HARVESTED SPECIES

Krill resources

2008/09 fishing season

4.1 Six vessels from five Members had fished for krill in 2008/09, all in Area 48 (Annex 4, Table 3).

4.2 The krill catch in 2008/09 (reported to October 2009) was 123 948 tonnes. In 2008/09 the catch was taken from Subareas 48.1 and 48.2 and there was <1 tonne caught from Subarea 48.3, which accords with reports that krill were absent from the South Georgia area during this season (paragraphs 3.8 and 3.38; Annex 4, paragraph 3.10).

4.3 It was unclear whether the shift of the fishery away from Subarea 48.3 in the 2008/09 season was the result of the absence of krill, or whether it was for other operational reasons; however, monthly catch data indicated a significantly higher than average winter catch from Subarea 48.2 so that the overall catch in Area 48 remained similar to that in 2007/08 despite the lack of a fishery at South Georgia. The Scientific Committee, however, noted that this shift in operational behaviour of the fishing fleet indicated that the historical pattern of krill fishing may not be observed in every year, and that concentration of fishing in smaller areas can occur.

Krill fishery notifications in 2009/10

4.4 Seven countries submitted krill fishery notifications for 13 vessels with a total notified catch of 363 000 tonnes which is considerably lower than the notified catch for the 2008/09 season of 629 000 tonnes. All notifications were for Area 48 but one notification also indicated fishing in Area 58.

4.5 Notifications to fish for krill were received from seven nations: China (3 vessels), Japan (1 vessel), Republic of Korea (3 vessels), Norway (3 vessels), Poland (1 vessel), Russia (1 vessel) and Ukraine (1 vessel). In addition, Chile submitted a notification for one vessel which arrived one month after the notification deadline of 1 June 2009 (CCAMLR-XXVIII/12 Rev. 1); this was therefore not considered further.

4.6 China notified its intention to fish for krill in Area 48 for the first time with three vessels and a projected catch of 9 000 tonnes.

4.7 In accordance with Conservation Measure 21-03, Norway notified its intention to participate in an exploratory krill fishery in Subarea 48.6 (paragraphs 4.215 and 4.216).

4.8 The Scientific Committee noted that some notifications had been submitted in official languages other than English this year and these were therefore unable to be examined fully by WG-EMM. The Scientific Committee recommended that translation of these and future notifications be carried out so that WG-EMM could provide scientific advice (Annex 4, paragraph 3.32).

Trends in krill fishery

4.9 The Scientific Committee noted that the projected catch for 2008/09 is likely to be similar to that in 2007/08 and that, although the notifications for fishing in 2009/10 were lower than in 2008/09, they were still considerably in excess of the current catch.

Potential trends in the krill fishery

4.10 The use of patent databases to examine potential future trends in the krill fishery was presented in SC-CAMLR-XXVIII/BG/15. The patent data show an upward trend. The Scientific Committee agreed that this could be a useful source of information to augment the Scientific Committee's data on trends in the krill fishery.

4.11 The data presented in SC-CAMLR-XXVIII/BG/15 showed there has been an increase in commercial interest in krill over the last decade as indicated by an increased rate of patent applications. Much of the increase in patent activity is in the area of medical products and human use, rather than patents for aquaculture or processing which dominated the earlier years of the krill industry. Recent patent activity has included a large number of applications from nations that are not currently fishing for krill.

4.12 The Scientific Committee agreed that a patent database could provide a valuable additional source of information about trends in the krill fishery and agreed that it would be useful if the Secretariat could maintain such a database in the future and provide annual updates on these trends.

Escape mortality

4.13 The Scientific Committee agreed that the potential mortality of krill that pass through the mesh of trawls ('escape mortality') could equal or exceed the mortality owing to catch alone and that this level of escape mortality is a matter of concern for assessments and catch allocation schemes (Annex 4, paragraph 3.4). The Scientific Committee recommended that there should be a concerted effort to estimate escape mortality in the krill fishery (Annex 4, paragraphs 3.5 and 3.6).

4.14 In SC-CAMLR-XXVIII/BG/10, Ukraine suggested the need to conduct experiments to determine escape mortality rates and provided details of designs of trawl nets with sewed-in catching patches to estimate the mortality rate.

4.15 The Scientific Committee thanked Ukraine for providing this useful information on escape mortality and recommended that the Scientific Committee ask the Members fishing for krill during the 2009/10 season to actively investigate the effects of different fishing gear on escape mortality of krill and report any information to next year's meeting of WG-EMM (Annex 4, paragraph 3.7).

Conversion factors

4.16 The Scientific Committee noted ad hoc TASO's discussion on volume-to-mass conversion factors; an issue identified as a potential problem in accurately estimating catch from volumetric measurement. Conversion factors discussed at previous meetings were limited to product-to-mass conversion, and the UK agreed to implement a trial procedure involving the collection of volume-to-mass data for krill samples from the krill fishery and to report the results to TASO and WG-EMM next year (Annex 9, paragraph 3.6; Annex 4, paragraph 3.49).

4.17 The Scientific Committee thanked the UK for undertaking this trial.

Data reporting

4.18 In 2007/08 the total catch of krill was 156 521 tonnes, all taken from Area 48; this compares with the total catch of 125 063 tonnes reported to the Scientific Committee in 2008 (SC-CAMLR-XXVII, paragraph 4.3). The Working Group noted that this discrepancy arose because the Secretariat did not receive monthly catch and effort data from one vessel for four months, a krill catch of 19 262 tonnes, due to an email failure and because the Secretariat was unaware that the vessel was engaged in fishing at that time (WG-EMM-09/6).

4.19 The Scientific Committee expressed its concern over this issue, which may have influenced the interpretation of the catch data in the Scientific Committee and Commission meetings, since the catch in 2007/08 was the highest since the 1991/92 season.

4.20 The Scientific Committee noted that the 2007/08 catch presented to SC-CAMLR-XXVII was an underestimate partly because Conservation Measure 10-04, which requires Flag States to notify the Secretariat of each entry to, exit from and movement between subareas and divisions of the Convention Area by each of its vessels, does not currently apply to krill fisheries (Annex 4, paragraph 3.67).

4.21 The Scientific Committee considered options that would allow the Secretariat to be informed if krill fishing activities were being undertaken so that it would be alerted to any missing reporting and be able to take appropriate action.

4.22 The Scientific Committee agreed that inserting a paragraph into Conservation Measure 23-06 requiring Flag States to notify the Secretariat of each entry to, exit from and movement between subareas and divisions of the Convention Area by each of its vessels would address this issue.

4.23 The Scientific Committee agreed that there is a need to make consistent the requirements of footnote 1 in Conservation Measure 21-03, which has a deadline of 1 June for the submission of notifications for exploratory fisheries for krill, and the timing of notifications under Conservation Measure 21-02 (Annex 4, paragraph 3.68).

4.24 The Scientific Committee noted (Annex 4, paragraph 3.69) that, while Conservation Measure 23-04 does not apply to the krill fishery, there were the following advantages of aligning the deadline for the submission of fine-scale catch and effort data from krill fisheries with the deadline applicable in other fisheries:

(i) WG-EMM will be provided with improved availability of fine-scale information, including timely access to fine-scale data during preparation of the annual krill fishery report.

(ii) It would facilitate improved data validation by enabling more timely and frequent communication between the Secretariat and data providers, and timely cross-checking with monthly catch and effort reports.

(iii) It would improve the scheduling of data processing and validation in the Secretariat by alleviating the large amount of fine-scale data received by the Secretariat in late March each year.

4.25 The Scientific Committee recommended that Members submit fine-scale data at reporting intervals such as employed in other fisheries (Annex 4, paragraph 3.70).

Trigger level

4.26 The Scientific Committee agreed with the advice from WG-EMM that:

(i) modelling results tabled at the meeting showed that a harvest level consistent with the current trigger level (620 000 tonnes) for the krill fishery in Subareas 48.1 to 48.3 was not as cautious as might have been thought at the time this was agreed (Annex 4, paragraph 3.122);

(ii) status quo management may reduce the Commission's ability to achieve the objectives specified in Article II (see also the 2008 advice to the Scientific Committee in SC-CAMLR-XXVII, paragraph 3.9). This concern would be particularly important if the fishery were to become more spatially concentrated than the historical distribution of catch in areas where predators with restricted foraging ranges occur (Annex 4, paragraph 3.124).

4.27 The Scientific Committee further endorsed the recommendation by WG-EMM that the trigger level and its application in Conservation Measure 51-01 needs to be reviewed, taking account of the advice related to spatial allocation of the trigger level (Annex 4, paragraphs 3.126 to 3.132).

4.28 The Scientific Committee agreed that the results of all analyses and modelling currently conducted by WG-EMM consistently indicated that if the trigger level catch was concentrated in a single area, then this would increase the risk of significant adverse impacts on dependent predators in Area 48 (Annex 4, paragraphs 3.122 and 3.126). It also noted that distributing the catch according to the historical fishing pattern poses higher risks than other methods to distribute catch.

4.29 The Scientific Committee noted that WG-EMM had therefore advised that, at the current trigger level, the most appropriate distribution of catches would be in approximate proportion to the biomass derived in the CCAMLR-2000 Survey.

4.30 The Scientific Committee noted that the current trigger level was based on the 1970s stock state and that it was not realistic to expect fishing patterns to remain the same over this

period of time, especially considering recent evidence which shows that krill stocks may have declined since the 1980s. Additionally, fishing patterns are known to change from season to season (e.g. 2008/09 season; paragraph 4.2).

4.31 Ukraine's proposal to amend Conservation Measure 51-01 (CCAMLR-XXVIII/48) suggested the subdivision of the trigger level in Area 48 into subareas in accordance with the ratio of krill biomass estimates in each subarea derived from the CCAMLR-2000 Survey and the distribution of catch limits between coastal and pelagic areas. The proposal further suggested the need for further research to identify and understand the uncertainties regarding information needed for krill fishery management.

4.32 The Scientific Committee thanked Ukraine for its effort in assembling this useful proposal.

4.33 The Scientific Committee noted that it is almost a decade since the CCAMLR-2000 Survey was conducted, and that there are uncertainties regarding the current use of the CCAMLR-2000 biomass distribution for allocating trigger levels. The Scientific Committee noted that there is an urgent need for another survey to update this information, but that this would take considerable planning, and management action was needed before such information would become available.

4.34 The Scientific Committee further noted that additional precaution is needed in the approach to manage the krill fishery because of increasing uncertainties in the overlap of fishing activities with predator requirements in specific locations and that this overlap may vary between and within years due to variation in the distribution of the krill stock as well as long-term ecological change.

4.35 It was noted that subdividing the trigger level needs to be achieved flexibly. Simply subdividing the trigger level with proportions which sum up to 100% may be equivalent to merely setting a new lower catch limit for each subarea, which is not the aim of the process.

4.36 The Scientific Committee agreed that there is a need to spatially distribute the krill fishing effort to avoid large catches being taken from restricted areas before the trigger level is reached. This could be a simple interim mechanism to manage the distribution of catch throughout Area 48.

4.37 In discussing the trigger level, the Scientific Committee noted that it should retain a focus on the ultimate aim of this series of work, which is to establish a feedback management procedure. This is intended to incorporate the SSMU concept but there is also a recognition that further research and time is still required to establish the long-term goal of feedback management and thus an interim mechanism is necessary.

4.38 The Scientific Committee agreed that mechanisms to avoid concentrating the catch before the trigger level is reached should be adopted this year, noting that the total catch possible within a year should be the total trigger level of 620 000 tonnes.

4.39 The interim mechanism should be able to distribute the catch without the need to know the exact krill distribution and the precise impact on krill predators. This approach needs to be flexible so as to avoid restricting the fishery at the current level of fishing, whilst at the same time providing the Commission with assurances that increased precaution is being

exercised while WG-EMM is working on the longer-term feedback management procedure. Five models for avoiding catch concentration are given in Table 1. Discussion points on each of the models are also provided with the table.

4.40 Five models to spatially distribute the catch trigger level were discussed.

4.41 The Scientific Committee clarified the basis on which each of the models to distribute the trigger level was derived (Table 1).

4.42 The Scientific Committee noted that:

(i) Models separating coastal and pelagic areas are the most precautionary option taking account of the needs of land-based predators; however, they are the least flexible for the current fishery and may force a change of fishing pattern at the current catch level, taking into account the potential interannual variations in krill distribution and oceanographic changes.

(ii) The overlap models, where the sum of spatially distributed proportions can be more than 100%, allow more flexible operations for the current fishing pattern compared to non-overlap models.

4.43 The Scientific Committee noted that models with a coastal–pelagic separation can also be formulated as an overlap model if certain percentages are added to each of the sub-region percentages. The Scientific Committee noted that the 'coastal' regions in these models were defined as the 60 n mile zone around land.

