

ADDENDA AU RAPPORT  
DE LA SEPTIEME REUNION DE LA COMMISSION  
(CCAMLR-VII)

RAPPORT DE LA REUNION DU GROUPE DE TRAVAIL  
CHARGE DU DEVELOPPEMENT D'UNE STRATEGIE DE CONSERVATION  
DE LA FAUNE ET LA FLORE MARINES DE L'ANTARCTIQUE

Hobart, Australie  
23 et 28 octobre 1988

RAPPORT DE LA REUNION DU GROUPE DE TRAVAIL  
POUR LE DEVELOPPEMENT D'UNE STRATEGIE DE CONSERVATION  
DE LA FAUNE ET FLORE MARINES DE L'ANTARCTIQUE

Le Groupe de travail pour le développement d'une stratégie de conservation de la faune et la flore marines de l'Antarctique, présidé par l'Australie, s'est réuni le 23 et le 28 octobre. Le rapport de la sixième réunion annuelle de la Commission présente cette liste des attributions du Groupe de travail (paragraphe 107) :

- "1. Parvenir à une commune compréhension quant aux implications pour l'aménagement de l'Article II de la Convention.
2. Développer des approches possibles de conservation dans le but de réaliser les objectifs de l'Article II par les moyens décrits à l'Article IX.
3. Sélectionner et appliquer des critères de performance pour l'évaluation de chaque approche.
4. Identifier, pour les approches préférées, des buts spécifiques à court et à long terme, compatibles avec les objectifs de la Convention.
5. Elaborer le cadre d'une stratégie pour gérer les activités dans le but d'atteindre ces objectifs.
6. Rendre compte à la Commission des mesures appropriées.

Il s'agit là d'attributions de travail qui pourront être modifiées au fur et à mesure que le Groupe progressera."

2. Le Groupe a considéré le rapport soumis par un sous-groupe d'experts techniques, qui s'est réuni du 20 au 22 octobre, pour formuler des avis au Groupe sur la spécification des critères de performance pour

l'évaluation de stratégies de conservation et de sujets connexes (troisième attribution). Le Responsable du sous-groupe technique, Dr G. Kirkwood (Australie) a présenté le rapport du sous-groupe. Le Groupe de travail a été satisfait de recevoir le rapport comme contribution utile à ses travaux.

3. Pendant la discussion du rapport du sous-groupe technique et à la considération de cette question l'an passé, il a été noté que la Commission voudrait accorder un statut aux paragraphes 114 et 115 du rapport de 1987, sous réserve de modifications lorsque des approches à la conservation sont développées. A cet égard, le Groupe de travail a noté l'opinion du sous-groupe technique qui a signalé que l'objectif primaire de l'utilisation rationnelle entraîne une exploitation effectuée d'une façon qui, à long terme, assurera le maintien du plus grand rendement possible, sous réserve des principes généraux de conservation convenus.

4. Le Groupe de travail a convenu, en ce qui concerne le paragraphe 13 du rapport du sous-groupe technique, des points suivants:

- (a) l'application de l'Article II 3(b) serait facilitée par une définition opérationnelle de l'épuisement et des niveaux visés pour un repeuplement des populations en voie de disparition. A cet égard, le Groupe de travail croyait que les avis du Comité scientifique sur ces sujets, comprenant une considération des limites probables du niveau d'accroissement maximal net annuel pour divers groupes majeurs d'espèces, seraient utiles.
- (b) il serait utile de recevoir les avis du Comité scientifique sur la capacité du programme de contrôle de l'écosystème pour distinguer les changements dans les rapports écologiques et aussi de reconnaître les effets de dépendances simples entre les espèces, y compris une distinction entre les variations naturelles et celles qui se sont produites en conséquence des activités de pêche.

5. Le Groupe de travail a convenu qu'il n'est pas pratique d'évaluer des approches alternatives de conservation en faisant des essais sur le

terrain car on risquerait de ne pas satisfaire aux objectifs de la Convention, et que la modélisation sera le procédé le plus efficace d'y parvenir. Il a été entendu qu'au cours du processus d'évaluation des approches de conservation, le développement des objectifs et des critères de performance continuerait à évoluer.

6. Il a été reconnu que les approches de conservation devrait tenir compte des deux échelles temporelles: longues et courtes. Il a été noté que, dans l'immédiat, la Commission a commencé à développer des approches de conservation pour l'aménagement des stocks de poissons, en accordant une importance particulière à ceux qui sont déjà sujets à une forte exploitation; que le cadre pour l'évaluation de l'efficacité de ces stratégies pour des espèces individuelles est relativement simple; et que le Groupe de travail chargé de l'évaluation des stocks ichtyologiques s'occupe déjà de telles questions.

