

## ECOSYSTEM MONITORING AND MANAGEMENT

5.1 Dr Bengtson, Convener, presented the report of the Sixth Meeting of the Working Group for the CCAMLR Ecosystem Monitoring Program (WG-CEMP), held at Viña del Mar, Chile, 7 to 12 August 1992 (Annex 7).

5.2 The Scientific Committee thanked the Working Group for its work during the intersessional period and at the recent meeting. The text below reports the endorsement of specific initiatives and the discussion of these and other points during the Scientific Committee's review of the report. The remainder of the WG-CEMP report, which was endorsed generally by the Scientific Committee, should be consulted for specific details.

5.3 Seventeen scientists from nine Members had attended the meeting. The absence of scientists at WG-CEMP from Brazil, France, Germany, New Zealand, Sweden and South Africa, all of whom have active programs of considerable relevance to WG-CEMP, was greatly regretted. The Scientific Committee endorsed the initiative of WG-CEMP in attempting to enhance participation (Annex 7, paragraph 3.10) and encouraged Members to do whatever possible to help. The action of Argentina in producing a video to increase awareness of CEMP operations was particularly commended.

5.4 The Convener drew attention to the substantial amount of CEMP activity being undertaken by Members. Annual data collection in support of CEMP is underway at several field sites (see Annex 7, Table 1), and many papers describing results and analyses from these studies had been tabled for the Working Group's consideration.

### MONITORING PROCEDURES

5.5 The Scientific Committee endorsed the establishment of *ad hoc* subgroups within WG-CEMP for reviewing existing and future proposals relating to:

- (i) designation and protection of monitoring sites and review of management plans;
- (ii) practical aspects of standard monitoring methods and proposals for new methods; and
- (iii) statistical aspects of monitoring and methods.

Member's attention was drawn to the requirement to submit any proposals on these topics in writing three months in advance of WG-CEMP meetings. Proposals concerning protection of CEMP sites should be submitted to the Secretariat; all others should be sent initially to the Convener.

5.6 The production by the Secretariat of a document describing in detail the procedures for calculating indices from each of the parameters being monitored by standard methods, was noted. This document marks an important step in the development of appropriate standardised analytical methods. Future refinements will undoubtedly be desirable but it was agreed that the document in its present form should be published in CCAMLR *Selected Scientific Papers* and included in the next edition of the *CEMP Standard Methods for Monitoring*.

5.7 Although no proposals for new standard field methods had been received, the Scientific Committee noted that the use of implanted passive transponder tags was an important development with significant implications for automated monitoring of several parameters in the future.

5.8 It was noted that WG-CEMP had indicated that it was not intending to schedule in 1993 a workshop to develop standard methods for monitoring at-sea behaviour of penguins and pinnipeds. Scientists who had attended the workshop on analysis of data from time-depth recorders used on pinnipeds at the University of Alaska in September 1992 and those who will attend sessions and/or symposia on this topic at the forthcoming meeting of the Society for Marine Mammalogy (Galveston, Texas, October 1993) are urged to ensure that WG-CEMP receives full and detailed feedback on relevant aspects of these meetings. Pending review of the outcome of these meetings, WG-CEMP will consider whether CCAMLR should consider holding a workshop on this topic in the future.

5.9 The Scientific Committee commended progress in investigating the feasibility of acquiring satellite imagery permitting routine monitoring of sea-ice distribution within CEMP Integrated Study Regions (ISRs). It thanked the Secretariat for its considerable effort in this regard. It endorsed the recommendations of WG-CEMP concerning acquisition of JIC data that would be incorporated into the CCAMLR Database for the three ISRs and for Subareas 48.1, 48.2 and 48.3 (Annex 7, paragraphs 4.30 and 4.31). SC-CAMLR-XI/10 provided the requested (Annex 7, paragraph 4.29) estimates for this undertaking. These were approved by the Scientific Committee and it was agreed that they be incorporated into the budget request of the Scientific Committee for the current and succeeding financial years.

5.10 The Scientific Committee endorsed the recommendation of WG-CEMP, based on a detailed evaluation by the Secretariat, that future editions of the *Standard Methods for Monitoring* volume should be produced in loose leaf ring binder format. It was recommended that a new edition be produced as soon as possible.

