DEPENDENT SPECIES

Species Monitored under the CCAMLR
Ecosystem Monitoring Program (CEMP)

Report of WG-EMM

4.1 Dr Everson introduced the report of WG-EMM by noting that Dr Ramm (Data Manager) had submitted a summary report of trends and anomalies of CEMP indices (WG-EMM-99/8). Dr Ramm and his staff were thanked for the amount and quality of the work.

4.2 An ad hoc group of WG-EMM reviewed the CEMP indices for possible errors. The group reported that out of several thousand entries, only about 34 contained possible errors, a very small proportion.

4.3 The Secretariat was requested to resolve the status of all the currently remaining queries concerning specific data entries.

4.4 The Scientific Committee endorsed the recommendations of WG-EMM regarding CEMP data and indices:

(i) Updated CEMP indices should be posted on the CCAMLR website each year prior to WG-EMM and copies sent to attendees and data holders by email. Two hard copies of the data should be brought to each meeting by the Secretariat for reference.

(ii) Data tables consisting of small, inactive summaries should be archived after consultation with the respective data holders regarding the status of these data. A table summarising archived data should be included as an appendix to the report. This would reduce the bulk of the CEMP indices report by about 23 tables.

(iii) Data should be submitted electronically in standard Excel formats to be developed by the Secretariat after consultation with current data holders.

(iv) The report of anomalies and trends should be presented in two ways: all variables by each site and all sites within subareas by each variable (where the variables are represented at every site).

(v) Each data holder should submit maps of sites and colonies where CEMP data are collected. These will be archived by the Secretariat.

4.5 A number of studies on the distribution and population dynamics of dependent species were reported.

(i) A census of seabirds breeding on Marion Island (WG-EMM-99/6) reported that in general, species with large foraging ranges increased whereas species foraging nearer to Marion Island showed decreases in numbers.

(ii) Sightings of large whales from three independent sighting databases showed that the areas where whales were sighted with the greatest frequency corresponded with traditional whaling areas, indicating that areas used by whales had not changed over time (WG-EMM-99/34).

(iii) Antarctic fur seal pup production at Cape Shirreff, Livingston Island, showed a 10% increase in 1998/99 from values in 1997/98. This followed a 14% decrease between 1996/97 and 1997/98, which was attributed to the El Niño Southern Ocean (ENSO) event (WG-EMM-99/16).

4.6 A promising technique for estimating Antarctic fur seal field metabolic rates, important for energetics calculations in prey consumption models, was described in WG-EMM-99/36. The technique, which is based on variations in heart rate, offers an attractive alternative to the doubly labelled water technique.

Proposals for Extension of CEMP Activities

Consideration of Existing and New Draft CEMP Methods

4.7 A discussion was held on issues related to existing CEMP methods and on proposals for new methods.

4.8 The current CEMP Standard Method C1a recommends a sample size of 40 animals to detect interannual differences in the foraging trip duration of lactating female Antarctic fur seals at Cape Shirreff. Analyses presented in WG-EMM-99/45 indicate that a smaller sample size (25 to 40 animals) was sufficient.

4.9 It was agreed that the advice on reduced sample size for Method C1a should be incorporated into the next revision of the standard methods.

4.10 It was noted that CEMP Standard Method A8a (meal mass of Adélie penguins) required clarification to emphasise the importance of determining the breeding status of sampled birds (WG-EMM-99/46). The Secretariat was requested to flag in the database potential problems arising from analyses of this parameter.

4.11 WG-EMM-99/12 presented new standard methods for indices of environmental parameters which have potential direct effect on predators. Methods and data collection forms were presented for three indices: F1 (sea-ice extent viewed from a CEMP site), F3 (local weather at a CEMP site) and F4 (snow cover at a CEMP site). These are to be considered for adoption at the next meeting of WG-EMM.

4.12 The Secretariat was tasked with requesting Members undertaking CEMP work at shore-based stations what meteorological data they collected on site or had ready access to from nearby stations.

4.13 The fatty acid signature analysis method was put forward as a potentially useful method for the characterisation of the diet of predators (WG-EMM-99/44).

4.14 The Working Group noted that the discriminant function method to determine the sex of krill, based on simple length and width measurements of the removed carapace (WG-EMM-99/31), was a useful development with potential for application to other taxa.

4.15 Progress was reported on the development of a standard method for the sampling of the diet of Antarctic fur seals (WG-EMM-97/5).