4.44 The Scientific Committee noted that the trigger level is an interim measure set to ensure that the total catch limit is not concentrated in any one subarea before a management strategy is identified that will appropriately conserve dependent and related species, in this case krill predators. Under current regulations, catches equivalent to the trigger level of 620 000 tonnes of krill could be taken from any single local area. The Scientific Committee agreed that this trigger level alone will not be sufficient to prevent the concentration of catches in localised areas.

4.45 The Scientific Committee developed the candidate options in Table 1 and recommended the Commission use the options in the table as a foundation for determining how to distribute the trigger level. Figure 1 is provided to help understand Model 4.

Feedback management procedures

4.46 The Scientific Committee recalled the long history of the development of feedback management strategies for krill and how this development is required under the precautionary approach (CCAMLR-X, paragraph 6.13; SC-CAMLR-XXVI, paragraph 3.36), and further noted that the FOOSA (WG-EMM-05/13 and 06/22) model is now well developed and has established a foundation for exploring the consequences to achieving the objectives of CCAMLR given plausible models of ecosystem structure and function in the Scotia Sea.

4.47 The Scientific Committee thanked Dr Watters and his co-workers for the development of FOOSA and Dr Watters for his hard work leading the working groups to the point that the Scientific Committee is able to provide agreed precautionary advice to the Commission.

4.48 The Scientific Committee encouraged all Members to participate in the process of developing the feedback management procedure.

Fish resources

Fisheries information

Catch, effort, length and age data reported to CCAMLR

4.49 Fishing took place in 13 fisheries targeting icefish (*C. gunnari*), toothfish (*Dissostichus eleginoides* and/or *D. mawsoni*) and krill (*Euphausia superba*) under conservation measures in force in 2008/09 (CCAMLR-XXVIII/BG/6).

4.50 Three other fisheries were conducted in the Convention Area in 2008/09:

- fishery for *D. eleginoides* in the French EEZ in Division 58.5.1
- fishery for *D. eleginoides* in the French EEZ in Subarea 58.6
- fishery for *D. eleginoides* in the South African EEZ in Subareas 58.6 and 58.7 and Area 51 outside the Convention Area.

4.51 The preliminary total catch of target species by country and region reported from fisheries conducted in the CAMLR Convention Area in 2008/09 are summarised in Table 2. Catches reported in 2007/08 are summarised in Table 3.

4.52 The Scientific Committee noted the work completed by the Secretariat (Annex 5, paragraph 3.1) on:

- monitoring and closure of fisheries when catch limits were reached
- updating of Fishery Reports
- development of the CCAMLR database.

4.53 The Scientific Committee noted the estimates of catch and effort from IUU fishing (Annex 5, Table 2).

4.54 The Scientific Committee noted the catches of toothfish from waters outside the Convention Area reported in the CDS (see also paragraphs 4.138 to 4.140) (Annex 5, Table 4).

Input for stock assessment

4.55 The Scientific Committee noted that WG-FSA had reviewed all available research data which were subsequently used in updating stock assessments of fish in the Convention Area.

This included catch-at-length/age data from fisheries, research surveys, catch and effort analyses, tagging studies, biological parameters, stock structure and management areas, and depredation.

Research surveys

4.56 The Scientific Committee noted that three Members reported on research surveys undertaken in 2008/09 (Annex 5, paragraphs 3.37 to 3.43):

(i) A bottom trawl survey in Division 58.5.2 was carried out by Australia. The results of this survey were used to update assessments of toothfish and icefish in this division.

(ii) A bottom trawl survey in Subarea 48.3 was carried out by the UK. The results from the survey were used to update the assessment of icefish in this subarea.

(iii) A bottom trawl survey in the South Orkney Islands in Subarea 48.2 was carried out by the USA. Results from the survey were used to evaluate the current status of demersal finfish stocks in this subarea and to detect potential VMEs. The Scientific Committee noted that this was the first survey in the area for 10 years and results from this survey indicated that finfish species in this region are currently below a level which would allow a reopening of commercial finfish fisheries in Subarea 48.2.

4.57 The Scientific Committee thanked Australia, UK and the USA for completing very complex research surveys and for speedily providing data and results. Such data will contribute to the long-term data series.

Tagging studies

4.58 The Scientific Committee noted the detailed discussion by WG-FSA on tagging of toothfish in both exploratory and assessed fisheries (Annex 5, paragraphs 3.48 to 3.54). It welcomed both the continuing progress in this area and the significant contribution of the results to the assessments carried out by WG-FSA.

4.59 The Scientific Committee considered that the descriptive analysis of the tagging program in Subareas 88.1 and 88.2 represented a useful assessment of the available data (Annex 5, paragraph 3.48). It agreed that the associated estimates should be used in the updated assessment of the stock assessments for the Ross Sea and SSRU 882E.

4.60 The Scientific Committee endorsed WG-FSA's use of a methodology to analyse data metrics for selecting high-quality tagging data for inclusion in stock assessments (Annex 5, paragraph 3.49). It was noted that WG-FSA had provided recommendations for further developing this approach (Annex 5, paragraphs 3.49 to 3.51).

4.61 The Scientific Committee noted from tagging studies in exploratory fisheries, that there was evidence that fish were not being tagged in proportion to their size distribution in the catch (Annex 5, paragraphs 3.54 and 5.12 to 5.17). These discussions are in paragraphs 4.148 to 4.151.

Stock structure

4.62 The Scientific Committee agreed that standardised methods and data sources need to be developed for deriving bathymetric information in the Convention Area. It also encouraged the establishment of a common data repository and the contribution by other data providers of suitable bathymetric data to such a facility. Dr Welsford proposed that the Australian Antarctic Data Centre may provide an appropriate facility for storage and administration of such data.

Biology, ecology and demography of target and by-catch species

4.63 The Scientific Committee noted the work of WG-FSA on biology, ecology and demography of target and by-catch species in the fisheries and that summaries of 17 papers are provided in Annex 5, Appendix D.

4.64 The Scientific Committee noted the WG-FSA discussion provided (Annex 5, paragraphs 9.5 to 9.8) on the status of the CON, and agreed that an intersessional group should:

- prepare an inventory of those laboratories undertaking ageing of *Dissostichus* spp.
- foster an exchange of age-reading methods between laboratories
- establish a reference collection of otoliths of both species from all areas fished
- establish protocols of how otoliths are prepared for ageing and how annuli are identified.

4.65 In addition, the Scientific Committee requested that age determination based on otolith analyses of samples from *Dissostichus* spp. be included in the research plan which forms part of the notification for fishing in new and exploratory fisheries.

4.66 The Scientific Committee further suggested that the results of ageing and a detailed description of how ageing was conducted should be submitted to WG-FSA on a regular basis. Ageing data should also be submitted to the Secretariat to help develop the Secretariat's database to be used in storing ageing data for use in assessments.

Preparation of assessments by WG-FSA

4.67 The Scientific Committee noted WG-FSA had reviewed and endorsed the relevant sections of the SG-ASAM report (Annex 5, paragraphs 4.1 to 4.3).

4.68 The Scientific Committee also noted that WG-FSA had reviewed and endorsed the relevant sections of the WG-SAM report (Annex 5, paragraph 4.4).

Review of preliminary stock assessment papers

4.69 The Scientific Committee noted that WG-FSA had reviewed preliminary stock assessments developed during the intersessional period for *D. eleginoides* in Subareas 48.3 and 48.4 and Division 58.5.2, *Dissostichus* spp. in Subareas 88.1 and 88.2, and *C. gunnari* in Subarea 48.3 and Division 58.5.2. The resulting discussions and summaries are provided in Annex 5, paragraphs 4.6 to 4.26. In most cases, issues that had been raised at WG-SAM had been incorporated into revised stock assessments.

Assessments carried out and assessment timetable

4.70 Updated assessments were completed for the following fisheries:

- *D. eleginoides* in Subarea 48.3
- *D. eleginoides* in Subarea 48.4
- *D. eleginoides* in Division 58.5.2
- *D. mawsoni* in Subarea 88.1 and SSRUs 882A–B (Ross Sea management area)
- *D. mawsoni* in Subarea 88.2, SSRU E
- *C. gunnari* in Subarea 48.3
- *C. gunnari* in Division 58.5.2.

4.71 All assessments for *Dissostichus* spp. used the CASAL framework, and those for *C. gunnari* used the short-term projection approach. Specific information on input data and assessment methodologies for each assessed fishery are provided in the relevant Fishery Reports.

4.72 WG-FSA had no new information with which to review assessments for *D. eleginoides* fisheries in the French EEZs in Division 58.5.1 and Subarea 58.6 and the South African EEZ in Subareas 58.6/58.7.

4.73 All assessment work was undertaken by primary authors of the preliminary assessments, and reviewed independently at the WG-FSA meeting. Tasks of independent reviewers are listed in WG-FSA-06/6, paragraph 6.3. The outcomes of the assessments were reported in the Fishery Reports (Annex 5, Appendices E to S)[1].

[1] The Fishery Reports are only available electronically in English at www.ccamlr.org/pu/e/e_pubs/fr/drt.htm.

Assessments and management advice

Dissostichus eleginoides South Georgia (Subarea 48.3)

4.74 The Fishery Report for *D. eleginoides* in Subarea 48.3 is contained in Annex 5, Appendix L, and the discussion by WG-FSA is in Annex 5, paragraphs 5.121 to 5.127.

4.75 The catch limit for *D. eleginoides* in the 2008/09 season was 3 920 tonnes, and the recorded catch was 3 383 tonnes.

4.76 The Scientific Committee endorsed the assessment undertaken by WG-FSA presented in Annex 5, paragraphs 5.121 to 5.127 and Appendix L (Fishery Report).

4.77 The Scientific Committee noted WG-FSA's assessment that fits to the tag, CPUE and catch-at-age data were good, with the exception of the 2009 catch-at-age data (Annex 5, paragraph 4.7). The model did not adequately predict the large proportion of young (age 7) fish caught this year. WG-FSA had agreed that there were two alternative explanations for this result; either recruitment (to the 2001 cohort) has been exceptionally high, or the pattern of the fishery has changed.

4.78 The Scientific Committee noted that WG-FSA was unable to distinguish between these two hypotheses, but this should become clearer when the 2001 cohort has fully recruited to the fishery in one or two years' time.

4.79 WG-FSA therefore considered two plausible scenarios for future recruitment in projections. The first assumes that future recruitment will be similar to the entire time series of past recruitment, and uses lognormal mean recruitment (CV 0.59) for the projections. The second assumes that future recruitment will be similar to the recent historically estimated recruitment, and uses the lognormal empirical time series of recruitments from 1991–2001 for the projections. This latter recruit series had both a lower overall recruitment level and lower variance (CV 0.56) than the former because of the removal of the very large 1990 cohort from the series (Annex 5, paragraph 5.125).

4.80 The calculated yields that satisfy the CCAMLR decision rules for these two scenarios were 3 950 and 2 750 tonnes respectively.

Management advice

4.81 Given the uncertainty in recent recruitment to the stock, and its implications on future recruitment levels, the Scientific Committee recommended that the catch limit should be set towards the lower end of the range 2 750–3 950 tonnes.

4.82 The catch limit can be carried over into the 2010/11 fishing season, subject to the conditions of the biennial assessment procedure for this fishery adopted in 2007, and detailed in SC-CAMLR-XXVI, paragraph 14.6.

Dissostichus spp. South Sandwich Islands (Subarea 48.4)

4.83 The Fishery Report for *D. eleginoides* in Subarea 48.4 is contained in Annex 5, Appendix M, and the discussion by WG-FSA is in Annex 5, paragraphs 5.128 to 5.138.

4.84 A tagging experiment has been conducted in the Northern Area of Subarea 48.4 over the last four years. This experiment was extended to the Southern Area of Subarea 48.4 in the 2008/09 fishing season.

4.85 The catch limits for *D. eleginoides* and *D. mawsoni* in the Northern Area of Subarea 48.4 in the 2008/09 season were 75 and 0 tonnes (except for scientific purposes) respectively, with recorded catches of 59 and 0 tonnes respectively. The northern fishery was closed when the macrourid by-catch limit was reached. The catch limit for *Dissostichus* spp. in the Southern Area of Subarea 48.4 in the 2008/09 season was 75 tonnes, with a recorded catch of 74 tonnes.

D. eleginoides in the Northern Area

4.86 The Scientific Committee noted that a single CASAL assessment model had been used for *D. eleginoides* in the Northern Area of Subarea 48.4. Discussions are presented in Annex 5, paragraphs 5.130 to 5.133. Long-term yield for the Northern Area that satisfies the CCAMLR decision rules was 41 tonnes.

4.87 The Scientific Committee noted the success of the four-year experiment in Subarea 48.4 and attributed this success to the following key factors:

(i) the experiment was well designed and monitored closely;

(ii) vessels undertaking the experiment had committed to it over the whole period of the experiment, allowing for consistency and high standards in the execution of the research plan;

(iii) tags were released randomly throughout the area, with tagging of a wide range of toothfish sizes.