## MONITORING RESULTS

5.11 The Scientific Committee noted that there had been an extensive review of the full set of data resulting from monitoring of predators (Annex 7, paragraphs 5.1 to 5.18). Members were encouraged to complete the process of checking the accuracy of their submitted data and of the indices derived therefrom.

5.12 Prey data from both fishery and fishery-independent activities had been reviewed by WG-CEMP. This included fine-scale krill catch data (Annex 7, paragraphs 5.20 to 5.22) and additional valuable information on the operations of the Russian and Chilean fisheries, including the provision of haul-by-haul and CPUE data from the latter (Annex 7, paragraphs 5.23 to 5.26).

5.13 The value of fine-scale data had again been emphasised by WG-CEMP, and the Scientific Committee noted the importance of the request to Japan to provide data on combined hauls at a scale of 10 x 10 n miles.

5.14 Dr Naganobu indicated that Japan could report future krill catches on a scale of 10 x 10 n miles. He noted, however, that because of the need to develop appropriate analytical software and domestic reporting mechanisms, initiating this reporting scheme may be delayed for 6 to 12 months. The Scientific Committee thanked Japan for their positive response and encouraged them to provide the required information as rapidly as circumstances permit.

5.15 Korea will continue scientific surveys on krill distribution and abundance. However, future plans for krill fishing are not available at the present time.

5.16 The Scientific Committee noted the request from WG-CEMP to WG-Krill for the provision of estimates of krill biomass within the complete area of all three ISRs whenever the data become available.

5.17 The Scientific Committee welcomed the continuation of the fine-scale hydroacoustic surveys of krill in the vicinity of the Seal Island CEMP site by the USA. These are currently the only surveys for krill being conducted in accordance with the standard methodology developed by WG-Krill; other Members were urged to commence similar surveys as soon as possible. The importance of reporting the variance associated with estimates of krill biomass was emphasised.

## ECOSYSTEM ASSESSMENT

5.18 The 1992 meeting of WG-CEMP provided the first opportunity to review and assess all the data being collected under CEMP in relation to available information on the biological and physical environment (including fishery data) in the manner previously endorsed by the Scientific Committee and Commission (see Annex 7, paragraphs 6.1).

5.19 This assessment and its synthesis in Annex 7, Table 4 was warmly welcomed by the Scientific Committee. Although WG-CEMP had noted that the present synthesis was a rather coarse and preliminary treatment, the Scientific Committee felt that even at this level it showed clearly the importance and utility of the approach. Some interesting patterns had emerged, particularly for 1991, apparently a year of poor availability of krill to predators across all three subareas of Statistical Area 48; there were numerous additional features of interest.

5.20 WG-CEMP was strongly encouraged to expand and refine these assessments at future meetings, especially by considering the magnitude and significance of changes and by incorporating future years' data as these become available.

5.21 It was recognised that these assessments would be greatly improved by more comprehensive data on krill availability both from the fishery and from research surveys. In this regard, WG-CEMP had suggested that obtaining some subjective assessments might be a helpful complement to other sources of data (Annex 7, paragraph 6.35).

5.22 However, Dr V. Marín (Chile) was doubtful that requesting subjective assessments, including general impressions from fishing captains (Annex 7, paragraph 6.35) would be useful. He much preferred reliance on CPUE indices, such as Chile was able to provide from its fishery. Mr Miller agreed and noted that the Composite Index which had been developed by WG-Krill (SC-CAMLR-VIII, paragraph 2.15) was directly relevant to this assessment of availability of krill to the fishery.

5.23 WG-Krill was encouraged to develop these indices as far as possible and to provide annual summaries of the current availability of such indices to WG-CEMP in advance of the latter's meeting.

## POTENTIAL IMPACT OF LOCALISED KRILL CATCHES

5.24 Last year in response to the analyses showing the considerable geographical overlap between the krill harvest and the foraging ranges of krill-dependent predators during their breeding

season in three successive years in Subareas 48.1 and 48.2, the Scientific Committee stated that “a situation, whereby a substantial krill fishery consistently operates within the foraging range of krill-dependent predators at a critical time of year (when the predators have dependent offspring), had long been identified as a most serious concern and one where close and urgent attention needs to be given to appropriate management action” (SC-CAMLR-X, paragraph 6.29).

