XXXIII SCAR Delegates Meeting

Auckland, New Zealand, 1-3rd September 2014

SSG-Life Sciences

Executive Summary

Title: Life Sciences

Authors: G. Hosie (CO), M. Shepanek (Deputy-CO), Y. Ropert-Coudert (Secretary), J. Xavier (Acting Secretary), B. Danis, B. Raymond, M. Hindell, K. Takahashi, J. Ayton, E.Kohlberg, S. Pillon, R. Bellerby, H-U. Peters, D. Bergstrom

Introduction/ Background: SSG-LS is primarily responsible for four Expert Groups and two Action Groups. SSG-LS shares five groups with SSG-PS. **EG-ABI** continues to build on the legacy of SCAR-MarBIN and CAML with the enhanced Antarctic Biodiversity facility biodiversity.aq. It is developing a dynamic online version of the Biogeographic Atlas of the Southern Ocean (dBASO) and Microbial Antarctic Resource System (mARS), a dedicated facility for microbial diversity data and metadata. **EG-BAMM** has been strengthening links with EG-ABI, APECS and the new **Remote Sensing AG**. BAMM and Remote Sensing will increase our capacity to monitor bird and mammal populations and species by using satellites to count animals. The new Retrospective Analysis of Antarctic Tracking database (RAATD) is a joint SCAR/CCAMLR project that will contribute significantly to conservation planning and management. **EG-CPR** continues to expand the SO-CPR Survey with South Africa, France and Brazil now involved. Korea, India, China and Peru are developing their programmes. Analysis CPR database shows significant increases in zooplankton abundance and shifts in species dominance in the eastern Antarctic Sector. The **SCAR-COMNAP JEGHBM** has enhanced tele-medicine and tele-health as a high priority, as well as applied research facilitating international collaboration and policy. The **Ocean Acidification AG** plans to release its report in June 2015 at ATCM. Reports for **ICED, ATHENA** and **ECA** are contained in the SSG-PS WP07 report.

Important Issues or Factors: A new observing system is being proposed "Antarctic Near-Shore and Terrestrial Observing System (ANTOS)". This is a cross-disciplinary project involving all three SSGs. An Action Group is proposed to development the Implementation Plan. Another Action Group is proposed on "Integrated Science for the Sub-Antarctic (ISSA)" to reinvigorate interest in the sub-Antarctic and to facilitate the development of a strategy for future research. Full proposals are attached.

Recommendations/Actions and Justification:

We request the Delegates to approve:

- The establishment to new Action Groups: ANTOS and ISSA.
- The XIIth SCAR Biology Symposium to be held in Brussels in 2017.
- SCAR sends a letter of commendation to Profs Claude De Broyer and Philippe Koubbi for their leadership on producing the Biogeographic Atlas.
- SCAR sends a letter of commendation to Dr Claude Bachelard for his decades of service to Antarctic medical practice and research.
- SCAR review timing of Business Meetings and OSC to minimum clashes with other activities.
- SCAR to review the use of new technologies for future group meetings/workshop for enhanced participation via video-conferencing.

Expected Benefits/Outcomes: ANTOS working with SOOS will provide a more complete understanding of changes occurring in the Antarctic region, not just from the ocean environment. ISSA will lead us to a better understanding of the connections between the Antarctic and adjoining areas.

Partners: ANTOS and ISSA will involve all SSGs, and work with the new SRPs, plus SOOS, CEP, CCAMLR and national programmes

Budget Implications: Budget requests for 2015 and 2016 from existing and new groups are $33,800 (2015) and $30,800 (2016).

SSG-Life Sciences

1. Chief Officers

CO: Graham Hosie (AUS); Deputy CO: March Shepanek (USA); Secretary: Yan Ropert-Coudert (FRA); Acting Secretary: Jose Xavier (POR)

2. Major Future Initiatives and Actions

ANTOS – Antarctic Near-Shore and Terrestrial Observing System

Perhaps the most important new initiative is the proposed new observing system, "Antarctic Near-Shore and Terrestrial Observing System (ANTOS)", which aims to establish an integrated and coordinated transcontinental and trans-regional environmental surveillance system to identify and track environmental variability and change at biologically relevant scales, and to use this information to inform biological, physical, and earth science studies. This will complement SOOS. Previous views and inputs were gained during various meetings including the SCAR Biology Symposium 2013 and at the Auckland SCAR Business Meeting. An Action Group is proposed to develop the Implementation for ANTOS. It will primarily sit within the SSG-LS, but is a cross-disciplinary project involving SSG-PS and SSG-GS. The group will operate for two years.

