ECOSYSTEM MONITORING AND MANAGEMENT

6.1 The ninth meeting of WG-CEMP was held in Cape Town, South Africa from 25 July to 3 August 1994 under the convenership of Dr Bengtson. The report of the meeting is attached as Annex 6.

MEMBERS' ACTIVITIES

6.2 In previous years, summaries of the status of Members' activities - specifically their submission of data to CEMP on monitoring approved predator parameters and the nature of their research directed towards evaluating the utility of potential predator parameters - have been attached as an annex to the WG-CEMP report. This year, to save space in the final report of the Scientific Committee, this information is presented to the Scientific Committee as SC-CAMLR-XIII/BG/2.

6.3 The Scientific Committee welcomed the initiation of CEMP-related research by Italy and South Africa and Norway's commitment to start such work (Annex 6, paragraph 3.3). It regretted the absence of participants from several Members known to have recent or current programs of research on top predators of considerable relevance and interest to CEMP.

6.4 Dr Fanta reported that the Brazilian CEMP program had been temporarily suspended but would recommence in 1995/96. Dr E. Balguerías (Spain) stated that research on penguins undertaken by Spain at Deception Island is funded on a year-to-year basis of research grants and therefore the continuity required by the CEMP Program could not be maintained.

6.5 The Scientific Committee again encouraged Members to participate in CEMP meetings and activities. In particular, it invited representation and collaboration from France, Germany and New Zealand, all of which have longterm research programs of special interest to CEMP, offering the possibility of mutually beneficial interactions.

6.6 It was noted that the production of the WG-CEMP newsletter, endorsed by the Scientific Committee last year, was expected to be undertaken immediately following the current meeting of the Scientific Committee.

Sites

6.7 A management plan for an Antarctic Specially Managed Area (ASMA) at Admiralty Bay, King George Island, submitted by Brazil and Poland had been approved by SCAR and, in accordance with agreed practice, was now being submitted to CCAMLR for comment.

6.8 In considering this proposal, the Scientific Committee recalled that an earlier draft of this document had been referred to WG-CEMP for consideration. Their comments were included in Appendix E of Annex 6.

6.9 The Scientific Committee noted that the proposal has been prepared in accordance with Annex V of the Protocol on Environmental Protection of the Antarctic Treaty and submitted to CCAMLR as would be required under Article 6(2) of Annex V once the Protocol came into force.

6.10 This is the first proposal of an ASMA to be developed and presented to CCAMLR. However, no criteria have been established by CCAMLR against which such proposals may be evaluated.

6.11 It was agreed to recommend to the Commission that assessment by the Scientific Committee of proposals for both ASMAs and Antarctic Specially Protected Areas (ASPAs) should include an evaluation of whether the proposals adequately:

(i) describe the breeding distribution of seabirds and seals in the area and, at least for colonially breeding species, include points of their entry and departure from the sea;

(ii) note the location of sites where monitoring studies for purposes of direct relevance to CEMP are being undertaken. This is irrespective of whether or not the sites have been formally protected under Conservation Measure 18/IX;

(iii) ensure protection to research which contributes to the objectives of CCAMLR;

(iv) describe areas in which birds and seals, associated with or breeding in the proposed management area, are known to forage;

(v) draw to the attention of CCAMLR any other matters which may be relevant to the implementation of Article II of the Convention.

6.12 The Scientific Committee recommended that the Commission develop a formal procedure for consideration of proposals for ASMAs and ASPAs and decide how and at which stages they should be reviewed by CCAMLR. It suggested the requirement that any proposals for review by CCAMLR should be received by 31 March so that they may be considered by WG-EMM and then by SC-CAMLR at their next meetings.

6.13 An *ad hoc* group was asked to review the ASMA proposal from Brazil and Poland against the criteria set out in paragraph 6.11. They noted that not all of the information required had been presented. They also noted that there was no report of consultations with other parties, e.g., USA, Ecuador and Peru who are known to be conducting research in the area.

