SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH

WORKING GROUP ON BIOLOGY BIRD BIOLOGY SUBCOMMITTEE

MINUTES OF MEETING, 7-8 JUNE 1992, BARILOCHE, ARGENTINA

1. PARTICIPANTS AND AGENDA

Dr J P Croxall, as Chairperson, welcomed members and observers (Annex 1) to the meeting. Apologies had been received from D G Ainley, L S Davis, G L Hunt Jr, P Jouventin, P A Prince, M Sander and W R Siegfried. Dr Croxall thanked the SCAR Executive for making travel funds available to the meeting, which allowed J Cooper as Secretary and Dr R Bannasch to attend. He also thanked members, and especially the Secretary, for active participation in intersessional work.

The draft agenda was adopted with minor alterations (Doc. 1, listed in Annex 2). Minutes of the previous meeting of the SCAR-BBS, held at XXI SCAR at Sao Paulo, Brazil in July 1990 and published in *Marine Ornithology* (1990) 18:79-89 (Doc. 2), were tabled. A list of previous meetings of the SCAR-BBS and its predecessors is given in Annex 3.

2. MATTERS ARISING FROM THE PREVIOUS MINUTES

Most matters arising from the last minutes are discussed below. However, publication of the BIOTAS (Biological Investigations of Terrestrial Antarctic Systems) Manual by SCAR was noted. This does not contain a section on relevant avian study methods (e.g. seabirds as vectors of propagules) which it was understood that Dr P Jouventin was preparing for inclusion within the manual. The Secretary agreed to investigate this matter with Dr Jouventin.

3. CENTRAL DATA BANK FOR ANTARCTIC BIRD BANDING

3.1 Primary banding data

Since the last meeting the report for 1986/87 and a five-year summary for the period July 1982 to June 1987 have been published in *Marine Ornithology* (1990) 19: 39-47 (Doc. 3). Previous published reports are listed in Annex 3. A provisional total of 24 205 birds of 54 species was banded in the period 1986/87 by 10 nations. A total of 91 514 birds of 60 species was banded in the five-year period, 72% belonging to only 20 species. Adélie Penguin *Pygoscelis adeliae* (10.7% of the total), Chinstrap Penguin *P. antarctica* (8.3%), Gentoo Penguin *P. papua* (5.8%), Wandering Albatross *Diomedea exulans* (9.6%) and Southern Giant Petrel *Macronectes giganteus* (8.1%) were the most commonly banded birds during the five-year period. The Central Data Bank (CDB) Manager, Mr T B Oatley, was thanked for the continued service offered. The Subcommittee noted the comments of the CDB Manager, Mr T B Oatley concerning opportunistic banding and agreed that this was of little value and incurred a cost to banding schemes and to the CDB. Banding should be restricted to long-term demographic studies and to those intensive shorter-term studies where individual recognition was necessary. Flipper-banding of penguins was an especially skilled task which should only be conducted by experienced and properly trained workers.

The SCAR-BBS noted recent staffing problems of the CDB's host organization, the Avian Demographic Unit (ADU) of the Department of Statistical Sciences, University of Cape Town, South Africa reported by the CDB Manager (Doc. 4). For this reason Subcommittee members and banding schemes had not been reminded to submit banding information during the past year, and continuing poor submission of information has meant that reviews of banding data from 1987/88 onwards

cannot be prepared. The SCAR-BBS reaffirmed its opinion that the CDB was a valuable service offered to SCAR and thanked the Avian Demographic Unit for hosting it. However, it was vital to be able to produce more up-to-date reports of banding and the Subcommittee asked the CDB Manager to write to all SCAR nation's banding schemes and Antarctic controlling authorities requesting the required data. To assist this endeavour the Subcommittee proposed as a recommendation that SCAR again request National Committees to ensure prompt submission of all outstanding bird-banding data as a matter of urgency.

Discussion was held on missing data, tabulated in Doc. 4.

For Argentina, contrary to earlier reports, some bird-banding had taken place, including of cormorants in 1988/89 at Nelson Island and in 1989/90, of penguins at Half Moon Island in 1990/91 and of Southern Giant Petrels at Laurie Island in 1991/92. Mr M Favero agreed to try to obtain full details. Dr D.F. Vergani had banded Adélie Penguins at King George Island, Antarctic Peninsula and Laurie Island. Lic. Z.B. Stanganelli will forward this information.

No Australian data had been received since 1986/87; the national scheme was in the process of reorganization and new efforts to obtain the data would be made. Brazil was known to be continuing bird banding at Elephant Island. Dr M Sander and Dr E Fanta would be contacted to obtain details.

Chilean data for its penguin banding programme at Ardley Island, South Shetland Islands for the period 1985/92 were handed in at the meeting. It was noted that Chilean bands were being used by Germany and Uruguay at Ardley Island as part of collaborative work there. This was a helpful and practical development, especially at localities such as King George Island where many nations had ongoing avian studies.

No French data had been received since 1986/87, and these should now be requested.

Dr R Bannasch was still awaiting Germany's 1990/91 data and would forward this as soon as possible.

The Netherlands banded birds at King George Island in 1990/91. The national banding scheme should be contacted for details; failing this Dr J A van Franeker would obtain the information.

New Zealand has not supplied data since 1987/88; the national ringing scheme organizer would be reminded to bring matters up to date.

It was believed that no banding had been undertaken by Norway on the recent expedition to Bouvet Island. Dr V Bakken would be contacted to confirm this.

Dr J Moreno had previously informed the Secretary of Spain's plan to commence banding Chinstrap Penguins at Deception Island in 1991/92. He was thanked for his prompt submission of these data.

Dr P Penhale (US National Science Foundation) who had successfully organized submission of US data in the past, had requested certain information from the CDB; the Secretary agreed to expedite a reply.

Unless otherwise indicated, all actions listed above will be initiated by the Secretary and/or the CDB Manager.

It was agreed that the CDB should be asked to prepare for intersessional circulation a document which would describe how incoming data are processed and list the forms in which data could most easily be received, especially including by electronic media. This document would include a reminder of the preferred scientific species' names and age-class categories and their definitions.

The Secretary agreed to liaise with the CDB Manager to ensure that prompt acknowledgement is given of receipt of submitted data.

3.2 Sightings and recoveries of banded birds

Reports of banded birds, especially penguins, from visitors, including tourists, to the Antarctic are increasing. It was agreed that it was not desirable actively to encourage tourists to read band numbers, because of potential disturbance to birds. However, it was felt useful to try to inform tour companies and private expeditions of the existence of the CDB, so that band details which were obtained without disturbance (e.g. including from dead birds) could be reported to the CDB and the relevant information conveyed to both bander and finder.

3.3 Colour banding

The CDB continues to curate colour-banding information received and to try to trace the details of sighted colour-banded birds. Members and observers were encouraged to continue to submit summary details of their schemes to the CDB. Spain had used yellow numbered plastic flipper bands for behavioural studies on Chinstrap Penguins at Deception Island and Chile had used colour bands on Wilson's Storm Petrels *Oceanites oceanicus* at Ardley Island.

3.4 Use of implanted electronic tags

In 1991/92 the Australian Antarctic Division (AAD) implanted 240 electronic tags in Adélie Penguins in a study by Dr K R Kerry in the Australian Antarctic Territory (Doc. 5). Implanted birds have been both web-punched to identify the bird as possessing a tag and tattooed to identify the provenance of the bird in case of resighting. Electronic tags have also been used since 1990 in a study of King Penguins *Aptenodytes patagonicus* at Possession Island, Iles Crozet, by Professor Y Le Maho (France) and in 1991/92 in a study of King Penguins at South Georgia by Mr O Olfsson (Sweden). The technique is likely to become more commonly used in the future, particularly in studies of penguins where it may even replace the use of conventional metal flipper bands in some studies at some sites. Dr Kerry had asked the Subcommittee (Doc. 5) to consider the implications of the widespread use of this technique from the point of view of avoiding double implantation (which would make tags unreadable) and exchanging information on the technique and its practical use and application.

