ECOSYSTEM MONITORING AND MANAGEMENT

AD HOC WORKING GROUP ON ECOSYSTEM MONITORING

7.1 Dr K. Kerry (Australia), Convener, introduced the report of the *Ad Hoc* Working Group on Ecosystem Monitoring (Annex 7).

7.2 The Working Group had defined the objective of ecosystem monitoring in relation to Antarctic marine living resources as:

> 'To detect and record significant changes in critical components of the ecosystem, to serve as the basis for the conservation of Antarctic Marine Living Resources. The monitoring system should be designed to distinguish between changes due to the harvesting of commercial species and changes due to environmental variability, both physical and biological.'

7.3 Within the defined objective, the *Ad Hoc* Working Group considered that ecosystem monitoring with respect to Antarctic marine living resources could be seen to be comprised of two facets:

(a) the monitoring of parameters of selected indicator species (those likely to have quantifiably significant changes in monitored parameters) of seals, seabirds and whales;

(b) the monitoring of harvested species (krill, fish and squid) and other species reflecting change, as an aid to understanding the nature and cause of any observed change.

7.4 Six Antarctic pinniped, seabird and cetacean species were identified as the most potentially useful indicators of changes in food availability. These species were chosen by the *Ad Hoc* Working Group in terms of a series of selection criteria taking into account such factors as the selected species relationship with critical prey components, importance in the Antarctic marine ecosystem and availability of baseline data. The species chosen were:

- Crabeater seal
- Adelie penguin
- Chinstrap penguin

- Macaroni penguin
- Antarctic fur seal
- Minke whale.

7.5 Of the Antarctic krill, fish and squid species evaluated for inclusion in ecosystem monitoring programs - *Euphausia superba, Pleuragramma antarcticum* and early life stages of fish were considered to be of most immediate and direct relevance with respect to the predators identified.

7.6 The minke whale was discussed as a potential indicator of the effects of krill harvest, but the Working Group, noting the current decision of the International Whaling Commission (IWC) to impose a pause in commercial whaling, did not afford it a high priority within the framework set by the Group. Cognizance was taken of the Group's recommendation that the Scientific Committee of CCAMLR consult with the IWC to determine whether and how minke whales or other cetaceans might function as indicators of krill availability as well as the general status of the Antarctic marine ecosystem. The Group also recommended that the Scientific Committee should consult with the IWC on the current status of Antarctic whale populations and the means by which trends might be monitored in the future. It was agreed that a series of questions should therefore be formulated along these lines by the Chairman of the Scientific Committee and that they be conveyed to the Scientific Committee of the IWC.

7.7 Parameters to be monitored within each species group were suggested taking into account trophic level, behaviour, longevity, sensitivity to perturbation (both natural and unnatural) and measurability.

7.8 Temporal and spatial resolution was considered of fundamental importance in the collection and interpretation of monitoring data. The Working Group therefore defined the scales of important variables relating to predators, prey, the environment and interactions among such variables.

7.9 Using a variety of criteria (e.g. influence of specific predators or predator groups, presence of species conducive to monitoring, presence or absence of fishing operations) the Working Group evaluated the suitability of potential areas and sites for ecosystem monitoring programs. High priority was placed on the initiation of integrated ecosystem monitoring programs in selected areas. These programs would combine directed research and monitoring of the selected predators and prey species in open water, pack-ice areas and onshore. Such programs would also include simultaneous investigation of local predator-prey dynamics. The Working Group recommended the following priority areas for integrated studies:

- Prydz Bay
- Bransfield Strait*
- South Georgia.

7.10 Other sites for monitoring purposes included a wide network of sites and areas to complement the integrated research and monitoring efforts proposed for the priority areas identified above, and sites of special interest for directed research.

7.11 The Working Group also outlined an approach for the establishment of an ecosystem monitoring regime which identified additional parameters and a variety of topics for future research (especially on predator-prey dynamics and remote sensing studies by satellites).

IMPLEMENTATION OF AN ANTARCTIC MARINE ECOSYSTEM MONITORING REGIME

7.12 Taking into account the report of the *Ad Hoc* Working Group, the Scientific Committee recognised the importance of a long-term monitoring program in terms of the high variability of krill and any subsequent impact on its important predators. In this regard the Committee noted the points raised in a document submitted by the USSR (SC-CAMLR-IV/13) relating to the need to focus joint research effort only in two areas: Prydz Bay Area with adjacent waters between 55° and 85° E; and Bellingshausen/ Amundsen Sea Area. Selection of monitoring sites would thus reflect the area of krill dominance as well as its total area of distribution. Remote sensing by satellite would play an important role in directed research of this kind. Results of such research can also be seen to ultimately facilitate the determination of the levels of fisheries exploitation thereby ensuring optimal reproductive success of krill-dependent and related species. The Committee thus recognised the urgent need for pilot studies on predators and prey in terms of monitoring important variables identified by the *Ad Hoc* Working Group. It also considered that directed ecological research on important predator and prey species was an urgent pre-requisite for determining potential indicator variables and essential background information for initiating or interpreting results of monitoring studies.

7.13 Therefore, bearing in mind the general provisions (and specifically Recommendation 4) of the report of the *Ad Hoc* Working Group on Ecosystem Monitoring, and taking into account the concomitant requirements of monitoring important predator

* Known in Argentina as Mar de la Flota

species, their prey and the environment, the Scientific Committee recommended the establishment of a 'Working Group for the CCAMLR Ecosystem Monitoring program'.

7.14 Dr K. Kerry (Australia) was unanimously elected Convener of this group. The terms of reference for the Working Group were agreed upon and follow:

1. to plan, recommend, coordinate and ensure the continuity of a multi-nation CCAMLR ecosystem monitoring program within the Convention area;

2. to identify and recommend research including theoretical investigations to facilitate design and evaluation of the recommended ecosystem monitoring program;

3. to develop and recommend methods for the collection and storage and analysis of data including data formats for submission to CCAMLR;

4. to facilitate the analysis of data, their interpretation, and to identify the management implications;

5. to report progress to each meeting of the Scientific Committee with recommendations for further work.

7.15 In order to expedite the operational implementation of an ecosystem monitoring program, the Scientific Committee agreed that an inter-sessional meeting of the Working Group lasting about 6 days should be scheduled for June/July 1986. It was also agreed that the Convener of the Working Group would formulate a detailed agenda in consultation with other members of the Committee during the current meeting session and by correspondence.

7.16 Following the Australian submission to the Third Meeting of the Scientific Committee (SC-CAMLR-III/7) and taking note of the task set for the Working Group on Ecosystem Monitoring, the Australian delegation framed an action plan for an international ecosystem monitoring program specific to the system within the Prydz Bay priority area. This document (SC-CAMLR-IV/10) was seen by the Committee to represent a useful framework upon which the Working Group on Ecosystem Monitoring could structure its deliberations.

SUMMARY OF RECOMMENDATIONS ON ECOSYSTEM MONITORING

7.17 The following recommendations were agreed on by the Scientific Committee:

(1) a Working Group for the CCAMLR Ecosystem Monitoring program be established;

(2) the above Working Group meet during the intersessional period;

(3) a series of questions be sent to the Scientific Committee of the IWC in order to evaluate the means by which trends of depleted populations might be monitored and the potential of whales as agents for ecosystem monitoring purposes might be assessed.