

International Council of Scientific Unions

SCAR **report**

**No 12
October 1996**

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**SCAR Group of Specialists on Environmental Affairs and Conservation
(GOSEAC)**

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**Published by the
SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH
at the
Scott Polar Research Institute, Cambridge, United Kingdom**

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SCAR GROUP OF SPECIALISTS

ON

ENVIRONMENTAL AFFAIRS AND CONSERVATION

Report of the fifth meeting, GOSEAC V, held at the Università, Gorizia, Italy, 21-24 April 1993.

Group members attending this Fifth meeting were: D W H Walton (Convenor), J M Acero, P J Barrett, K Birkenmajer, E Fanta, M Manzoni, H Miller, M Oehme, J C A Sayers, P Trehen and J Valencia. R M Laws (President of SCAR), P R Dingwall (IUCN), B Marks (The Antarctica Project), M De Poorter (ASOC), and J Dalziell (Greenpeace) attended as Observers. P D Clarkson (Executive Secretary, SCAR) acted as Secretary to GOSEAC.

1. Opening Business

The Convenor welcomed the Members and Observers to the meeting and noted that the membership of GOSEAC had been substantially revised by the SCAR Executive at XXII SCAR in San Carlos de Bariloche during June 1992. He particularly welcomed Dr R M Laws, President of SCAR, to the meeting.

The Convenor thanked Dr Manzoni for the meeting arrangements and asked that the Group's appreciation be conveyed to the Università administration for the invitation to meet in such delightful surroundings.

1.1 Adoption of agenda and work plans

The Agenda (Appendix 1) and the proposed work plans were adopted.

1.2 Appointment of Rapporteurs

The following were appointed Rapporteurs: J C A Sayers (Agenda items 1-5); J Dalziell (Agenda item 6); J Valencia (Agenda items 7.1 and 7.2); H Miller (Agenda items 7.3-7.5); P J Barrett (Agenda items 8.1-8.5); P D Clarkson (Agenda items 8.6-12);

2. Terms of Reference and Operation of GOSEAC

2.1 Terms of Reference

The Terms of Reference for GOSEAC were discussed by the SCAR Executive at XXII SCAR. The new Convenor prepared a paper considering the Terms of Reference and operation of the Group, which was discussed by the SCAR Executive at its meeting in Stockholm, Sweden, immediately prior to this GOSEAC meeting. Minor amendments were made and the Terms of Reference were approved as follows:

1. To advise SCAR on scientific and related matters concerning environmental affairs and conservation in the SCAR area of interest, in particular;

- identification of environmental criteria relating to research activities and associated logistic support, as well as to relevant commercial activities, and to the selection of sites for all types of stations;
- environmental aspects of waste disposal;
- protected areas in the Antarctic;
- additional protective measures.

2. Through SCAR Executive to maintain links with international organizations.

3. To keep the relevant SCAR and COMNAP subsidiary groups informed.

The Convenor noted that only one of the GOSEAC Recommendations tabled at XXII SCAR had been adopted by Delegates. The President explained that some of the Recommendations had been too general and others had political connotations. He stressed that it was important that Recommendations to SCAR should be precise and specific.

The Convenor stated that it was not the role of GOSEAC to pre-empt or anticipate political decisions but to provide quality scientific advice to ensure that relevant political decisions were soundly based.

2.2 Operation of GOSEAC

The President briefed the meeting on the SCAR Rules of Procedure applicable to the operation of Groups of Specialists as follows:

- Groups of Specialists are not permanent groups but exist only as long as is necessary to address the particular problems for which they are created.

He continued to report on the discussion on the membership of Groups of Specialists by the SCAR Executive at its recent meeting. The following proposals by the Executive will be circulated to National Committees for approval:

- The status of Full Members remains unchanged. They are appointed by SCAR and funded by SCAR to attend meetings of the Group.
- Associate Members will be proposed by the Group of Specialists to augment the expertise of the Group. They will be funded from other sources, typically a national organization, but not by SCAR. They may be funded by the Group of Specialists from any income which the Group may derive from sources outside SCAR.
- Corresponding Members will be proposed by National Committees but they will not have the right to attend meetings except by the invitation of the Convenor of the Group. Corresponding Members may not be proposed by a National Committee when there is already a Full or Associate Member of the Group from that country. Corresponding Members attending meetings by invitation shall have the status of Observers at the meeting.
- Observers may be invited by the Convenor, in consultation with the SCAR Executive, to attend meetings or an invitation may be requested by the local organization hosting the meeting, typically for younger scientists who would benefit by attending the meeting. SCAR is not responsible for funding Observers. Active participation in the meeting by

Observers is at the discretion of the Convenor in consultation with the Full Members of the Group of Specialists.

The Convenor advised the meeting that the operation of GOSEAC meetings will generally follow the established practice of previous meetings, that all present (Full and Associate Members, and Observers) will be able to contribute to discussions.

It was noted that the intention to hold annual Antarctic Treaty meetings will challenge GOSEAC to provide timely advice. In this respect, the timing of GOSEAC meetings will be critical and there will be increasing pressure to progress matters inter-sessionally. It is intended to use electronic mail to facilitate communication between members and hopefully to accelerate the production of discussion and other papers for meetings.

3. Report of the previous meeting, GOSEAC IV

The report of the previous meeting, GOSEAC IV, had been circulated to members. There were no comments or questions on the report.

4. Matters arising

The Convenor advised that matters arising from GOSEAC IV have been incorporated into the agenda of this meeting.

With reference to the Bonner and Lewis Smith monograph on Protected Areas, the Convenor noted that the project is now in abeyance because of the new requirements for protected areas under Annex V of the Protocol on Environmental Protection to the Antarctic Treaty. Unfortunately much of the work on this project now needs to be substantially revised.

5. Meeting reports

5.1 XXII SCAR, Bariloche

The Convenor stated that XXII SCAR was a highly successful meeting and that the Argentine authorities were to be congratulated for their efforts in successfully organizing such a complex series of inter-related meetings and activities.

H Miller advised that the Working Group on Glaciology had discussed a GOSEAC request to identify large areas of the polar ice sheet as pristine glaciological ASPAs. The Working Group had requested that information on previous oversnow traverses and field activities need to be provided by COMNAP before the work could be undertaken. It was agreed that the Working Group on Glaciology and on Geodesy and Geographic Information and GOSEAC should liaise to determine the appropriate action.

5.2 First Meeting of Experts on Environmental Monitoring

The Antarctic Treaty First Meeting of Experts on Environmental Monitoring was held in Buenos Aires, Argentina, during June 1992 immediately prior to XXII SCAR. SCAR and COMNAP had jointly produced a substantive document for the meeting which detailed an approach to the problems of long-term environmental monitoring. There were only two major discussion papers tabled at the meeting, namely the SCAR-COMNAP discussion document and a paper from the US delegation.

It was pleasing to note that a major part of the final report on the meeting contained substantial sections of the SCAR-COMNAP document and its proposals. The Recommendations included the need for a data management system, the importance of co-ordination for all environmental monitoring, requests that SCAR provide advice on emission standards, marine pollution and long-term monitoring programmes, and a requirement for a second meeting of experts to advise on the technical aspects of monitoring. Concern had been expressed at the Meeting of Experts regarding the high level of resources and associated costs which may be absorbed in implementing environmental monitoring programmes.

5.3 XVII ATCM

The Convenor reported that at the request of the President he had represented SCAR at the meeting. Several matters were discussed which were of interest to GOSEAC:

- Terms of Reference for CEP
- Inspections under the Treaty
- Environmental monitoring
- Environmental management
- Protected Area System
- Tourism

Whereas a Committee on Environmental Protection (CEP) is to be established by the Parties in accordance with the Protocol, it may be a considerable time before the CEP is functioning. Until the CEP is established, GOSEAC, through SCAR, is likely to remain the principal source of scientific advice on environmental matters. The Convenor considered that GOSEAC should become more pro-active in this respect.

SCAR was requested to provide advice on a number of complex matters associated with several of these subject areas.

The importance of the Treaty Parties resolving the liability issue was discussed by the Group. J Valencia advised that Chile has an emergency response plan and support services in place to react to environmental threats and other emergencies in the Antarctic Peninsula region.

The Convenor reported that the US authorities had contracted Dr J A Heap, Director of the Scott Polar Research Institute, Cambridge, to provide a comprehensive listing of Antarctic Treaty Recommendations and to revise the Antarctic Treaty Handbook.

The Treaty Parties had requested that SCAR and COMNAP jointly develop an inspection check-list for the inspection of station facilities in accordance with the Treaty requirements and the Protocol on Environmental Protection. This task will be coordinated by the Convenor of GOSEAC and the Chairman of SCALOP and will be discussed in more detail under agenda item 7.2.

XVII ATCM also requested SCAR and COMNAP to convene a workshop on Antarctic data management. Plans are already in place to hold a workshop in the USA which will be jointly chaired by A Clarke (Australia) for SCAR and by M Thorley (UK) for COMNAP.

The following two draft EIAs were presented to the ATCM for comment.

- CEE Antarctic Stratigraphic Drilling east of Cape Roberts in the south-west Ross Sea (NZ)

- CEE Study of the environmental impact of the construction and operation of a scientific base at Dome C (France).

In addition the following documents were circulated for information:

- IEE Construction and operation of a new scientific laboratory at Jubany Station, King George Island, (Argentina and Germany)
- IEE Salvage operation of the remaining oil aboard *Bahia Paraiso* (Netherlands and Argentina)
- EIA and management plan of the Finnish and Swedish Antarctic Stations (Finland)

Also, ASOC submitted the Greenpeace 1991-92 Antarctic Expedition report which contained information on the removal of World Park Base.

The XVII ATCM agreed to consider at XVIII on Environmental Monitoring ATCM in Japan, probably during April 1994, the need for a second Meeting of Experts. The First Meeting had proposed that a second meeting should be held to consider such questions as available technologies, monitoring methods and protocols, standardization of data collection methods, quality assurance, and data analysis and interpretation. The Convenor suggested that GOSEAC should consider drafting a paper for this meeting which could detail the issues to be addressed and the expertise that would be needed. It was agreed that the Group would discuss this proposal further under agenda item 7.1 on environmental monitoring.

The Treaty Parties discussed the Antarctic Protected Area System and approved management plans for SPA nos 1-3 and 20 in the ASPA format required by Annex V of the Protocol. The majority of the Recommendations from the joint SCAR-IUCN Workshop on the Antarctic Protected Area System, held in Cambridge, UK, during 1992, were adopted by the ATCM; this is reported in more detail in Agenda item 8.

6. Environmental Impact Assessment

6.1 Availability of Documents

A list, compiled by the Convenor, of environmental impact assessment (EIA) documents, was tabled. The Convenor commented that the incompleteness of the list illustrated the inconsistencies in the distribution and availability of such documents.

The meeting, noting that the Protocol requires circulation of Comprehensive Environmental Evaluations to all Treaty Parties, debated the question of whether Initial Environmental Evaluations (IEEs) should also be distributed more widely. To answer this question, however, it was necessary to agree on the purpose of these documents, and what could be done with them if they were circulated more widely.

It was felt that, in principle, the main reasons for circulating IEEs were to elicit opinions on whether the correct level of impact assessment had been chosen, whether the best available data had been used for the assessment, and to ensure the quality of the assessment and its conformity with the legislation. However, the meeting recognised that the number of IEEs that could be expected every year, as well as their timing with respect to the activities

they assess, would preclude the circulation of all IEEs in time for comments before the activity proceeded. In this context, concern was expressed that some operators may be doing IEEs for activities that might be more appropriately covered by a Comprehensive Environmental Evaluation (CEE), to avoid the lengthy comment periods and subsequent modifications required for the latter.

The Group recommended that SCAR urge Treaty Parties to implement Protocol Annex I, Article 6, immediately, ensuring that lists of IEEs done in the preceding year are circulated by each Treaty Party in the annual exchange of information. This would enable interested parties to request copies of particular IEEs and allow periodic assessments of the methodologies used in the evaluations to encourage improvements in the techniques used.

6.2 Scientific content of available EIAs

A discussion document on the scientific content of environmental impact assessments, which included a short critique of four CEEs prepared recently, was tabled and discussed. The Group agreed that its task should be to discuss only the scientific content of EIAs, rather than whether documents conform to the procedural requirements laid out in Annex I of the Protocol.

In general, the meeting felt that at present there are many problems with the body of EIAs done to date. For example:

- there is a general confusion about which activities should receive CEEs, IEEs, and even preliminary assessments, and over which documents qualify for each category.
- some documents are apparently not publicly available until after the activity is undertaken, or produced undated making it difficult to ascertain when the assessment was undertaken
- the scientific content could be improved (more appropriate or adequate descriptions, and realistic and testable hypotheses);

There was some discussion on the relevant merits of a single CEE for each definable activity, as opposed to composite CEEs covering several related activities. The meeting thought that it is better to include as many foreseeable related activities in one CEE as possible.

There was some discussion on the difficulty of conducting EIAs when acceptable levels of impacts have not been defined. It was also noted that the seriousness of impacts will depend on their scale in time and space, as well as the possibility of their reversibility.

In light of the identified problems, the Group agreed on two projects which might be used in the future to add to the COMNAP handbook for the preparation of EIAs.

1. In order to provide a constructive contribution to the development of the EIA process, the Group will undertake an evaluation of all IEEs produced for the 1993/94 and 1994/95 seasons. The convenor will write to COMNAP to request that it forward to him copies of IEEs for those seasons. Work will begin in June 1994 using the following criteria to provide a scientific assessment of the IEEs:

- the inclusion of a clearly stated and testable hypothesis;

- the definition of a monitoring programme, with adequate protocols, and with a time limit;
 - whether there is enough information provided to justify the decision taken;
 - whether the options have been adequately discussed and weighed.
2. In recognition that many impact assessments will be for commonly performed activities (for example, drilling), the meeting thought it might be useful to provide checklists of questions that should be addressed in any IEE/CEE about those activities. Such checklists would not be intended to be prescriptive or exhaustive. As a pilot project, the Group agreed that it would develop such checklists for:
- scientific drilling (in consultation with the chairs of the Working Groups on Geology and Glaciology);
 - overland seismic traverses; and
 - lake research.

7. Environmental monitoring

7.1 Advice to Treaty on necessary monitoring.

The Convenor referred to the ATCM recommendation XVII-1 that requests SCAR to provide advice on: "the types of long term programs, if any, necessary to verify that human activities such as tourism, scientific research or other activities) do not have significant adverse effects on birds, seals and plants", and to a document containing a discussion framework.

The elements contained in the request were first analyzed:

- a. "if any" implies that it is possible that no monitoring may be necessary.
- b. "birds, seals and plants" limits the scope to only three groups of organisms, ignoring the other important components of the ecosystem and their relatedness.
- c. "significant adverse effects" introduces uncertainty because of a lack of objective definitions of either "significant" or "adverse".

After extensive discussion of the implications of the question posed, the open ended nature of the research required, and the exclusion of other important organisms, the Group concluded that the request needed to be redefined before a scientific approach could be formulated. The question of the cost of long term programs of research was considered a strong limitation for monitoring. The opportunities for research using present facilities, was proposed as an alternative.

The Convenor mentioned the list of likely impacts in the document by Benninghoff & Bonner (1985) "Man's Impact on the Antarctic environment: a procedure for evaluating impacts from scientific and logistic activities. The Group discussed several aspects relating to the importance of long term data in determining the natural variability of Antarctic ecosystems, the difficulties associated with their interpretation, the questions of temporal and spatial scale and what kind of experimental data would be needed to elucidate the question of significant adverse impacts. A practical approach was required, utilizing other initiatives and methodologies where appropriate (eg CCAMLR CEMP programme). It was agreed that the way

forward was to utilize the SCAR document on environmental monitoring as the basis from which to develop a new paper for the ATCM which would provide guidance on the subject and suggest a clear agenda for a second Meeting of Experts.

ATCM had requested that COMNAP and SCAR propose a range of national Antarctic facilities as monitoring sites. The Group considered advice to COMNAP on how to choose an adequate subset of existing facilities to illustrate impacts, defining them by: size, location, duration and complexity of operation, geographical location around the Antarctic and importance of type of impact on different components of the ecosystem.

The Group suggested the following criteria, in priority order, for choosing stations to provide case studies on impacts:

1. Location
 - Coastal. (on rock, proximity to area of biological importance)
 - Inland (on snow/ice, distant from any biological activity)
2. Duration of operations
 - Newly established. (impact recent, reference site data likely to be available).
 - Established for >15 years. (impact long-term, reference site data unlikely to be available).
3. Extent of operation
 - Year round. (continuous impact)
 - Summer only. (episodic impact)
4. Disposal of sewage
 - No biological treatment of sewage
 - With biological treatment of sewage
5. Air strip availability
 - No air operations
 - With air operations

The Group also agreed to give due consideration to the tables 1, 2 and 3 of the SCAR/COMNAP document "Environmental Monitoring in Antarctica" (1992). Table 1 is a list of chemical compounds, Table 2 is a list of biological indices and Table 3 is a list of physical variables. All of them are pertinent to the process of selection of variables for a monitoring programme. At this stage it was thought appropriate to select an initial set of variables to provide a range of monitoring possibilities, such as the following:

- a. Emission related compounds (vapour-phase and particles)
- b. Human commensals in waste water
- c. Heavy metals and/or selected anions in waste water, soil, snow.
- d. Hydrocarbon residues.
- e. Physical impacts on soil and geomorphological features.
- f. Spatial distribution of artefacts.
- g. Eutrophication of local freshwater bodies.

7.2 Advice to Treaty on environmental inspection checklist.

The group examined the request directed to SCAR and COMNAP by the ATCM XVII on the subject of Inspections. The objective was to enhance the quality of inspec-

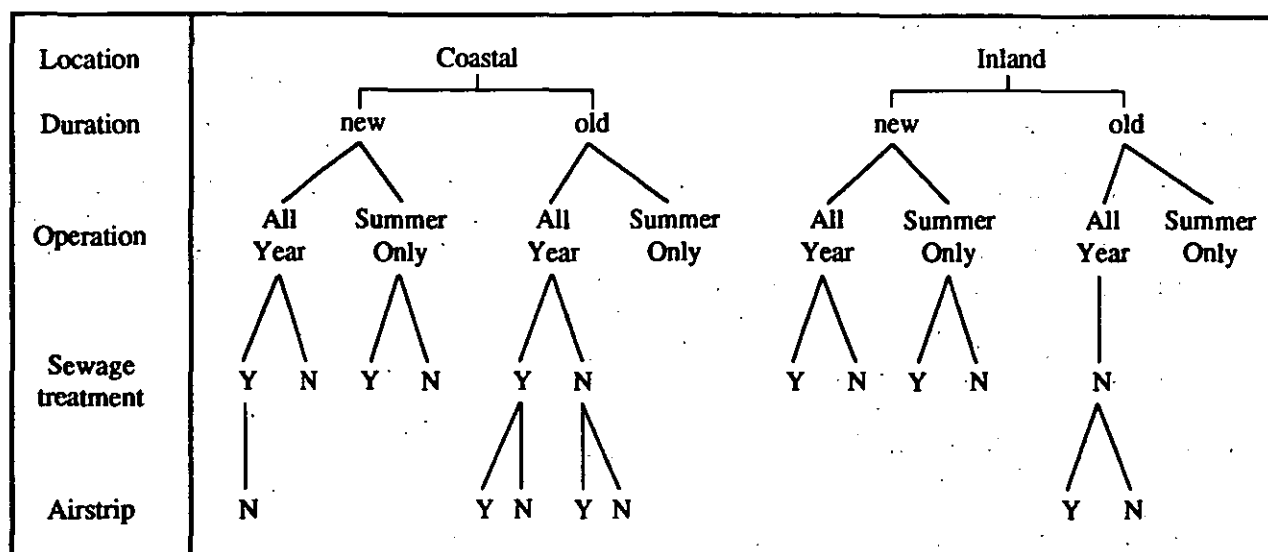


Table 1. Selection matrix. (Y = Yes; N = No)

tions, to facilitate comparisons of results and the assessment of adherence to the requirements of the Protocol on Environmental Protection by providing advice on the contents of a checklist. The documents available for discussion were: US Antarctic Inspection Checklist (1989); UK/Italy/South Korea Inspection Checklist (1993); Greenpeace Antarctic Expedition Comprehensive Base Checklist (1992-93) and Franco-German Inspection Checklist (1989-90).