The proposed Terms of Reference of ANTOS are:

1. Develop an implementation plan. The implementation plan would review the need for ANTOS and the placement of ANTOS with the current SCAR framework of programs and the Horizon Scan.
2. Conduct a resource analysis – assets & liabilities, community review, return on investment analysis, resource needs.

The proposed Chief Officer is Craig Cary (NZ), Deputy is Vonda Cummings (NZ), Secretary is Megumu Tsujimoto (Japan).

ISSA - Integrated Science for the Sub-Antarctic

A new Action Group is proposed on Integrated Science for the Sub-Antarctic with the aim to reinvigorate interest in the sub-Antarctic and to facilitate the development of a strategy for future research in the region based on previous work, the Horizon Scan outcomes, and national priorities. The sub-Antarctic islands have an extraordinary array of biodiversity and are globally significant breeding areas for many seabird and several mammal species, which feed in both the sub-Antarctic and Antarctic regions. They hold much information regarding past changes in climate that are relevant both to past diversity and future resource availability. Many of them also face a suite of conservation challenges. Unlike the area south of 60°S, the islands are managed by individual countries, while the oceans are typically managed as a globally governed area. In consequence, science coordination is less well-developed in the region than in the Antarctic Treaty area. Moreover the significance of the islands themselves is frequently overlooked in discussions of the Antarctic region. The AG plans to operate for four years 2015 to 2018.

Terms of Reference
This group will facilitate an integrated programme of science in the sub-Antarctic, and identify key areas for new research, in line with national and international priorities, across this important SCAR area of interest. The boundaries of the sub-Antarctic will follow those set out in the SCAR Strategic Plan. The AG will be cross-cutting, but located within SSG-LS.

The proposed Co-Chief Officers are Steven Chown (AUS), Gary Wilson (NZ).

Further details and proposed membership of each AG are in the appendices.

Other major new activities

EG Antarctic Biodiversity Informatics – It is anticipated that EG-ABI will continue its role in facilitating a series of flagship initiatives, which are bringing the attention of the SCAR community to the potential uses of existing distributed data resources and infrastructures which have been built over a long period, now considered as a commons. Apart from the constant design of a conceptual framework, the Group facilitates concrete initiatives. The three main ongoing initiatives are the dynamic version of the Biogeographic Atlas of the Southern Ocean (dBASO; http://atlas.biodiversity.aq), the Microbial Antarctic Resource System (http://mars.biodiversity.aq) and the Retrospective Analysis of Antarctic Tracking Database (RAATD, See EG-BAMM report for details). In terms of upcoming actions, EG-ABI will facilitate a kick-off meeting for dBASO during the last quarter of 2014. The meeting will be devoted to the implementation of the first steps of the dBASO as described in the dBASO Scoping and Requirements document. The mARS project is approaching completion of a significant milestone – in which the first three steps of the vision plan have been achieved. mARS is now accepting data submissions, and the leadership is making efforts to encourage data submissions. The vision plan for mARS also includes final steps that are reliant on population of mARS. The ultimate goal will be to harvest data and process a complimentary components to produce data sets and a sequence database that represents circum-Antarctic microbial diversity. This will allow tackling high-level, complex questions pertaining to microbial diversity and ecology.

EG Bird and Marine Mammals - EG-BAMM currently comprises 8 working groups that are focussing on enhanced outreach, development of databases, aliens in Antarctica, continued analyses of CAML data, trophic interactions (conducted with AnT-ERA and AntEco), developing the field guide, and use of satellite monitoring. The latter involves actively working with the new Animal Remote Sensing Action Group. EG-BAMM has established a new working group to coordinate the research and the assessment about health of birds and marine mammals. There have been preliminary discussions with representatives from CCAMLR and SOOS. At the SSG-LS meeting the establishment of the new Working Group was agreed.

EG Continuous Plankton Recorder Research – after bringing South Africa, France and Brazil into the SCAR Southern Ocean CPR Survey, EG-CPR is now focussing on bringing Korea, Peru, China and India into the to fill gaps and enhance data resolution. The involvement of Korea, and Peru will enhance the plankton survey of the Pacific sector and Drake Passage and build on previous CPR data collected by Russia, USA, Chile, Brazil, Japan. The Pacific sector is poorly sampled in relation to plankton and krill. EG-CPR is also working on new "Status of the Southern Ocean Zooplankton" report aimed for delivery by SCAR XXXIV. This will build on the spatial data provided in the Biogeographic Atlas, the Southern Ocean CPR Atlas, but will focus more on temporal trends. The report will contribute to AntEco, AnT-ERA, contribute to updates of the ACCE report, and inform other agencies such as CCAMLR.

