HARVESTED SPECIES

Krill Resources

Report of WG-EMM

Distribution and Standing Stock

5.1 The Scientific Committee noted the results of the Workshop on Area 48 regarding distribution and standing stock of krill which suggested that there was considerable concordance in recruitment indices between Subareas 48.1, 48.2 and 48.3, implying that large-scale phenomena were likely to be influencing population dynamics in this region (Annex 4, paragraphs 4.1 to 4.12).

Recruitment and Mortality

5.2 The Scientific Committee noted the detailed considerations of recruitment indices for krill and the reasons for the change in terminology from 'proportional recruitment' to 'per capita recruitment'. It was agreed that this change was appropriate (Annex 4, paragraphs 4.1 to 4.38).

5.3 The Working Group had conducted some analyses which demonstrated that there may be errors in either the current estimates of mortality (M) or in estimates of per capita recruitment and the Scientific Committee agreed that work needs to be done to resolve the observed discrepancies. Particular emphasis should be placed on the key questions raised in paragraph 4.38 of the Working Group's report (Annex 4) and the aim of this work is to determine how to utilise length-density data from restricted areas in estimating large-scale trends in absolute recruitment.

Area 48 Synoptic Survey

5.4 The Scientific Committee noted the progress made with the design and planning for the Area 48 synoptic krill survey which has as its primary objective an improved estimate of B_0, the pre-exploitation biomass. The survey will be conducted in January 2000 (Annex 4, paragraphs 9.49 to 9.90).

5.5 The survey design as currently configured utilises three vessels which will sail along parallel transects that are considered representative of the entire survey area. Should other vessels become available, they would conduct extra transects interleaved within the survey area.

5.6 The core measurements on the survey would be:

(i) krill acoustic data collected using a Simrad EK500 scientific echosounder on transect;

(ii) krill length-frequency data collected using an RMT8 net (or equivalent); and

(iii) physical oceanographic data collected using a CTD to 1 000 m.

The net sampling and the CTD data would be collected at stations at midday and midnight.

5.7 Additional sampling was encouraged but should not compromise the collection of the core data. Consideration should be given to the incorporation of observations on seabirds and marine mammals using standard techniques, such as outlined in paragraphs 4.27 and 4.30, however, the Scientific Committee was aware of possible restrictions on the number of berths on the participating vessels.

5.8 Participants were encouraged to carry out their own standard regional studies either prior to or after the synoptic survey so that the wide spatial coverage of the survey could be linked to the temporal sequence of the regional surveys.

5.9 Vessels from three Member nations, Japan, UK and USA are likely to participate in the survey and the Scientific Committee requested that these Members confirm their ability to arrive at South Georgia in the first week of January 2000 to start the first calibration.

5.10 Brazil and the Republic of Korea have expressed some interest in participating in the survey with well-equipped research vessels. It was noted that Peru may also have some interest, and the Scientific Committee asked Dr E. Fanta (Brazil) to seek further information. Additionally, scientists from the Ukraine with particular expertise in krill biology, hydroacoustics and oceanology would be interested in participating in the survey on vessels of other nations.

5.11 The Scientific Committee agreed that any countries wishing to participate in the survey should notify the coordinator of the survey (Dr J. Watkins, UK) no later than 15 March 1999. Drs Hewitt, Naganobu and Watkins have agreed to be coordinators for their nations' survey plans.

5.12 The tasks of the survey coordinator are to: convene a planning workshop (to be held in mid- to late March 1999), to coordinate cruise plans and preparations, to serve as at-sea coordinator, to ensure the data are supplied to CCAMLR and to participants, to organise a post-survey data analysis workshop and to coordinate report generation.

5.13 The Scientific Committee agreed that the core datasets should be analysed at a workshop attended by all survey participants as soon as possible after the survey and in advance of the 2000 meeting of WG-EMM. There was also agreement that the initial dissemination and publication of these core results of the survey should take place as a joint undertaking by the participants.

5.14 The CCAMLR Data Centre would be the depository of all core data and consequently appropriate data storage formats would need to be addressed prior to the survey.

Data Requirements

5.15 The Scientific Committee endorsed the list of data requirements relating to krill set out in the Working Group's report (Annex 4, paragraphs 12.2(i) to (vii), (ix), (x) and 12.3(ii), (iii) and (x)).

Precautionary Catch Limits and Advice to the Commission

5.16 The Scientific Committee noted that there is insufficient new information to warrant a reassessment of the precautionary catch limits for krill. Also, it acknowledged that continued progress in developing a general model of krill dynamics in Area 48 arising from the Workshop on Area 48 would, in the near future, contribute to an evaluation of a subdivision of the precautionary catch limit in this area (Annex 4, paragraph 8.1).

5.17 The Scientific Committee noted that no new management measures were proposed by WG-EMM (Annex 4, paragraph 8.21).

Fish Resources

Background Matters to Assessments

5.18 For the purposes of stock assessments during WG-FSA, estimates of total catches (including illegal, unreported and unregulated catches) during the current fishing season, i.e. from the end of the last CCAMLR meeting until the present, were used. The Scientific Committee endorsed the view of WG-FSA that these figures were more appropriate inputs to assessment models than the split-year catches reported in paragraphs 2.7 and 2.8 and Tables 3 and 4.

5.19 The estimates of total catches of *D. eleginoides* taken during the 1997/98 fishing season are detailed in Annex 5, paragraphs 3.20 to 3.38 and Table 8, and those for *C. gunnari* are summarised in Annex 5, paragraph 3.14. These data are summarised in Table 6.

5.20 The Scientific Committee recommended that for future meetings, the Secretariat prepare catch statistics for the period of the preceding fishing season, as well as those for the split-year.

Database Data Entry and Validation

5.21 A large number of computer-based datasets are maintained by the Secretariat to support the work of CCAMLR. A long-term aim is to move all datasets into formats supported by a database management system, and to document each dataset in the Secretariat's Dataset User Guide. As part of this long-term integration of datasets, the Secretariat is developing an intranet.

5.22 All the available fishery and observer data for the 1997/98 split-year, and earlier years, have been entered and validated. However, as in previous years, some datasets have only recently been submitted, and these were being processed in order of priority, as detailed in Annex 5, paragraph 3.4. Some data for 1997/98 were either overdue or in the process of being submitted, and these were not available at the time of the WG-FSA meeting.

5.23 The Secretariat was also tasked with the transfer of all available survey data to the newly-designed survey database. Participants were encouraged to either submit or resubmit recent survey data and supporting documentation to the Secretariat so that these data could be used in future analyses of the Working Group (Annex 5, paragraph 3.7).

