

ECOSYSTEM MONITORING AND MANAGEMENT

WG-EMM advice

3.1 Dr Watters (WG-EMM Convener) reported that the 15th meeting of WG-EMM had been held in Bergen, Norway, from 6 to 17 July 2009. The meeting was hosted by the Norwegian Institute of Marine Research and the Norwegian Ministry of Foreign Affairs. The senior Vice-Chair of the Scientific Committee, Dr Iversen, coordinated local arrangements.

3.2 Dr Watters informed the Scientific Committee that WG-EMM had followed the agenda adopted by the Scientific Committee in 2008 (SC-CAMLR-XXVII, paragraph 3.48) and had considered reports from four intersessional meetings during its discussion, including the reports from the Joint SC-CAMLR–CEP Workshop (SC-CAMLR-XXVIII/6), SG-ASAM (Annex 8), WG-SAM (Annex 6) and ad hoc TASO (Annex 9).

Acoustic estimates of krill biomass

3.3 The Scientific Committee noted that WG-EMM had considered advice from SG-ASAM that included uncertainty associated with estimates in B_0 and the need to re-calculate B_0 for Subareas 48.1 to 48.4 (Annex 4, paragraphs 3.73 to 3.94).

3.4 The Scientific Committee endorsed the advice from WG-EMM regarding acoustic assessments, specifically with regard to: (i) uncertainty in B_0 (Annex 4, paragraph 3.75); (ii) a joint meeting between SG-ASAM and WG-SAM to combine appropriate expertise to evaluate broader aspects of uncertainty in the acoustic estimate of krill biomass (Annex 4, paragraph 3.76); and (iii) the need to recalculate B_0 for Subareas 48.1 to 48.4 (Annex 4, paragraphs 3.77 to 3.83).

3.5 The Scientific Committee noted that WG-EMM considered that any recalculation of the B_0 estimate from the CCAMLR-2000 Survey using the revised parameter set provided by SG-ASAM is unlikely to result in a krill biomass estimate that is higher than the present biomass estimate, and that the current Conservation Measures 51-01, 51-02 and 51-03 should remain as interim conservation measures until a fully validated reanalysis of the results of the CCAMLR-2000 Survey was performed (Annex 4, paragraphs 3.85 and 3.86).

3.6 The Scientific Committee endorsed the advice from WG-EMM that, in the future, if implementation errors to an agreed protocol were discovered, then WG-EMM and the Scientific Committee should be notified and these errors should be corrected as soon as possible (Annex 4, paragraph 3.87). The Scientific Committee also endorsed the recommendation from SG-ASAM that the Secretariat work with Members to develop detailed acoustic protocols and make them available on the CCAMLR website (Annex 4, paragraph 3.88).

3.7 The Scientific Committee noted that as well as recalculation of estimates of B_0 for Subareas 48.1 to 48.4, recalculation of estimates of B_0 for Divisions 58.4.1 and 58.4.2 would also be required.

Krill-dependent predators

3.8 The Scientific Committee noted that there had been a strong ecosystem anomaly at South Georgia during 2009 (Annex 4, paragraph 3.10). This was manifested in the lowest krill density on record, very low land-based predator breeding performance, changes in the diet of icefish and anomalous values for a range of physical parameters including sea-surface temperature. The Scientific Committee further noted that ecosystem monitoring at South Georgia, including CEMP monitoring, had allowed the early detection of this anomaly, demonstrating the value of such monitoring for management purposes.

3.9 The Scientific Committee recognised that the ecosystem anomaly at South Georgia provided a natural experiment, the impacts of which would become evident through continued monitoring over the coming years of both the pelagic ecosystem and of land-based predators. The Scientific Committee noted that previous work undertaken by UK scientists suggested that impacts on demographic parameters of long-lived species were to be anticipated as a consequence of the anomaly.

3.10 The Scientific Committee welcomed new initiatives for CEMP monitoring at Cumberland Bay, South Georgia, and at Petermann Island on the Antarctic Peninsula (Annex 4, paragraph 3.12). The Scientific Committee further welcomed data collected in a manner consistent with the CEMP standard methods from penguin colonies used to monitor tourism impacts on Goudier Island (Annex 4, paragraph 3.14). The Scientific Committee congratulated Ukraine, UK and Russia on these new initiatives.

