



Agenda Item:

Person Responsible:

XXXIII SCAR SSG-LS Meeting

Auckland, New Zealand, 1-3rd September 2014

Expert Group on Birds and Mammals

Executive Summary (1 page)

Title: Expert Group on Birds and Marine Mammals

Authors: Mark Hindell, Yan Ropert-Coudert

Introduction/ Background: The current terms of reference are:

- a. To quantify the role of birds and marine mammals in the Antarctic marine and terrestrial ecosystems
- b. To work with other components of SCAR towards a multi-disciplinary synthesis of biophysical and biochemical coupling mechanisms in the Antarctic.
- c. To collate and provide information on the status and trends of populations of specific species in the SCAR area of interest based on needs identified by SCAR or by the group.
- d. To provide advice to ATS bodies and others as requested from time to time, as agreed by SCAR, and in collaboration with these bodies including the exchange of data.
- e. Contribute to the conservation and management of Antarctic and sub-Antarctic birds and mammals through the appropriate utilisation and interpretation of currently available scientific data.

We have a core group of specialists consisting of approximately 12 scientists with on-going research roles in the Southern Ocean, and who would span a range of disciplines, taxa and nationalities. The role of this core group is to facilitate communication and involvement of the wider community of bird and mammal biologists regarding activities of EG-BAMM. One of the exciting prospects of the EG-BAMM is the opportunity to develop new synergies. This is particularly true in the area of ecosystem structure and dynamics, bearing in mind that predators can provide an integrated signal of changes in distribution and abundance of prey. Further, the physical and biological coupling mechanisms can be elucidated in these species, due to our ability to track them accurately, measure relevant life history characteristics, and even collect pertinent biological data at scales relevant to the organism.

Important Issues or Factors: (what do the SCAR Delegates need to be aware of). The Retrospective Analysis of Antarctic Tracking data is progressing well, at least in part thanks to a SCAR Contingency Fund grant. A new EG-BAMM subcommittee on population monitoring which will be part of a consortium incorporating SCAR, CCAMLR and SOOS is being considered and will be discussed further in Auckland. Another EG-BAMM subcommittee is also being considered to deal with the emergence of diseases and parasites infection in top predator populations in relation with the warming of the climate in Antarctica. This subcommittee is currently defining its terms of references and will be discussed in Auckland. Finally, the Biogeographic Atlas, the main output of the Census of Antarctic Marine Life in which EG-BAMM members played a significant role as editors, authors or data contributors, should be finalized – in its paper version – in the coming weeks and will be presented in Auckland.

Recommendations/Actions and Justification: (what actions are you requesting of the Delegates and why they should agree). Continued financial and logistic support for EG-BAMM.

Expected Benefits/Outcomes: (if the actions are taken what outcomes are expected). EG-BAMM will continue engaging with the existing SCAR Biology programs, as well as with CCAMLR, SOOS and Birdlife International. For example we are playing an active role in the SOOS/SCOR Essential Ecological Variables initiative, with several core EG-BAMM members attending the recent meeting at Rutgers University, as well as the SCAR Horizon Scan.

Partners: (will this involve others both within and outside of SCAR?) The main partners on our on-going programs are CCAMLR, SOOS and Birdlife International, as well as the various national Antarctic Programs that continue to support bird and mammal research in the Southern Ocean. We also work with the Antarctic Treaties CEP.

Budget Implications: (What funds are requested or other commitments by SCAR?). We request US\$9000 for the next year of EG-BAMMs operation.

Expert Group on Birds and Marine Mammals

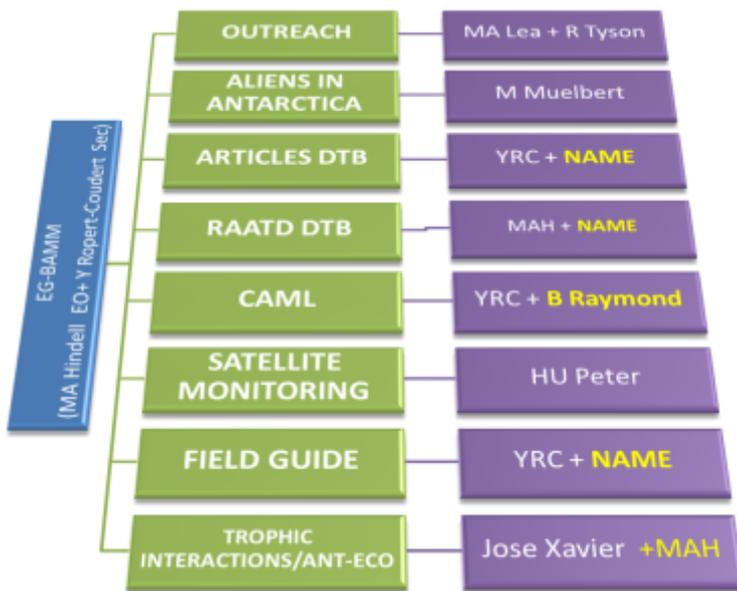
(Should be no longer than 8 pages, excluding appendices)