Estimates of Seabed Area

5.24 At last year's meeting, WG-FSA used estimates of seabed area within two fishing depth ranges as the basis for estimating the amount of potentially suitable substrate available to *Dissostichus* spp. in regions where new and exploratory fisheries had been proposed. This year, estimates of seabed areas by depth strata were revised. The estimates contained mean depths of 2 x 2 minute grid squares. In addition, fishing depth ranges for Subarea 88.1 were calculated south of 72°S, whereas last year data in this area were not available. Seabed under permanent ice cover was excluded from the analysis of the southern region of Subarea 88.1 (Annex 5, paragraphs 3.8 to 3.12). The Scientific Committee endorsed the recommendation of WG-FSA for Members to continue to collect detailed bathymetric data and to submit these to the Secretariat so as to develop a high resolution bathymetry dataset which could be used to further the knowledge of species' habitat.

Research Surveys

5.25 Several research cruises were conducted in the Convention Area during the 1997/98 season, and are detailed in Annex 5, paragraphs 3.82 to 3.86. These included trawl surveys by the USA in Subarea 48.1 and Australia in Division 58.5.2, and longline research surveys by Spain in Subarea 48.6 and Division 58.4.4 and Chile in Subareas 48.1, 48.2 and 48.3. The Scientific Committee noted the value of these research efforts for assessments. Information obtained during the longline surveys by Spain and Chile had made a valuable contribution to the knowledge of *Dissostichus* spp. in regions where new and exploratory fisheries had been proposed.

Resumption of Closed or Lapsed Fisheries

5.26 The Scientific Committee noted the discussion in WG-FSA concerning the need for development of a formal procedure for dealing with closed or lapsed fisheries (Annex 5, paragraphs 3.88 to 3.92). The Scientific Committee agreed that a fishery could be considered to lapse when an assessment is no longer current. After this time, such a fishery would be required to submit new information on which a satisfactory assessment can be made before continuing or, in the absence of such information, the fishery would revert to a new fishery. To this end, the Scientific Committee requested that WG-FSA consider how to provide a period of currency along with assessments and recommendations it makes to the Scientific Committee. In this context, it also asked WG-FSA to consider how often a fishery needs to be assessed or reviewed. For example, the assessment of long-term annual yield for myctophids in Subarea 48.3 is now four years old. The Scientific Committee asked that WG-FSA examine how often assessments of long-term annual yield using the GYM need to be reviewed.

General Scheme

5.27 The submission by the European Community of a discussion paper (CCAMLR-XVII/18) on a unified regulatory framework for CCAMLR based on stages of

fishery development was welcomed by WG-FSA (Annex 5, paragraphs 3.93 to 3.95). This was viewed as an important initiative, and WG-FSA endorsed the need to develop a framework of this type. The Working Group also agreed with the sentiments expressed in the final paragraph of this document, which indicated that development of such a framework will take some time, and that Conservation Measures 31/X and 65/XII should remain in force until a replacement scheme is adopted.

5.28 In addition, the Scientific Committee stressed that the transition from a developing to an established fishery should only occur when WG-FSA has been able to conduct a stock assessment confirming that the fishery is sustainable according to the decision rules set by the Commission. The Scientific Committee also endorsed the importance of adequate prior notification by Members intending to commence fishing in new or lapsed fisheries.

Fish Biology, Demography and Ecology

5.29 Characteristics of the biology and demography of fish species are presented in Annex 5, paragraphs 3.96 to 3.136. Important points are considered below.

5.30 *Dissostichus* spp. identification, especially distinction between *D. eleginoides* and *D. mawsoni* is discussed, and biological characteristics of both species are provided.

5.31 Areas of overlap of the two *Dissostichus* species were discussed at WG-FSA (Annex 5, paragraphs 3.100 to 3.103). For the purpose of the assessment, the delineation between *D. eleginoides* and *D. mawsoni* was as illustrated in Annex 5, Figure 1.

5.32 Several studies were reviewed which reported on attempts to age *D. eleginoides.* These used annuli on otoliths and scales and radiocarbon dating. WG-FSA agreed that further work was needed to validate ageing methods to determine the time scale of annulus formation for scales and that Members should report their findings on the use of scales and otoliths for age determination to the next meeting of WG-FSA. Several studies investigated fecundity, maturity, and stock structure of *Dissostichus* spp. Significant findings included that *D. eleginoides* probably spawn in late July/August and maybe in April/May in Subarea 48.3. Tagging studies at Macquarie Island indicated that only one fish out of a total of 469 recaptures was recaptured outside the ground at which it was released, and that preliminary genetic studies indicated that fish from locations only 40 n miles apart appeared to have significantly different DNA sequences. However, during the meeting a report was received that a *D. eleginoides* tagged in the Falklands/Malvinas area was recaptured close to Coquimbo in Chile, a distance of several thousand kilometres from its initial tagging location.

5.33 The Scientific Committee agreed that further studies on stock delimitations are required, and information on this subject is urgently required to resolve the problem of management units discussed below (paragraphs 5.37 and 5.39).

5.34 The exploratory longline fishery undertaken in Subarea 88.1 by New Zealand provided information on *D. mawsoni* distribution, diet and growth. Similar work was undertaken by Chile in Subareas 48.1, 48.2 and 88.3.

5.35 Information concerning the biology of *C. gunnari* and several other species included a revised biomass estimate and length-frequency data for *C. gunnari* in Subarea 48.1, and abundance of several species inferred by studies using trammel nets over a 15-year study.

Developments in Assessment Methods

5.36 A new user guide to the GYM was provided at WG-FSA along with recent updates to the model. The GYM was validated with only two minor errors being identified. Members were encouraged to conduct further evaluations and the Secretariat was tasked with establishing a register of tests conducted on the GYM. The Scientific Committee thanked Dr Constable for providing the guide and Drs Ramm and Constable for validation of the GYM, thus making it straightforward to use by many participants at the meetings. Versions on a CD-ROM are available for participants to evaluate in their own institutes. A proposal for recording the status of assessment methods and associated computer programs used by CCAMLR was discussed at WG-FSA. Members were encouraged to participate in validation of programs not yet validated and the Secretariat was tasked with establishing a central repository of programs used by CCAMLR and information on the tests conducted as part of their validation.

Consideration of Management Areas and Stock Boundaries for *Dissostichus* spp.

5.37 Preliminary findings of genetic and tagging studies on *D. eleginoides* near Macquarie Island, and analyses of seabed areas within the fishing depth range of 500 to 1 800 m had led WG-FSA to consider the possibility that discrete stocks of *Dissostichus* spp. may occur over smaller spatial scales than the management areas currently used by CCAMLR (SC-CAMLR-XVII/BG/4, paragraphs 3.151 to 3.154). Given this possibility, the most precautionary approach was to assume that discrete stocks of *Dissostichus* spp. may occur over small spatial scales. The Working Group had identified two types of spatial scale: the geographic area over which stocks were assessed (assessment unit) and the geographic area over which stocks were managed (management unit).