Joint SCAR-COMNAP Expert Group on Human Biology and Medicine (JEGHBM) – Tele-medicine and tele-health continues to be a priority for JEGHBM with an international position publication envisaged. As a Joint SCAR-COMNAP expert group, applied research facilitating international collaboration and policy is a key focus and was reviewed in light of the SCAR Horizon Scan. The JEGHBM responds to Human biology and medicine tasks and emerging issues from ACTM, COMNAP and SCAR.

AG Ocean Acidification - The key findings of the OA report to date will be presented at the OSC in Auckland. The delivery of the actual report will be at ATCM June 2015. Several small focused meetings are to be held in the second half of 2014 where lead authors will meet to integrate the chapter contributions. A scientific paper is being drafted as a summary of the report findings.

AG Remote Sensing – Developing guidelines for the use of unmanned aerial vehicles over penguin colonies, use of databases for storing remote sense data, and the development of new technologies including those on recently launched satellites.

Major future meetings

The XIIth SCAR Biology Symposium is proposed for 10th to 14th July 2017 in Brussels. The venue will be the Royal Academy of Sciences. The theme of the symposium will be "Antarctic Biology: it's all a matter of scale." The proposed local steering committee is: Bruno Danis and Anton van de Putte as co-chairs, with

Ann Vanreusel, Annick Wilmotte, Chantal De Ridder, Maaike Vancauwenberghe, Claude De Broyer, Philippe Dubois, Wim Vijverman, Ines Tavernier. As usual, the International Steering Committee will comprise the Chair of the local committee, SCAR Executive Director, the current and immediate past Chief Officers and Secretaries of Life Sciences, and the Chief Officers AnT-ERA, AntEco and the Life Sciences Expert Groups.

3. Major Activities and Significant Progress

Important publications, databases, workshops and meetings, education and outreach, data and information activities are mentioned in the reports from each Expert and Action Group. Three particular issues are highlighted here.

Significant Publication

One of the most significant publications is the "Biogeographic Atlas of the Southern Ocean". This has involved substantial input from all parts of the Life Sciences community in relation to contributing data, analysing and synthesising data, authoring and editing chapters, and production of the final text. Chief Editors Claude de Broyer and Philippe Koubbi, plus their editorial team, are to be commended for their leadership and drive in producing what is a seminal text on Antarctic marine biodiversity and a fitting icon of the success of CAML and SCAR-MarBin. The next stage is to enhance this work through the creation of the dynamic online version of the Atlas (dBASO). The online version will allow both updates of existing chapters and the addition of new chapters covering taxa and issues not previously covered. The book will be available from October, from Amazon.

Recommendation: SCAR sends a letter of commendation to Profs Claude De Broyer and Philippe Koubbi for their leadership on producing the Biogeographic Atlas.

XIth SCAR Biology Symposium - Barcelona

The principal Life Sciences meeting in the previous 12 months was the SCAR Biology Symposium. While the success of the symposium has previously been reported it is still worth highlight the achievements. The Symposium theme was "Life in Antarctica: Boundaries and Gradients in a Changing Environment" and associated six key themes were very apt and timely, resulting in outstanding presentations and stimulus for discussion. Overall, there were 300 participants from 27 countries, 133 oral presentations, plus six key note address, and 150 posters. The Symposium was deemed highly successful thanks to the Chair of the Local Scientific Organizing Committee. Josep Maria Gili, and Secretary Rebeca Zapata leading a very young and enthusiastic symposium team. There was in fact a notably high number of students and early career scientists, as well as an active participation by APECS.

Recommendation: The XIIth SCAR Biology Symposium will be held in Brussels in 2017.

Horizon Scan

Several scientists from the Life Sciences community participated in the Horizon Scan, including both biology and human biology-medicine, and representatives of the new SRPs. Numerous life sciences questions had been proposed and selected in the final 80 Gold Questions published in Nature and Antarctic Science. Many of these questions are cross-disciplinary.