3.11 The Scientific Committee noted that a broad monitoring network would be required if the Scientific Committee and its working groups were to have the necessary information available to manage CCAMLR fisheries, particularly the krill fishery, in the face of climate change. The Scientific Committee noted that the Joint SC-CAMLR-CEP Workshop (SC-CAMLR-XXVIII/6, paragraphs 8.1 to 8.11) had also highlighted the importance of exploring new and innovative ways to augment existing resources dedicated to ecosystem monitoring.

3.12 The Scientific Committee noted the progress made by WG-EMM-STAPP in advancing estimation of krill consumption by predators in Area 48 and noted the work program proposed for WG-EMM-STAPP during the coming intersessional period (Annex 4, Table 1).

3.13 The Scientific Committee encouraged the further development of new photographic methods by Australia to provide penguin breeding population size estimates, noting that these could be incorporated, in the future, into CEMP Standard Method A3 (penguin breeding population size) for some penguin species (Annex 4, paragraph 3.22). The Scientific Committee encouraged Australia and other Members to investigate this and other innovative ways to augment monitoring approaches.

Management of protected areas

3.14 The Scientific Committee endorsed the advice from WG-EMM (Annex 4, paragraphs 5.15 to 5.37), noting that the establishment of a representative system of MPAs across the Convention Area is a high priority for the Scientific Committee (SC-CAMLR-XXVII, paragraph 3.55) and the Commission (CCAMLR-XXVII, paragraph 7.2).

3.15 The Scientific Committee agreed that significant further work is required to progress the establishment of a representative system of MPAs by 2012, within the timeline agreed by the WSSD, and it endorsed the advice from WG-EMM on the types of projects which would contribute towards the achievement of this target (Annex 4, paragraph 5.33). It was agreed that the MPA Special Fund should be used to facilitate this work.

3.16 The UK presented SC-CAMLR-XXVIII/14, describing a preliminary proposal for marine spatial protection to be implemented around the South Orkney Islands, to contribute towards the conservation of biodiversity in Subarea 48.2, and the development of a representative network of protected areas across the Convention Area. The proposed area was selected on the basis of a systematic conservation planning analysis, the initial results of which were presented to WG-EMM in 2008 and 2009. It includes representative examples of two pelagic bioregions occurring in Subarea 48.2, and incorporates an area of key importance for winter penguin foraging and unique oceanographic frontal systems.

3.17 Additional areas have also been identified as important for the conservation of biodiversity in Subarea 48.2, and it was noted that further work is required to determine the requirements for spatial protection in these areas, particularly in the context of circumpolar frontal systems which extend into neighbouring regions, and VMEs which have recently been identified in the South Orkney Islands shelf region.

3.18 All types of fishing would be prohibited within the proposed area, however, scientific research activities would be permitted under conditions agreed by the Scientific Committee (and in accordance with Conservation Measure 24-01).

3.19 The Scientific Committee:

- (i) endorsed the work undertaken to date, and recommended the adoption of a protected area in the South Orkney Islands region (as defined in SC-CAMLR-XXVIII/14, Figure 3), noting that the data had been used appropriately and that the method was able to deliver robust scientific results;
- (ii) recommended that further work be undertaken in relation to the additional areas of conservation importance identified in SC-CAMLR-XXVIII/14, with a view to finalising further proposals for specific areas for protection in the South Orkney Islands region at CCAMLR-XXIX;
- (iii) recommended that the proposal should be forwarded to the Commission for consideration of procedures for implementing the proposed area.

3.20 While expressing its appreciation for the UK's continued efforts in the development of spatial management, China expressed its concern about forwarding the proposal to the Commission, as the proposal is not accompanied by any workable plans, and in particular, the management plan for potential scientific research activities.

3.21 The UK confirmed that the intention of its proposal was that advice on the requirements for, and content of, a management plan should subsequently be developed by the Commission, and that this could include a research plan.

3.22 The Scientific Committee agreed that WG-EMM consider research plans that could be used to support the management plan.

3.23 The CEP Observer noted that part of the South Orkney Islands analysis had been presented to CEP XII earlier this year, and that the CEP had endorsed the method and preliminary results and encouraged further development of this work. The CEP Observer also encouraged the submission of information on this proposal to CEP XIII in 2010.

3.24 The Convener of the MPA Special Fund Correspondence Group (Dr Grant) reported on the discussions held by this group during the intersessional period (SC-CAMLR-XXVIII/13). The group agreed that priorities for support by the MPA Special Fund are:

- (i) the collation of data to facilitate the development of MPAs, fine-scale bioregionalisation and systematic conservation planning (as endorsed by SC-CAMLR-XXVII, paragraph 3.55);
- (ii) the convening of a workshop to share experience and develop best-practice guidance on approaches to the selection of candidate sites for protection.