5.38 The Scientific Committee noted that the assessment of yields in new and exploratory fisheries notified for 1998/99 had used statistical subareas or divisions as the assessment units. This had been the same approach as used in 1997. The Scientific Committee also noted that WG-FSA had tentatively identified smaller management units based on the analyses of seabed areas within the fishing depth range of 500 to 1 800 m (SC-CAMLR-XVII/BG/4, Table 15, Figure 1). Management units within and outside EEZ boundaries had been determined taking into account the new fisheries notified by France, and the exploratory fisheries notified by South Africa.

5.39 The Scientific Committee considered that the Commission may wish to look at these management units as a basis for allocating effort in new and exploratory fisheries, and in areas where longliners and trawlers may both target the same species. Such management areas could also be used to ascertain preferred fishing grounds in future notifications of new and exploratory fisheries. The Scientific Committee sought guidance from the Commission on whether this matter should be taken forward, and explored in further detail, especially in the Indian Ocean sector of the Convention Area.

Assessments and Management Advice

Dissostichus eleginoides

Methods Applied to the Assessment of *D. eleginoides*

5.40 The Scientific Committee noted that, as during previous meetings of WG-FSA, the assessment of *D. eleginoides* at the 1998 meeting comprised three main areas of data analysis:

(i) standardisation and assessment of CPUE data;
(ii) determination of long-term annual yields using the GYM; and
(iii) analysis of length data to investigate trends in size at capture.

The application of these methods is discussed in Annex 5, paragraphs 4.86 to 4.90.

5.41 The Scientific Committee agreed that the use of assessment models such as the GYM has been very valuable in assessing precautionary catch limits for fisheries in several statistical areas for which little information is available. In some areas there now exists a dataset on CPUE covering a number of years that would allow the use of conventional depletion-based assessment techniques such as the de Lury method. The use of historical recruitment data with the GYM is appropriate when data are limited, but when there is a clear trend in CPUE, traditional assessment methods may give more information on the status of the stock. Such analyses have the potential to be used as an alternative method for assessing short-term replacement yields.

5.42 The Scientific Committee recommended that the Secretariat should acquire appropriate software for conducting a variety of depletion analyses in time for the next meeting of WG-FSA. At its next meeting, WG-FSA should examine how the GYM and depletion-based methods could be used to estimate both short- and long-term annual yields.

South Georgia (Subarea 48.3)

Standardisation of CPUE

5.43 The Scientific Committee noted the GLM analyses undertaken by WG-FSA, which included revised information from previous fishing seasons as well as new information from the 1997/98 fishing season.

5.44 The Scientific Committee endorsed the use of only winter CPUEs in the GLM analyses, because they provide a better overlap between vessels of different nationalities throughout the fishing season (Annex 5, paragraph 4.93).

5.45 Details of applying the GLM analyses are provided in Annex 5, paragraphs 4.94 to 4.103. The Scientific Committee shared the concern of WG-FSA that the CPUE indices, both in terms of kilograms and numbers of fish per hook, showed a consistent declining trend since 1994 (Annex 5, Figures 4 and 5).

Determination of Long-term Annual Yield using the GYM

5.46 Details of the assessment methods and input parameters for the GYM undertaken by WG-FSA are given in Annex 5, paragraphs 4.104 to 4.107 and Table 17.

5.47 During the Scientific Committee meeting it was realised that out-of-date input parameters were used in this analysis. The model was rerun using the updated input parameters as per SC-CAMLR-XVI, Annex 5, Table 18, and repeated here in Table 7. The yield at which there is a probability of 0.1 of falling below 0.2 of the median pre-exploitation spawning biomass level over 35 years was 3 616 tonnes. The median escapement for this level of catch was 0.52.

5.48 This was the second year running in which errors in the analyses undertaken by WG-FSA have been identified by the Scientific Committee. The Scientific Committee agreed that this underlined the importance of maintaining well-documented assessment histories for each stock.

Comparison of the GYM Output with the CPUE Trend shown by the GLM

5.49 Last year, WG-FSA had noted that the trends in median biomass predicted from the GYM indicated a smaller decline than that indicated by the GLM analyses of CPUE. The new GLM analyses of CPUE data conducted this year had indicated a continued decline in CPUE between 1997 and 1998.

5.50 In an attempt to compare results of the CPUE analyses with those of the GYM, WG-FSA had used the GYM to examine the effects of the time series of observed recruitments and the catch history on the status of the spawning stock. Preliminary results indicated that the decline in CPUE may be the result of a series of low recruitments in the early 1980s (Annex 5, paragraphs 4.108 to 4.110).

5.51 Prof. Beddington noted that there was no inherent inconsistency between the results of the CPUE analysis and those of the GYM. The GYM makes a large number of runs in a stochastic projection procedure. Some of these runs may be consistent with the CPUE trend and some may not.

5.52 The Scientific Committee noted that the stronger cohorts in the latter part of the recruitment history in SC-CAMLR-XVI, Annex 5, Table 17 will enter the fishery over the next few years. As this occurs, the effects may be seen in an upturn in the CPUE trend. Given that there are data on recruitment over 14 years and CPUE data over a period of seven years, the use of a depletion model for assessing yields, as discussed in paragraphs 5.41 and 5.42, should be investigated.

Trends in Size at Capture

5.53 The Scientific Committee noted WG-FSA's preliminary analysis of catch-weighted length-frequency data and endorsed the recommendation that the routines for extracting catch-weighted length-frequency data developed by the Secretariat prior to the 1998 meeting be further developed in the intersessional period.

Management Advice for *D. eleginoides* (Subarea 48.3)

5.54 The estimate of yield from the GYM was 3 616 tonnes. This was similar to the result obtained at last year's meeting (3 540 tonnes).

5.55 According to the analysis of available data for the most recent season the CPUE has continued to decline from 1997 to 1998. Preliminary analysis using the GYM indicated that the decline in CPUE may be the result of a series of low recruitments in the early 1980s. However, the Scientific Committee considered that the catch limit for the 1998/99 season should be less than the 3 616 tonnes indicated by the GYM in order to maintain a degree of caution appropriate to the results of the CPUE analysis.

5.56 The Scientific Committee reiterated its advice from last year that the following points can be taken into consideration in setting a catch limit for the 1998/99 season:

(i) recruitment overfishing is unlikely to be a problem at this time; and
(ii) a modest reduction of the catch limit below the estimate of precautionary yield would be appropriate.

5.57 The Scientific Committee observed that the new analytical techniques it has suggested be applied to this stock next year (paragraph 5.41) may allow a more accurate estimate of the stock status to be made.

South Sandwich Islands (Subarea 48.4)

5.58 Despite a catch limit of 28 tonnes last season, no fishing in this subarea was reported to the Commission during the 1997/98 season. No new information was made available to WG-FSA on which to base an update of the assessment.

Management Advice for *D. eleginoides* (Subarea 48.4)

5.59 The Scientific Committee recommended that Conservation Measure 128/XVI be carried forward for the 1998/99 season. It also recommended that the situation in this subarea be reviewed at next year's meeting with a view to considering the period of validity of the existing assessment.