The meeting was visited by Ing Pietro Giuliani the Italian member of the joint UK/Italy/South Korea inspection team. He made several suggestions and comments relevant to the improvement of the effectiveness of inspections.

The Group considered the contents of the available checklists and their congruence with the objectives relevant to environmental protection in the Antarctic. Coverage of areas of activity was uneven between checklists. Some members expressed concern about the coverage given to scientific activities and their objectives. Others laid emphasis on specific items, such as fuel handling, roads, resupply operations, external installations for communications, waste disposal, medical facilities, field huts, tourist visits and use of aircraft, which they felt were essential to a rigorous assessment.

After consideration of the merits of each checklist and selection of particular components the meeting agreed to ask the Convenor and the chairman of SCALOP to prepare a new version, to be circulated to members by mail for comments and approval.

7.3 Emissions

During the discussions only emissions from incinerators were dealt with. Emissions from vehicles and generators could not be considered without the provision of extensive data on the equipment and fuel used.

GOSEAC considers that the planned reduction of waste produced coupled with complete removal from Antarctica is the best possible solution. However, Annex III of the Protocol makes specific provision for the use of incinerators for waste disposal. The recent Treaty request for advice on emission standards and equipment guidelines is based on Annex III, Article 3(1).

A paper by M. Oehme was tabled summarizing adverse effects of incineration. From experience in Europe on the use of small incinerators it can be stated that, in order to reduce the production of harmful effluents, it is important that:

- i. the feedstock mix is right;
- ii. the burn profile i.e. the temperature of primary incineration as well as residence time of the effluent gases, is correct;
- iii. solid residues are dealt with properly, i.e. are taken out of Antarctica for disposal elsewhere.

It was felt that GOSEAC should not develop standards for maximum concentrations of emissions, but rather look towards Europe and the US for appropriate standards based on the extensive research by government monitoring agencies. However note was taken of the list in Annex III to the Protocol of the substances which may not be incinerated; strict application of this would substantially reduce the potential for harmful emissions.

To develop an adequate response to the Treaty request will require details of construction of present equipment, operating procedures, and feedstock mix. GOSEAC will ask SCALOP to undertake a survey of incinerator operations in the Antarctic to provide these details. National operators should also be asked (a) how they ensure that personnel responsible for incineration are trained and (b) determine if they understand the importance of proper burning procedures. It would be useful to have data on any sites where open burning procedures are continuing.

At present one of the major items for burning appear to be food wrappings, which some operators deal with by keeping them deep frozen and returning them for incineration outside the Treaty area. GOSEAC will continue to consider landbased incineration and, together with national operators, try to find acceptable emission limits within best available technology. This may necessitate a study of the relevant literature on ecotoxicology and a consideration of how emission and accumulation of particular compounds might affect scientific assessments of global baseline pollution.

7.4 Oil spill contingency planning

The Convenor noted that this question will be dealt with at an imminent SCALOP subgroup meeting. Draft oil spill contingency plans for all stations should be available by end of 1993.

Further general oil spill remedial procedures were discussed. In general however the data base upon which to build a balanced judgement at present seems to be rather sparse. Bioremediation seems not to be an effective method in polar regions mainly due to the prevailing low temperatures and, in any case, the provisions of Annex II to the Protocol require that non-indigenous species must not be introduced to the Treaty area. Dispersants presently in use elsewhere are not apparently effective at low temperatures as tests in Alaska have shown, and they may be harmful to the environment.

In view of the above *in situ* burning needs to be considered in the case of a major oil spill as this appears to be a possible form of mitigation. GOSEAC will consider this further on receipt of results from planned, but not yet realized, experiments in Alaska. It was reported that the UK had conducted small scale trials using a biodegradable solvent (Desolvit). Finally, GOSEAC urges COMNAP to draw up multi-operator contingency plans for major oil spill disasters, especially for areas with high concentrations of stations.

7.5 Drilling fluids and runway de-icers

- i. P J Barrett summarised for GOSEAC the present situation on the use of drilling fluids in rock drilling. As explained in the draft CEE for the CIROS drilling in McMurdo Sound closed circuit mud systems are environmentally quite harmless and even in the event of major spillage adverse effects seem negligible where the drilling fluid is biodegradable.
- ii. H Miller summarized drilling fluids used in ice core drilling to depths greater than 500 m, where borehole closure must be prevented by a fluid with low viscosity even at low temperatures and a density equivalent to that of ice. At present two fluids are in use in two deep drilling projects in Greenland. The US program uses n-butylacetate with a densifier (ANISOL) additive, and the European programme uses petrol (D60 or Jet-A1) plus a densifier (freon substitute F113). A large number (250 000) of compounds have been checked for their suitability as drilling fluids and there remain only those two alternatives. There is still debate on whether n-butylacetate is really non toxic since it does cause severe headaches and nausea after long exposure and it is an aggressive solvent for some of the materials used in drill construction. It also prohibits certain chemical analyses.
GOSEAC will ask the Working Groups on Geology and Glaciology for further information on this subject.
- iii. The Convenor reported on the future possible use of de-icers on crushed rock airstrips for safety reasons. Although up to now no incident of such usage is known, with the increased construction of gravel runways in Antarctica, GOSEAC should seek information on the toxicity of any commercial de-icers used for this purpose in other parts of the world.

8. Protected areas

8.1 Handbook for the preparation of management plans

The Convenor reported that he had not yet received a copy of the handbook from Ms S Abbott, and could therefore not say what work was required to complete it. The Group agreed on the importance of the handbook, and its timely completion. The Convenor proposed, on receipt of the material, to circulate it to members for comment. It was agreed that it should be completed by correspondence before the next meeting.

8.2 Report of SCAR/IUCN workshop on Protected Areas

The workshop was held in Cambridge, UK, from 29 June to 2 July, 1992, and produced 22 recommendations relating to the protected areas system. The recommendations were considered by the Venice ATCM and of the 17 that lay within the scope of the Working Group II 14 were accepted. This was considered a gratifying result and a measure of the success of the meeting.

It also illustrated the value of reviewing a subject area prior to its consideration by the Treaty system to ensure that the deliberations of the Treaty had, through SCAR, an appropriate firm scientific foundation.

The report of the workshop is to be published as a joint document by IUCN and distributed by both organisations, ensuring a wide availability to both the Antarctic and global conservation communities.

8.3 Revision of ecosystem classification system

The revised classification matrices for terrestrial, inland waters and marine ecosystems developed at the SCAR/IUCN workshop on Antarctic protected areas were discussed. Their purpose is to provide an agreed framework for ensuring adequate coverage of all Antarctic ecosystems by protected area designation.

It was noted that only the terrestrial matrix had been filled out for existing protected areas, and some points concerning consistency and coverage were raised. To obtain a broad review and at the same time a rapid response it was decided to circulate as soon as possible, copies with explanatory text, to chief officers of Working Groups and Groups of Specialists. Their comments would then be used in developing the draft for circulation and final comment to National Committees.

8.4 Inspection of protected areas

The Convenor introduced the topic by noting that the Treaty had requested from SCAR guidance on the inspection process for protected areas. He noted that the Treaty had previously agreed on a list of the information required, including information about the physical environment, markers and buildings, human activity in the area, comment on activity contrary to the management plan and whether the site is continuing to serve its designated purpose.

The Convenor reported that COMNAP had already proposed an inspection procedure to the Treaty that made no provision for SCAR input. He noted that the justification for most protected areas was scientific, and that SCAR

had the responsibility for advising on the scientific soundness of data gathering procedures under the aegis of the Treaty. It was also clear that as the Treaty request was addressed to SCAR it should be answered by SCAR. It was therefore appropriate that GOSEAC should advise on what in the inspections should be assessed, and how it should be assessed and reported. It was also stressed that scientific aspects of the assessment should be carried out by a scientist with the appropriate background and experience.

The Group agreed that the Convenor should task several members to examine the issue and report back. In addition he should write to COMNAP to ensure that there was a clear understanding on the division of responsibilities.

8.5 Revision of existing management plans.

8.5.1 SSSI No 2 - Arrival Heights, Ross Island

The Convenor introduced the topic by noting that a dispute over possible compromise of scientific results in this protected area had raised a broader question for GOSEAC to consider, viz. whether the needs of physical scientists for a noise-free environment for their work can be adequately met by the provisions of the protected area system which was based on the delimitation of geographical boundaries.

It was noted that the amount and variety of electromagnetic noise had increased by orders of magnitude near large stations, where it was most convenient for scientists to conduct such work. It was also noted that intensity of electromagnetic interference was not necessarily related to proximity of potential sources of noise because of the possibility of directionality and limiting frequency range. One possible option was to consider the application of a managed area approach instead of or as well as a conservation one, where the introduction of new potential sources of electromagnetic noise to an area required the negotiated agreement of existing users of the area. The Convenor undertook to bring this to the attention of the Chairman of the Working Group on Solar-Terrestrial and Astrophysical Research

8.5.2 National responsibilities for revising management plans of Antarctic protected areas.

It was recalled that all proposals for protected areas have been traditionally presented to the Treaty by the UK delegation. Now with the task of revising all current plans to conform with the management regime required by Annex V of the Protocol on Environmental Protection, the original nominating countries should take on the responsibility for revision of individual plans.

The Convenor presented a list of sites and nominating countries for discussion (Appendix 3), noting that in some cases the Treaty records did not clearly identify nominating countries. Chilean interest in taking responsibility for SSSI nos 6, 28 and 32 was noted.

It was agreed that the list of sites should be circulated to National Committees with a request that they should arrange for the revision of the management plans in accordance with Annex V of the Protocol.

It was noted that two proposals, the Dufek Massif as a Specially Reserved Area, and Southwest Anvers Island as a Multiple-use Planning Area, have been discussed by the Treaty but not legally accepted. They will have to be redrafted also and resubmitted for approval under Annex V of the Protocol.

Some concern was expressed at the process by which CEMP sites were gaining protection from CCAMLR outside the framework for the rest of the protected areas. It was agreed to suggest to CCAMLR that it would be appropriate for future CEMP site management plans to be defined as is required by Annex V for protected areas. Their formal designation as ASPAs would also bring them firmly within the Environmental Protocol.

8.5.3 Revised management plan for SSSI 15 - Cierva Point and offshore islands, Danco Coast

The revision involved an extension of the period of designation and a change in the research objectives of the site, acknowledging its biological richness.

The proposal for revision was approved for passage to SCAR subject to satisfactory drafting, and a 5 year period of extension was agreed.

8.6 New management plans for protected areas

K Birkenmajer introduced the new Polish-Brazilian draft management plan for an Antarctic Specially Managed Area (ASMA) in Admiralty Bay, King George Island, South Shetland Islands. The Convenor congratulated the Polish and Brazilian authorities who had worked together to produce the first ASMA under the Protocol. Members agreed that the substance of the management plan was well-prepared and covered virtually all the aspects required under Article 5 of Annex V of the Protocol.

The proposed boundaries of the ASMA enclose an area of approximately 370 km² and includes the Polish Arctowski Station at Point Thomas and the Brazilian Ferraz Station on Keller Peninsula. It also includes part of SSSI No 8 and HM No 51. Extracts of the most important aspects of the management plan are given at Appendix 4.

Discussion of the plan raised several points for further consideration, including a suggestion to change the duration of the plan from 10 years to indefinite, noting that there was provision for review of the plan every 5 years. It was noted that a decision on the fate of the abandoned bases on Keller Peninsula would need to be made by the Argentine and UK operators, and by the Italian operator for the remains of the private base in Italia Bay. It was also noted that several features within the area had been identified as possibly needing protection in the future. The concept of zoning, as envisaged under the former Recommendation on MPAs, might usefully be employed here. It was felt that mention should be made in the plan of the freshwater bodies within the area.

Designation of Admiralty Bay as a protected area was thought to require the agreement of CCAMLR, and the Convenor undertook to investigate this.

Conformity of the proposal with the yet to be completed handbook on protected areas was also seen as important, though the prevailing view was that the layout of the proposal, determined as it was by the language of the

Protocol, might be a useful and practical guide to the completion of the handbook.

Suggestions for the completed proposal included an executive summary, inclusion of a request (in 17.1) that any IEEs be copied to the area manager, replacement of the term "tourist", consideration for the management of fresh water bodies and for further annexes on waste management, oil spill contingencies etc. Some features on the maps also needed clarification.

The Group agreed that the plan should be endorsed by GOSEAC, subject to minor revisions, and recommended for submission to the next ATCM in Japan.

9. Tourism

9.1 Handbooks

The question addressed to the Group was "should SCAR be ensuring that accurate scientific information is provided to tourists and, if so, how should this be done?". Although there was agreement that it is important that SCAR had a responsibility to supply this when requested, it was agreed that SCAR and GOSEAC have other more urgent matters than preparing handbooks voluntarily. The tourism situation had changed radically since the idea of preparing handbooks was first considered at GOSEAC I and it was agreed that the incomplete draft originally prepared by K Birkenmajer and R Bannasch should now be abandoned.

9.2 Tourist monitoring

J Acero enlarged on a paper by Dr B Stonehouse, Scott Polar Research Institute, Cambridge, UK, describing a monitoring programme on Cuverville Island, Danco Coast, Antarctic Peninsula undertaken as part of the joint UK-Argentine-Chile tourist impact study. In general, the principle of tourist monitoring was welcomed but some concerns were expressed about some aspects of this particular programme as described in the report. Although the impact of humans on Antarctic fauna and flora and the physical environment was well-known qualitatively from experience of the past 40 years, it was recognized that the pattern of tourist usage (eg multiple short visits by large groups) required investigation to assess the effects of the size and management (or lack of management) of group visits ashore. Some of the research, particularly the evolution of the socio-economic aspects of tourism in the Antarctic, was regarded as more sociological than natural science and was therefore not a subject for SCAR. It was agreed, however, that the results of such research would be of interest to SCAR where it was demonstrated that there was an impact on the Antarctic environment (*sensu lato*) and on scientific research.

9.3 COMNAP meeting on tourism

The Convenor reported that there would be a COMNAP discussion on tourism held during the annual meeting of COMNAP in New Zealand during June 1993. It was noted that this will be a closed meeting but that Mr Sayers, Chairman of SCALOP, would report to GOSEAC VI.

10. Reports

10.1 SCAR activities

The Executive Secretary reported on the activities of three other SCAR subsidiary groups relevant to GOSEAC.

10.1.1 Group of Specialists on Southern Ocean Ecology

This Group was continuing with its planning for a programme of research on the marine ecology of the shelf and coastal sea ice zone. Much of this research, particularly the effects of increased UV-B radiation on phytoplankton production due to the depletion of ozone during the Antarctic spring, would have implications for the SCAR programme of global change research. Two regional planning groups were proposed, for the southern Indian and Atlantic oceans.

10.1.2 Group of Specialists on Global Change and the Antarctic

This Group held its first meeting (GLOCHANT I) during February 1993 and made a number of proposals for the planning stage of the proposed programme of global change research. Five planning groups are proposed to address five of the six core programmes, the sixth core programme on detection to be considered by each of the planning groups. Two coordination groups, on modelling and on data, were also proposed. The Bremerhaven workshop had proposed that a small number of Regional Research Centres (RRCs) be established in SCAR countries; the Group considered that it would be more effective, and in closer accord with the IGBP START Programme, to regard each active Antarctic station as an RRC and to invite SCAR nations to offer to host a single Regional Research Coordination Centre (RRCC). The RRCC would also be expected to house the proposed Project Coordinator.

10.1.3 SCAR-COMNAP *ad hoc* Planning Group on Antarctic Data Management

The Planning Group had met in Washington during November 1992 and the report of its meeting had been tabled as a Working Paper at XVII ATCM where it had been favourably received. The SCAR and COMNAP Executives had recently agreed that the Planning Group should continue with its efforts to establish a directory of Antarctic databases and should hold a meeting during September 1993. Further progress of the Group would be dependent on substantial funding and it was proposed that SCAR members should be invited to offer to host and fund a SCAR data centre. It was possible that such a centre could be located within the proposed RRCC for the global change programme.

10.2 CCAMLR

The Convenor reported on relevant CCAMLR activities. No new CEMP sites had been established but there were proposals for protection of Cape Shirreff, Livingston Island, South Shetland Islands and of Magnetic Island, Christensen Coast, Princess Elizabeth Land; modifications to these had been requested by Chile and Australia respectively. The CCAMLR Scientific Committee had established three new sub-groups on:

- designation and protection of monitoring sites and review of management plans;
- practical aspects of standard monitoring methods and proposals for new methods;
- statistical aspects of monitoring methods.

10.3 IUCN

P A Dingwall reported on relevant IUCN activities during the past year. These included the two SCAR-IUCN workshops on Protection, Research and Management of Sub-Antarctic Islands and on Antarctic Protected Areas held during 1992. He reminded the Group that a third SCAR-IUCN workshop, on Antarctic Environmental Education and Training, would be held in Gorizia, Italy, the following week. He reported on the Fenner Conference held in Australia during February 1993 at which it was agreed to adapt and adopt the IUCN approach to conservation in Australian Antarctic Territory, the first time that the scheme for national domestic use had been proposed for use in Antarctica. He reported that IUCN proposed to be more active in meetings of CCAMLR in the future. He commented on the very successful SCAR-IUCN collaboration during the past few years and expressed the hope that this would continue, although the degree of collaboration, which had been actively encouraged by Dr M W Holdgate during his tenure as Director-General of IUCN, might change following the retirement of Dr Holdgate in 1994.

