

DEPENDENT SPECIES

Species Monitored under the CCAMLR Ecosystem Monitoring Program (CEMP)

4.1 Dr Everson introduced the report of WG-EMM by noting that the work of WG-EMM was conducted in two parts: the Workshop on Area 48 and the WG-EMM meeting.

4.2 The Workshop on Area 48, convened by Dr R. Hewitt (USA), was held at the Southwest Fisheries Science Center in La Jolla, USA, from 15 to 26 June 1998. The report of the meeting is appended to the WG-EMM report (Annex 4).

4.3 Dr Everson took the opportunity to thank Dr Hewitt for his contributions to all stages of the planning and organisation of the workshop.

4.4 Dr Everson further noted that during this very successful workshop, a large number of datasets were processed and a number of complex analyses were undertaken. It was decided at the workshop that the data and indices utilised would only be made available by the Secretariat in accordance with CCAMLR's normal rules of data access. Analyses were being prepared for publication.

4.5 The main WG-EMM meeting was held from 10 to 20 August 1998 in Kochi, India. Dr Everson thanked the host country and in particular, Mr Ravindranathan and his colleagues, for their efforts which resulted in a successful, productive meeting.

4.6 Prof. Croxall noted that the WG-EMM meeting suffered from a lack of scientific expertise in the area of dependent species due to a late change in meeting dates which precluded attendance by several members. It was recommended that meeting dates, once set, should not be changed.

4.7 The terms of reference for the Workshop on Area 48 were to:

- (i) identify the extent of between-season and within-season variation in key indices of the environment, harvested species, and dependent species over past decades;
- (ii) identify coherence in the indices between sites and clarify understanding of the linkages between Subareas 48.1, 48.2 and 48.3;
- (iii) develop working hypotheses; and
- (iv) provide a summary report for consideration of the 1998 meeting of WG-EMM.

4.8 The workshop was organised around the hypothesis H_0 and an alternative, H_1 as described below:

- (i) H_0 : Subareas 48.1, 48.2 and 48.3 are discrete ecosystems and events observed in any one subarea do not reflect what is happening in other subareas; and
- (ii) H_1 : Area 48 is a homogeneous ecosystem and events observed in any one subarea reflect the entire area.

4.9 It was recognised that neither of these hypotheses was likely to be correct. However, they represent the end points of the spectrum of possibilities and thus provided a useful structure for organising the workshop.

4.10 The results of the workshop were considered under appropriate agenda items of the WG-EMM meeting rather than taking the complete report at once.

4.11 Dr Everson summarised the results of analyses of land-based predator indices from the workshop report:

- (i) most land-based predator indices showed greater coherence between species within sites than across sites (Annex 4, Appendix D, paragraphs 7.9 to 7.16);
- (ii) land-based predator indices in summer were generally coherent across Subareas 48.1, 48.2 and 48.3 (Annex 4, Appendix D, paragraphs 7.18 to 7.29):
‘good’ years: 1984/85, 1987/88, 1994/95 to 1996/97,
‘bad’ years: 1990/91 and 1993/94, particularly 1990/91;
- (iii) coherence in land-based predator indices for summer across subareas was generally more evident in good than in bad years (Annex 4, Appendix D, paragraphs 7.28 and 7.32);
- (iv) winter land-based predator indices showed less coherence across subareas and summer indices. When there was coherence, it was more consistently area-wide in winter than in summer (Annex 4, Appendix D, paragraphs 7.33 to 7.48):
‘good’ years: 1988, 1989 and 1997,
‘bad’ years: 1990 and 1994; and
- (v) there was no consistent sequence in land-based predator indices between bad winters and bad summers; that is, either can precede the others (Annex 4, Appendix D, paragraph 7.45).

4.12 Dr Everson reported that the Working Group appreciated the whale data provided by the IWC and concluded that sighting surveys of minke whales appeared to offer the best technique for censusing whales for analyses in CCAMLR.

4.13 Ms D. Thiele (IWC Observer) stated that the SC-IWC is undertaking a large retrospective analysis of Southern Ocean baleen whale sighting data. This study will be completed prior to the krill synoptic survey planned for 2000.

4.14 The Working Group reviewed SC-CAMLR-XVII/BG/2 Rev. 1 and concluded that it was no longer necessary to present this information in a paper. It was suggested that for Table 1, (Summary of Members’ CEMP activities on monitoring approved predator parameters), the Secretariat should directly pursue the submission of relevant historic data. The Working Group suggested that Tables 2 (directed research programs required to evaluate the utility of potential predator parameters) and 3 (Summary of Members’ research required to provide essential background information needed to interpret changes in monitored predator parameters) should go onto the CCAMLR website.