Dr P D Shaughnessy (Australia) joined the meeting to advise the Subcommittee on his understanding of the activities of the AAD in this regard. The Subcommittee agreed that it would be very valuable to maintain a register of studies using this technique. Minimum information required, in addition to names and addresses of researchers, would be species, site, nature of tag, serial numbers of tags used, and position on the bird where implants were made. It was agreed that the best place to maintain this register, which it was envisaged might usefully be developed into an analogue of conventional banding data with details of individual tags being recorded, would be within the CDB (Doc. 6). The Secretary agreed to discuss this matter with the CDB. In the meantime, Dr Kerry was asked to collect information, including field procedures, on existing and planned implantation schemes and report back to the Subcommittee before its next meeting. Dr Kerry's suggestions that researchers be advised or requested to web-punch and/or tattoo birds bearing implanted tags were discussed. It was noted that other methods of identifying penguins with external marks, such as attaching small fish tags to the trailing edge of flippers, were currently under consideration. The Subcommittee felt that it was premature to make any formal suggestions or recommendations on this topic until research had been conducted to investigate the effects of using such marking methods.

3.5 Operation of the Central Data Bank

A letter (Doc. 7) from Professor L G Underhill, Director of the Avian Demographic Unit, which now houses the CDB, soliciting financial support

from SCAR for the running of the CDB had been received by the Chairperson at the meeting. Consequently it had not been possible to copy this to members in advance. Furthermore, the letter had apparently not yet been discussed within the South African National Committee for SCAR, the body which authorized the original offer to host the CDB in South Africa. It was agreed that the Chairperson would correspond intersessionally with Professor Underhill to clarify matters and that the Secretary would draw this matter to the attention of the South African National Committee for SCAR.

4. RECENT PUBLICATIONS ON ANTARCTIC AND SUBANTARCTIC BIRDS

Compilation of annual lists and their publication in *Marine Ornithology* has continued from the scheme's inception with the 1984 literature (Annex 3). The 1990 list has been published in *Marine Ornithology* Volume 19: 61-68 (Doc. 8). The 1991 and 1992 lists were tabled in draft form (Docs 9 & 10). With the help of members and observers, additional references were added to the 1991 list which will be published in *Marine Ornithology* Volume 20 in 1992. Recent publication lists from France, Netherlands and the United Kingdom were tabled (Docs 11-13).

The Subcommittee thanked the Secretary for producing these publications and agreed that the service was a valuable one, especially by drawing attention to theses and the more obscure references not published in the international refereed literature. Details of publications, and preferably copies of them, should be sent to the Secretary, who agreed to continue the service with the help of his research assistant. Dr M Sallaberry offered to help with the South American literature.

The Subcommittee accepted an offer from the Secretary to produce a ten-year (1984-1993) compilation of these references for circulation to members and observers. It was agreed that it would be especially valuable if the ten-year compilation could also contain indices to species and topics. However, this would represent a very substantial task and the Subcommittee agreed that it could only proceed with this if it could use as a basis existing computerized library bibliographies which included key words. The Chairperson agreed to investigate the feasibility of this, initially by consulting the Librarian of the British Antarctic Survey, who had been a co-author of the penguin bibliography sponsored by the SCAR-BBS and published in 1985.

5. SYNTHESIS OF DATA ON DISTRIBUTION AND ABUNDANCE OF ANTARCTIC AND SUBANTARCTIC BIRDS

5.1 Penguins

The comprehensive new review edited by Mr E J Woehler on behalf of the BBS had gone to press with SCAR at the end of 1991, but had not yet been published. It was agreed to ask the Working Group on Biology to request SCAR to expedite publication, to avoid the data in the report being too out-of-date before they were freely available. Accordingly the Subcommittee recommended that SCAR be requested to publish the penguin synthesis volume as soon as possible. The Subcommittee thanked Mr Woehler for completing the review and Ms S Poncet for her help with data for the Antarctic Peninsula.

5.2 Other birds

The Secretary reported no progress in compiling data on the distribution and abundance of other species. It was agreed to start work on this topic by summarizing data for the Southern Giant Petrel. Dr W R Fraser agreed to coordinate the production of this synthesis. Data should first be sent to the Secretary. The Secretary was asked to investigate the feasibility of producing such a compilation for the southern albatrosses, for which good data on abundance were available for most, but not for all, localities. It was noted that several persons had compilations of the distribution and abundance of southern albatrosses. They should be approached to

see if they would be prepared to become involved in producing a publication similar to that for penguins. It was noted that new censuses at New Zealand cold temperate islands would be especially valuable for an up-to-date and comprehensive synthesis.

The Subcommittee asked anybody wishing to compile syntheses for other species or species groups to contact the Secretary.

6. INTERNATIONAL GIANT PETREL BANDING PROJECT

Unfortunately no report was received from the organizer, Dr S Hunter, in time for the meeting . Recoveries of birds banded by the United Kingdom had been submitted directly to Dr Hunter. South African movements of Marion Island birds (nine Northern Giant Petrels *M. halli* and 23 Southern Giant Petrels) were tabled. These records, which include those of birds banded before the 1988/89 cohort banded during the project, show marked differences in movements between the species. They only include two records of birds thought to have been caught in association with fishing operations.

The Subcommittee agreed to request a report from Dr Hunter as a matter of urgency, and reminded members and observers who had not yet submitted their recovery data to the Secretary to do so without delay.

7. MONITORING STUDIES

7.1 CCAMLR Ecosystem Monitoring Program

The Chairperson reviewed the recent work of the CEMP, with particular reference to the report of the most recent (1991) meeting of this CCAMLR Working Group (Doc. 14) and the review of this report by the Scientific Committee and Commission of CCAMLR (Docs 15 & 16). These reports, available from the CCAMLR Secretariat, should be consulted for full details of recent, current and projected CEMP activities, which have also been summarized in a small brochure (Doc. 17).

Matters of particular relevance to the Subcommittee, since its last meeting were: a) inclusion of Gentoo Penguin as an approved species for monitoring; and b) the publication in 1991 of a complete revision of the standard methods for monitoring, including new outline methods for monitoring environmental variables likely to effect seabird reproductive performance (Doc. 18).

The BBS noted that, despite the recommendation from its 1990 meeting, the extensive and valuable data from the long-term studies of penguins at Admiralty Bay, South Shetland Islands, carried out by USA scientists, were still not available to CCAMLR, nor was this study incorporated as a recognized monitoring site within CEMP. However, Dr Fraser indicated that SCAR support had been most valuable in making considerable progress in this regard.

7.2 Status and trends of Antarctic seabirds

In 1988 at the request of CCAMLR the Subcommittee reviewed the status and trends of Antarctic and Subantarctic seabirds and published its conclusions (*Cormorant* 16: 138-158, 1988). In 1990 CCAMLR indicated that it wished again to consider this topic in detail at its 1992 meeting and invited the Subcommittee to update the 1988 review.

Three sources of material for this review were available at the meeting. Firstly, data on the forms provided by CCAMLR (listed in Doc. 19). Secondly, data from the published and in-press literature (Docs 20-35) and thirdly, personal communications from scientists present at the meeting.

Concern was expressed over the CCAMLR forms in that independently of circulation via the Secretary of the Bird Biology Subcommittee, CCAMLR had also provided these forms to individual researchers, some of whom had replied directly to CCAMLR rather

than to the Bird Biology Subcommittee. This had resulted in some submitted data (e.g. for Japan) being unavailable for review at this meeting. The forms themselves were also felt to be too complicated. In particular, they seemed to be designed to acquire primary data from research studies, rather than achieving a summary of the conclusions of these. This was felt to be inappropriate and potentially misleading.