EG-ABI

Chief Officer: Bruno Danis and Secretary: Ben Raymond

EG-ABI is building concrete products on the shoulders of community-driven information systems such as SCAR-MarBIN, ANTABIF and now biodiversity.aq, which is now its permanent name. A series of pertaining initiatives are ongoing, all aiming at offering free and open access to biodiversity information, but also at carrying out open source technical developments, and promoting international standards. Ongoing initiatives include biodiversity.aq (all biodiversity information, http://www.biodiversity.aq), the mARS project (microbial Antarctic Resource System, http://mars.biodiversity.aq), the dynamic Biogeographic Atlas of the Southern Ocean (http://atlas.biodiversity.aq), the Expert Group on Birds and Marine Mammals

database (RAATD, see above and EG-BAMM report). EG-ABI maintains strong connections to the Southern Ocean Observing System (SOOS), the Standing Committee on Antarctic Data Management, the new SCAR Research Programs or the Antarctic Environments initiative.

The most significant progress we would like to highlight in the present report is the advancement of the mARS and dBASO projects.

The dynamic Biogeographic Atlas of the Southern Ocean (dBASO)

The first version of the BASO is taking the form of a «classic» printed version, which will be presented at the upcoming SCAR Open Science Conference in Auckland, New Zealand. To take full advantage of the existing informatics tools, in particular biodiversity informatics and web tools, a dynamic approach was envisaged from the beginning of the project to follow-up on the initial, static version.

The dynamic, digital version of the BASO, available through a dedicated portal, will build its content from a blend of authoritative sources, primarily the data assembled in the framework of the static version, but also taking advantage of a dynamic approach, allowing re-generation of maps including the latest available taxonomic and biogeographic data from various sources. The dynamic BASO could also include advanced functionalities, such as the capacity to build tailor-made maps, the possibility to tweak the modellisation parameters, the inclusion of data available from different databases (e.g. Register of Antarctic Marine Species (RAMS), SCAR-MarBIN/AntaBIF, Antarctic Field Guides, GenBank), allowing the end-users to provide feedback on data or models, eventually turning the BASO into a community-driven platform entailed to publish and share maps generated using the most accurate and up-to-date information.

Hence, the dynamic version will complete and expand the hard copy version, and offer in addition – using appropriate technical solution such as web services and APIs (Application Programing Interfaces) - analysis and visualization tools as well as environmental/model datasets in appropriate formats directly useful for Geographical Information Systems (GIS) users. This approach would be particularly useful in the framework of habitat modelling and prediction of potential climate-related changes. Habitat modelling allows predicting species potential distribution according to the species relation to a set of environmental variables. The species modelling is not possible for all of the species considered in the atlas, but the identification of areas of major biodiversity change is nevertheless achievable. Two workshops identified the methodology that will be used for the Atlas. A specific workshop was organized in Brussels in March 2014 to draft the Scoping and Requirements document that will drive the development phase.

The objective of the dynamic atlas is to browse with a user friendly interface the spatial distribution of species described in the printed version. It will make link with the text written by the panel of experts. It will explore species distributions that were not mapped in the printed version (because of lack of space or because it is new data) and that are of interest for studying biogeographic patterns. The development of appendix and new tools will help understanding differences in distributions between geographic regions, ecoregions, Marine Protected Areas (MPA) or CCAMLR areas. Exploring tools will allow assessing environmental ranges that help to describe species distribution. The purpose is to create an evolving version of the atlas that will grow as new data is added. It will also offer increased functionality and tools through integration with existing and future components of biodiversity.aq.

The Microbial Antarctic Resources System (mARS)

mARS is envisioned as an information system dedicated to facilitate the discovery, access and analysis of geo-referenced, molecular microbial diversity (meta)data generated by Antarctic researchers, in an Open fashion. The scope of diversity will encompass all free-living and host-associated virus, Bacteria, Archaea, and singled-celled Eukarya.

mARS focuses on past, present and future works. It offers a community-driven platform for scientists to publish, document, analyse and share their (meta)data with the broad community for science, conservation and management purposes, in the spirit of the Antarctic Treaty.

mARS is composed of interoperable modules, iteratively building the microbial component of the biodiversity.aq infrastructure.

The mARS initiative brings innovative perspectives to Antarctic microbial biodiversity research and its applications. Once mARS reaches full operability it is envisioned that new research areas in both basic and applied areas will be significantly enabled. For example, biogeography, bioprospecting, environmental impact, species introductions, and climate change-related studies will be made possible using a data-driven approach accessible through mARS.
Also, mARS will allow the consolidation of a new community within SCAR and new perspectives for collaboration within and beyond SCAR. There is also significant potential for expanding the model for genetic work carried out on all organisms, allowing integrated studies on Antarctic biodiversity.