10.4 ASOC

A written report of ASOC activities was tabled by J Dalziell who gave an oral presentation of the relevant

highlights. ASOC expressed its concern that certain Treaty recommendations had not yet been put in place, particularly the ratification of the Protocol on Environmental Protection to the Antarctic Treaty, and agreement to an Annex to the Protocol on Liability. Of even greater concern was the finding of the recent Greenpeace visits to Antarctic stations that several stations did not have copies of the Protocol and that at one station there was no knowledge of the Protocol. The report also included an account of the monitoring activity, particularly of the fuel spill, at the site of the former World Park Base on Ross Island.

11. Any other business

No other items of business had been notified to the Convenor.

12. Next meeting, GOSEAC VI

The Convenor expressed the gratitude of the Group to J Valencia for his kind offer to host GOSEAC VI in Santiago, Chile. The date of the meeting will be determined later; the date of XVIII ATCM in Kyoto, Japan is 11-22 April 1994.

The Convenor expressed his thanks and those of the Group to Marcello Manzoni for hosting the meeting, providing such excellent facilities, very helpful staff, and, of course, the wonderful hospitality of the Italian people in this region of Friuli. The meeting was formally closed at 1720 on Saturday 24 April 1993.

Appendix 1

Agenda

Opening of the Meeting

1. Adoption of Agenda and Appointment of Rapporteurs

- 1.1 *Adoption of agenda and work plans*
- 1.2 *Appointment of Rapporteurs*

2. Terms of Reference and Operation of GOSEAC

- 2.1 *Terms of Reference*
- 2.2 *Operation of GOSEAC*

3. Report of the previous meeting, GOSEAC IV

4. Matters arising

5. Meeting Reports

- 5.1 *XXII SCAR, Bariloche*
- 5.2 *First Meeting of Experts on Environmental Monitoring*
- 5.1 *XVII ATCM, Venice*

6. Environmental Impact Assessment

- 6.1 *Availability of Documents*
- 6.2 *Scientific Content of available EIAs*

7. Environmental monitoring

- 7.1 *Advice to Treaty on necessary monitoring*
- 7.2 *Advice to Treaty on environmental inspection checklist*
- 7.3 *Emissions*
- 7.4 *Oil-spill contingency planning*
- 7.5 *Drilling fluids and runway de-icers*

8. Protected areas

- 8.1 *Handbook for the preparation of management plans*
- 8.2 *Report of SCAR/IUCN workshop on Protected Areas*
- 8.3 *Revision of ecosystem classification system*
- 8.4 *Inspection of protected areas*
- 8.5 *Revision of existing management plans*
 - 8.5.1 *SSSI No 2, Arrival Heights*
 - 8.5.2 *National responsibilities for revising management plans of Antarctic protected areas*
 - 8.5.3 *Revised management plan for SSSI No 15 - Cierva Point*
- 8.6 *New management plans for protected areas*

- 9. Tourism
 - 9.1 Handbooks
 - 9.2 Tourist monitoring
 - 9.3 COMNAP meeting on tourism
- 10. Reports
 - 10.1 SCAR activities
 - 10.1.1 Group of Specialists on Southern Ocean Ecology
 - 10.1.2 Group of Specialists on Global Change and the Antarctic
 - 10.1.3 SCAR-COMNAP ad hoc Planning Group on Antarctic Data Management
 - 10.2 CCAMLR
 - 10.3 IUCN
 - 10.4 ASOC
- 11. Any other business
- 12. Next meeting, GOSEAC VI

Appendix 2

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Appendix 3

National Responsibilities for Revising Management Plans of Antarctic Protected Areas

Argentina

Sites of Special Scientific Interest

12. Potter Peninsula
- [14. Harmony Point -joint with Chile]
15. Cierva Point

Australia

Specially Protected Areas

1. Taylor Rookery
2. Rookery Islands
3. Ardery and Odbert Islands

Sites of Special Scientific Interest

16. North-eastern Bailey Peninsula
17. Clark Peninsula
25. Marine Plain, Vestfold Hills

Chile

Specially Protected Areas

16. Coppermine Peninsula

Sites of Special Scientific Interest

5. Fildes Peninsula
- [6. Byers Peninsula - joint with UK]
- [14. Harmony Point - joint with Argentina]
26. Chile Bay, Greenwich Island
27. Port Foster, Deception Island
28. South Bay, Doumer Island
- [32. Cape Shirreff - joint with USA)]
34. Ardley Island

Japan

Sites of Special Scientific Interest

22. Yukidori Valley

New Zealand

Specially Protected Areas

4. Sabrina Island
5. Beaufort Island
20. New College Valley
22. Cryptogam Ridge

Sites of Special Scientific Interest

10. Caughley Beach
11. Tramway Ridge
12. Canada Glacier
24. Summit of Mount Melbourne

Norway

Sites of Special Scientific Interest

23. Svarthamaren

Russia

Sites of Special Scientific Interest

7. Haswell Island

Poland

Sites of Special Scientific Interest

8. Western shore, Admiralty Bay
34. Lions Rump, King George Island

United Kingdom

Specially Protected Areas

8. Dion Islands
9. Green Island
13. Moe Island
14. Lynch Island
15. Southern Powell Island
18. North Coronation Island
19. Lagotellerie Island
21. Avian Island

Sites of Special Scientific Interest

- [6. Byers Peninsula - joint with Chile]
9. Rothera Point
29. Ablation Point
21. Parts of Deception Island
1. Mount Flora

USA

Specially Protected Areas

7. Cape Hallett
17. Litchfield Island
23. Forlidas Ponds

Sites of Special Scientific Interest

1. Cape Royds
2. Arrival Heights
3. Barwick Valley
4. Cape Crozier
18. North-western White Island
19. Linnaeus Terrace
20. Biscoe Point
- [32. Cape Shirreff - joint with Chile]
35. Western Bransfield Strait
36. East Dallman Bay

Draft Management Plan for an Antarctic Specially Managed Area in Admiralty Bay, King George Island, South Shetland Islands

Proposed by Brazil and Poland

The following summary has been prepared by the SCAR Secretariat.

During the past 15 years, Admiralty Bay has become an area of increasingly diverse human activities that will tend to grow in extent and complexity in the near future. Improved planning and coordination of existing and future activities will help to avoid or minimize the risk of mutual interference and environmental impact. This will provide an effective mechanism for conserving the characteristic values of the area: the glaciated mountainous landscape, rich sea bird and mammal breeding grounds, marine and freshwater ecosystems, and terrestrial plant habitats.

The area includes two permanent, year-round stations: Henryk Arctowski Station (Poland) at Point Thomas, and Commandante Ferraz Station (Brazil) on Keller Peninsula; and one summer-only station Machu Picchu (Peru) at Crépin Point. There are two refuges: one (Ecuador) at Point Hennequin is used sporadically, one (USA) at Llano Point is used during the austral summer. There is also a lighthouse at Arctowski Station operating year-round. The area includes SSSI No 8 on the west coast of Admiralty Bay and Historic Monument No 51, a grave at Arctowski Station.

Admiralty Bay is regularly visited by private yachts, commercial tour ships and scientific expeditions.

The Parties (Brazil and Poland) propose to use the management plan to regulate their own on-going and future research activities at the year-round stations, similar activities of other Parties at the summer-only refuges, and the activities of all other visitors, including tourists, entering the area. This will be done by:

- improving the level of mutual assistance and cooperation among Parties operating in the area;
- avoiding or minimizing risk of mutual interference and cumulative impacts on the environment;
- improving the understanding of natural processes at work in the area that, in turn, will help to protect the environment from unnecessary disturbance;
- protecting important physiographical features and the outstanding biological, ecological, historical and aesthetic values of the area; and
- safeguarding the progress of scientific research in the area.

The total area of the proposed ASMA is about 370 km² (see map below) comprising approximately 15% ice-free land, 50% ice-covered land and 35% sea in Admiralty Bay and Bransfield Strait. The area is intended to encompass the glacial drainage basin of Admiralty Bay.

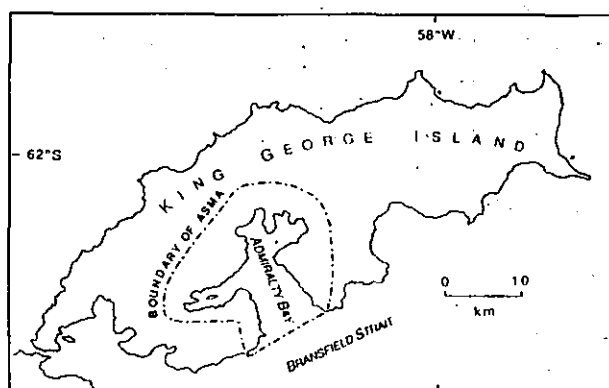


Fig. 1. Proposed ASMA in Admiralty Bay

List of Acronyms and Abbreviations

ASMA	Antarctic Specially Managed Area	GLOCHANT	Group of Specialists on Global Change and the Antarctic
ASOC	Antarctic and Southern Ocean Coalition	GOSEAC	Group of Specialists on Environmental Affairs And Conservation
ASPA	Antarctic Specially Protected Area	HM	Historic Monument
ATCM	Antarctic Treaty Consultative Meeting	IEE	Initial Environmental Evaluation
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources	IUCN	World Conservation Union
CEE	Comprehensive Environmental Evaluation	MPA	Multiple-use Planning Area
CEMP	CCAMLR Ecosystem Monitoring Programme	RRC	Regional Research Centre
CEP	Committee on Environmental Protection	RRCC	Regional Research Coordination Centre
CIROS	Cenozoic Investigations of the western Ross Sea	SCALOP	Standing Committee on Antarctic Logistics and Operations
COMNAP	Council of Managers of National Antarctic Programmes	SCAR	Scientific Committee on Antarctic Research
EIA	Environmental Impact Assessment	SSSI	Site of Special Scientific Interest
		UV-B	Ultra-Violet B radiation

SCAR GROUP OF SPECIALISTS ON ENVIRONMENTAL AFFAIRS AND CONSERVATION

Report of the sixth meeting, GOSEAC VI, held at the Instituto Antartico Chileno, Santiago, Chile, 9-14 May 1994.

Group members attending this Sixth meeting were: D W H Walton (Convenor), J M Acero, K Birkenmajer, E Fanta, M C Kennicutt II, M Manzoni, H Miller (from Tuesday afternoon), M Oehme, J C A Sayers, P Trehen and J Valencia. M De Poorter (ASOC), C Crohare (Ministry of External Relations, Chile) and P Eberhard (Chilean Antarctic Institute) attended as Observers. P D Clarkson (Executive Secretary, SCAR) acted as Secretary to GOSEAC. P J Barrett was unable to attend (Appendix 1).

Opening of the Meeting

The Convenor welcomed the Members and Observers to the meeting and thanked the Chilean Antarctic Institute for the excellent meeting arrangements and expressed pleasure at the meeting being convened in such pleasant surroundings. The Convenor invited the Director of the Chilean Antarctic Institute, Ambassador Oscar Pinochet de la Barra, to address the meeting.

Ambassador Pinochet de la Barra offered delegates a very warm welcome to Santiago and the Institute. He referred to the development of GOSEAC and noted that Chile had supported its formation from the beginning. The Ambassador also referred to the valuable work which GOSEAC is undertaking in providing expert scientific advice to the Treaty Parties on a wide range of matters. He wished the meeting well with its various deliberations.

1. Adoption of Agenda and Appointment of Rapporteurs

1.1 Adoption of agenda and work plans

The Convenor referred to a revised version of the draft Agenda (Appendix 2) which was adopted without amendment. The meeting agreed to a work plan for scheduling the business of the meeting.

1.2 Appointment of Rapporteurs

The following were appointed Rapporteurs:

J C A Sayers	(Agenda items 1-5.2)
M De Poorter	(Agenda items 5.3-5.4)
M Oehme	(Agenda items 6.1-6.3)
J Valencia	(Agenda items 7.1-7.4)
D W H Walton	(Agenda items 7.5-7.9)
and J Valencia	
P D Clarkson	(Agenda items 6.4-6.5, 8-10)

2. Membership of the Group

The Convenor advised that the membership of the Group had changed this year with the addition of Mr Mahlon C Kennicutt II of the USA. Mr Kennicutt was co-opted to GOSEAC because of his expertise in environmental monitoring which would complement that of Dr Oehme. It was

emphasized that membership of the Group was not fixed but could change from time to time to ensure that there is sufficient expertise available to examine the issues under consideration. The appointment of co-opted members is recommended by the Convenor (in consultation with the Group) and must be approved by the SCAR Executive. Co-opted members can only be accepted on the basis that their travel costs are met by the national scientific committee.

It was also pointed out that the number of observers attending the meeting had been reduced in response to the revised guidelines for membership of SCAR committees. The guidelines were outlined and discussed at GOSEAC V. The Convenor pointed out that while SCAR has always been an open organization that welcomed observers this access had to be balanced against ensuring that committees did not reach such a size that their efficiency was impaired.

3. Matters arising

The Convenor advised that a number of matters arising from GOSEAC V had been incorporated into the agenda of the meeting. He briefly summarized, in conjunction with other members, some of the actions which had been undertaken or were still outstanding.

The meeting was advised that information sought from the appropriate Working Groups on **overland traverses** had not yet been received as these were not due to meet until the SCAR meeting in Rome later this year. Information had not yet been located on the **toxicity of de-icers** although it is known to be available and would be tabled by the Convenor at GOSEAC VII.

The first draft of a paper on **environmental monitoring** was circulated to Group members in November 1994. As a result of comments received, the paper was re-drafted in consultation with COMNAP and presented as a working paper at the Kyoto XVIII ATCM. The paper was well received by the ATCM which concurred with the proposal to hold meetings of technical experts to agree, among other things, on the scientific hypotheses underlying any monitoring programme, recommend key variables which should be monitored and propose protocols for methodologies, technology, and a system for providing for quality control of data.

The Convenor confirmed that he had written to the COMNAP Chairman with the agreed selection matrix for choosing stations to provide **case studies on impacts**. COMNAP had, however, developed a simpler selection format which was being used to identify appropriate monitoring sites.

The SCALOP Chairman reported the conclusions of the COMNAP discussions on **tourism** which took place at the 1993 Christchurch meeting and a subsequent meeting of the COMNAP Sub-group on Tourism held in Santiago during March 1994.

The principal recommendations agreed by COMNAP following these two meetings were reported as follows:

- The need for operators to have a common but flexible approach regarding the processing of requests for visits to stations taking into account the 'carrying capacity' of the stations.
- To develop a standard procedure by which national programs receive and process requests to visit Antarctic stations including advance notification (4 to 6 months), notification of agreed numbers and locations of visits, and for each visit a reconfirmation 72 hours before arrival.
- To recognize the International Association of Antarctic Tour Operators (IAATO) as the principal point of contact and coordination for Antarctic tour operators and annual meeting between COMNAP and IAATO to discuss proposed station visits which are to take place during the forthcoming season.
- To offer COMNAP assistance to IAATO with the preparation of information pamphlets/brochures (in conjunction with SCAR), development of guidelines and standards for the use of guides and assistance with other operational matters.

It was noted that a proposed **Handbook on Management Plans** is still incomplete and would not now be completed by the original author. Discussions would take place later in the meeting on what action may now be necessary. It was confirmed that a paper on the ecosystem matrices has been distributed to chief officers for comment.

The Convenor referred to a decision of GOSEAC V to abandon a proposal to produce a handbook for tourists because of other SCAR work priorities. A proposal would be put to the SCAR Executive to produce a brochure for tourists (about 32 pages long) which will describe in lay language the important scientific research being undertaken in Antarctic. It was expected that GOSEAC would play some part in this. It was noted that COMNAP has also expressed an interest in producing information for tourists and therefore there was the potential for SCAR and COMNAP to jointly produce such a brochure.

4. Meeting Reports

4.1 XVIII Antarctic Treaty Consultative Meeting, Kyoto 1994

The Convenor reported that he and three other GOSEAC members were present at the XIX ATCM in Kyoto. The meeting was of particular interest because of an agreement among Parties to make important changes to the way in which future ATCM meetings will operate. These changes will be described later.

Early in the meeting the President of SCAR, Dr R M Laws, had the opportunity of presenting the SCAR Report to Treaty Parties. The report provided an overview of SCAR highlighting new initiatives including the GLOCHANT Program. Reference was made by the President to the new digital data base and the work being done by GOSEAC on behalf of the ATCM. The problems of conducting the current range of SCAR activities with

relatively limited funding was also highlighted.

The following matters were discussed at the XIX ATCM which are of particular interest to GOSEAC:

- Antarctic Inspection Checklist
- Collection of Geological Specimens
- Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica
- SCAR/COMNAP Data Management
- GLOCHANT Program
- Environmental Monitoring
- Tourism
- Liability Annex to the Environmental Protocol
- ATCM Meeting Future Format

The **Antarctic Inspection Checklist** was welcomed by the Treaty Parties. It was decided to enlarge its scope by adding items mainly concerned with complying with the Environmental Protocol. Reports on inspections carried out by Sweden and a joint team from Italy, Korea and the UK were presented and considered.

A SCAR Recommendation on the **Collection of Geological Specimens of scientific value**, prohibiting the collection of specimens except for scientific purposes and requiring that samples should be properly curated and accessible for future studies, was accepted.

The meeting had some difficulties with the proposed **Code of Conduct for the Use of Animals for Scientific Purposes in Antarctica** which is less stringent than that already in use by various Consultative Parties. However, the ATCM welcomed it as a minimum standard and governments were exhorted to apply it, consistent with their national legislations.

An interim report from the joint SCAR/COMNAP *ad hoc* group on **Data Management** was accepted by Treaty Parties with only minor amendments. It is proposed to hold a seminar on data management at XXIII SCAR in Rome.

An overview report on the Global Change Research Programme (GLOCHANT) was presented. The Treaty Parties encouraged SCAR in this work and recognized the need for extra funding to facilitate the research.

Under the topic of environmental monitoring, the ATCM was advised that GOSEAC is seeking assistance from other scientific groups within and outside of SCAR on long-term monitoring programs. The meeting was also advised that SCALOP was collecting data on all incinerators within the Antarctic Treaty area and at the same time GOSEAC was investigating current emission standards and best practice in Europe and North America.

The SCAR-COMNAP paper on **environmental monitoring** was presented as a Working Paper. The Treaty Parties supported the proposal to convene technical workshops attended by individuals with expertise and competence in relevant fields. Revised terms of reference were developed (para 87 of draft XVIII ATCM Report) which are directed towards providing a technical basis for developing the environmental monitoring necessary to verify impact assessments, assess local pollution and provide standardization of techniques and management of data.

Considerable unanimity was evident on how the issue of **tourism** should be dealt with by the ATCM. This was

assisted by the prior work of COMNAP on the operational aspects and by IAATO on environmental audits. The ATCM developed and agreed upon Codes of Conduct for tourists and tourist operators.

Work on the **Liability Annex** to the Environmental Protocol by a legal experts group is continuing and was reported upon at the ATCM. The chairman of the group indicated that there would be a need to seek scientific input to their deliberations at a later stage and this would be sought through SCAR.