6.14 The Scientific Committee therefore recommended that the proposal be revised to include the information sought in paragraph 6.11.

Standard Methods

6.15 The Scientific Committee noted the revision of standard methods on breeding population size, breeding success and age-specific recruitment and survival in black-browed albatrosses, on age-specific recruitment and survival in penguins, on procedures for determining the sex of penguins and on methods involving banding and lavage (resulting from the workshop last year on seabird/researcher interactions). It noted that in response to the recommendation of WG-CEMP, the Secretariat had circulated these methods (in English only) to Members in advance of the 1994/95 field season. The Secretariat was thanked for its prompt and efficient response.

6.16 However, it was noted that changes agreed in previous years, especially those consequent on the incorporation of the gentoo penguin as a CEMP monitoring species, had not yet been incorporated and circulated. The Secretariat was requested to make these changes at the earliest opportunity and to circulate the revised texts to the *Ad Hoc* Subgroup on Monitoring Methods (currently Drs Bengtson, Croxall and W. Trivelpiece (USA)). Once approved, these additional changes should then be circulated together with the earlier ones in all languages of the Commission.

6.17 The Scientific Committee welcomed the agreement of the following scientists to prepare preliminary drafts of new standard methods for consideration by WG-EMM:

- time/depth recorder (TDR) deployment: Drs P. Boveng and Trivelpiece (USA), B. Culik and R. Wilson (Germany);

- TDR data collection: Drs I. Boyd and Croxall (UK); and

- Antarctic and cape petrels: Drs F. Mehlum (Norway) and J. van Franeker (Netherlands).

6.18 The Scientific Committee also supported the request made to the following persons to provide new text for potential incorporation into standard methods: Dr G. Robertson (Australia): penguin lavaging; Dr R. Veit (USA): procellariiform lavaging; Dr Kerry and Ms J. Clarke (Australia): penguin disease sampling.

6.19 It was noted that no progress had yet been made in developing standard methods for crabeater seals and Members with relevant experience were encouraged to prepare draft standard methods as soon as possible.

6.20 Last year the Scientific Committee endorsed WG-CEMP's development of initiatives designed to lead to standard methods for studying, recording and reporting on diving behaviour and foraging performance of penguins and seals using data collected by TDRs and related instruments. WG-CEMP has now developed its proposal in considerable detail (Annex 6, paragraphs 4.15 to 4.21) and recommended that a workshop be held in 1996 to develop as standard parameters indices of foraging effort which are likely to reflect intra- and interannual variation in prey availability. Subject to the approval of the terms of reference of this workshop, to be developed intersessionally by Dr Boyd and an *ad hoc* subgroup of WG-CEMP, the Scientific Committee accepted this proposal and agreed to make appropriate provision in the draft budget for 1996.

ENVIRONMENTAL MONITORING

6.21 The Scientific Committee commended the work of the Secretariat in compiling information on sea-ice distribution and extent in the vicinity of CEMP monitoring sites. It welcomed the detailed report in SC-CAMLR-XIII/BG/10 on progress to date and noted the recent dialogue with the IWC and other institutions also investigating Antarctic sea-ice characteristics based on archived historical data. The report indicated that additional - and possibly less costly - sources of relevant data might exist.

6.22 Rather than referring this matter to the WG-CEMP *Ad Hoc* Subgroup on Statistics as suggested in SC-CAMLR-XIII/BG/10, the Scientific Committee felt that the potential, for CCAMLR purposes, afforded by sources of sea-ice data which have recently become available, should be critically reviewed next year by the appropriate Working Groups of the Scientific Committee. To

facilitate this, the Data Manager was asked to obtain CD-ROM data from the US Snow and Ice Data Centre to calculate sea-ice indices as currently defined by CEMP (SC-CAMLR-XI, Annex 7, paragraphs 4.30 to 4.32), to compare these with the indices calculated from the JIC charts and to report the results to the meeting of WG-EMM.