7. Dans le contexte de l'écosystème, toute approche de conservation doit tenir compte des effets produits par la pêche non seulement sur les espèces visées, mais aussi sur les espèces dépendantes et voisines. Cela rend plus complexe le développement d'une approche ainsi que l'évaluation de son efficacité. Le groupe a convenu que, bien qu'il faille commencer le développement des approches appropriées à la conservation des écosystèmes, la priorité pour l'achèvement de cette tâche est moins pressante que chez les stocks de poissons.

8. Dans ce contexte il a été convenu que l'Antarctique ne doit pas être considéré comme un seul écosystème, mais plutôt qu'il comprend un nombre d'écosystèmes différents. Ceux-ci sont sujets à des niveaux d'exploitation qui diffèrent beaucoup. Cela signifie que, bien que les effets des pêcheries doivent être considérés dans le cadre du sous-système de la région où ils ont lieu, il faut considérer leurs effets potentiels dans les sous-systèmes voisins.

9. Le Groupe de travail a discuté la valeur d'obtenir une information sur les projets de pêche des pays membres, comme l'a exposé le paragraphe 28 du rapport du sous-groupe technique, dans ses lignes générales. Des

représentants du Japon et de l'URSS ont exprimé leurs problèmes à cet égard, dûs à certains facteurs qui affectent les projets à long terme des activités de pêche. Par exemple, le taux de développement des pêcheries japonaises peut être déterminé par l'état du marché et par les activités des compagnies de pêche individuelles. Dans le cas de la pêcherie de l'URSS, même au cours d'une saison, des décisions sont prises pour changer de la pêche de poissons à celle du krill selon les conditions de pêche dans la région. Malgré ces incertitudes, des informations de ce genre présentées à la Commission sont valables pour le développement, entre autres, des approches prévisionnelles plutôt que réactives à la conservation du krill.

10. Le Groupe de travail estime que toute information supplémentaire en ce qui concerne les projets de développement et l'évaluation des approches de conservation seraient valables. Par exemple, des informations détaillées sur les opérations journalières des chalutiers de krill ont été trouvées utiles aux travaux de modélisation pour évaluer le rôle potentiel des données sur les prises et l'effort dans le contrôle des changements de l'abondance du krill.

11. On s'est mis d'accord pour que le travail continue à développer des modèles pour l'évaluation des approches de conservation par rapport, non seulement aux espèces individuelles, mais aussi aux espèces multiples. Ce travail doit être entrepris par les Membres et par les divers Groupes de travail du Comité scientifique. En même temps, il a été noté que la priorité pour ce genre de travail doit être déterminée par rapport à d'autres tâches importantes, telles que la détermination de l'abondance du stock et des structures du stock pour des espèces clés dans l'écosystème.

12. En révisant la direction de son travail, le Groupe de travail a souligné qu'on devrait tenir pleinement compte des travaux conduits par le Comité scientifique et d'éviter la répétition de ces travaux. Il a été convenu que le Groupe de travail joue un rôle important et continu dans le développement des approches de conservation pratiques, conformément à ses attributions.

13. Le rapport du sous-groupe technique est ci-joint.

REPORT OF THE MEETING OF THE TECHNICAL SUB-GROUP  
OF THE CCAMLR WORKING GROUP FOR THE DEVELOPMENT  
OF A CONSERVATION STRATEGY

(Hobart, Australia, 20-22 October 1988)

The Meeting was held in the CCAMLR Secretariat on 20-22 October, 1988. A list of participants is attached at Appendix 1.

2. Dr Geoff Kirkwood was elected Convener of the Sub-group, and it was agreed that the rapporteurs duties would be assumed by members of the Australian delegation at the meeting.

3. The Convener expressed his understanding that the development of performance criteria involved developing a methodological framework for evaluation of potential conservation approaches. The Group accepted this definition of their task and adopted the agenda attached at Appendix 2.

4. Papers were submitted by technical experts from several CCAMLR Members for the Group's consideration (see list of documents at Appendix 3). It was agreed that these should be used to assist the Group through reference to them where they were relevant to the issues raised rather than considering them individually.

