

SCIENTIFIC COMMITTEE

4.1 The Chair of the Scientific Committee, Mr S. Iversen (Norway) presented the Committee's report (SC-CAMLR-XXVIII). The Commission thanked Mr Iversen for his comprehensive report (CCAMLR-XXVIII/BG/42).

4.2 The Commission noted the Scientific Committee's general recommendations, advice, research and data requirements. The Commission discussed substantive matters arising from the Committee's deliberations under various parts of the Commission's agenda. Such matters included: fisheries management and conservation under conditions of uncertainty (section 5); assessment and avoidance of incidental mortality (section 6); illegal, unreported and unregulated (IUU) fishing (section 10); Scheme of International Scientific Observation (section 11); new and exploratory fisheries (section 12); data access and security (section 14); cooperation with other international organisations (section 16); and CCAMLR-IPY activities (section 20).

4.3 The Commission noted the relatively low number of Members at working group meetings and expressed its concern that less than half the Members of the Commission were able to send scientific experts to working group meetings. This issue is considered further under Item 16.

4.4 The Commission also noted attendance at the Scientific Committee this year and encouraged all Members to make their best efforts to attend next year's meeting.

Intersessional activities

4.5 The Commission noted the Scientific Committee's extensive activities in 2009 (SC-CAMLR-XXVIII, paragraph 1.9). It joined the Scientific Committee in thanking the conveners of the working groups, subgroups and workshops for their contributions to the work of CCAMLR.

Advances in statistics, assessments and modelling

4.6 The Commission noted progress by the Scientific Committee and the Working Group on Statistics, Assessments and Modelling (WG-SAM) on developing various methodologies for use in the Committee's assessment work (SC-CAMLR-XXVIII, paragraphs 2.1 to 2.6). Future developments being pursued include the standardisation of CPUE across different fishing methods. This will need to be further considered in relation to the krill fishery, established toothfish fisheries and exploratory fisheries.

Advances in acoustic survey and analysis methods

4.7 The Commission endorsed the recommendations of the Scientific Committee in respect of the Subgroup on Acoustic Survey and Analysis Methods (SG-ASAM) (SC-CAMLR-XXVIII, paragraphs 2.7 to 2.11). It noted that the fifth meeting of SG-ASAM

is to be held in Cambridge, UK, in 2010. The Commission endorsed the proposed terms of reference for SG-ASAM agreed by the Scientific Committee (SC-CAMLR-XXVIII, Annex 11).

Ecosystem monitoring and management

4.8 The Commission endorsed the Scientific Committee's advice on acoustic assessments of krill, specifically with regard to: (i) uncertainty in B_0 ; (ii) a joint meeting between SG-ASAM and WG-SAM to combine appropriate expertise to evaluate broader aspects of uncertainty in acoustic estimation of krill biomass; and (iii) the need to recalculate B_0 for Subareas 48.1 to 48.4 and Divisions 58.4.1 and 58.4.2 (SC-CAMLR-XXVIII, paragraphs 3.4 to 3.7).

4.9 The Commission noted that there had been a strong ecosystem anomaly at South Georgia during 2009 (SC-CAMLR-XXVIII, paragraph 3.8). This was reflected in the lowest krill density on record, very low land-based predator breeding performance, changes in the diet of icefish and anomalous sea-surface temperatures. Krill catches in Subarea 48.3 during 2008/09 were <1 tonne compared to 60 000 tonnes in 2007/08 (SC-CAMLR-XXVIII, paragraphs 3.8 and 4.2).

4.10 The Commission noted the new CEMP monitoring sites at South Georgia and on the Antarctic Peninsula (SC-CAMLR-XXVIII, paragraph 3.10).

Interactions between WG-EMM and WG-FSA

4.11 The Commission endorsed the recommendations of the Second Workshop on Fisheries and Ecosystem Models in the Antarctic (FEMA2) relating to the Ross Sea ecosystem and the toothfish fishery in Subarea 88.1 (SC-CAMLR-XXVIII, paragraphs 3.34 to 3.37). These recommendations outlined the need to use food-web models and spatially structured population models prior to further field programs to explore spatial overlaps between the fishery and other predators of toothfish and what data might be needed to understand the effects of fishing. Such models are also necessary to evaluate linkages between toothfish populations, the fishery and toothfish predators, as well as to determine data needs for further development of a management strategy for exploratory toothfish fisheries.

