

DEPENDENT SPECIES

Species Monitored by CEMP

Report of WG-EMM

4.1 Dr Everson introduced those sections of the WG-EMM report dealing with dependent species and with species studied under CEMP.

4.2 Papers concerning population sizes and the demography of dependent species are summarised in Annex 4, paragraphs 4.1 to 4.5.

Methods for Monitoring the Performance of Dependent Species

4.3 The Subgroup on Monitoring Methods in 1996 (SC-CAMLR-XV, Annex 4, Appendix I) proposed several new methods and suggested areas where changes were required. These revisions were incorporated into the *CEMP Standard Methods*.

4.4 The Scientific Committee noted that WG-EMM made a number of recommendations for action related to methods for which comments had been received in tabled papers or in the report of the Subgroup on Statistics.

- (i) Method A5 – duration of foraging trips. The Scientific Committee endorsed the WG-EMM recommendation that the Data Manager should review the existing data, and revise the standard method appropriately, in consultation with the originators of the data. Once this has been done, sample size appropriateness should be reviewed (Annex 4, paragraph 8.52).
- (ii) Method A8 – chick diet. WG-EMM discussed potential biases in diet studies, whereby the fish component may be underestimated. WG-EMM recommended that a paragraph on this topic could be incorporated the next time standard methods are reviewed (Annex 4, paragraph 8.54).

The Scientific Committee referred this item to the Subgroup on Monitoring Methods.

- (iii) Method B5 – Antarctic petrel population size and breeding success. Norway has submitted the data collected from Svarthamaren to the Secretariat (Annex 4, paragraph 8.59). It was noted that similar data for this species are held by Dutch and US scientists working with Australia.

The Scientific Committee endorsed the WG-EMM recommendation that the Data Manager should contact these scientists to determine whether some of their data would meet the criteria for submission to CEMP.

- (iv) Method C1 – Antarctic fur seal foraging trip duration (Annex 4, paragraph 8.60). WG-EMM discussed bias which might be introduced by excluding from analysis data for which less than six trips had been completed and agreed that the

simulation of different sampling regimes could provide a guide to the most appropriate method for measuring foraging trip duration.

The Scientific Committee recommended that WG-EMM take this item forward to next year.

- (v) Method C2 – Antarctic fur seal pup growth. Possible modifications to take account of the pups which die were discussed (Annex 4, paragraph 8.62).

The Scientific Committee recommended that WG-EMM take this item forward to next year.

- (vi) the Scientific Committee noted the recent serological evidence for the presence of infectious bursal virus in Antarctic penguins (Annex 4, paragraph 8.63).

It was noted that undetected outbreaks of such diseases might have implications for interpreting CEMP data.

New CEMP Methods

4.5 A draft new method A3B – breeding population size from aerial photography – was discussed (Annex 4, paragraph 8.64). It was recommended that a revised draft method be submitted to WG-EMM next year.

4.6 Preliminary draft methods for estimating survival and pregnancy rates in Antarctic fur seals were considered (Annex 4, paragraphs 8.65 and 8.66). With regard to estimating survival rate, WG-EMM was not in favour of methods based on age structures but recommended that a mark-recapture method be developed (Annex 4, paragraph 8.66 to 8.85).

4.7 A draft method – C4 Antarctic fur seal diet – was discussed and suggestions for revisions made (Annex 4, paragraph 8.67). The Scientific Committee recommended that WG-EMM take this forward next year.

4.8 The Subgroup on Statistics made recommendations concerning the development of methods for measuring at-sea behaviour (Annex 4, paragraph 8.69). A significant problem with setting up a standard method of analysis is the likelihood that methods will continue to be refined with time and that summary parameters derived from data on at-sea behaviour may become outdated. To avoid this, it was suggested that data should be submitted in both a raw and analysed format. The Scientific Committee endorsed the recommendation of WG-EMM that the Secretariat and suppliers of the data should develop software to derive monitoring parameters from these data.

4.9 WG-EMM addressed proposed methods on minke whales (Annex 4, paragraph 8.71) by briefly reviewing the elements of a proposal concerning body fat condition and stomach content mass of minke whales. While these indices are appropriate in concept, the spatial and temporal scales over which they integrate information are uncertain and hard to relate to those of land-based predators, and therefore need further study. The Scientific Committee agreed that WG-EMM lacked the expertise to review these methods further and agreed to discuss this issue further under Agenda Item 11 in relation to cooperation with the IWC.

4.10 WG-EMM noted that methods for monitoring crabeater seals had been proposed by APIS and agreed that these, with small modifications, could form the basis for a CEMP standard method (Annex 4, paragraph 8.72).

4.11 WG-EMM requested that the SCAR Group of Specialists on Seals provide CCAMLR with a copy of the report of the 1996 APIS Workshop on Survey Design as soon as possible. The completion of the development of survey methods should be possible after the planned APIS survey in the summer of 1999.