4.16 It was recommended that future consideration of the detailed aspects of submissions regarding methods be considered in a subgroup, either intersessionally and/or during the WG-EMM meeting, prior to a report being presented to the Working Group for discussion in plenary.

Proposals for CEMP Sites

4.17 No new CEMP sites were proposed for consideration by WG-EMM.

4.18 It was noted that all structures have been removed from Seal Island, the former site of US CEMP research. The Working Group regretted that the site had been closed but was pleased that the site had been cleared.

4.19 The Scientific Committee considered Conservation Measure 82/XIII, which affords protection to the Cape Shirreff CEMP site. It noted that the measure became effective 1 May 1995.

4.20 The Scientific Committee considered Conservation Measure 18/XIII which states that each management plan shall be reviewed every five years to determine whether it requires revision and whether continued protection is necessary. This task was referred to the Subgroup on Designation and Protection of CEMP Sites for guidance.

4.21 The subgroup cited the importance of the long-term CEMP research being conducted at Cape Shirreff by Chile and the USA and recommended continued protection. A review of the management plan (Conservation Measure 18/XIII, Annex B – Cape Shirreff) showed that there are minor technical aspects of the plan that require revision.

4.22 The subgroup referred the Scientific Committee to Conservation Measure 62/XI, which affords protection to the Seal Islands CEMP site. It was noted that the management plan (Conservation Measure 82/XIII, Annex B – Seal Islands) also requires minor technical revision, due to the removal of all structures at the site.

4.23 The Chairman noted the importance of avoiding a gap in protection to the Cape Shirreff CEMP site, while acknowledging the need for minor technical revisions to the management plan. The Chairman suggested that a way forward would be to recommend to the Commission an extension of site protection for five years. The Scientific Committee agreed with this recommendation.

4.24 The Chairman referred the review and revision of the technical aspects of the management plans for both CEMP sites to the Subgroup on Designation and Protection of CEMP Sites, which would work intersessionally to prepare revised plans for consideration during the next WG-EMM meeting. Additionally, due to concern about the quality of maps for CEMP sites, the subgroup was tasked with working intersessionally with the Secretariat to address this matter.

4.25 Dr K. Sullivan (New Zealand) introduced CCAMLR-XVIII/24 which presents a management plan for a proposed Specially Protected Area (SPA) which includes the Balleny Islands and a surrounding marine area. He requested that the Scientific Committee comment on the merits of protection for this area both in principle and with regard to the specific proposal, which had been revised since the initial submission of the draft plan in June 1999 at the CEP meeting at ATCM-XXIII.

4.26 The Chairman of the Scientific Committee noted that WG-EMM had discussed an earlier draft of the Balleny Island SPA Management Plan (WG-EMM-99/21) at its July 1999 meeting. The Working Group had decided to circulate this paper to its Subgroup on Designation and Protection of CEMP Sites and noted that approval was beyond WG-EMM's remit at this year's meeting (paragraph 11.33(iii)). It was also recommended that clearer information and a scientific rationale for zone limits be provided, along with improved maps.

4.27 The Chairman further noted that this paper was submitted to the Commission and would most likely be referred to the Scientific Committee for comment. According to Annex V, Article 6(2) of the Protocol for Environmental Protection, the draft management plans that include a 'marine area' need to be submitted to CCAMLR for approval.

4.28 The Scientific Committee commented that, in principle, the concept of a marine protected area and ecological preserve could have scientific merit, if properly assessed, but that it was premature to comment specifically on the proposal for the Balleny Islands. It was recommended that the details of the proposal be directed to the Subgroup on Designation and Protection of CEMP Sites.

4.29 The Scientific Committee noted that the Subgroup on Designation and Protection of CEMP Sites should consider further development of a methodology for the assessment of proposals for marine protected areas put forward by the ATCM. It was further recommended that the subgroup be expanded to include additional expertise in the area of fisheries.

4.30 As a matter of clarification, the Chairman asked Dr E. Fanta (Brazil) to comment on the current status of the review of the management plan in the ATCM system. She stated that the plan had been reviewed at the July 1999 GOSEAC meeting (SC-CAMLR-XVIII/BG/27) and then noted that some of the changes recommended by GOSEAC had been incorporated into the plan submitted as CCAMLR-XVIII/24 (paragraph 11.33).

4.31 The Chairman cautioned that it was important for the most current version of the management plan to be provided to those charged by CCAMLR to review the plan.

4.32 Prof. C. Moreno (Chile) called attention to the first report of anti-*Brucella* antibodies in fur and Weddell seals from Cape Shirreff, Livingston Island (SC-CAMLR-XVIII/BG/18). It was noted that protected areas are not impermeable to the possibility of disease.