Harvested species

Krill resources

4.12 The Commission noted that five Members (six vessels) targeted krill in 2008/09 in accordance with conservation measures in force. A total catch of 123 948 tonnes of krill was reported to the Secretariat by the end of September 2009 (SC-CAMLR-XXVIII, Table 2). The total catch of krill reported in 2007/08 was 156 521 tonnes (SC-CAMLR-XXVIII, Table 3).

4.13 The krill catch in 2008/09 was taken from Subareas 48.1 and 48.2 and there was <1 tonne caught from Subarea 48.3 (paragraph 4.9).

4.14 Notifications for krill fishing in 2009/10 were received from seven Members covering 13 vessels and a total proposed catch of 363 000 tonnes (see SC-CAMLR-XXVIII, Annex 3, Table 3). This included a notification to participate in the exploratory fishery for krill in Subarea 48.6 (see Item 11).

4.15 The Commission endorsed the Scientific Committee's advice on the krill fisheries in 2009/10 (SC-CAMLR-XXVIII, paragraphs 4.22, 4.23 and 4.25), and agreed to:

- (i) insert a paragraph in 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 (see Item 13);
- (ii) clarify the requirements in 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 (see Item 13);
- (iii) revise the deadline for the submission of fine-scale data (see Item 13).

4.16 The Commission also noted the European Community's proposal to adopt a mandatory observer program and biological data reporting for krill fisheries to enable the Scientific Committee to develop assessments of the impact of these fisheries (CCAMLR-XXVIII/47). This approach would also allow the Scientific Committee to develop and recommend appropriate deployment schemes to continue to acquire relevant data as well as enhance the Commission's ability to monitor and manage this resource in a sustainable manner.

4.17 Some Members agreed that it was time to align the observer and data requirements in krill fisheries, including VMS, with the requirements adopted in all other CCAMLR fisheries.

4.18 The Commission noted the development of a patent database which could provide a valuable additional source of information about trends in the krill fishery (SC-CAMLR-XXVIII/BG/15) and agreed that the Secretariat should maintain such a database in the future and provide annual updates on these trends (SC-CAMLR-XXVIII, paragraph 4.12).

4.19 The Commission also noted the issue of escape mortality in the krill fishery, and urged Members fishing for krill in 2009/10 to actively investigate the effects of different fishing gear on escape mortality of krill and report information to next year's meeting of WG-EMM (SC-CAMLR-XXVIII, paragraph 4.15).

4.20 The Commission noted the Scientific Committee's further work and advice on the need to distribute the trigger level in the krill fishery across Subareas 48.1, 48.2, 48.3 and 48.4 (SC-CAMLR-XXVIII, paragraphs 4.26 to 4.48, Table 1), including the following:

- (i) modelling results indicated that a harvest level consistent with the current trigger level (620 000 tonnes) was not as cautious as might have been thought at the time this was agreed;

- (ii) status quo management¹ may reduce the Commission's ability to achieve the objectives specified in Article II (see also 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;
- (iii) the trigger level and its application in Conservation Measure 51-01 needs to be reviewed, taking account of the advice related to spatial distribution of catches;
- (iv) there is a need to spatially distribute the krill fishing effort to avoid large catches being taken from localised areas before the trigger level is reached. This could be an interim mechanism to manage the distribution of catch throughout Area 48.

4.21 The Commission endorsed the development of an interim mechanism to distribute the catch without the need to know the exact krill distribution and the precise impact on krill predators. The Commission also agreed that this approach needs to be flexible so as to avoid restricting the fishery at the level of fishing in recent years, whilst at the same time providing assurances that increased precaution is being exercised while the Scientific Committee develops the longer-term feedback management procedure (SC-CAMLR-XXVIII, paragraphs 4.39, 4.44 and 4.45).

4.22 The Commission also recognised that the type of flexibility described above (paragraph 4.21) is not part of Article II of the Convention. However, the inclusion of some level of flexibility in the interim mechanism would facilitate the transition to the feedback management procedure.

4.23 The Commission considered five candidate models proposed by the Scientific Committee for avoiding catch concentration (SC-CAMLR-XXVIII, Table 1), and 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 fishery 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, but do not account for the needs of land-based predators.