4.12 WG-EMM recommended that a proposed method using data on the diet and reproductive performance of Antarctic blue-eyed shags (*Phalacrocorax bransfieldensis*) to provide information on the relative abundance of coastal fish populations be drafted for consideration at the next WG-EMM meeting. Dr E. Barrera-Oro (Argentina) informed the Scientific Committee that Argentina would present a paper on this draft method at the next meeting of WG-EMM.

4.13 WG-EMM noted that the results from the Antarctic Site Inventory Project (ASIP) might be of interest to CCAMLR and agreed that ASIP should be requested to provide WG-EMM with a list of its sites and, in due course, submit a paper to CCAMLR when about five years of consecutive data are available from most sites.

4.14 WG-EMM agreed that there should be standardisation of tagging procedures for Antarctic fur seals and recommended that a standard method for tagging fur seals should be prepared (Annex 4, paragraphs 8.82 to 8.85).

4.15 WG-EMM agreed on a system of site-specific colour coding of tags (Annex 4, paragraph 8.87).

4.16 WG-EMM agreed that information on tagging would be submitted to the SCAR Antarctic Seal Tagging Database which is located at the National Marine Mammal Laboratory, Seattle, USA.

Consideration of CEMP Sites

Management Plans

4.17 In accordance with Conservation Measure 18/XIII, which requires a review of CEMP management plans every five years in order to determine whether changes are required and whether continued protection is necessary, the Seal Island CEMP site (Conservation Measure 62/XI) was discussed by WG-EMM (Annex 4, paragraphs 8.39 to 8.42).

4.18 Based on a recommendation by WG-EMM, the USA submitted a revised Seal Island CEMP site management plan (SC-CAMLR-XVI/BG/27).

4.19 Dr Holt reported that the revised management plan took into account the reduced level of scientific research at the site during the phase out of US research there, which was necessitated by safety concerns.

4.20 The Scientific Committee endorsed WG-EMM's recommendation that the revised Seal Island CEMP site management plan be approved and site protection be extended for five years.

New CEMP Sites

4.21 Dr Everson summarised the discussion of the ad hoc Subgroup on the Protection of Sites regarding Norway's request to the Commission for the designation of a CEMP site at Bouvet Island (Annex 4, paragraphs 8.42 and 8.43). The Scientific Committee agreed with positive comments on the extension of the CEMP research program to Subarea 48.6, due in particular to the increased interest in fishing in the area (SC-CAMLR-XVI/BG/4).

4.22 The Scientific Committee endorsed WG-EMM's recommendation that Bouvet Island be accepted as a CEMP site.

4.23 It was noted that site protection has been provided through national legislation in Norway, therefore site protection under Conservation Measure 18/XIII may not be required.

4.24 Dr T. Øritsland (Norway) noted that logistical considerations may prevent scientists from conducting the CEMP research program at Bouvet Island site as frequently as desirable. Additionally, Dr Øritsland confirmed the four-mile territorial limit around Bouvet Island.

Review of Existing CEMP Sites

4.25 WG-EMM reviewed the status of work at existing CEMP sites to assess whether research programs at several sites were short-term efforts or long-term commitments (Annex 4, paragraphs 8.44 and 8.45).

4.26 As far as WG-EMM could determine, sites where data on dependent species are being collected annually according to CEMP standard methods are as follows:

Subarea 48.1:	Anvers Is, Esperanza Station, Cape Shirreff, Stranger Point, Admiralty Bay and Seal Island
Subarea 48.2:	Signy Island and Laurie Island
Subarea 48.3:	Bird Island
Subarea 48.6:	Bouvet Island and Svarthamaren
Division 58.4.2	Béchervaise Island and Syowa Station
Subarea 58.7:	Marion Island
Subarea 88.1:	Edmonson Point and Ross Island

Data Requirements

Existing Standard Methods

4.27 WG-EMM had not identified a need for any revision of the *CEMP Standard Methods* at this stage. When the *CEMP Standard Methods* is next revised, topics requiring further consideration should include those listed in Annex 4, paragraphs 8.48 to 8.75.

4.28 The Scientific Committee noted that, as requested by WG-EMM (Annex 4, paragraph 10.16), the revised edition of the *CEMP Standard Methods* had now been circulated, incorporating revised versions of Tables 1 to 4.

4.29 WG-EMM recommended that Members holding appropriate datasets evaluate sampling regimes and sample sizes for standard methods as described in Annex 4, paragraphs 8.49, 8.52 to 8.53 and 8.60 to 8.62.

Potential Standard Methods

4.30 Revisions of the proposed new standard methods for penguin breeding population size (A3B), Antarctic fur seal adult female survival rate and pregnancy rate (C3), and Antarctic fur seal diet (C4) should be submitted to next year's meeting (Annex 4, paragraphs 8.64 to 8.67).