4.15 Prof. Croxall concurred with this assessment, but felt that Table 1 in SC-CAMLR-XVII/BG/2 Rev. 1 was a useful summary which allowed scientists to anticipate what data might become available in the future. Dr Penhale concurred, but recommended that there be a notation of the expected date of data submission. The Scientific Committee agreed that Table 1 should continue to appear as a paper and that the Secretariat should solicit information on the status of ‘in preparation’ data, including a date when these data were expected to be submitted.

4.16 Dr Everson began his presentation on the section of the WG-EMM report which dealt with CEMP standard methods by reporting that the completed, revised *CEMP Standard Methods* had been circulated in September 1997. The rest of Dr Everson’s presentation focused mainly on paragraphs which required input from the Scientific Committee.

4.17 Dr Everson observed that the Working Group found uncertainties with standard method A3 Breeding Population Size (Annex 4, paragraphs 8.5 and 8.13 to 8.15).

4.18 Dr Miller noted that his misinterpretation of the treatment of the A3 data from Marion Island may have led to unwarranted concerns.

4.19 Prof. Croxall noted that it was difficult to reconcile the text of Annex 4, paragraph 8.13 with the data in the CEMP database and with the information published in the papers tabled for CCAMLR in the last two years (WG-EMM-96/38 and 97/55). It was agreed that further (intersessional) examination of the relationship between the population sizes of the penguins in the CEMP study colonies at Marion Island and those in the overall population might be useful. Dr R. Crawford (South Africa) would be asked to investigate this and report to next year's meeting of WG-EMM.

4.20 Accordingly, it was agreed that it was probably not appropriate to review Method A3 at present. However, it was reaffirmed that discrete colonies need to be used and that these should contain a total of 1 000 to 2 000 breeding pairs. Although the instructions in the method provide for study population sizes of as few as 100 pairs, such small samples were only envisaged to be used in exceptional circumstances.

4.21 In terms of questions relating to the representativeness of CEMP study colonies in respect of population processes and trends at larger spatial scales, the Scientific Committee agreed that Members with relevant data should be encouraged to address some of the questions set out in the WG-EMM report (Annex 4, paragraphs 8.5(i) to (iv)).

4.22 Dr Everson noted that Method A5 (duration of foraging) should be reviewed intersessionally by the Subgroup on Methods.

4.23 A new method, using aerial photography as an alternative to ground counts was presented. The Working Group recommended that the method, with minor changes, could be adopted for Adélie penguins and noted it may be applicable to, and could be tested on, other species.

4.24 Dr Everson reported that a new method which proposes to monitor changes in coastal fish populations by the analysis of the pellets of the Antarctic shag was approved for an initial five-year trial period. This method will be published and circulated to Members.

4.25 The Scientific Committee noted that the forthcoming synoptic krill survey of Area 48 in 2000 provided an important opportunity to acquire simultaneous data on the distribution and abundance of marine mammals and birds. It was agreed that this should be brought to the attention of Members.

4.26 SCAR-BBS had provided CCAMLR with advice on appropriate recording techniques for seabirds at sea, arising from a workshop on this topic, which should supersede parts of the methods developed for use during the BIOMASS FIBEX and SIBEX programs.

4.27 Further details of the recommended seabird at-sea recording methods should be sought from SCAR and/or scientists experienced in using the two methods recommended by the workshop, in order to assist participants in the B₀ survey to use appropriate methods for estimating seabird distribution and abundance.

4.28 Dr Nicol noted that seabird and cetacean observations had been successfully carried out on the 1996 krill biomass survey in Division 58.4.1. Further results of and experience gained during this survey will be presented to WG-EMM in 1999.

4.29 Dr Kerry noted that in addition to recording the aerial distribution of seabirds during the synoptic krill survey (paragraph 4.25), it would be useful to investigate the three-dimensional overlap of penguins with krill.

4.30 It was noted that methods of estimating the at-sea distribution and abundance of seabirds are to be considered by the IWC Scientific Committee at a workshop to define whale survey methods for use on the synoptic survey and for GLOBEC. It was recommended that the results of the IWC methods workshop to be held in March 1999 should be reviewed by the Working Group.

4.31 The Working Group thanked SCAR for the report of the 1996 APIS survey meeting and the report of SCAR-GSS in the same year, which were forwarded following WG-EMM's request last year.

4.32 It was noted that it is unlikely that the APIS program will produce a standard method for routine monitoring of crabeater seals before the APIS program is completed in the year 2000.

4.33 The Working Group expressed its continuing interest in the development of a suitable technique to be completed as soon as possible.

4.34 The Working Group noted that no new CEMP sites were proposed for consideration by the Working Group. It was also noted that no Protected Area Management plans had been forwarded by SCAR for consideration by the Working Group.

Assessment of Incidental Mortality

Incidental Mortality Arising from Longline Fishing

IMALF Intersessional Activities

4.35 The Scientific Committee noted the active intersessional work program of ad hoc WG-IMALF and the excellent attendance (12 members from seven countries) at the meeting held as part of WG-FSA. The request for additional members from countries involved in longline fishing and/or seabird research in the Convention Area (e.g. Norway, Ukraine, Uruguay and USA) and currently unrepresented in WG-IMALF, was noted, as was the decision that technical coordinators and the Scientific Observer Data Analyst should be ex-officio members of ad hoc WG-IMALF.

