

## DEVELOPMENT OF APPROACHES TO CONSERVATION OF ANTARTIC MARINE LIVING RESOURCES

7.1 During the last meeting of the Commission, advice was sought from the Scientific Committee (CCAMLR-VII, paragraphs 140 and 141) on:

‘operational definitions for depletion and target levels for recovery of depleted species’, and

‘the ability of the CCAMLR Ecosystem Monitoring Program to detect changes in ecological relationships and to recognise the effects of simple dependencies between species including distinguishing between natural fluctuations and those induced by fisheries’.

7.2 Following correspondence between the Chairman of the Scientific Committee and the Commission’s Working Group for the Development of Approaches to Conservation of Antarctic Marine Living Resources (WG-DAC) during the intersessional period, these matters were referred to the specialist working groups of the Scientific Committee; the Working Group on Krill (WG-Krill), Working Group on Fish Stock Assessment (WG-FSA), Working Group for the CCAMLR Ecosystem Monitoring Program (WG-CEMP), and to the Workshop on the Krill CPUE Simulation Study (WS-KCPUE) for comments which might be taken into account by the Scientific Committee in providing advice to the Commission.

7.3 All working groups had considered the Commission’s questions, but none had been able to devote sufficient time to consider them in depth. The responses were recorded in the groups’ reports, and relevant excerpts were compiled by the Secretariat for the consideration of the Scientific Committee (SC-CAMLR/BG/56).

7.4 The Krill CPUE Simulation Study Workshop noted that the ability to detect changes in krill abundance from CPUE data is limited (see paragraphs 2.16 and 2.19). It further noted that the implications of this for a conservation strategy were a matter for the WG-Krill in the first instance.

7.5 The WG-Krill agreed that at this stage it had no contribution to make to the preparation of the advice to the Scientific Committee on the Commission’s questions, but that at some stage it may be able to assist WG-CEMP in the provision of its advice on krill parameters.

7.6 In this context, the Scientific Committee also considered SC-CAMLR-VIII/BG/17. On introducing the paper, Mr Miller indicated that in his view, the approach outlined, although focussing on krill (see also paragraph 2.30), had some applicability in the broader context of development of an operational management procedure for marine living resources in the Convention Area. The approach is one already being used by other international fishery organisations (IWC, ICSEAF and ICES) and its development is based on four active principles. These are that there should be:

- (a) a basis for assessment of the status of a resource in the region under consideration (an 'estimator');
- (b) an algorithm for specifying appropriate levels of regulatory activities (a 'catch control law') which is a function of the assessment;
- (c) a basis for assessing the performance of the management procedure (related to the two components above); and
- (d) an operational definition of Article II of the Convention to provide criteria against which performance can be assessed.

The management procedure being suggested thus consists of a combination of a 'control law' and an 'estimator' ((a) and (b) above).

7.7 The overall approach espoused in the paper was not claimed to be the only one available and both the Soviet and Japanese Delegations expressed some reservations about some of the assumptions underlying its formulation with respect to the krill fishery.

7.8 Dr Shimadzu was of the opinion that an alternative or more direct approach should be given priority over the development of simulation models. Such an approach would estimate krill biomass in areas being fished, the advection of krill in and out of fishing areas, rates of exploitation of krill and the amount of krill taken by predators within fishing areas. The last point in particular would be important for the evaluation of the potential impact of krill fishing activities on local predators.

7.9 Mr Miller made the point (as is made in SC-CAMLR-VIII/BG/17) that it is inadequate to offer reservations alone. What must also be provided is alternative, and presumably better, assumptions, or indications of the extent to which the original assumptions may be in error. It

is precisely such information which is relevant to testing any management procedure that may be suggested; not just the one detailed in the paper.

7.10 The Scientific Committee welcomed this initiative, and Dr Lubimova in particular emphasised the seriousness of the matters being addressed, and the need for in-depth consideration of them. The Scientific Committee therefore agreed that approaches to management of the krill fishery such as that discussed in SC-CAMLR-VIII/BG/17 should be referred to the WG-Krill for detailed consideration.