4.31 A draft standard method on tagging of Antarctic fur seals should be prepared (Annex 4, paragraph 8.85) and submitted to next year's meeting.

4.32 Members conducting research on fur seals should note the colour combinations for tags prescribed for the sites at Cape Shirreff, Bouvet Island, Bird Island, South Georgia and elsewhere (Annex 4, paragraph 8.87). Members tagging fur seals should ensure that data are submitted to the SCAR Antarctic Seals Tagging Database (Annex 4, paragraph 8.88).

4.33 The suggestion that data on at-sea behaviour collected according to the standard method set out in Section 4 of Observation Protocols and Techniques should be submitted in both raw and analysed data format (Annex 4, paragraphs 8.69 and 8.70) requires the development of instructions which should be submitted to WG-EMM as soon as possible, taking account of the methodological investigations recommended by the Subgroup on Statistics (Annex 4, Appendix D, paragraph 7.13).

4.34 The Secretariat should request from the SCAR Group of Specialists on Seals the report of the APIS Workshop on Survey Design (Annex 4, paragraph 8.74), together with relevant details from Australian shipboard and helicopter surveys and UK pilot studies with fixed-wing aircraft in order to develop a standard method for monitoring crabeater seal abundance.

Advice to the Commission

4.35 The Scientific Committee recommended that the Commission:

- (i) approve the revised management plan for the Seal Island CEMP site and extend site protection for five years; and
- (ii) approve Bouvet Island as a CEMP monitoring site.

Assessment of Incidental Mortality

Incidental Mortality in Longline Fisheries

4.36 The Scientific Committee reviewed the report of WG-FSA, which incorporated work undertaken both intersessionally and at the meeting of the ad hoc WG-IMALF. It endorsed the report, commenting specifically only on those items where recommendations or advice had been directed to the Scientific Committee (Annex 5, paragraph 7.148).

4.37 The Scientific Committee encouraged more members of WG-IMALF to attend at the start of the WG-FSA meeting in order to assist with data analysis and discussion from the outset (Annex 5, paragraph 7.1). It noted the addition of three new members to WG-IMALF and the request to Members to review their nominees to the group (Annex 5, paragraph 7.2).

Intersessional Work

4.38 The Scientific Committee recommended:

- (i) that the Secretariat should revise certain details of the *Scientific Observers Manual* and the associated logbook for scientific observers (Annex 5, paragraphs 7.6, 7.9 and 7.40); and
- (ii) that the Secretariat should send copies of the newly published CCAMLR booklet *Fish the Sea Not the Sky* to companies believed to be engaged in longline fishing in the Convention Area and adjacent regions, with the request that additional copies of the booklet be obtained from CCAMLR and placed on board all their vessels (Annex 5, paragraph 7.11).

4.39 Noting the constructive dialogue with and useful data provided by CCSBT-ERSWG (Annex 5, paragraphs 7.13, 7.103 to 7.106), the Scientific Committee recommended:

- (i) that reciprocal observership be arranged for the 1998 meetings of CCSBT-ERSWG and CCAMLR WG-FSA; and
- (ii) that CCAMLR supply CCSBT with data on longline fishing effort for *Dissostichus* in the Convention Area (Annex 5, paragraphs 7.14 and 7.15).

4.40 The Scientific Committee asked the Secretariat to request from France reports on monitoring programs for seabirds particularly those which existence is at risk from longline fishing (Annex 5, paragraph 7.18), further information from New Zealand (Annex 5, paragraph 7.20) and regular updates on the progress of relevant studies from all Members (Annex 5, paragraph 7.24).

4.41 The Scientific Committee noted that:

- (i) based on a recent review using the new IUCN criteria, five species of albatross breeding in the Convention Area are now classified as globally threatened (and one as near-threatened) (Annex 5, paragraphs 7.26 and 7.27); and

- (ii) thirteen species of albatross (six of which breed in the Convention Area) were added to Appendices 1 and 2 of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) in 1997 (Annex 5, paragraph 7.29).

4.42 Accordingly, the Scientific Committee recommended that:

- (i) Members individually, and where possible, collaboratively, take note of potential new opportunities and responsibilities in respect of their obligations to protect officially designated globally threatened taxa and those on the appendices to the CMS (Annex 5, paragraphs 7.28 and 7.30); and
- (ii) the Secretariat inform the secretariats of the CMS and of the Convention on Biodiversity (CBD) of CCAMLR's work in relation to albatross conservation (Annex 5, paragraphs 7.31 and 7.32).