Data Requirements

4.33 Dr Everson noted the importance of continuing the data collection process. He called attention to the SCAR Working Group on Bird Biology workshop held in Montana, USA, during May 1999. This report will be submitted to the upcoming SCAR meeting to be held in July 2000 in Japan.

4.34 Since this report will contain the best information on the status and trends of Antarctic seabird populations, the Scientific Committee requested that the report be provided in advance of the 2000 meeting of WG-EMM.

4.35 Mr Cooper, Chairman of the SCAR-BBS, agreed that the report would be provided in advance of WG-EMM.

4.36 Prof. D. Torres (Chile) informed the Scientific Committee that the SCAR-GSS would be producing a report on the status of seals for the 2000 meeting of SCAR. Prof. Torres noted the importance of having this report made available to the 2000 WG-EMM meeting. Dr Miller agreed to write a letter to the group's convener, Dr J. Bengtson (USA), asking that the report be made available prior to WG-EMM.

4.37 Dr Everson noted the importance of the collaboration between CCAMLR and the IWC in the upcoming CCAMLR-2000 Survey. The participation of IWC observers in cruises will provide data beneficial to both CCAMLR and the IWC.

4.38 Dr Everson reported that Dr P. Hammond (IWC) clarified the status of whale survey data to be collected by IWC observers participating in the CCAMLR-2000 Survey. The data would be freely available for analyses to be presented to its scientific committee but would still be subject to the CCAMLR data rules for publication.

4.39 Dr Holt noted that the US APIS Program would conduct an ice-seal survey as part of its overall ecosystem research cruise in January 2000. The results of this survey would have

relevance to CCAMLR, which is a joint sponsor of the program.

4.40 The Scientific Committee agreed with the following tasks for work on CEMP sites and existing and new standard methods:

Secretariat tasks:

(i) Resolve the status of all inquiries listed in Table 1 of the WG-EMM report (Annex 4).

(ii) Flag in the database potential problems of interpretation arising from analysis of parameters of Method A8a.

(iii) Request Members undertaking CEMP work at shore-based stations to advise on the type of meteorological data they collect on site or had ready access to from nearby stations.

Working Group activities:

Subgroup on Designation and Protection of CEMP Sites –

(iv) Review and revise the technical aspects of the management plans for both the Cape Shirreff and the Seal Islands CEMP sites.

(v) In cooperation with the Secretariat, upgrade the quality of maps for CEMP sites.

(vi) Review the details of the management plan of the Balleny Island SPA.

(vii) Consider further development of a methodology for the assessment of proposals for marine protected areas put forward by the ATCM.

Subgroup on Standard Methods –

(viii) Prepare advice on reduced sample size for Method C1a which should be incorporated into the next revision of the *CCAMLR Standard Methods.*

(ix) Consider drafts of Methods F1 and F4 for adoption at the next meeting of WG-EMM.

Advice to the Commission

4.41 The Scientific Committee reviewed the management plan of the Cape Shirreff CEMP site (Conservation Measure 62/XI), as per the procedures for affording protection to CEMP sites (Conservation Measure 18/XIII, Annex B – Cape Shirreff). The Scientific Committee, noting the importance of the long-term CEMP research being conducted by Chile and the USA, recommended that the Commission extend protection to the Cape Shirreff CEMP site for an additional five years.

Assessment of Incidental Mortality

Incidental Mortality Arising from Longline Fishing

4.42 The Scientific Committee noted the recommendations and advice provided by ad hoc

WG-IMALF (Annex 5, paragraphs 7.171 to 7.180).

4.43 The Scientific Committee welcomed the publication of the book *Identification of Seabirds of the Southern Ocean. A Guide for Scientific Observers aboard Fishing Vessels* published by CCAMLR and the National Museum of New Zealand in 1999, and noted WG-IMALF's comments for any possible future revisions (Annex 5, paragraph 7.5). Dr A. Baker (New Zealand) promoted the guide as the best available and highlighted its importance in assisting CCAMLR to gather more accurate data on incidental mortality of seabirds. He also indicated that good use could be made of the guide by observers working in areas outside the Convention Area.

4.44 The Scientific Committee noted the comprehensive response to its request for information on research programs into the population status and foraging ecology of seabird species at risk from longline fishing in the Convention Area (Annex 5, paragraph 7.7). It endorsed WG-IMALF's interim advice along with the need for intersessional investigation and refinement of information to determine more accurately the potential utility to CCAMLR of data from such research programs (Annex 5, paragraphs 7.9 to 7.18).