The last mARS workshop took place in Brussels, in May 2014, to initiate beta-testing mARS to take it to Step 3, as described in the vision document.

mARS has been nominated by Belgium for the Ebbe Nielsen prize 2014.

Other EG-ABI information are available at:
http://www.biodiversity.aq

http://mars.biodiversity.aq

http://atlas.biodiversity.aq

EG-BAMM

Chief Officer: Mark Hindell and Secretary: Yan Ropert-Coudert

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 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 CEP. 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 synthesis 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 four 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" by Ben Ramond et al. currently in press. The work focused on the spring/summer breeding period and the region from 30–150E, south of 55S. Tracks from Adélie and emperor penguins, light-mantled albatrosses, Antarctic fur seals, southern elephant seals, and Weddell seals were used to build habitat selectivity models for each species. These model results were then combined to obtain integrated estimates of habitat importance. The modelling process also identified environmental and other factors that were related to the spatial patterns in habitat importance. The work is important for Southern Ocean conservation planning and management, including the establishment of MPAs currently being considered by CCAMLR.

> Raymond B, Lea MA, Patterson T, Andrews-Goff V, Sharples R, Charrassin J-B, Cottin M, Emmerson L, Gales N, Gales R, Goldsworthy S, Harcourt R, Kato A, Kirkwood R, Lawton K, Ropert-Coudert Y, Southwell C, van den Hoff J, Wienecke B, Woehler EJ, Wotherspoon S, Hindell MA (In Press) Important marine habitat off East Antarctica revealed by two decades of multi-species predator tracking. Ecography

The fourth development is the establishment of a new working group to coordinate the research and the assessment about health of birds and marine mammals. The Working Group will coordinate efforts to determine the presence of disease and impacts on the health of birds and marine mammals, in particular those related to human activities and their impacts, as well as make assessments in case of potential risk situations. Information about the health status of birds and marine mammals in Antarctica is crucial to assess the risk of disease outbreaks and likely population crashes. There have been very few mass mortality events of birds or marine mammals reported in the Antarctic continent but the increase of human activity and ongoing environmental changes during the last years is likely to increase the risk of disease epidemics. Environmental changes are likely to increase the risk further, especially in relation to the introduction of new pathogenic organisms, outbreaks of endemic pathogens or a reduction in the ability of birds and marine mammals to adequately respond to disease due to immunosuppression associated with stress or the effects of environmental pollutants. Migratory species can contribute to the spread of pathogenic organisms in Antarctica. Therefore, baseline information about what pathogens and parasites are present in Antarctica, their prevalence and infection intensity is needed. This information is up to now scarce and fragmented (Barbosa & Palacios 2009; Kerry & Riddle 2009).

EG-CPR

Chief Officer: Kunio Takahashi, and Deputy-CO: Graham Hosie

The 2013/14 Antarctic season ended in April concluding a seven month long season with than 50 tows were completed from six vessels, RSV *Aurora Australis* (Australia), JMSDF *Shirase* and TRV *Umitaka Maru* (Japan), FV *San Aotea II* (New Zealand), MV *SA Agulhas II* (South Africa) and RV *Marion Dufresne II*

(France). Overall, we expect 4,000+ samples from the tows which will expand the database to 46,000 sample records for more than 230 zooplankton taxa gathered from 230,000 nautical miles of tows. Notably, nearly all data comes from the spring to autumn period. There is still a paucity of winter data. The group welcomes notification of any planned winter voyages that can provide the opportunity to tow CPRs.

The SO-CPR database is hosted by the Australian Antarctic Data Centre and is officially a SCAR Business Product. Development of a new more efficient database and an associated data portal for the SO-CPR data continues. The new system will make data access easier for all users, and will improve the exchange of data with other international agencies and databases/portals such as the new Global Alliance of CPR Surveys (GACS) global CPR database, SCAR's AntaBIF, CCAMLR, SOOS, and OBIS. The new database and portal were due to be commissioned at the end of 2013, but delays have occurred due to funding cut backs by the Australian government and subsequent reduction in resources within the AADC. The new target for commissioning is by end of 2014.

Data have been used in various bioregionalisation analyses, and for analyses and status reports produced by GACS. CPR data were used in a number of chapters in the Biogeographic Atlas of the Southern Ocean, including one chapter devoted solely to the analysis of CPR database to define zooplankton community biogeographic zones for each month.