Incidental Mortality of Seabirds during Longline Fishing in the Convention Area

4.43 The Scientific Committee noted that it had been impossible to improve the analysis and conclusions from the 1996 data during the intersessional period because few additional relevant data had been submitted (Annex 5, paragraphs 7.33 to 7.36); the minimum total estimated seabird mortality associated with longline fishing in the Convention Area in 1995/96 was therefore still about 1 600 birds (all in Subarea 48.3).

4.44 The Scientific Committee noted substantial improvements in the quality and quantity of data submitted in 1997 and in the quality of the reports of scientific observers (Annex 5, paragraphs 7.38 and 7.40). There were, however, still some problems with the late submission of data and reports (Annex 5, paragraph 7.39).

4.45 It was recognised, however, that with the fishing season for *Dissostichus* extending into late August and some scientific observers spending most of the period from March to August at sea, it was often difficult to get reports to CCAMLR in advance of the start of the WG-FSA meeting.

4.46 While it was agreed that priority attention should in future be given to data from within the July–June split-year (other data being processed and analysed as time permitted), it was noted that:

- (i) monthly reporting of incidental mortality is required under Conservation Measure 117/XV; and
- (ii) the prompt transmission to the Secretariat of C2 forms would enable substantial work to be done before the WG-FSA meeting and in advance of receiving reports from scientific observers.

4.47 In reviewing data for 1997, the Scientific Committee noted that no data are available from the unregulated vessels longlining in the Convention Area. Such unregulated fishing will add substantially to incidental seabird mortality (see paragraph 4.54).

4.48 In reviewing the results of the analysis by WG-FSA of the 1997 data on seabird incidental mortality in Subarea 48.3 (Annex 5, paragraphs 7.45 to 7.58), the Scientific Committee noted that:

- (i) in respect of Conservation Measure 29/XV there was:
 - (a) much improvement (compared with 1996) in night-time settings (Annex 5, paragraph 7.51);
 - (b) poor compliance with the requirement to use streamer lines (Annex 5, paragraph 7.52);
 - (c) poor compliance with the requirement to discharge offal on the opposite side to the haul (Annex 5, paragraph 7.53);
- (ii) rates of seabird by-catch for most cruises/vessels were broadly similar to last year, but a few cruises gave higher values, resulting in a minimum (see Annex 5, paragraphs 7.80 and 7.81) estimated total mortality of 5 755 seabirds this year, considerably higher than last year (1 618 seabirds);
- (iii) much of this seabird mortality reflects a lack of compliance with Conservation Measure 29/XV; some elements, however, were less easy to explain; and
- (iv) the species involved are principally black-browed albatross (40%; mainly caught during the day and twilight) and white-chinned petrel (48%; caught both during the day and at night – the latter when the use of streamer lines was minimal throughout the fishery).

4.49 The Scientific Committee noted that the single set of data available for Division 58.5.1 (from two Ukrainian vessels) (Annex 5, paragraphs 7.62 to 7.64) indicated that the seabird by-catch rate was substantially reduced once night-time setting was implemented.

4.50 In relation to Subarea 58.6 (outside the waters adjacent to the Crozet Islands) and Subarea 58.7 (Annex 5, paragraphs 7.65 to 7.79), the Scientific Committee noted that:

- (i) in respect of Conservation Measure 29/XV there was:
 - (a) poor compliance with the requirement to set at night, with 55% of sets in daytime (Annex 5, paragraphs 7.67 and 7.73);
 - (b) poor compliance with the requirement to use streamer lines (Annex 5, paragraphs 7.71 and 7.74);
 - (c) evidence that about half the vessels discharged offal on the same side as the haul (Annex 5, paragraph 7.75);
- (ii) rates of seabird by-catch averaged 0.289 birds per thousand hooks, probably largely reflecting a lack of compliance with Conservation Measure 29/XV, resulting in a minimum (see Annex 5, paragraphs 7.80 and 7.81) total estimated seabird mortality of 879 seabirds;

- (iii) catch rates:
 - (a) at night, were an order of magnitude less than during the day (0.012 and 0.138 birds per thousand hooks respectively);
 - (b) were 40-fold greater in October to April than in May to June (0.363 and 0.009 birds per thousand hooks respectively);
 - (c) of species other than white-chinned petrel, within 100 km of the Prince Edward Islands were six-times greater than between 100 and 200 km from these islands; and
- (iv) species mainly affected were white-chinned petrels (73%) and grey-headed/yellow-nosed albatrosses (23%) – the two albatrosses both threatened species.

4.51 The Scientific Committee noted various requirements for intersessional work, especially for the Scientific Observer Data Analyst to complete entry and analysis of some data (particularly for Subareas 58.6 and 58.7) and to resolve any discrepancies in the data with those who submitted or collected it (Annex 5, paragraphs 7.42, 7.44, 7.56 and 7.60).