7.11 The WG-FSA noted that a useful working definition of the stock level where recruitment may be impaired would be the lowest spawning stock biomass estimated for the stock. Hence if the current spawning stock was the lowest observed, the aim of management should be to ensure that future stock levels do not drop below this level. It was noted in SC-CAMLR-VIII/BG/47 that, taking into account the average spawning stock size over a number of years, the corresponding coefficients of variation and the number of years when the spawning stock size was low, a certain level was introduced as a measure of spawning stock stability. The WG-FSA further noted that there were a number of significant uncertainties associated with the assessment of all stocks considered.

7.12 The WG-CEMP noted the progress made in the definition of the accuracy and precision of estimates of predator parameters being monitored. They were investigating the possibility of distinguishing between changes in food availability that result from commercial harvesting and changes due to natural fluctuations in the biological and physical environment. Because of the complexity of this topic and the possible need for modelling studies, they noted that advice could not be provided at present and that further work and discussion will be needed.

7.13 Dr Croxall introduced SC-CAMLR-VIII/9, which reviewed the feasibility of using indices of predator status and performance (i.e. the predator parameters being monitored by the CEMP) as part of CCAMLR fishery management strategies.

7.14 The paper suggested that it was relatively straightforward and highly desirable to devise a system for annually assessing the overall pattern of changes in indices at the levels of parameter, species, site and area. Management recommendations would arise from considering the patterns of change in predator indices in the light of available relevant biological and physical environmental data. Such recommendations would only be likely where there is evidence of significant broad-scale general effect, or of acute effects at more local levels. This would apply, however, even when there was no evidence that harvesting is,

or has been, a contributing factor. The logic for this is that if predator populations may be in trouble, any level of harvesting if conducted at critical times and places may have significant adverse effects. Examples of possible management action, involving restrictions on krill catch size, timing and location were compared from the perspectives of ease of implementation, consequences for the fishery and the probability of aiding predators.

7.15 Dr Lubimova expressed reservations about paragraph 7.14 and noted that they contained a number of speculative ideas based on an approach to the problem solely from the perspective of predators. In spite of the fact that the document was distributed to the Members in all the agreed languages of the Commission, these ideas have not been discussed in any real detail at this meeting.

7.16 There was general agreement that such approaches as outlined in SC-CAMLR-VIII/9 and the comments contained in paragraph 7.15 merited further investigation and development and WG-CEMP was encouraged to discuss this whole topic at its next meeting.

7.17 From these considerations, two broad areas of the work of the Scientific Committee were identified as contributing to the development of approaches to conservation:

- (a) actual work at assessment level in key areas involving coordination and integration of studies which would enable definition of appropriate management options. An example would be investigation of the krill flux in the South Shetlands/Peninsula area combined with determination of the impact of predators on stocks, leading to drawing up a budget of predator prey interactions; and
- (b) the wider task of evaluating the effectiveness of approaches to management adopted by the Commission in the light of the objectives of the Convention. It was suggested that the fundamental problem is how to deal with the uncertainty of the assessments that can be made.

7.18 The Scientific Committee agreed that it was important for more time and effort to be devoted to both of these areas of work. It was therefore agreed that, in addition to the consideration of the matters referred to in paragraphs 7.14 and 7.15 above, the specialist working groups should reconsider the Commission's questions and the wider issue of development of appropriate approaches to conservation in the light of the Scientific Committee's consideration of the issue. It was recognised that there had been relevant work

done by Members, particularly in the context of the Commission's WG-DAC, which would assist in this consideration.

7.19 It was recognised that the data requirements for different conservation approaches may be vastly different and the cost of pursuing inappropriate approaches could be high. It was therefore agreed that the Commission should be asked for more specific guidance on the strategic issues it would like the Scientific Committee to consider and provide advice on.