Although the Subcommittee had assembled many published papers, other pertinent published data undoubtedly exist. Members were asked to identify such information as soon as possible with a view to including relevant data in the final report to be tabled at CCAMLR.

The main data reviewed by the Subcommittee are summarized in detail, by species and site or area in Table 1. The emphasis here is on data newly available since the 1988 review for sites where at least two comparable counts are available. However, many of the more significant long-term data sets are also summarized, whether or not new data are available. It should be noted that, particularly for Antarctic Peninsula penguins, substantial additional relevant historical data can be found in Croxall & Kirkwood (1979) and Poncet & Poncet (1985, 1987).

In its discussion of these data the Subcommittee emphasized that most data, even from exactly the same site, derive from a few counts widely separated in time. Breeding populations of most, if not all, Antarctic and sub-Antarctic seabirds show substantial natural fluctuations. Different apparent 'trends' can be produced by the selection of particular years from a long-term dataset (e.g. see Trivelpiece *et al.* 1990) and thus interpretations from fewer, more disjunct data can be misleading. In addition, interpretation of essentially the same data can be substantially different, as for Southern Giant Petrels at Iles Crozet (Voisin 1988, Bretagnolle *et al.* 1991, Voisin 1991). Thus the 'changes' indicated in Table 1 should not necessarily be taken as evidence of systematic population change. The source documents, particularly the published papers, should be consulted in conjunction with the species' summaries which follows.

Emperor Penguin *Aptenodytes forsteri*

The significant population decrease at Pointe Géologie, Adélie Land does not seem to be matched by the (very limited) data available for other breeding sites. The Pointe Géologie decrease has usually been attributed to changing physical environmental conditions relating to the local environment of the colony and/or to the extent of ice cover and date of ice breakout (Jouventin *et al.* 1984, Jouventin & Weimerskirch 1991). Long-term studies, with annual counts, of other breeding populations are obviously desirable; it was noted that Australia had recently commenced such work.

King Penguin *A. patagonicus*

Populations continue to increase very substantially at all breeding sites where data exist (South Georgia, Crozet, Kerguelen, Heard, Macquarie). Increases appear to be least at Marion Island. Reasons for the increases are uncertain. Whereas initial increases at some sites may have represented response to human exploitation in the 19th and early 20th centuries, it is most unlikely that populations are still 'recovering' today. In addition, evidence for actual human exploitation at several sites is very weak or non-existent. Increases are thus most likely to reflect enhanced levels of availability of food (especially myctophid fish).

Adélie Penguin *Pygoscelis adeliae*

The most extensive data are for the Ross Sea (and especially Cape Bird). Here, colonies may have decreased in size pre-1970, remained stable through the next decade and have certainly increased significantly since 1982/83. Elsewhere on the Antarctic Continent the limited data broadly suggest population stability, at least in the 1980s, or increases between the late 1950s to mid-1980s (e.g. Woehler *et al.* 1991), or in the late 1980s. At sites

TABLE 1

CHANGES IN POPULATIONS OF ANTARCTIC AND SUBANTARCTIC SEABIRDS

Species	Site	Year of data	Mean annual change		Reference
			Year	%	
Emperor Penguin	Pointe Géologie	1952, 1958, 1962, 1986	1975-86	-7.5	Jouventin & Weimerskirch 1990
King Penguin	Iles Crozet	1962, 1965, 1981, 1986	1962-86	-0.4*	"
		1962, 1967, 1981, 1986	1962-86	+7.3	"
		1967, 1981, 1986	1967-86	+10.4	"
	Iles Kerguelen	1962, 1985	1962-85	+6.3	"
		1962, 1985	1962-85	+7.2	"
		1974, 1985	1974-85	+19.6	"
	Heard I (Spit Bay)	8y 1963-1988	1963-88	+25.5	Gales & Pemberton 1988
	Macquarie I	1930, 1980	1930-80	+6.9	Rounsevell & Brothers 1984
	S. Georgia	1914, 1946, 1976, 1986	1976-86	+5.0	Croxall *et al.* 1988
Adélie Penguin	Cape Bird	1965-70, 1974-87	1982-88	+10.1	Wilson 1990
	Cape Hallatt	1981-87	1981-82	+9.9	Taylor *et al.* 1990
	Beaufort I	1981, 1983-87	1981-87	+6.1	"
	Franklin I West	1981, 1983-87	1981-82	+8.5	"
	Pointe Géologie	1958, 1984	1958-84	+2.1	Jouventin & Weimerskirch 1990
	Windmill I	1961, 1971, 1989	1961-71	+9.6	Woehler *et al.* 1991
		1971-89	+0.8		
	Signy I	4y 1948-1979	1948-79	+3.6	Croxall *et al.* 1981
		1979-1992	1979-92	+0.04	Croxall *et al.* 1988 & unpubl. data
	Admiralty Bay	7y 1977-86	1977-86	+0.2	Trivelpiece *et al.* 1990
Chinstrap Penguin	Admiralty Bay	7y 1977-86	1977-86	-3.1	Trivelpiece *et al.* 1990
	Signy I	4y 1948-1979	1948-79	+7.3	Croxall *et al.* 1981
		1979-92	1979-92	-0.1	Croxall *et al.* 1988 & unpubl. data

	Bouvetøya	4y 1958-78	1958-78	+14.6	Bakken 1991
		1979, 1990	1978-90	-7.6	"
	Half Moon I	1965, 1990	1965-90	+1.5	Favero & Silva 1991
	Harmony Pt	4y 1964-88	1964-88	+5.5	Favero *et al.* 1991
Gentoo Penguin	Iles Crozet	1970, 1985, 1986	1970-86	-2.0	Jouventin & Weimerskirch 1990
	Heard I	1952, 1987	1952-87	+2.5	Woehler 1991
	Signy I	1979-92	1979-92	+2.1	J.P. Croxall *et al.* unpubl. data
	Harmony Pt	6y 1903-88	1903-88	+5.4	Favero *et al.* 1991
Macaroni Penguin	Iles Kerguelen	1962, 1985	1962-85	+0.7	Jouventin & Weimerskirch 1990
	Bird I, S. Georgia	1958, 1977	1958-77	+9.7	Croxall & Prince 1990
		1977-92	1976-92	-0.7	J.P. Croxall *et al.* unpubl. data
	Bouvetøya	5y 1958-81	1958-81	+17.1	Bakken 1991
		1979-90	1979-90	-0.9	"
Wandering Albatross	Bird I, S. Georgia	1976-92	1976-92	-1.0	Croxall *et al.* 1990 & unpubl. data
	Possession I, Crozets	5y 1960-85	1960-85	-2.4	Jouventin & Weimerskirch 1990
	Cochon I, Crozets	3y 1964-81	1964-81	-2.0	"
	Iles Kerguelen	1971, 1985	1971-85	-5.7	"
	Marion I	7y 1974-91	1974-91	-0.7	J. Cooper unpubl. data
Blackbrowed Albatross	Bird I, S. Georgia	1976-89	1976-89	+0.8	P.A. Prince *et al.* unpubl. data
	Iles Crozet	1978, 1986, 1987	1978-87	-3.1	Jouventin & Weimerskirch 1990
Greyheaded Albatross	Bird I, S. Georgia	1977-90	1977-90	-1.8	P.A. Prince *et al.* unpubl. data
Southern Giant Petrel	Pointe Géologie	1956-84	1956-84	-5.5	Jouventin & Weimerskirch 1990
	Giganteus I	1956, 1985	1956-85	-8.2	Woehler & Johnstone 1991
	Hawker I	1970, 1988	1970-88	-7.8	"
	Frazier Is	1956, 1983	1956-83	-2.1	"
	Signy I	4y 1937-85	1937-85	-6.5	Rootes 1988
	Anvers I	?-92	19?-92	+?	W.R. Fraser unpubl. data
	Harmony Pt	1965, 1989	1965-89	+0.7	Favero *et al.* 1991
	Marion I	6y 1985-92	1985-92	-2.2	J. Cooper unpubl. data
	Heard I	1951, 1988	1951-88	-1.9	Woehler 1991