4.52 In reviewing the results of the analysis of the 1997 data on incidental mortality of seabirds in the Convention Area, the Scientific Committee expressed serious concern at the poor level of compliance with Conservation Measure 29/XV. It drew the attention of the Commission to a number of suggestions that were made as to how better compliance with this conservation measure might be achieved:

- (i) improved education of fishing companies, vessel captains, fishing masters and crew (see Annex 5, paragraph 7.133). It was noted that the circulation of *Fish the Sea Not the Sky* was intended to assist in this (paragraph 4.38(ii)). Prof. C. Moreno (Chile) noted that in 1996, when a special course was held in Chile for captains of longline fishing vessels, compliance with the Conservation Measure 29/XV had been good and seabird mortality much reduced compared with 1997, when it had not been possible to hold the course.

There was general support for encouraging Members of the Commission to seek international support for improving their training of captains, fishing masters and observers in respect of the use of measures to reduce by-catch of seabirds in longline fisheries;

- (ii) preferential access to the fishery of vessels which have a good record of compliance with relevant CCAMLR conservation measures;
- (iii) access to the fishery only of vessels which are able to comply fully with CCAMLR conservation measures (e.g. constructed so as to allow offal to be discharged on the opposite side to the haul).

It had apparently been claimed that there were technical and/or financial constraints which precluded some vessels complying with this element of Conservation Measure 29/XV. It was agreed that Members should request more explicit information on this topic from fishing companies. In the meantime, the Scientific Committee took the view that failure to make provision for offal

discharge in order to comply with Conservation Measure 29/XV should preclude such vessels from fishing in the Convention Area; and

- (iv) in-port inspection prior to the departure of vessels for fishing grounds to ensure that they fully understand all relevant CCAMLR conservation measures, that they possess tori poles and streamer lines of CCAMLR specification and that they can comply in full with offal discharge requirements.

4.53 It was noted, however, that in-port inspections prior to the departure of vessels could be difficult to achieve for Members with fleets operating in distant waters which rarely returned to their home ports.

4.54 The Scientific Committee noted that, even at a conservative estimate of 16 500 to 26 800 seabirds, the level of seabird by-catch in the unregulated fishery for *D. eleginoides* in Subareas 58.6/58.7 (and probably also in Divisions 58.5.1 and 58.5.2) in 1996/97 was at least 20 times greater than that for the regulated fishery (Annex 5, paragraphs 7.85 to 7.94). Its impact on white-chinned petrels and albatrosses is entirely unsustainable (Annex 5, paragraph 7.95) for the populations concerned (including those of at least two globally threatened species) – principally those at breeding sites in the Indian Ocean (Prince Edward Islands, Crozet, Kerguelen, Heard/McDonald Islands) (Annex 5, paragraph 7.95).

4.55 The Scientific Committee recommended that the Commission take the strongest possible action to eliminate unregulated fishing (Annex 5, paragraph 7.96). Those responsible for undertaking unregulated fishing in the Convention Area are simultaneously causing the likely collapse of the populations of several species of albatross and of white-chinned petrels, as well as the potential collapse of the *Dissostichus* stocks.

Incidental Mortality of Seabirds during Longline Fishing outside the Convention Area

4.56 The Scientific Committee noted:

- (i) information concerning the nature and extent of longline fishing for various fish species in the Southern Ocean, including areas adjacent to the Convention Area (Annex 5, paragraphs 7.107 to 7.109);
- (ii) data on seabird by-catch outside the Convention Area, indicating that for some species in some areas there is substantial mortality of seabird species breeding within the Convention Area (Annex 5, paragraphs 7.99 to 7.117); and
- (iii) results of analyses of data on seabird by-catch in longline fishing for southern bluefin tuna in relation to environmental variables and the use of mitigating measures, which are of considerable relevance to CCAMLR (Annex 5, paragraph 7.110 to 7.113).

4.57 In responding to the request to New Zealand for relevant information (Annex 5, paragraph 7.115), Dr Robertson indicated that in the tuna longline fishery within the New Zealand EEZ for the 1996/97 fishing year (ending 30 September 1997), 414 sets (1 016 000 hooks) were observed by scientific observers; 366 birds were observed caught.

This fishery involved New Zealand vessels and Japanese-chartered vessels. The observed incidental catch rate was 0.88 birds per set or 0.36 birds per thousand hooks. These were all observations on vessels using tori poles and most of them were setting at night.

4.58 It was hoped that full information from this fishery could be provided next year in a paper to WG-FSA and that the results of the analyses of previous years' data would also be available.

4.59 The Scientific Committee recommended that the Commission should urge those responsible for regulating longline fishing in the areas immediately to the north of the Convention Area adjacent to Subareas 48.3 and 48.6, Division 58.5.1 and Subareas 58.6, 58.7 and 88.1 to adopt the provisions of Conservation Measure 29/XV and to consider restricting the fishing season to periods outside the main breeding season of albatrosses and petrels (Annex 5, paragraph 7.130).

