures that could be useful for ensuring a suitable level of escapement of the target species from the fishery during the development phase.

On the basis of this information the Commission could determine the initial upper levels to fishing activity (in terms of catch, effort, area, time, or a combination of these) and appropriate management areas, and adjust management measures after assessment of the effects of fishing at the initial level.

10. These papers were noted with interest and it was agreed that the approach to be taken in relation to new and developing fisheries was a key issue for the Commission to consider, and one which required further discussion.

11. The responses of the Scientific Committee to questions posed in the CCAMLR-VII Report were not available in time for the Working Group to consider at its meeting.

12. A list of documents is attached as Appendix 3.

APPENDIX 1
(WG-DAC-89/4)

APPROACHES TO CONSERVATION IN NEW OR DEVELOPING FISHERIES

In fulfilling the objectives of the Convention for the Conservation of Antarctic Marine Living Resources, the Commission needs to adopt approaches to conservation for new or developing fisheries. This paper examines the development of a fishery in accordance with the ecosystem approach to management. It synthesizes points already raised in the submissions to the Working Group for the Development of Approaches to Conservation (WG-DAC) over the last two years and, from these, suggests a framework for the assessment and monitoring of the fisheries, the effects the fisheries have on the ecosystem and the extent to which the objectives of the Convention are being met.

2. The objectives and principles of conservation, fully set out in Article II, were summarized in paragraph 114 of CCAMLR-VI as:

(a) maintenance of ecological relationships;

(b) maintenance of populations at levels close to those which ensure the greatest net annual increment;

(c) restoration of depleted populations; and

(d) minimisation of the risk of irreversible change in the marine ecosystem.

The term 'conservation' includes rational use. The Commission (CCAMLR-VII, paragraph 139) agreed that, for the purposes of the Working Group, the definition of rational use includes the following elements:

(a) that the harvesting of resources is on a sustainable basis;

(b) that harvesting on a sustainable basis means that harvesting activities are so conducted as to ensure that the potential for achieving the highest possible long-term yield is preserved, subject to the principles of conservation above; and

(c) that the cost-effectiveness of harvesting activities and their management is given due weight.

3. Submissions to the first meeting of the Working Group at CCAMLR-VI implied that, for these objectives to be achieved, conservation approaches must reconcile the following factors concerned with the viability of fisheries and the maintenance of the Antarctic marine ecosystem:

(a) objectives of fishing operations;

(b) conservation of target species;

(c) maintenance of the relevant ecosystem;

(d) objectives of other activities in that ecosystem; and

(e) the cost and feasibility of assessing the extent to which the various objectives are being met.

4. The United Kingdom noted that 'the Commission must guard against the consequences of its own ignorance and cannot proceed on an assumption that an action now which is inconsistent with ... provisions of Article II is somehow acceptable because it might be reversible in 20 to 30 years' (WG-CSD-87/13). Other Members, including Argentina, Japan and the USA, have reiterated the need for the assembly of the best scientific evidence available for determining and evaluating approaches to conservation, required by Articles II and IX. The EEC mentioned that 'there is a need to ensure that a new fishery does not develop beyond the potential of the resource' (WG-CSD-87/7). In particular, the USA explicitly stated that for stocks in the undepleted state, 'the primary management strategy would be prevention of depletion ... based on long-term, theoretical principles' (WG-CSD-87/14).

5. In light of these discussions, the Commission's task concerning new or developing fisheries is to ensure that the amount of fishing that occurs in the developing phase is in accordance with the overall objectives of the Convention. This requires that catches do not develop to a level where there is a substantial risk that a stock is reduced to below the level giving the greatest net annual increment (GNA) before the potential long-term yield of the fishery can be evaluated. Consequently, we suggest that the Commission be notified of an impending fishery so that it may conduct a preliminary evaluation of the fishery and formulate approaches to conservation before the fishery develops beyond the exploratory phase.