4.36 The Scientific Committee noted that WG-FSA had appointed Prof. Croxall as Convener and Mr B. Baker (Australia) as Deputy Convener of ad hoc WG-IMALF (Annex 5, paragraph 7.5).

4.37 The Scientific Committee endorsed the intention to review research programs into the status of albatrosses, giant petrels and *Procellariapetrels* at the 1999 ad hoc WG-IMALF meeting and the request to all Members to submit relevant summary data intersessionally (Annex 5, paragraph 7.8).

Data on Incidental Mortality of Seabirds during Longline Fishing in the Convention Area

4.38 The intersessional revision of 1997 data on seabird by-catch from Subareas 58.6 and 58.7 was noted (Annex 5, paragraphs 7.9 to 7.12). This showed that:

- (i) the overall catch rate (birds/thousand hooks) was estimated as 0.49 and 0.58 for day and night setting (Annex 5, paragraph 7.12 and Table 32);
- (ii) the main species killed by regulated fisheries were white-chinned petrels (66%) and grey-headed albatrosses (11%) (Annex 5, paragraph 7.11 and Table 31); and
- (iii) an estimated 696 birds were killed during night setting and 866 during day setting. This total estimated mortality of 1 562 birds is 69% greater than the observed total mortality of 923 birds (Annex 5, paragraph 7.12, Tables 33 and 34).

4.39 The Scientific Committee noted that these revised estimates include by-catch rates that would have increased last year's estimates of seabird by-catch in unregulated fisheries in these subareas.

4.40 Noting the continuing difficulties with timely data submission and validation which preclude the undertaking of comprehensive analysis of the current year's data (Annex 5, paragraphs 7.15 and 7.16), the Scientific Committee approved the suggestion that the main analysis of by-catch data should be undertaken intersessionally (Annex 5, paragraphs 7.17, 7.37 and 7.59), complemented by preliminary assessment of the current year's data at the WG-FSA meeting (Annex 5, paragraphs 7.18 and 7.19).

4.41 To allow comprehensive analysis and assessment, full details from observers on all seabird by-catch for longline fisheries in the Convention Area, and especially from the French EEZ, would be needed (Annex 5, paragraphs 7.22 to 7.24).

4.42 The 1998 results for Subareas 48.1, 48.2, 88.1 and 88.3 showed no by-catch of seabirds in these subareas (Annex 5, paragraphs 7.25 and 7.26).

4.43 The 1998 results for Subarea 48.3 were as follows:

- (i) 79 seabirds (83% white-chinned petrels, 12% black-browed albatrosses) were observed killed at an overall catch rate of 0.025 birds/thousand hooks (Annex 5, paragraphs 7.27, 7.28 and 7.33, Tables 35 and 36), compared with 712 seabirds at a catch rate of 0.23 birds/thousand hooks in 1997;
- (ii) an estimated 640 birds were killed, a substantial reduction (88% fewer) of the estimated 1997 kill of 5 755 (Annex 5, paragraph 7.34 and Table 37);
- (iii) these results represent a major improvement compared with 1997, due to the much higher levels of compliance with CCAMLR conservation measures (Annex 5, paragraphs 7.35 and 7.40); and
- (iv) the one-month delay (until 1 April) in the start of the fishing season is thought to be a major factor in reducing bird by-catch in 1998 (Annex 5, paragraph 7.36).

4.44 The 1998 results for Subareas 58.6 (outside the French EEZ) and 58.7 were as follows:

- (i) 498 seabirds of five species (mainly white-chinned petrels (96%)) were observed killed with an average catch rate of 0.117 birds/thousand hooks (Annex 5, paragraph 7.42, Tables 38 and 39), compared with 834 seabirds at a catch rate of 0.52 birds/thousand hooks in 1997;
- (ii) seabird by-catch rates were considerably reduced compared with 1997; this was probably because of improved compliance with Conservation Measure 29/XVI, especially with respect to night setting and use of streamer lines (though the 5 n miles fishing exclusion zone around the Prince Edward Islands may have contributed) (Annex 5, paragraphs 7.51 and 7.52);

- (iii) important factors associated with higher rates of seabird by-catch were daytime setting (though reduced three-fold from last year), high winds, proximity to breeding island, vessel and time of year (Annex 5, paragraphs 7.45 to 7.50 and Figure 10);
- (iv) by-catch occurred mainly during summer, peaking during February to mid-March, the chick-rearing period of white-chinned petrels (Annex 5, paragraph 7.45 and Figure 11); and
- (v) WG-FSA had endorsed the suggestion that the fishery in Subarea 58.7 should be closed from February to mid-March during the chick-rearing period of white-chinned petrels (Annex 5, paragraph 7.55).