4.88 The Scientific Committee noted that the experimental design and proposed analyses, which would result in completion of a stock assessment, were reviewed by WG-FSA prior to undertaking the experiment.

4.89 In addition, the Scientific Committee noted the lack of IUU removals in Subarea 48.4 which provided for greater understanding of stock status.

4.90 The Scientific Committee expressed its appreciation to the vessels that participated in the four-year experiment for their dedicated and high-quality work, essential to the success of the experiment.

Dissostichus spp. in the Southern Area

4.91 A report of the first year of the experiment in the Southern Area was submitted to WG-FSA (Annex 5, paragraph 5.134). *Dissostichus mawsoni* were found throughout the area, and *D. eleginoides* only in the very northernmost part of the area.

4.92 Following comparison of CPUE and fishable area between the Northern and Southern Areas of Subarea 48.4, WG-FSA concluded that a catch of 75 tonnes, taken over the three years of the experiment, was unlikely to deplete the stock in the Southern Area.

Management advice

4.93 The Scientific Committee recommended that the catch limit for *D. eleginoides* in the Northern Area of Subarea 48.4 should be set at 41 tonnes.

4.94 The Scientific Committee recommended that the catch limit for *Dissostichus* spp. in the Southern Area of Subarea 48.4 should remain at 75 tonnes, and that the experiment should be extended for a further two years and be reviewed periodically by WG-FSA.

4.95 The Scientific Committee recommended that Conservation Measure 41-03 should be updated during the two-year tagging experiment to incorporate a threshold catch of 150 kg of *Macrourus* spp. above which the move-on rule would be triggered, and that it should be reviewed on an annual basis. The existing move-on rules for rajids in the Southern Area of Subarea 48.4 should be retained.

Dissostichus eleginoides Kerguelen Islands (Division 58.5.1)

4.96 The Fishery Report for *D. eleginoides* in Division 58.5.1 is contained in Annex 5, Appendix N, and the discussion by WG-FSA is in Annex 5, paragraphs 5.139 to 5.145.

4.97 The catch of *D. eleginoides* reported for this division to 31 August 2009 was 3 108 tonnes. Only longlining is currently permitted in the fishery. The estimated IUU catch for the 2008/09 season was zero in Division 58.5.1 (Annex 5, paragraph 5.140).

4.98 The CPUE standardisation for Division 58.5.1 was not updated by WG-FSA.

Management advice

4.99 The Scientific Committee encouraged the estimation of biological parameters for *D. eleginoides* in Division 58.5.1 and the development of a stock assessment for this area. It also encouraged cooperative work in the intersessional period between France and Australia on analyses of catch and effort data and other data that could be used to progress the understanding of fish stocks and fishery dynamics for Divisions 58.5.1 and 58.5.2 and Subarea 58.6. The Scientific Committee encouraged France to continue its tagging program in Division 58.5.1.

4.100 The Scientific Committee recommended that avoidance of fishing in zones of specific high rates of by-catch should also be considered.

4.101 No new information was available on the state of fish stocks in Division 58.5.1 outside areas of national jurisdiction. The Scientific Committee therefore recommended that the prohibition of directed fishing for *D. eleginoides*, described in Conservation Measure 32-13, remains in force.

4.102 The Scientific Committee noted that France had made significant progress in mitigating seabird by-catch, including area/season closures (SC-CAMLR-XXVI, Annex 6, paragraph II.23). It noted that the CPUE analysis would probably be robust to these changes so long as detailed haul-by-haul data continued to be available.

Dissostichus eleginoides Heard Island (Division 58.5.2)

4.103 The Fishery Report for *D. eleginoides* in Division 58.5.2 is contained in Annex 5, Appendix O, and the discussion by WG-FSA is in Annex 5, paragraphs 5.146 to 5.152.

4.104 The catch limit of *D. eleginoides* in Division 58.5.2 west of 79°20'E for the 2008/09 season was 2 500 tonnes (Conservation Measure 41-08) for the period from 1 December 2008 to 30 November 2009. The catch of *D. eleginoides* reported for this division as at 11 October 2009 was 2 177 tonnes. Of this, 1 000 tonnes was taken by trawl, 1 164 tonnes by longline and the remainder by pot (<1%). The estimated IUU catch for the season was 0 tonnes.

4.105 Long-term annual yield, based on a slight revision of the preliminary assessment was estimated to be 2 550 tonnes.

4.106 The Scientific Committee noted that under this scenario, as presented in WG-FSA-09/20, the median SSB may remain below the target level for several years, before returning to the 0.5 SSB at the end of the 35-year projection period. The Scientific Committee noted the advice of WG-FSA that the stock is currently estimated to be above the target level, and that while a stock is likely to fluctuate around the target level through natural variability, this indicated a need for continued scrutiny of this stock into the future.

4.107 The Scientific Committee thanked Australia for setting out a comprehensive program of future work (Annex 5, paragraph 5.151) aimed at reducing key uncertainties in the assessment before the SSB is forecast to fall below the target level.

Management advice

4.108 The Scientific Committee recommended that the catch limit for *D. eleginoides* in Division 58.5.2 west of 79°20'E should be 2 550 tonnes for the 2009/10 fishing season.

4.109 This catch limit can be carried over into the 2010/11 fishing season, subject to the conditions of the biennial assessment procedure for this fishery adopted in 2007, and detailed in SC-CAMLR-XXVI, paragraph 14.6.

Dissostichus eleginoides Crozet Islands (Subarea 58.6)

4.110 The Fishery Report for *D. eleginoides* in Subarea 58.6 (French EEZ) is contained in Annex 5, Appendix P, and the discussion by WG-FSA is in Annex 5, paragraphs 5.153 to 5.159.

4.111 The catch of *D. eleginoides* reported for this subarea to October 2009 was 746 tonnes. Only longlining is currently permitted in the fishery. The estimated IUU catch for the 2008/09 season was zero inside Subarea 58.6 (Annex 5, paragraph 5.154)

4.112 The standardised CPUE series for this fishery was not updated by WG-FSA.

Management advice

4.113 The Scientific Committee encouraged the estimation of biological parameters for *D. eleginoides* in the French EEZ of Subarea 58.6, and the development of a stock assessment for this area. The Scientific Committee encouraged France to continue its tagging program in Subarea 58.6.

4.114 The Scientific Committee recommended that avoidance of zones of high by-catch abundance should also be considered.

4.115 No new information was available on the state of fish stocks in Subarea 58.6 outside areas of national jurisdiction. The Scientific Committee therefore recommended that the prohibition of directed fishing for *D. eleginoides*, described in Conservation Measure 32-11, remain in force.

4.116 The Scientific Committee noted that France had made significant progress in mitigating seabird by-catch, including area/season closures (SC-CAMLR-XXVI, Annex 6, paragraph II.23). It noted that the CPUE analysis would probably be robust to these changes so long as detailed haul-by-haul data continued to be available.

Dissostichus eleginoides Prince Edward and Marion Islands (Subareas 58.6 and 58.7)

4.117 The Fishery Report for *D. eleginoides* in Subareas 58.6 and 58.7 inside the South African EEZ is contained in Annex 5, Appendix Q, and the discussion by WG-FSA is in Annex 5, paragraphs 5.160 to 5.164.

4.118 The catch limit of *D. eleginoides* in the South African EEZ for the 2008/09 season was 450 tonnes for the period from 1 December 2008 to 30 November 2009. The catch reported for Subareas 58.6 and 58.7 as at 5 October 2009 was 4 tonnes, all of which was taken by longlines. There was no evidence of IUU catch in 2008/09.

4.119 The standardised CPUE series was not updated by WG-FSA in 2009.

Management advice for *D. eleginoides* at Prince Edward and Marion Islands (Subareas 58.6 and 58.7) inside the EEZ

4.120 South Africa is considering the adoption of an Operational Management Procedure (SC-CAMLR-XXVII, Annex 7, paragraphs 6.1 to 6.3) approach as a basis for provision of management advice, and the catch limit for 2010 is likely to be in the range of 250–450 tonnes. Details are provided in Annex 5, Appendix Q. This is proposed to address the concerns over the sensitivity of the South African assessment using ASPM to weightings used for different data sources and the estimation of recruitment levels for forward projections.

4.121 The Scientific Committee recalled its advice from 2005 that the advice on the appropriate levels of future catch provided in WG-FSA-05/58 (see also WG-FSA-06/58 and 07/34 Rev. 1) was not based on the CCAMLR decision rules. Therefore, the Scientific Committee was unable to provide management advice for the fishery in the South African EEZ at the Prince Edward Islands. The Scientific Committee recommended that CCAMLR decision rules also be used in estimating yields for this fishery.

Management advice for *D. eleginoides* at Prince Edward Islands (Subareas 58.6 and 58.7 and Division 58.4.4) outside the EEZ

4.122 No new information was available on the state of fish stocks in Subareas 58.6 and 58.7 and Division 58.4.4 outside areas of national jurisdiction. The Scientific Committee therefore advised that the prohibition of directed fishing for *D. eleginoides*, described in Conservation Measures 32-10, 32-11 and 32-12, remains in force.

Champsocephalus gunnari South Georgia (Subarea 48.3)

4.123 The Fishery Report for *C. gunnari* at South Georgia (Subarea 48.3) is contained in Annex 5, Appendix R, and discussion by WG-FSA is in Annex 5, paragraphs 5.166 to 5.172.

4.124 In the 2008/09 fishing season the catch limit set for *C. gunnari* in Subarea 48.3 was 3 834 tonnes. During the 2008/09 season the fishery caught 1 837 tonnes by the end of October 2009.

4.125 The Scientific Committee noted that in 2009 the UK undertook a random stratified bottom trawl survey of the South Georgia and Shag Rocks shelves. A short-term assessment was implemented using the GYM to project the new biomass estimate from the survey, assuming the same parameters for the assessment as in 2008.

Management advice

4.126 The Scientific Committee recommended that the catch limit for *C. gunnari* should be set at 1 548 tonnes in 2009/10 and 949 tonnes in 2010/11 based on the outcome of the short-term assessment.

4.127 The Scientific Committee recommended that the season start date be altered to 1 December to reflect the start dates of other CCAMLR fishing seasons.

Champsocephalus gunnari Heard Island (Division 58.5.2)

4.128 The Fishery Report for *C. gunnari* in Division 58.5.2 is contained in Annex 5, Appendix S, and discussion by WG-FSA is in Annex 5, paragraphs 5.173 to 5.178.

4.129 The catch limit of *C. gunnari* in Division 58.5.2 for the 2008/09 season was 102 tonnes for the period from 1 December 2008 to 30 November 2009. The catch reported for this division as at 5 October 2009 was 99 tonnes.

4.130 The Scientific Committee noted that a large 3+ year class, probably the result of spawning by the 4+ year class dominant in 2006, was observed to dominate the population in the survey undertaken in April 2009.

4.131 The Scientific Committee recalled that the current strategy of spreading catch over two years, while meeting the escapement rule, was to provide for two years of spawning (SC-CAMLR-XVI, Annex 5). The Scientific Committee noted that the 3+ cohort had been reproductively mature for one year and that after one more year, it was likely that the cohort would disappear (SC-CAMLR-XX, Annex 5, Appendix D, Figure 1). Further, the Scientific Committee noted that the large increase in biomass of this cohort in the recent survey, relative to the 2008 survey, suggests that last year's assessment probably underestimated the precautionary yield from this cohort in 2008/09. Therefore, the escapement of these fish is likely to have been greater than 75%.

4.132 The Scientific Committee agreed that a strategy for fishing on the current 3+ year class could be similar to that applied in the 2005/06 season (SC-CAMLR-XXIII, Annex 5, Appendix M), allowing the catch to be taken in one year (2009/10) with the expectation of no exploitation of that cohort in the following year (2010/11). The Scientific Committee recalled that, due to the strong three-year cycle evident in the icefish population in Division 58.5.2, it is unlikely that there will be another sizeable cohort available to the fishery until after 2010/11. When estimated in a scenario based on all fishing in one year and no catch in the second year, the yield estimate for 2009/10 is 1 658 tonnes, with a fishing mortality of 0.288.

Management advice

4.133 The Scientific Committee recommended that the catch limit for *C. gunnari* in Division 58.5.2 should be set at 1 658 tonnes in 2009/10 and zero tonnes in 2010/11.

Assessment and management advice for other fisheries

Antarctic Peninsula (Subarea 48.1) and South Orkney Islands (Subarea 48.2)

4.134 The Scientific Committee noted the reported recovery of *Notothenia rossii* populations in Potter Cove, South Shetland Islands, to levels close to that of the early 1980s and that WG-FSA had (Annex 5, paragraph 5.179) cautioned that extrapolation of these findings to a subarea scale was premature.