In August 2013, the New Zealand National Institute of Water and Atmospheric Research (NIWA) hosted a data analysis workshop to compare CPR data from the Ross Sea region south of New Zealand with the eastern Antarctic region south and west of Australia. A detailed report from the workshop was published the NZ Ministry for Primary Industries:

> Robinson, K.V., Pinkerton, M.H., Hall, J.A., Hosie, G.W., (2014) Continuous Plankton Recorder Time Series. New Zealand Aquatic Environment and Biodiversity Report No. 128. Ministry for Primary Industries, Wellington. 74 pp. ISBN 978-0-478-43226-8

The results showed statistically significant increases in zooplankton abundance since 1991 in all zones of the East Antarctic region (Sub-Antarctic, Polar Frontal, Open Ocean, and Sea-Ice zones). There were also corresponding shifts in dominance towards larger copepod species in all zones, contrary to the hypothesis that warming of the oceans will see a shift to warm water species which are smaller. The Ross Sea region appears to behave differently and showed no similar trends. However, the Ross Sea area had substantially higher abundances of zooplankton than in the East Antarctic region and coincided with higher Chlorophyll *a* concentrations in the Ross Sea region. Following the report, the Ministry for Primary Industries provided further funding for New Zealand to continue the CPR work another five years between New Zealand and the Ross Sea. The results were also included in the Global Environment Facility (GEF) - Transboundary Water Assessment Programme (TWAP), and has been included in the second GACS Global Environment Status Report on plankton.

The SO-CPR Survey involves numerous countries with analyses conducted by experienced plankton researchers in several separated laboratories. Every opportunity is taken to run workshops on methods and taxonomy to ensure the highest level of procedures and identification standards are maintained. Information and images are also regularly exchanged electronically. In the last year a training workshop was conducted at the AAD in Hobart for the French programme. Taxonomic training sessions were conducted in Christchurch, New Zealand and at the SAHFOS laboratories in Plymouth, UK. The next workshop is due to be held in Cape Town for South African and Namibian CPR personnel, thanks to a SCAR Visiting Professor Award to Dr Graham Hosie and the support of the Departmental of Environmental Affairs (DEA) South Africa. The workshop has been delayed to early 2015 due to delays rebuilding the DEA laboratories following a fire.

EG-CPR has remained active participants in GACS. Dr Hosie is the current Chair of GACS. This has helped get South Africa, France and Brazil established in the SO-CPR Survey, and is helping getting other countries involved.

EG-CPR is due to conclude its work in 2016. Before then the group will produce a Status of the Southern Ocean Zooplankton Report on known spatial and temporal patterns and trends for delivery at SCAR 2016. This will contribute to AnT-ERA and AntEco, complement ACCE reports, and inform other agencies such as CCAMLR.

SCAR-COMNAP JEGHBM

Chair: Jeff Ayton, Deputy-Chair: Eberhard Kohlberg, Secretary: Prof. Sergio Pillon

The Joint SCAR-COMNAP Expert Group on Human Biology and Medicine (JEGHBM) was established and had its first meeting at SCAR COMNAP Portland Oregon, USA in 2012. The group is in its formative stages and continues to serve as a forum to develop best practices for safe, healthy, efficient and effective management in healthcare and in the support of scientific research in Antarctica.

The group has been the focus for strategic research advice to members and National Antarctic programs, i.e. COMNAP, ATCM referral for matters of Antarctic healthcare human biology and medicine. There is a strong interest from new and early career researchers in extreme medicine. JEGHBM is working closely with APECS.

Attempts for the JEGHBM executive and members to meet face to face have not been possible due to organizational resource challenges and limitations over this reporting period. Whilst executive meetings have been undertaken remotely there has been limited engagement with the broader JEGHBM membership from remote working methods to date.

Telemedicine and tele-health continues to be a priority for JEGHBM with an international position publication envisaged. As a Joint SCAR COMNAP group, applied research facilitating international collaboration is also a priority. Subgroups addressing specific topics of interest are being considered and developed.

A SCAR related website addressing human biology and medicine in the Antarctic has been developed and maintained.

The current EG-HB&M research strategy is aligned to SCAR research strategy to help coordinate and facilitate medical research in the Antarctic and its nature and processes was reviewed at SCAR 2014 in light of the SCAR Horizon Scan and feedback. Affiliation with other groups dealing with medicine of extreme environments was further pursued at SCAR Auckland including the Arctic, space and other agencies.

JEGHBM seeks to encourage greater representation from more members of national programmes, particularly from South America.