It was agreed to substantially change the **format of future ATCM meetings** commencing with the XIX in Seoul in 1995. Until such time that the CEP is established, it has been agreed to set up a Transitional Environmental Working Group (TEWG) which will meet during the first week of the XIX ATCM. Representatives of SCAR, CCAMLR, COMNAP are expected to participate in TEWG to:

- provide the results of any specific work requested of them at the XVIII ATCM;
- identify ways in which they could contribute to the work of future ATCMs, and
- provide general advice within their competence.

In general discussion by the GOSEAC committee of this development, it was considered that there would be a continuing need for TEWG to have access to specialist scientific/operational advice. It was noted that TEWG/CEP would eventually take over some aspects of GOSEAC's work although this is likely to take several years.

4.2 SCAR/IUCN Workshop Reports

The Convenor advised that Mr Paul Dingwall would not attend GOSEAC meetings in future as he no longer has responsibility within IUCN for Antarctic matters.

The Convenor advised that the final version of the report on the first SCAR-IUCN workshop held at Paimpont is now almost complete and would go to IUCN shortly for publication. The second workshop held at Cambridge is also with IUCN and should be published by July 1994. The Gorizia workshop proceedings are being completed and should be sent to IUCN for publication before the end of 1994.

A SCAR/IUCN information paper summarizing the conclusions of the workshop on Environmental Education and Training for Antarctica had been circulated at the ATCM. This subject has been included on the agenda for discussion at the XIX ATCM in Seoul. The Convenor noted that the IUCN intend to hold a workshop on Human Impact in the Antarctic for which they already have funds available through sponsorship.

5. Environmental Impact Assessment

5.1 Documents issued since last meeting

The Convenor advised that a paper analysing the type and nature of EIAs was presented to the Kyoto ATCM by the United Kingdom. Copies of the paper were distributed to members of the Group for information. In preparing the paper it was difficult to find copies of all EIAs. The Treaty

Parties have requested that until such time the Treaty Secretariat was in a position to maintain a record of EIAs, SCAR should publish a list annually in the SCAR Bulletin.

The Convenor tabled a list of US Antarctic environmental assessment documents available on an NSF database. These included a considerable number of Environmental Action Memoranda (EAMs). The EAMs represent a formal preliminary assessment of particular activities and can be used to determine whether an IEE or CEE would be required. It was noted that a number of countries had similar processes in place and a list of Preliminary Assessments (PA's) and an assessment forms for the Australian and Italian Programmes were provided to the meeting. It was agreed that GOSEAC should seek details of the procedures and forms used by other countries through COMNAP. This should enable GOSEAC to determine the range of information sought at the initiation of environmental impact procedures throughout the Antarctic.

COMNAP had agreed to obtain copies of IEEs from all operators and to date had provided copies of the Australian documents. In addition the following documents were available since the last meeting:

- CEE for SANAE IV (South Africa)
- IEE for removal of Vanda Station (New Zealand)
- IEE for Radarsat at McMurdo (USA)
- IEE on Dome Fuji Station (Japan)
- IEE for medium frequency spaced antenna radar at Davis Station (Australia)
- IEE for upgraded water supply facility at Davis Station (Australia)
- IEE for summer ablation facility at Davis Station (Australia)
- IEE for new emergency power house at Mawson Station (Australia)

5.2 Scientific Assessment of Content

The Convenor provided a pro-forma called Review of Ecological Content of Antarctic Impact Assessments (Annex 2) which was designed to be used to review the scientific content of published IEEs. In response to comments on the questions contained in the pro-forma the following suggestions were made:

- It was proposed that there was a need to consider also connections of the area with the surrounding region. It was noted, however, that this particular issue could be accommodated under para 1.7 entitled 'Position/importance of the site/area within landscape/region.'
- It was proposed and agreed that an additional para 2.11 should be added entitled 'At cessation of activity will development be removed?'
- It was proposed and agreed that besides the size of the affected area, it is also important to know why that area was chosen

An intensive and constructive discussion took place on how best to proceed. It is possible that an historical review of existing data could yield worthwhile results. However, a more forward-looking approach would probably be more helpful to the Antarctic community. It was noted that the EIA process is not only a scientific process but relies on

scientific information, amongst other data, and may establish scientific research programs to evaluate impacts. It was also evident that existing IEEs and CEEs varied considerably in format, content and quality although the introduction of the COMNAP Guidelines had resulted in some standardization of format. In providing any further advice in this field it is important not to make the process so daunting or complex that it becomes unworkable.

At the conclusion of the discussion it was decided that the proposal to review the IEEs against the draft questionnaire should be abandoned but instead the questionnaire should be converted into guidelines to assist in the preparation of scientific input to IEEs. It was agreed that the guidelines would provide a useful addition to the existing COMNAP document.

5.3 Development of checklists for common activities

At GOSEAC V it was decided that it would be helpful to provide checklists of questions that should be addressed in preparing environmental impact assessment of commonly performed scientific activities. This meeting commented on two drafts of such checklists: one for near-shore biological studies prepared by E Fanta, and one on drilling prepared by H Miller. The latter contained separate lists for drilling in ice and rock/soil/sediment and seismic traverses.

It was agreed that authors would incorporate the comments received and that the checklists would then be made available to a few relevant research projects planned for the 94/95 season. Feedback from these pilot tests will be used for further discussion of this issue at the next GOSEAC Meeting.

It was noted that the amount of information provided to answer the questions on the list would depend on the type of EIA carried out (PA, IEE, CEE). It was also noted that logistics supporting the research would need to meet EIA requirements but that this was a separate issue from the one addressed here.

It was reiterated that these checklists were intended as an advisory tool only. Such checklists would only provide an *aide memoire* for impact assessments of frequently performed scientific activities.

5.4 Cumulative impacts

A summary was presented of XVIII ATCM Info 95. This identified the possibility, contained in the draft Terms of Reference, for the CEP to have direct involvement in monitoring environmental impacts by establishing a "monitoring subgroup". More specifically the draft Terms of Reference for the CEP, as agreed by the XVII ATCM, provide for it to seek the advice of experts on an *ad hoc* basis (Rule 5), while Rule 15 states that the CEP may, with the approval of the ATCM, establish "such subsidiary bodies as it deems necessary for the performance of its functions...".

GOSEAC considered CEP involvement of this nature might provide a useful contribution to addressing cumulative impacts which was already recognized as one of the most intractable areas of impact assessment.

GOSEAC also noted that a CEP-subsidary body of this type would be constituted of scientists from State Parties rather than from SCAR.

5.5 Environmental Audits

The Convenor drew the meeting's attention to three "Environmental Audit" documents that had been distributed at the XVIII ATCM (Info 13, Info 23, Info 59). One of them concerned a national Operator (audit of the impacts of the New Zealand programme), the other two concerned non-governmental tourist operators (audits of the impacts of airborne and shipborne tourism). The aim of an "environmental audit" is to assess the degree of compliance with the Protocol and/or national Antarctic legislation; it is usually carried out by a body that is independent of the operator being assessed.

The meeting took note of these documents, which constitute a valuable source of historical data and represent a new approach to monitoring compliance to the Protocol. It pointed out that "environmental audit" procedures are national internal procedures and that there is no requirement (nor guidelines) for them anywhere in the Antarctic Treaty System. The meeting felt that if and when such procedures are carried out, the resulting "Environmental Audit" report(s) are a useful source of information. GOSEAC encourages the widest distribution of such reports.

6. Environmental monitoring

6.1 SCAR/COMNAP workshop on monitoring protocols

XVIII ATCM supported the SCAR-COMNAP proposal to hold workshops concerning monitoring protocols and suggested terms of reference based on the report of the First Group of Experts on Environmental Monitoring and summarized in the draft final report of XVIII ATCM at paragraph (87).

It was concluded that the subjects addressed in this list contained too broad a range of topics to be covered within a single workshop. Furthermore, it was considered important to give priority to environmental monitoring of impacts due to local or regional activities.

To progress this it would be necessary to provide the joint SCAR-COMNAP Executive meeting with a detailed proposal. The number of experts attending the workshop should be restricted to a maximum of 20. They should be invited on the basis of the expertise needed, and a chairman with the broadest possible background would be requested. The wide overlap between the subjects to be discussed would probably make subdivision into working groups inadvisable.

The following aspects were selected to be discussed at the first workshop:

1. Priority of impacts needing monitoring:

- Station and airstrip logistic operations
- Waste water and sewage
- Incineration of waste
- Power and heat generation
- Human impact on fauna and flora
- Scientific research
- Accidental fuel spills

2. Design of monitoring programmes

Key items are hypothesis testing versus a descriptive approach as well as regulation and resource preservation.

3. Provide technical advice on:

3a. Minimum monitoring needed to meet the requirements of the Protocol in the following fields:

- Key environmental parameters of operations and activities (Article 3)
- Monitoring to assess impacts (Article 3)
- Monitoring required by IEE (Annex I, Article 2)
- Monitoring to assess and verify impacts of activities (Annex I, Article 5)
- Status of native mammals, birds, plants and invertebrates (Annex II, Article 6)
- Dispersion of sewage discharged (Annex III, Article 5)
- Waste management plans (Annex III, Article 10)
- Significant changes or damage to ASMAs, ASPAs, historic sites or monuments (Annex V, Article 10)

3b Key variables to be monitored

Appropriate key variables have to be selected according to the ecosystem to be studied.

3c Baseline information

Global information from outside the studied local/regional areas has to be collected for comparison. Typical ecosystems and station activities should be considered.

3d Design of monitoring programmes

Scaling, heterogeneity, logistical constraints and feasibility are fundamentals which have to be taken into consideration.

It is essential for the success of this workshop that a background document is prepared in advance to introduce monitoring within the context of the Antarctic Treaty for those persons who have not worked in the Antarctic.

A further technical workshop will be necessary to provide guidance on scientific protocols, measurement methods, quality assurance, applicable technology and data management. In addition, the ATCM had also requested advice on criteria for judging whether monitoring programme objectives were being met.

6.2 Implementation of monitoring at COMNAP sites

ATCM XVII requested that COMNAP select a range of stations as exemplar sites for monitoring human impact. SCAR is to provide advice on the monitoring to be undertaken. A list of the station facilities chosen would be useful information for the planned technical workshop on monitoring. The Convenor agreed to request COMNAP to provide this information in good time before the workshop.

6.3 International environmental monitoring initiatives

GOSEAC has recognized that the following activities are on-going or being planned:

- A laboratory inter-calibration programme for the determination of hydrocarbons (HC) and PAH in marine sediments and krill as part of the International HC monitoring programme. This activity is organized by Australia and the United Kingdom.
- A marine litter monitoring programme on beaches organized by CCAMLR on a continuing basis.
- The Netherlands is attempting to organize an international monitoring programme for organo-chlorines in birds.

6.4 Incinerators

J C A Sayers introduced a tabulation of the SCALOP survey of incinerators in current and recent use in the Antarctic (Appendix 3). He explained that it was not complete but represented a 60% return to the questionnaire.

M Oehme drew attention to the following critical parameters:

- incineration temperatures are mostly in the range 600-800°C that will produce persistent organic compounds in the emissions;
- incinerators are discontinuous types requiring batch stock feed and this enhances total emissions;
- start-up conditions, such as temperature, are critical in determining total emissions and should be recorded;
- some materials, such as waste oils, PVC, polystyrene and rubber, should not be incinerated in these incinerator types;
- wet scrubbers represent "best available technology" in reducing stack emissions but produce significant amounts of toxic liquid waste;
- critical emission parameters, such as CO, are monitored at very few sites, but are essential to optimize incinerator performance.

Further comments included:

- the importance of having an emission stack at least 20 m high to give improved dilution factors and to limit deposition within the station area;
- for some compounds, such as dioxins, most Antarctic incinerators would have emissions 2-3 orders of magnitude greater than the allowable European emission limits;
- the importance of employing properly trained operators;
- that current emissions from Antarctic incinerators include carcinogens which make them also a potential problem for human health.

It was noted that the incineration of PVC, polystyrene, rubber and waste oils was actually prohibited under Annex 3 of the Protocol and should cease immediately. The practical difficulties of storing and removing food wastes were recognized; maceration and flushing to the sea is a common alternative to incineration at many sites, although this does not deal with large bones or contaminated plastic wrappings. The meeting considered that flushing of macerated food into the sea should not be a recommended practice. It was felt that cost benefit analysis of dealing with many types of waste may indicate that removal would be the best option. However, this would present practical difficulties for many operators. It was suggested that operators should be encouraged to aim for achieving national standards of waste incineration as a way of improving existing practices as far as possible.

The techniques of drip-feeding waste lubricating oils into diesel fuel lines for generators or using specially designed burners for waste oils to provide heat generation were considered. However, it was thought that these heavy metal-contaminated oils would probably lead to unacceptable levels of emissions. Further investigation would need to be undertaken.

6.5 Oil-spill contingency planning

6.5.1 *In-situ* burning

J C A Sayers described four booklets prepared by SCALOP on: writing oil-spill contingency plans; oil-spill prevention and response measures at stations; ship-to-shore transfer of fuel; guidelines for reporting oil-spills; a further booklet, on oil-spill prevention and response in the field is in preparation. SCALOP is also undertaking a survey among national operators to determine the types and maximum quantities of fuel and lubricating oils being taken into the Treaty area. COMNAP has recommended that vessels should use light fuel oil for bunkers where practicable. A significant number of vessels, both tourist and national operators, are using heavy fuel oil as bunkers. Data on fuels used by tourist ships have been obtained from IAATO but there are no data available on fishing fleets. It was suggested that these could be requested through CCAMLR.

Several papers were tabled on the subject of *in-situ* burning of oil spills at sea but these were mostly concerned with heavier oils. It was also apparent that these papers contained little or no research on the products of burning, neither gaseous products nor precipitates beneath the spill. It was felt that the results of Arctic research, particularly with respect to the effects of fuel spills in ice-covered seas, should be awaited. The lighter fuel oil used by stations and by many Antarctic ships generally formed too thin a film on the sea surface to ignite easily. Despite the low temperatures, many fractions evaporated very easily so that small spills should disappear in a few days.

In-situ burning of heavier oils will probably produce undesirable toxic products and soot that will have a detrimental effect elsewhere, eg on land or ice. Bearing in mind the need for further research, *in-situ* burning of heavier oils is probably a good option as a rapid response measure to prevent the spill moving ashore where clean-up will be much more difficult and have a greater effect on marine life. However, due regard should be given to the prevailing weather and sea conditions and the proximity of structures on shore before attempting to ignite a spill.

6.5.2 State of national contingency plans

J C A Sayers reported on the present state of national contingency plans as reported to SCALOP. Cooperation with plans for multi-operator response could only be done at present, because of logistic constraints, in the McMurdo Sound area (New Zealand, United States and Italy) and in the South Shetland Islands where discussions are in progress. It was reported that a planning meeting was held in King George Island during February 1994 to discuss regional oil-spill contingency planning for the South Shetland Islands by nine nations.

The following operators have lodged contingency plans for individual stations with the COMNAP Secretariat: Argentina, Australia (3), Brazil, Chile, Germany, Korea, New Zealand, South Africa, Spain, UK (3), USA (3). These plans are available for inspection but are not routinely circulated. Most national plans are regularly up-dated and there are discussions of new developments and improvements at the annual SCALOP meeting.

7. Protected and Managed areas

7.1 *Handbook for the preparation of management plans*

The Convenor received notice from S B Abbott that she would not be able to complete the text of the Handbook. The meeting considered if it was necessary to have such Handbook bearing in mind the recent support for the principles of guidance for the preparation of Management Plans by XVIII ATCM. The meeting agreed that there will be a need for such a Handbook to assist in revising existing plans, preparing new plans and to encourage a consistent approach for all protected areas. The Meeting began the compilation of the contents of this handbook, using the revised plans submitted to the meeting as practical reference material (Appendix 4).

7.2 *Revision of Ecosystem Classification Matrix*

GOSEAC has not received any new proposals for modifications of the current matrix. It is expected that WGs at XXIII SCAR in Rome, will provide comments in due course.

7.3 *Visits to protected areas*

The Meeting drew attention to the need for all Parties to have permitting procedures in place now for protected areas. Whilst it was agreed that there was a need to ensure sites were being managed properly, the Meeting drew attention to the possibility of damage from over-visiting and suggested that those sites designated for conservation reasons should be visited only for scientific reasons and not simply for inspection purposes. It was recognized that advance information on planned visits to such sites would be desirable.

7.3.1 Reports

The meeting considered a draft form submitted by ICAIR containing twenty one items as the basis for reporting on visits to protected areas, together with a report of a visit to Linnaeus Terrace, Victoria Land using the format proposed.

The meeting made some modifications to the draft form and agreed to recommend adoption of the revised version (Appendix 5) to the ATCM. Its use by visitors will contribute to ensuring the effectiveness of the management plans and the continuing protection of sites.

The meeting recommended that permitting authorities should ensure that a visitor should be provided with the permit, the management plan and the report form as a single package when the visit is approved. The meeting further recommended that visit reports should be forwarded to TEWG and that State Parties should provide listings of these in Exchange of Information to ensure the widest dissemination of information.

7.3.2 Signs and boundary markers

The meeting considered the value of signs indicating the position of protected areas and markers indicating the boundaries. Some members recalled past experience with the use of different kinds of signs and marker posts, stressing the likelihood of removal by some visitors or damage by the weather.

Despite the cost and installation difficulties the meeting urged national authorities to consider marking those sites vulnerable to tourist visits.

An XVIII ATCM paper (Info 34) was circulated to indicate the design and contents of a new type of sign being installed by the United Kingdom at protected areas in the South Orkney Islands and the Antarctic Peninsula region.

The Convenor reported briefly on a recent field party report he had seen on the state of SSSI No 32 Cape Shirreff suggesting significant violation of the management plan. It was agreed that it was important that such reports should be forwarded officially to the ATCM.

The Convenor showed a volume of recent visit reports to protected areas in the Ross Sea region prepared by C M Harris of ICAIR. He complimented the author on the thoroughness of the material provided but doubted that many visitors would be able to produce such detailed documents.

7.4 Zoning within ASPAs and ASMAs

Annex V, Article 3.f of the Protocol provides an opportunity for describing zones within protected areas where specific activities can be undertaken. The meeting examined a paper by C M Harris presenting a series of zoning options as a management tool for Antarctic protected and managed areas and stressing the need for a standard application of zoning principles.

The scheme was considered unduly complicated and difficult to enforce. The meeting agreed that, at this stage, it was an unnecessary procedure that would delay the decisions to be made for protected areas.

7.5 Protected Areas

Before embarking on a detailed examination of the revised management plans for existing protected areas the Meeting spent some time considering the detailed interpretation of the particular sections of Annex V dealing with the contents of plans. It was felt to be especially important to ensure that the present review process focussed on four specific objectives:

- to ensure that plans provided all the information legally required,
- to ensure that the provisions in the plans were practicable,
- to ensure that the language used in the plans was direct and unambiguous, and
- to provide advice on a consistent format for all plans.

The Meeting was mindful that the management plans were for internationally protected areas and had to be usable by nationals of any Treaty Party. The Convenor reminded the Meeting that XVIII ATCM had requested that SCAR consider the presentational format of plans and advise on a format which would promote ease of use, and avoid repetition and redundancy.