Northern Giant Petrel	Iles Crozet	1980-85	1980-85	-7.0	Jouventin & Weimerskirch 1990
	Bird I, S. Georgia	6y 1973-82	1973-82	+4.3	Hunter 1984
	Marion I	6y 1985-92	1985-92	+4.1	J. Cooper unpubl. data
Antarctic Fulmar	Haswell I	1963, 1979	1963-79	-1.8	Woehler & Johnstone 1991
	Rauer I	1981, 1985	1981-79	+10.7	"
	Windmill Is	1962, 1984	1962-84	+3.5	van Franeker *et al.* 1990
Antarctic Petrel	Haswell I	1962, 1979	1962-79	-8.1	Woehler & Johnstone 1991
	Rauer I	1981, 1985	1981-85	-2.4	"
	Windmill Is	1962, 1984	1962-84	+6.0	van Franeker *et al.* 1990
Pintado/Cape Petrel	Haswell I	4y 1957-1975	1957-79	-0.6	Woehler & Johnstone 1991
	Windmill Is	1962, 1978, 1984	1962-84	+10	van Franeker *et al.* 1990
	Harmony Pt	1965, 1989	1965-89	+7.6	Favero *et al.* 1991
Subantarctic Skua	Bird I, S. Georgia	1959, 1977, 1981	1959-81	+3.8	Prince & Croxall 1983
	Signy I	1959-66, 1983	1959-83	+3.8	Hemmings 1984
South Polar Skua	Anvers I	1974-1990	1974-90	+6.6	W.R. Fraser unpubl. data
Kelp Gull	Half Moon I	1966, 1991	1966-91	+2.5	Favero & Silva 1991
	Harmony Pt	1965, 1989	1965-89	+8.1	Favero *et al.* 1991
Imperial/Blue-eyed Cormorant	Signy I	20y 1948-1981	1948-81	+6.0	Shaw 1984
	Half Moon I	1953, 1991	1953-91	+7.2	Favero & Silva 1991
	Harmony Pt	1965, 1989	1965-89	+3.4	Favero *et al.* 1991

* colony close to permanent station.

on the Antarctic Peninsula and nearby island groups, the evidence of increases between the 1950s to late 1970s is unequivocal. Thereafter, depending on site, populations have either fluctuated substantially but remained generally stable overall, or decreased locally. Some decreases may have been due to human disturbance but decreases at many sites (e.g. Anvers Island area) cannot have been caused in this way. At Bouvet Island, Adélie Penguins appear to breed only sporadically (on three of five visits; Bakken 1991). Adélie Penguin population changes may be especially closely linked to changes in the physical environment (Stanganelli & Vergani ms), particularly ice cover (Croxall *et al.* 1988, Fraser *et al.* 1992), but these relationships are not necessarily on an immediate or proximate basis.

Chinstrap Penguin *P. antarctica*

Major population increases (at faster rates than for Adélie Penguins) were generally characteristic of the 1950s to mid-1970 period. Since then most of the few data indicate substantial fluctuations or, at most, a very reduced rate of continued increase. There is no longer evidence of colonization of new sites nor of significant increases at the edge of the species' breeding range. Decreases at some sites are perhaps attributable to human disturbance, although the data for Bouvet Island cannot be explained in this way. Chinstrap Penguin fluctuations are also undoubtedly influenced by changes in the physical environment (Croxall *et al.* 1988, Fraser *et al.* 1992) but possibly to a lesser extent than for Adélie Penguins and with even less obvious simple correlations.

Gentoo Penguin *P. papua*

This species shows the largest interannual population fluctuations (influenced to some (considerable?) extent by its early age of first breeding) in the genus *Pygoscelis*. Few data are adequate to demonstrate any systematic trend. Generally, therefore, populations are believed to be stable or, perhaps, increasing (currently or in the past) at a few localities (e.g. Nelson Island, Ardley Island, Signy Island and Heard Island).

Macaroni Penguin *Eudyptes chrysolophus*

Data from South Georgia and Bouvet Islands suggest that populations are currently fairly stable after substantial increases prior to the 1970s - and a possible decrease at South Georgia in the early 1980s. Marion Island populations appear relatively stable.

Rockhopper Penguin *E. chrysocome*

No relevant data exist within the CCAMLR area for a species very difficult to count accurately. Substantial population decreases for the Campbell and Auckland Islands have been reported by Moors (1986) and Cooper (1992) but the causes of these remain entirely speculative.

Wandering Albatross *Diomedea exulans*

Population decreases at all breeding sites for where there are sufficient data. Some suggestion exists of slower rates of decrease/stabilization at Iles Crozet but not at South Georgia. Incidental mortality associated with long-line fisheries is probably the most significant cause of the population decrease (Croxall *et al.* 1984, Jouventin *et al.* 1984, Weimerskirch & Jouventin 1987, Croxall & Prince 1990, Croxall *et al.* 1990, Brothers 1991).

Amsterdam Albatross *D. amsterdamensis*

Stable or perhaps slightly increasing from very low population levels (Jouventin *et al.* 1989), partly due to removal of feral cattle and consequent restoration of breeding habitat.

Blackbrowed Albatross *D. melanophris*

Decreasing at Iles Crozet, possibly increased at Heard Island between the 1950s and 1980s and essentially stable at Bird Island, South Georgia, decreases at some colonies being balanced by increases in others (P A Prince *et al.* unpubl. data). It is difficult to interpret the status of this species

because local fishing activities could contribute to population increases (through enhanced opportunities for scavenging food) and also to decreases (through incidental mortality).

Greyheaded Albatross *D. chrysostoma*

A significant decrease has occurred at Bird Island since 1975 across all colonies (P A Prince *et al.* unpubl. data). Populations on Marion Island counted in seven years between 1974-1991 have fluctuated substantially but without any clear trend (J Copper unpubl. data). The causes are unknown but less likely to be fishery-related than for the other species of albatrosses at South Georgia because the Greyheaded Albatross is not typically associated with fishing vessels.

Southern Giant Petrel *Macronectes giganteus*

There have been decreases in numbers at South Georgia, Marion and Heard Islands. The situation at Iles Crozet is controversial (Voisin 1988, Bretagnolle *et al.* 1991, Voisin 1991). Populations at all continental sites are decreasing in size. In the Antarctic Peninsula the situation is more complicated. The species appears to be stable at some sites (e.g. Nelson Island, (Favero *et al.* 1991), Laurie Island since 1981/82 (D F Vergani pers. comm.), Potter Cove, King George Island, (N R Coria pers. comm.)). There have been substantial decreases in numbers at some other sites (e.g. Signy Island, Rootes 1988). The population at Anvers Island has increased substantially over the last two decades (W R Fraser pers. comm.). Human disturbance can have an undoubted influence on this species but the decreases include several sites where this is unlikely to have been a factor. Incidental mortality is also likely to influence this ship-associated species, especially in sub-Antarctic areas.

Northern Giant Petrel *M. halli*

No clear pattern exists for this species but the population is apparently decreasing at Iles Crozet and increasing at South Georgia (although no data are available since the mid-1980s) and at Marion Island.