4.45 Mr Purves noted that the forthcoming South African fishing plan will take the advice in paragraph 4.44(v) into account but there are strong local views that a sustained fishing presence in the area is needed to combat illegal fishing. Prof. Duhamel supported this view.

4.46 The Scientific Committee noted that, in the Convention Area overall, based on data available to WG-FSA:

- (i) there had been a substantial reduction (by 90% in Subarea 48.3 and about 50% in Subareas 58.6 and 58.7) in seabird by-catch in the regulated fisheries in the Convention Area in 1997/98;
- (ii) this was in part attributable to greater compliance with the mitigating measures set out in Conservation Measure 29/XVI and to the later commencement of the fishing season in most areas in 1997/98 than in preceding years; and
- (iii) that the highest by-catch rates recorded were for sets commenced in daytime and for those undertaken during February and March in Subareas 58.6 and 58.7 and in April in Subarea 48.3.

Compliance with Conservation Measure 29/XVI

4.47 The Scientific Committee noted the advice of WG-FSA that:

- (i) no vessels were in compliance in respect of line weighting, for the second successive year (Annex 5, paragraph 7.63 and Figure 12);
- (ii) improvement in the prevalence of night setting, compared with 1997, occurred in all subareas (Annex 5, paragraph 7.64);
- (iii) despite some improvements since 1997 (principally relating to retaining offal during the haul), many vessels are still discharging offal during the haul on the same side as line hauling (Annex 5, paragraph 7.65); and
- (iv) streamer lines were used on more vessels than last year, but most streamer lines do not meet CCAMLR specifications (Annex 5, paragraphs 7.67 to 7.70 and Table 40).

Assessment of Potential Levels of By-catch of Seabirds in the Convention Area due to Unregulated Longline Fishing

4.48 The Scientific Committee noted that WG-FSA had estimated this in an identical fashion to last year, using the 1997 by-catch rates from the regulated fishery, rather than the much lower 1998 values, to characterise the performance of unregulated vessels. On this basis, the estimate of potential seabird by-catch for 1998 (taken exclusively in the Indian Ocean sector) was between 50 000 and 89 000 seabirds (Annex 5, Tables 41 and 42), potentially comprising 31 000 to 56 000 white-chinned petrels, 11 000 to 20 000 albatrosses and 2 000 to 4 000 giant petrels. This compares with estimated values for 1997 of 31 000 to 111 000 seabirds.

4.49 The Scientific Committee accepted the conclusion of WG-FSA that these levels of mortality would be unsustainable for the populations of these species breeding within the Convention Area in the southern Indian Ocean, and drew this to the attention of the Commission.

4.50 Therefore the Scientific Committee recommended that the Commission take the most stringent measures possible to combat unregulated fishing in the Convention Area.

Incidental Mortality of Seabirds during Longline Fishing outside the Convention Area

4.51 The Scientific Committee noted that:

- (i) information on seabird by-catch outside the Convention Area, especially the extensive data provided by Australia and New Zealand, continued to indicate that substantial by-catch occurs of species and populations breeding within the Convention Area (Annex 5, paragraphs 7.122 to 7.134); and
- (ii) new information on fishing effort and on bird by-catch by Taiwanese pelagic longliners for tuna in the Southern Ocean (north of the Convention Area) had been acquired and that further dialogue was recommended (Annex 5, paragraph 7.135).

Effectiveness of Mitigation Measures

4.52 The review of new information relating to methods for mitigating seabird by-catch in longline fisheries was welcomed by the Scientific Committee. It endorsed the advice relating to:

- (i) offal discharge, including bait spillage and vessel reconfiguration, particularly the reaffirmation (SC-CAMLR-XVI, paragraph 4.52(iii)) that vessels discharging offal during the haul on the same side as the line hauling site should no longer be allowed to fish in the Convention Area and drew this especially to the attention of those involved in licensing of vessels to fish in national EEZs (Annex 5, paragraphs 7.139 to 7.144);
- (ii) the importance of adequate line weighting as potentially the most effective of existing mitigating measures (Annex 5, paragraph 7.150), the need to develop more efficient methods to weight lines and the high priority of research on effects of line sink rates (Annex 5, paragraph 7.168);
- (iii) the potential need to add a provision to Conservation Measure 29/XVI governing the use of line floats (Annex 5, paragraph 7.152);

- (iv) the need to investigate the use of line-setting devices (Annex 5, paragraph 7.154);
- (v) the development and testing of underwater setting tubes by Australia, New Zealand, Norway and South Africa, which was noted and encouraged (Annex 5, paragraphs 7.161 to 7.163); and
- (vi) the need for research into artificial bait, gear colour and bait-taking behaviour of seabirds (Annex 5, paragraphs 7.166 and 7.167).