5.25 The Scientific Committee also noted last year that an appropriate precautionary management measure to provide protection for land-based predator populations at the critical time of year when they are breeding would be to prevent fishing within the foraging range of these predators (up to 50 km for penguins, 80 to 100 km for fur seals) at the time of year that they are rearing offspring (from December through February) (SC-CAMLR-X, paragraph 6.34).

5.26 In consequence, the Scientific Committee initiated an investigation of the implications and consequences of such potential conservation measures with Members conducting fishing in these areas (see paragraph 5.35 below).

5.27 Notwithstanding these initiatives the Scientific Committee also made a clear statement recognising the potentially serious situation of substantial krill fisheries consistently located near seal and seabird colonies, (SC-CAMLR-X, paragraphs 6.28 and 6.31), the current lack of data adequate for any precise assessment of the magnitude and consequences of these problems (SC-CAMLR-X, paragraphs 6.30(i) and (ii), paragraph 6.26) and the advice on precautionary management procedures available to mitigate these problems (SC-CAMLR-X, paragraph 6.34). Most Members felt that it was highly desirable to implement now a conservation measure to provide adequate protection for predators in appropriate parts of Subareas 48.1 and 48.2 until sufficient data are available to assess the situation more precisely (SC-CAMLR-X, paragraph 6.75).

5.28 Dr Naganobu indicated the lack of evidence that the fishery is having any marked effect on seal and penguin colonies.

5.29 This year the analyses by the Secretariat of the fine-scale catch data had reinforced the findings of previous years. The overall picture for Subarea 48.1 was still remarkably consistent in all four years (1988 to 1991) for which data are available, with 96 to 98% of the krill catch from December to March in the subarea being taken within the critical period-distance for foraging activity of breeding penguins and fur seals. For Subarea 48.2, the 1991 data showed 81% of the catch taken within the critical period-distance, similar to 1987 (83%) and 1988 (96%) and very different from 1989 (5%) and 1990 (17%) (Annex 7, paragraph 6.39).

5.30 WG-CEMP had agreed that it was entirely proper for WG-Krill and WG-CEMP to give serious and urgent consideration to the circumstances whereby substantial krill catches are taken annually from within a very restricted area at a time of year when krill eating predators, trying to rear offspring, are restricted to the same area - that it would be difficult to imagine a situation of greater potential concern to WG-CEMP (Annex 7, paragraph 6.49) and, that it is essential to consider appropriate precautionary management measures, including, but not confined to, catch limits (Annex 7, paragraph 6.50). WG-CEMP had re-emphasised that the object of developing precautionary measures in this context is to try to identify management measures to afford adequate protection for krill-dependent predators in specific areas at critical times of year without this protection causing unnecessary or unacceptable restrictions for the krill fishery.

5.31 Dr Naganobu had disagreed with this view, for the reasons set out in Annex 7, paragraphs 6.46 and 6.47, which had been rebutted by other Members (Annex 7, paragraphs 6.50 to 6.52), who drew attention to the possible incompatibility of some of the former views in relation to the established policies of the Scientific Committee and Commission.

5.32 The Scientific Committee then considered a proposal (SC-CAMLR-XI/BG/15) tabled by Dr Holt concerning allocation of krill precautionary catches within the foraging ranges of land-based predators in Statistical Area 48. This was essentially an elaboration of the proposal noted in the report of WG-Krill (Annex 4, paragraph 6.11).

5.33 With regard to this proposal for allocating a precautionary catch limit for the krill fishery near land-based predator colonies, the Chilean Delegation considered that because of the prevailing low catch levels of krill and their decreasing trend, there is no basis for immediate action to be taken by the Scientific Committee. Nevertheless, Chile proposed that this matter should be given further consideration by WG-Krill and WG-CEMP during the intersessional period.