Smaller fulmarine petrels

Long-term data on Antarctic Fulmars *Fulmarus glacialoides* and Snow Petrels *Pagodroma nivea* from Pointe Géologie, Adélie Land (Weimerskirch 1990, Jouventin & Weimerskirch 1991, Chastel *et al.* in press) show substantial interannual fluctuations in populations but no clear trend over the last 30 years. Data for these species at other sites and all data for Pintado/Cape *Daption capense* and Antarctic *Thalassoica antarctica* Petrels are insufficiently detailed, when viewed against this background, to indicate clearly any significant population change. Furthermore, counts of breeding populations of fulmarine petrels are particularly significantly affected by the timing of counts (J A van Franeker pers. comm.). Most data do not have this information and so an additional source of variation is present. Increases reported for all four species at the Windmill Islands between the 1960s and 1984 simply reflect improved coverage and accuracy of censuses and do not indicate any population change (van Franeker *et al.* 1990).

Burrow-dwelling petrels (Procellaridae, Hydrobatidae, Pelecanoididae)

The conclusions of the previous review still pertain. That is, despite lack of precise data, populations of species in these groups have been greatly reduced at sub-Antarctic island localities where feral animals are present. In this context, the apparent removal by South Africa of feral cats *Felis catus* from Marion Island ranks as of one of the most significant recent achievements in the field of sub-Antarctic island conservation. It has lead to increases in breeding success at this site for at least three species of burrowing petrels (Cooper & Fourie 1992, J Cooper pers. comm.). Other nations should be strongly encouraged to follow this lead.

Local decreases in populations of burrowing petrels (especially Blue Petrels *Halobaena caerulea* and

Antarctic Prions *Pachyptila desolata*) at South Georgia have been caused by destruction of breeding habitat by Antarctic Fur Seals *Arctocephalus gazella* (P A Prince unpubl.data).

Imperial/Blue-eyed Cormorant *Phalacrocorax atriceps*

This species characteristically shows considerable interannual variation in timing of breeding and population size, making assessment of population trends very difficult. Nevertheless there are clear indications of gradual long-term increases at Half Moon Island, Nelson Island and Signy Island, which may generally be typical of the species in this region.

Subantarctic Skua *Catharacta antarctica*

Increases on King George Island and at Nelson Island may have been facilitated by availability of refuse from nearby bases. Populations at Admiralty Bay, King George Island, away from the base area, are stable (W R Fraser pers. comm.). Otherwise there are no new data since the last review.

South Polar Skua *C. maccormicki*

There are few new data, either on changes in populations at continental sites associated with bases (decreases at Cape Hallett (Harper *et al.* 1964), increases at Pointe Géologie (Jouventin *et al.* 1984)) or increases and range extension in the Antarctic Peninsula (Hemmings 1984). Although some changes may be attributable to more opportunities for scavenging at bases, this cannot explain the large increase at Anvers Island where no refuse has been available since 1979 (W R Fraser pers. comm.). Numbers have increased substantially in the Admiralty Bay area, King George Island since the first censuses in 1976. The potential influence of refuse cannot be totally discounted, although at sites where both skua species co-occur, South Polar Skuas are usually excluded from the food source by their larger congener. Thus the increases probably reflect natural, rather than man-induced, changes (W Z Trivelpiece pers. comm.).

Kelp Gull *Larus dominicanus*

Increases at Nelson Island, King George Island may relate to increased availability of refuse. Populations in the Anvers Island area, where no refuse is available, have remained stable (W R Fraser pers. comm.).

Antarctic and Kerguelen Terns *Sterna vittata* and *S. virgata*

No new data exist for these potentially vulnerable species which, because of their tendency regularly to move breeding sites, are very difficult to count accurately.

Greater Sheathbill *Chionis alba*

Populations have remained stable over the last decade at Hope Bay (N R Coria pers. comm.), the only site for which any quantitative data exist this species.

The Subcommittee offered the following general conclusions:

1. For many species of Antarctic and sub-Antarctic seabirds, data are generally inadequate to make any accurate assessment of population trends at any site in the region. For most other species, adequate data exist for only one or two sites. Only commitments to continuous long-term studies will remedy this situation.

2. Of species for which adequate data exist for at least one site, most are currently fluctuating appreciably around a basically stable level, or increasing slightly.

3. The King Penguin is the only species for which significant population increases are currently taking place at most, if not at all, breeding localities. These increases are likely to reflect changes in the species'

biological environment, presumably involving its main prey, myctophid fish.

4. Adélie Penguins have increased steadily in the Ross Sea region since 1982. Populations are generally stable elsewhere, including at sites where significant population increases occurred between the 1950s and 1970s.

5. Chinstrap, and possibly Macaroni Penguins, which showed substantial local or regional population increases in the 1950s through 1970s are now stable or, at most, slightly increasing.

6. There is less evidence than previously that species are continuing to increase in numbers because of increased availability of refuse in the vicinity of stations. Treatment of human wastes, although much improved, still needs attention, especially when the potential main beneficiaries are predatory species whose population increases will be to the likely detriment of other birds.

7. The Southern Giant Petrel and nearly all albatrosses for which adequate data are available are decreasing at most or all sub-Antarctic islands. The Southern Giant Petrel has decreased significantly at all breeding sites on the Antarctic Continent but the situation in the Antarctic Peninsula area is more complex. The decreases are most likely to relate to incidental mortality associated with fisheries but better data, especially for Greyheaded Albatrosses and giant petrels, are urgently needed.

8. There is less evidence than previously that species are continuing to decrease because of human disturbance, although better data are needed for populations in the vicinity of bases.

9. Burrowing petrels at most sub-Antarctic islands continue to be seriously affected by introduced animals; the example of South Africa in probably having eradicated feral cats on Marion Island needs to be emulated as widely and as rapidly as possible.

10. There is still only circumstantial evidence that decreases in any seabird population can be attributed to decreases in food availability at sea. There is no evidence that any population decreases reflect the effects of commercial fishing.

11. There is increasing evidence of the importance of the physical environment in influencing reproductive performance and even population dynamics of Antarctic seabirds, especially species of high latitudes. It is crucial that all seabird monitoring studies should record physical variables as an integral part of the programme.

12. Despite numerous examples of changes in abundance of seabird populations that correlate with previous or simultaneous changes in characteristics of the biological or physical environment, we have only a very poor knowledge of how such environmental factors operate and interact, or of how seabird populations are regulated. These remain vital fields for enhanced research.

7.3 Incidental mortality

In 1990 the SCAR-BBS expressed its serious concern over mortality of seabirds, particularly albatrosses, caused by long-line fisheries both inside and outside the Southern Ocean. Since then, considerable quantitative data have been published (e.g. Docs 22 & 23) and the various problems have been thoroughly reviewed by CCAMLR (Docs 15 & 16). This has resulted in: a) a ban on the use of net monitor cables (a source of substantial mortality of seabirds through collisions) on trawlers operating in the Convention Area after 1994/95; and b) requiring vessels engaged in long-line fishing (for Patagonian Toothfish *Dissostichus eleginoides*) in the Convention Area to comply with a suite of measures designed to reduce incidental mortality of seabirds until a means of eliminating this can be found.

Concern was expressed at the recent expansion of Chilean long-line fisheries, both inside the Convention Area and off southern South America,

the latter posing particularly serious threats to globally important populations of Blackbrowed and Greyheaded Albatrosses breeding at Islas Diego Ramirez. It was suggested that Chile be encouraged to adopt the relevant CCAMLR regulations as minimum standards for its long-line fisheries off southern South America.

The Subcommittee agreed that there was a need for more research on incidental mortality and encouraged members also to exchange and publish the results of current studies. Dr Fraser reported that four out of 180 Southern Giant Petrels examined at Anvers Island in 1991/92 had ingested fishing hooks (of the type used in long-line fisheries). An adult with a hook through its bill was observed at Admiralty Bay, King George Island, in February 1991 (W Z Trivelpiece pers. comm.). These are the first such reports for this species and are cause for concern.