1. Chief Officers

Mark Hindell, Yan Ropert-Coudert (secretary)

2. Major Future Initiatives and Actions

EG-BAMM currently comprises of 8 working groups (see below). We also have are involved in the new Animal Remote Sensing action group. We are at present actively considering a new working group on population monitoring. We have had preliminary discussions on this with representatives from CCAMLR and from SOOS and this will be considered at the groups meeting in August.



3. Major Activities and Significant Progress

i) The Retrospective Analysis of Antarctic Tracking Data is a cornerstone project of EG-BAMM. The Retrospective Analysis of Antarctic Tracking data (RAATD) is a joint SCAR/CCAMLR project coordinated by the SCAR Expert Group on Birds and Marine Mammals (EG-BAMM). The project aims to undertake a multi-predator assessment of habitat use in the entire the Southern Ocean. Identifying the basic habitat requirements of Antarctic predators is fundamental to understanding how they will respond to the human-induced challenges of commercial fisheries and climate change. This understanding can only be achieved if the underlying linkages to physical processes are related to animal movements. Briefly, this study will develop global and regional habitat usage maps for key species based on physical and biological attributes of their "hot-spots" and then overlay all the species-specific maps to identify multi-species areas of ecological significance. This is a new approach that, by virtue of identifying regions that are important to multiple species, will provide a much better understanding of the regions and processes that require monitoring and management in the future.

The resulting habitat usage maps and identified Areas of Ecological Significance will be used by CCAMLR in its spatial conservation planning and by other policy organizations such as the Antarctic Treaty's Committee on Environmental Protection. EG-BAMM, through its Outreach sub-committee interacting with APECS, will disseminate the outputs of the RAATD project, for example via its "webinars" (online seminars with schools). Also, several publications will result from this work: at least two synthetic papers in scientific journals and a SCAR/CCAMLR report, perhaps in the form of an atlas similar to that produced for the Patagonian Shelf (<http://atlas-marpatagonico.org/the-atlas.html>).

There have been three important developments in the RAATD project over the past year. The first is the collation of the existing datasets, work that has been supported by the SCAR contingency fund. We now have all available data from southern elephant seals, Weddell seals, Antarctic fur seals, Adélie penguins and emperor penguins. We are still working to get data from black-browed albatross, wandering albatross and Macaroni penguins. We anticipate completing negotiations with data holders for these species by the end of this year.

The second development has been the establishment of the Birdlife Penguin tracking database development and analysis project and joint initiative with Birdlife International, CCAMLR and SCAR, and funded by the Darwin Plus Foundation. Subsequently, a tracking workshop was convened at the 8th International Penguin Conference (IPC8), which was held in Bristol, UK, September 2 to 6, 2013. Approximately 60 penguin researchers attended the workshop and many researchers (more than 20, from 10 different countries) indicated their willingness to contribute tracking data to the international database (more than 1500 tracks of 14 different species were promised). Extensive literature review has been undertaken to compile a metadata summary of published penguin tracking data. This found more than 80 penguin tracking studies, covering almost all (16/18) species and more than 2500 individual bird tracks. This metadata summary was also completed with information collected directly from penguin researchers during the workshop held at the IPC8. At a recent informal meeting between US AMLR and BAS scientists, it was agreed to convene a penguin tracking workshop in spring 2015 (April or May). This workshop will bring together those scientists that hold penguin tracking data for the southwest Atlantic, particularly for those species that are also CEMP monitoring species. Penguin tracking data are known to be available from Hope Bay on the Antarctic Peninsula and from Livingston Island and King George Island at the South Shetland Islands (Subarea 48.1), Signy Island, Powell Island and Laurie Island at the South Orkney Islands (Subarea 48.2) and from Bird Island and mainland South Georgia (Subarea 48.3). Other scientists with expertise in habitat modelling and spatial analysis of tracking data will also be invited. The outputs of this workshop will be presented to CCAMLR at WG-EMM in 2015.