NOTIFICATION

6. The Commission, in developing approaches to conservation for a particular fishery, needs to consider the best scientific information available on how the fishery will interact with the Antarctic ecosystem and other activities, as well as any difficulties that there may be in assessing the possible effects of the fishery on the target stock and dependent species. Details of the proposed fishing activity will set the agenda for the considerations set out in the five factors listed above. The details would need to include designation of the species to be targeted, the equipment to be used (e.g. vessel and gear types), the location in which the proposed fishing is to take place, and such details of the operational tactics that will determine when, where and how much of the target species will be taken. (This type of information on operational tactics has already shown its usefulness in developing an understanding of possible assessment methods for the krill fishery [SC-CAMLR-VII/BG/12 and 37]).

7. The type of approach chosen to conserve the target stock is also likely to depend on the long-term subsidiary objectives of the fishery, e.g. the rate at which the fishing could develop and whether it is preferable to maintain catches nearly constant or for catches to fluctuate with changes in biomass. At the meeting of the Working Group last year, the USSR and Japan noted that it is difficult to detail long-term fishing plans because of market fluctuations or the need to change from one target species to another when fishing conditions alter. However, these difficulties are also important considerations in the formulation of approaches to conservation.

8. Information concerning the size of the target stock, as well as its general distribution, local abundance and demography is necessary. The regions from which such information needs to be compiled will depend on the intentions of the fishery. The need to assess the potential of a stock prior to substantial fishing has been a common element in all the submissions to this Working Group. It is the responsibility of the Scientific Committee to evaluate the knowledge of the target species and to determine what further information is required so that the Commission can consider approaches to conservation for the proposed fishery.

9. Previous submissions, including those from Argentina, Australia, Japan, South Africa, the USSR and the USA, highlighted the need to define the important aspects of the ecosystem before conservation measures can be set in place. The USSR pointed out that the Southern Ocean should be viewed as comprising many sub-systems. The Working Group 'agreed that the Antarctic should not be regarded as a single ecosystem but, rather, as a set of linked sub-systems subject to widely differing levels of exploitation in which the potential effects of fisheries on related sub-systems would have to be considered' (CCAMLR-VII, paragraph 143).

10. Given the limited resources available to the Commission and the enormity of the task of defining all the sub-systems and their intra- and inter-relationships, the ecosystem or sub-system requiring the attention of the Commission should be that which encapsulates the proposed fishery. If we consider the target species as being a the centre of its 'apparent' ecosystem, then the primary interactions important to the well-being of that species, and to the objectives of the Convention, are those with its predators, competitors and prey. Secondary or indirect interactions are those with the predators of predators or prey of prey and such like. The total number of interactions between species is impractically large to consider. Therefore, we need to limit the extent of consideration of ecological interactions. If the deleterious effects of fishing on primary interactions are within the objectives of the Convention it is unlikely that secondary interactions will be affected to any greater degree. In other words, assessing the effects of fishing on the most important species in the apparent ecosystem of the target species should be sufficient in most cases. Similarly, the predators of the target species are the species likely to be deleteriously affected by the effects of the fishery, rather than the prey of the target species. Top predators can probably be managed satisfactorily on traditional single species lines.

11. The definition of an apparent ecosystem will also be useful in the development of approaches to conservation for cases where two or more fisheries (or the needs of depleted species) are assessed. By defining the apparent ecosystem for each fishery, the Commission will be able to consider whether they need to be managed jointly rather than independently. For example, if two fished stocks do no have the same predators then the combined impact of the two fisheries would probably be small. In cases where two targeted species had common predators then the level of fishing on one or both stocks may need to be lower to protect the predators from the reduction of two food sources. As the USA pointed out, there will be a greater risk of failing to meet the objectives as the difference between apparent ecosystems becomes less (WG-CSD-87/14). It is likely that multi-species approaches to conservation will need to be formulated if and when these situations arise.

12. In summary, the initial stage in the development of a fishery should involve the consideration of the following information by the Commission:

(a) the proposed fishing operation, including target species, methods of fishing, proposed region and any minimum level of catches that would be required to develop a viable fishery;

(b) details of the stock size and general distribution, abundance and demography of the target species;

(c) a description of the components of the apparent ecosystem, highlighting those species at the primary level and their likelihood of being affected in some way by the proposed fishery, including summaries of current applicable scientific knowledge; and

(d) a review of other fisheries that may have similar effects on the same or related components of the Antarctic marine ecosystems as the proposed fishery.