Dr Anne Hicks (UK) has taken on the responsibility of Secretary of JEGHBM, replacing Prof. Sergio Pillon. Dr Hicks will also be the representative to International Union of Circumpolar Health (IUCH). Dr Claude Bachelard is to be commended for his four decades of service to Antarctic medical practice and Human Biology and Medical Research.

Recommendation: SCAR sends a letter of commendation to Dr Claude Bachelard for his decades of service to Antarctic medical practice and research.

AG-Ocean Acidification (with SSG-PS)

Chief Officer: Richard Bellerby

The OA action group has developed texts (150p+ and growing) towards the Southern Ocean acidification report. The report is proceeding well but it is clear that there is still considerable detail to be developed to represent the regionality and species-specific nature of the challenges and responses. There have been no physical meetings to date but we have communicated significantly by phone, skype and email. The report is planned to be presented at the ATCM in June 2015.

Representations have been made to the Global Ocean Acidification observing network (GOA-ON) to promote Southern Ocean network identification and development. Bellerby now sits on the Executive committee.

AG-Remote Sensing

Chief Officer: Hans-Ulrich Peter

AG-Remote Sensing has been established with the full name "Development of a satellite-based, Antarctic-wide, remote sensing approach to monitor bird and animal populations" at the SCAR XXXII Meeting in Portland 2012. A working meeting of the Action group was held during the XIth SCAR Biology Symposium on 19 July 2013 in Barcelona. A meeting was held in Auckland on August 25. Important points discussed included:

- Availability of relevant databases for collecting penguin (and other seabirds and seals) abundance data, collected with remote sensing methods.
- Latest technological developments were discussed including new satellites recently launched.
- Discussion about the rules for using unmanned aerial vehicles (UAV) drones over penguin colonies. The group is actively working on a set of guidelines.

A remote sensing symposium was held within the Auckland OSC with more than 30 oral and poster presentations. The AG will continue the remote sensing work for the next two years and will hold another symposium in Malaysia 2016.

Cross-link Groups: ICED, EG-Athena, AG-ECA

For reports on cross-link groups ICED, EG-ATHENA, and AG-ECA, see the SSG-PS Report WP 07.

4. Budgetary Implications

Estimated budget requests for 2015 and 2016 from existing subsidiary groups and the new groups AG-ANTOS and AG-ISSA are $33,800 for 2015 and $30,800 for 2016. ANTOS involves all SSGs, and will receive partial funding from each SSG.

Group	**Contact**	**Purpose**	**2015**	**2016**	
EG-ABI	Bruno Danis	Meetings/workshops, database development	4000	4000	
EG-BAMM	Mark Hindell	Meetings, workshop, symposia	12000	12000	
EG-CPR	Kunio Takahashi	Travel for meetings, standardisation workshops, status report	4000	4000	
JEGHBM	Jeff Ayton	Website, communication strategy, capacity building and outreach	3300	3300	
AG Remote Sensing	Hans-Ulrich Peters	Participation of young scientists on conferences	1000	1000	PS
AG-OA	Richard Bellerby	Meetings, presenting OA report	1000	0	PS
AG-ANTOS	Craig Cary	Workshop and implementation plan development	2000	0	PS, GS
AG-ISSA	Steven Chown, Gary Wilson	Meetings	1500	1500	
SSG-LS	CO	Travel for meetings, supporting early career/student travel, contingency	5000	5000	
Total			**33800**	**30800**	

PS, GS: plus funding from SSG-PS and SSG-GS

Appendices

The full ANTOS and ISSA proposal are attached. More detailed reports from the Export and Actions Groups were tabled at the SSG-LS meetings and circulated. These are available from the publication section of SSG-LS website.

Proposal to establish an Action Group for ANTOS – Antarctic Near-shore Observing System

Background
The Antarctic terrestrial and near-shore community have been exploring the idea of a cross regional, cross-disciplinary observing system to maximize explanatory power by coordinating our long-term study efforts.

The discussions began in the SCAR Conservation Horizon scan meeting in South Africa and was followed by the McMurdo Terrestrial Observing Network (McMurdo TON) workshop supported by NSF in Portland in 2012. Three other workshops have now been completed (Barcelona, 2013, Hobart 2013, Auckland 2014). We have full endorsement from AntEco. The Auckland meeting was attended by 43 people from 10 nations. At this meeting we defined the mission statement and draft goals of ANTOS:

Mission Statement
To establish an integrated and coordinated transcontinental and trans-regional environmental surveillance system to identify and track environmental variability and change at biologically relevant scales, and to use this information to inform biological, physical, and earth science studies.