4.24 The Commission focused its discussion on candidate models 4 and 5, and thanked Ukraine for its contribution to the development of candidate model 4 (SC-CAMLR-XXVIII/48). Both models included flexibility so as to avoid restricting the fishery at its current level of fishing.

4.25 Some Members supported candidate model 4 (SC-CAMLR-XXVIII, Table 1) as an interim mechanism to avoid catch concentration in Area 48. This model allocated the trigger

¹ Current management arrangements that would allow historical distribution of krill catches up to the trigger level.

level between costal and pelagic zones in Subareas 48.1, 48.2 and 48.3 in proportion to the biomass observed in those zones during the CCAMLR-2000 Survey. This model was the best amongst those considered in allocating the trigger level in a precautionary manner.

4.26 Other Members supported candidate model 5 (SC-CAMLR-XXVIII, Table 1) as an interim mechanism to avoid catch concentration in Area 48. This model allocated the trigger level evenly across Subareas 48.1, 48.2, 48.3 and 48.4 and provided greater flexibility for the distribution of fishing effort. Further, this model was not based on the results of the CCAMLR-2000 Survey which some Members believed were outdated and may not reflect the current distribution of krill (e.g. see paragraph 4.13 above).

4.27 The Commission requested that the Conservation Measure Drafting Group further consider this matter (see Item 12).

Toothfish

4.28 The Commission noted that in 2008/09 Members had targeted *Dissostichus eleginoides* in Subareas 48.3 and 48.4 and Division 58.5.2, and *Dissostichus* spp. (*D. eleginoides* and/or *D. mawsoni*) in Subareas 88.1 and 88.2 and Divisions 58.4.1, 58.4.2, 58.4.3a and 58.4.3b. These fisheries had been carried out in accordance with conservation measures in force. Other managed fisheries for *D. eleginoides* occurred in the EEZs of South Africa (Subareas 58.6 and 58.7, and outside the Convention Area in Area 51) and France (Subarea 58.6 and Division 58.5.1). A total catch of 13 025 tonnes of *Dissostichus* spp. was reported from the Convention Area in 2008/09 (to end of September 2009), compared with 15 592 tonnes in the previous season (SC-CAMLR-XXVIII, Tables 2 and 3 respectively).

4.29 In addition, reported CDS data indicated that 10 065 tonnes of *Dissostichus* spp. were taken outside the Convention Area in 2008/09 (to October 2009) compared with 12 351 tonnes in 2007/08 (SC-CAMLR-XXVIII, Annex 5, Table 4). These catches were taken mostly in Areas 41 and 87.

4.30 Estimates of catches from IUU fishing for *Dissostichus* spp. inside the Convention Area were discussed under Item 9.

4.31 The Commission endorsed the Scientific Committee's management advice for the fisheries for *D. eleginoides* in Subarea 48.3 and Division 58.5.2 in 2009/10, noting that the catch limits may be carried over into 2010/11 subject to the conditions of the biennial assessment procedure (SC-CAMLR-XXVIII, paragraphs 4.81, 4.82, 4.108 and 4.109). The Commission considered the management advice for the exploratory fisheries for *Dissostichus* spp. under Item 11.

4.32 The Commission also endorsed the Scientific Committee's management advice for the fishery for *D. eleginoides* (Northern Area) and *Dissostichus* spp. (Southern Area) in Subarea 48.4 in 2009/10 (SC-CAMLR-XXVIII, paragraphs 4.93 and 4.95).

4.33 The Commission noted that the success of the four-year experiment in the Northern Area of Subarea 48.4 was largely attributed 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.

4.34 The Commission endorsed the Scientific Committee's advice on the fisheries for *D. eleginoides* in the French EEZs in Division 58.5.1 (Kerguelen Islands) and Subarea 58.6 (Crozet Islands). The Commission encouraged France to continue developing assessments for the stocks concerned, to continue its tagging program in these fisheries, and to avoid fishing in zones of specific high rates of by-catch (SC-CAMLR-XXVIII, paragraphs 4.99 to 4.102 and 4.113 to 4.116). The Commission noted that France had continued to make significant progress in mitigating seabird by-catch (see Item 6).

4.35 The Commission noted that the Scientific Committee was unable to provide management advice for the fishery for *D. eleginoides* in the South African EEZ in Subareas 58.6 and 58.7 (Prince Edward Islands). The Commission urged South Africa to adopt the CCAMLR decision rules for estimating yields for this fishery (SC-CAMLR-XXVIII, paragraphs 4.120 and 4.121).