The SCAR-BBS noted that compliance with the various measures designed to reduce or eliminate incidental mortality was likely to be significantly improved by the use of a system of placing scientific observers (who would also be able to collect scientific data on incidental mortality and related topics) on fishing vessels. This was the topic of a recommendation by SCAR in 1990 but CCAMLR has still been unable to implement its plans for such a scheme, due to objections by the European Community (EC). The SCAR-BBS recommends that SCAR expresses its concern to CCAMLR over this situation and that National Antarctic Committees of EC member countries take all appropriate action to try to ensure that the EC does not continue to obstruct the development of CCAMLR's scientific observer programme.

7.4 Pollutants

The Secretary drew the attention of the meeting to the recent publication of the Proceedings of the Second International Conference on Marine Debris, held in Honolulu, Hawaii, USA in April 1989. Several papers in the proceedings reviewed the incidence of ingested artificial material and entanglements and their effects on seabirds.

Work on pesticide and heavy metal pollution of sub-Antarctic seabirds and their eggs was being undertaken by several groups and there was a need for a review of field and laboratory techniques in order to achieve better standardization on optimal methods.

The Secretary had not yet contacted the U.S. National Science Foundation, Office of Health, Safety and Environment to obtain information on its attempts to define pollutants in Antarctica and to address issues of detection and monitoring. He agreed to do this without delay and to report back to the Subcommittee.

7.5 *Bahia Paraiso*

Dr J Coosen (Netherlands) then joined the meeting to give details of an Environmental Impact Assessment being prepared at the time of the meeting, concerning a proposal to remove oil from the sunken *Bahia Paraiso* near Palmer Station on the Antarctic Peninsula (Doc. 36). In case of any oil spills during the removal operation it is important both to reduce impact on birds to a minimum, and also to monitor any effects that may occur. Dr W R Fraser reported that most of the seabirds close to the site of the wreck are already monitored on an annual basis. This existing monitoring programme is thus ideally placed to detect adverse effects that might derive from the oil-removal operation. However, the Subcommittee noted that some species, notably Wilson's Storm Petrels, are attracted to oil slicks and therefore are especially at risk. Antarctic Terns *Sterna vittata* are plunge-diving inshore foragers and may also be affected. Neither species is being currently monitored at Palmer Station.

8. MATTERS ARISING FROM BIOMASS INVESTIGATIONS

8.1 Computerization of penguin distributional data

The distributional data within the penguin distribution and abundance review (see 5.1 above) are being added to the Antarctica digital topographic database administered in the United Kingdom. There may be a need to incorporate data on a finer geographical scale, which would require, in many cases, consulting the original sources of data summarized in the penguin review.

8.2 BIOMASS Colloquium

The programme for this Colloquium, held in Bremerhaven, Germany in September 1991, was tabled (Doc. 37). Two birds-at-sea papers, based on data collected on the multiship and multinational FIBEX and SIBEX Cruises in the Prydz Bay and the Antarctic Peninsula regions, were presented at the Colloquium, and are now in press (referenced as Docs 38 & 39). The Secretary tabled a compilation of BIOMASS Cruises, along with their number of ten-minute card records (Doc. 40). The BIOMASS Data Centre is supplying all BIOMASS participatory nations with a complete BIOMASS data set in electronic form, along with a summary of its contents and a guide to its use.

9. CO-ORDINATION OF ANTARCTIC SEABIRD RESEARCH

9.1 Seabirds-at-sea data

No progress had been made with requesting information on the nature of SCAR nations' seabirds-at-sea data bases. However, the Subcommittee noted the existence of the BIOMASS data set (see 8.2 above) which contains the largest data set on seabirds at sea in the Southern Ocean. New methodologies are being tested (e.g. Docs 41 & 42). The Subcommittee agreed that before any new multinational study, involving collecting quantitative data on seabirds at sea, commenced in the Southern Ocean (see 9.2 below), it would be necessary to hold a workshop to ensure standardization of techniques on the basis of the best current methodologies.

9.2 SCAR IGBP programmes

The Subcommittee was informed on relevant developments within the International Geosphere-Biosphere Programme (IGBP) as covered in the reports of the last two meetings of SCAR's Group of Specialists on Southern Ocean Ecology (GOSSOE) in *SCAR Report* No. 8 (Doc. 43). The planned expansion of the Global Ocean Ecosystems Dynamics Study (GLOBEC) to include a Southern Ocean component (SO-GLOBEC) should give substantial opportunities for the study of "top predators", including seabirds, in the Southern Ocean (Doc. 44). The field programme for a SO-GLOBEC is not likely to commence prior to the mid 1990s and will probably run to the end of the millennium. Likely study areas may include the Bellingshausen Sea area and parts of the southern Indian Ocean.

Discussion was then held on the use of instrumented birds, especially penguins, to collect oceanographic data of a quality sufficient to identify fronts and other water features, and at a cost substantially below that of ship-based oceanographic research. It was agreed that this developing technology needed to be brought to the attention of oceanographers, most preferably by publishing details of it in the scientific literature. It would be most desirable if a SO-GLOBEC Programme considered the use of instrumented birds as part of its planning.

Members were encouraged to prepare outline research proposals for seabird research as part of SO-GLOBEC with a view to the development at the next meeting of the Subcommittee of one or more proposals for coordinated studies.

10. SEABIRD RESEARCH AT THE SOUTH SHETLAND ISLANDS

10.1 King George Island

Concern had been expressed at previous SCAR-BBS meetings that seabird research at King George Island should be better coordinated and integrated. A letter

received from Dr J Moreno of Spain was read to the meeting (Doc. 45) in which he also expressed concern on the matter, and on the quality of some of the avian research conducted at King George Island. A recent paper on the environmental effects of human activities on the island was tabled (Doc. 46).

The Subcommittee was pleased to hear of recent collaboration taking place on the island between Chilean and German ornithologists. It is hoped to extend this collaboration to include Uruguayan scientists. To facilitate further such developments it was deemed essential for scientists and managers of scientific programmes at King George Island to meet together. It was suggested that the SCAR Working Group on Biology should consider the need for a workshop on the co-ordination of biological research at King George Island.

10.2 Nelson Island

An expedition from Czechoslovakia (which is not a member of SCAR) to this island had received advice from German ornithologists, as well as from the SCAR-BBS intersessionally and from CCAMLR. The scientific programme and results of this expedition were as yet unknown. Dr R Bannasch was asked to investigate and report to the Subcommittee at its next meeting.

A number of SCAR members are now undertaking research on Nelson Island and the SCAR-BBS was encouraged to learn of the development of collaborative programmes between Argentina and Germany at Jubany Station.

A draft revised Management Plan for the Harmony Point, Nelson Island Site of Special Scientific Interest (SSSI No. 14) (Doc. 47) was tabled for comment. This had previously been discussed at the fourth meeting of the SCAR Group of Specialists on Environmental Affairs and Conservation (GOSEAC IV). The suggestion is to divide the SSSI into control and impact areas, and after baseline studies, allow tourism into the latter. The effects of such tourism on the SSSI's biota would then be assessed.

The Subcommittee recognized the importance of obtaining quantitative data on interactions between tourists and biota and commended the concept of the proposed study. However, it was concerned at the lack of supporting information available on the proposed study, particularly because impact on penguins will undoubtedly be a major element of the research. The whole topic is an important one and would have benefited from advice from appropriate SCAR specialist and working groups from the outset.

On the basis of such information as was available at the meeting, the Subcommittee expressed the following concerns: a) that an SSSI, rather than some other site visited by tourists, had been selected. The introduction of tourism into an existing SSSI might be regarded as an unfortunate precedent. In addition, Harmony Point is the site of probably the largest colony of Chinstrap Penguins in the Antarctic Peninsular region; b) that the proposal to divide the SSSI into two portions, the impact area and the control area, would effectively preclude any other research in the SSSI; c) the apparent proposal to build a visitor centre within the SSSI needs careful scrutiny. It was assumed that this would involve a full environmental impact assessment (EIA) which would require the consideration of other sites; and d) whether alternative and/or additional approaches to the study had been considered. For instance, the establishment of a base-line study of impacts at a site currently subjected to tourism, followed by the closure of the site in order to study subsequent changes was suggested.