Goals
- To establish an observation network to address key scientific questions
- To stimulate the development of new observation technologies, data capture, and encourage data sharing and measurement standards, and integrate these with existing monitoring data.
- To provide opportunity for alignment of national and international programs and project, and also provide an observational platform for SCAR science activities
- To provide information to assist evidence-based conservation decisions and policy in Antarctica and the sub-Antarctic

Way Forward
We request permission to establish an Action Group to develop the idea of ANTOS fully. The Action Group would be established for two years to develop the implementation plan and progressive and prescribed way forward. The Action group would be embedded in the LSSG but would require input from the other SSGs.

Terms of Reference
1. Develop an implementation plan. The implementation plan would review the need for ANTOS and the placement of ANTOS with the current SCAR framework of programs and the Horizon Scan.
2. Conduct a resource analysis – assets & liabilities, community review, return on investment analysis, resource needs.

Proposed Structure of Chief Officers of the Action Group
- Terrestrial (primary): Craig Cary (AntEco Rep) (NZ)
- Near-Shore (deputy): Vonda Cummings (NZ)
- Secretary: Megumu Tsujimoto (Japan)
- Data management advisor: TBA
- Technical Advisor: Charlie Lee (NZ)
- General member: Dana Bergstrom (AUS)
- General member: Emmanuelle Sultan (FR)
- General member: Elie Verleyen (Belgium)
- General member: Soon Gyu Hong (Sth Korea)
- AnT-ERA Rep: Byron Adams (US)
- AntECO Rep: TBA
- PSSG Rep: TBA
- GSSG Rep: TBA

Proposed budget
$2000 per year for 2 years towards workshop and implementation plan development.

Workshop 2015
Open workshop - University of Waikato, Hamilton NZ April 2015.

Proposal for Action Group: Integrated Science for the Sub-Antarctic

Introduction

The sub-Antarctic area, defined by SCAR to include islands from c. 40°S (e.g. Gough Island) to those south of the Antarctic Polar Front (e.g. South Georgia, Heard Island), includes large portions of the southern ocean and some of the only land between 35°S and 60°S. The sub-Antarctic islands have an extraordinary array of biodiversity and are globally significant breeding areas for many seabird and several mammal species. Given their situation among the major southern ocean fronts and directly in the path of the westerlies, the islands also hold much information regarding past changes in climate that are relevant both to past diversity and future resource availability. Many of them also face a suite of conservation challenges. Unlike the area south of 60°S, the islands are managed by individual countries, while the oceans are typically managed as a globally governed area. In consequence, science coordination is less well-developed in the region than in the Antarctic Treaty area. Moreover the significance of the islands themselves is frequently overlooked in discussions of the Antarctic region. The recent 1st SCAR Horizon Scan is an important example, where the islands have enjoyed comparatively little attention. The aim of this Action Group is to reinvigorate interest in the sub-Antarctic and to facilitate the development of a strategy for future research in the region based on previous work, the horizon scan outcomes, and national priorities.

Terms of Reference

This group will facilitate an integrated programme of science in the sub-Antarctic, and identify key areas for new research, in line with national and international priorities, across this important SCAR area of interest. The boundaries of the sub-Antarctic will follow those set out in the SCAR Strategic Plan. The AG will be cross-cutting, but located within SSG-LS.

Objectives

- Provide a comprehensive, interdisciplinary overview of past and current sub-Antarctic science.
- Identify pressing questions for current and future work based on this review, the questions from the 1st SCAR Horizon Scan, and on national science priorities and strengths.
- Identify key lessons for science, conservation and policy across the sub-Antarctic.
- Develop a network of scientists interested and working in the region across all SCAR disciplines.
- Facilitate exchanges of early career scientists with an interest in the region.

Steering Committee

Steven Chown (Australia, Co-Chair)
Gary Wilson (New Zealand, Co-Chair)
Bettine Jansen van Vuuren (South Africa)
Peter Convey (United Kingdom)
TBC (Chile)
TBC (France)
TBC (Norway)
Dana Bergstrom (for ANTOS)
Aleks Terauds (for SC-ATS)
TBC (for SOOS)

Duration

2015-2018

Activities

Scoping meeting 2015
Synthesis meeting 2016
Strategy development meeting 2017
Plan delivery 2018

Budget request (2015-2016)

US$1500 p.a. (further funds will be solicited from NAPs and others)