4.60 At the time of adopting the report, Mr K. Katsuyama (Japan) stated that although Japan shares the concern expressed in the preceding paragraph, the Commission should be cautious in addressing issues which do not fall into its competence.

4.61 The Scientific Committee noted the results indicating that the mortality of albatrosses and white-chinned petrels in the period May to August was more than ten times less than that in March and April (Annex 5, paragraphs 7.82 and 7.83). It endorsed the recommendation that, from the perspective of achieving a significant reduction in seabird by-catch, the start of the longline fishing season in the Convention Area should be delayed until after 1 May (Annex 5, paragraph 7.84).

Assessment of Incidental Mortality in Relation to New and Exploratory Fisheries

4.62 The Scientific Committee noted the advice from WG-IMALF concerning action to minimise the risk of seabird by-catch in the areas for which proposals had been made for new or exploratory longline fisheries (Annex 5, paragraphs 7.118 to 7.126). It agreed to review this advice in conjunction with that arising from other evaluations of these fisheries conducted by WG-FSA (Annex 5, paragraphs 4.1 to 4.91) and in the light of comments offered in Annex 5, paragraphs 7.128 and 7.129.

Research into Mitigating Measures and Experience with their Implementation

4.63 The Scientific Committee noted the various comments in relation to techniques known or potentially useful in reducing seabird by-catch, especially relating to the effectiveness of streamer lines (when correctly used), the importance of correctly weighted longlines, some potential advantages of using artificial bait and forthcoming data on sinking rates of different types of bait (Annex 5, paragraphs 7.132 to 7.135).

4.64 The Scientific Committee reviewed the provisions of footnotes 3 and 6 of Conservation Measure 29/XV in the light of the comments in Annex 5, paragraphs 7.135 and 7.141 (see also Annex 5, paragraph 7.147).

4.65 It concluded that:

- (i) as the recommendation in footnote 3 (weighting of longline) is based on the only empirical study so far undertaken on such vessels (WG-FSA-95/58), it would be inappropriate to include different, or additional, recommendations without further scientific study. However, it was recommended that this footnote should be incorporated into the main text of the conservation measure; and
- (ii) although testing of streamer line design was now accorded a lower priority than correct deployment and operation of the CCAMLR design, it was unnecessary to modify either element 6 or footnote 6 of Conservation Measure 29/XV at present.

4.66 In particular, the Scientific Committee commended New Zealand and Norway for their pioneering research into underwater setting of longlines, encouraged them to undertake further development and testing and requested Members to report on their experiences in using these or similar devices (Annex 5, paragraphs 7.142 to 7.146).

4.67 The Scientific Committee noted that once such techniques were proved to be effective under commercial conditions, vessels using them would be eligible for numerous advantages (e.g. potential exemption from the provisions of Conservation Measure 29/XV, relaxation of fishing season restrictions, preferential access to fisheries, etc.), by virtue of their ability to avoid incidental mortality of albatrosses and petrels.

Other Incidental Mortality in Longline Fisheries

4.68 The report of WG-FSA indicated that three Antarctic fur seals were killed in longline fishing in Subarea 48.3; three others were entangled but freed themselves. Two sperm whales and one minke whale became entangled in longlines in Subarea 58.6/58.7 but broke free (Annex 5, paragraphs 8.1 and 8.2, and Tables 35 and 36).

Incidental Mortality in Trawl Fisheries

4.69 The report of WG-FSA indicated that past observations had provided no evidence of incidental mortality of seabirds or marine mammals associated with trawl fisheries for *D. eleginoides* in Divisions 58.5.2 and 58.4.3 (Annex 5, paragraph 4.73).

4.70 In CCAMLR-XVI/MA/4 France stated that because the trawlers fishing for *D. eleginoides* in Division 58.5.1 in 1996/97 used a cable-less netsonde system there was no incidental mortality of seabirds.

4.71 In CCAMLR-XVI/BG/8 Japan reported that krill fishing vessels caught one Antarctic fur seal and one penguin in Subarea 48.1 and one Antarctic fur seal in Subarea 48.3. One seal and one penguin in Subarea 48.1 died; the other seal was released alive.

Incidental Mortality in Jig Fisheries

4.72 In CCAMLR-XVI/BG/15 the UK reported that, in the course of jig fishing for the squid *M. hyadesi* in Subarea 48.3, four gentoo penguins were caught and released alive.

Marine Debris

4.73 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.