5.34 Japan, Korea and Poland endorsed the statement by Chile.

5.35 In addition, Japan stated that it believed the catch limit for Subarea 48.1 to be recommended to the Commission this year is sufficient to safely manage the krill resources and local ecosystem. Japan does not consider, however, that there is any biological need to further restrict krill catch in the waters around the islands in Subarea 48.1. According to monitoring surveys on penguins and seal populations thus far conducted, there are no signs to suspect that populations of predator animals are adversely affected by the present krill fishery. This is corroborated by the following findings:

- (i) according to the Japanese surveys, 80% of the krill resource in Subarea 48.1 is located in the waters around the islands;
- (ii) according to surveys by both Japan and USA, the biomass of krill in the waters around islands fluctuates between 1 and 2 million metric tonnes.
- (iii) Agnew (1992)<sup>1</sup> estimates that the present catch level in Subarea 48.1 is less than one-third of the MSY and this applies principally to the waters around the islands (see (i) above);
- (iv) the nature of the Butterworth model used in setting precautionary catch limits, is, as pointed out by Dr Hatanaka, sufficiently conservative and precludes the need to install further restriction in the area.

5.36 Most Members disagreed with these views and interpretations.

- First, the topic at issue is the provision of protection to populations of krill-dependent predators which are constrained to forage at critical times of year in restricted areas in which substantial krill fishing also occurs. WG-CEMP and the Scientific Committee have consistently recognised that setting precautionary catch limits at area or subarea scales is inadequate to provide protection in such cases (SC-CAMLR-X, paragraphs 3.80 to 3.84, Annex 5, paragraphs 5.13 and 6.16).
- Second, at least with respect to such predators breeding in areas adjacent to the main fishing grounds in Subarea 48.1, there are neither adequate data on status and trends of populations nor monitoring data and so no basis for coming to any conclusion on whether these populations are adversely affected by krill fishing or not. In any case, WG-CEMP and the Scientific Committee have noted the difficulty of detecting causal relations between changes in predator performance and fishing activities (e.g., SC-CAMLR-VIII, Annex 7, paragraph 104) and most Members have recognised that precautionary management approaches will need to be adopted in these kinds of circumstances, based on the best available data.
- Third, the statements in paragraph 5.35(i) and (ii) provide no logical corroboration of any of the preceding statements in the paragraph in view of the restricted nature of the surveys, the mobility of krill, the lack of information on relationships between krill biomass and availability to predators (and fishery) and the fact that estimates of krill

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<sup>1</sup> AGNEW, D. 1992. Distribution of krill (*Euphausia superba* Dana) catches in the South Shetlands and South Orkneys. Document WG-KRILL-92/19. CCAMLR, Hobart, Australia.

requirements of penguins and fur seals represent minimum estimates for the whole of the local krill-dependent predator community.

- Fourth, the calculation in Agnew (1992) that the ratio between the catch and the estimated predator consumption in Subarea 48.1 is less than one-third does not imply that the catch is less than one-third of the MSY because, as indicated by Beddington and Cooke (1983)<sup>1</sup>, the MSY usually occurs at levels of fishing mortality that are lower than natural mortality.
- Fifth, the model referred to in paragraph 5.35(iv) had not been used in the setting of the precautionary catch limits. The model is currently being validated, taking account of Dr Hatanaka's reservation, as requested by the Scientific Committee. Consequently, it is premature to comment on the characteristics of this model at this time and in this context.

5.37 After pursuing counter-comments as described in paragraph 5.36, Japan did not find any scientific reason to alter its position as described in paragraph 5.35. Specifically,

- The point is whether there is any urgent need to introduce further protection measures for foraging animals for particular areas within Subarea 48.1 in addition to the precautionary catch limit to be installed for the entire Subarea 48.1, in view of the available scientific evidence and the historical fishing pattern in the area. Japan stated that there is no such urgency as would not allow awaiting the outcome of the planned study on this issue.
- Further, Japan considers it appropriate to clarify its view in relation to some of the arguments raised in paragraph 5.36. First, Japan does not see any logic in the accusation that 5.35(i) and (ii) provide no logical corroboration. Japan's explanation was terse, pointing to the existence of some 1 to 2 million tonnes of krill in the waters around islands throughout the critical period from January through March, which is far in excess of the demand of the krill predators.
- Japan referred to Agnew (1992) and his use of the Gulland model that indicated the present catch level being less than one-third of the MSY level.