Kerguelen Islands (Division 58.5.1)

Standardisation of CPUE for the Trawl Fishery

5.60 WG-FSA used a GLM to standardise an updated series of CPUE data from the trawl fishery for *D. eleginoides* in Division 58.5.1 (Annex 5, paragraphs 4.121 to 4.126). This GLM analysis followed the approach used at the Working Group's last meeting.

5.61 Adjusted, standardised CPUE decreased between 1990/91 and 1993/94 but have been relatively stable since then (Annex 5, Figure 8). Nevertheless, the standardised CPUE index for the 1997/98 split-year is the lowest on record.

5.62 The Working Group viewed the declining trend in standardised catch rates with concern and noted that the trend in nominal catch rates demonstrated a more precipitous decline in CPUE during the early part of the time series (Annex 5, Figure 8). Further concern was expressed over the apparent increase in the percentage of hauls with small catches (Annex 5, Table 23).

Longline CPUE

5.63 Although the total catch in the longline fishery in Division 58.5.1 during the 1997/98 season was 1 118 tonnes, it was not possible to undertake an analysis of longline CPUE data at this year's meeting because haul-by-haul data were only available for the most recent season (Annex 5, paragraph 4.127).

5.64 Standardised CPUE analysis using the GLM has been applied to both longline and trawl fisheries, but these have not been compared. The Scientific Committee recommended that interpretation of CPUE as an abundance index should be evaluated by WG-FSA.

Determination of Long-term Annual Yields using the GYM

5.65 The GYM was used to assess long-term annual yield in Division 58.5.1. Recruitments were prorated from the estimate for Subarea 48.3. Parameters adopted from Subarea 48.3 and the catch history, including unreported catches (paragraph 5.19), were used in the projection (Annex 5, paragraphs 4.128, 4.129 and Table 24). The Scientific Committee agreed to rerun this assessment based on the updated recruitment parameters for Subarea 48.3 (paragraph 5.47).

5.66 The estimated long-term annual yield was 6 997 tonnes. WG-FSA noted that this yield is higher than most years in the catch history, except for 1992, 1997 and 1998. Given this potentially high yield, the Scientific Committee endorsed WG-FSA's advice that verification of recruitment at this level to this division is necessary.

Management Advice for *D. eleginoides* (Division 58.5.1)

5.67 The declining trend in CPUE in the trawl fishery demonstrated by the GLM analysis confirms previous studies of this stock. Reduction of the French catch limit (from the 1996 season onwards) shows concern for the management of the fishery in the French EEZ.

5.68 The French authorities have allocated a catch limit for trawling for the 1998/99 season (1 September 1998 to 31 August 1999). A maximum of 3 400 tonnes applies for two vessels only in the whole area, including a 1 000-tonne limit in the eastern sector.

5.69 The longlining catch limit in the western sector has already been established up to the end of 1998 (October to December). A catch limit of 500 tonnes applies for two foreign (Ukrainian) vessels only. The total value for the 1998/99 season in this sector will not exceed the value of the long-term sustainable yield estimated at the 1994 meeting (1 400 tonnes).

5.70 A catch limit of 1 100 tonnes will apply for the 1998/99 season for one French longliner in the eastern sector outside the area fished by trawlers.

5.71 The Working Group considered that the GLM analysis of factors affecting CPUE in the trawl fishery is a useful technique to improve its assessments and recommended the continued reporting of catch and effort data on a haul-by-haul basis. In addition, efforts should be made to continue to acquire haul-by-haul data collected on board Ukrainian longline vessels from the Ukrainian authorities, and to ensure that such data are also collected from the longliner working in the eastern sector.

5.72 Effective management of this fishery, in common with other subareas in the Indian Ocean sector, will be severely compromised as long as illegal catches continue.

Heard and McDonald Islands (Division 58.5.2)

5.73 The catch limit of *D. eleginoides* in Division 58.5.2 for the 1997/98 season was 3 700 tonnes for the period 8 November 1997 to the end of the Commission meeting in 1998. The catch reported for this division by the time of the Working Group meeting was 3 264 tonnes. This was expected to increase to 3 700 tonnes by the end of the Commission meeting.

Determination of Long-term Annual Yields using the GYM

5.74 The analysis undertaken at last year's meeting was updated using the latest version of the GYM, incorporating total reported catches for the 1997/98 fishing season. The unreported catch in the 1996/97 fishing season was revised and the upper estimate of unreported catch for the 1997/98 season was used. The future long-term annual yield at which the median escapement is 0.5 was 3 690 tonnes for the upper estimate of catch, provided that high levels of unreported catches do not continue (Annex 5, paragraphs 4.137 to 4.140 and Table 17).

Management Advice for *D. eleginoides* (Division 58.5.2)

5.75 The Scientific Committee recommended that the catch limit for Division 58.5.2 in the 1998/99 season should be revised to 3 690 tonnes, representing the annual yield estimate from the GYM, assuming removals in 1997/98 were equal to the reported catches plus the upper estimate of unreported catches.

5.76 The analysis resulting in this recommendation assumed that total removals of fish in 1998/99 and future seasons are reduced to the level of 3 690 tonnes.

5.77 The Scientific Committee noted that estimates of unreported catches in Division 58.5.2 in the 1997/98 season were less than 20% of those estimated for the previous fishing season. It was nevertheless reiterated that there will be a much greater effect on the catch limit in future years if the level of removals continues to exceed catch limits.

Crozet Islands and Prince Edward Islands (Subareas 58.6 and 58.7)

5.78 The catch reported for these subareas in 1997/98 comprised 88 tonnes caught inside the Crozet Islands EEZ (Subarea 58.6) and 814 tonnes from inside the Prince Edward Islands EEZ (140 tonnes from Subarea 58.6 and 674 tonnes from Subarea 58.7). One tonne was reported for the exploratory fisheries conducted in accordance with Conservation Measures 141/XVI and 142/XVI, which set catch limits of 658 tonnes and 312 tonnes for Subareas 58.6 and 58.7 respectively.

5.79 The fishery in the Crozet Islands EEZ took place only in November 1997. A total of 77 sets were made in 12 small-scale units (0.5° x 1° square). No new analysis of the data was undertaken.

5.80 The estimated longlining yields from the GYM were 8 874 tonnes in Subarea 58.6 and 1 529 tonnes in Subarea 58.7. These assumed removals from the 1997/98 season of 1 994 tonnes and 1 574 tonnes for the two subareas respectively. Given these potentially high yields, the Scientific Committee endorsed WG-FSA's concern that the verification of recruitment to these subareas is necessary (Annex 5, paragraphs 4.147 and 4.148). The Scientific Committee agreed to rerun the GYM assessment based on the updated recruitment parameters for Subarea 48.3 (paragraph 5.47).

Standardisation of CPUE for the Prince Edward Islands (Subarea 58.7)

5.81 The GLM was used to standardise an updated series of CPUE data from the longline fishery for *D. eleginoides* around the Prince Edward Islands. This GLM analysis followed the approach that was used at the Working Group's last meeting (Annex 5, paragraphs 4.149 to 4.153).