4.74 SC-CAMLR-XVI/BG/6 reported the results of the survey of entanglement of Antarctic fur seals at Bird Island, South Georgia (Subarea 48.3) for the sixth consecutive winter (1996) and eighth consecutive summer (1996/97). In winter, 17 seals were observed entangled, double the number in 1995 and the third highest total so far. As usual most (88%) entanglements were of juveniles; however one-third were of females, an unusually high proportion. Synthetic fishing line (47%), fishing net (24%) and packaging bands (18%) were the main entangling materials. In summer, 27 seals (mainly juvenile females) were recorded entangled, the third lowest total and a 21% reduction from 1996. The proportion of entanglements in fishing line (41%) was much greater than in recent years, with fishing net (22%) commensurately reduced and packaging bands (33%) similar to last year. The paper noted that whereas the relatively low level of entanglements in summer is encouraging, the increase in winter records is discouraging, with fishing vessels the only likely source of debris at this time. The evidence of continued use and discarding of packaging bands within the Convention Area is of particular concern.

4.75 In CCAMLR-XVI/BG/26 additional records of entanglements from other locations around South Georgia are presented. The 13 observations of entanglement of marine mammals, between November 1996 and January 1997, included one southern elephant seal and 12 Antarctic fur seals. Of the fur seals, five (42%) were female (three adult, two juvenile) and seven (58%) were male (one adult, six juvenile); seven (58%) were entangled with plastic packaging bands, three (25%) in trawl netting and two (17%) in synthetic rope. All entangling material probably originated from fishing vessels.

4.76 The results of a survey of entanglement of Antarctic fur seals at Signy Island, South Orkney Islands (Subarea 48.2) are reported for the 1996/97 season in SC-CAMLR-XVI/BG/7. Neck collars of man-made debris were seen on 12 seals, all of which were juvenile males. Five entangled seals were observed in an area around Signy Island research station where approximately 1.3% of the fur seal population come ashore, giving an incidence of entanglement of 0.33%. Although synthetic line and packaging bands were the main entangling materials at both sites, a greater proportion of fur seals was entangled in these items at Signy Island (50% and 52% respectively) than at Bird Island (22% and 33% respectively) in the same season.

4.77 In response to a question from Dr V. Siegel (European Community) concerning whether entanglement in packaging bands could reflect unregulated fishing activity in the area, Dr Croxall indicated that male fur seals regularly migrate from South Georgia to Signy Island. Therefore, it was likely that a proportion of the entanglements observed at Signy

reflect animals which actually became entangled near South Georgia. However, surveys of marine debris at Signy Island indicate the frequent presence of packaging bands, some uncut. While these also might originate from South Georgia, this would be against the prevailing current systems. This might suggest that fishing vessels using packaging bands have been operating in Subarea 48.2.

4.78 Prof. D. Torres (Chile) presented SC-CAMLR-XVI/BG/33 which reviewed the circumstances of entanglement of 20 Antarctic fur seals observed at Cape Shirreff, South Shetland Islands (Subarea 48.1), between 1988 and 1997. The animals involved comprised nine sub-adult males (45%), four juvenile males (20%), five females (35%) and two pups (10%). Of these, 45% were entangled in plastic debris and packaging bands, the rest in fishing net fragments and nylon ropes; the entangling material was removed from 35% of animals (four females, one juvenile male and two pups). The paper considered that these observations probably underestimate the real incidence of entangled seals in the area. The authors propose to coordinate sightings of entangled seals in the South Shetland Islands area, and recommended that fishing vessels and scientific observers be given further education concerning waste disposal regulations in force in the Convention Area.

4.79 In CCAMLR-XVI/MA/3 Norway reported the observation of 39 entangled seals during surveys at Bouvetøya (Subarea 48.6) during the 1996/97 season. Most animals were entangled in portions of fishing net.

4.80 SC-CAMLR-XVI/BG/5 reports the results of the fourth year of standardised recording of man-made debris associated with seabirds at breeding colonies in Bird Island, South Georgia (Subarea 48.3). Ingested and regurgitated plastic items were reported for wandering albatrosses (three items), grey-headed albatrosses (one item) and white-chinned petrels (two items). Fishing gear was reported in association with grey-headed albatrosses (four squid jigs), black-browed albatrosses (three hooks and line, found next to nests), wandering albatrosses (15 hooks and/or line, eight found next to nests, six in squid pellets and one internally lodged in an adult, and adult regurgitates of nylon line thought to originate from trawlers (three items)) and southern giant petrels (one freshly dead with ingested hook and line; two with lodged hooks and line; one hook in a pellet). Levels of fishing gear associated with southern giant petrels increased (only one previous record) and were similar to previous years for black-browed and grey-headed albatrosses but for wandering albatrosses were halved compared to last year. The evidence of continued discarding of plastic material and the loss of longline fishing gear, especially hooks, remains a cause for concern.

4.81 CCAMLR-XVI/BG/24 reported three observations of entangled animals at Palmer Station, Anvers Island (Subarea 48.1). One subadult male Antarctic fur seal died of entanglement in fish netting. Two adult southern giant petrels with longline hooks embedded in their wings were caught, the hooks removed and the birds released. (WG-FSA-95/58 provides further details and some background information.)