THE DEVELOPMENT OF A METHODOLOGICAL FRAMEWORK FOR EVALUATION  
OF POTENTIAL CONSERVATION APPROACHES

5. The Group accepted, as a working definition, that a conservation strategy incorporates procedures under which conservation measures (for example, catch limits, open and closed seasons) are established, removed or varied. It involves using the information available to assess the state of the resources, from which decisions are made as to what changes in conservation measures are necessary.

6. It was pointed out that the Antarctic should not be thought of as a single ecosystem; rather it comprises a number of different sub-systems. These are subject to widely differing levels of exploitation. This means that the potential effects of fisheries have to be considered in both local and broad geographical scales.

7. It was recognised that a methodological framework had to consider both short and long time-scales. In the short term, the Commission has begun to develop conservation strategies for the management of finfish stocks, with emphasis on those already subject to heavy exploitation. The framework for assessing the effectiveness of these single species strategies is relatively straightforward. Such matters are already being addressed by the Fish Stock Assessment Working Group.

8. In an ecosystem context, a strategy has to take into account the effects of fishing on not only the target species, but also dependent and related species. This makes its assessment more complex. The Group agreed that while there is a need to begin development of appropriate strategies for conserving ecosystems, the priority for completing this task is lower than that for the finfish stocks.

#### Information Requirements for Specification of Conservation Strategies, Including Data Inputs and Monitoring

9. The specification of a conservation strategy involves the identification of operational objectives, data inputs and monitoring, assessment procedures and decision rules. For evaluation of a strategy, the decision rules need to be specified in terms of the information inputs and the range of decisions that are possible.

#### Preliminary Objectives

10. At its 1987 Meeting, the Working Group for the Development of a Conservation Strategy for Antarctic Marine Living Resources had developed a

set of principles of conservation based on Article II of the Convention, and an interpretation of the term "rational use" (CCAMLR-VI, paragraphs 114-115). These were :

"114. The Group noted that, under Article II, the term "conservation" includes rational use. Harvesting and associated activities are to be conducted in accordance with the following principles of conservation :

- (i) maintenance of ecological relationships;
- (ii) maintenance of populations at levels close to those which ensure the greatest net annual increment;
- (iii) restoration of depleted populations;
- (iv) minimisation of the risk of irreverisible change in the marine ecosystem.

115. With these principles in mind, the Working Group felt that rational use involved inter alia the following elements :

- (i) that the harvesting of resources is on a sustainable basis;
- (ii) that harvesting on a sustainable basis means that harvesting activities are so conducted as to ensure that the highest possible long-term yield can be taken from a resource, subject to the general principles of conservation above;
- (iii) that the cost effectiveness of harvesting activities and their management is given due weight."

11. The Group agreed to adopt as a set of preliminary objectives these general principles of conservation and elements of "rational use". It



agreed that they were sufficient for the purpose of evaluating potential conservation strategies.

12. The Group noted that it was not possible to simultaneously satisfy each of the preliminary objectives. Conservation strategies must inevitably involve compromises between the objectives, and an important part of any examination of differing strategies would be a comparison of the extent to which they met the different objectives.

13. The Group then addressed the interpretation of these preliminary objectives in terms which admit assessment of the degree to which they are able to be met.

(i) Maintenance of ecological relationships

The Group agreed that it was difficult to see how to evaluate the extent to which this objective could be met because of the sheer number of species and interrelationships which might be monitored. It is only practical to monitor a small number of these. This matter has been considered by the Working Group for the CCAMLR Ecosystem Monitoring Program and they have drawn up a program for monitoring selected predators which, at this stage, is as comprehensive as practicable. There are plans for the monitoring of prey species and environmental parameters. There remains a need to examine the power of this monitoring program to detect changes in relationships and to recognise the effects of even simple inter-specific dependencies.

The question was raised as to the number of species which would need to be monitored to be reasonably certain that important ecological relationships were being maintained. While it was felt that this required further investigation it was suggested that the largest and smallest species in major groups should be considered.

- (ii) Maintenance of populations at levels close to those which ensure greatest net annual increment (GNAI)

There is a paradox in this objective in that the level of GNAI for a dependent species changes with the level of exploitation of prey species. This has been resolved by interpreting the predator population levels referred to as those which would exist if there were no exploitation of prey. In practical terms these levels can be best assessed from historical levels of abundance.

It was generally accepted that if this objective is achieved then objective (i) would also probably be achieved as a consequence.

The Group agreed that, in general, it is not possible to accurately predict the population level at which GNAI would be obtained, therefore arbitrary working values will need to be chosen for various types of species.