4.45 Also the Scientific Committee recognised the need for ongoing investigation of the sampling effort required to estimate accurately seabird by-catch rates (Annex 5, paragraph 7.33).

Incidental Mortality of Seabirds during Regulated Longline Fishing in the Convention Area

4.46 The intersessional revision of 1998 data by WG-IMALF showed that:

(i) seabird by-catch totals and rates for Subareas 58.6 and 58.7 (Annex 5, Tables 46 to 48) were 63 and 39% of the 1997 values respectively (Annex 5, paragraph 7.21); and

(ii) the time of year (very few birds caught after April) and use of streamer lines were important in reducing seabird by-catch as shown by observer data from 1997 and 1998. However, the effects of most other factors (including line weighting) could not be fully analysed using the existing data (Annex 5, paragraphs 7.22 to 7.25).

4.47 The Scientific Committee noted that further improvements to, and assessments of, mitigation measures will require carefully designed field experiments as not much more is likely to be learnt from continuing analysis of observer data (Annex 5, paragraph 7.28).

4.48 Timely submissions by Members resulted in detailed analysis of 1999 data (Annex 5, paragraph 7.30) which showed that:

(i) Subarea 48.3: seabird by-catch (210 birds) was reduced by 65% and the by-catch rate (0.01 birds/thousand hooks) by 67%, compared with 1998. However, there was scope for further reductions through improved offal discharge, daytime setting and line weighting (Annex 5, paragraphs 7.36 to 7.38).

(ii) Division 58.5.1: no data were received but at least 151 birds were killed. France was requested to submit data to future meetings (Annex 5, paragraphs 7.39 and 7.40).

(iii) Subareas 58.6 and 58.7: seabird by-catch (156 birds) was reduced by 70% and the by-catch rate (0.03 birds/thousand hooks) by 85%, compared with 1998 (Annex 5, paragraphs 7.41 to 7.44). The largest reductions in by-catch were

achieved by a change in the fishing area and by the use of underwater setting. WG-IMALF recommended that fishing within 200 km of the Prince Edward Islands should be prohibited from January to March (Annex 5, paragraphs 7.41 to 7.46). In response, Mr Watkins drew the Scientific Committee's attention to the fact that South Africa had prohibited longlining close to the islands year round, had improved compliance with Conservation Measure 29/XVI and was vigorously investigating underwater setting of lines. All these factors had resulted in a marked reduction of bird by-catch during the past year.

(iv) Subarea 88.1: no seabird by-catch was observed (Annex 5, paragraph 7.34).

4.49 The Scientific Committee noted that seabird by-catch and by-catch rate in the regulated fishery over the past three years had been reduced by 96.4 and 95.7% respectively in Subarea 48.3 and by 81.3 and 94.2% respectively in Subareas 58.6 and 58.7 from 1997 to 1999. This had been achieved by a combination of improved compliance with Conservation Measure 29/XVI and by delaying the start of fishing towards the end of the breeding season of most albatross and petrel species (Annex 5, paragraph 7.47).

Compliance with Conservation Measure 29/XVI

4.50 The Scientific Committee noted that overall, levels of compliance with elements of Conservation Measure 29/XVI have steadily improved, particularly with respect to night setting and offal discharge. However, compliance with line weighting and overall use of streamer lines is still far from satisfactory. Two autoline vessels operating in Subarea 88.1 complied with all aspects of Conservation Measure 29/XVI (subject to the variation to allow daytime setting granted under Conservation Measure 169/XVII). For the remainder of the vessels, either insufficient data were provided to assess full compliance or not all elements of the conservation measure were complied with (Annex 5, paragraph 7.48 and Table 16).

4.51 The average weights (kg) per metre of mainline for all vessels in 1997, 1998 and 1999 were 0.111 (5 kg at 45 m), 0.133 (6 kg at 45 m) and 0.159 (7 kg at 44 m) respectively. This indicates a substantial increase in the overall weight added to lines in 1998/99, but is still well below the level (6 kg at 20 m) specified by Conservation Measure 29/XVI (Annex 5, paragraph 7.49). One vessel complied with the line-weighting regime for the Spanish longline system (6 kg every 20 m) on two of three cruises. Another vessel used a line-weighting regime close to this requirement (5 kg every 20 m) on two of five cruises.