During a detailed and wide-ranging discussion on the fundamentals of management of protected areas the Meeting defined several points of importance in the drafting of plans:

- a clear and precise description of the values to be protected is fundamental as the remainder of the plan hinges on this

- Annex V specifically allows for active management to meet objectives of designation
- where such management activities had possible impacts on a protected area an environmental impact assessment would be required before any such activity could be sanctioned
- mandatory requirements can and should be set in management plans for ASPAs

The question of the philosophy of active management which might for example allow direct interference with natural or induced change was discussed at some length. Particular instances were examined where it might prove necessary to limit the access of particular species to specific areas in order to provide direct protection to maintain biodiversity. This is an approach widely used in conservation management throughout the world but is not without its critics. The Meeting concluded that this approach was possible under Annex V but emphasized that its implications should always be assessed by an environmental impact assessment.

The ten revised management plans tabled were then examined in detail. It had been agreed in advance that the plans could be submitted without final maps since in many cases these were still being drafted from new air photography. It was stressed that the maps provided for the new plans would have to be significantly better than those originally provided for these protected areas since without clear and accurate maps it would be impossible for visits to the sites to conform to the management plans. A wide variety of changes were suggested. It was agreed that it would not be useful to record all those changes in the report of the meeting but that the Convenor should write to the appropriate national committees detailing the suggestions for the plans they had submitted and providing them with an exemplar plan to consider. It was agreed to use the plan for Moe Island as the example (Appendix 6).

In commenting on the format of plans the Meeting felt that for some sections the application of standard wording would promote valuable consistency of action. Some plans made excessive use of internal cross references which made them difficult to read.

7.6 Management plans for new ASPAs

The Meeting considered this proposal for a new ASPA at Archipel de Pointe Géologie in the same way as the revised management plans under 7.5. Considerable changes were suggested to bring the draft plan into the standard format.

7.7 Management plans for new ASMAs

The Convenor reported that the Admiralty Bay ASMA was being considered by CCAMLR and Brazil and Poland would receive a response later this year. There had been discussion at XVIII ATCM about the possibility of developing an ASMA for Deception Island. It seemed likely that the Managed Area plan prepared by the US for the environs of Palmer Station would be redrafted into the new format and resubmitted as an ASMA. Some initial discussions had also begun on the possibility of managed areas in Victoria Land.

7.8 SSSI No 2, Arrival Heights

The Convenor reported that a meeting between New Zealand and US scientists had been convened at BAS, under the chairmanship of J R Dudeney. Considerable progress had been made with resolving the technical problems associated with managing this site and an agreed report would be available later this year.

7.9 CEMP Sites

The Convenor reported that there had been a very positive response from CCAMLR to the request for consideration of how CEMP sites and ASPAs could be more clearly related in terms of their management plans. The Meeting noted an internal CCAMLR report which provided a first assessment of the changes necessary to make the management plans for both consonant.

8. Reports

8.1 SCAR GLOCHANT and SCAR-COMNAP Data Management Group

The SCAR Group of Specialists on Global Change and the Antarctic (GLOCHANT) held its second annual meeting (GLOCHANT II) near Grenoble, France, during February 1994. The Group heard reports by the Planning Groups that had met and had made progress by correspondence. Proposals for the membership of the last Planning Group were agreed. One of the Coordinating Groups also reported progress.

The Meeting reviewed two proposals to host a Regional Research Centre (RRC) for the SCAR global change programme and made a recommendation to the SCAR Executive for acceptance of one of these proposals. The Australian proposal was formally accepted in June 1994. The meeting also drafted a job description and an advertisement for the post of coordinator for programme to be housed in the RRC. The Meeting also drafted a description for the operation of a GLOCHANT Special Fund together with a draft 3-year budget and drafted an invitation to National Operators to contribute to the Special Fund.

Contacts with other international global change programmes were agreed and revised as necessary. In particular the Meeting welcomed the participation of Dr Neil Swanberg, Deputy Executive Director of START, who helped to guide the Group in its relationship with START. It was agreed that a close relationship with START would be beneficial to both programmes.

The XVIII ATCM received a report on the SCAR programme and encouraged SCAR to continue with this important initiative. It also requested SCAR to send copies of the SCAR book to the Secretariat of the United Nations Commission for Sustainable Development, the Secretariat of the Intergovernmental Negotiating Committee of the Framework Convention on Climate Change, and the Secretariat of the Montreal Protocol on Substances that Deplete the Ozone Layer.

The SCAR-COMNAP *ad hoc* Group on Antarctic Data Management met in Boulder, USA, during September 1993. The concept of the Antarctic Master Directory (AMD) as a metadata depository was further developed. It was agreed to use existing software and protocols that

could be readily adapted for the AMD, rather than develop new software. A letter to National Operators inviting proposals to host a SCAR-COMNAP AMD was drafted for submission to the SCAR and COMNAP Executives for approval. The Group also proposed to provide a demonstration and seminar on the operation of the AMD at XXIII SCAR for the benefit of scientists and managers.

A report of this meeting was submitted to XVIII ATCM and was favourably received. Delegates encouraged the Group to continue with its activities and suggested six guidelines, based on the Group's own recommendations, to guide the development of the AMD.

8.2 CCAMLR

The Convenor drew attention to extracts from the report of the Twelfth Meeting of the Commission. He highlighted in particular the desire to retain strong links with SCAR, the reference to consistency between management plans for CEMP sites, ASPAs and ASMAs, the draft management plan for Cape Shirreff as a CEMP site, the results of the marine debris monitoring programme, and the handling of the Admiralty Bay draft ASMA.

8.3 IUCN

The Convenor reported that IUCN would now be treating Antarctic matters through a new Antarctic Advisory Committee chaired by B Davis in Hobart, with the direct IUCN responsibilities previously held by P Dingwall being transferred to the IUCN Protected Areas Unit headed by D Shepherd at Gland, Switzerland. At the IUCN General Assembly in January 1994 Dingwall had given a summary of progress with the joint SCAR/IUCN initiatives. Discussions there had resulted in a change in IUCN priorities for the immediate future. Efforts were to be focussed on protected areas, the liability regime and CCAMLR.

8.4 ASOC

M De Poorter introduced the brief report and laid stress on the ASOC commitment to support SCAR's scientific activities, especially with respect to global change. She spoke also about the three Greenpeace reports that had been tabled, covering the technical details of construction and removal of World Park Base, the monitoring results from that site for 1991/92 and the Greenpeace Antarctic expedition report for 1992/93. The Meeting noted the considerable amount of valuable data contained in these reports. Since several national operators will need to undertake the removal of abandoned facilities it was suggested that ASOC make at least the technical report on World Park Base available to SCALOP members.

8.5 COMNAP

The report of COMNAP to the Treaty was tabled for information purposes only.

9. Any other business

There was none.

10. Time and Place of next meeting

The Convenor announced that, through the good offices of P J Barrett, GOSEAC had been invited to meet in 1995 at the International Antarctic Centre, Christchurch, New

Zealand. Since XIX ATCM was scheduled for 8-19 May 1995 in South Korea it would not be possible for the New Zealand meeting to be before June. It was agreed to ask New Zealand for agreement on the week beginning 12 June 1995.

There being no further business the Convenor thanked the Institute staff and J Valencia for all their efforts to make this a very successful meeting. He wished it to be noted that the ready assistance provided and the well-planned organization had made a very important contribution to completing a very extensive agenda on time. He closed the meeting at 1230.

Appendix 1

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Appendices

1. Address List of Members and Participants
2. GOSEAC VI Agenda
3. SCALOP 1993 Incinerator Survey: summary of responses
4. Proposed Structure of Management Plan Handbook
5. Proposed Report Form for Visits to Protected Areas
6. Example of a Management Plan for an ASPA (Moe Island)
7. List of Acronyms and Abbreviations

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Appendix 2

Agenda

Opening of the Meeting

1. Adoption of Agenda and Appointment of Rapporteurs

- 1.1 *Adoption of agenda and work plans*
- 1.2 *Appointment of Rapporteurs*

2. Membership of the Group

3. Matters arising

4. Meeting Reports

- 4.1 *XVIII Antarctic Treaty Consultative Meeting, Kyoto 1994*
- 4.2 *SCAR/IUCN Workshop Reports*

5. Environmental Impact Assessment

- 5.1 *Documents issued since last meeting*
- 5.2 *Scientific Assessment of Content*
- 5.3 *Development of checklists for common activities*
- 5.4 *Cumulative impacts*
- 5.5 *Environmental Audits*

6. Environmental monitoring

- 6.1 *SCAR/COMNAP workshop on monitoring protocols*
- 6.2 *Implementation of monitoring at COMNAP sites*
- 6.3 *International environmental monitoring initiatives*

6.4 *Incinerators*

6.5 *Oil-spill contingency planning*

- 6.5.1 *In-situ burning*
- 6.5.2 *State of national contingency plans*

7. Protected and Managed areas

- 7.1 *Handbook for the preparation of management plans*
- 7.2 *Revision of Ecosystem Classification Matrix.*
- 7.3 *Visits to protected areas*
 - 7.3.1 *Reports*
 - 7.3.2 *Signs and boundary markers*
- 7.4 *Zoning within ASPAs and ASMAs*
- 7.5 *Protected Areas*
- 7.6 *Management plans for new ASPAs*
- 7.7 *Management plans for new ASMAs*
- 7.8 *SSSI No 2, Arrival Heights*
- 7.9 *CEMP Sites*

8. Reports

- 8.1 *SCAR GLOCHANT and SCAR-COMNAP Data Management Group*
- 8.2 *CCAMLR*
- 8.3 *IUCN*
- 8.4 *ASOC*
- 8.5 *COMNAP*

9. Any other business

10. Time and Place of next meeting

SCALOP 1993 INCINERATOR SURVEY: SUMMARY OF RESPONSES

National Operator	Base	Year of Installation	Number of stages	Operating temp (°C)	Frequency of burns		Design capacity (m³)	Type of wastes burnt	Monitoring performed	Air Pollution control equip.
					summer	winter				
Australia	Mawson Casey Davis	1983 1982 1982	2	600, 900	2-3 per day	3 per week	1.5 (typical load 75-135 kg approximately)	paper, timber, food scraps, human wastes, plastics, medical and lab wastes	none	none
Argentina	Marambio	1992	1	800	3 per week	2 per week	4 (typical load 115 kg)	paper, timber, food scraps	none	none
	Esperanza	1991-92	3	600	not on photocopy		1.5 (typical load 38 kg)	paper, untreated timber, (mostly) food scraps	CO, O ₂ and other gases, automatic thermostat	Wet scrubber
	Almirante Irizar	1976	1	550	1 per day		0.3 (typical load 25 kg)	paper, timber, food scraps, plastics, lubricating oils	none	none
	Belgrano II	No incinerator								
	Matienzo	No incinerator								
	Naval Orcadas	No incinerator								
	San Martin	No incinerator								
Brazil	Commandante Ferraz	1990	4	700, 900, 1 200	1 per month	1 per week	0.04 (typical load 60 cm³ or 12-15 kg)	paper, food scraps only	temperature monitored in 3 stages	Burning 99.99% efficient, automatic grate system over ash deposit
Finland	Aboa	No incinerator								
France	Dumont d'Urville 1	1991	1	800	1 per day	not operated	8 (typical load 700 kg)	timber, paper only	none	Operated by air analyst
	Dumont d'Urville 2	1993	1	900	not operated	every 2 days	0.4 (typical load 80 kg)	timber, paper only	none	operated by air analyst
Germany	Neumayer	No incinerator								
	Georg Forster	No incinerator								
	Filchner	No incinerator								

SCALOP 1993 INCINERATOR SURVEY: SUMMARY OF RESPONSES continued

National Operator	Base	Year of Installation	Number of stages	Operating temp (°C)	Frequency of burns		Design capacity (m³)	Type of wastes burnt	Monitoring performed	Air Pollution control equip.
Italy	Terra Nova Bay	1986-87	2	650, 950	1 per week	-	1.5 (typical load 50 kg)	paper, untreated timber, food	isokinetic sampling	wet scrubber, washing tower, filter
Japan	Syowa	1990	2	80-600	1 per day	2 per week	0.5 (19 000 kg (?) total, 1992?)	paper, untreated timber, food, cloth, vinyl	none	none
Netherlands		No incinerators								
Poland	H Arctowski	1993	1	1 400	not operated	2 per week	0.25 (typical load approx 10 kg)	paper, timber, food, traces of plastic, polystyrene, rubber	none	none
Russia	Molodezhnaya	1992	1 (?)	600, 1 000	2 per week	2 per week	0.65 (typical load 50 kg)	paper, timber only	none	dry scrubber and filter
South Africa		No incinerators								
Spain	Juan Carlos I	1992	2	1 000, 800	1 per day	-	0.75 primary 0.25 secondary (typical load 15 kg)	paper, untreated timber, food, plastics	none	none
United Kingdom	Signy	No incinerator								
	Faraday	No incinerator								
	Rothera	No incinerator								
	Halley	No incinerator								
United States of America	McMurdo	Ceased incineration since March 1992								
		1992	3	650, 930,	6 per week	Ceased operation in March 1993	0.76 m³ per hour	paper, food scraps, human wastes, plastics, polystyrene	SO ₂ , NO _x , O ₂	dry line scrubber

Appendix 4

Proposed Structure of Management Plan Handbook

[Contents of Protected Areas Management Plan Book]

Introduction

[to include brief résumé of Antarctic conservation objectives and the history of protected area legislation]

Management Plans for Specially Protected Areas

Introduction

[include need for active management and better reporting; prohibitions are mandatory; conventions suggested for uniformity; value of standard for some activities]

Description of values to be protected

[key importance for whole plan]

Aims and objectives

[identification of how management will be focused]

Management activities

[key objectives needed to ensure objectives met]

Period of designation

[explain options]

Maps

[detail requirements for maps; importance of GPS for fixing positions; use of latest available coastline data; value of photographs]

Description of area

[importance of choosing a boundary which is easy to follow; need for boundary markers; accurate, brief description of topography; geology and biology to substantiate the reasons for designation; definition of

restricted or prohibited zones, including location, timing and reasons for limitation; location and description of all structures in the Area; location of, including distances to, other Protected Areas in close proximity]

Permit conditions

[who may issue permits and the conditions attached; any restrictions on access to or travel within the Area, including reasons (this should cover boats, helicopters, fixed-wing aircraft, vehicles and pedestrian access); definition of what activities can be undertaken in the Area and any limitations in time or place on these activities; rules for installing or removing any structures in the Area (including scientific equipment); location of field camps, especially with respect to access routes and any existing accommodation inside or just outside the Area; specific restrictions on materials or organisms that can be brought into the Area; limitations on storing materials in the Area; limitations on experimenting on or harvesting fauna and flora; instructions on how to deal with materials found in the Area that do not belong there; waste management, including disposal routes for particular types of waste; management activities on a continuing basis to meet objectives of the Management Plan (including monitoring); specification of reporting regime.

Review process for draft plans from origination to ATCM acceptance

Reporting format for visits

**ANTARCTIC SPECIALLY PROTECTED AREA
VISIT REPORT**

1. Protected Area name and number:	
2. Name and address of Authority issuing permit:	3. Date Report filed:
4. Name and address of Authority to whom Report is made:	5. Person completing Report:
6. Name and address of Principal Permit Holder: International telephone: + International facsimile: + E-mail address:	7. List of all persons who entered the Area under the current Permit:
8. Objectives of the visit to the Area under the current Permit:	
9. Date(s) and duration of visit(s) under the current Permit:	
10. Mode of transport to/from the Area:	
11. Activities conducted in the Area:	
12. Descriptions and locations of samples collected (type, quantity, and details of any Permits for sample collection):	
13. Descriptions and locations of markers, instrumentation or equipment installed, or any material released into the environment (noting how long these are intended to remain in the Area):	
14. Descriptions and locations of markers, instrumentation or equipment removed:	
15. Any departures from the provisions of the Management Plan during this visit, noting dates, magnitudes and locations:	

16. Measures taken during this visit to ensure compliance with the Management Plan:
17. Observations of human effects on the Area, distinguishing between those resulting from the visit and those due to previous visitors:
18. Evaluation of whether the values for which the Area was designated are being adequately protected:
19. Note any features of special significance that have not been previously recorded for the Area:
20. Recommendations on further management measures needed to protect the values of the Area, including location and appraisal of condition of structures, markers etc:
21. Summary of scientific research undertaken in the Area:
22. On an attached photocopy of the map of the Area, please show (as applicable) camp site location(s), land/sea/air movements or routes, sampling sites, installations, deliberate release of materials, any impacts, and features of special significance not previously recorded:
23. Any other comments or information:

Example of a Management Plan for an ASPA (Moe Island)

Management Plan for Antarctic Specially Protected Area (ASPA) No. ??

MOE ISLAND, SOUTH ORKNEY ISLANDS

1. Description of Values to be Protected

The Area was originally designated in Recommendation IV-13 (1966, SPA No 13) after a proposal by the United Kingdom on the grounds that Moe Island provided a representative sample of the maritime Antarctic ecosystem, that intensive experimental research on the neighbouring Signy Island might alter its ecosystem and that Moe Island should be specially protected as a control area for future comparison.

These grounds are still relevant. Whilst there is no evidence that research activities at Signy Island have significantly altered the ecosystems there, a major change has occurred in the low-altitude terrestrial system as a result of the rapidly expanding fur seal (*Arctocephalus gazella*) population. Plant communities on Signy Island have been physically disrupted by trampling by fur seals and nitrogen enrichment from the seals' excreta has resulted in replacement of bryophytes and lichens by the macro-alga *Prasiola crispa*. Low-lying lakes have been significantly affected by enriched run-off from the surrounding land. So far Moe Island has not been invaded by fur seals to any great extent and its topography makes it less likely that seals will penetrate to the more sensitive areas.

The values to be protected are those associated with the biological composition and diversity of a near-pristine example of the maritime Antarctic terrestrial and littoral marine ecosystems. In particular, Moe Island contains the greatest continuous expanses of *Chorisodontium-Polytrichum* moss turf found in the Antarctic. Moe Island has been visited on few occasions and has never been the site of occupation for periods of more than a few hours.

2. Aims and Objectives

Management of Moe Island aims to:

- avoid major changes to the structure and composition of the terrestrial vegetation, in particular the moss turf banks,
- prevent unnecessary human disturbance to the Area,
- permit research of a compelling scientific nature which cannot be served elsewhere, particularly research related to determining the differences between the ecology of an undisturbed island and that of an adjacent occupied and fur seal perturbed island,

3. Management Activities

Ensure that the biological condition of Moe Island is adequately monitored, preferably by non-invasive methods, and that the sign-boards are serviced.

If fur seals were to gain access to the interior of Moe Island it would be necessary to take action to prevent damage to the vulnerable moss banks. This action would most likely consist of the erection of a seal-proof fence at the head of the gully at the northeast of Landing Cove. Any direct management activities in the Area would be subject to an environmental impact assessment before any decision to proceed is taken.