5.82 Standardised catch per unit effort has decreased substantially between 1996 and 1998. The major drop in CPUE between 1996 and 1997 occurred over a period in which WG-FSA has estimated substantial unreported catches were taken from this region.

5.83 The Scientific Committee noted that the GYM estimates for Subareas 58.6 and 58.7 need to be treated with particular caution for a number of reasons:

(i) unreported catches in these areas may be underestimated because of the amount of unreported catch that could not be attributed to specific areas. This is especially important considering the high level of these catches and the dramatic decline in CPUE;

(ii) the fishable ground straddles the boundary between Subareas 58.6 and 58.7, which could result in incorrect allocation of unreported catch between these subareas; and

(iii) recruitments to these areas remain unknown.

5.84 Because of this, the Scientific Committee felt that a direct estimate of recruitment, e.g. from a trawl survey, is essential in order to make a proper assessment for Subareas 58.6 and 58.7.

Management Advice for *D. eleginoides* (Subareas 58.6 and 58.7)

5.85 The Scientific Committee recalled its advice for Subareas 58.6 and 58.7 from last year that the total estimated catch, including the unreported component, has represented a substantial proportion of the estimated median unexploited biomass from the GYM.

5.86 This information, coupled with the major decline in the CPUE index since 1996 suggests that the estimate of annual yield provided by the GYM for the purposes of the new and exploratory fisheries for Subarea 58.7 (Annex 5, Table 19) should be viewed with considerable caution.

5.87 The extent to which the standardised CPUE data for the Prince Edward Islands EEZ are relevant to the situation in Subarea 58.6 is uncertain. However, the Scientific Committee agreed that in view of the history of unregulated catch and the decline in CPUE indicated at last year's meeting, the annual yield estimate calculated for the purpose of new and exploratory fisheries for Subarea 58.6 should also be treated with caution.

5.88 Advice on new and exploratory fisheries notified for Subareas 58.6 and 58.7 is provided in paragraphs 9.19 to 9.26 and 9.29.

5.89 The Scientific Committee noted that estimates of unreported catches in these areas in the 1997/98 season were less than 15% of those estimated for the previous fishing season. It was nevertheless reiterated that there will be a much greater effect on the catch limit in future years if the level of removals continues to exceed the estimated yield.

Champsocephalus gunnari

South Georgia (Subarea 48.3)

Commercial Catch

5.90 Although the commercial fishery for *C. gunnari* around South Georgia (Subarea 48.3) was open from the end of the Commission meeting in November 1997 until 1 April 1998 and a catch limit of 4 520 tonnes had been set, only one vessel took part in this fishery. The vessel fished for 10 days between 25 December 1997 and 5 January 1998 catching 5.04 tonnes of *C. gunnari* out of a total catch of 5.25 tonnes. 67% of the catch was taken in just two hauls, confirming the patchy distribution of this species around South Georgia.

5.91 The Scientific Committee discussed the extent to which the poor catches were due to a low standing stock of the target species, or the inexperience of the fishing master in locating fishable concentrations of *C. gunnari*, and/or the very low level of fishing effort applied. It was concluded that the results of the limited fishing in 1997/98 did not provide a reliable indication of the current viability of the fishery or of stock status.

Assessment at this Meeting

5.92 The catch limit for the 1997/98 season of 4 520 tonnes was derived from a short-term cohort projection performed at last year's meeting. This was based on a biomass estimate from a UK trawl survey in September 1997. In view of the extremely low catches and the lack of a new survey, an assessment of yield over the period 1998/99 and 1999/2000 was performed, using the same short-term projection method as used last year (SC-CAMLR-XVI, Annex 5, paragraphs 4.202 to 4.208). Analysis with the GYM was not carried out this year because the survey results used last year were still considered current. The projected short-term yield estimates were 4 840 tonnes for the 1998/99 season and 3 650 tonnes for the 1999/2000 season. The estimate of yield for the 1998/99 season was higher than that estimated at last year's meeting (4 140 tonnes), owing to the negligible catch (about 5 tonnes) in 1997/98 (Annex 5, paragraphs 4.162 and 4.163).

5.93 Dr E. Marschoff (Argentina) noted that the inexperience of the captain in catching *C. gunnari* was a consequence of the long period that the fishery has not been operating, but does not mean that the vessel was inefficient at catching this species. This is an ad hoc hypothesis that does not satisfactorily explain the poor catches. Dr Marschoff also stated that fish have been consistently of small size both in recent surveys and in the commercial fishery, suggesting the existence of unrecorded ecological interactions, and for this reason the fishery should be closed.

5.94 Other Members noted that the fishery usually depends on fish aged 3 and 4 and that the 1997 survey showed the presence of fish aged 2 to 6 years, and that year classes 2 to 4 were very abundant (SC-CAMLR-XVI, Annex 5, Table 24). In addition, the yields estimated from the short-term projections were based on the lower 95% confidence bound of the survey, and hence were conservative estimates of yield (Annex 5, paragraph 4.166).

Management Advice for *C. gunnari*
(Subarea 48.3)

5.95 Most Members agreed that the management of the fishery for *C. gunnari* in Subarea 48.3 during the 1998/99 season should be similar to that in force last season. The total catch limit should be revised to 4 840 tonnes in accordance with this year's short-term yield calculations.

5.96 Dr Marschoff noted that the low catch rates in this fishery and the high percentage of small fish taken indicate that the stock remains at a low level. While further research is needed on the causes of this situation the stock should be afforded maximum protection by closing the fishery.

5.97 In response, other Members recalled that the yields estimated from the short-term projections were based on the lower 95% confidence bound of the 1997 UK trawl survey, and that therefore they constituted conservative estimates of yield.

Kerguelen Islands (Division 58.5.1)

5.98 No commercial fishing for *C. gunnari* took place in this division during the 1997/98 season. During the 1998/99 season, France intends to conduct a full survey on *C. gunnari* to assess the abundance using the same method as in the 1997 survey. No commercial fishing for this species is envisaged in 1998/99. If the presence of a strong year 2+ cohort is confirmed in 1998/99, fishing may take place on this species in the 1999/2000 season.

Management Advice for *C. gunnari* (Division 58.5.1)

5.99 The Scientific Committee supported the French plan to conduct a pre-recruit survey in the 1998/99 season and looked forward to seeing the analysis of the results at the next meeting.

Heard and McDonald Islands (Division 58.5.2)

Commercial Catch

5.100 The catch limit agreed by the Commission for the 1997/98 season was 900 tonnes to be taken on the Heard Plateau area only. Two vessels took part in this fishery. *C. gunnari* was targeted sporadically between mid-May and September 1998, as commercial demand required, while the vessels were engaged in their principal fishery for *D. eleginoides*. A total of 115.2 tonnes was caught up to 24 September 1998.