4.135 In reference to WG-FSA-09/31, the Scientific Committee recalled that *N. rossii* has been the first overexploited fish species in the Southern Ocean and that, after three decades from the end of commercial fishery operations in Subarea 48.1 (1979/80), this species is showing signs of recovery in Potter Cove in 2008/09. This emphasised that the period required for the apparent recovery of *N. rossii* in Subarea 48.1 exceeds the limit of two to three decades established in Article II of the Convention, and that the same situation could be happening with other overexploited Antarctic fish species.

4.136 On the basis of the results of a multi-species research survey in Subarea 48.2 (Annex 5, paragraph 5.180), the Scientific Committee agreed that the populations of previously exploited species, including *C. gunnari* and *N. rossii*, show little sign of recovery in Subarea 48.2 despite the closure of the fishery after the 1989/90 season (see Annex 5, paragraph 3.41).

Management advice

4.137 The Scientific Committee recommended that the existing Conservation Measures 32-02 and 32-04 on the prohibition of finfishing in Subareas 48.1 and 48.2 respectively, remain in force.

Catches from outside the Convention Area

4.138 Dr E. Barrera-Oro (Argentina) advised that approximately 2 400 tonnes of *D. eleginoides* had been caught in the Argentine EEZ in Area 41 in 2008/09, and the catch limit in that area was 2 500 tonnes. The catch had been taken by longline (approximately 55% of the catch), bottom trawl (37%) and pots (8%). Since 2007, vessels are required to tag *D. eleginoides* at a rate of two fish per tonne of green weight caught, and to date 2 520 individuals have been tagged and released. Thirteen tagged fish have been recaptured and reported.

4.139 Prof. O. Pin (Uruguay) advised that approximately 550 tonnes of *D. eleginoides* had been caught in the Uruguayan EEZ in Area 41 in 2008/09. The catch had been taken by longline (approximately 50% of the catch), trotline with cetacean exclusion devices (40%) and pots (10%).

4.140 The Scientific Committee welcomed this information and urged Members managing fisheries for *D. eleginoides* outside the Convention Area to provide information to WG-FSA

on these fisheries, including details of the assessments and management measures in place. The Scientific Committee also urged Members with such fisheries to attend the meetings of WG-FSA, to the extent possible.

New and exploratory finfish fisheries

New and exploratory fisheries in 2008/09 and notifications for 2009/10

4.141 In 2008 the Commission agreed to seven exploratory longline fisheries for *Dissostichus* spp. in the 2008/09 season (Conservation Measures 41-04, 41-05, 41-06, 41-07, 41-09, 41-10 and 41-11), an exploratory trawl fishery for *E. superba* in Subarea 48.6 (Conservation Measure 51-05), and exploratory fisheries for crab in Subareas 48.2 and 48.4 (Conservation Measures 52-02 and 52-03). Activities in the exploratory fisheries are outlined below and summarised in Annex 5, Table 5.

4.142 Notifications for exploratory fisheries in 2009/10 are summarised in Annex 5, Table 6; no notification for a new fishery was submitted. Ten Members submitted paid notifications for exploratory longline fisheries for *Dissostichus* spp. in Subareas 48.6, 88.1 and 88.2 and Divisions 58.4.1, 58.4.2, 58.4.3a and 58.4.3b, an exploratory trawl fishery for *E. superba* in Subarea 48.6, and for exploratory pot fisheries for crab in Subareas 48.2 and 48.4.

4.143 The Scientific Committee noted that Argentina had originally notified to fish using both pots and longlines in Subarea 88.1, however, Argentina advised the Scientific Committee that it would only use longlines in this fishery in 2009/10.

Tagging in exploratory toothfish fisheries

4.144 Under Conservation Measure 41-01, each longline vessel fishing in exploratory fisheries for *Dissostichus* spp. in 2008/09 was required to tag and release *Dissostichus* spp. at the rate of one toothfish per tonne of green weight caught throughout the season in Subareas 88.1 and 88.2, and three fish per tonne in Subarea 48.6 and Divisions 58.4.1, 58.4.2, 58.4.3a and 58.4.3b (Annex 5, Table 8). All vessels achieved the required tagging rate except for the *Isla Eden*[2] in Subareas 88.1 and 88.2. In 2008/09, 6 326 *Dissostichus* spp. were reported to have been tagged and released in the exploratory longline fisheries (Annex 5, Table 9), and 172 tags were recovered (Annex 5, Table 10).

4.145 The Scientific Committee noted that recaptures of tags in Subarea 48.6 and Divisions 58.4.1, 58.4.2 and 58.4.3b, were very low, with 45 recaptures from over 7 000 fish tagged and released between 2003/04 and 2008/09. The Scientific Committee noted that there may be movements of some tagged fish over time into closed SSRUs, however, this factor alone was unlikely to provide sufficient explanation for the low number of tag-recaptures to date.

[2] The tagging rates for the *Isla Eden* were incorrectly reported at the meeting of WG-FSA. The *Isla Eden* achieved the required tagging rates in Subareas 88.1 and 88.2. See Annex 5, Table 8 corrigendum.

4.146 The Scientific Committee noted that the analyses of the tagging program by WG-FSA (Annex 5, paragraphs 5.9 to 5.17) suggested some improvements in the implementation of the tagging program on the 2007/08 season, with most vessels now tagging at the correct rate (Annex 5, Figure 2), and in the overlap where tagged fish had been released in relation to the locations of catches.

4.147 However, the Scientific Committee noted that one vessel initially tagged at a very high rate (including 100 fish tagged from one set) but then ceased tagging altogether during the remainder of its cruise. Although this vessel exceeded the overall required tagging rate, the Scientific Committee was concerned that such a high tagging rate over a short period of time may be detrimental to those fish that were tagged, and was not consistent with the intention to spread tagged fish throughout the area as fishing proceeds.

4.148 The Scientific Committee noted that the amount of overlap between the length of fish caught and the length of fish tagged was highly variable between vessels depending on species and areas, however, several vessels (*Isla Eden, Insung No. 1, Insung No. 22, Jung Woo No. 2, Jung Woo No. 3* and *Tronio*) showed low overlap between the two distributions in all statistical areas fished. Other vessels (*Shinsei Maru No. 3, Antarctic Chieftain, Janas, San Aotea II, San Aspiring* and *Ross Star*) achieved high overlap in at least one statistical area (Annex 5, Figure 3 and Table 11).

4.149 The Scientific Committee noted the method developed by WG-FSA to assess the level of overlap between the size of released fish and the size of retained fish was useful in summarising the implementation of the tagging program in exploratory toothfish fisheries, and recommended that the method could be used by SCIC in evaluating the implementation of the tagging program under Conservation Measure 41-01, Annex 41-01/C.

4.150 The Scientific Committee agreed that one of the main reasons for the low number of recaptures in Subareas 48.6 and 58.4 was likely to be the small size of the fish tagged compared to the overall size distribution of the fished population. It further noted with concern that these small fish were very unlikely to be recaptured, as such small fish may take 15–20 years to grow to a point where they would be representative of the size of fish taken by the fishery.

4.151 The Scientific Committee noted with concern the low level of commitment to the tagging program by some Members, and that this was having a serious impact on its efficacy. It further noted that practical methods for tagging large toothfish had been available for several years (Annex 5, paragraph 5.17). The Scientific Committee therefore noted that it was incumbent on Members to ensure that the tagging program was implemented correctly, and large fish were tagged in proportion to their presence in the catch.

Research hauls in exploratory fisheries

4.152 The Scientific Committee recalled that under Conservation Measure 41-01, each longline vessel fishing in exploratory fisheries for *Dissostichus* spp. in Subareas 48.6 and 58.4 in 2008/09 was required to complete 10 research hauls (each comprising 3 500–5 000 hooks and separated by a distance of at least 5 n miles) on entering an SSRU in an exploratory

fishery. For the 2008/09 season, each SSRU was divided into two strata (fished and non-fished/lightly fished) and vessels were required to carry out their research hauls at randomly allocated positions which had been pre-determined by the Secretariat. If it was not possible to complete the research hauls in the allocated positions, then they were requested to complete the hauls within the appropriate strata (CCAMLR-XXVIII/BG/6).

4.153 The Scientific Committee noted that the degree of consistency between the allocated and actual research haul locations varied considerably between vessels and statistical areas (Annex 5, paragraph 5.19). Whilst most vessels set lines on, or close to, the allocated location, the *Banzare* consistently set its research hauls at a mean distance of more than 25 n miles from the allocated positions (Annex 5, Table 12). The Scientific Committee noted not all research hauls were set at their allocated locations, some research hauls were not even completed in the required stratum (Annex 5, Table 12).

4.154 The Scientific Committee also noted that comparison of the mean catch rates (catch per 1 000 hooks) from the research hauls with mean catch rates for commercial hauls indicated that there was no substantial reduction in overall catch rates from completing the 10 research hauls.

4.155 The Scientific Committee endorsed the advice from WG-SAM on the use and implementation of research hauls in exploratory fisheries (Annex 6, paragraphs 2.56 to 2.61), including that:

(i) the research set allocation approach developed for use for the exploratory fisheries in 2008/09 be retained for the 2009/10 season with the implementation outlined in Annex 6, paragraph 2.58;

(ii) the number of research hauls required to achieve a target CV for this monitoring tool should be evaluated by WG-FSA and, if appropriate, the proportion of research hauls in the non-fished/lightly fished strata could be altered accordingly.

Open and closed areas

4.156 The Scientific Committee noted the discussion on open and closed areas (Annex 5, paragraphs 5.23 to 5.28). The Scientific Committee agreed that the relative merits of the different views on harvest strategies for toothfish in new and exploratory fisheries be evaluated using simulations. It recommended that such work be submitted to WG-SAM for review of the simulation methodologies before submitting the outcomes to WG-FSA for consideration.

4.157 Dr L. Pshenichnov (Ukraine) made the following statement to the Scientific Committee:

> 'When, a few years ago, it was suggested that some SSRUs in Divisions 58.4.1 and 58.4.2 be closed and that, periodically, the closed SSRUs be opened to fishing and vice versa, the Ukrainian Delegation agreed with this approach. However, we can see that the experiment has lasted too long and we are losing time which could be used to research these regions. The Scientific Committee cannot assess the distribution of the

target fish species and by-catch species over a large area because much of the marine area is closed to fishing and, therefore, to the acquisition of any data. It is clear that no-one is going to conduct any real scientific research to assess the resources in this region for years to come, because it is too expensive. The only way to obtain any information about the biological resources is to conduct observations on board fishing vessels, but even fishing vessels do not enter the closed SSRUs now and, given the current catch limits, the fishing vessels only stay in certain open SSRUs for a short time. Since last year, the SSRUs closed to fishing have been closed to research fishing as well.

We believe that it is this approach which is impeding the assessment of the toothfish resources in Divisions 58.4.1 and 58.4.2, i.e. estimating fish stocks and fish biomass for each SSRU separately. The biomass of the population cannot be estimated by surveying only a small part of it. This contradicts all biological rules, as we stated last year (SC-CAMLR-XXVII, paragraph 4.116) and have done repeatedly in the past. I hope that this time both the Scientific Committee and the Commission will take notice of my statement.

The concentration of fishing effort in small areas leads to depletion of fish resources in those areas, and this does not reflect the biomass status of the species in the whole area. The information on a depletion experiment (fishing operations conducted during a short period of time in one location) provided last year (WG-FSA-08/43) demonstrated that there was no significant movement of fish observed over a short period of time. An increase in catch-per-unit effort (CPUE) this year for the SSRUs in Divisions 58.4.1 and 58.4.2 that were open for fishing (Annex 5, Table 7) indicated that there was no stock depletion as had been indicated last year (in WG-FSA-08/43). The Scientific Committee agreed (paragraph 4.109 of last year's Scientific Committee Report) that, in the absence of reliable tagging information, the only other information currently available is CPUE. So, we should be consistent: an increase in CPUE means that the fishable part of the population is in good condition, even in small areas, and, consequently, it is possible to increase the level of TAC for these areas.

Last year, the Scientific Committee agreed (SC-CAMLR-XXVII, paragraph 4.108) on the need for a good spatial overlap of tags and subsequent fishing effort. Due to the lack of data from SSRUs that have been closed to fishing in recent years, we cannot recapture fish which have been tagged in the areas open to fishing. Moreover, we do not know, and we will never know, the numbers of fish that have moved into adjacent areas closed to fishing. The data presented to WG-FSA for Divisions 58.4.1 and 58.4.2 (Annex 5, Figure 8) indicated that over 10% of tagged fish recaptured in a short period of time had travelled a distance of more than 100 miles (and according to a working group document on the Ross Sea (WG-FSA-09/39), tagged fish were caught within a distance of 400 to 600 km from their tagging location). Fish are often tagged on the border between areas, and the extent of SSRUs is less than 300 miles. Figure 8 of the WG-FSA report shows that there were practically no tag returns for the whole period of the toothfish tagging program in a huge area between 30°E and 90°E. In our opinion, this is the result of an incorrect strategy adopted by the Scientific Committee with regard to research and data collection for the purposes of the rational use of biological resources in Divisions 58.4.1 and 58.4.2.