The third development was the publication of a paper in *Ecography*: "Important marine habitat off East Antarctica revealed by two decades of multi-species predator tracking" (see Appendix One). This paper is a preliminary attempt at the analysis of multi-species tracking data, based on 14 species in East Antarctica. The paper uses a statistical approach, which may be adopted in the large, global analyses that will be undertaken once all the datasets are collated. Satellite tracking of six seal and seabird species in the East Antarctic sector of the Southern Ocean has identified six major hotspots of important marine habitat. The research uses two decades of satellite tracking data collected by Australian and French Antarctic research teams. Most telemetry studies have been conducted on individual species and few have been able to consider multi-species datasets, but combining telemetry data from a diverse suite of Antarctic marine predators has allowed us to identify several marine regions and features important to these animals. These include regions accessible to breeding colonies, and winter polynyas. The preferred habitat of each species was identified by applying statistical modelling methods to the observed tracks. Each model was then used to predict the habitat preference for that species over the full region of interest. The results were consistent with previous studies that showed, for example, that both Adélie and emperor penguins prefer habitats close to their breeding colonies during the chick-rearing period. Male and female southern elephant seals, in contrast, disperse widely from their colonies after breeding and concentrate on shallow parts of the continental shelf and areas of winter polynyas. There was also a high degree of overlap in six regions, generally over the Antarctic shelf and waters immediately to its north, excluding deep, open oceanic areas. The work is important for Southern Ocean conservation planning and management activities, including the establishment of marine protected areas currently being considered by the Commission for the Conservation of Antarctic Marine Living Resources. The research could also be used to improve ecosystem modelling and to assess future changes in habitat use.

ii) EG-BAMM has played an active role in many activities in 2013/14. These include

- The Biogeographic Atlas of the Census of Antarctic Marine Life is nearing completion. All chapters, including Introduction and Conclusions are finalized and the Atlas should be printed in the coming weeks. Several presentations about the Atlas will take place at the occasion of the meeting in Auckland. Five EG-BAMM members participated to the Atlas, three as editors, two as co-authors of the Top Predator chapters.
- The SOOS/SCOR Essential Ecological Variables initiative, with several core EG-BAMM members attending the recent meeting at Rutgers University. The aim of this work is to identify ecologically important variables that can be measured as part of long-term monitoring programs in the Southern Ocean, and is a partner program to the physical sciences Essential Ocean Variables.
- EG-BAMM was also represented at the 1st SCAR Antarctic and Southern Ocean Science Horizon Scan, which was held in Queenstown, New Zealand, from 20 to 23 April 2014. EG-BAMM members participated actively to the selection of the 80 most important questions that will animate scientific research in the Antarctic in the coming 5 decades. The Scan outputs are currently serving as the basis for at least two scientific articles that are under preparation at the time of this report. The Scan received media coverage from New Zealand television and other media worldwide.
- The Antarctic Field Guide and the Antarctic top predator literature database continued to be populated by contributors from the EG-BAMM community. Yet, support in terms of manpower will be needed in order to accelerate the process of completing these two tasks.
- Two members of EG-BAMM participate to the scientific committees of AnT-ERA and AntECO.

4. Budgetary Implications

EG-BAMM meets at every SCAR Biology or Open Science, as well as occasional out of session meetings. This requires an annual budget of US\$9000 to pay for travel to the meetings for the chief officers and to assist other members to attend.

Appendix One

Abstract from Raymond et al (In press). "Important marine habitat off East Antarctica revealed by two decades of multi-species predator tracking". *Ecography*.

Satellite telemetry data are a key source of animal distribution information for marine ecosystem management and conservation activities. We used two decades of telemetry data from the East Antarctic sector of the Southern Ocean. Habitat utilization models for the spring/summer period were developed for six highly abundant, wide-ranging meso- and top-predator species: Adélie Pygoscelis adeliae and emperor Aptenodytes forsteri penguins, light-mantled albatross Phoebastria palpebrata, Antarctic fur seals Arctocephalus gazella, southern elephant seals Mirounga leonina, and Weddell seals Leptonychotes weddellii. The regional predictions from these models were combined to identify areas utilized by multiple species, and therefore likely to be of particular ecological significance. These areas were distributed across the longitudinal breadth of the East Antarctic sector, and were characterized by proximity to breeding colonies, both on the Antarctic continent and on subantarctic islands to the north, and by sea-ice dynamics, particularly locations of winter polynyas. These areas of important habitat were also congruent with many of the areas reported to be showing the strongest regional trends in sea ice seasonality. The results emphasize the importance of on-shore and sea-ice processes to Antarctic marine ecosystems. Our study provides ocean-basin-scale predictions of predator habitat utilization, an assessment of contemporary habitat use against which future changes can be assessed, and is of direct relevance to current conservation planning and spatial management efforts.