4.52 The Scientific Committee recommended that further experiments to determine minimum effective line-weighting regimes for both Spanish and autoline systems should be undertaken as a matter of urgency (Annex 5, paragraphs 7.167 and 7.180(vi)). In the meantime, it recommended that the line-weighting regime in Conservation Measure 29/XVI be adhered to.

4.53 In Subareas 58.6, 58.7 and 88.1, there was 100% compliance with the requirement either to hold offal on board during the haul, or to discharge on the opposite side of the vessel to hauling. In Subarea 48.3, 71% of the vessels discharged offal on the opposite side to hauling, compared with only 31% in 1998 (Annex 5, paragraph 7.50). In Subarea 88.1, vessels achieved compliance through having a fish meal plant operating to process offal.

4.54 Night setting was achieved for 80% of sets in Subarea 48.3 and 84% in Subareas 58.6 and 58.7. Excluding daytime sets made during mitigation-measure experiments by the *Argos Helena* in Subarea 48.3 and *Eldfisk* in Subareas 58.6 and 58.7, night-setting values are 86 and 98% respectively, compared with 90 and 93% for 1998 (Annex 5, paragraph 7.51).

4.55 Both vessels fishing in Subarea 88.1 deployed streamer lines that complied with Conservation Measure 29/XVI. No vessels fishing in Subareas 48.3, 58.6 and 58.7 used

streamer lines that met all aspects of the CCAMLR design. The length of streamer lines was the element with lowest compliance and only 10% of vessels in Subareas 58.6 and 58.7 and 26% in Subarea 48.3 had lines that were at least 150 m long. Compliance with attachment height and number and spacing of streamers is generally close to 100% (Annex 5, paragraph 7.52, Tables 16 and 17).

Incidental Mortality of Seabirds during Unregulated Longline Fishing in the Convention Area

4.56 The Scientific Committee noted that the 1997 seabird by-catch rates from the regulated fishery, rather than the much lower 1999 values, had been used to characterise the performance of unregulated vessels in 1999 in respect of incidental mortality of seabirds (Annex 5, paragraphs 7.57 to 7.62).

4.57 The estimates of potential seabird by-catch by area for 1999 (Annex 5, paragraphs 7.64 to 7.68, Tables 55 and 56) were:

Subarea 48.3	3 230–4 360 to 11 700–15 800 seabirds
Subareas 58.6 and 58.7	12 070–16 140 to 23 800–32 100 seabirds
Divisions 58.5.1 and 58.5.2	110–155 to 3 725–5 050 seabirds
Division 58.4.4	3 015–4 030 to 5 030–7 130 seabirds.

4.58 The overall estimated totals for the whole Convention Area (Annex 5, paragraph 7.69 and Table 56) indicated a potential seabird by-catch in the unregulated fishery of 18 000–25 000 (lower level) to 44 000–59 000 birds (higher level) in 1998/99. This compares with totals of 17 000–27 000 (lower level) to 66 000–107 000 (higher level) in 1996/97 and 43 000–54 000 (lower level) to 76 000–101 000 (higher level) in 1997/98. However, any suggestion of a decrease in 1998/99 should be viewed with caution, given the uncertainties and assumptions involved in the calculations.

4.59 The species composition of the estimated potential seabird by-catch (Annex 5, Table 57) indicates a potential by-catch of 21 000 to 46 500 albatrosses, 3 600 to 7 200 giant petrels and 57 000 to 138 000 white-chinned petrels in the unregulated fishery in Convention Area over the last three years.

4.60 The Scientific Committee agreed that such levels of mortality are unsustainable for the populations of albatrosses, giant petrels and white-chinned petrels breeding in the Convention Area (Annex 5, paragraph 7.73).

4.61 As last year (SC-CAMLR-XVII, paragraph 4.50), the Scientific Committee therefore recommended that the Commission take the most stringent measures possible to combat IUU fishing in the Convention Area.

4.62 Dr Baker expressed extreme concern at the continuing massive mortalities of seabirds during IUU longline fishing. He also expressed disappointment that not all CCAMLR-licensed vessels were adhering to CCAMLR conservation measures, and suggested that Flag States needed to be much stricter in their control of such vessels and their parent companies.

Incidental Mortality of Seabirds in relation to New and Exploratory Fisheries

4.63 The Scientific Committee noted the levels of the incidental mortality of seabirds in new and exploratory longline fisheries during the 1998/99 season. In Subarea 88.1 (New Zealand),

no seabirds were caught (Annex 5, paragraph 7.31), and in Subareas 58.6 and 58.7 (South Africa) low levels of seabird by-catch were experienced (Annex 5, paragraphs 7.29 to 7.51).