6.23 Pending the outcome of this review and re-assessment, the Scientific Committee agreed that the Secretariat should not undertake further extraction of sea-ice data from the JIC charts.

6.24 In addition, Dr Bengtson had been asked to consult with the Chairman of the Scientific Committee of the IWC (SC-IWC), Dr S. Reilly (USA) concerning the IWC initiatives on sea-ice data. Initial consultation indicated that further discussions would be fruitful and Dr R. Holt (USA) was asked to undertake these and report back to the WG-EMM meeting.

REVIEW OF MONITORING RESULTS

6.25 The Scientific Committee noted that 46 sets of data on designated monitoring species were submitted to CEMP by five Members for eight sites, including the first submissions from Italy (Annex 6, Table 1). However, the Scientific Committee echoed the concern of the Working Group that some Members, ostensibly undertaking active CEMP programs, were still not submitting data to CEMP. Furthermore, because no Member had submitted any historical data this year, gaps were increasing in the time series of data so far submitted to CEMP.

6.26 The Secretariat had, as requested, used the statistical methods specified in the CEMP standard methods to assess differences between years in the data submitted for each parameter at each site. In reviewing these assessments the Working Group:

(i) raised queries concerning the appropriateness of some of the statistical tests used;

(ii) requested investigation of other ways of presenting the results in order to assist the review process; and

(iii) recommended that the Data Manager and the Subgroup on Statistics (currently Drs Boveng, P. Rothery (UK) and Lic. E. Marschoff (Argentina)) should address these issues intersessionally.

6.27 The Scientific Committee agreed that work aimed at identifying the most appropriate statistical analyses to be used to investigate interannual variation and trends in CEMP indices and the

means of presenting the results of these analyses most clearly should be undertaken as a high priority before the 1995 meeting of WG-EMM. This work should be undertaken by correspondence, and, where circumstances allow, direct contact among Members of the statistics subgroup and the Data Manager. A one-day meeting of the subgroup to complete this work may be required immediately prior to the meeting of WG-EMM, depending on progress made intersessionally.

ECOSYSTEM INTERACTIONS

6.28 The Scientific Committee noted that the discussion of this topic had taken place at the joint meeting of the Working Groups.

ECOSYSTEM ASSESSMENT

6.29 Because of the problems in calculating the magnitude and significance of interannual differences in parameter values (see paragraph 6.26 above), the assessment procedure undertaken by WG-CEMP in 1994 (presented in Annex 6, Table 2) remained rather similar to those followed in 1992 and 1993, rather than the more quantitative summary envisaged in SC-CAMLR-XII, Annex 6, paragraph 6.37.

6.30 Nevertheless, the Scientific Committee found the summary tables very useful and welcomed the clear distinction in the tables between assessments based on data actually submitted to the CEMP database and those based on data collected annually by standard procedures but not submitted to CEMP.

6.31 The Scientific Committee noted the value of Annex 6, Table 2, in terms of the insight the data provide into predator population size and predator performance in 1993/94 (Annex 6, paragraphs 7.13 to 7.22).

6.32 In particular, the Scientific Committee noted the conclusions (Annex 6, paragraph 7.23) that very different patterns of predator performance and prey availability/abundance had apparently existed in the three subareas of Statistical Area 48 in 1993/94. It concurred with the Working Group that these contrasting situations offered an excellent opportunity for a concerted effort to investigate the biological and physical characteristics of the marine environment that existed in these three subareas in 1993/94.

6.33 Accordingly, WG-EMM was requested to investigate the best way that comparable, and, where appropriate, coordinated analyses of relevant data might be arranged and expedited. Members holding, or aware of the existence of, data relevant to this undertaking were asked to provide WG-EMM with details, if they had not already done so at the joint Working Group or in the report of their Member's activities for 1993/94.

SCOPE OF CEMP

6.34 The Scientific Committee agreed last year that WG-CEMP should consider whether it was timely and appropriate now to consider expanding CEMP beyond its current exclusive focus on the krill-based system.