In mathematical stock assessment models it may be convenient to use a certain number of fish from a small area in which the fishery is concentrated. However, from a biological point of view, this approach is a distortion of the overall pattern of the species' spatial distribution and, as a result, misrepresents the biomass level for the species and hinders the acquisition of the best scientific data. Furthermore, from the point of view of the environmental approach used by our organisation, it is harmful and has an adverse impact on a certain proportion of the population, especially as we do not have sufficient data to determine the structure of this population. We do not think that the best scientific data is an almost complete lack of such data.

During the Scientific Committee meeting we propose to discuss the possibility of opening all SSRUs in Divisions 58.4.1 and 58.4.2 to fishing (and for the Commission this provides an opportunity to acquire data), to discuss (or refine) the procedures for conducting research work in closed SSRUs, and to provide the appropriate recommendations to the Commission for developing amendments to conservation measures.'

4.158 Dr Bizikov supported the intervention by Dr Pshenichnov, noting that fishing in closed areas would provide data on the distribution of species, and the Scientific Committee should provide advice to the Commission on a coordinated and coherent program to collect data across the entire Convention Area.

4.159 The Scientific Committee agreed that a well-designed research experiment is needed to clarify the issues on stock status in Subarea 58.4. This needs to be designed and undertaken in accordance with the guidelines developed at SC-CAMLR-XXVII (SC-CAMLR-XXVII, paragraphs 8.9 to 8.11) and endorsed by the Commission in paragraph 4.66 of CCAMLR-XXVII. Catch limits will need to be consistent with the objectives of the experiment. The aim of such an experiment would be to provide information on the status of stocks of *Dissostichus* spp. in Subarea 58.4 over a 2–3 year time period.

4.160 The Scientific Committee agreed that it was important to use simulations and MSE frameworks to address the potential bias in assessments arising from open/closed SSRUs. The Scientific Committee also recalled that New Zealand has been developing an SPM over the past two years which could be used to assess potential issues of bias in the tagging program (WG-SAM-08/14, 09/17, 09/18). New Zealand welcomed the cooperation of other Members to further develop this work.

Development of methods for assessing new and exploratory fisheries

4.161 The Scientific Committee noted the discussion by WG-FSA on developing methods of collecting data and providing assessments for new and exploratory fisheries (Annex 5, paragraphs 5.112 to 5.120).

4.162 The Scientific Committee recalled that participation in exploratory fisheries represents a commitment towards undertaking research that will lead to a stock assessment before the stock is reduced to the target status. It further noted that research programs will have to operate in a different manner in fisheries that have not been previously exploited compared to

those which have been depleted. In the latter case, the Scientific Committee agreed that the research strategy needs to be designed so as to ensure that research requirements do not impact on the ability of the fishery to recover.

4.163 The Scientific Committee agreed that in evaluating research programs in data-poor fisheries, there were three questions that need to be addressed for the provision of advice on what research would be appropriate:

(i) What research needs to be undertaken to facilitate a preliminary assessment of stock status?

(ii) What is the mortality of fish that will likely occur as a result of undertaking the research without any additional catch? For example, if all fish in good condition were tagged and released, what proportion of the tagged fish would be in poor condition and die?

(iii) What is the quantity of fish that could be taken to offset the cost of the research, noting the possible status of the stock?

4.164 The Scientific Committee agreed that the data currently provided from the new and exploratory fisheries in areas other than the Ross Sea are unlikely to provide an assessment in the near future. The Scientific Committee further noted that the lack of commitment by some vessels to implementing research plans cast doubt on the likelihood that useful data may be collected by these vessels in the future.

4.165 The Scientific Committee agreed that the lack of useful data being derived from the current approach to new and exploratory fisheries in areas other than the Ross Sea, made it urgent to develop a revised approach that will ensure the delivery of all data needed to provide assessments within these subareas within 3–4 years. The Scientific Committee noted that the lack of useful tagging data was only part of this problem, and the lack of consistency in nations, vessels and gear types fishing in new and exploratory fisheries in areas other than the Ross Sea was also an important issue.

4.166 The Scientific Committee agreed that the proposal by Japan for research on Ob and Lena Banks could provide a model for developing research plans in exploratory fisheries. It further agreed that for these plans to lead to advice, they need to be evaluated in relation to how the data would be used to assess stock status.

4.167 The Scientific Committee asked the Commission to note that research plans should take account of the fact that toothfish fisheries in Subarea 58.4 are no longer in a pristine state. The Scientific Committee asked the Commission to further consider that such programs may require a level of research catch guaranteed to those conducting the research plan, to ensure the research can be completed and an assessment can be provided.

4.168 The Scientific Committee also asked the Commission to note that the development of research plans would be difficult to resolve this year, and that the opportunity to develop research plans should be open to all Members, not just those submitting notifications this year.

Dissostichus spp. Subarea 48.6

4.169 In 2008/09, the exploratory fishery for *Dissostichus* spp. in Subarea 48.6 was limited to Japanese and Korean flagged vessels using longlines only, and no more than one vessel per country was permitted to fish at any one time. The precautionary catch limit for *Dissostichus* spp. was 200 tonnes north of 60°S (SSRUs A and G) and 200 tonnes south of 60°S (SSRUs B–F). Information on this fishery is summarised in Annex 5, Appendix E.

4.170 Licensed longline vessels have fished the exploratory fishery for *Dissostichus* spp. in Subarea 48.6 since 2003/04, and the main species caught has been *D. eleginoides*, except in 2008/09 when the dominant species in the catches was *D. mawsoni*. In 2008/09, two vessels fished in SSRUs E and G. SSRU E was closed on 12 March 2009 (catch limit for *Dissostichus* spp.: 200 tonnes; final reported catch: 189 tonnes), with a consequential closure of all other SSRUs south of 60°S.

4.171 There was no evidence of IUU fishing in 2008/09.

4.172 Vessels were required to tag and release *Dissostichus* spp. at a rate of three tags per tonne in 2008/09 and both vessels achieved the new target rate. A total of 401 *D. eleginoides* and 906 *D. mawsoni* (total 1 307 fish) have now been tagged and released, and five *D. eleginoides* and two *D. mawsoni* have been recaptured in that subarea (Annex 5, Tables 9 and 10).

4.173 Three Members (Japan, Republic of Korea and South Africa) and a total of five vessels notified their intention to fish for toothfish in Subarea 48.6 in 2009/10.

4.174 The Scientific Committee recommended the existing conservation measures for Subarea 48.6 be retained for the 2009/10 season.

Dissostichus spp. Division 58.4.1

4.175 Two Members (Republic of Korea and Uruguay) and three vessels fished in the exploratory fishery in Division 58.4.1 in 2008/09. The precautionary catch limit for toothfish was 210 tonnes, of which no more than 100 tonnes could be taken in SSRU C, 50 tonnes in SSRU E and 60 tonnes in SSRU G. The five other SSRUs (A, B, D, F and H) were closed. Fishing was prohibited in depths less than 550 m in order to protect benthic communities. Information on this fishery is summarised in Annex 5, Appendix F.

4.176 SSRU G was closed on 2 February 2009 (catch limit for *Dissostichus* spp.: 60 tonnes; final reported catch: 60 tonnes). SSRU E was closed on 27 February 2009 (catch limit for *Dissostichus* spp.: 50 tonnes; final reported catch: 54 tonnes). SSRU C, and consequently the fishery, was closed on 12 March 2009 (SSRU C catch limit for *Dissostichus* spp.: 100 tonnes; final reported catch: 108 tonnes). The catch limit for the whole fishery for *Dissostichus* spp. was 210 tonnes and the final reported catch was 222 tonnes. Information on IUU activities indicated that 152 tonnes of toothfish were taken in 2008/09.

4.177 A total of 1 127 toothfish were tagged and released in the 2008/09 season, and seven tagged toothfish were recaptured during that season (Annex 5, Tables 8 and 10).

4.178 Five Members (Japan, Republic of Korea, New Zealand, Spain and Uruguay) and a total of 11 vessels notified their intention to fish for toothfish in Division 58.4.1 in 2009/10.

4.179 The Scientific Committee noted that Russia had begun research on *Dissostichus* spp. in this division (Annex 5, paragraphs 4.17 and 4.18). The Scientific Committee encouraged the continuation of the work during the intersessional period and for the otolith readings to be verified by CON (Annex 5, paragraphs 9.4 to 9.8) and for the results to be evaluated by WG-SAM (Annex 5, paragraphs 4.15 to 4.18).

4.180 The Scientific Committee recommended that the existing catch limits and other aspects of the conservation measures for Division 58.4.1 be retained for the 2009/10 season. It noted that several SSRUs in this division have catch limits of less than 100 tonnes which posed problems with predicting fishery closures (Annex 5, paragraphs 3.13 to 3.15) considering the large number of vessels notified for this division.

Dissostichus spp. Division 58.4.2

4.181 Two Members (Japan and Republic of Korea) and two vessels fished in the exploratory fishery in Division 58.4.2 in 2008/09 and the reported catch was 66 tonnes. SSRU E was closed on 17 February 2009 (catch limit for *Dissostichus* spp.: 40 tonnes; final reported catch: 61 tonnes), and the fishery was closed on 23 February 2009 (catch limit for *Dissostichus* spp.: 70 tonnes; final reported catch: 66 tonnes). The other SSRUs (B, C and D) were closed to fishing. Fishing was prohibited in depths less than 550 m in order to protect benthic communities. Information on this fishery is summarised in Annex 5, Appendix G.

4.182 The fishery targeted *D. mawsoni* and operated in SSRUs A and E in 2008/09. It was estimated that 176 tonnes of *D. mawsoni* were taken by IUU fishing in 2008/09.

4.183 A total of 277 toothfish were tagged and released in 2008/09 and one tagged toothfish was recaptured (Annex 5, Tables 9 and 10).

4.184 Five Members (Japan, Republic of Korea, New Zealand, Spain and Uruguay) and a total of nine vessels notified their intention to fish for toothfish in Division 58.4.2 in 2009/10.

4.185 The Scientific Committee recommended the existing conservation measures for Division 58.4.2 be retained for the 2009/10 season. It noted that several SSRUs in this division have catch limits of less than 100 tonnes which posed problems with predicting fishery closures (Annex 5, paragraphs 3.13 to 3.15) considering the large number of vessels notified for this division.

Dissostichus spp. Division 58.4.3a

4.186 One Member (Japan) and one vessel fished in the exploratory fishery in Division 58.4.3a in 2008/09. The precautionary catch limit for toothfish was 86 tonnes and the reported catch was 31 tonnes. Information on this fishery is summarised in Annex 5, Appendix H.

4.187 There was no evidence of IUU fishing in 2008/09.

4.188 A total of 113 toothfish were tagged and released in 2008/09 and two tagged toothfish were recaptured during that season.

4.189 Two Members (Japan and Republic of Korea) and three vessels notified their intention to fish for toothfish in Division 58.4.3a in 2009/10.

4.190 The Scientific Committee agreed that, in the absence of a new assessment, the catch limit should remain at 86 tonnes in this division.

Dissostichus spp. Division 58.4.3b

4.191 Two Members (Japan and Uruguay) and two vessels fished in the exploratory fishery in Division 58.4.3b in 2008/09. In November 2007, the division was divided into two SSRUs: A north of 60°S and B south of 60°S. In November 2008, the area north of 60°S was further subdivided into four SSRUs (A, C, D and E). The precautionary catch limit for *Dissostichus* spp. in the fishery was 30 tonnes in each of SSRUs A, C, D and E, and SSRU B remained closed to fishing. Information on this fishery is summarised in Annex 5, Appendix I.

4.192 In 2008/09, the fishery operated in SSRUs A, C, D and E. SSRU D was closed on 27 January 2009 (catch limit for *Dissostichus* spp.: 30 tonnes; final reported catch: 31 tonnes). SSRU A was closed on 2 February 2009 (catch limit for *Dissostichus* spp.: 30 tonnes; final reported catch: 28 tonnes). SSRU E was closed on 7 February 2009 (catch limit for *Dissostichus* spp.: 30 tonnes; final reported catch: 45 tonnes). The entire fishery was closed on 9 February 2009 with a reported total catch of 104 tonnes of *Dissostichus* spp. (87% of the precautionary catch limit for the fishery).

4.193 Information on IUU activities indicated that 610 tonnes of toothfish were taken in 2008/09.

4.194 A total of 431 toothfish were tagged and released in 2008/09, including 75 *D. eleginoides* and 356 *D. mawsoni*. One tagged toothfish was recaptured during the 2008/09 season.