4. Period of Designation

Designated under ATCM Recommendation ??-?? for an indefinite period.

5. Maps

Map XX shows the location of Moe Island in relation to Signy Island. Map XX shows Moe Island in greater detail.

6. Description of the Area

i Geographical coordinates, boundary markers and natural features

Moe Island, South Orkney Islands, is a small irregularly-shaped island lying 300 m off the southwestern extremity of Signy Island, from which it is separated by Fyr Channel. It is about 1.8 km from the northeast to southwest and 1 km from northwest to southeast. Its position on Admiralty Chart No 1775, latitude 60°44'S, longitude 45°45'W, agrees closely with that in Recommendation IV-13 (lat. 60°45'S, long. 45°41'W).

The island rises precipitously on the northeastern and southeastern sides to Snipe Peak (226 m altitude). There is a subsidiary summit above South Point (102 m altitude) and lower hills on each of three promontories on the western side above Corral Point (92 m), Conroy Point (89 m) and Spaul Point (56 m). Small areas of permanent ice remain on the east- and south-facing slopes with late snow lying on the steeply dipping western slopes. There are no permanent streams or pools.

The rocks are metamorphic quartz-mica schists, with occasional biotite and quartz-rich beds. There is a thin bed of undifferentiated amphibolite on the northeastern coast. Much of the island is overlain with glacial drift and scree. Soils are predominantly immature deposits of fine to coarse clays and sands intermixed with gravels, stones and boulders. They are frequently sorted by freeze-thaw action in high or exposed locations into small-scale circles, polygons, stripes and lobes. There are deep accumulations of peat (up to 2 m thick on western slopes, considerable expanses of the surface of which are bare and eroded).

The dominant plant communities are *Andreaea-Usnea* fellfield and banks of *Chorisodontium-Polytrichum* moss turf (the largest known example of this community type in the Antarctic). These moss banks constitute a major biological value and the reason for the designation of the Area. The cryptogamic flora is diverse.

The mites *Gamasellus racovitzai* and *Stereotydeus villosus* and the springtail *Cryptopygus antarcticus* are common under stones.

There were five colonies of chinstrap penguins *Pygoscelis antarctica* totalling about 11,000 pairs in 1978-79. A more recent visit (February 1994) noted fewer than 100 pairs on the northern side of Landing Cove and more than a thousand on the southern side. Numerous other birds breed on the island, notably about 2000 pairs of cape petrels *Daption capensis* in 14 colonies (1966) and large numbers of Antarctic prions *Pachyptila desolata*. Weddell seals *Leptonychotes weddellii* and leopard seals *Hydrurga leptonyx* are found in the bays on the west side of the island. Increasing numbers of fur seals *Arctocephalus gazella*, mostly juvenile males, come ashore on the north side of Landing Cove and have caused some damage to vegetation in that area. However, it is possible that the nature of the terrain will restrict these animals to this small headland where damage may intensify.

ii Restricted zones within the Area

None

iii Location of structures within the Area

A marker board is located at the back of the small shingle beach in the northeast corner of Landing Cove, beyond the splash zone on top of a flat rock, to which it is bolted. The board was erected on 2 February 1994.

There is a cairn and the remains of a survey mast, erected in 1965-66, on Spaul Point. This mast is of interest for lichenometric studies and should not be removed. There are no other structures on Moe Island.

iv Location of other Protected Areas within close proximity

SPA No 14, Lynch Island, lies about 10 km north-north-east of Moe Island. SPA No 18, North Coronation Island, lies about 19 km away on the northern side of Coronation Island. SPA No 15, Southern Powell Island, is about 41 km to the east.

7. Permit Conditions

Permits may be issued only by appropriate national authorities as designated under Annex V Article 7 of the Protocol on Environmental Protection to the Antarctic Treaty.

Conditions for issuing a Permit to enter the Area are that:

- it is issued only for a compelling scientific purpose which cannot be served elsewhere
- the actions permitted will not jeopardize the natural ecological system in the Area
- any management activities are in support of the objectives of the Management Plan

- the actions permitted are in accordance with this Management Plan
- the Permit, or an authorized copy, must be carried within the Antarctic Specially Protected Area
- a report is supplied to the authority named in the Permit.

i Access to and movement within the Area

There are no restrictions on landing from the sea which is the preferred method. No special access points are specified, but landings are usually most safely made at the northeast corner of Landing Cove.

Helicopter landings should be avoided where practicable. Helicopters may land only on the col between hill 89 m and the western slope of Snipe Peak. To avoid overflying bird colonies approach should preferably be from the south, though an approach from the north is permissible.

It is forbidden to overfly the Area below 250 m altitude above the highest point except for access to the landing point specified above.

No pedestrian routes are designated but persons on foot should at all times avoid disturbances to birds or damage to vegetation and periglacial features. Vehicles are prohibited on Moe Island.

ii Activities which are or may be conducted within the Area, including restrictions on time and place

- Compelling scientific research which cannot be undertaken elsewhere and which will not jeopardize the ecosystem of the Area
- Essential management activities, including monitoring

iii Installation, modification or removal of structures

No structures are to be erected in the Area, or scientific equipment installed, except for essential scientific or management activities, as specified in the Permit.

iv Location of field camps

Parties should not normally camp in the Area. If this is essential for reasons of safety, tents should be erected having regard to causing the least damage to vegetation or disturbance to fauna.

v Restrictions on materials and organisms which may be brought into the Area

No living animals or plant material shall be deliberately introduced into the Area.

No poultry products, including food products containing uncooked dried eggs, shall be taken into the area.

No herbicides or pesticides shall be brought into the Area. Any other chemicals, which may be introduced for a compelling scientific purpose specified in the Permit, shall be removed from the Area at or before the conclusion of the activity for which the Permit was granted.

Fuel, food and other materials are not to be depoted in the area, unless required for essential purposes connected with the activity for which the Permit has been granted. All such materials introduced are to be removed when no longer required. Permanent depots are not permitted.

vi Taking or harmful interference with native flora and fauna

This is prohibited, except in accordance with a Permit. Where animal taking or harmful interference is involved this should be in accordance with the SCAR Code of Conduct for Use of Animals for Scientific Purposes in Antarctica, as a minimum standard.

vii Collection and removal of anything not brought into the area by the Permit holder

Material may be collected or removed from the Area only in accordance with a Permit, except that debris of man-made origin may be removed from the beaches of the Area and dead or pathological specimens of fauna or flora may be removed for laboratory examination.

viii Disposal of waste

All non-human wastes shall be removed from the Area. Human waste may be deposited in the sea.

ix Measures that may be necessary to ensure that the aims and objectives of the Management Plan continue to be met

Permits may be granted to enter the Area to carry out biological monitoring and site inspection activities, which may involve the collection of small amounts of plant material or small numbers of animals for analysis or audit, to erect or maintain notice boards, or protective measures.

x Requirements for reports

The Principal Permit Holder for each issued Permit shall submit a report of activities conducted in the Area using the accepted Visit Report form. This report shall be submitted to the authority named in the Permit as soon as practicable, but not later than 6 months after the visit has taken place. Such reports should be stored indefinitely and made accessible to interested Parties, SCAR and COMNAP if requested, to provide the documentation of human activities within the Area necessary for good management.

Appendix 7

List of Acronyms and Abbreviations

AMD	Antarctic Master Directory	ICAIR	International Centre for Antarctic Information and Research
ASMA	Antarctic Specially Managed Area	IEE	Initial Environmental Evaluation
ASOC	Antarctic and Southern Ocean Coalition	IUCN	International Union for the Conservation of Nature (World Conservation Union)
ASPA	Antarctic Specially Protected Area	NSF	National Science Foundation
ATCM	Antarctic Treaty Consultative Meeting	PA	Preliminary Assessments [environmental]
CCAMLR	Convention for the Conservation of Antarctic Marine Living Resources	PAH	Poly-Aromatic Hydrocarbons
CEE	Comprehensive Environmental Evaluation	PVC	Poly-Vinyl Chloride
CEMP	CCAMLR Environmental Monitoring Programme	RRC	Regional Research Centre
CEP	Committee for Environmental Protection	SANAE	South African National Antarctic Expedition
CO	Carbon Monoxide	SCALOP	Standing Committee on Antarctic Logistics and Operations
COMNAP	Council of Managers of National Antarctic Programmes	SCAR	Scientific Committee on Antarctic Research
EAM	Environmental Assessment Memoranda	SPA	Specially Protected Area
EIA	Environmental Impact Assessment	SSSI	Site of Special Scientific Interest
GLOCHANT	SCAR Group of Specialists on Global Change and the Antarctic	START	System for Analysis, Research and Training
GOSEAC	SCAR Group of Specialists on Environmental Affairs and Conservation	TEWG	Transitional Environmental Working Group
GPS	Global Positioning System	WG	SCAR Working Group
HC	Hydro Carbons		
IAATO	International Association of Antarctic Tour Operators		

SCAR GROUP OF SPECIALISTS ON ENVIRONMENTAL AFFAIRS AND CONSERVATION

Report of the seventh meeting, GOSEAC VII, held in Christchurch, New Zealand, 12-17 June 1995.

Group members attending the seventh meeting were: D W H Walton (Convenor), J M Acero, P J Barrett, K Birkenmajer, E Fanta, M C Kennicutt, M Manzoni, H Miller, J C A Sayers and J Valencia. M De Poorter (ASOC), C M Harris (ICAIR), E Waterhouse (NZAP) and C Howard-Williams (NIWA) attended as Observers. P D Clarkson (Executive Secretary, SCAR) acted as Secretary to GOSEAC. Apologies were received from M Oehme and P Trehen. A list of GOSEAC members and observers attending the seventh meeting is given in Appendix 1.

Opening of the Meeting

The Convenor welcomed the Members and Observers to the meeting and thanked the Royal Society of New Zealand, the New Zealand Antarctic Programme (NZAP) and Dr P J Barrett for the excellent arrangements in support of the meeting. Dr Barrett acknowledged the support of Ms G S Wratt, Director of NZAP, and Dr S M Smith, Director of ICAIR, for their efforts and support in coordinating the arrangements in Christchurch. The Convenor invited the Director of NZAP to address the meeting.

Ms Wratt warmly welcomed GOSEAC members to the headquarters of the New Zealand Antarctic Programme and to Christchurch. She thanked GOSEAC for choosing to meet in New Zealand and outlined administrative arrangements in support of the meeting. She wished the meeting well and hoped that members would enjoy their stay in Christchurch.

The Convenor noted with great sadness the sudden death of Nigel Bonner last August. He reported that the ASOC representative at XIX ATCM had made particular mention of Nigel's contribution to Antarctic conservation in his report to the meeting. SCAR, and especially GOSEAC, owed a great deal to Nigel's vision and dedication which had proved seminal for conservation and environmental management in Antarctica.

1. Adoption of Agenda and Appointment of Rapporteurs

1.1 Adoption of agenda and work plans

The Convenor referred to the draft Agenda which was circulated to members prior to the meeting. The following additions were proposed:

7.3 Treaty and CCAMLR

7.4 Subantarctic Islands

8.5 IUCN

The meeting adopted the revised agenda (Appendix 2) and proposed work schedule for the meeting.

1.2 Appointment of Rapporteurs

The following were appointed Rapporteurs:

J C A Sayers	(Agenda items 1-5.2);
P J Barrett	(Agenda items 5.3-5.6);
P D Clarkson	(Agenda items 6.1-6.2, 8-10);
M C Kennicutt	(Agenda items 6.3-6.6);
H Miller	(Agenda items 7.1-7.4);

2. Membership of the Group

The Convenor reminded the group of the need to keep the membership of GOSEAC under regular review to ensure that there is the appropriate balance of expertise for the tasks being undertaken. Comments were invited regarding perceived gaps in the range of expertise possessed by the current membership.

It was suggested that there may be a need to include someone with fisheries expertise within the group or alternatively develop links with the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). It was noted, however, that a GOSEAC member, E Fanta, does attend CCAMLR meetings and is therefore able to inform members of activities which are of particular interest to GOSEAC. Remote sensing was another field of expertise which, it was suggested, might be included in GOSEAC. However it was felt that H Miller could provide links with specialists in this field should they be needed.

Following extensive discussion it was concluded that the expertise represented in GOSEAC at this time was appropriate to meet current needs. A further review would take place at GOSEAC VIII.

3. Matters arising

The Convenor advised that a number of items arising from GOSEAC VI would best be considered under the relevant agenda items and the balance discussed at this time.

Information on the types and toxicity of de-icing fluids used on aircraft in Antarctica was still to be obtained. It was suggested that the Standing Committee on Antarctic Logistics and Operations (SCALOP) be requested to provide data on the type and quantity of de-icers used in Antarctica. J C A Sayers agreed to provide this information to GOSEAC via SCALOP.

The Convenor reported that at the SCAR meeting in Rome he had explored the possibility of obtaining information on the routes of overland traverse and aircraft operations with a view to identifying pristine areas of the ice sheet which might be considered suitable for preserving in that condition for future science activities. This was a site category for which no protected areas had been proposed.

It was acknowledged that it would be extremely labour intensive and difficult to obtain a comprehensive record of previous operational activities across the Antarctic continent and, in many cases, such information is no longer readily available. Before pursuing this matter further it

was agreed that H Miller would seek advice from the Working Group on Glaciology and the International Trans-Antarctica Scientific Expedition (ITASE) scientists whether or not it would be scientifically valuable to identify sites on the ice sheet largely free from contamination. It was noted, however, that the contamination from human sources has largely occurred during the last fifty years and data on atmospheric pollutants during this period is available from other sources.

The Convenor referred to discussions between the SCAR and the Council of Managers of National Antarctic Programmes (COMNAP) Executive Committees on a proposal to produce jointly a brochure for tourists. Agreement on the content and format of the brochure has not yet been reached. The group recommended that SCAR should take a proactive role in developing suitable promotional material for disseminating information on Antarctic science in lay terms to the public at large. It was suggested that a ten minute video on Antarctic science could readily be produced using video footage that could be made available through various national Antarctic programmes. The group requested K Birkenmajer to represent GOSEAC's view on this matter at the forthcoming meeting of the SCAR Executive.

The GOSEAC paper on incinerator emissions was adopted by the Rome meeting of SCAR and presented to the Seoul XIX ATCM as a Working Paper. The paper proposed that Antarctic operators adopt best practice for incineration consistent with national legislation or regulations. Following discussion at the ATCM, the meeting noted the need to reduce pollution caused by the use of incinerators at Antarctic stations and Parties agreed that:

- a. wherever practicable, waste which is presently incinerated should be removed from Antarctica;
- b. where it is necessary to continue incineration, Parties should investigate means of minimising the impact of emissions; and
- c. incinerators should only be operated by trained personnel.

The Convenor reported on a workshop convened in Santa Fe by the US National Science Foundation to discuss the development of management proposals for the Dry Valleys region. It was of interest to note that some form of zoning was considered to be a necessary part of a management system mainly because of the large geographical area to be covered by any management plan. Because the findings of the workshop are fundamental to so many areas of science, the Convenor had suggested that the workshop report should be submitted to SCAR to undertake a study of the wider implications of the workshop outcomes. MC Kennicutt referred to the large number of helicopter landings within the Dry Valleys and the intention of the USA and New Zealand to develop a joint Code of Conduct for activities in the region. It was noted that the International Centre for Antarctic Information and Research (ICAIR) is presently working on a data base of aircraft activities of the USA and New Zealand programmes in the Dry Valleys region.

P J Barrett referred to a recent meeting at Woods Hole Oceanographic Institute where the unique value of the high level surfaces of the Dry Valleys region, currently

dated at 14 Ma, was recognised as critical in helping to piece together the geological and glaciological history of the continent. Greater attention needed to be paid to conserving such areas and limiting impacts.

4. Meeting Reports

4.1 XIX Antarctic Treaty Consultative Meeting, Seoul 1995

Extracts from the XIX ATCM report were circulated to group members prior to the meeting. The Convenor reported that SCAR had submitted eleven papers to the meeting on substantive matters. It was pleasing to report that the ATCM complimented SCAR on the quality of the papers.

The Transitional Environmental Working Group (TEWG) met for the first time in Seoul. There was considerable discussion by TEWG on the role of the group prior to the establishment of the Committee for Environmental Protection (CEP). The ATCM confirmed that TEWG was an advisory group pending entry into force of the Protocol. Most delegations believed that TEWG should be a standing group with a membership comprising specialists with the appropriate scientific, environmental and technical competence. The work of TEWG was made more difficult by a shortage of working papers. Nevertheless the Convenor believed that TEWG had done quite well in difficult circumstances.

The New Zealand and United States delegations together welcomed SCAR's role in providing an agreed resolution to the problems identified at the Arrival Heights Site of Special Scientific Interest (SSSI).

It was noted that GOSEAC and SCAR would encounter difficulties in meeting deadlines for the preparation of papers for the ATCM. However, it is considered vital that SCAR deposit working papers prior to the meeting so that they can be translated. Distribution of information papers to Parties prior to the ATCM would also promote better discussion.

The proposed Liability Annex to the Protocol was discussed at Seoul. The Convenor advised that the Group of Legal Experts on Liability is experiencing considerable difficulty in developing definitions and that SCAR may be requested to provide advice.

Working Group II identified items that they would like to discuss and requested substantive papers on agenda items. The Working Group requested to be advised of major international collaborative science programmes that may occur in the medium term together with information on the expected outcomes and resource needs. The Convenor noted that SCAR should take advantage of this opportunity to provide working papers on such programmes.

The ATCM discussed the topic of cumulative impacts and asked SCAR to address the issue and report back to XX ATCM. The Convenor proposed that there was a need for the group to discuss how this matter may be progressed later in the meeting. It was suggested that it may be useful to hold a workshop on this topic involving expertise outside the Antarctic science community.

The ATCM agreed that in future the host country, rather than SCAR, would be responsible for compiling a

list of Comprehensive Environmental Evaluations (CEEs) and Initial Environmental Evaluations (IEEs) issued since the last meeting. The Meeting agreed to adopt the model format developed by GOSEAC for the development of management plans for protected areas and recommended the use of the Visit Report. The ATCM also welcomed the work of SCAR in developing the ecosystem matrices that provide a basis for allowing representative examples of all ecosystem types to be identified for inclusion in the Antarctic Protected Area System.

The Convenor advised that the ATCM has agreed that the system of adopting Recommendations would be superseded in future by new rules of procedure categorised as follows:

- *Measures*; which are intended to be legally binding once approved by all ATCPs.
- *Decisions*; taken on internal organisational matters and operative at adoption or as specified.
- *Resolutions*; hortatory texts or statements of positions.