The Subcommittee asked that the SCAR Working Group on Biology draw these comments to the attention of the appropriate bodies.

11. MEETINGS

11.1 International Council for Bird Preservation World Conference, Hamilton, New Zealand, 1988

The Chairperson gave brief details of activities held at this meeting which were of interest to the SCAR-BBS. The proceedings of the island management symposium were now in press with the *ICBP Technical Publications* series.

11.2 International Ornithological Congress, Christchurch, New Zealand, 1988

The Proceedings of the 20th IOC were published in December 1991 and contained a number of papers on Antarctic seabirds. These have been included within the 1991 list of recent publications (Doc. 9).

11.3 SCAR Antarctic Science Conference, Bremen, Germany, 1991

The Chairperson reported that this meeting included a paper on southern seabirds by Dr P Jouventin which will appear in the conference volume. In addition, the Chairperson, after correspondence with members, had contributed a poster covering current initiatives in Antarctic and sub-Antarctic seabird research and had prepared the section on seabirds and seals for the SCAR poster on monitoring. These posters are now being refurbished prior to being sent to several countries for educational purposes and will also be on display at the next SCAR Biology Symposium in Italy in 1994.

11.4 SCAR/IUCN conservation workshops, 1992

A workshop on the conservation of sub-Antarctic islands was held in Paimpont, France in April/May 1992, cosponsored by SCAR and the World Conservation Union (IUCN). The proceedings of this meeting are to be published. A similar meeting, dealing with protected areas on the Antarctic Continent, is to be held in the UK in late June 1992.

11.5 Forthcoming meetings

In August 1992, a biotelemetry conference will be held in Italy. The Second International Penguin Conference will be held at Phillip Island, Australia in September 1992. In June 1993, a conference on cephalopods of the Southern Ocean will be held in the United Kingdom at Cambridge; this will include a session on cephalopods as prey of seabirds, seals and whales.

The Secretary gave details (Doc. 48) of a Symposium on Migration, Dispersal and Nomadism to be held at Langebaan, South Africa in September 1993. A session was being organized by the Secretary on movements, including foraging trips, of southern seabirds. Members and observers were encouraged to consider contributing to this symposium session and to bring it to the notice of their colleagues.

12. ANY OTHER BUSINESS

The need for a compilation of mass data of seabirds was raised, especially for use in models of food and energy consumption. The Chairperson explained the previous efforts of the SCAR-BBS in this regard, which had not come to fruition because of the complexity of these data, especially for penguins. It was agreed, however, to put the topic on the agenda for the next meeting of the SCAR-BBS.

The Secretary, in his capacity as Editor of *Marine Ornithology*, again offered to publish the minutes of the SCAR-BBS meeting in this journal. This offer was accepted with thanks, pending approval by the SCAR Working Group on Biology.

13. MEMBERSHIP

The Subcommittee wished to recommend to the SCAR Working Group on Biology that it appoint Drs W R Fraser and J A van Franeker as members of the SCAR-BBS. Dr J P Croxall indicated his desire to relinquish the Chair at the next meeting of the Subcommittee.

14. NEXT MEETING

The Subcommittee requested the permission of the SCAR Working Group on Biology to meet in

association with the planned VIth SCAR Symposium on Antarctic Biology in May/June 1994 in Venice, Italy.

15. RECOMMENDATIONS

15.1 To SCAR via the Working Group on Biology.

1. Requests that SCAR National Committees be again asked to ensure that banding data are submitted promptly to the CDB on an annual basis.

2. Requests SCAR to ensure the prompt publication of the volume on distribution and abundance of Antarctic and sub-Antarctic penguins.

3. Requests that SCAR expresses to CCAMLR its concern about the continuing failure of CCAMLR to implement its programme of scientific observers on fishing vessels and that National Antarctic Committees of European Community member countries be requested to take appropriate action to ensure that the EC does not continue to obstruct the development of CCAMLR's scientific observer programme.

4. Requests from SCAR the sum of USD 3 000 to enable members, and especially the Secretary, to attend the meeting of the Subcommittee in 1994.

15.2 To the SCAR Working Group on Biology

1. Requests that Dr W R Fraser and Mr J A van Franeker be appointed to the Subcommittee.

16. CLOSURE

The Chairperson thanked the members and observers for their contributions and then closed the meeting.

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ANNEX 1

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ANNEX 2

TABLED DOCUMENTS AT THE 1992 MEETING OF THE SCAR BIRD BIOLOGY SUBCOMMITTEE

1. SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH BIRD BIOLOGY SUBCOMMITTEE, Bariloche, Argentina, 6-8 June 1992. Agenda. 2 pp.
2. SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH BIRD BIOLOGY SUBCOMMITTEE 1990. Minutes of meetings, 16-18 July 1990, Sao Paulo, Brazil. *Marine Ornithology* 18: 79-89.
3. OATLEY, T.B. 1991. Antarctic and Southern ocean bird banding review, July 1982 - June 1987. *Marine Ornithology* 19: 39-47.
4. OATLEY, T.B. 1992. Status report from Central Data Bank for Antarctic Bird Banding for year ending 31 May 1992. 2 pp.
5. KERRY, K. R. 1992. Utilization of implanted electronic identification into Antarctic seabirds. Letter to SCAR-BBS Secretary. 2 pp.
6. OATLEY, T. B. 1992. Letter to SCAR-BBS Secretary. 1 pp.
7. UNDERHILL, L. G. 1992. Letter to SCAR-BBS Chairperson. 1 pp.
8. COOPER, J. 1991. Publications and theses on Antarctic and sub-Antarctic birds, 1990. *Marine Ornithology* 19: 61-68.
9. COOPER, J. & PLÖS, A.L. 1992. Publications and theses on Antarctic and sub-Antarctic birds, 1991. *Marine Ornithology* 20: in press.
10. PLÖS, A L 1992. Publications and theses on Antarctic and sub-Antarctic birds, 1992. 2 pp.
11. CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CENTRE D'ETUDES BIOLOGIQUES DE CHIZE 1992. Liste des publications. 1988-sous presse. 2 pp.
12. VAN FRANEKER, J.A. ms. Netherlands recent publications on southern seabirds. 2 pp.
13. BRITISH ANTARCTIC SURVEY. ms. United Kingdom publications on southern seabirds and seals, 1991 - in press. 7 pp.
14. SCIENTIFIC COMMITTEE FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES. 1991. Report of the Working Group for the CCAMLR Ecosystem Monitoring Programme. In: Report of the Tenth Meeting of the Scientific Committee. Hobart, Australia 21-25 October, 1991. Hobart: CCAMLR. Annex 7. pp. 347-418.
15. SCIENTIFIC COMMITTEE FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES. 1991. Report of the Tenth Meeting of the Scientific Committee. Hobart, Australia 21-25 October, 1991. Hobart: CCAMLR. 427 pp.
16. COMMISSION FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES. 1991. Report of the Tenth Meeting of the Commission. Hobart, Australia 21 October - 1 November 1991. Hobart: CCAMLR. 101 pp.
17. COMMISSION FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES. 1991. CCAMLR Ecosystem Monitoring Program (CEMP). Hobart: CCAMLR. 14 pp.
18. SCIENTIFIC COMMITTEE FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES. 1991. CCAMLR Ecosystem Monitoring Program. Standard methods for CEMP monitoring studies. Hobart: CCAMLR. 131 pp.
19. COOPER, J. (COMPILER) 1992. Summary of submitted forms for CCAMLR Antarctic seabird population status and trends review. 2 pp.
20. CARLINI, A., VERGANI, D.F. & GASCO, M.A. ms. Changes on Adélie Penguin population between 1963-1992 breeding seasons at Hope Bay. 3 pp.