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<sup>1</sup> BEDDINGTON, J.R. and J.G. COOKE. 1983. The potential yield of fish stocks. *FAO Fish. Techn. Pap.* 242: 47 pp.



- With respect to the Butterworth model (1991) used in calculating a precautionary catch limit, Japan had two thoughts in advancing its view. One concerns the basic assumption employed in the model; Japan considered that that assumption is far too conservative to be realistic. The second point is the discounting factor employed in the model in arriving at the final catch limit figures.
- In conclusion, Japan does not see any urgent need to introduce such conservative measures as those contemplated in paragraph 5.36 without awaiting the outcome of the planned research into this question.

5.38 The Scientific Committee then addressed the topic of potential management measures relating to closed seasons and areas.

5.39 Responses to last year's questions from the Scientific Committee to Members engaged in fishing in the relevant areas (Annex 4, paragraphs 5.1 to 5.35) had been most helpful. However, it was noted that the general tenor of the replies indicated that moving part of the harvest away from the areas currently targetted during December through February would probably entail some reduction in fishing efficiency.

5.40 The importance of continuing this dialogue was recognised. Several Members indicated that asking questions as general as those outlined in Annex 7, paragraph 6.57 might not be very helpful. However, other Members felt that it would still be useful to invite Members currently engaged in fishing for krill to consider and report on what potential measures, or combinations of measures, would be acceptable to them for application within Subareas 48.1 and 48.2 in order to address the specific problem of providing some precautionary protection for land-based krill predators foraging within 100 km of breeding colonies between December and March inclusive.

5.41 The Scientific Committee decided that in the context of developing precautionary measures to afford adequate protection for krill-dependent predators in specific areas at critical times of year, without this protection causing unnecessary or unacceptable restrictions for the krill fishery, it would be helpful to conduct a simulation study to explore more fully the potential and consequences of different extents and locations of closed areas. The study would use the fine-scale data for the krill fishery in Subarea 48.1 within the period December through February in the last five years.

5.42 The Secretariat was asked to undertake this simulation analysis intersessionally. The Scientific Committee advised that the model would require the subdivision of Subarea 48.1 into several "longitudinal" subdivisions taking into account especially the timing and location of fishing, and the consideration of various zonal limits (e.g., 50 km, 60 km, 100 km from breeding colonies of land-based predators).

5.43 The simulation analysis should examine the consequences of closing one or more subdivisions simultaneously, and in rotation, and taking account also of the need to ensure that in areas around some existing or potential CEMP sites, fishing should remain unrestricted.

5.44 The Secretariat should table the results of these analyses at the next meetings of WG-CEMP and WG-Krill. It is intended that these results would stimulate a further dialogue on the feasibility of implementing some combination of closed areas and closed seasons to protect some predators at a particularly critical time of year.

5.45 Japan, although not intending to deny the merit of such simulation studies, stated that it was opposed to any proposition which might pre-determine the necessity of closed area or closed season measures, in light of the current historical low catch level in the region concerned.

5.46 In response to the Japanese statement, other Members expressed the following opinions. In several recent meetings of WG-CEMP and the Scientific Committee of CCAMLR there had been unanimous or near unanimous concern over circumstances of persistent geographical overlap between significant krill fishing and the foraging ranges of krill-dependent predators at critical times of year; this concern was irrespective of the overall magnitude of the krill fishery and of any assertions regarding future levels of this fishery.

5.47 The Scientific Committee had agreed unanimously that there was a need to give close and urgent attention to appropriate management action in these circumstances (SC-CAMLR-X, paragraph 6.29). It had been indicated at the present meeting that the imposition of precautionary TACs over particular zones within subareas was unlikely, on its own, to be the most appropriate or most effective management measure. Various Members were agreed that some combination of catch limits, closed seasons and closed areas would offer a good prospect of mitigating potential problems for predators without imposing unacceptable changes to fishing practice and also offered a reasonable prospect of monitoring compliance.