4.2 SCAR/IUCN Workshop Reports

The Convenor referred to the three joint workshops held with the World Conservation Union (IUCN), namely:

1. Antarctic Protected Area System
2. Protection, Research and Management of Subantarctic Islands
3. Antarctic Environmental Education and Training

Reports (1) and (2) have been published by IUCN-SCAR and copies were provided to the Antarctic Treaty Consultative Parties (ATCPs). The Convenor tabled a copy of draft report (3) which is expected to be published in August 1995 and will be distributed to ATCPs before XX ATCM in 1996. The Convenor advised that there is an opportunity for SCAR to submit a working paper on the topic to the XX ATCM if deemed appropriate. Some of the principal issues highlighted in the report are:

- the need to produce a lay guide to the Protocol in several languages;
- the need to provide a forum to discuss how education and training can assist in implementing the requirements of the Protocol;
- noting that there are a number of academic environmental educational activities but no linkage exists between them; and
- the need for accessibility of information to the general public.

It was suggested that ATCPs should designate a national library where access to Treaty information is available. It was noted, however, that ICAIR is now placing ATCM reports on their World Wide Web (WWW) server. Ultimately the responsibility for placing Treaty information on the WWW could be undertaken by the Antarctic Treaty Secretariat, when established. The Convenor agreed to distribute copies of Report (3) to group members when published and seek comments on issues that might be presented to the ATCM in a working paper.

The Convenor advised that IUCN has established a new committee, the Antarctic Advisory Committee chaired

by Professor B Davis of the Institute of Antarctic and Southern Ocean Studies, University of Tasmania, to advise the Director-General of IUCN on Antarctic matters. Professor Davis has approached the Convenor regarding a joint sponsorship of a workshop this year on Human Impacts in Antarctica. The Convenor advised that GOSEAC would not be in a position to participate in this activity because of other commitments, especially the planned workshops on environmental monitoring. The Convenor suggested that IUCN may wish to consider co-sponsoring such a workshop in 1996 with especial emphasis on cumulative impacts, to allow full advantage to be taken of the work of the two environmental monitoring workshops. The participation of IASC in such a workshop could also be advantageous.

5. Environmental Impact Assessment

5.1 Documents issued since last meeting

The Convenor asked members to bring to the meeting's attention any IEEs or CEEs that exist but are not listed in Treaty Information Paper XIX ATCM/INFO 15. The following IEEs were submitted to the meeting for information on behalf of Australia:

- Operation of hydroponics, and
- Use of long-range helicopters.

The group discussed the possible difficulties in deciding at what level particular projects should require a CEE rather than an IEE. It was acknowledged that there is a considerable incentive to undertake an IEE rather than a CEE because of cost and time in following the latter process. It was also noted that some IEEs approach the standard of CEEs. However concern was expressed that there is no process of review for IEEs and therefore it was not known whether the IEE process had achieved an overall improvement in the management of new activities. Examples were provided to the group of situations where the EIA process has resulted in activities taking place with a lesser impact on the environment than former practices. It was also noted that many countries have transparent national processes which allow for public scrutiny of EIAs.

The question was asked as to whether SCAR should provide scientific advice to the Treaty on the IEE/CEE process. Following considerable discussion it was concluded that the best way of facilitating improvements in the process at this point in time is by example, by circulating all available IEEs and CEEs to operators. It was suggested that new IEEs could be submitted to the ATCMs as working papers. M Kennicutt suggested that GOSEAC could provide to SCAR a detailed commentary on one or two existing IEEs to provide exemplar guidance for future compilers of IEEs. It was also noted that the USA has its IEEs available on the WWW and other countries were expected to adopt this procedure in the next few years. M Manzoni agreed to undertake a preliminary investigation of the way in which key terms had been interpreted in recent IEEs and CEEs.

The Convenor referred to Information Paper XIX ATCM/INFO 14 which was developed by the United Kingdom as a guide to the assessment of activities in Antarctica. Other members reported that national opera-

tors were called upon to advise private expeditions and tourist operators on EIAs. Attention was specifically drawn to Sections 8.1, 9 and 10 which provide examples of typical activities likely to be considered under the Preliminary Assessment (PA), IEE and CEE processes.

5.2 Scientific Assessment of Content

At GOSEAC VI it was agreed to examine the preparation of a document that would provide guidelines to assist in the preparation of scientific input to IEEs that could be incorporated into the existing COMNAP document. The Convenor advised that, following consultation with COMNAP, it had been decided not to proceed with this task.

5.3 Development of checklists for common activities

New drafts of checklists of questions that should be addressed in preparing environmental impact assessments of commonly performed scientific activities were presented and discussed. The checklist for near-shore biological studies, presented by E Fanta, had been extended with a short text explaining a number of items. Some points requiring clarification were discussed, notably what is meant by the importance of an area. It was agreed that the text served a very useful purpose, but that it should be more closely linked with the list, either by integration or cross-referencing.

H Miller presented checklists for soil/rock drilling, ice drilling and seismic traverses. Discussion on several points followed. These included the aesthetic appearance of sites after drilling, and the effects of underwater explosions on marine biota. The Convenor reminded the meeting that the value of checklists was to ensure all impacts were considered, but that responsibility for mitigating the impact lay with those carrying out the activity. Several further items were suggested for inclusion. In further discussion, it was agreed that all checklists should, as far as possible, have a similar structure.

Agreed revisions of checklists are attached at Appendix 3 and will be sent to appropriate Working Groups for consideration.

5.4 Cumulative impacts of human activities.

The Treaty had requested that SCAR offer some guidance in the measurement and assessment of cumulative impacts. Cumulative impacts of human activities are an important but a particularly difficult aspect of environmental degradation to assess. To assist the meeting in its consideration of this issue K Birkenmajer provided a matrix for identifying type and magnitude of variables that determine the effect of an activity or event on the Antarctic environment. The matrix included the following types of variables, the last of which included the cumulative effect:

- magnitude of the impact
- duration
- area
- nature (simple, complex, cumulative).

The discussion that followed resulted in some modifications, including judgements on the two questions of whether adverse impacts under consideration were repairable, and whether the level of damage was acceptable.

5.5 Defining minor or transitory

Discussions on a Liability Annex to the Protocol by the Legal Expert Group at XIX ATCM had led to a request for scientific assistance in clarifying the terms minor and transitory. The matrix developed by K Birkenmajer for the discussion on cumulative impacts was used to facilitate discussion on the definition of "minor or transitory". It was suggested that these terms be used with reference to natural variability.

Key issues were seen to be:

- scale of event with respect to both individual organisms and populations. At the very least biological populations should not be threatened by human events.
- reversibility or better, reparability, of adverse impacts, acknowledging that rarely can an environment be restored to its original state.

The Convenor summarised the Group's position on both cumulative impact and definition of "minor or transitory" by observing that work on these concepts is at an early stage, and is unlikely to be ready for presentation to the Treaty for some time. The Convenor and P J Barrett agreed to develop the framework, adding a text. This would be circulated to members for consideration and a revised version discussed at the next GOSEAC meeting.

5.6 Environmental audit

The Convenor observed that the role of the environmental audit (an historical review of previous and current activities) was not well understood and seemed at times to be confused with that of environmental impact assessment. Ms G S Wratt, the Director NZAP, was invited to present the results of an environmental audit on the programme and to comment on the process.

Ms Wratt began by noting that in 1992 there was a clear need to see how well New Zealand's Antarctic activities met the principles and requirements of the newly agreed Environmental protocol. It was decided to proceed with an environmental audit, i.e. an independent assessment of previous and existing NZAP activities. The audit was to review the environmental aspects of these activities and make recommendations as to how the environmental impact of the programme in future could be monitored and minimized.

Terms of reference were set and the audit was carried out in 1993. The audit provided recommendations on NZAP management structure, environmental impact assessment, management of Antarctic protected areas, monitoring, training, waste, sewage and fuel management, and reporting/record keeping.

The Convenor drew attention to Article 3 of the Environmental Protocol, which requires activities to be conducted in accordance with the Protocol. It was noted that environmental review was a tool by which obligations under Article 3 could be considered. In the discussion that followed it was noted that approaches to this do differ widely among countries. Members were also concerned that in some countries the word "audit" carried the clear connotation of financial assessment of past activity of an organisation.

The Convenor, with E Fanta, J M Acero and M C Kennicutt, considered that the best way forward would be for them to draft a working paper on the topic for the next GOSEAC meeting with emphasis on Article 3 and its annexes. The paper would distinguish between Environmental Impact Assessment (an outline of planned future activity, with a consideration of environmental consequences), Environmental Monitoring and Environmental Review (a review of past and present activity to check and document environmental consequences, if any, so as to improve future practice). It would also list existing tools and consider the best ways of using them.

6. Environmental Monitoring

6.1 SCAR-COMNAP workshops on monitoring protocols

The Convenor introduced this item by reference to the recent letter of invitation and the draft programmes for the two environmental monitoring workshops (Appendix 4). The meeting discussed the way in which the two workshops would actually operate and proposed that each workshop should open and close with plenary sessions. The intervening time should be used by sub-groups to develop specific themes that will be reported by the subgroup chairmen to the final plenary session for discussion and inclusion in the final report. The theme of each subgroup should be opened by a keynote presentation and briefing papers should be sought from participants once these were known. The Meeting also suggested names for plenary and subgroup chairmen and for the keynote presentations.

The draft programme for each workshop has been agreed by COMNAP and is given in Appendix 4.

6.2 Implementation of monitoring at COMNAP sites

The Meeting was unable to discuss this item in detail because the location of the proposed COMNAP sites will not be known until after the meeting of COMNAP at the end of July 1995. Furthermore, COMNAP may wish to wait until after the monitoring workshop reports are available to provide guidance before any monitoring is undertaken at the selected sites.

6.3 International Monitoring Initiatives

The status of international intercalibration initiatives was reviewed. Results from an intercalibration of hydrocarbon methodologies, compiled by Dr G C Cripps (British Antarctic Survey), have been reported to the participating laboratories. The seven laboratories that participated, determined quantitative hydrocarbon concentrations in a series of standard mixtures and natural matrices. Initial results were encouraging with reported concentrations of hydrocarbon being generally of the same order of magnitude. A second round of intercalibrations based on actual field samples will be pursued during the next year. Seawater, particulate matter, sediments, and selected biological samples will be distributed for analysis. Samples will be collected from oceanic and near-shore environments.

An intercalibration of methods to determine organochlorine compounds in environmental samples is continuing. N Van der Brink (Netherlands) is continuing to organise this effort.

E Fanta reported that an intercalibration of chemical and biological methodologies between Brazilian and German investigators is continuing. Hydrocarbon and organochlorine methodologies are among those being evaluated.

The Convenor urged those undertaking similar activities to inform GOSEAC.

6.4 Exhaust Emissions

In a continuing response to an ATCM request to provide advice on emissions related to usage of fossil fuels and incinerators in Antarctica, further actions were discussed. The incinerator issue was considered complete after being reported to the last Treaty meeting.

To move forward in evaluating exhaust emissions created by aircraft, vehicles, diesel generators, etc, it was decided to ask COMNAP/SCALOP to poll its members to provide an inventory of fuel usage in the Treaty area. The SCALOP survey should include the amount, type, and additives included in the various fuels utilised in Antarctic logistic activities. M. Oehme will be asked to produce an information paper on the emissions levels that may be produced by present practices in Antarctica. It was recognised that an important recommendation was that all fuel burning operations be maintained at optimal operating conditions to minimise emissions. The type and amount of emissions are determined by the efficiency of the combustion processes.

It was also recognised that emissions due to all ship operations in the Treaty area may be more significant than land-based operations.

6.5 Oil Spill Contingency Planning

It was reported that plans for contingency responses to oil spills at stations and on ships were well advanced. A number of response actions have been reviewed and evaluated including dispersants, in situ burning, remediation, and containment. COMNAP has formed a working group on Contingency Planning (D van Schalkwyk, South Africa, Chairman). National operators have been asked to expedite the completion of Facility Contingency Plans for Oil Spills. The working group is tasked with a revision of the COMNAP Contingency Plan Guidelines to include environmental risks in addition to oil spills and assessment of other common risks that arise in Antarctic programme activities.

Multi-operator contingency plans are also considered a high priority for the working group. A comparative study of oil spill contingency plans to determine opportunities for cooperation and coordination is to be pursued.

It was noted that oil spill contingency plans were as important for ships as for stations. The requirement for plans may affect an operator's ability to operate ships within the territorial waters of gateway countries. Insurance and the requirements of the International Convention for the Prevention of Pollution from Ships (MARPOL) need to be included in the promulgation of oil spill contingency plans for ship operations.

The COMNAP system for reporting oil spills within the Antarctic Treaty area recorded 12 spills since late 1993. The amount spilled varied from 200 to 11,500 litres. The comprehensiveness of the spill reporting process is difficult to assess.

6.6 Tourism

Tourism and its impact on the environment continues to be an issue of high interest at the ATCM. Prior activities have addressed various issues related to tourism including how to monitor impact, routine collection of statistics on tourism (numbers, sites visited, duration), and other assessments of environmental effects. It was recognised that the International Association of Antarctic Tour Operators (IAATO) has also attempted to address environmental issues by adopting a code of conduct, providing representation at Treaty meetings, and attempting to produce IEEs. These documents produced as IEEs for tourist activities were not considered satisfactory by GOSEAC because they did not conform to requirements of the Protocol. They often failed to identify impacts, mitigation options, monitoring, etc. Future trends in tourism-related issues are increasing numbers of non-IAATO operators, extension of activities beyond current tourist activities, and accountability being assigned to the country of origin and registry of tour companies. It was noted that the US programme is actively pursuing research on tourist impacts and is funding tourist visit site inventories to provide a detailed basis for future monitoring.

The development of a new approach to tourism which includes research camps that may involve semi-permanent shore facilities, was reported to be proposed by a Canadian company. This increase in activity and more invasive nature of extended stays on land were seen as potentially more detrimental in impact than previous tourism practices. However, it was noted that no prohibitive statutes were in place to restrict these activities. Claims of "zero impact" were challenged and suggest a need for monitoring.

Argentina is continuing to pursue long-term monitoring of tourist impact.

7. Protected and Managed Areas

The Convenor introduced the subject and informed participants about considerations on this item at XIX ATCM when four management plans (Moe Island, South Orkney Islands; Southern Powell Island and adjacent islands, South Orkney Islands; Tramway Ridge, Mount Erebus, Ross Island; and Pointe-Géologie, Terre Adélie) were considered and accepted. At present there are legal problems associated with this, because under current legislation only Specially Protected Areas (SPAs) and SSSIs are recognised internationally. Only after the Protocol has entered into force can Antarctic Specially Protected Areas (ASPAs) be designated. However, in future, the Moe Island management plan should be used as a model to develop new management plans.

The Treaty extended the expiry date of 12 SSSIs to 31 December 2000. There is ample time to produce revised management plans.

J M Acero informed the meeting that Argentina had presented new management plans in ASPA format for SSSI nos 13, 14 and 15 to the XXIII SCAR Delegates Meeting in Rome. They were accepted by SCAR but have not been forwarded to the ATCM.

7.1 Management Plan Handbook

The Convenor introduced the subject and set out the timetable. The final draft of the Handbook should be completed during 1995, then circulated widely through SCAR and COMNAP for information and comment. The final version of the draft should then be presented at XX ATCM in 1996.

The individual items on the tabled summary were discussed at length and suggestions noted by the Convenor. Special items were that Historic Sites may need to be dealt with in the Handbook and that the Visit Report Form should be appended. Historical sites posed special problems for management plans including the possibility of ownership of artefacts, potential conflict of interest between scientific interests and archaeological/historical values, etc. M Manzoni suggested that these fields were not within the original concept of the handbook and that SCAR should consider how to provide advice, if any, to the ATCM.

It was also noted that designation of a site leads to increased tourist interest and, due to the rather long review and approval process for an ASPA, the original purpose might be defeated by increased tourism degrading the values to be protected. This problem should be discussed by SCAR and ways found to shorten the approval process.

The Convenor also introduced the concept of a Quick Reference Sheet that had been put to the Treaty as an information paper by New Zealand. This example, for Tramway Ridge, was discussed. It was felt by some members that such a Quick Reference Sheet was not without danger because it could prevent people from taking note of the full management plan. However, acknowledging that it was noted on the Quick Reference Sheet that it is only an excerpt of the full management plan, the Group agreed that this concept has its merits, especially during field work.

7.2 Revision of existing management plans for SSSIs and SPAs

7.2.1 Canada Glacier (SSSI No 2)

A draft management plan was introduced by C M Harris and discussed. It will not be acceptable to SCAR without the full set of maps, which was not presented. Furthermore some open questions remain regarding removal of structures from the area and the existing helicopter landing site. Several suggestions were made for changes in the wording and the use of standard wording agreed by the Treaty was encouraged where appropriate. GOSEAC members felt unable to endorse the draft at its present stage.

7.2.2. Rothera Point (SSSI No 9)

The Convenor introduced the draft management plan for Rothera Point which was approved subject to the incorporation of some minor changes.

7.3 Antarctic Treaty and CCAMLR Protected Areas

The Convenor reported no further progress with ensuring management plans for ASPAs and CEMP sites were similar.

7.4 Sub-Antarctic islands

A proposal by P A Dingwall for a revision of the *Directory of Protected Areas on Islands of the Southern Ocean* was discussed. It was agreed to suggest to the SCAR Executive Committee that this should be supported as a joint SCAR-IUCN publication.

8. Reports

8.1 Relevant SCAR groups

GLOCHANT: The Executive Secretary briefly described the restructuring of the Group of Specialists on Global Change and the Antarctic (GLOCHANT) that was agreed by Delegates at XXIII SCAR (SCAR Bulletin No 117). He also reported that the GLOCHANT Project Office was being hosted by Australia at the Cooperative Research Centre in the University of Tasmania and that a Project Coordinator had been appointed and would take up office as soon as Australian visa and work permit formalities had been completed. In addition to servicing GLOCHANT, the Project Coordinator would service the SCAR Coastal and Shelf – Ecology of the Antarctic Sea-Ice Zone (CS-EASIZ) programme that would aid the GLOCHANT programme with the integration of the biological aspects of CS-EASIZ that are relevant to global change.

APIS: The Executive Secretary reported briefly on the Antarctic Pack Ice Seals (APIS) programme of the Group of Specialists on Seals. The programme aims to study the pack ice seals, principally crabeater seals, that are believed to be the most abundant seal species in the world but that are relatively little known due to the inaccessibility of their habitat. The steering committee for APIS met in Seattle during the week immediately preceding the GOSEAC meeting.

CS-EASIZ: The Coastal and Shelf – Ecology of the Antarctic Sea-Ice Zone programme was introduced briefly by the Executive Secretary. He said that the programme would investigate the productivity of the sea-ice zone that was known to be one of the most productive regions in the Southern Ocean. He told the meeting that the programme plan had been published by SCAR and that a more eye-catching brochure was being prepared. Several countries would be undertaking cruises to collect data for the programme during the coming season. J C A Sayers showed a diagram of the planned Australian cruise.

Vostok Lake: H Miller gave a brief account of the Vostok Lake Workshop held in Cambridge, United Kingdom, during May 1995. Vostok Lake is the largest known body of water between the base of the ice sheet and the continental bedrock. There is considerable interest from geologists and biologists in the sediments believed to underlie the water. There is concern that the ice core drilling at Vostok Station could inadvertently enter the lake and contaminate the water. The workshop recommended that drilling should be terminated at least 25 m above the ice–water interface and that further remote sensing surveys should be made to define the lake and its environs more precisely.