4.64 In this and past years, WG-IMALF has undertaken comprehensive assessments of incidental seabird mortality for most subareas and divisions. Full assessments of the risk of seabird by-catch have been compiled for all statistical subdivisions of the Convention Area (except Subarea 48.5) (SC-CAMLR-XVIII/BG/23; Annex 5, paragraph 7.84 and Table 58).

4.65 The Scientific Committee noted there are a number of potential conflicts between proposed fishing seasons and closed seasons to protect breeding seabirds from longline fishing contained in the new and exploratory fisheries notifications for 1999/2000. These were:

(i) minor for Divisions 58.4.3 (European Community), 58.4.4 (Chile, European Community, South Africa and Uruguay), Subarea 58.6 (Chile, European Community, South Africa) and Subarea 58.7 (South Africa);

(ii) substantial for Divisions 58.4.3 (France), 58.4.4 (France), 58.5.1 (France), Subarea 58.6 (France) and Subarea 58.7 (France); and

(iii) uncertain for Division 58.5.1 (Chile).

4.66 The Scientific Committee endorsed WG-FSA's advice (Annex 5, paragraph 7.90) that the New Zealand proposal to continue variation to Conservation Measure 29/XVI in 1999/2000 within Subarea 88.1 (Annex 5, paragraphs 7.85 to 7.93) be accepted by the Commission.

4.67 With the exception of the variation agreed for Subarea 88.1, the Scientific Committee agreed that Conservation Measure 29/XVI should be retained for all longline fisheries in all parts of the Convention Area. With respect to new and exploratory fishery in 1999/2000, the Scientific Committee also recommended that the Commission adopt seasonal fishing closures for various subareas and divisions in line with those proposed by WG-IMALF (SC-CAMLR-XVIII/BG/23; Annex 5, paragraph 7.84 and Table 58).

Incidental Mortality of Seabirds during Longline Fishing outside the Convention Area

4.68 Information on seabird by-catch outside the Convention Area continues to indicate substantial by-catch of species and populations breeding within the Convention Area (Annex 5, paragraphs 7.97 to 7.100).

4.69 It was noted that no data were received from Members, especially for regions adjacent to the Convention Area, such as New Zealand, South Africa, southern South America and the Falkland/Malvinas Islands. The Scientific Committee considered that this situation was regrettable and Members were requested to conduct analyses of any existing datasets and provide information to next year's meeting of WG-IMALF (Annex 5, paragraphs 7.102 and 7.103).

Effectiveness of Mitigation Measures

4.70 The continued evaluation of methods to mitigate seabird by-catch in longline fisheries was welcomed by the Scientific Committee.

4.71 Offal discharge: Some vessels were still discharging offal on the same side of the vessel as hauling of the longline. This practice is in contravention of Conservation Measure 29/XVI.

Vessels were encouraged to undertake waste-pipe reconfiguration using information from the *Koryo Maru 11* (Annex 5, paragraph 7.110).

4.72 Line weighting: Experiments into line-weighting regimes using the Spanish longline-system vessels in Subarea 48.3 in February (Annex 5, paragraphs 7.111 to 7.115) and autoline vessels in Subarea 88.1 in January and February (Annex 5, paragraph 7.116), showed reductions in bird by-catch rates from 3.98 birds/thousand hooks to <1 bird/thousand hooks (in Subarea 48.3) and zero by-catch (in Subarea 88.1). These results have potentially important implications for longline fishing practices in the Convention Area (paragraph 4.76).

4.73 Underwater setting: The experiment using a Mustad underwater setting funnel in Subareas 58.6 and 58.7 between August 1998 and June 1999 showed that seabird by-catch (0.002 birds/thousand hooks) was significantly less with the funnel's use than without it (0.017 birds/thousand hooks) (Annex 5, paragraph 7.122). Further use and development of this system was strongly encouraged (Annex 5, paragraph 7.124).

4.74 The Scientific Committee requested technical coordinators of national scientific observation programs to provide relevant information on operational issues and fishing strategy procedures that may influence the successful use of mitigation measures, especially line-weighting regimes, for next year's meeting of WG-IMALF (Annex 5, paragraphs 7.126 and 7.127).