4.53 Participants in the ad hoc WG-IMALF and WG-FSA meetings indicated that the detailed discussion of mitigating measures this year had been made possible by the high quality of the data provided by observers and by the presence at the meeting of scientists with much practical experience of fishing operations on board longline vessels.

4.54 It was especially noted that WG-FSA advised that line weighting is potentially a very effective mitigating measure. Indeed, achieving rapid sinking of the baited longline is probably the measure which offers at present the best opportunity substantially to reduce, if not eliminate, seabird by-catch in longline fisheries. If an appropriate weighting and spacing regime can be used, no seabirds should be caught, even in daytime sets (Annex 5, paragraph 7.150).

4.55 Prof. C. Moreno (Chile) advised of a forthcoming collaborative research project between Chile and Australia to be undertaken in southern Chile. This will include research relevant to albatross–fishery interactions, especially in relation to longline sink rates, and albatross at-sea distribution in relation to the distribution of fishing effort. Members encouraged Australia and Chile in these initiatives, noting the importance of such information for an important area for which few data are currently available.

International and National Initiatives relating to Incidental Mortality of Seabirds in Relation to Longline Fishing

4.56 Last year the Commission requested the Secretariat to arrange for comments on the draft of the FAO International Plan of Action on the Reduction of Incidental Catch of Seabirds in Longline Fisheries (IPOA) from ad hoc WG-IMALF (SC-CAMLR-XVII/BG/5) to be forwarded to FAO in time for consideration at the FAO Consultation, to be held in Rome from 26 to 30 October 1998 (CCAMLR-XVI, paragraph 12.4). In accordance with FAO's timetable, the revised International Plan of Action will then be submitted for adoption at the next meeting of the FAO Committee on Fisheries (COFI), to be held in February 1999.

4.57 In consultation with the Chairman of the Scientific Committee it was decided that, taking into account the timing of various CCAMLR meetings, it would be possible to arrange for the intersessional comments of ad hoc WG-IMALF to be considered at WG-FSA and then sent to FAO. After intersessional consultation with members of the Scientific Committee, Mr J. Cooper (South Africa) was nominated as CCAMLR observer at the FAO Consultation. The ad hoc WG-IMALF comments and additional observations in the IPOA were approved by WG-FSA (WG-FSA-98/34 Rev. 2, Appendix) and sent to FAO with Mr Cooper.

4.58 It was hoped that Mr Cooper would be able to submit a summary report on the October consultation in time to be considered by the Scientific Committee at its 1998 meeting. In any case, the Scientific Committee endorsed the comments on the FAO IPOA in the appendix to WG-FSA-98/34 Rev. 2 and drew them to the attention of the Commission.

4.59 The Scientific Committee commended Australia on its Threat Abatement Plan, the objective of which is to reduce seabird by-catch in all fishing areas, seasons and fisheries within the AFZ to be achieved within the five-year life of the plan. The ultimate aim of the threat abatement process is to achieve a zero by-catch of seabirds, especially threatened albatross and

petrel species, in longline fisheries. It was noted that the Threat Abatement Plan contained many elements which might be used in developing other national and regional agreements, especially that proposed for southern hemisphere albatrosses under the CMS. The Scientific Committee noted the prospect of a meeting in Chile to begin developing this agreement.

New and Exploratory Fisheries Proposed in 1998

4.60 Last year in response to concerns relating to the numerous proposals for new fisheries and the potential for these new and exploratory fisheries to lead to substantial increases in seabird incidental mortality (SC-CAMLR-XVI, Annex 5, paragraph 7.118), advice was requested on known and potential interactions with seabirds, relating to the:

- (i) timing of fishing seasons;
- (ii) need to restrict fishing to night time; and
- (iii) magnitude of general potential risk of by-catch of albatrosses and petrels.

4.61 Last year the Working Group undertook the first comprehensive assessment on this basis. It assessed new and exploratory fisheries for most subareas and divisions of the Convention Area. For comparison, it also undertook assessments of areas with established longline fisheries (Subarea 48.3 and Division 58.5.1) (SC-CAMLR-XVI, Annex 5, paragraphs 7.126 and 7.127).

4.62 This year most statistical subdivisions of the Convention Area, including all with proposals for new and exploratory fisheries, were reassessed in terms of risk of by-catch of species and groups of seabirds at risk (Annex 5, paragraphs 7.101 to 7.116 and Figure 13).

4.63 In broad terms, the assessments and reassessments made this year, and the resulting advice, differ very little from those prepared and agreed last year for the same areas. The only areas assessed for the first time this year were Subarea 48.5 and Division 58.4.2 (Annex 5, paragraph 7.103). There were only two new features of the assessments this year:

- (i) consideration of the potential for longline fishing in an area, as deduced from inspection of bathymetric maps of the area in question (Annex 5, paragraph 7.114); and
- (ii) areas which had been, or were being, considered as subdivided in respect of fishery assessments (e.g. Subareas 88.1 and 48.6) were therefore also assessed for seabird risk in relation to the subdivisions (Annex 5, paragraph 7.114).