The Group agreed that there was a problem in separating what may be natural fluctuations in dependent populations from changes induced by fishing on their prey. This needs to be addressed.

- (iii) Restoration of depleted populations

The Group identified a number of considerations to be examined in relation to this objective. These were :

- (a) the need for an operational definition of depletion and of a target level for recovery;
- (b) the likely time-scale of the recovery;
- (c) the compromise between the rate of recovery of a stock and the effects of any fishing activities permitted during the recovery period;

- (d) the possibility that reducing the abundance of competitors or predators might assist in the recovery of depleted populations.

Assessing the achievement of this objective depends upon some form of monitoring of trends in the abundance of depleted species. It was suggested that in certain instances some level of fishery could assist in monitoring the recovery of a depleted stock.

- (iv) Minimisation of risk of irreversible change in the marine ecosystem

In the Convention, this principle is stated as "the prevention of changes or minimisation of the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades". This suggests that the minimum levels of abundance for various species need to be tied to their dynamics. For example, slow growing populations will take the specified time to recover from levels which are not far below the target levels, while fast growing populations may recover from levels well below target levels over that time. However, in many circumstances, it will be difficult to predict that a population could recover from a given level in the required time.

#### Elements of "Rational Use"

14. The primary objective involving rational use is that of harvesting to ensure that the potential for achieving the highest possible long-term yield is preserved, subject to the above principles of conservation. The Group agreed that assessing the extent to which this objective was met by a proposed conservation strategy was straightforward.

15. With respect to the issue of cost-effectiveness, it was agreed that it was not appropriate to consider the economics of individual fishing

operations. However, the costs of management and monitoring, including those related to observation and inspection, must be taken into account in any evaluation of a conservation strategy.

Evaluating Performance of Conservation  
Strategies in Meeting Objectives

16. The Group considered that it was not practical to evaluate conservation strategies by applying them in the field because of the risk of failure to meet the objective should they prove inadequate. The time-scale involved could be long and the cost prohibitive. It was therefore agreed that a modelling approach to evaluation will be the most effective.

17. Models appropriate for evaluating conservation strategies for single species fisheries not involving substantial levels of ecological interactions (as currently being applied to finfish fisheries in the CCAMLR Area) are already in wide use in fisheries science.

18. The types of model required to evaluate conservation strategies for the management of fisheries involving substantial levels of interactions (e.g. krill) are more complex, because of the need to consider dependent and related species from an ecosystem perspective.

19. In any evaluation sub-models are needed to describe :

- the dynamics of the ecosystem or the species;
- the management procedure;
- the fishery; and
- the monitoring process and its results.

20. Most of the discussion focussed on the sub-model dealing with the dynamics of the ecosystem or the species. It was agreed that initial testing on simple models would define the range of potential strategies suitable for further development. These models can then be made more

complex to give more rigorous evaluation. The aim would be to use a diverse range of models to try to develop conservation strategies which are robust, in the sense that they would still meet their objectives when applied to model ecosystems that are radically different. As it will not be known which model best captures the dynamic features of real ecosystems or populations, potential strategies should be tested in as many hypothetical situations as possible.

21. The Group therefore decided that it is now appropriate to continue to develop specific models for use in the evaluation of potential conservation strategies.

22. For performance criteria, two papers presented to the meeting (WG-CSD-88/6 and 8) contained suggestions suitable for application to evaluations aimed at refining the range of potential conservation strategies. The Group recognised that performance criteria would need to evolve in step with both the conservation strategies and the complexity of the hypothetical ecosystems to be managed.

#### Protocols for Conducting Evaluations

23. A protocol is a uniform set of evaluation procedures which allow the performance of different potential conservation strategies to be compared. It was agreed that protocols which might be employed in this process should now be developed. Further work by individual members is required in order to develop protocols for consideration by a technical group at a further meeting.

#### EXAMPLES OF PERFORMANCE CRITERIA AND EVALUATIONS

24. Paper WG-CSD-88/8 included examples in which a simple predator-prey system is simulated, with exploitation occurring only on the prey. Catch limits are set according to two different conservation strategies. One strategy uses a standard Schaeffer model to obtain annual estimates of MSY

from CPUE data and harvested at 90% of the estimated MSY. The second strategy uses a simple feedback procedure to adjust catches up or down depending on whether the prey abundance is estimated to be above or below a target level (55% of unexploited). On face value, any differences in the results of applying the two strategies should be slight.