4.195 Four Members (Japan, Republic of Korea, South Africa and Uruguay) and six vessels notified their intention to fish for toothfish in Division 58.4.3b in 2009/10.

4.196 The Scientific Committee considered three possible scenarios for the *D. mawsoni* stock on BANZARE Bank, based on existing knowledge:

(i) Scenario 1: spawning fish have a high turnover in Division 58.4.3b, moving freely within this division between SSRUs and areas outside each year.

(ii) Scenario 2: spawning fish move sporadically to Division 58.4.3b, and then remain in the area, moving little across the area between years.

(iii) Scenario 3: there is large turnover of large fish in Division 58.4.3b, but they represent only a fraction of the spawning stock that sustains the population in East Antarctica.

4.197 The Scientific Committee noted that, due to their proximity, the fish on BANZARE Bank are likely to originate from the coastal areas of Antarctica in the southern Indian Ocean. The Scientific Committee noted that other plausible scenarios could be envisioned, however, it saw that the three scenarios captured useful alternative hypotheses for this division (Annex 5, Figure 5).

4.198 The Scientific Committee recalled that it had agreed last year (SC-CAMLR-XXVII, paragraph 4.146) that:

(i) based on fishing information until 2006/07, the fisheries across BANZARE Bank show that the preferred fishing grounds were depleted in the Southern Area (adopted by WG-FSA-07, resulted in the closure of the Southern Area);

(ii) based on the survey and fisheries across BANZARE Bank, there are very few fish apart from in the preferred fishing grounds;

(iii) the fish found in the preferred fishing grounds are large and likely spawning, there are no small fish and fish are male dominated (79%);

(iv) in the survey, the fish are large and mostly male;

(v) spawning fish in East Antarctica have only been found on BANZARE Bank (WG-FSA-07/44; Annex 5, paragraph 5.56).

4.199 The Scientific Committee agreed, on the basis of analyses undertaken by WG-FSA (Annex 5, paragraphs 5.60 to 5.62) that:

(i) depletion had occurred during fishing in Patch B in 2007/08 and Patch C in the 2008/09 season, but the results of the depletion analysis were ambiguous for Patch A and for Ground C (see Annex 5, Figure 6 for location of grounds and patches);

(ii) unstandardised CPUE for the whole of Division 58.4.3b has increased between 2003/04 and 2008/09 (Annex 5, Figure 7);

(iii) CPUE is affected by factors such as gear and bait type, vessel, season, depth fished, species and area fished, and these have serious consequences for interpreting unstandardised CPUE (SC-CAMLR-X, Annex 6, paragraphs 7.107 to 7.121; SC-CAMLR-XI, Annex 5, paragraphs 6.143 to 6.166);

(iv) of 10 tags recaptured in Division 58.4.3b, nine were released in Division 58.4.3b and one was released in Division 58.4.1 (Annex 5, Figure 8);

(v) large movements of fish have been observed for fish at liberty for two years or more, and tend to be from the east to the west in coastal Antarctica, or from the coast to BANZARE Bank;

(vi) stocks of *D. mawsoni* are likely to be distinct at the scale of ocean;

(vii) there is no evidence of recruitment of small (<60 cm) *D. mawsoni* in Divisions 58.4.1, 58.4.2 and 58.4.3b (Annex 5, Figure 9);

(viii) *D. mawsoni* are likely to move throughout Divisions 58.4.1, 58.4.2 and 58.4.3b;

(ix) smaller fish are found in the western area of Division 58.4.2 and in waters shallower than 1 000 m, and larger fish in waters deeper than 1 000 m.

4.200 Dr T. Ichii (Japan) noted that he does not believe that the stock level has been low to such an extent that the fishery should be closed in this division based on the following reasons:

(i) overall unstandardised CPUE has been increasing by about four times over the past six years (Annex 5, Figure 7);

(ii) body size compositions of catch show no decreasing trend in larger size component for the past six years, suggesting no evidence of growth overfishing;

(iii) Ground C and Patch A (WG-FSA-09/44) showed no declining trend in catch rate by the depletion analysis;

(iv) regarding Ground C and Patch B, their decreasing trends in catch rate are based on single-season data and hence could be just within-season phenomena. The repetition of analysis in the subsequent season is necessary to confirm the depletion.

Therefore, Japan supposed that a modest catch limit similar to that in 2008/09 could be allocated in this division.

4.201 Dr Constable thanked WG-FSA for its clear advice on the points of agreement and disagreement on the status of the stock on BANZARE Bank. He asked the Scientific Committee to recall that the fishery in Division 58.4.3b was an exploratory fishery, and to recall the chapeau to Conservation Measure 21-02, which states that 'exploratory fishing should not be allowed to expand faster than the acquisition of information necessary to ensure that the fishery can and will be conducted in accordance with the principles set forth in Article II'. He noted that the intent of CCAMLR exploratory fisheries was to collect data on pristine stocks to determine if a viable fishery is present in an area. He recalled that the Commission had already closed the southern area of Division 58.4.3b because it was depleted (CCAMLR-XXVI, paragraph 12.10(v)), and there are further indications that the stock may be further depleted. Despite the lack of agreement on the level of depletion, he noted that there is no debate that this stock is no longer pristine, and therefore the Scientific Committee should advise the Commission that it cannot consider that this fishery is in an exploratory phase.

4.202 Dr Constable also noted that the Scientific Committee had already agreed that the data being collected in the exploratory fishery in this division would not lead to an assessment in the near future (paragraph 4.164). As an example, he noted that the CPUE series for this division had not been able to be standardised for all the different vessels, gear types, bait types, depths and areas that had been fished in this division. Therefore, it was impossible to

interpret any trend in the overall unstandardised CPUE as indicating the status of the stock. He further noted that WG-FSA had considered a plausible scenario that BANZARE Bank was a location where only large fish migrated to. Under this scenario, therefore, attempting to interpret the length-frequency distribution in the catch would also be unhelpful in understanding the status of this stock. Alternatively, if BANZARE Bank is an important spawning area for *D. mawsoni* in the southern Indian Ocean, as in one of the other scenarios considered, then the evidence for depletion of this stock dictates additional caution. Therefore, he asked that the Commission be made aware of the possible scenarios for BANZARE Bank as shown in Annex 5, Figure 5, and that it note that there is insufficient data to distinguish these scenarios. Further, as there is little prospect of collecting useful data on the status of this stock in the near future, the Commission must be advised to await a satisfactory data collection plan, considering all of the elements agreed by the Scientific Committee in paragraph 4.164, before it can allow any further fishing in this division.

4.203 The Scientific Committee was unable to provide management advice on catch limits in Division 58.4.3b, but recommended that all other aspects of Conservation Measure 41-01 be carried forward if a catch limit is set in 2009/10. It noted that several SSRUs in this division have catch limits of 30 tonnes which posed problems with predicting fishery closures (Annex 5, paragraphs 3.13 to 3.15) considering the large number of vessels notified for this division.

Dissostichus spp. Subareas 88.1 and 88.2

4.204 In 2008/09, six Members (Chile, Republic of Korea, New Zealand, Spain, UK and Uruguay) and 13 vessels fished in the exploratory fishery in Subarea 88.1. The fishery was closed on 25 January 2009 and the total reported catch of *Dissostichus* spp. was 2 434 tonnes (90% of the limit) (Annex 5, Appendix J, Table 4). The following SSRUs were closed during the course of fishing:

- SSRUs B, C and G closed on 22 December 2008, triggered by the catch of *Dissostichus* spp. (total catch 410 tonnes; 116% of the catch limit);
- SSRUs H, I and K closed on 22 January 2009, triggered by the catch of *Dissostichus* spp. (total catch 1 957 tonnes; 98% of the catch limit).

The IUU catch for the 2008/09 season was estimated to be 0 tonnes.

4.205 Seven Members (Argentina, Republic of Korea, New Zealand, Russia, Spain, UK and Uruguay) and a total of 18 vessels notified their intention to fish for *Dissostichus* spp. in Subarea 88.1 in 2009/10.

4.206 Seven Members (Chile, Republic of Korea, New Zealand, South Africa, Spain, UK and Uruguay) and seven vessels fished in the exploratory fishery in Subarea 88.2. The fishery closed on 31 August 2009 and the total reported catch of *Dissostichus* spp. was 484 tonnes (85% of the limit) (Annex 5, Appendix J). SSRU E was closed on 8 February 2009, triggered by the catch of *Dissostichus* spp. (total catch 316 tonnes; 89% of the catch limit). The IUU catch for the 2008/09 season was estimated to be 0 tonnes.

4.207 Seven Members (Argentina, Republic of Korea, New Zealand, Russia, Spain, UK and Uruguay) and a total of 18 vessels notified their intention to fish for *Dissostichus* spp. in Subarea 88.2 in 2009/10.

4.208 The Fishery Report for *Dissostichus* spp. in Subareas 88.1 and 88.2 is in Annex 5, Appendix J.

4.209 The Scientific Committee noted that a high-quality tag dataset for the assessment of *D. mawsoni* was selected on the basis of data-quality metrics for individual trips (Annex 5, paragraph 5.76). The method first selected an initial informative dataset comprising trips with (i) high (above median) rates of recovery of previously released tags, and (ii) where tags released on the trip were subsequently recaptured at a high rate. The method then used these trips to define the upper and lower bounds of data-quality metrics that were informative with respect to tagging data. Other trips with data-quality metric values within these ranges were then added to the initial informative dataset.

4.210 Since 2000/01, more than 22 000 *Dissostichus* spp. have been tagged in Subareas 88.1 and 88.2, with almost 19 000 and 2 000 *D. mawsoni* in the Ross Sea and SSRU 882E respectively (WG-FSA-09/39). The selected trips' tag dataset contained a total of 13 308 releases and 474 recaptures that were used in the assessment of the Ross Sea (WG-FSA-09/40 Rev. 1), and 947 releases and 47 recaptures that were used in the assessment for SSRU 882E (WG-FSA-09/41).

4.211 The Scientific Committee noted that, for the first time, the assessment included data from vessels of all Members that had provided high-quality tagging data used in the assessment of the Ross Sea. The Scientific Committee thanked all vessels that provide consistently high-quality data, noting that these data are critical to the success of CCAMLR in managing the Ross Sea fishery. The Scientific Committee also thanked the New Zealand scientists who had developed the method for objectively assessing data quality, and encouraged consideration of a 'one-sided' distribution of appropriate metrics, to ensure the best data continue to be included in future assessments.

4.212 The Scientific Committee agreed that the catch limits for *Dissostichus* spp. in Subarea 88.1 should be 2 850 tonnes and for *Dissostichus* spp. in SSRU 882E should be 361 tonnes and for SSRUs 882C, D, F and G should be 214 tonnes (Annex 5, paragraphs 5.79 to 5.81 and 5.91). The Working Group recommended that the allocation method used to set the 2005/06 catch limits for SSRUs in Subarea 88.1 be continued for the 2009/10 season.

4.213 The catch limits can be carried over into the 2010/11 fishing season, subject to the conditions of the biennial assessment procedure for this fishery adopted in 2007, and detailed in SC-CAMLR-XXVI, paragraph 14.6.

4.214 The Scientific Committee agreed that other measures in the research and data collection plans, including the tagging requirement for one tag per tonne, be retained for the exploratory fisheries in Subareas 88.1 and 88.2.

Exploratory krill fisheries

4.215 The Scientific Committee noted that Norway has notified an exploratory fishery for krill in Subarea 48.6 during 2009/10 (CCAMLR-XXVIII/14 Rev. 1). It thanked Norway for its consideration and contribution to further improving the research plan for this exploratory fishery. The recommendations made by the Scientific Committee in 2008 (SC-CAMLR-XXVII, paragraphs 4.163 to 4.185) and WG-EMM (Annex 4, paragraph 3.40) (see also paragraphs 4.217 to 4.219 below) were now included in the research plan provided with the notification.

4.216 The Scientific Committee also noted that Norway would be using cover nets to mitigate interactions with marine mammals during fishing activities.

4.217 The Scientific Committee recommended the following amendments to Conservation Measure 51-04:

(i) The vessel could carry out the research plan either before or after the commercial fishery.

(ii) If the vessel is collaborating with a research institute to conduct the research plan, it should identify the collaborating institute.

(iii) If the survey is undertaken after the commercial fishery, it should follow the current guidelines within Conservation Measure 51-04, where the measure defines the number of exploratory units to be visited as the catch divided by 2 000 tonnes. If the survey is conducted prior to the commercial fishery, then the fishing vessel must:

(a) undertake a research plan for the exploratory units based on the area where it intends to fish;

(b) complete additional surveys to fulfil the number of exploratory units required if the number of exploratory units completed at the end of fishing is less than the catch divided by 2 000 tonnes;

(c) carry out its fishery and survey in a manner in which the research exploratory units surround and include the units where the fishery is carried out.

