ADVANCES IN STATISTICS, ASSESSMENTS, MODELLING AND SURVEY METHODS

WG-SAM advice

2.1 Dr Constable presented the report of WG-SAM (Annex 7), noting that most of the report was referred to WG-EMM and WG-FSA for consideration. The attention of the Scientific Committee was drawn to the following points for consideration:

(i) Noting the recalculation of seabed areas in Subarea 48.3, a request for Members to consider collating bathymetric data to develop updated bathymetric grids for other areas where recent multi-beam data or single-beam echo soundings exist and trawl surveys are conducted (Annex 7, paragraph 2.10).

(ii) Noting in Annex 7, paragraph 3.21, WG-FSA had given specific guidance on the information that would have to be provided for WG-SAM to adequately review the TISVPA method proposed to be used for assessing toothfish in the Ross Sea (SC-AMLR-XXVI, Annex 5, paragraph 4.27):

(a) a full paper detailing the method and its implementation needs to be compiled from existing work and presented to WG-SAM with further consideration of its implementation as discussed in the following points;

(b) simulated (theoretical) data need to be developed for a number of fishery–stock scenarios and those data need to be analysed using CASAL and the TISVPA in order to compare how the two methods perform using data from known population and fishery attributes;

(c) mathematical and statistical details of how the input data for the TISVPA are generated from the available datasets used in CASAL, including any pooling of the data in space and/or time, need to be provided;

(d) descriptions need to be provided on the methods for deriving the CPUE indices, including how the indices are standardised to account for differences and variability between vessels, times of year, location of fishing and so forth;

(e) descriptions are needed on how uncertainty is treated in both the assessments and evaluation of yield.

WG-SAM agreed in paragraph 3.22 of its report (Annex 7) that this had not been carried out and, in the absence of the authors, was therefore unable to complete an evaluation of the TISVPA method. WG-SAM reiterated its advice from last year and recommended that the authors carry out the program of work required for evaluation of the model outlined by WG-FSA (Annex 7, paragraph 3.25).

(iii) WG-SAM reviewed methods for evaluating the quality of data arising from the exploratory toothfish fishery in the Ross Sea (Annex 7, paragraphs 3.26 to 3.29). WG-SAM noted that the methodology would have uses beyond the selection of data for stock assessment (Annex 7, paragraph 3.30). These include the use of fishery data by other working groups, such as WG-EMM, and the performance

management and training of observers. WG-SAM also considered that a centralised system of data-quality assessment by the Secretariat may provide both for rapid feedback on the quality of data from individual trips, and simplify the determination of data quality by other working groups. WG-SAM recommended that TASO consider the issues raised in this discussion.

(iv) WG-SAM considered the value of the 10 tonne research limits for *Dissostichus* spp. (Annex 7, paragraphs 4.5 to 4.9) and concluded that interpreting the data from 10-tonne research operations by new vessels in new areas may be difficult, but data from vessels which have a history of several years of fishing and provision of comprehensive and high-quality data in known (assessed) areas may be more readily interpreted (Annex 7, paragraph 4.9).

(v) WG-SAM provided advice on situations in which fishing practices may change and how this should be managed to ensure the data could be used in assessments (Annex 7, paragraph 4.12).

(vi) WG-SAM advised on issues that may need to be considered in utilising BRTs for the purposes of bioregionalisation, and encouraged the authors of the approach to continue developing this approach and suggested that this could best be pursued through a correspondence group involving statistical experts familiar with BRTs (Annex 7, paragraphs 4.13 to 4.19).

(vii) WG-SAM reviewed the new assessment tool, SeaBird, developed in New Zealand for assessing the abundances of seabirds (Annex 7, paragraphs 4.21 to 4.24). It considered this to be a valuable contribution to the work of SC-CAMLR.

(viii) WG-SAM also reviewed an assessment and simulation tool developed in New Zealand to estimate parameters in a spatially structured population model (Annex 7, paragraphs 5.1 to 5.6). It welcomed this new tool and advised on how it may be further developed to assist the work of the Working Group.

(ix) WG-SAM also noted that, in the development of the spatially structured population model, a number of methods were applied to assist with model validation, including unit testing procedures. This is regarded as a useful approach for aiding the development of other models for use by CCAMLR (Annex 7, paragraphs 5.7 and 5.8).