4.36 The Commission agreed that prohibition of directed fishing should remain in force for *D. eleginoides* in Subareas 58.6 and 58.7, and Divisions 58.4.4 and 58.5.1 in areas outside national jurisdiction (SC-CAMLR-XXVIII, paragraphs 4.115 and 4.122).

Icefish

4.37 The Commission noted that Members had targeted *Champscephalus gunnari* in Subarea 48.3 and Division 58.5.2 in 2008/09 in accordance with conservation measures in force. A total of 1 936 tonnes of *C. gunnari* was taken in the Convention Area (to end of September 2009), compared with 2 690 tonnes in 2007/08 (SC-CAMLR-XXVIII, Tables 2 and 3 respectively).

4.38 The Commission endorsed the Scientific Committee's management advice for the fisheries for *C. gunnari* in Subarea 48.3 and Division 58.5.2 in 2009/10 (SC-CAMLR-XXVIII, paragraphs 4.126, 4.127 and 4.133).

Other finfish species

4.39 The Commission endorsed the Scientific Committee's advice 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.

Crab resources

4.40 The Commission noted that there had been no fishery for crab in Subarea 48.3 in 2008/09, and that one Member had notified its intention to harvest crab in 2009/10. The Commission endorsed the Scientific Committee's management advice that the existing elements of Conservation Measure 52-01 be carried forward (SC-CAMLR-XXVIII, paragraphs 4.225 and 4.226). The Commission considered the exploratory fisheries for crab in Subareas 48.2 and 48.4 under Item 11.

Squid resources

4.41 The Commission noted that there had been no fishery for *Martialia hyadesi* in Subarea 48.3 in 2008/09 and that no notification to harvest this species had been received for 2009/10. The Commission agreed that this fishery has now lapsed, and that Conservation Measure 61-01 be removed from the *Schedule of Conservation Measures in Force* (SC-CAMLR-XXVIII, paragraph 4.229).

By-catch species

4.42 The Commission endorsed the Scientific Committee's management advice on by-catch (SC-CAMLR-XXVIII, paragraphs 4.230 to 4.237), including:

- (i) extending the Year-of-the-Skate protocols for the 2009/10 season, in order to allow for sufficient data to be collected for preliminary assessments;
- (ii) incorporate a threshold catch of 150 kg in the move-on rule for *Macrourus* spp. in the Southern Area of Subarea 48.4;
- (iii) development of identification guides for benthic invertebrate by-catch.

Research exemption

4.43 The Commission recalled that it closed the toothfish fishery in Divisions 58.4.4a and 58.4.4b (Ob and Lena Banks) in 2002 on the basis that the stock was depleted (CCAMLR-XXI, paragraph 11.36). The Commission noted that IUU fishing has continued in this area, and there was no evidence that the stock had recovered to a level that could sustain fishing. Therefore, the Commission agreed that a catch limit of 60 tonnes was appropriate for the survey by Japan on Ob and Lena Banks as a research exemption under Conservation Measure 24-01. Consideration of further research activities on Ob and Lena Banks will be dependent on advice from the Scientific Committee of a research and recovery plan for Divisions 58.4.4a and 58.4.4b, based on advice from WG-SAM and WG-FSA.

Climate change

4.44 The Commission endorsed the Scientific Committee's proposal (SC-CAMLR-XXVIII, paragraphs 7.11 to 7.15) concerning potential management responses to climate change. Specifically, the proposal identified the necessity for a review of CEMP that includes requirements for reference sites so that the effects of krill fishing may be monitored in the face of rapid climate change.

4.45 The Commission agreed that climate change is a very important issue and adopted Resolution 30/XXVIII on climate change that urges increased consideration of climate change impacts in the Southern Ocean to better inform CCAMLR management measures. In light of this, the Commission requested that the Chair of the Commission write to the United Nations Framework Convention on Climate Change (UNFCCC) to express that the CAMLR Commission considers that an effective global response by the UNFCCC is urgently needed to address the challenge of climate change in order to protect and preserve the Southern Ocean ecosystems and their biodiversity.