3.25 The group also noted the importance of a work plan to ensure progress towards the achievement of a representative system of MPAs by 2012.

3.26 The Scientific Committee noted that projects were already under way to develop marine spatial protection in several of the 11 priority regions identified by WG-EMM (Annex 4, paragraph 5.23), (including the Western Antarctic Peninsula, South Orkney Islands, Kerguelen Plateau, Prydz Bay, northern Ross Sea and Ross Sea shelf), and that further projects were planned for other priority areas. It encouraged Members to collaborate on such work, and to develop proposals for use of the MPA Special Fund as appropriate, given the priorities identified in paragraph 3.24. The Scientific Committee welcomed notification from the CEP Observer that the CEP had also endorsed the 11 priority regions for focused attention. The Scientific Committee further noted that work should not be limited to the 11 priority regions. For example, additional considerations could include regional or circumpolar features such as the fronts of the ACC.

3.27 The Scientific Committee agreed that a set of milestones would be useful in guiding its work towards the achievement of a representative system of MPAs within the Convention Area by 2012. It noted that work may progress at different rates for different priority regions, that work for some regions may be completed earlier than these milestones, and that ongoing progress was not dependent on the completion of work in each region. Projects which aim to achieve one or more of these milestones could be considered for support (either in full or in part) by the MPA Special Fund.

3.28 The Scientific Committee agreed the following milestones describing tasks which should be completed by the end of each year leading up to 2012, with relevant work presented to the Scientific Committee and its working groups during each year:

- (i) by 2010, collate relevant data for as many of the 11 priority regions as possible (and other regions as appropriate), and characterise each region in terms of biodiversity patterns and ecosystem processes, physical environmental features and human activities;

- (ii) by early 2011, convene a workshop to review progress, share experience on different approaches to the selection of candidate sites for protection, and determine a work program for the identification of MPAs in as many of the priority regions as possible (and other regions as appropriate);
- (iii) by 2011, identify candidate areas for protection in as many of the priority regions as possible (and other regions as appropriate), based on the collated data and regional characterisations, and using appropriate selection methods;
- (iv) by 2011, submit proposals for areas for protection to the Scientific Committee;
- (v) by 2012, submit proposals on a representative system of MPAs to the Commission.

3.29 To provide support for the achievement of these milestones, the Scientific Committee requested that WG-EMM should consider the following topics as part of its agenda item on spatial management to facilitate the conservation of marine biodiversity:

- (i) provision of advice on the development of a representative system of MPAs within the Convention Area by 2012;
- (ii) review of progress at each milestone towards the 2012 target, and coordination between regional projects;
- (iii) coordination with the CEP, and with groups such as SCAR-MarBIN and CAML, to ensure utilisation of the best available scientific data;
- (iv) convening of a workshop in 2011 to review progress, share experience on approaches to the selection of candidate sites for protection, and determine a work program for the identification of MPAs.

3.30 The Scientific Committee recognised the value of obtaining input from the CEP and SCAR to discussions on 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 from the CEP and SCAR should be invited to attend meetings of WG-EMM, and to participate in intersessional work on the topic of MPAs, as appropriate.

3.31 The Scientific Committee agreed that the MPA Special Fund Correspondence Group should continue to work under the remit of WG-EMM, with the aim of assisting with the review of proposals for use of the MPA Special Fund if requested to do so by the Scientific Committee. The existing participants in the group are listed in SC-CAMLR-XXVIII/13, and any additional Members are also encouraged to join the group.

3.32 The Scientific Committee agreed that the proposed workshop in early 2011 should be a priority for support by the MPA Special Fund. It requested that the MPA Special Fund Correspondence Group should develop a proposal for such a workshop, and that funds could be set aside for this purpose as required.

3.33 The Scientific Committee recommended that the following guidelines should be adopted for submission and review of proposals, and allocation of funds from the MPA Special Fund:

- (i) proposals for use of funds from the MPA Special Fund may be submitted directly to the Scientific Committee, or to the Secretariat at any time of year;
- (ii) proposals may be submitted by individual Members or groups of Members;
- (iii) proposals should include information on the project objectives, justification, methodology, outputs, milestones, timelines and budget (requested funding, contributed funding, other in-kind support etc.);
- (iv) the Scientific Committee will consider any proposals received, either during its meeting, or through distribution of the relevant information to all Members via a circular if received by the Secretariat intersessionally;
- (v) proposals will be assessed by the Scientific Committee on the basis of whether they will contribute to the achievement of one or more of the milestones set out in paragraph 3.29;
- (vi) the Scientific Committee may ask the MPA Special Fund Correspondence Group to provide initial recommendations on the merits of submitted proposals;
- (vii) if the proposal is received intersessionally, an initial recommendation on whether it should be supported by the MPA Special Fund will be distributed to all Members via a circular (this initial recommendation can be made by the Secretariat, with advice from the MPA Special Fund Correspondence Group as required). Members will then have an opportunity to comment on this recommendation within a defined time limit (e.g. one month). If no objections are received during that time, then the initial recommendation will be upheld and funds will be allocated accordingly;
- (viii) quarterly reports on the progress of funded projects should be submitted by the project manager to the Secretariat for circulation to all Members.

Interactions between WG-EMM and WG-FSA

FEMA2 Workshop

3.34 FEMA2 was held as a focus topic within the agenda of WG-EMM. Terms of reference and a specific task for the workshop are provided in Annex 4, paragraphs 2.1 and 2.2. Unless stated otherwise, all advice arising from the FEMA2 Workshop refers solely to the Ross Sea ecosystem and the toothfish fishery in Subarea 88.1 (Annex 4, paragraph 2.3).

3.35 The Scientific Committee agreed that FEMA2 was useful and, subject to the paragraphs below, endorsed the results of the workshop which:

- (i) advised on requirements for additional data and monitoring (Annex 4, paragraphs 2.14, 2.29, 2.43 and 2.48), as well as for additional modelling and inputs to modelling efforts (Annex 4, paragraphs 2.33, 2.43, 2.48, 2.51 and 2.53);

- (ii) concluded that there was negligible overlap of Weddell seals with the fishery and similarly negligible overlap between the fishery and killer whales (Annex 4, paragraph 2.42);
- (iii) concluded that where there is overlap between the distribution of these two predators and elements of the toothfish population which may be impacted by the fishery, this is limited to shallow areas of the shelf and to the sub-adults of the toothfish population which are taken in small numbers by the fishery (Annex 4, paragraph 2.42);
- (iv) noted that a large portion of the shelf area is currently closed to fishing (Annex 4, paragraph 2.52);
- (v) demonstrated that the current status of size classes of interest are routinely monitored within regular stock assessments of the toothfish stock (Annex 4, paragraph 2.47) which currently detects no reduction in the abundance of recruiting size classes to the stock;
- (vi) were also endorsed by WG-FSA (Annex 5, paragraph 10.52).

3.36 The Scientific Committee endorsed Annex 4, paragraph 2.53, regarding the need to use food-web models and spatially structured population models prior to further field programs on these issues to:

- (i) better explore spatial overlaps and evaluate linkages between the toothfish population, the fishery and toothfish predators;
- (ii) determine the data needed to further develop a management strategy for the fishery.

3.37 The Scientific Committee also noted WG-EMM's discussion on potential revisions to the decision rule for toothfish in the Ross Sea that might accommodate effects both on toothfish predators (Annex 4, paragraph 2.49) and toothfish prey (Annex 4, paragraph 2.50) if needed.

Other considerations

3.38 The Scientific Committee noted the strong ecosystem anomaly that occurred at South Georgia in 2009 (paragraph 3.8; Annex 4, paragraph 3.10), and that, *inter alia*, this had caused low catches of krill (total catch 50 kg) and *Chamsocephalus gunnari* in the fishery and scientific surveys (Annex 4, paragraph 4.8). It was also noted that, in the relevant sections of its agenda, WG-FSA had taken up advice from WG-EMM on this issue as well as advice on VMEs (Annex 5, paragraph 10.56).

3.39 The Scientific Committee endorsed a request from WG-FSA and WG-EMM that Members provide the next meeting of WG-FSA with information that may be used to advise scientific observers in the krill fishery on key identification features for the most frequently encountered larval fish by-catch species (Annex 5, paragraph 10.58).

3.40 The Scientific Committee noted that information not currently considered by WG-EMM may provide information on the ecosystem impacts of finfish fishing. In particular, it was noted that Argentina has collected and maintained a dataset that describes declines in the abundance of reproductively active Antarctic shags around the Antarctic Peninsula. These birds are fish predators, and declines in their abundance may be tied to the depletion of commercially important finfish populations during the early 1980s (Casaux and Barrera-Oro, 2006). The Scientific Committee encouraged Argentina to attend a future meeting of WG-EMM and provide information and analyses of these data to the Working Group.