(x) WG-SAM considered that some mechanisms for managing versions of models would be useful (see Annex 7, paragraph 5.31 for details).

(xi) WG-SAM provided preliminary reviews of an empirical ecosystem assessment model. It noted this was a novel approach to using small-scale krill surveys, CEMP data and environmental data in an ecosystem assessment (Annex 7, paragraphs 5.32 to 5.34). It endorsed the continued work on the model and provided advice on its further development.

(xii) WG-SAM reviewed the models to be used in the Stage 1 assessment of the subdivision of the krill catch in Area 48 (Annex 7, paragraphs 6.1 to 6.45). It

agreed to adapt a framework for developing management procedures (Annex 7, paragraphs 6.20 and 6.21) to suit the purposes of SC-CAMLR. WG-SAM provided advice on performance measures (Annex 7, paragraphs 6.26 to 6.30) and risk summaries (Annex 7, paragraphs 6.31 to 6.44). It also noted that the current models provide a foundation for evaluation of management procedures for krill in subsequent stages of the SSMU allocation work (Annex 7, paragraph 6.45). The body of this advice was passed on to WG-EMM.

(xiii) WG-SAM considered that a revision control system should be implemented in the work of SC-CAMLR (Annex 7, paragraphs 7.1 to 7.4).

(xiv) WG-SAM highlighted its future work in paragraphs 8.1 to 8.6 of its report (Annex 7).

(xv) WG-SAM included its advice to the working groups and the Scientific Committee in paragraphs 9.1 to 9.9 of its report (Annex 7). The primary advice for consideration by the Scientific Committee is contained in Annex 7, paragraph 9.9.

2.2 Dr Constable thanked the contributions of the Members in WG-SAM, indicating that the diversity of participants enabled great progress in the development and review of new methods. He also thanked Dr Jones for helping convene aspects of the meeting in order to enable him to participate in discussions.

2.3 The Scientific Committee endorsed the report of WG-SAM (Annex 7) including its program of future work, noting that the work program for the coming year will be determined amongst the conveners of the working groups and the Chair of the Scientific Committee.

2.4 The Scientific Committee agreed that:

(i) methodologies to assess data quality should be further developed and implemented (Annex 7, paragraph 9.9(i));

(ii) models that may be used towards understanding ecosystem dynamics and consequences of management approaches for Antarctic resources should continue to be developed and advanced (Annex 7, paragraph 9.9(ii));

(iii) revision (version) control systems which allow the management of multiple revisions of programming code, documents and data files within a central database should be implemented in the work of SC-CAMLR (Annex 7, paragraph 9.9(iii));

(iv) a common set of terminology consistent with that of other international fora with respect to the evaluation of management procedures should be adopted for use in the work of SC-CAMLR (Annex 7, paragraph 9.9(iv)).

SG-ASAM

2.5 The Scientific Committee noted discussions from the meetings of WG-EMM and WG-FSA regarding the holding of a meeting of SG-ASAM during the forthcoming intersessional period and the associated recommendations for issues that this meeting should address (Annex 4, paragraphs 5.114 to 5.116; Annex 5, paragraphs 3.26, 13.20 and Appendix O, paragraph 7).

2.6 The Scientific Committee agreed to hold a fourth meeting of SG-ASAM during 2009. Terms of reference for this meeting, provided in Annex 8, include both general points brought forward from the terms of reference of the third meeting of SG-ASAM in 2007 (SC-CAMLR-XXVI, Annex 8, Appendix A) and a series of specific tasks in response to points raised during the meetings of WG-EMM and WG-FSA.

2.7 The Scientific Committee noted the large number of items to be addressed by SG-ASAM and the need to prioritise the work of the subgroup. The Scientific Committee identified points (ii), (iii) and (iv) in the list of specific tasks in Annex 8 as being of highest priority to the work of the Scientific Committee. Point (iv) of Annex 8 should include analysis of acoustic data from vessels involved in exploratory fisheries.

2.8 The Scientific Committee agreed that the fourth meeting of SG-ASAM should be held close to the time and location of the meeting of ICES WG-FAST in Ancona, Italy (which is from 18 to 22 May 2009), to increase the opportunity for participation by appropriate experts from Members and invited experts. The Scientific Committee accepted with thanks the offer from Dr M. Vacchi (Italy) to hold the meeting at the University of Ancona, Italy, in May 2009.