5.101 Between 29 May and 4 June 1998, one vessel conducted a random-stratified trawl survey for *C. gunnari* on Heard Island Plateau and Shell Bank, similar to that conducted in August 1997. Compared to the previous survey, fish were much more concentrated on Gunnari Ridge, and densities were very low over the remainder of Heard Island Plateau. Densities on Shell Bank were much lower than in the previous year.

Assessment of Yield

5.102 An assessment of *C. gunnari* in the Heard Island Plateau area was made using the same short-term annual yield method as used last year. Estimates of yield for Shell Bank were not made because of the very low abundance of this population. The assessment was updated to include an estimate of catches taken since the survey was conducted (Annex 5, paragraphs 4.175 to 4.177). This resulted in a combined catch over two years of 1 984 tonnes, comprising 1 160 tonnes in the first year and 824 tonnes in the second year.

5.103 Unlike the previous three years the age 2 cohort in 1998 is very weak and is expected to contribute little to the biomass in the coming years. Unless a new recruitment class enters the fishery by the year 2000, catch limits may need to be set by some other method, and be maintained thereafter unless a further survey demonstrates that abundant cohorts are recruited. The Scientific Committee recommended that WG-FSA investigate what assessment techniques are appropriate for such a case.

5.104 Although the estimate of biomass on Heard Island Plateau is lower than in the survey of the previous year, the calculated yield is higher. This results from the fact that the fish in the 1998 survey were mostly concentrated in one area, and so the biomass estimate had a low variance and the lower 95% confidence limit of the estimate, which is used in the yield calculation, was consequently higher than in the previous year (Annex 5, Table 26).

Management Advice for *C. gunnari* (Division 58.5.2)

5.105 The Scientific Committee agreed that the management of the fishery for *C. gunnari* on the Heard Island Plateau part of Division 58.5.2 during the 1998/99 season should be similar to that in force last season. The total catch limit should be revised to 1 160 tonnes in accordance with this year's short-term yield calculations. The Scientific Committee agreed that no fishing should be undertaken on Shell Bank.

Assessment of Other Fish Species and *Dissostichus* spp. in Pacific Ocean Sector (Subarea 88.3)

Antarctic Peninsula (Subarea 48.1) – *Notothenia rossii, Gobionotothen gibberifrons, Chaenocephalus aceratus, Chionodraco rastrospinosus, Lepidonotothen larseni, Lepidonotothen squamifrons* and *Champsocephalus gunnari*

5.106 Finfish stocks in the Antarctic Peninsula region (Subarea 48.1) have been exploited from 1978/79 to 1988/89 with most of the commercial harvesting taking place in the first two years of the fishery. Given the substantial decline in biomass of the target species in the fishery, *C. gunnari* and *N. rossii,* by the mid-1980s, Subarea 48.1 was closed for finfishing from the 1989/90 season onwards.

5.107 A random-stratified bottom trawl survey was carried out in two regions of Subarea 48.1. Estimates of standing total stock biomass for eight species of finfish were made. Biomass estimates for most species were still less than the 1987 survey estimates; indicating that stock of fish in this area have not recovered since the early fishery. This was supported by results from the Chilean feasibility longlining effort in Subarea 48.1. Total catch was low (<1 tonne) and CPUE was also very low (<0.1 kg/hook) (Annex 5, paragraphs 4.179 to 4.186).

Management Advice

5.108 There appears to be little prospect for a substantial fishery given the low biomass estimates for the 1997/98 season and some of the uncertainties associated with the decline in biomass compared to 1987. The Scientific Committee therefore recommended that Conservation Measure 72/XII should remain in force for the species considered in this section until future surveys indicate an increase in fish biomass in the subarea.

5.109 In view of the low catch rates in the exploratory *Dissostichus* spp. fishery, the Scientific Committee recommends that fishing for *Dissostichus* spp. should be prohibited in this area.

South Orkney Islands (Subarea 48.2)

5.110 Total catch from the Chilean feasibility longlining survey in Subarea 48.2 for three days during March 1998 was low (<1 tonne) and CPUE was lower than the minimum established by the Commission of 0.1 kg/hook to initiate a commercial fishery (Annex 5, paragraph 4.189).

Management Advice

5.111 In the absence of new information on stocks in this subarea, the Scientific Committee noted that fisheries in Subarea 48.2 should remain closed in accordance with Conservation Measure 73/XII. In view of the low catch rates in the exploratory *Dissostichus* spp. fishery the Scientific Committee also recommends that fishing for *Dissostichus* spp. should be prohibited in this area.

Antarctic Coastal Area of Division 58.4.1 and Division 58.4.2

5.112 No new information was available to the Working Group to undertake any assessment on the stocks in these divisions.

Pacific Ocean Sector (Subarea 88.3)

5.113 The Chilean feasibility longlining survey carried out in Subarea 88.3 for 10 days during February 1998 indicated that catch was low (<1 tonne) and CPUE was lower than the minimum established by the Commission of 0.1 kg/hook required to establish a commercial fishery (Annex 5, paragraph 4.199).

Management Advice for *Dissostichus* spp. (Subarea 88.3)

5.114 In view of the low catch rates in the feasibility survey of *Dissostichus* spp. in Subarea 88.3, the Scientific Committee recommended that fishing for *Dissostichus* spp. should be prohibited in that subarea.

By-catch Provisions

5.115 The Scientific Committee noted the recommendation of WG-FSA to retain the two main principles for by-catch species (Annex 5, paragraph 4.202). The current by-catch provision specifies actions required when the by-catch in any one haul is greater than 100 kg and exceeds 5% of all fish by weight (e.g. Conservation Measure 130/XVI, paragraph 11). It was noted that this provision may limit exploratory fishing on some *Dissostichus* spp. grounds. The Scientific Committee discussed the extent to which the existing by-catch provisions of

conservation measures need to be revised in order to allow exploratory fishing to proceed in a reasonable manner. It was agreed that any such change should nevertheless ensure that exploratory fisheries continue to be undertaken in the spirit of Conservation Measure 65/XII, and retain the level of control on the size and distribution of by-catch inferred by the existing provisions. The Scientific Committee agreed that the scheme set out in the following subparagraphs would be a reasonable way to proceed:

(i) for any species for which there is no explicit by-catch limit held under a conservation measure, the by-catch limit should be set at 50 tonnes;

(ii) when the catch of a single by-catch species (as defined in conservation measures) in an individual set or haul exceeds 2 tonnes, the vessel shall move to another fishing location at least 5 n miles distant, in accordance with the existing provision; and

(iii) in statistical areas where the aggregate catch limits for target species are less than 1 000 tonnes, the catch of a single by-catch species should be no more than 5% by weight of the aggregate catch limit.

This last provision was added in recognition of the fact that 50 tonnes represents a high proportion of the catch in some statistical areas where the sum of all catch limits for target species is low.