25. In WG-CSD-88/8, a number of performance criteria were defined which relate to the objectives of management identified by the Working Group. Three examples of these objectives and the corresponding performance criteria are :

(a) Maintenance of ecological relationships :

Probability of the predator population being reduced to less than 30% of its initial abundance.

(b) Maintaining highest long-term yield :

Cumulative catch over 70 years.

(c) Risk of irreversible change :

Probability of the prey population being reduced to levels from which recovery to the target level takes more than 30 years.

26. Applying the conservation strategy to the simulated predatory-prey system led to the following estimates of performance criteria under the two strategies :

Performance criterion	Strategy 1	Strategy 2
(a)	0.94	0.33
(b)	1.14	4.51
(c)	0.93	0.08

27. Despite expectations, the two strategies differ considerably in their ability to achieve the three objectives illustrated. Strategy 1 is markedly inferior in all three criteria, and would be rejected as a conservation strategy in this example.

#### OTHER MATTERS

28. The Group recognised the importance of obtaining an understanding of the plans of member nations for the development of krill fisheries, and similar information on squid and finfish fisheries would be useful. This information would help identify types of conservation strategy that are broadly consistent with the planned exploitation of the resource. Also, slight differences in the way in which development plans are implemented can sometimes provide substantially different opportunities to learn about the resource dynamics (e.g. the interactions between prey and dependent species and the separation of natural from fishery-induced fluctuations in abundance). Early notification of fishery development plans would allow examination of these opportunities.

#### CONCLUDING REMARKS

29. The Group recognised that further work is needed to develop models and protocols for the evaluation of potential conservation strategies. It noted that some related work useful for the examination of methodology and elements of conservation strategies has been and will be carried out under the auspices of the Scientific Committee.

30. The Group noted that some of the papers that it had received were pertinent to the development of conservation strategies. These might be considered by the Working Group.

LIST OF PARTICIPANTS

Technical Sub-Group of the CCAMLR Working Group  
for the Development of a Conservation Strategy  
(Hobart, Australia, 20-22 October, 1988)

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Dr E. BARRERA ORO (Argentina)  
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AGENDA

Technical Sub-Group of the CCAMLR Working Group  
for the Development of a Conservation Strategy  
(Hobart, Australia, 20-22 October, 1988)

1. Discussion of Methodological Framework for Evaluation of Potential Conservation Approaches
  - 1.1 Preliminary Objectives
  - 1.2 Performance Criteria
  - 1.3 Data Inputs - Harvesting
    - Scientific Monitoring
2. Examples of Performance Criteria and Evaluations
3. Report to the Working Group

LIST OF DOCUMENTS

Technical Sub-Group of the CCAMLR Working Group  
for the Development of a Conservation Strategy  
(Hobart, Australia, 20-22 October, 1988)

Meeting Documents

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|--------------|--|
| WG-CSD-88/1  | Provisional Agenda for the Meeting of the Conservation Strategy Working Group                                  |
| WG-CSD-88/2  | Provisional Agenda for the Meeting of the Technical Sub-Group<br>(Convener)                                    |
| WG-CSD-88/3  | List of Participants<br>(Secretariat)  |
| WG-CSD-88/4  | List of Documents<br>(Secretariat)   |
| WG-CSD-88/5  | The Selection of Performance Criteria in the Evaluation of Conservation Strategies<br>(Convener)               |
| WG-CSD-88/6  | Performance Criteria for the Evaluation of Conservation Strategies<br>(Delegation of Argentina)                |
| WG-CSD-88/7  | EEC Background Paper on Conservation Strategy<br>(Delegation of the EEC)                                       |
| WG-CSD-88/8  | Preliminary Consideration of Performance Criteria for the Evaluation of Conservation Strategies<br>(Australia) |
| WG-CSD-88/9  | Towards a Conservation Strategy for Antarctic Marine Living Resources<br>(Delegation of USSR)                  |
| WG-CSD-88/10 | Modelling and Decision Making as Part of the CCAMLR Management Regime  |
| WG-CSD-88/11 | Objectives of Ecosystem Monitoring   |

WG-CSD-88/12      Report of the Meeting of the Technical Sub-Group of the  
CCAMLR Working Group for the Development of a  
Conservation Strategy (Hobart, Australia, 20-22 October,  
1988)

Other Papers Referred to at the Meeting :

CEMP Standard Methods for Monitoring Parameters of  
Predatory Species, 1988