2.9 The Scientific Committee was advised that Drs J. Watkins (UK) and R. O'Driscoll (New Zealand) have agreed to co-convene the meeting. There is provision for two invited experts, who will be identified through consultation between the co-conveners and other participants in advance of the meeting.

Joint CCAMLR-IWC Workshop

2.10 The Joint CCAMLR-IWC Workshop to Review Input Data for Antarctic Marine Ecosystem Models was held at CCAMLR Headquarters in Hobart, Australia, from 11 to 15 August 2008. The workshop was co-convened by Drs Constable and Gales from the Scientific Committees of CCAMLR and the IWC respectively.

2.11 A detailed account of the outcome of the workshop is provided in Annex 12. An Executive Summary is given in SC-CAMLR-XXVII/14 on which the presentation of the workshop results by Dr Constable and the deliberations of the Scientific Committee were based.

2.12 Fourteen expert groups had been formed which were tasked to complete review papers on different topics related to the Southern Ocean. These groups were (group conveners in brackets):

- toothed whales (Mr R. Leaper)
- baleen whales (Dr A. Zerbini)

- pack-ice seals (Dr C. Southwell)
- Antarctic fur seal (Dr K. Reid)
- seabirds (Dr B. Wienecke)
- fish (Dr K.-H. Kock)
- squid (Prof. P. Rodhouse)
- krill (Dr S. Nicol)
- primary production (Dr S. Strutton)
- zooplankton (Dr A. Atkinson)
- sea-ice (Dr R. Massom)
- ocean processes (Prof. E. Hofmann)
- exploitation (Dr S. Kawaguchi)
- penguins (Dr P. Trathan).

2.13 Reports delivered by the expert groups to the workshop varied in level of detail. Most were near completion with respect to the distribution and abundance of primary taxa, while others still needed considerable additional input to be completed within the first half of 2009, notably seabirds.

2.14 Dr Holt congratulated the organisers of the workshop on its achievements, especially in bringing together scientists from the IWC and CCAMLR in one meeting.

2.15 The Joint Steering Group of the workshop was tasked with developing a plan to further progress the collation and synthesis of the data and completion of the expert group review papers (SC-CAMLR-XXVII/14, paragraph 44), including broadening participation in the different expert groups. Although the Joint Steering Group has yet to complete this planning exercise, the Scientific Committee agreed that the work should be completed to the extent of a joint publication of all expert group papers and the compilation of data in the metadatabase. It encouraged the co-conveners of the expert groups to correspond with the Members of the respective Scientific Committees to identify mechanism to complete this work.

2.16 Completion of the expert review papers was identified as the primary task in the follow-up to the workshop. The deadline for the submission of final papers from the different expert groups will be the end of June 2009, although the format for the publication has yet to be decided.

2.17 Australia will continue to host the metadatabase and provide support for input of metadata to it. However, there are no resources to further develop the user interface of the database. This should be considered by the Scientific Committee in the future.

2.18 The Scientific Committee noted that the workshop expenditure had been well within the budget. However, it noted that the following items remain to be funded (paragraph 11.3):

(i) translation and publication of the report
(ii) publication of the expert group papers.

2.19 The Scientific Committee particularly welcomed estimates of the distribution and abundance of pack-ice seals resulting from SCAR's APIS Program, recognising that this was an ambitious and very difficult program of work and was of great relevance to CCAMLR's

work. The workshop benefitted considerably from the outcome of the APIS Program. The Scientific Committee encouraged SCAR to find ways to undertake the final analyses of the APIS abundance data which remain outstanding.

2.20 The Scientific Committee thanked the workshop conveners, the Joint Steering Group, the expert group coordinators, the participants in the expert groups and the workshop for making such good progress on collating important metadata for modelling in CCAMLR and the IWC. It expressed its satisfaction at what the workshop achieved with respect to the terms of reference, noting that it was important to recognise that it was the beginning of an ambitious process rather than an end point. It encouraged the Joint Steering Group to complete the publication of the papers and the compilation of the metadatabase. It also encouraged the Joint Steering Group to consider what future work might be undertaken jointly between SC-CAMLR and SC-IWC, noting that future work could centre on the synergies between the two committees in ecosystem modelling.