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

4.83 It was noted that several reports of scientific observers on longline fishing vessels recorded numerous observations of albatrosses and petrels flying around with hooks and fishing line ingested or attached to their bodies. They had clearly been cut free, presumably after becoming entangled at the haul (see also Annex 5, paragraphs 7.53, 7.75 and Table 46).

4.84 The Scientific Committee was concerned that the considerable evidence of seabirds and marine mammals entangled in debris had clearly originated from fishing vessels. In particular, it recognised that the continuing occurrence of entanglement in packaging bands indicated inadequate compliance with Conservation Measure 63/XV, which prohibits the use of packaging bands on fishing vessels in the Convention Area.

4.85 Although some of the debris and packaging bands presumably originate from the unregulated fisheries in the Convention Area, there is clear evidence that many vessels in regulated fisheries are still using packaging bands – and some of them were observed to discard these at sea (Annex 5, paragraph 3.38 and Table 7).

4.86 The Scientific Committee drew the attention of the Commission to these failures to comply with Conservation Measure 63/XV, indicating a need for considerable improvement in informing fishing vessels of the provisions of CCAMLR conservation measures and of the regulations for waste disposal in the Convention Area.

4.87 The Scientific Committee drew to the attention of the Commission that appropriate in-port inspection of vessels prior to departure for fishing grounds (see paragraph 4.52(iv)) might assist vessels in complying with this conservation measure. Reminding fishing companies that excellent alternatives to plastic packaging bands exist might also be timely.

4.88 It was noted that the forthcoming CCAMLR brochure on marine debris (CCAMLR-XVI/BG/29) would be an appropriate place to publicise these issues and concerns.

4.89 The Science Officer informed the Scientific Committee that the new marine debris database is now operational (CCAMLR/XVI/BG/30) and encouraged Members to submit data to it.

Marine Mammal and Bird Populations

4.90 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. The SCAR Group of Specialists on Seals (SCAR-GSS), the SCAR Bird Biology Subcommittee (SCAR-BBS) and the IWC were asked in 1995 again to provide appropriate information (SC-CAMLR-XIV, paragraph 3.70).

4.91 Reports of SCAR-BBS and IWC were discussed by the Scientific Committee in 1996 (SC-CAMLR-XV, paragraphs 3.66, 3.67, 3.70 to 3.76). However, the report from SCAR-GSS was not available in time for discussion at this meeting, nor the meeting of WG-EMM in 1997 (Annex 4, paragraph 6.73). As a consequence, WG-EMM deferred substantial discussion on both reports until its 1998 meeting.

4.92 SCAR-GSS was requested to provide CCAMLR with its report at the earliest opportunity.

4.93 Some relevant information, supplementary to the information included in the SCAR-BBS review, was provided on the populations of penguins at Marion Island (Annex 4, paragraph 4.2), penguins and fur seals at Bouvet Island (Annex 4, paragraph 4.3) and fur seals

and chinstrap penguins at Cape Shirreff, was tabled at the meeting of WG-EMM (Annex 4, paragraphs 4.4 and 4.5).

4.94 Some additional information on current status of seabirds and seals monitored through CEMP are provided in Annex 4, paragraphs 7.20, 7.33 and 7.26 to 7.28.

4.95 Members had provided data on the status and distribution of albatross, giant petrel and white-chinned petrel populations in response to requests by WG-IMALF (Annex 5, paragraph 7.120). These data, which were extensively used during WG-FSA, had been available to SCAR-BBS and were included in its 1996 review (SC-CAMLR-XVI/BG/21).

4.96 The next review of the status and trends of Antarctic seals and seabirds should occur in the year 2000 and allowance for this will need to be made in the 1998/99 budget.

Changes in Predator Populations caused by Interspecific Interactions

4.97 The Scientific Committee noted that the rapid increase in fur seal numbers has the potential to make some shore-breeding sites less attractive for penguins. This interaction was described from Livingston Island (WG-EMM-97/62). However at South Georgia, gentoo penguins appeared to co-exist at several sites with fur seals. The declines in macaroni penguins at South Georgia and Marion Island had occurred mainly in areas and/or colonies which were inaccessible to fur seals.

Abundance of Seabirds at Sea

4.98 At its 1996 meeting WG-EMM identified the need for quantitative at-sea surveys of seabirds and marine mammals (SC-CAMLR-XV, Annex 4, paragraph 4.92) and noted that a workshop dealing with standardising quantitative surveys of seabird abundance and distribution at sea had been held. The Scientific Committee endorsed the request of WG-EMM (Annex 4, paragraph 10.25) that the Secretariat obtain a copy of the report of this workshop from SCAR-BBS.