(iv) The echo sounder (minimum frequency 38 kHz, minimum observing depth range 200 m) should preferably be calibrated in the actual fishing grounds. However, this is often impossible due to logistical problems of identifying suitable locations for calibration. Therefore, as a minimum, the echo sounder should be calibrated prior to the vessel leaving port. Calibration data should be reported with research transect data.

(v) If a vessel is unable to calibrate its echo sounder on the fishing grounds:

(a) acoustic survey grids comparable/identical with the first survey (assuming it covers the fishing area) should be conducted on subsequent visits;

(b) vessels undertaking continuous trawling should attempt to match some acoustic observations with respective trawl catches since they may be able to trawl acoustic layers more or less immediately after they have been recorded.

4.218 The Scientific Committee recommended revision of the research plan (Conservation Measure 51-04, Annex 51-04/B) to include an option to allow conduct of a research survey prior to commercial operations. It noted that there would be advantages if fishing vessels were to conduct research operations prior to commercial operations, since:

(i) such operation will provide information of krill distribution prior to any disturbance by fishing;

(ii) vessels are likely to conduct research in the area of interest prior to commercial operation in order to find suitable fishing locations;

(iii) there would be a greater likelihood of research operations being completed.

4.219 The Scientific Committee noted that there would be a need for ongoing review of the research plans for exploratory krill fisheries.

Crabs (*Paralomis* spp.) Subareas 48.2 and 48.4

4.220 Crabs were not exploited in exploratory fisheries in 2008/09. Russia notified the Commission of its intention to fish for crabs in exploratory fisheries in Subareas 48.2 and 48.4 in 2009/10 (CCAMLR-XXVIII/23) in accordance with the requirements of Conservation Measures 52-02 and 52-03.

4.221 The Scientific Committee noted that the research plan for the exploratory crab fishery in Subareas 48.2 and 48.4, although revised last year, should be reviewed by WG-FSA next year. The Scientific Committee further noted that MSE could be considered in refining the data collection plan for these fisheries.

4.222 The Scientific Committee recommended that the management areas defined in Conservation Measure 52-02 as part of the experimental harvest program containing VMEs (Areas A, C, E) should be closed to protect the known VMEs and likely others in similar nearby areas (Annex 5, Figure 12).

4.223 The Scientific Committee recommended that Conservation Measures 52-02 and 52-03 on crabs remain in force, noting the recommended changes to the experimental harvest block regime (paragraphs 4.222 and 4.249).

Squid and crab resources

Crabs (*Paralomis* spp.) (Subarea 48.3)

4.224 Crabs were not exploited in the 2008/09 season. Russia notified the Commission of its intention to fish for crabs in this subarea during the 2009/10 season. It indicated its intention to conduct fishing operations in accordance with conditions specified under Conservation Measure 52-01.

4.225 The Scientific Committee noted that the research plan outlined in Conservation Measure 52-01 had been developed in the early 1990s and that it had not been substantially reviewed since then. The Scientific Committee also noted that there had been considerable advances in the development of research designs since that time, including, for example, the use of MSE simulations. The design of the research plan may, therefore, no longer be optimal. WG-FSA was requested to review the research plan at its next meeting.

Management advice

4.226 The Scientific Committee recommended that the existing Conservation Measure 52-01 on crabs should remain in force.

Squid (*Martialia hyadesi*) (Subarea 48.3)

4.227 Squid were not exploited in the 2008/09 season. No proposal for the harvest of squid has been received by CCAMLR for the 2009/10 season.

4.228 The Scientific Committee noted that there had been no interest in fishing for squid for a number of years. It proposed that squid be removed from the agendas of the Scientific Committee and its working groups until a notification to initiate a fishery is received.

Management advice

4.229 The exploratory fishery on squid was subject to Conservation Measure 61-01. Noting the proposal in paragraph 4.228, the Scientific Committee recommended that this fishery be considered as lapsed, and that Conservation Measure 61-01 be removed from the *Schedule of Conservation Measures in Force*.

Fish and invertebrate by-catch

Year-of-the-Skate

4.230 The Scientific Committee noted the general success of the initiatives undertaken during the Year-of-the-Skate. The Scientific Committee agreed that the Year-of-the-Skate protocols be continued for the 2009/10 season, in order to allow for sufficient data to be collected for preliminary assessments to be made in the future.

4.231 The Scientific Committee noted that some vessels had made errors recording the appropriate fate for by-caught skates, and endorsed the recommendation by WG-FSA that the Secretariat develop a one-page guide to assist vessels in recording skate data accurately.

4.232 The Scientific Committee also noted that some of the data reviewed by the Scientific Committee indicated that vessels had discarded dead by-caught skates in fisheries operating in areas south of 60°S. The Scientific Committee reviewed the definition of 'offal' and associated terms of reference (paragraphs 5.8 and 5.9) and referred this issue to the Commission (paragraph 5.10).

4.233 In order to clarify skate by-catch handling and reporting requirements in different subareas and fisheries, the Scientific Committee recommended that a slight revision be made to the Year-of-the-Skate guidelines (CCAMLR-XXVII, paragraph 4.55(iii)), as follows:

> 'all skates which are dead or with life-threatening injuries (condition 1 or 2 in the logbook) should be retained by the vessels fishing in areas where discharge of offal is not allowed, but may be discarded in other subareas.'

4.234 The Scientific Committee noted that most vessels had achieved the required tagging rate for skates in exploratory fisheries, however, there were some instances where vessels had skate by-catch but had not released any tagged skates. The Scientific Committee recommended that the relevant conservation measures be amended to 'at least one skate per five skate caught (including those released alive)'.

4.235 The Scientific Committee congratulated all Members that had conducted skate research as part of the Year-of-the-Skate initiative, and noted that it was useful to have an intensive period of data collection on such priority topics. The Scientific Committee noted that such intensive periods of research, through scientific field work in addition to research fishing conducted by Members, should be considered in the future to advance priority issues such as bottom fishing impacts on VMEs.

Move-on rule in the Southern Area of the Subarea 48.4 research fishery

4.236 The Scientific Committee noted the discussions by WG-FSA in Annex 5, paragraphs 6.28 to 6.31 and recommended that Conservation Measure 41-03 should be updated during the two-year tagging experiment in the Southern Area of Subarea 48.4 to incorporate a threshold catch of 150 kg of *Macrourus* spp. above which the move-on rule would be triggered, and that this should be reviewed on an annual basis. The existing move-on rules for rajids in the Southern Area of Subarea 48.4 should be retained.

Identification guides for benthic invertebrate by-catch

4.237 The Scientific Committee noted the publication of 'Field identification guide to Heard Island and McDonald Islands (HIMI) Benthic Invertebrates: a guide for scientific observers aboard fishing vessels' (SC-CAMLR-XXVIII/BG/12). The Scientific Committee

congratulated the authors, noting that the guide had been useful for the identification of benthic invertebrates in other areas and encouraged other Members to develop similar guides for other regions of the Convention Area (see also paragraph 4.246).

Bottom fishing in CCAMLR high-seas areas

4.238 The Scientific Committee recalled its discussions and agreements on approaches to avoid significant adverse impacts on VMEs (SC-CAMLR-XXI, paragraphs 4.159 to 4.171; SC-CAMLR-XXII, paragraphs 4.207 to 4.284) and that of the Commission (CCAMLR-XXVI, paragraphs 5.9 to 5.20; CCAMLR-XXVII, paragraphs 5.4 to 5.30). It also noted the discussions this year by WG-SAM (Annex 6, paragraphs 4.7 to 4.19), WG-EMM (Annex 4, paragraphs 5.1 to 5.14), WG-FSA (Annex 5, paragraphs 10.1 to 10.51) and the outcomes of WS-VME (Annex 10).

4.239 The Scientific Committee noted that the Commission requires advice on the following:

(i) whether proposed bottom fishing activities would contribute to having significant adverse impacts on VMEs and whether proposed or additional mitigation measures would prevent such impacts (Conservation Measure 22-06, paragraph 8(ii));

(ii) Risk Areas arising from the implementation of Conservation Measure 22-07, and advice on proposed research and other activities in Risk Areas (Conservation Measure 22-07, paragraph 9);

(iii) the magnitude of the existing footprint of bottom fisheries covered by Conservation Measure 22-06 (CCAMLR-XXVII, paragraph 5.15);

(iv) notifications of VMEs (CCAMLR-XXVII, paragraph 5.16);

(v) known and anticipated impacts of bottom fishing activities covered by Conservation Measure 22-06 (CCAMLR-XXVII, paragraph 5.18(i));

(vi) available knowledge on VMEs, the potential for significant adverse impacts, risk assessments and potential for impacts arising from bottom fisheries, with such advice provided in a report akin to the Fishery Reports on ‘Bottom Fisheries and Vulnerable Marine Ecosystems’ (CCAMLR-XXVII, paragraph 5.18(ii));

(vii) a precautionary strategy that will avoid significant adverse impacts on VMEs until impact assessments are completed and long-term mitigation strategies are developed (CCAMLR-XXVII, paragraph 5.19);

(viii) results of simulations of different management approaches (CCAMLR-XXVII, paragraph 5.21);

(ix) mitigation measures and practices when evidence of VMEs is encountered, including outcomes of reviews of scientific observer data and vessel data and the results of WS-VME (CCAMLR-XXVII, paragraph 5.22);

(x) scientific aspects of the implementation and operation of Conservation Measure 22-07 (CCAMLR-XXVII, paragraph 5.25).

4.240 The Scientific Committee also noted that Conservation Measure 22-06 will be reviewed by the Commission this year (Conservation Measure 22-06, paragraph 16). In that respect, it noted the following elements of the conservation measure had scientific components that may require reviewing:

(i) assessment by the Scientific Committee on whether individual bottom fishing activities would contribute to having significant adverse impacts on VMEs, where such reviews will include consideration of preliminary assessments by Contracting Parties (Conservation Measure 22-06, paragraph 8);

(ii) information required for evaluating notifications of VMEs (Conservation Measure 22-06, paragraph 9);

(iii) advice by the Scientific Committee on the known and anticipated impacts of bottom fishing activities on VMEs, including recommending practices when evidence of a VME is encountered in the course of fishing operations (Conservation Measure 22-06, paragraph 11);

(iv) advice on where VMEs are known to occur or are likely to occur and on potential mitigation measures (Conservation Measure 22-06, paragraph 14).

4.241 The Scientific Committee thanked the working groups and, in particular, WS-VME, for their considerable work this year. In particular, it thanked Dr Jones for convening WS-VME, which had provided great impetus to resolving many questions on this issue for the Scientific Committee. It also thanked the invited experts that attended WS-VME for their input and considered advice on this issue (SC-CAMLR-XXVIII/BG/8).

4.242 The Scientific Committee noted that, despite great progress, the magnitude of the tasks listed above are such that it will take another year to conclude the work related to reviewing the conservation measures. The following discussion provides advice to date on this issue.

4.243 The Scientific Committee noted the following with respect to bottom fisheries operating under Conservation Measure 22-06 this year:

(i) some vessels had failed to report VME indicator catch levels for any hauls (Annex 4, paragraph 5.3)

(ii) approximately 14 000 segments were deployed in the 2008/09 season. The number of reported notifications from exploratory bottom fishing under Conservation Measure 22-07, where five or more VME indicator units in a segment were recorded, totalled 30. Of these, seven notifications consisted of at least 10 VME indicator units, which resulted in seven Risk Areas being declared (see WG-FSA-09/6 and CCAMLR-XXVIII/BG/6) (Annex 5, paragraph 10.29).

4.244 On the basis of advice from WG-FSA on the preliminary assessments of bottom fisheries by Members according to Conservation Measure 22-06 (CCAMLR-XXVIII/18), the Scientific Committee:

(a) endorsed the report card for summarising the quality and quantity of information supplied in each assessment (Annex 5, paragraph 10.6) and advised the Commission of the quality of the preliminary assessments this year (Annex 5, Table 17);

(b) noted that notifications were provided in several languages, which limited the ability of WG-FSA to evaluate the proposals without significant additional translation effort by the Secretariat and requested the Commission to consider how this issue may be overcome in the future (Annex 5, paragraph 10.8);

(c) noted that no assessment was available for proposed pot fishing for crabs in Subarea 48.2, or for proposed pot fishing for toothfish in Subareas 88.1 and 88.2; that it therefore could not provide advice on the impact of this proposed fishing activity on VMEs, and that the development of pot fishing for both fish and crabs may require further consideration of gear code definitions (Annex 5, paragraph 10.9);

(d) noted the assessment of the cumulative magnitude of the bottom fishing footprint by WG-FSA (Annex 5, paragraphs 10.10 to 10.12, Table 18).