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

4.75 Initiatives to reduce seabird by-catch in longline fisheries by FAO, CMS, Australia and New Zealand (Annex 5, paragraphs 7.128 to 7.149) were supported by the Scientific Committee. The following initiatives were also noted and Members were urged to support them where appropriate:

(i) adoption by FAO of its IPOA–Seabirds in 1999 along with requests for FAO member states to produce NPOAs and report on them to FAO in 2001. The Scientific Committee encouraged longlining Members to develop their own NPOA–Seabirds and to report on progress next year (paragraph 11.4; Annex 5, paragraphs 7.129 to 7.131);

(ii) an initiative by the Valdivia Group to assist conservation of southern hemisphere albatrosses (Annex 5, paragraph 7.133);

(iii) progress with implementation of the Australian Threat Abatement Plan (Annex 5, paragraphs 7.137 to 7.140); and

(iv) the intention of New Zealand to host an International Fishers Forum in 2000 to develop improved mitigation measures. Members and fishers were encouraged to participate in this important initiative (Annex 5, paragraphs 7.144 to 7.149).

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

4.76 The Scientific Committee welcomed and endorsed the review of policies and practices by WG-IMALF, involving seabird and fish research, fishing gear development, education and legislation which it believed was essential to furthering the work of WG-IMALF (Annex 5, paragraphs 7.150 to 7.170). The attention of the Commission was drawn to the following:

(i) Within the Convention Area, IUU longline fishing now poses the principal survival threat for most, if not all, the species and populations of at-risk seabirds (Annex 5, paragraph 7.156).

(ii) The impact of IUU fishing on seabirds could be reduced by increasing the benefit to fishers of using vessels or fishing practices which were configured and/or operated in ways to reduce the probability of seabird by-catch (e.g. underwater setting, integrated weighted autolines) (Annex 5, paragraph 7.157).

(iii) Relaxation of current fishing season restrictions can only be recommended when there is full compliance with all elements of Conservation Measure 29/XVI (Annex 5, paragraph 7.160).

(iv) Vessels able to demonstrate that they have consistently (i.e. in every cruise) achieved full compliance with all elements of Conservation Measure 29/XVI in a fishing season should, in the following year, be allowed to fish at any time of year (Annex 5, paragraphs 7.163 to 7.166). In this respect:

(a) continuing compliance would need to be monitored on the basis of all available data, including scientific observer reports;

(b) appropriate line-weighting regimes for autoline vessels still require determination;

(c) there should be in-port inspection of vessels prior to departure in order to ensure that they are capable of complying fully with Conservation Measure 29/XVI and have all necessary fishing and related gear on board (see also paragraph 3.16); and

(d) longline fishing should cease if a significant level of bird by-catch occurs (cf. the Scientific Committee recommendation in SC-CAMLR-XVII, Annex 5, paragraphs 4.67 and 4.68, with respect to the New Zealand proposal for fishing in Subarea 48.1 in 1998/99). Advice on appropriate levels of seabird by-catch, on an area-specific basis, should be provided by WG-IMALF.

4.77 Given that full compliance with Conservation Measure 29/XVI remains elusive, the Scientific Committee agreed that it was premature to advise adoption of the above approach at the present time (Annex 5, paragraph 7.164).

4.78 The Scientific Committee noted the need for continued experiments to define the optimum (minimum) line-weighting regime that will eliminate (or reduce to a very low level) seabird by-catch for both autoliners and vessels using the Spanish system. As an incentive to attract the cooperation of fishers and fishery managers, the Scientific Committee recommended that such experiments should be conducted in accordance with a strictly specified experimental design under Conservation Measure 64/XII (Annex 5, paragraphs 7.167 and 7.169).

Incidental Mortality in Trawl Fisheries

4.79 The Scientific Committee noted WG-IMALF's conclusions on incidental mortality due to trawl fisheries (Annex 5, paragraphs 8.2 to 8.6).

4.80 The Scientific Committee noted that although WG-IMALF had identified measures to minimise seabird by-catch in trawl fisheries, such fisheries may exert other effects on seabird

populations and that these required further research (Annex 5, paragraph 8.7).

4.81 The Scientific Committee agreed that vessels conducting trawling operations in the Convention Area should have demonstrated their capacity to retain waste products from fishing and should organise the location and intensity of deck lighting to minimise the possibility of bird strikes. The latter would require directing lights inboard and downward onto the deck.