The first two descriptions would be supplied by those proposing to establish the fishery while the latter two summaries would be compiled by both the Scientific Committee and its relevant working groups.

PRELIMINARY ASSESSMENT AND FISHERY DEVELOPMENT

13. The primary aim of the preliminary assessment would be for the Commission to use the information provided to investigate an 'upper level' below which commercial development of the proposed fishery can begin. This upper level could be specified in terms of catch, effort, area, time, or a combination of these. Exploratory fishing would provide much of the data for the initial assessment, such as surveys and biological sampling. The level of exploratory fishing should be sufficient for the commercial evaluation of the stock. A few designated vessels would be able to carry out this exploration with catches in the order of hundreds of tonnes.

14. Commercial development of the fishery would begin when the Commission is satisfied that the risk of failing to meet the objectives of the Convention is acceptable when using the approach to conservation adopted, including the designated initial upper level.

15. There are two possible outcomes to a preliminary investigation. First, sufficient information may be available to determine approximately the upper level on which to base the amount of fishing. The second, and more difficult situation, is where it is not possible to collect sufficient data to make such approximations. In this case, the Commission should be prudent in designating the upper level but, equally, it needs to attempt to identify roughly the level of fishing that the ecosystem might support. This may be possible with further exploratory fishing. In either case, the Commission needs to choose a rate of exploitation that is sufficiently high to produce some effects of fishing, but not so high that the stock might be depleted substantially below its GNAI before the effects of fishing are detected. As a result, the estimate of yield can be improved without damaging the potential of the fishery or the ecosystem.

16. Experimental approaches to fisheries management and conservation could be very useful, particularly in the more difficult cases. Further, a series of open and closed areas would help maintain essential ecological processes, ensure stock escapement and provide a means for designating different approaches to conservation when there are competing needs within regions of the Southern Ocean.

17. In formulating a policy on the upper level, the Commission will need the advice of the Scientific Committee on the following two questions:

(a) the types of information that are required to evaluate the potential yield of stocks; and

(b) the measures that could be useful for ensuring a suitable level of escapement of the target species from the fishery during the development phase.

18. The EEC suggested that initial catch levels, such as those in both the above cases, be maintained for a number of years to provide adequate assessment of the effects of the exploitation on the ecosystem (WG-CSD-87/7). During this period, a thorough collection of data should be made in the designated fishing region on fishing operations, target and selected consumer species in the primary level of the apparent ecosystem, and on the physical environment. This data can be used for re-assessing and modifying the conservation approach, or establishing a new one, using the iterative approaches suggested by South Africa (WG-CSD-87/11).

19. Australia and South Africa also believed that the further development of the commercial fishery should be at a rate that does not outpace the ability of the Commission to monitor and assess its impact (WG-CSD-87/6 and 11), thereby avoiding the problems of over-exploitation and the management of depleted stocks outlined by the USA (WG-CSD-87/14). A form of feedback management (see WG-CSD-87/6) could be an appropriate approach, where conservation measures are considered and evaluated in response to needs of the fishing parties to increase yields, or if data collected in the course of monitoring indicated that recruitment was failing in exploited or dependent species.

20. The Technical Sub-Group advised that numerical modelling could be the most useful technique for assessing potential approaches to conservation (CCAMLR-VII, Addendum, Annex 1, paragraph 16). It considered that field trials were unacceptable because of the risk of failure to meet the objectives should an approach prove inadequate. A modelling approach, based on data of the available quality, can provide the Commission with an objective procedure for choosing an approach to conservation using estimates of the risk of failure to meet the objectives. Such modelling may also point to the need for more or different kinds of data.

21. In summary, this paper suggests that an approach to conservation for new or developing fisheries should include the following elements;

(a) notification of a proposed fishery;

(b) collation of information concerning the proposed fishery, the apparent ecosystem and other existing activities;

(c) the determination of initial upper levels to fishing activity (in terms of catch, effort, area, time or a combination of these);

(d) the designation of management areas;

(e) assessment of the effects on the stock and its apparent ecosystem of fishing at the initial level; and

(f) continued feedback management to adjust the fishery in light of new information concerning the status of the ecosystem and the needs of the fishery.