6.35 WG-CEMP reviewed briefly three areas of current research that had the potential to make valuable contributions to monitoring of and directed research on predators of fish species currently or recently subject to commercial fishing (Annex 6, paragraphs 9.3 to 9.7). These were:

(i) work on blue-eyed shags, especially by Lic. E. Barrera-Oro and Lic. R. Casaux and colleagues, providing data on the relative abundance and other characteristics of several species of coastal benthic fish. This research had been further discussed by WG-FSA (Annex 4, paragraphs 5.1 to 5.3);

(ii) current research at five sub-Antarctic island groups by Australia, France, South Africa and Sweden investigating the dynamics of interactions between king penguins and myctophids; and

(iii) detailed work, principally by Australian, German and US scientists, on predators that are important consumers of *Pleuragramma antarcticum*, a selected species within the CEMP Program about which CEMP has rarely received any information.

6.36 In discussion, Members noted that research on king penguins and myctophids could potentially be coordinated with research on squid, which would also be valuable to the Scientific Committee.

6.37 It was also noted that interactions between Antarctic fur seals and *C. gunnari* were of considerable potential interest in relation to the dynamics and management of stocks of this icefish in Subarea 48.3 (Annex 4, paragraph 4.77).

6.38 The Scientific Committee noted the conclusions of WG-CEMP that it would be very valuable to widen the scope of CEMP to take full advantage of current work on these topics.

6.39 The Scientific Committee recollected its discussions of last year (SC-CAMLR-XII, paragraphs 8.11 to 8.13) concerning the advantages and disadvantages of expanding the scope of CEMP. It endorsed the statement of WG-CEMP that any expansion should be carefully planned and should not dilute the considerable effort required to maintain the existing CEMP Program. It further noted the potential value of comparisons between krill-based and fish-based predator-prey interactions.

6.40 Consequently, recognising the interest in undertaking appropriate research and monitoring activities on selected predators of fish species that are or have been of commercial interest, the Scientific Committee agreed this topic should be considered at the next meeting of its Working Groups. It encouraged Members to submit outline proposals for research and monitoring activities.

6.41 Finally, the Scientific Committee noted Dr Bengtson's intention to retire as Convener of WG-CEMP. The Chairman, with unanimous endorsement, thanked him for five years of outstanding leadership of WG-CEMP, during which time the program had made great progress, attracting much international interest and furthering the ecosystem management goals of CCAMLR.

ADVICE TO THE COMMISSION

6.42 Members should be reminded of the importance of submitting current CEMP data annually and in a timely fashion, and of the requirement to submit all relevant historical data to CEMP as soon as possible.

6.43 Members undertaking long-term research programs relevant to CEMP, and especially France, Germany and New Zealand, should be particularly encouraged to participate fully in meetings and activities of WG-CEMP.

6.44 Subject to its approval of terms of reference of next year's meeting, the Scientific Committee recommended including funds in the provisional 1996 budget for a workshop to develop standard indices of foraging effort of seals and penguins (from TDR data) which are likely to reflect intra- and interannual variation in prey availability.

6.45 The Secretariat should be requested to circulate all approved revisions to existing CEMP standard methods in all languages of the Commission before the 1995/96 field season.

6.46 The Scientific Committee prepared specific recommendations to the Commission concerning the establishment of criteria against which proposals from SCAR for ASMAs and ASPAs should be assessed. These are set out in full in paragraph 6.11.

6.47 In respect of the current ASMA proposal from Brazil and Poland, the Scientific Committee drew the attention of the Commission to the fact that not all of the information required under the criteria proposed in paragraph 6.11 had been presented in the proposal. The Scientific Committee recommended appropriate revision (paragraph 6.14). Furthermore, there was no report of consultations with other parties (e.g., Ecuador, Peru, USA) known to be conducting research in the area (paragraph 6.13).