5.116 While these may operate as a general approach to by-catch species, the Scientific Committee noted that, in Subarea 88.1, the by-catch of *Macrourus carinatus* can be up to 15% in areas near to suitable fishing grounds (Annex 5, paragraph 4.52). It also noted that this species is widespread in Subarea 88.1. The Scientific Committee requested WG-FSA to review at its next meeting any information available on by-catch species in order to assess their potential yield in this area.

By-catch Species in Subarea 48.3

Chaenocephalus aceratus, Pseudochaenichthys georgianus, Gobionotothen gibberifrons, Notothenia rossii, Patagonotothen brevicauda guntheri and *Lepidonotothen squamifrons* (Subarea 48.3)

5.117 No new information was available on *C. aceratus, P. georgianus, G. gibberifrons, N. rossii, P. brevicauda guntheri* and *L. squamifrons* in Subarea 48.3.

Assessments of By-catch in Division 58.5.2

5.118 WG-FSA used estimates of recruitment parameters for two by-catch species, *C. rhinoceratus* and *L. squamifrons*, in Division 58.5.2 to complete assessments using the GYM in the same manner as is undertaken for *D. eleginoides* (Annex 5, paragraphs 4.204 to 4.206). The estimates of long-term annual yield for *C. rhinoceratus* and *L. squamifrons* are 150 tonnes and 78 tonnes respectively. The Scientific Committee agreed that these estimates are more reliable than those for last year because they are now based on recruitment estimates from the area in which fishing takes place.

Management Advice

5.119 The Scientific Committee agreed that the mixed strategy for protecting by-catch species should be retained as a general policy.

5.120 The Scientific Committee reiterated its advice from previous years concerning the by-catch species in Subarea 48.3 and therefore recommended that Conservation Measures 3/IV and 95/XIV remain in force and that Conservation Measure 127/XVI be extended to the 1998/99 season.

5.121 The Scientific Committee recommended that the catch limit in Division 58.5.2 for *C. rhinoceratus* should be 150 tonnes, and that for *L. squamifrons* should be 80 tonnes. Because of their low long-term annual yields, however, it is still advisable to retain the 2-tonne limitation on individual hauls in Conservation Measures 130/XVI and 131/XVI to avoid directed fishing on these species.

5.122 The Scientific Committee drew attention to the fact that the yield for *L. squamifrons* has been rounded from 78 to 80 tonnes. The Scientific Committee felt that using exact results from the assessments implies a spurious precision. It realised, however, that a set of rules is required governing rounding of results and requests that WG-FSA consider this matter at its next meeting.

5.123 The Scientific Committee recommended that for any by-catch species for which there is no explicit catch limit, that the scheme set out in paragraph 5.115 be applied.

Research Surveys

Simulation Studies

5.124 Drs P. Gasiukov (Russia) and Marschoff reported on progress made on the study of the influence of spatial correlation in the estimates of the *C. gunnari* stock (SC-CAMLR-XVI, Annex 4, paragraph 6.2). Preliminary results indicate that the correlation between stations of the order of 10 km apart is small enough to treat them as uncorrelated. The work will continue in the intersessional period.

Recent and Proposed Surveys

Recent Surveys

5.125 Four recent surveys were undertaken in the Convention Area during 1997/98 covering Subareas 48.1, 48.2, 48.6 and 88.3 and Divisions 58.4.4 and 58.5.2. These surveys were carried out by Australia, Chile, Spain and USA (Annex 5, paragraphs 6.2 to 6.6). Results have been used in assessments completed for the respective areas.

Proposed Surveys

5.126 Plans to conduct research surveys have been received from Australia (Division 58.5.2), France (Division 58.5.1) and the USA (Subareas 48.1 and 48.2) and are described in Annex 5, paragraphs 6.7 and 6.8.

Future Work

Elasmobranch By-catch

5.127 The Scientific Committee reviewed the need to study elasmobranch by-catch in the light of discussions initiated at CCAMLR-XVI between Mr R. Shotton (FAO Observer) and Drs Miller and Ramm. Mr Shotton had outlined a FAO initiative to review the elasmobranch by-catch in world fisheries, and to present findings at a meeting in October 1998. As part of this review, FAO had expressed interest in a baseline study of elasmobranch by-catch in the Southern Ocean.

5.128 Mr Shotton expressed disappointment that little was done to study a group of species that ranked seventh of the 14 taxa in terms of weight landed from the CCAMLR area, is very widely distributed, and is an important by-catch in many fisheries.

5.129 The Scientific Committee appreciated the offer from FAO and wished to draw attention to the potentially serious problem of the levels of catch of this group about which little is known. At present the Scientific Committee is not aware of the availability and quality of relevant data held by Members.

5.130 WG-FSA, however, had confirmed the long-term need to document and assess, in general, by-catch in fisheries within the Convention Area, and to collect information which would allow the assessment of stocks of species caught as by-catch. Several steps were envisaged as provided in Annex 5, paragraphs 9.2 and 9.3 (see also paragraphs 7.9 and 7.10).

Fishery Data Manual

5.131 The Scientific Committee supported the Secretariat's proposal to publish and update the data reporting requirements for CCAMLR fisheries in a loose-leaf format as detailed in WG-FSA-98/12 and further discussed by WG-FSA (Annex 5, paragraphs 9.4 to 9.6).

Workshop on *Champsocephalus gunnari*

5.132 Last year, the Working Group had identified a high-priority need for further developments of long-term management strategies for *C. gunnari*. This was endorsed by the Scientific Committee and a workshop was planned in association with the 1998 meeting of WG-FSA. The terms of reference of the workshop were prepared. The meeting was not held because necessary papers and information were not available in time for the meeting. Because of high-priority needs for work on *D. eleginoides*, the Scientific Committee endorsed the assessment of WG-FSA that the workshop should be postponed until after 1999 (Annex 5, paragraphs 9.7 to 9.10).

5.133 The Scientific Committee encouraged Members to continue to collect and submit data on *C. gunnari* to maximise the productivity of the workshop.

High-priority Intersessional Work on *Dissostichus* spp.

5.134 In the course of this year's assessments WG-FSA identified high-priority areas for future work on *Dissostichus* spp. The Scientific Committee agreed that this work should be

afforded higher priority to that on *C. gunnari* given the state of fisheries for *Dissostichus* spp. and the low catches of *C. gunnari* reported in recent years. The principal areas of work identified in Annex 5, paragraph 9.11 were:

(i) consider the currency of assessments for both *D. eleginoides*, as well as other species;

(ii) subject to the advice of the Scientific Committee and the Commission, define a start date for fisheries for *Dissostichus* spp. and review the 35-year period of which stock trajectories are projected with the GYM, especially in terms of reconciling the outputs of the GYM and information derived from CPUE;

(iii) identify stocks and define their home ranges;

(iv) analysis and interpretation of CPUE data;

(v) develop and validate growth models for *D. eleginoides* and *D. mawsoni* in different parts of their range;

(vi) obtain recruitment data for areas for which none are currently available;

(vii) derive recruitment indices from mixture analyses and analysis of their sensitivity to expected outcomes from growth and mortality functions; and

(viii) define ways of apportioning assessments in areas where both trawling and longlining may occur.