4.64 The Scientific Committee noted that, in respect of this year's proposals (full details of assessments and advice appear in Annex 5, paragraph 7.116), potential conflict between proposed longline fishing seasons and advice on seasons closed to longline fishing to protect seabirds was, in essence:

- (i) minor for Division 58.4.4 (Spain and South Africa), Subareas 58.6 (South Africa) and 58.7 (South Africa);
- (ii) substantial for Divisions 58.4.3 (France), 58.4.4 (France), Subareas 58.6 (France) and 58.7 (France); and
- (iii) uncertain for Division 58.4.4 (Uruguay).

4.65 Relevant information from the proposals for new and exploratory fisheries (especially in relation to fishing seasons) and the advice from the IMALF section of WG-FSA are summarised in Table 5.

4.66 In addition, WG-FSA had provided detailed advice in respect of the New Zealand request for a variation from Conservation Measure 29/XVI for exploratory fishing in Subarea 88.1, south of 65°S (Annex 5, paragraphs 7.117 to 7.119).

4.67 The Scientific Committee endorsed the New Zealand request (Annex 5, paragraph 7.117), subject to:

- (i) the use of the variation of a minimum sink rate of 0.3 m/s, as described in Annex 5, paragraphs 7.117 and 7.118;
- (ii) all other elements of Conservation Measure 29/XVI remaining in force; and
- (iii) fishing ceasing if significant bird by-catch occurs.

4.68 Dr A. Baker (New Zealand) indicated that the level of bird by-catch deemed to be significant would be a very low number (e.g. 10 or less) and based on the bird mortalities directly observed by the scientific observer. If the limit is reached, the use of the variation for the purpose of the experiment will cease and the vessels will revert in full to the provision of Conservation Measure 29/XVI.

4.69 The Scientific Committee noted that the variation from Conservation Measure 29/XVI and the limit on bird mortality is only for the purpose of allowing the experiment with line weighting to proceed with the ultimate aim of introducing measures which will reduce bird mortality to zero. They do not constitute precedents for longline fishing operations in other years, seasons or areas.

4.70 The Scientific Committee agreed that with the exception of the variation agreed above for Subarea 88.1 (south of 65°S), Conservation Measure 29/XVI should be retained in full for longline fisheries in all parts of the Convention Area (Annex 5, paragraph 7.169).

Approaches to Eliminating Seabird By-catch in Longline Fisheries in the Convention Area

4.71 The Scientific Committee welcomed and endorsed the WG-FSA review of policies and practices (involving seabird and fish research, fishing gear development, education and legislation) which it believed essential to progressing and resolving this issue (paragraph 7.189). It drew to the attention of the Commission the recommendations for:

- (i) sustained development of underwater setting, as the likely medium- to long-term solution (Annex 5, paragraph 7.190);
- (ii) enhanced work to develop line weighting regimes to ensure sink rates that will preclude seabirds accessing baits (Annex 5, paragraph 7.191) and the implications of this for exemption from other mitigating measures (Annex 5, paragraph 7.192);
- (iii) improving compliance with the existing suite of mitigation measures (Annex 5, paragraph 7.193);
- (iv) improved training and education of fishing companies, vessel captains, fishing masters, crew, scientific observers and technical coordinators (Annex 5, paragraph 7.194);
- (v) development of a range of national and international plans of action, e.g. those under FAO, CMS and the Australian Threat Abatement Plan (Annex 5, paragraph 7.196); and

- (vi) action relating to improved regulation of high seas fishing (especially through harmonisation of management measures) with CCAMLR encouraging Members (and other countries fishing in the Convention Area) to ratify and promote entry into force of instruments such as the 1995 UN Agreement for the Implementation of Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNIA), FAO Compliance Agreement and Code of Conduct for Responsible Fisheries (Annex 5, paragraph 7.197).

4.72 The observer from ASOC expressed appreciation for the work which scientists and governments have undertaken to resolve the critical problem of incidental seabird mortality. However, ASOC still has grave concerns regarding the level of seabird by-catch that has been associated with longline activity in the Convention Area. It is ASOC's view that the existing problem is greatly exacerbated by the fact that actual levels of incidental mortality are unknown and existing figures are likely to significantly under-represent the true extent of the problem, and thus the ecological implications of present incidental seabird mortality levels. It can be argued that extinction remains a very real possibility for several populations of albatrosses. Therefore ASOC believes that it is vital that recommendations for effective by-catch prevention measures be forwarded to the Commission by the Scientific Committee in the strongest of terms. Bearing in mind that the overwhelming majority of seabird deaths occur in the illegal and unregulated fishery, these measures must involve actions by Member States, e.g. port and market controls, that will effectively bring an end to these illegal and unregulated activities. ASOC notes the success of the enforcement activities taken by some governments in reducing levels of illegal activities within their EEZs and urges all states to devote more resources to effective enforcement. Finally, ASOC would like to see continued progress with respect to the development of a broader range of measures to prevent seabird mortality, taking into account the ecological, seasonal and environmental conditions which increase the likelihood of seabird by-catch.