4.245 On the basis of advice from the working groups and WS-VME, the Scientific Committee noted the following points that need to be considered with respect to the implementation of Conservation Measures 22-06 and 22-07 this year:

(i) the current trigger levels (i.e. 10 kg or 10 litres) were likely to be too high for 'light' taxa, but there was insufficient information to suggest an appropriate new level, and that separate trigger levels may also need to be developed for encounters with rare and unique populations (Annex 10, paragraphs 6.8 and 6.9);

(ii) recording either weight or volume, as currently written, creates problems with data quality and limits analysis of by-catch data (Annex 5, paragraph 10.43);

(iii) segment-level VME indicator units and target species catch will be needed to analyse correlations in their distributions (Annex 5, paragraph 10.44);

(iv) section 2 of Annex 22-06/A be simplified to obtain information, judgements or quantitative estimates that Members may have of the vulnerabilities of benthic taxa in the fishing areas to the gears, including any potential differences in vulnerabilities between components of the gear. This could be included in the guidelines for Member's Bottom Fishing Gear Assessments and included in Conservation Measure 21-02 (Annex 5, paragraphs 10.21 to 10.23).

4.246 The Scientific Committee endorsed the recommendation of WG-FSA to adopt the new 'CCAMLR VME Taxa Classification Guide' for use in the coming season (Annex 5, paragraph 10.41). It noted that the VME Invertebrate Classification Guide implemented in the 2008/09 season was very useful in aiding observers and vessels to correctly classify VME indicator taxa. It thanked the authors, WS-VME and WG-FSA for further developing this guide. The new version should be implemented in 2009/10 for the entire CCAMLR area applicable to Conservation Measure 22-06. It recommended that the guide be made available

as a CCAMLR document on the website, and that funds be made available through the Secretariat to provide laminated double-sided copies for those not equipped to produce their own.

4.247 On the basis of advice from the working groups and WS-VME, the Scientific Committee recommended that the following improvements are needed in the implementation of Conservation Measures 22-06 and 22-07 this year:

(i) the CCAMLR VME Taxa Classification Guide be used as the guide referenced in Conservation Measure 22-07, paragraph 2(ii);

(ii) segment midpoint locations should be reported as DD.MM and fractional minutes along with the geodetic datum set in the navigation system, with care to report longitude as negative degrees in the western hemisphere (Annex 5, paragraph 10.44(i));

(iii) from a data analysis and simplicity perspective, weight and the units used to quantify VME taxon by-catch should be reported as a minimum requirement (Annex 5, paragraph 10.44(ii));

(iv) vessels should report sets and segments resulting in zero VME indicator units (Annex 5, paragraph 10.44(iii));

(v) the procedure in Annex 22-06/A in Conservation Measure 22-06 be replaced by the guidelines for 'Member's Bottom Fishing Gear Assessments' in Annex 5, Table 19 (Annex 5, paragraphs 10.20 and 10.21). Subsequent notifications for fisheries using the same gear type would then only require information needed to update the notification for the proposed activities;

(vi) the new and exploratory fisheries notification guidelines developed from Conservation Measure 21-02 (paragraph 5(ii) (Fishery Operations Plan)) be revised for Members to provide the following new information with each notification (Annex 5, paragraph 10.24):

(a) reference to the relevant Bottom Fishing Gear Assessment that adequately describes the fishing method and gear configuration to be deployed;

(b) notification of any exceptions or changes – e.g. gear changes, alternate fishing practices, altered impact assumptions, mitigation measures adopted etc. – that may be expected to cause the actual impact of the proposed fishing activity to be different from that described in the relevant Bottom Fishing Gear Assessment;

(c) an estimate of fishing effort proposed by the Member for the upcoming fishing season, detailed by subarea and SSRU, in units compatible with the estimation of footprint size used in the relevant Member's Bottom Fishing Gear Assessment.

(vii) Conservation Measure 22-06, Annex 22-06/B, be reconfigured to reflect its use mainly for research vessels and encounters not otherwise reported under Conservation Measure 22-07 (Annex 10, paragraph 3.11; Annex 5,

paragraph 10.42). Conservation Measure 22-06, Annex 22-06/B, could be revised to indicate that notifications of encounters with VMEs should be prepared as proposals/research papers to be submitted to WG-EMM for review via the Secretariat. The annex would no longer be necessary as a data form. Rather, the annex would become guidelines specifying categories of information to include in the submitted notification. If adopted, the Conservation Measure Drafting Group could consider revisions to Conservation Measure 22-06, paragraph 9, for consistency. A draft revised annex is provided in Annex 5, Figure 14.

4.248 On the basis of advice from the working groups and WS-VME, the Scientific Committee recommended that the Commission agree to give special attention to the following in the implementation of Conservation Measures 22-06 and 22-07 this year:

(i) information in Conservation Measure 22-06, Annex 22-06/A, or its equivalent (e.g. Annex 5, Table 19), is essential, for undertaking assessments of potential footprint and impacts (Annex 5, paragraphs 10.19 and 10.25);

(ii) the catch of VME indicator units must be reported by vessels for each set even if the amount is zero, and that it is very important that segment-specific data is collected, as the scale of VME patch size is likely to be much smaller than the length of a longline (Annex 5, paragraph 10.27);

(iii) with the revision of Conservation Measure 22-06, Annex 22-06/B, WG-EMM could recommend a classification of the area(s) and forward data and metadata associated with locations of VMEs, and links to the supporting review documents, to be added to the VME register (Annex 5, paragraph 10.42);

(iv) as indicated in Conservation Measure 22-07, paragraph 10, the responsibility for reporting VME indicator units is a vessel, not an observer responsibility (Annex 5, paragraph 10.43);

(v) information on gears and the vulnerabilities of benthic taxa are required for all operations but are a particularly high priority for trotlines, trotlines with cachaloteras, Spanish longlines, fish pots and crab pots (Annex 5, paragraph 10.22).

4.249 The Scientific Committee received the advice on notifications of VMEs in WG-EMM-09/32 (Annex 4, paragraphs 5.6 to 5.9; Annex 5, paragraphs 10.30 to 10.34; Annex 10, paragraphs 6.7 to 6.14) and recommended that all 28 areas notified showed compelling evidence of VMEs and should be registered in the VME registry as VMEs (Annex 5, paragraphs 10.30 and 10.31). It also endorsed the recommendation that Conservation Measure 52-02 be amended to reduce the risk that the experimental harvest regime for crabs in Subarea 48.2 will negatively impact known and likely VME distributions (Annex 10, paragraphs 5.48 to 5.50) and noted that the same restrictions should apply to other proposed fisheries in the area (Annex 10, paragraph 5.51). It therefore recommended that the management areas defined in Conservation Measure 52-02 as part of the experimental harvest program containing these VMEs (Management Areas A, C, E) should be closed to protect the known VMEs and likely others in similar nearby areas (Annex 5, paragraphs 10.32 and 10.33, Figure 12).

4.250 The Scientific Committee endorsed the amended framework proposed by WG-FSA (Annex 5, paragraph 10.37, Figure 13) in order to clarify the procedures needed to integrate the information available from Conservation Measures 22-06 and 22-07 and provide advice to the Scientific Committee. The Scientific Committee requested this be further considered by the Working Group as to how this framework would best be implemented (Annex 5, paragraph 10.38).

4.251 The Scientific Committee wished to advise the Commission that the review of Conservation Measures 22-06 and 22-07 will proceed in the intersessional period with the aim of providing advice on these measures next year. In particular, it indicated the following will be given attention:

(i) definition of Risk Areas (Annex 4, paragraph 5.3; Annex 10, paragraphs 5.38 to 5.47);

(ii) review of existing Risk Areas, including the development of a review process (Annex 5, paragraph 10.29);

(iii) development of a glossary of terms, including quantitative definitions as appropriate, to improve understanding and communication on these issues (Annex 5, paragraphs 10.36 and 10.40);

(iv) further consideration of criteria to assist the Scientific Committee in defining areas as VMEs under Conservation Measure 22-06 (Annex 10, paragraph 6.14);

(v) evaluation of the proportions of fishable areas that would comprise different benthic habitats and whether the frequency of observations of benthos in by-catch is consistent with the proportional coverage of these different habitats (Annex 4, paragraph 5.4);

(vi) development of alternate trigger levels for a range of VME taxa, including distinction between 'heavy' and 'light' taxa, along with options to enable taxon-specific weights to be collected (Annex 5, paragraph 10.44);

(vii) consideration of whether the presence of high densities of rare taxonomic groups or unique community assemblages specific to the Southern Ocean will warrant additional attention, and perhaps an increased level of precaution (Annex 4, paragraph 5.9);

(viii) further consideration of fishing footprint and its possible impacts on VMEs, taking account of the differences in the interactions of different gears with the bottom (Annex 5, paragraphs 10.20 to 10.22);

(ix) refinement of methods for creating cumulative fishery-scale footprint maps (Annex 5, paragraphs 10.14 to 10.16), including resolving technical issues for their production, in order to update the calculations annually (Annex 5, paragraphs 10.16 and 10.17);

(x) development of plausible scenarios of the types and dynamics of VMEs and the spatial and temporal interactions of the fishery with VMEs (Annex 5, paragraph 10.45);

(xi) evaluation of management strategies within the conservation measures along with other possible strategies for avoiding significant adverse impacts on VMEs (Annex 5, paragraph 10.45);

(xii) further development of risk assessment frameworks (Annex 4, paragraph 5.11; Annex 6, paragraphs 4.9 and 4.16; Annex 10, paragraphs 4.1 to 4.5) and simulation approaches, such as 'Patch' (Annex 4, paragraphs 5.11 to 5.14; Annex 5, paragraphs 10.46 to 10.48; Annex 6, paragraphs 4.10 to 4.15, 4.17 to 4.19; Annex 10, paragraphs 4.6 to 4.10);

(xiii) further assessment of benthic taxa against the seven criteria for assisting in evaluating their vulnerability (Annex 10, paragraphs 3.1 to 3.10, Table 1);

(xiv) consideration of different methods for identifying locations of VMEs (Annex 10, paragraphs 5.1 to 5.37, 6.10 to 6.13);

(xv) consideration of how the footprint estimates for different gears might be used to assess whether proposed bottom fishing activities would contribute to having significant adverse impacts on VMEs (Annex 5, paragraph 10.13);

(xvi) further development of the Secretariat's capability to manage, store, process and summarise data resulting from Conservation Measures 22-06 and 22-07 is necessary (Annex 5, paragraph 10.39), including the development of a work plan and budget, prioritising the capability to provide real-time data, and to provide data for use by the Scientific Committee and its working groups;

(xvii) further develop the procedural framework for managing bottom fisheries (as in Annex 5, paragraph 10.37, and Figure 13).

4.252 With respect to the Report on 'Bottom Fisheries and Vulnerable Marine Ecosystems', the Scientific Committee noted that this will be further developed by the WG-FSA Subgroup on VMEs during the intersessional period and that a template will be provided for consideration by WG-EMM and WG-FSA next year, including the procedure for mapping the fishing footprint (Annex 5, paragraphs 10.50 and 10.51).

Advice to the Commission

4.253 The Scientific Committee noted that, despite great progress, the magnitude of the tasks (paragraphs 4.239 and 4.240) are such that it will take another year to conclude the work related to reviewing the conservation measures.

4.254 The Scientific Committee advised on a number of issues with respect to bottom fisheries operating under Conservation Measure 22-06 this year (paragraph 4.243).

4.255 On the basis of advice from WG-FSA on the preliminary assessments of bottom fisheries by Members according to Conservation Measure 22-06 (CCAMLR-XXVIII/18), the Scientific Committee provided advice on a number of general issues relevant to Conservation Measure 22-06 in paragraph 4.244.

4.256 On the basis of advice from the working groups and WS-VME, the Scientific Committee:

(i) noted a number of points that need to be considered with respect to the implementation of Conservation Measures 22-06 and 22-07 this year (paragraph 4.245);

(ii) endorsed the recommendation of WG-FSA to adopt the new 'CCAMLR VME Taxa Classification Guide' for use in the coming season and that the guide be made available as a CCAMLR document on the website, and that funds be made available through the Secretariat to provide laminated double-sided copies for those not equipped to produce their own (paragraph 4.246);

(iii) recommended that a number of improvements are needed in the implementation of Conservation Measures 22-06 and 22-07 this year (paragraph 4.247);

(iv) recommended that the Commission agree to give special attention to a number of issues in the implementation of Conservation Measures 22-06 and 22-07 this year (paragraph 4.248).

4.257 The Scientific Committee recommended that 28 VMEs be added to the VME Register and that they be given protection in Conservation Measure 52-02 in the experimental harvest regime for crabs in Subarea 48.2 by closing the Management Areas A, C, E (paragraph 4.249).

4.258 The Scientific Committee wished to advise the Commission that the review of Conservation Measures 22-06 and 22-07 will proceed in the intersessional period with the aim of providing advice on these measures next year (paragraph 4.251), along with a report on 'Bottom Fisheries and Vulnerable Marine Ecosystems' (paragraph 4.252).