8.2 CCAMLR

The Convenor reported on discussions he had held with Dr E de Salas, Executive Secretary of the Commission for the Conservation of Antarctic Marine Living Resources, dur-

ing XIX ATCM in Seoul, Korea. He noted particularly the contact maintained with GOSEAC on CCAMLR conservation activities with respect to CCAMLR Ecosystem Monitoring Programme (CEMP) sites. He reminded the meeting that SCAR has an observer at meetings of the CCAMLR Scientific Committee and of the CCAMLR Commission.

8.3 ASOC

M De Poorter introduced the report from the Antarctic and Southern Ocean Coalition (ASOC) that was originally tabled at XIX ATCM. She emphasized the ASOC priorities for encouraging ATCPs to ratify the Protocol and the concern at the impact of tourism in the Antarctic. Other particular concerns included whether or not the Protocol would apply to the deep ocean floor within the Antarctic Treaty area (south of 60°S), the standard of environmental impact assessments and their final approval, and the implementation of the Protocol by tour operators in the Antarctic. She also informed the meeting that Greenpeace is considering a final monitoring project at the site of the former Greenpeace World Park Base at Cape Evans, Ross Island.

She also drew attention to ASOC concerns about global warming and the evidence for this in the Antarctic. K Birkenmajer responded with a cautionary statement that, since the 1950s, whereas many areas in King George Island, South Shetland Islands, showed definite evidence of ice retreat, other areas showed evidence of ice advance.

8.4 COMNAP

The Convenor tabled a copy of the Council of Managers of National Antarctic Programmes Report to XIX ATCM. He noted the items covered by the report and drew attention to the brief section concerning the environmental monitoring workshops (see also item 6.1 above).

8.5 IUCN

The Convenor explained the re-organization of the World Conservation Union approach to the Antarctic following the departure of Sir Martin Holdgate as Director-General. P A Dingwall is no longer involved with Antarctic matters and a new committee under the chairmanship of Professor B Davis will focus on the Southern Ocean. Mr D Shepherd will oversee Antarctic matters from IUCN HQ in Gland, Switzerland.

9. Any Other Business

Significant advances in the management of data from Antarctic activities were illustrated for the Group by Drs S M Smith and C M Harris of ICAIR. The easy accessibility of data was shown by the ICAIR "Home Page". A variety of data related to Antarctic activities was directly available to interested parties through the World Wide Web. A wide range of computer-based applications from GIS mapping of SPAs to a CD-ROM containing an educational series of various Antarctic topics was also demonstrated. It was clear that a necessary feature of further coordinated efforts in environmental management and monitoring will require ready-access to information by all parties. Standardization of data, central data management (or interconnected systems of databases), appropriate graphical support, and user-friendly platforms are all well-advanced at ICAIR.

10. Time and place of next meeting

J M Acero confirmed the offer from Argentina to host GOSEAC VIII at Puerto Iguazu 17–21 June 1996. H Miller offered to host GOSEAC IX in Bremerhaven, Germany, during 1997. K Birkenmajer made a preliminary offer to host GOSEAC X in Kraków, Poland, in 1998. The Convenor expressed his thanks and those of the Group to J M Acero, H Miller and K Birkenmajer for these offers to host the forthcoming meetings.

List of Appendices

- Appendix 1 Address list of Members and participants at GOSEAC VII
- Appendix 2 GOSEAC VII Agenda
- Appendix 3 Checklists for common scientific activities
- Appendix 4 Draft programmes of the two SCAR-COMNAP Environmental Monitoring Workshops
- Appendix 5 List of Acronyms and Abbreviations

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Agenda

Opening of the Meeting

1. Adoption of Agenda and Appointment of Rapporteurs
2. Membership of the Group
3. Matters arising from previous meeting, GOSEAC VI
4. Meeting Reports
 - 4.1 XIX Antarctic Treaty Consultative Meeting, Seoul, 1995
 - 4.2 SCAR/IUCN Workshops
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 - 5.1 Documents issued since last meeting
 - 5.2 Scientific Assessment of Content
 - 5.3 Development of checklists for common activities
 - 5.4 Cumulative impacts of human activities
 - 5.5 Defining minor or transitory
 - 5.6 Environmental audits
6. Environmental monitoring
 - 6.1 SCAR/COMNAP workshops on monitoring protocols
 - 6.2 Implementation of monitoring at COMNAP sites
 - 6.3 International monitoring initiatives
 - 6.4 Exhaust emissions
 - 6.5 Oil-spill contingency planning
 - 6.6 Tourism
7. Protected and Managed areas
 - 7.1 Draft handbook for the preparation of management plans
 - 7.2 Revision of existing management plans for SSSIs and SPAs
 - 7.2.1 Canada Glacier
 - 7.2.2 Rothera Point
 - 7.3 Treaty and CCAMLR protected areas
 - 7.4 Subantarctic islands
8. Reports
 - 8.1 Relevant SCAR groups
 - 8.2 CCAMLR
 - 8.3 ASOC
 - 8.4 COMNAP
 - 8.5 IUCN
9. Any other business
10. Time and Place of next meeting

Appendix 3

Draft Checklist for Environmental Impact Assessment Activities in Near-shore or Shallow Coastal Areas

Introduction

Shallow coastal or near-shore areas are often the site of great activity, from logistics to research, often close to Antarctic coastal stations. These notes provide an introduction to key features which need to be considered when making an environmental impact assessment. Numbers in brackets refer to the checklist that follows.

This environment shows many important biotic and abiotic characteristics (1), such as:

- The quality of the bottom or substrate determines the distribution and composition of animal and plant populations in an area. Substrate modification may change the local fauna and flora.
- Benthic fauna and flora are rich. Their organisms are important links in the food chain of some predators, like penguins, fish, krill, birds, seals and whales. Some species use these areas for reproduction. Thus, they should be taken into consideration in environmental conservation measures.
- Water quality shows cyclical changes due to seasonal events like freezing, melting, changes in photoperiod and light intensity. Levels of water contamination are potentially higher during the Antarctic summer and potentially lower during the winter, because of seasonal patterns in human activity.

Some of the activities normally carried out in these regions (2) that would require an environmental impact assessment are:

- Research, including local measurements, sampling of substrate or collection of sometimes large amounts or numbers of organisms, once or repeatedly in the same area.
- Station, shelter, camping and ship activities with terrestrial and aquatic vehicles, anchoring in shallow waters, boats, amphibious vehicles, terrestrial vehicles; also the release of oils, waste and pollution.
- Construction or dismantling of buildings with the introduction of materials and great activity, repeatedly in the same region or only for one period

The reasons leading to a need for special attention to be paid to the impacts that may be caused to these area (3, 4) with potential damage to the organisms are:

- Some effects may be immediately lethal to some of the organisms.
- Other effects may be sub-lethal and long-term effects may appear during the development or reproduction. Reproduction may stop or become deficient.
- The behaviour of some species, including their interactions and the predator-prey relationships may change, leading to incapacity or a lower capacity for survival.

- All these consequences may cause the removal of a trophic level, with ecological consequences.

For a better knowledge of the coastal systems (4, 5), surveys may be conducted:

- Locally, in areas that may be easily visited at regular intervals.
- Regionally, in different areas around the Antarctic continent and islands. Repeated surveys would allow a broader understanding of this environment and its fauna and flora.
- Seasonally, when possible, mainly close to permanent stations, for detection of environmental changes.
- Over longer periods, as only after many years will it be possible to distinguish between natural and man-made impacts and environmental changes.
- Comparison of disturbed and undisturbed area in order to follow the changes that may occur. Even

disturbed areas should be studied, from now on, and some historical data obtained, when possible.

Conclusions

- Benthic surveys are required to provide the basis for predicting impacts of future activities.
- Countries with activities in Antarctica shall be encouraged to monitor the environment in the areas of their activities.
- Organisms to be observed must include the most important links of the food webs.
- Results must be fully available.
- Methodology should be standardized and improved, whenever possible.
- Field studies shall be done in parallel with laboratory research.

Checklist

1. Description of the area

- 1.1 *location with chart (lat, long, scale)*
- 1.2 *size of the area within which activities will be conducted*
- 1.3 *main topographic features*
- 1.4 *currents, tides, meltwater input from glaciers, sea ice*
- 1.5 *importance of the area within the region*
- 1.6 *close to or inside CCAMLR protected areas, SSSIs, ASPAs or ASMAs*
- 1.7 *location of other activities currently undertaken in the same area*

2. Description of actions

- 2.1 *short description of activity proposed*
- 2.2 *objectives of activity*
- 2.3 *timetable*
- 2.4 *prediction of possible acute and chronic impacts*
- 2.5 *other action in the same region and possible interaction*
- 2.6 *alternative actions or areas*

3. Information necessary to predict impacts

- 3.1 *possible initial impacts*
- 3.2 *possible cumulative effects*
- 3.3 *reversibility of the effects if action ceases*

4. Assessment

- 4.1 *method used for environmental evaluation*
- 4.2 *when known, species affected and typos and extent of adverse impact or damage to organisms or populations*
- 4.3 *damage to physical environment*
- 4.4 *long-term data storage*

5. Survey when area unknown

- 5.1 *pilot survey for assessment of methodology*
- 5.2 *area of survey or transect*
- 5.3 *alternative area*
- 5.4 *duration and periodicity of survey*
- 5.5 *season*
- 5.6 *data collection*
- 5.7 *difficulties*

6. Environmental recovery possibilities

- 6.1 *new actions or avoidance of actions to allow recovery*
- 6.2 *expected effects of new actions or avoidance of actions*

7. Presentation of information

- 7.1 *summary of results of surveys*
- 7.2 *definition of technical vocabulary*
- 7.3 *conclusions and predictions*

Draft Checklist for Environmental Impact Assessment

Drilling in rock / soil / sediments

Note that only core drilling is considered in this checklist

1. Very shallow diamond-bit drilling (eg for palaeomagnetic cores)

1.1 Drill fluid / cooling agent being used

1.2 Amount of fluid / agent used and lost

1.3 Number of holes drilled at each site

2. Shallow drilling in soil

2.1 Drilling technique used (coring / non-coring)

2.2 Drill fluid / mud being used (if applicable)

2.3 Effects of drill fluid spillage, and appropriate containment procedures and contingency measures

3. Deep drilling

3.1 Drilling technique and type of equipment used

3.2 Drilling mud used

- details of composition and volume
- method of preparation in the field

3.3 Effects of drilling mud spillage, and appropriate containment procedures and contingency measures

3.4 Casing remaining in hole

3.5 Cementation of hole

3.6 Specify control of down-hole pressures (hydrocarbon and geothermal)

3.6 Hole completion

4. All drilling operations

4.1 Proposed site clean-up measures (specifically with regard to the drilling operations)

Draft Checklist for Environmental Impact Assessment

Ice drilling

All drilling in ice is necessarily accompanied by other logistic activities and these need to be addressed in the EIA. These activities may include traverses, temporary or permanent installations, such as stations and drill camps. There should be no need to undertake an elaborate EIA for shallow ice drilling. This is normally carried out using simple hand-driven, solar- or motor-powered augers that rarely reach depths exceeding 30 metres.

There should probably be no need to undertake an elaborate EIA for intermediate depth ice drilling. These drilling operations are essentially similar to shallow ice drilling and everything is removed from the site at the end of operations.

In deep ice core drilling, the hole needs to be stabilized by using a drill fluid that has the same or a slightly higher density than the ice being drilled and that will not freeze in the hole at the temperatures of the ice.

The following specific points should be addressed in the EIA.

Non-coring ice drilling

Holes drilled in ice without taking a core are essentially access holes and may be required for various purposes. Thermal drilling techniques are usually used for these

holes and may include steam, hot water, and flame jets. These techniques are normally non-polluting and simply melt the ice. However, care needs to be taken to prevent antifreeze solutions (commonly used to protect the equipment) from entering the ice.

Any substances, other than water, released into the hole should be noted.

Ice core drilling

1. Drilling technique employed

- melting technique
- mechanical technique
- type of equipment

2. Hole depth and diameter

3. Drill fluid specifications

- composition
- density
- amount

4. Surplus drill fluid management

- eg separation of drill fluid from drill chips

5. Measures to be taken against accidental spillage

Draft Checklist for Environmental Impact Assessment

Seismic Traverses

1. Description of area

1.1 Physiographic features

- snow/ice
- bare soil
- vegetation
- marine
- lakes
- rock glacier
- moraine

1.2 Biological features

- bird population
- animal population
- plant communities
- distance to working area

1.3 Infrastructures

- buildings
- other camps
- other ongoing research
- Specially Protected Areas
- distance to working area

2. Description of values of area

2.1 biological/scientific/historic/aesthetic/wilderness

2.2 Ecosystem (terrestrial/glacial/marine)

3. Description of Actions (or activities)

3.1 Logistics

- Number of vehicles
- type of vehicles
- distance travelled
- air support
- number of personnel
- camps
- waste policy

3.2 Science

i. Objectives of activity

ii. Detailed description of activity

a. Seismic source(s)

- explosives
- gas/air-guns
- charge size
- volume

b. Details of shooting technique

- land:
- boreholes
 - depth
 - how drilled
 - air shooting

- sea:
- water depth for source
 - shot interval

c. Timetable

d. Alternate actions or regions

3.3 Information necessary to predict possible impact(valued judgement)

a. Likely primary impacts

- nature
- magnitude
- noise
- contamination through explosive gases

b. possible acute or chronic impacts

- duration

c. possible cumulative impacts

- extent

d. reversability

- duration

3.4 Assessment

- Judge according to matrix

3.5 Analysis and management of information

- results (which)
- long term data storage
- limitations

3.6 Conclusion and prediction

**SCAR/COMNAP Workshops on
Environmental Monitoring of impacts from research and operations in the Antarctic
Workshop 1**

Prioritization of impacts and the development of monitoring options

Draft Programme

1. Introduction

- Background
- Terms of Reference
- Monitoring requirements specified in the Protocol

2. Activities/impacts identified as needing monitoring

- station and airstrip logistic operations
- waste water and sewage
- incineration of waste
- power and heat generation
- human impact on flora and fauna
- scientific research
- accidental fuel spills

3. Principles underlying the design of monitoring programmes

4. Technical advice on:

4a. Minimum monitoring needs to meet the requirements of the Protocol in the following fields:

- Baseline monitoring of air and water quality
- Monitoring of activities/impacts identified under Item 1

- Status of native animals, birds, plants and invertebrates
- Significant changes or damage to ASPAs or ASMAs
- Monitoring requirements for Environmental Impact Assessment

4b. Design framework:

- Scaling
- Heterogeneity
- Logistical constraints
- Feasibility

5. Recommendations

Date: 17–20 October 1995

Place: State Pollution Board, Oslo, Norway

Local contact:

Dr R Hansson

Norsk Polarinstitutt, Box 5072 Majorstua, N-0301 Oslo, Norway.

E-mail: hansson@npolar.no

Fax: +47-22-95-95-01

Workshop 2

Practical design and implementation of environmental monitoring programmes

Draft Programme:

1. Introduction

- Background
- Terms of Reference

2. Key variables to be monitored

3. Measurement methods

4. Applicable technology

5. Standardisation and quality assurance of techniques and data

6. Data management

7. Criteria for assessment of monitoring programmes.

8. Recommendations

Date: 25–29 March 1996

Place: Texas A & M University, College Station, USA.

Local contact:

Dr M C Kennicutt II

Geochemical & Environmental Research Group,
Texas A & M University, 833 Graham Road,
College Station, Texas 77845, USA.

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Note

The draft programmes for these two workshops were tabled at the meeting and subsequently revised in consultation with COMNAP.

The revised programmes are given here.

Appendix 5

List of Acronyms and Abbreviations

APIS	Antarctic Pack Ice Seals	IAATO	International Association of Antarctic Tour Operators
ASOC	Antarctic and Southern Ocean Coalition	IASC	International Arctic Science Council
ASPA	Antarctic Specially Protected Area	ICAIR	International Centre for Antarctic Information and Research
ATCM	Antarctic Treaty Consultative Meeting	IEE	Initial Environmental Evaluation
ATCP	Antarctic Treaty Consultative Party	INFO	Information Paper
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources	ITASE	International Trans-Antarctica Scientific Expedition
CD-ROM	Compact Disc – Read-Only Memory	IUCN	World Conservation Union
CEE	Comprehensive Environmental Evaluation	MARPOL	International Convention for the Prevention of Pollution from Ships
CEMP	CCAMLR Ecosystem Monitoring Programme	NIWA	National Institute for Water and Atmospheric Research
CEP	Committee for Environmental Protection	NZAP	New Zealand Antarctic Programme
COMNAP	Council of Managers of National Antarctic Programmes	PA	Preliminary Assessment
CS-EASIZ	Coastal and Shelf – Ecology of the Antarctic Sea-Ice Zone	SCALOP	Standing Committee on Antarctic Logistics and Operations
EIA	Environmental Impact Assessment	SCAR	Scientific Committee on Antarctic Research
GLOCHANT	Group of Specialists on Global Change and the Antarctic	SPA	Specially Protected Area
GOSEAC	Group of Specialists on Environmental Affairs and Conservation	SSSI	Site of Special Scientific Interest
HQ	Headquarters	TEWG	Transitional Environmental Working Group
		WWW	World Wide Web

SCAR Report

SCAR Report is an irregular series of publications, started in 1986 to complement *SCAR Bulletin*. Its purpose is to provide SCAR National Committees and other directly involved in the work of SCAR with the full texts of reports of SCAR Working Group and Group of Specialists meetings, that had become too extensive to be published in the *Bulletin*, and with more comprehensive material from Antarctic Treaty meetings.

SCAR Bulletin

SCAR Bulletin, a quarterly publication of the Scientific Committee on Antarctic Research, is published on behalf of SCAR by Polar Publications, at the Scott Polar Research Institute, Cambridge. It carries reports of SCAR meetings, short summaries of SCAR Working Group and Group of Specialists meetings, notes, reviews, and articles, and material from Antarctic Treaty Consultative Meetings, considered to be of interest to a wide readership. Selections are reprinted as part of *Polar Record*, the journal of SPRI, and a Spanish translation is published by Instituto Antártico Argentino, Buenos Aires, Argentina.

Polar Record

Polar Record appears in January, April, July, and October each year. The Editor welcomes articles, notes and reviews of contemporary or historic interest covering the natural sciences, social sciences and humanities in polar and sub-polar regions. Recent topics have included archaeology, biogeography, botany, ecology, geography, geology, glaciology, international law, medicine, human physiology, politics, pollution chemistry, psychology, and zoology.

Articles usually appear within a year of receipt, short notes within six months. For details contact the Editor of *Polar Record*, Scott Polar Research Institute, Lensfield Road, Cambridge CB2 1ER, United Kingdom. Tel: 01223 336567 (International: +44 1223 336567) Fax: 01223 336549 (International: +44 1223 336549)

The journal may also be used to advertise new books, forthcoming events of polar interest, etc.

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