Marine Debris

4.82 The UK undertook surveys of entanglements of Antarctic fur seals at Bird Island, South Georgia (SC-CAMLR-XVIII/BG/5) as in previous years. The numbers (13) of entangled seals in winter represented an 86% increase on the 1997 figure. Only two animals were entangled with polypropylene straps, the second lowest level since records started. Twenty-four seals were observed entangled in summer, 84% higher than the previous year. The proportion of animals showing severe injuries (30%) was in contrast to 1997/98 when none was noted. Overall, occurrence of entanglement was down 80 to 90% of early 1990 levels. Polypropylene strap incidences have decreased slightly (35%) since their prohibition by CCAMLR in 1994, but severity of entanglement has increased. Sustained monitoring and continuing publicity aimed at preventing the disposal of debris at sea remains necessary.

4.83 In 1998/99 the UK undertook the third systematic annual survey of entanglements of Antarctic fur seals at Signy Island, South Orkney Islands (SC-CAMLR-XVIII/BG/6). Ten seals were sighted with neck collars, all juvenile males. The number of sightings increased by 66% since the previous season but was 17% lower than for 1996/97. Severe or very severe injuries were noted in 70% of the animals. The continued presence of packaging bands and synthetic line is of concern.

4.84 For the sixth year, the UK recorded man-made debris associated with seabirds at Bird Island, South Georgia (SC-CAMLR-XVIII/BG/7). An unprecedented quantity of lines originating from fishing vessels was recorded in association with wandering albatrosses. Quantities of fishing gear remained within the levels of previous years for most other species. Plastic debris remained within the levels of previous years for most species. Birds soiled with paint, tar and oil were noted.

4.85 Marine debris and fishing gear associated with seabirds at Marion Island was reported in SC-CAMLR-XVIII/BG/14. Most (52%) of the 306 items originated from the fishing industry. The most common items were rope nooses (79) and fishing hooks (28). Wandering albatrosses took the highest proportion of fishing gear, followed by southern giant petrels. Standardised searches revealed a slight decrease in debris associated with albatross nests since 1997/98, but levels were still much higher than in 1996/97.

4.86 Prof. Torres reported on the presence of transparent packaging bands, observed for the first time at Cape Shirreff in 1998/99.

4.87 The Scientific Committee took note of reports of marine debris surveys by several nations (CCAMLR-XVIII/BG/6, BG/7, BG/14, BG/18, BG/20, BG/22, BG/39, BG/40 as well as SC-CAMLR-XVIII/BG/10) that would be considered by the Commission.

4.88 It was noted that the increased summer totals of marine debris at South Georgia, at a time when no licensed fishing occurs, is a cause for concern (CCAMLR-XVIII/BG/12).

4.89 Dr Baker noted that in addition to CCAMLR-XVIII/BG/20, the two longline vessels which operated in Subarea 88.1 in 1998/99 each returned three tonnes of non-biodegradable waste to New Zealand at the end of their exploratory fishing.

4.90 Prof. Torres reported on the risk of disease from syringes and other medical waste and of containers with unidentified contents found washed up at Cape Shirreff in 1998/99 (CCAMLR-XVIII/BG/39).

Marine Mammal and Bird Populations

4.91 At its Sixth Meeting, the Scientific Committee agreed to periodically review the status of all marine mammals and bird populations in the Antarctic (SC-CAMLR-VI, paragraphs 8.6 and 8.7). The purpose of such a review would be to identify those species whose populations have experienced or are currently experiencing a significant change in abundance. SCAR-GSS, SCAR-BBS and the IWC were requested in 1995 to provide appropriate information on such populations (SC-CAMLR-XIV, paragraph 3.70).

4.92 The Scientific Committee has agreed that it will review the status of marine mammal and bird populations every five years (SC-CAMLR-VI, paragraph 8.7). The next review is planned for the year 2000.

4.93 It was noted that both SCAR-GSS and SCAR-BBS were currently involved in producing population assessments for pack-ice seals and seabirds respectively. In this regard, Dr Holt indicated that the APIS census planned for January and February 2000 is a one-off survey (paragraph 4.39). Dr Everson also noted that data gathered from whale observations during the CCAMLR-2000 Survey could provide population information on whales (paragraph 4.37).

4.94 The Scientific Committee encouraged SCAR-BBS and SCAR-GSS to provide their assessments in good time for the results to be reviewed by WG-EMM at its meeting in late July 2000. It was agreed that Mr Cooper and Prof. Torres should convey this request to the respective SCAR groups. It was also recognised that both these groups will meet in advance of WG-EMM's next meeting (paragraphs 4.35 and 4.36). Consequently, the Scientific Committee indicated its appreciation to Mr Cooper for his undertaking to provide a late draft version of the seabird population assessments as soon as this was available.