5.48 Most Members recognised that it was unreasonable to try to establish measures for closed seasons and closed areas without dialogue with Members conducting fishing and without assessment of the potential consequences of various types and combinations of such measures. Detailed (and very helpful) dialogue commenced last year and the simulation study referred to above is both a logical development and an appropriate scientific way of approaching the issue. There was widespread agreement in the Scientific Committee that this research is appropriate and useful. Members would welcome constructive suggestions from Japan for the development of precautionary management measures for the situation outlined above.

5.49 Dr Shust noted that assessment of overlap between fishery and predators in appropriate parts of Subarea 48.1 depended significantly on the location of the fishing fleet and rates of krill flux (Annex 7, paragraph 6.42).

5.50 All Members recognised that work is needed to investigate more precisely the overlap between predators and the commercial fishery and to assess more accurately the magnitude of potential competition between predators and fishery.

5.51 To undertake this it will be necessary to have accurate data on the size and distribution of the breeding colonies of the major krill predators and of their krill requirements, at least during the time of year when the fishery is operating. It is also important to have fishery data on as fine a scale as possible, to have accurate data on krill biomass (and availability to predators) and to take account of different potential rates of movement of krill through the areas under investigation.

5.52 WG-CEMP and WG-Krill were encouraged to prepare for such work as a matter of some priority and it was agreed that Subarea 48.1 should be the first target of this work.

5.53 The Scientific Committee also endorsed the need to enhance CEMP activities, especially expanded monitoring operations in Subarea 48.2 and as a particularly high priority conducting monitoring at one or more additional sites on the north coast of the main islands in the South Shetland Island group.

#### PREY REQUIREMENTS FOR KRILL PREDATORS

5.54 Considerable progress had been made intersessionally in accumulating data to estimate prey requirements of krill predators in the ISRs (Annex 7, paragraphs 7.3 to 7.5, 7.8 and 7.9). These data are required to help assess the significance of overlap between the krill fishery and krill-dependent predators and are also potentially relevant to other Scientific Committee initiatives, including assessment of escapement levels and estimates of potential yield of krill (see SC-CAMLR-X, Annex 6, paragraph 6.1).

5.55 However, there had been insufficient time during the intersessional period for WG-CEMP to provide interim estimates even for selected predator species for the ISRs.

5.56 The Joint Meeting of WG-Krill and WG-CEMP had emphasised that even with revised estimates of krill requirements of predators for all or part of the ISRs, assessment of the significance

of overlap between fishery and predators would require a knowledge of functional relationships between krill availability and predator performance.

5.57 Consequently, WG-CEMP had accorded greater priority to improving understanding of these relationships, rather than to estimating predator consumption in the ISRs. It was noted that WG-CEMP intended to continue its efforts to develop estimates of the prey requirements of krill predators.

5.58 Several Members indicated their considerable interest in estimates of krill consumption by selected predators (especially penguins and fur seals) for Subareas 48.1 and 48.2. They urged WG-CEMP to try to complete the task of estimating krill consumption by at least these predators in the ISRs as soon as possible.

#### KRILL ESCAPEMENT

5.59 Last year WG-CEMP noted that the prospects of estimating desired levels of krill escapement on the basis of estimates of krill consumption by all natural predators were remote. At the Joint Meeting of WG-Krill and WG-CEMP, attention was focussed instead on the need to consider critical levels of predator performance in relation to escapement of krill from the fishery. Approaches for doing this were developed in some detail in Annex 8, paragraph 2 and Appendix 1.

5.60 WG-CEMP had chosen representative species (Adélie penguin, crabeater seal, and black-browed albatross) and had allocated responsibility for providing the required data. The Scientific Committee encouraged the prompt provision of these data. It was agreed that as soon as data were received at the Secretariat, they should be circulated to Members who were encouraged to undertake the modelling described in Annex 8, Appendix 1 as soon as possible and to report the results to the next meetings of WG-Krill and WG-CEMP.

#### LIAISON WITH WG-FSA

5.61 The acting chairman of WG-FSA noted that there had been insufficient time at its recent meeting for consideration of the WG-CEMP ecosystem assessment in the light of relevant fish data. However, WG-FSA intended to carry out this task in future.