4.73 In respect of entanglement in longlines of animals other than birds, the only report is of a single seal killed in Subarea 48.2 (Annex 5, paragraph 8.1).

Incidental Mortality in Trawl Fisheries

4.74 Only a single report, of a grey-headed albatross killed in collision with a trawl warp line (Annex 5, paragraph 8.3), was received this year. There was no evidence of vessels fishing with net monitor cables in contravention of Conservation Measure 30/X (Annex 5, paragraph 8.2).

Marine Debris

4.75 The Scientific Committee confined its discussion of this item to reports of direct interaction between marine debris and living resources. Reports of surveys of marine debris will, as usual, be considered by the Commission.

4.76 The UK undertook surveys of entanglement of Antarctic fur seals (*Arctocephalus gazella*) at Bird Island, South Georgia (SC-CAMLR-XVII/BG/11) for the eighth consecutive winter (1997) and tenth consecutive summer (1997/98). In winter, seven seals were observed entangled, 40% of the number in 1995. Usually most (75%) entanglements were of adult females. Packaging bands (57%), synthetic fishing line (14%) and fishing net (14%) were the main entangling materials. In summer, 13 seals were recorded entangled, the lowest total to date. Most animals involved were juveniles; the overall severity of injury was the lowest yet recorded. The proportion of entanglements in synthetic line (8%) was much less than in recent

years, with fishing net (38%) and especially packaging bands (54%) considerably increased. Overall however, the level of entanglement recorded was the lowest since the study started 10 years ago.

4.77 In 1997/98, the UK undertook the second systematic annual survey of entanglement of Antarctic fur seals at Signy Island, South Orkney Islands (SC-CAMLR-XVII/BG/12). Six seals, all juvenile males, were reported entangled; this is half the number in the previous year, possibly due to the prolonged presence of sea-ice in the area. Entanglement was mainly in fishing net (83%) but also in packaging bands (17%), the reverse of the situation at Bird Island (14% and 57% respectively). Severe injury was being caused to 67% of animals at Signy Island (none at Bird Island). The reduction in entanglement in general and in packaging bands in particular, is encouraging. However, this may have been as much due to environmental conditions in 1997/98 as to improved waste disposal practice.

4.78 In 1997/98, the fifth year of standardised recording of man-made debris associated with seabirds at Bird Island, South Georgia (SC-CAMLR-XVI/BG/10), there was a marked increase in ingested and regurgitated plastic items reported for albatrosses. The total of 41 items was more than twice the previous highest total (in 1993/94). Ingested plastics were also reported for giant petrels and white-chinned petrels. Fishing gear was reported in association with grey-headed albatrosses (seven squid jigs), black-browed albatrosses (two hooks and line, one squid jig) and wandering albatrosses (25 hooks and/or line). These levels are similar to or higher than most previous years, especially for squid jigs. This may suggest increased squid fishing activity in the area around, or adjacent to, South Georgia. Overall, the impact on birds at their breeding colonies remains a cause of concern.

4.79 Pollutants found in association with seabirds at sub-Antarctic Marion Island for the period May 1996 to April 1998 are reported in CCAMLR-XVII/BG/26. Standardised searches and incidental finds show a large increase between the 1996/97 and the 1997/98 field seasons. Fishing gear increased at a rate 10-times higher than other (non-fishing) pollutants over this period. Sixty rope nooses used for suspending toothfish in blastfreezers and 23 toothfish hooks were found. All the rope nooses, and 19 of the hooks were found during the second year. This increase in fishing gear from 1996/97 to 1997/98 is interesting in view of the fact that the large influx of vessels fishing illegally for *D. eleginoides* in waters around the Prince Edward Islands occurred during the 1996/97 season. Prior to this study, three southern bluefin tuna hooks had been found at Marion Island between 1992 and 1996. Three seabirds (a southern giant petrel, a northern giant petrel and a sub-Antarctic skua) were found entangled in fishing gear, while five seabird carcasses (three wandering albatross chicks, one white-chinned petrel chick and a southern giant petrel adult) were found with ingested fishing gear.

4.80 Dr Miller indicated that a similar survey at Prince Edward Islands was planned in the next couple of years to compare levels of debris at a strict nature reserve with those on Marion Island.

4.81 Prof. D. Torres (Chile) indicated that CCAMLR-XVII/BG/27 reports two Antarctic fur seals seen entangled at Cape Shirreff in 1997/98. One animal, a juvenile male, was entangled in a packaging band from which it was released.

4.82 Prof. Duhamel noted that a substantial increase in debris, especially fishing hooks, has been recorded around the nests of wandering albatrosses on Possession Island, Crozet Islands (CCAMLR-XVII/BG/41).