Secretariat supported activities

4.46 The Commission noted the Secretariat's activities in respect of the continued high level of data management outlined in SC-CAMLR-XXVIII (paragraphs 13.1 to 13.7 and 13.10 to 13.17) and in the provision of comprehensive documentation on CCAMLR's data holdings (CCAMLR-XXVIII/BG/9).

4.47 The Commission noted the various documents that had been published in 2008 in support of the Scientific Committee's work (SC-CAMLR-XXVIII, paragraph 13.8).

4.48 The Commission endorsed the various Scientific Committee decisions relating to *CCAMLR Science*. It noted with appreciation that the journal is currently ranked 19th out of 40 journals in the Fisheries subject category in Thomson Reuters *Journal Citation Reports*, Science Edition (SC-CAMLR-XXVIII, paragraph 13.12).

Scientific Committee activities

4.49 The Commission noted that the current pace and demands of work within the Scientific Committee and its working groups are not sustainable and this may cause advice to the Commission to be delayed (SC-CAMLR-XXVIII, paragraph 14.1; CCAMLR-XXVII, paragraph 4.73).

4.50 The Commission agreed that it would be essential to ensure that any delay in the provision of scientific advice does not undermine the Convention's primary objectives (SC-CAMLR-XXVIII, paragraph 14.1). Therefore, it agreed that if there was a delay in the provision of advice, additional precaution in the approach to management would be required in managing the living marine resources (e.g. krill, icefish, toothfish, VMEs and by-catch) typically addressed by the Scientific Committee working groups.

4.51 The Commission noted the priorities that the Scientific Committee had put on its work, particularly the plans for addressing key issues at the 2010 meetings of WG-SAM and WG-EMM (SC-CAMLR-XXVIII, paragraphs 14.2 and 14.3), which will lead to a delay in the provision of some advice to the Commission (SC-CAMLR-XXVIII, paragraph 14.1). It accepted the need for such prioritisation, but urged the Scientific Committee to ensure that issues of key importance to the work of the Commission which have been de-prioritised for 2010 are addressed adequately in 2011. It encouraged Members to submit preliminary work on postponed issues for consideration at forthcoming intersessional meetings if there is time within this year's work plan. It further noted that the proposal to hold a symposium on future work priorities of the Scientific Committee (SC-CAMLR-XXVIII, paragraph 14.4) would be discussed by the ad hoc correspondence group.

4.52 The Commission accepted the work plans for the Scientific Committee and its subsidiary working bodies in 2009 (SC-CAMLR-XXVIII, paragraphs 14.5 and 14.10). This work included:

- SG-ASAM, Cambridge, UK (date to be advised) (Convener, Dr J. Watkins (UK));
- WG-SAM (date and location to be advised) (Convener, Dr A. Constable (Australia));
- WG-EMM (date and location to be advised) (Convener, Dr G. Watters (USA));
- ad hoc TASO, Hobart, Australia, 11 to 16 October 2010 (Co-conveners Dr D. Welsford (Australia) and Mr C. Heineken (South Africa));
- WG-FSA at CCAMLR Headquarters, Hobart, Australia, from 11 to 22 October 2010 (Convener, Dr C. Jones (USA)).

4.53 The Commission recognised the value of obtaining input from the CEP and SCAR to discussions on marine protected areas (MPAs), to ensure harmonisation across the Antarctic Treaty System, and to facilitate the provision and use of the best available scientific data. It agreed that experts/observers should be invited to attend meetings of WG-EMM, and to participate in intersessional work on the topic of MPAs, as appropriate (SC-CAMLR-XXVIII, paragraph 3.30).

4.54 The Commission noted that no Member had offered to host the meetings of WG-EMM and WG-SAM in 2010. In the absence of such an offer, the Commission recognised that the important capacity-building component derived from these meetings being hosted by Members could be lost (SC-CAMLR-XXVIII, section 10).

4.55 The Commission noted that the Scientific Committee had unanimously elected Drs D. Agnew (UK) and Jones to the positions of Chair and Vice-Chair of the Scientific Committee respectively, both for a term of two regular meetings (2010 and 2011) (SC-CAMLR-XXVIII, paragraphs 15.1 and 15.2). A very warm welcome was extended to both Drs Agnew and Jones.

4.56 The Commission noted the Scientific Committee's decision that all observers invited to SC-CAMLR-XXVIII would be invited to participate in SC-CAMLR-XXIX (SC-CAMLR-XXVIII, paragraph 14.8).