5.62 He drew the attention of WG-CEMP to the fact that data on *P. antarcticum* (a target species for CEMP) had been received by the CCAMLR Data Centre.

## FUTURE WORK

5.63 The Scientific Committee endorsed WG-CEMP's plan of future work (Annex 7, paragraph 10.1).

## MANAGEMENT PLANS FOR CEMP SITES

5.64 Last year the Commission adopted Resolution 8/X according protection to the Seal Islands CEMP site in response to a proposal submitted by the US. In accordance with Conservation Measure 18/IX, the Secretariat sought comments on the proposal from SCAR and from the Antarctic Treaty Consultative Parties.

5.65 Within SCAR the management plan was considered by the Group of Specialists on Environmental Affairs and Conservation (GOSEAC), the Working Group on Biology and the Working Group on Geology (CCAMLR-XI/BG/9 Rev. 1). GOSEAC commented that it "found the management plan acceptable in its present form in terms of environmental care, but noted some written views from USA [geologists] concerning the wording of specific sections"; the Working Group on Biology recommended endorsement by SCAR and the Working Group on Geology found the proposal acceptable. On this basis it was formally endorsed by XXII SCAR.

5.66 Subsequently, however, the Secretary of the Working Group on Geology had requested the CCAMLR observer to SCAR to include some comments on the management plan in his report (CCAMLR-XI/BG/9 Rev. 1, Annex 1). These comments indicate concern due to:

- (i) inadequate time to consider the document; and
- (ii) potentially restrictive conditions for access to a geologically anomalous area.

5.67 Dr Bengtson noted that the management plan did not intend to exclude geologists or others from conducting research at the Seal Islands that does not disturb the local wildlife, their habitat, or the CEMP studies being undertaken. The US Delegation suggested a modification to the management plan's wording to rectify any such misunderstanding.

5.68 Accordingly, the Scientific Committee recommended that the Commission revise the Seal Islands CEMP Site Management Plan by incorporating the following text as appropriate under section D.1.b. and in the third paragraph of Annex A:

D.1.b. **Throughout the site at all times of year:** Any non-CEMP activities are not permitted which result in:

- (i) killing, injuring, or disturbing pinnipeds or seabirds;
- (ii) damaging or destroying pinniped or seabird breeding areas; or
- (iii) damaging or destroying the access of pinnipeds or seabirds to their breeding areas.

Annex A (paragraph 3)

Geological and other studies which can be done inside of the pinniped and seabird breeding seasons in such a way as they do not damage or destroy pinniped or seabird breeding areas, or access to those areas, would be permitted as long as they would not adversely affect the planned assessment and monitoring studies. Likewise, the planned assessment and monitoring studies would not be affected adversely by periodic biological surveys or studies of other species which do not result in killing, injuring, or disturbing pinnipeds or seabirds, or damage or destroy pinnipeds or seabird breeding areas or access to those areas.

5.69 No adverse responses had been received from Antarctic Treaty Consultative Parties.

5.70 Consequently, the Scientific Committee noted that, with the amendments suggested above, the way was now clear for the Commission to adopt Resolution 8/X as a conservation measure and to attach the Management Plan for the Seal Islands CEMP Site as Annex B to Conservation Measure 18/XI.

5.71 The Scientific Committee noted that draft management plans for the CEMP sites at Magnetic Island (Australia) and Cape Shirreff (Chile) had been reviewed by WG-CEMP and would be reconsidered next year after revision.

ADVICE TO THE COMMISSION

5.72 The Scientific Committee recommended that the Secretariat begin the acquisition of current and historical data on sea-ice distribution around CEMP sites as described by WG-CEMP (Annex 7, paragraphs 4.28, 4.30, 4.31 and 4.33) and according to the schedule and budget elaborated in SC-CAMLR-XI/10.

5.73 The Scientific Committee recommended the publication of a new edition of the *Standard Methods for Monitoring*, in loose leaf format as soon as possible.

5.74 The Scientific Committee recommended that CCAMLR support the proposed SCAR workshop to plan a coordinated multinational research initiative on Antarctic ice-breeding seals.

5.75 The Scientific Committee recommended that a meeting of WG-CEMP be held during 1993.