5.135 The Scientific Committee noted that task (vii) will require the reporting or re-reporting of survey data to the Secretariat in order that they may be analysed in accordance with current standard methods before the next meeting of WG-FSA.

5.136 Recognising the high-priority need for further work on *Dissostichus* spp., WG-FSA examined the idea of holding a thematic session during its 1999 meeting. If such a session was feasible, then key new work on *Dissostichus* spp. could be reviewed during the meeting, and would alleviate the need for a workshop prior to the meeting. The success of the thematic session would hinge on the success of intersessional activities and the ability to report findings in papers focused on key elements of the assessments.

Other Work During the Intersessional Period

5.137 The Scientific Committee supported the recommendation of WG-FSA that the role of subgroup coordinators at this year's meeting be extended to the intersessional period, and that these people be tasked with coordinating the relevant and high-priority aspects of the work identified at the meeting. WG-FSA concluded that such an approach was likely to ensure the success of the thematic session. The Convener of the Working Group and Chairman of the Scientific Committee in consultation with Working Group members, appointed coordinators for the following activities:

(i) compilation of catch data (from regulated and unregulated fishing activities) (Mr Purves and Prof. Duhamel);

(ii) review of observer reports and information (Dr Balguerías);

(iii) review and summarise new and exploratory fisheries activities and notifications (Secretariat);

(iv) assessment of *D. eleginoides* in established, new and exploratory fisheries (Drs Constable, Parkes, Agnew, Moreno, Marschoff and Ramm);

(v) assessment of *C. gunnari* (Drs Constable, Parkes, Agnew, Moreno, Marschoff and Ramm);

(vi) review, and where necessary assess, the biology and demography of species considered by the Working Group (Dr Everson); and

(vii) compilation of data necessary for ad hoc WG-IMALF activities (Secretariat).

5.138 The work of these coordinators will be triggered by the arrival of the data necessary for them to address the various topics identified.

5.139 The Working Group identified a number of tasks which should be carried out by participants and the Secretariat during the intersessional period. These tasks are summarised in Annex 5, paragraphs 9.16 to 9.20.

Convener of WG-FSA

5.140 The Scientific Committee expressed its gratitude to Dr Holt for so ably convening this year's meeting of WG-FSA at short notice after the resignation of Dr de la Mare.

5.141 The Scientific Committee discussed the recommendation of WG-FSA concerning the convenership of the meetings for 1999 and 2000. The nomination of Mr Williams as the next Convener of WG-FSA was proposed by Dr Holt, seconded by Prof. Moreno and agreed by the Scientific Committee.

5.142 The Scientific Committee congratulated Mr Williams on his appointment.

Crab Resources

5.143 No vessels have fished for crabs in Subarea 48.3 since January 1996, and no vessels have expressed an interest in participating in this fishery during the 1998/99 crab fishing season (SC-CAMLR-XVI, Annex 5, paragraphs 4.226 and 4.227).

5.144 The Scientific Committee endorsed WG-FSA's view that it was not necessary to conduct an assessment of the crab stock in Subarea 48.3 (Annex 5, paragraph 4.195) and noted that Conservation Measures 90/XV and 126/XVI were in force for the 1996/97 and 1997/98 crab fishing seasons.

5.145 The Scientific Committee noted that, currently, the crab fishery is not considered commercially viable (SC-CAMLR-XVI, Annex 5, paragraph 4.227). At present, the viability of the fishery is related to various economic factors rather than to stock abundance, and the Scientific Committee agreed that the fishery could become commercially viable in the future. In this regard, the Scientific Committee endorsed WG-FSA's view that a conservative management scheme as contained in Conservation Measure 126/XVI is still appropriate for this fishery (Annex 5, paragraph 4.196).

5.146 The Scientific Committee further noted that Conservation Measure 90/XV expired after the 1997/98 crab fishing season. The Scientific Committee, recognising the great utility of the experimental harvest regime set out in Conservation Measure 90/XV in providing useful information for developing an assessment of the target species, reiterated the view expressed at

its 1996 meeting that Conservation Measure 90/XV should remain in force, but that if new vessels were to enter the fishery, the Commission might wish to revise Phase 2 in the light of the comments made in paragraph 4.183 of the 1996 report (SC-CAMLR-XV, Annex 5).

Squid Resources

5.147 A notification of the intention to conduct an exploratory fishery for the squid *M. hyadesi* in Subarea 48.3 by the Republic of Korea and the UK during the 1997/98 season had been approved under Conservation Measure 145/XVI. No fishing had been carried out since the 1997 Commission meeting. No new information had been presented to WG-FSA, WG-EMM or the Scientific Committee.

5.148 The scientific basis on which both the notification and the current conservation measure were based has not changed. WG-FSA, WG-EMM and SC-CAMLR had had detailed discussions on the subject of a squid fishery in 1997 (SC-CAMLR-XVI, Annex 5, paragraphs 4.2 to 4.6; SC-CAMLR-XVI, Annex 4, paragraphs 6.83 to 6.87; SC-CAMLR-XVI, paragraphs 9.15 to 9.18). The catch limit is considered to be precautionary, since it is only 1% of a conservative estimate of annual predator consumption (SC-CAMLR-XV, paragraph 8.3).

5.149 The Scientific Committee recommended that a conservative management scheme as contained in Conservation Measure 145/XVI is still appropriate for this fishery.

Timing of the CCAMLR Fishing Year: Technical Considerations of the Feasibility of a Change in Timing of the Annual Season

5.150 The Scientific Committee considered the current timing of the annual fishing season which begins immediately following the Commission meeting and concludes at the end of the Commission meeting in the following year. The Scientific Committee recognises that the requirement for Members to licence vessels to fish in the Convention Area results in a period immediately following CCAMLR when fishing cannot take place. This is because licences based on the recently decided conservation measures need to be issued in a manner consistent with domestic legislative requirements.

5.151 The Scientific Committee considered whether there are any technical difficulties in moving the start and end of the annual season for finfish to, say, the end of November, and for any interim measures that may be necessary to facilitate the transition to a new season, such as adding an additional month to the first year of operation. This would enable 12 months of fishing activity when there is no biological reason to have a closed season and to retain the requirement that regulations come into force as close to the end of the Commission meeting as possible while enabling the issue of licences within a reasonable time.

5.152 The Scientific Committee provides advice to the Commission on the most recent data and analyses available from its Working Groups and, in some cases, from other sources. This advice is unlikely to be affected by a change in season by approximately one month. Currently, WG-FSA (including ad hoc WG-IMALF) concludes its work two weeks before the end of the season and uses data from the fishery up to the end of September in the current year. An additional three to four weeks is unlikely to affect the current assessments, particularly as many are now based on assessments of long-term annual yield or, in the case of *C. gunnari*, include projections over two years based on recent surveys.