4.83 Prof. Torres again suggested that all efforts should be made to free seabirds and marine mammals from entangling debris.

4.84 The Scientific Committee noted that the relatively frequent reports of entanglements in packaging bands are not necessarily evidence of failure by vessels of Members of CCAMLR to comply with Conservation Measure 63/XV, as the bands could well derive from vessels

engaged in illegal or unregulated fishing. However, it was noted that observers reported the presence of packaging bands on two vessels in the Convention Area in 1997/98 (Annex 5, Table 14).

4.85 The Scientific Committee drew to the attention of the Commission that there may be quite extensive amounts of gear lost from longline vessels which are currently unreported to CCAMLR. Such gear has considerable potential for entanglement of marine mammals and birds. This problem is likely to be more acute in the unregulated fishery, exacerbated by occasional instances of large-scale gear loss, when complete longlines are abandoned in order that vessels may evade capture.

Marine Mammal and Bird Populations

4.86 The Scientific Committee at its Sixth Meeting (SC-CAMLR-VI, paragraphs 8.6 and 8.7), agreed to periodically review the status of all marine mammal and bird populations in the Antarctic, with particular attention to identifying those species whose populations have experienced or are currently experiencing a significant change in abundance. SCAR-GSS, SCAR-BBS and the IWC were asked in 1995 to again provide appropriate information (SC-CAMLR-XIV, paragraph 3.70).

4.87 The report from SCAR-BBS, prepared in August 1996, was tabled as requested at the 1996 meeting of the Scientific Committee which recognised the vast amount of work involved in preparing the review and expressed its appreciation for the work of SCAR-BBS (SC-CAMLR-XV, paragraph 3.80).

4.88 Although the report of SCAR-BBS (SC-CAMLR-XV/BG/29) was available to WG-EMM at its 1997 meeting, substantial discussion was deferred to the 1998 meeting so that it could be discussed alongside the report of SCAR-GSS (SC-CAMLR-XVI, paragraph 4.91) when presented.

4.89 It was noted that the report of SCAR-GSS (paragraph 4.31) was available for the 1998 meeting of WG-EMM. The Scientific Committee thanked SCAR-GSS for this report.

4.90 Discussions of the reports of both SCAR-GSS and SCAR-BBS at the 1998 meeting of WG-EMM were limited on this occasion due to the absence of appropriate bird and seal biologists.

4.91 In respect of the report of SCAR-BBS (SC-CAMLR-XV/BG/29), the WG-EMM report had suggested that it contained data of questionable reliability and outdated information and recommended that its utility should be considered by the Scientific Committee in the light of the data submitted to CEMP. However, Dr Everson indicated that the original comments of the working group may have been based on a misunderstanding.

4.92 Dr Everson expressed his view that WG-EMM participants at the 1998 meeting did not properly recognise the value of this status and trends report. The report addressed bird populations at the broad Southern Ocean scale and provides information far beyond the basic krill-centred system currently under consideration by WG-EMM.

4.93 Prof. Croxall reaffirmed that the SCAR-BBS review, which had been prepared by 21 scientists from 13 countries, considered data for some 24 species for about 80 locations, and gave comprehensive advice on the status and trends of Antarctic and sub-Antarctic seabirds that could not be derived from existing CEMP data.

4.94 It was noted that the next review of status and trends of Antarctic seals and seabirds should be presented in the year 2000 (SC-CAMLR-XVI, paragraph 4.96).

4.95 Prof. Croxall reported that preparations for the next review of the status and trends of Antarctic and sub-Antarctic seabirds were well advanced. In order to take account of the request to undertake statistical analysis of trends in seabird populations in the Convention Area, SCAR-BBS had decided to hold a special workshop, involving the holders of long-term data together with other seabird experts and statisticians.

4.96 This workshop will be hosted by the Montana State University, USA from 17 to 21 May 1999. Contributions to the funding for this workshop have already been provided by the US National Science Foundation and SCAR and are being sought from CCAMLR at this meeting, as was indicated last year (SC-CAMLR-XVI, paragraph 4.96).

4.97 Prof. Torres noted that SCAR-GSS will meet prior to the year 2000 meeting of SCAR. The 1998 report from the meeting in Concepción, Chile, will be made available to WG-EMM, possibly next year.

4.98 The Scientific Committee welcomed these initiatives and looked forward to receiving reports from SCAR in due course.

4.99 Several bird species forage within the CCAMLR area although breeding outside it (e.g. Annex 5, paragraph 7.7) and it was hoped that these species will be included in the review.

4.100 Three other seabird research papers tabled by New Zealand (SC-CAMLR-XVII/BG/8, BG/9 and BG/13) provide additional data on populations. These papers were provided in response to CCAMLR's request for information on national programs investigating the status of albatrosses, giant petrels and white-chinned petrels (SC-CAMLR-XVI, Annex 5, paragraphs 7.18 and 7.20).