APPENDIX 2
(WG-DAC-89/5)

CONSIDERATION OF A MANAGEMENT STRATEGY

Comments by Norway on:
'Future directions for the Working Group for the
Development of Approaches to Conservation (WG-DAC)'
Paper submitted by Australia as Convener, 24 July 1989

Australia, as Convener of WG-DAC, has a very difficult task and we appreciate their constructive effort for the development of approaches to a conservation strategy.

2. The general objectives of CCAMLR according the Article II of the Convention require an approach to fishery management basically different from fishery management at present being applied in most regions of the World. Although multi-species models are being developed successfully in many regions, single species management systems will probably still be applied for several years and an 'ecosystem approach' is even further away. It should also be realised that the development of an ecosystem conservation strategy requires extensive research. In the Antarctic the ecosystem is complex and it is essential that the Commission draw on the expertise of the Scientific Committee and its subsidiary bodies to outline required research tasks and areas of immediate priority.

3. In a submission by Australia in 1987, some examples of conservation approaches were examined. In brief, the following comments can be given:

Reactive management as a conservation strategy alone would not be sufficient to prevent over-exploitation. Important species in the total ecosystem could be depleted to a level where recruitment is seriously affected.

Predictive management (modelling) require extensive research and collection of data both of commercial and non-commercial species, but is by far the best solution to provide a sound management strategy for rational utilisation of the living resources.

Sanctuaries have been used in many other areas and will probably be required to be used in the Antarctic, particularly combined with predictive management. To be effective it requires good information about stock units and migration between areas.

Pulse fishing can result in serious over-exploitation and is generally not acceptable.

Feedback management as described in the Australian submission, is useful and in most cases necessary in combination with predictive management. It requires extensive monitoring of stocks and research on interaction between different species in the total ecosystem.

4. In view of the Norwegian Delegation, evaluation of a given strategy should include consideration of:

(a) the scientific resources necessary to obtain the data required to implement it; and

(b) the practical possibilities and resources necessary to enforce the conservation measures implied.

5. As outlined in the Australian paper, the immediate priority should be to restore depleted fish populations and to prevent depletion of other stocks new being exploited.

6. If lack of data prevents a more comprehensive conservation strategy, the introduction of precautionary conservation measures on an interim basis must be considered. For example, the development of a management strategy for krill requires extensive research on stock abundance and productivity. To prevent an uncontrolled escalation of a fishery which could result in heavy depletion of the krill population, serious consideration should be given to restricting the level of fishing by introducing precautionary TACs by areas and/or by seasons.

7. The questions concerning exploratory fishing have been raised by Australia. It is important to allow exploratory fishing in order to make an evaluation of stock abundance and its composition. To prevent any excessive catches it must be assured that exploratory fishing is done under full control.

8. With regard to a suitable task for the WG-DAC to address at the 1989 Meeting, we agree with the suggestion made by Australia to consider the development of approaches to conservation for new and developing fisheries.

9. In addition, a number of important issues are mentioned in the Australian submission where the advice by the Scientific Committee is required. Examples are:

(a) what are the key elements of an ecosystem approach?

(b) level of exploratory fishing to gather data needed.

(c) conduct of research surveys, etc.

10. We would suggest therefore, that the WG-DAC at the end of the 1989 Meeting, also specify urgent questions that should be addressed by the Scientific Committee at their 1990 Meeting.

APPENDIX 3

LIST OF DOCUMENTS

WG-DAC-89/1	DRAFT AGENDA FOR THE WORKING GROUP FOR THE DEVELOPMENT OF APPROACHES TO THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES
WG-DAC-89/2	LIST OF DOCUMENTS
WG-DAC-89/3	FUTURE DIRECTIONS FOR THE WORKING GROUP FOR THE DEVELOPMENT OF APPROACHES TO CONSERVATION (WG-DAC) (Convener, Australia)
WG-DAC-89/4	APPROACHES TO CONSERVATION IN NEW OR DEVELOPING FISHERIES (Australia)
WG-DAC-89/5	CONSIDERATION OF A MANAGEMENT STRATEGY (Norway)