21. STANGANELLI, Z.B. & VERGANI, D.F. ms. What is the key factor in breeding success of Adélie Penguins at Antarctic Peninsula area? 9 pp.
22. CROXALL, J.P, ROTHERY, P., PICKERING, S.P.C. & PRINCE, P.A. 1990. Reproductive performance, recruitment and survival of Wandering Albatrosses *Diomedea exulans* at Bird Island, South Georgia. *Journal of Animal Ecology* 59: 775-796.
23. CROXALL, J.P. & PRINCE, P.A. 1990. Recoveries of Wandering Albatrosses *Diomedea exulans* ringed at South Georgia. *Ringing and Migration* 11: 43-51.
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25. FAVERO, M., BELLAGAMBA, P.J. & FARENGA, M. 1991. Abundancia y distribucion espacial de las poblaciones de aves de Punta Armonia y Punta Dedo, Isla Nelson, Shetland del Sur. *Rivista Italiana di Ornitologia* 61: in press.
26. JOUVENTIN, P. & WEIMERSKIRCH, H. 1990. Long-term changes in seabird and seal populations in the Southern Ocean. In: KERRY, K.R. & HEMPEL, G. (Eds). *Antarctic ecosystems. Ecological change and conservation*. Berlin: Springer-Verlag. pp. 208-213.
27. JOUVENTIN, P. & WEIMERSKIRCH, H. 1991. Changes in the population size and demography of southern seabirds: management implications. In: PERRINS, C.M., LEBRETON, J.D. & HIRONS, G.J.M. (Eds). *Bird population studies: their relevance to conservation and management*. Oxford: Oxford University Press. pp. 297-314.
28. WILSON, K.-J. 1990. Fluctuations in populations of Adélie Penguins at Cape Bird, Antarctica. *Polar Record* 26: 305-308.
29. TAYLOR, R.H., WILSON, P.R. & THOMAS, B.W. 1990. Status and trends of Adélie Penguin populations in the Ross Sea region. *Polar Record* 26: 293-304.
30. FRASER, W.R., TRIVELPIECE, W.Z., AINLEY, D.G. & TRIVELPIECE, S.G. 1992. Increases in Antarctic penguin populations: reduced competition with whales or a loss of sea ice due to environmental warming? *Polar Biology* 11: 525-530.
32. BAKKEN, V. 1991. Fugle-og selundersøkelser på Bouvetøya i Desember-Januar 1989/90. *Norsk Polarinstitutt Meddelelser* 15:1-30.
33. WOEHLER, E.J. 1991. Status and conservation of the seabirds of Heard Island and the McDonald Islands. In: CROXALL, J.P. (Ed.). *Seabird status and conservation: a supplement*. Cambridge: International Council for Bird Preservation. pp. 263-277.
34. WOEHLER, E.J. 1991. Status and conservation of the seabirds of the Australian Antarctic Territory. In: CROXALL, J.P. (Ed.). *Seabird status and conservation: a supplement*. Cambridge: International Council for Bird Preservation. pp. 279-308.
35. ALVAREZ, B., PUIG, J., GRANUCCI, A., FROS, T., SANCHEZ, J., ALVAREZ, S. & MENDEZ, C. ms. Estudio de algunas variables eco-etologicas, en una pinguinera de *Pygoscelis papua*, en las Islas Shetland del Sur - Isla Ardley. 20 pp.
36. MARSCHOFF, E., ACERO, J.M. & COOSEN, J. 1992. Draft 2nd Progress Report on the Environmental Impact Assessment associated with the salvage operation of the remaining oil of the *Bahia Paraiso*. 7 pp.
37. BIOMASS Colloquium September 18-20, 1991 Programme. 4 pp.
38. COOPER, J. & WOEHLER, E.J. in press. Consumption of Antarctic Krill *Euphausia superba* by seabirds during summer in the Prydz Bay region, Antarctica. In: EL-SAYED, S. Z. (Ed.). Southern Ocean ecology: the BIOMASS perspective. Cambridge: Cambridge University Press.
39. HUNT JR, G.L., CROXALL, J.P. & TRATHAN, P. in press. Marine ornithology in the southern Drake Passage and Bransfield

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41. VAN FRANEKER, J.A. 1992. Top predators as indicators for ecosystem events in the confluence zone and marginal ice zone of the Weddell and Scotia Seas, Antarctica, November 1988 to January 1989 (EPOS Leg 2). *Polar Biology* 12: 93-102.
42. VAN FRANEKER, J.A. ms. A comparison of different methods for counting seabirds at sea in the Southern Ocean. 21 pp.
43. SCAR/SCOR GROUP OF SPECIALISTS ON SOUTHERN OCEAN ECOLOGY 1992. Reports of the meetings held in Trondheim, Norway, 21-23 May 1990 and Bremerhaven, Germany, 17-18 September 1991. *SCAR Report* 8: 1-40.
44. GLOBAL OCEAN ECOSYSTEMS DYNAMICS 1991. GLOBEC: Southern Ocean Program. GLOBEC Workshop on Southern Ocean Marine Animal Populations and Climate Change. *Global Ocean Ecosystems Dynamics* 5: 1-150.
45. MORENO, J. 1991. Letter to SCAR-BBS Secretary. 2 pp.
46. HARRIS, C.M. 1991. Environmental effects of human activities on King George Island, South Shetland Islands, Antarctica. *Polar Record* 27: 193-204.
47. SCAR GROUP OF SPECIALISTS ON ENVIRONMENTAL AFFAIRS AND CONSERVATION 1992. Annexes to GOSEAC IV Report. Annex 9. Revised Management Plan for Site of Special Scientific Interest (SSSI) No 14, Harmony Point, Nelson Island, South Shetland Islands. pp. 35-36.
48. ANON. 1992. Preliminary announcement Southern African Ornithological Society Thematic Symposium Migration, Dispersal and Nomadism, 12-16 September 1993. 1 pp.
49. GRILLO, B.A., TERRA, F.O., ALALLON, W., GALLO, J., GUGLIUCCI, A. & PURRIEL, J. 1986. Estudio de lipoproteinas plasmaticas y su relacion con la aterosclerosis en el pinguino. *Instituto Antartico Uruguayo Actividad Cientifica 1985/86* 1: 54-69.
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ANNEX 3

REPORTS AND PUBLICATIONS OF THE SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH BIRD BIOLOGY SUBCOMMITTEE AND ITS PREDECESSORS, 1965-1992

BIOMASS WORKING PARTY ON BIRD ECOLOGY 1980. Antarctic bird biology II. Report of meeting of BIOMASS Working Party on Bird Ecology. Queenstown, New Zealand, 13 October 1980. *BIOMASS Report Series* 18: 1-32.

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BIOMASS WORKING PARTY ON BIRD ECOLOGY 1981. Post-FIBEX Data Analysis Workshop. Hamburg, F.R.G. 21 September - 9 October 1981. *BIOMASS Report Series* 22: 1-36.

BIOMASS WORKING PARTY ON BIRD ECOLOGY 1982. Recording observations of seabirds at sea. *BIOMASS Handbook* 18: 1-14.

BIOMASS WORKING PARTY ON BIRD ECOLOGY 1982. Monitoring studies of seabirds. *BIOMASS Handbook* 19: 1-13.

BIOMASS WORKING PARTY ON BIRD ECOLOGY 1982. Penguin census methods. *BIOMASS Handbook* 20: 1-10.

BIOMASS WORKING PARTY ON BIRD ECOLOGY 1982. Meeting of BIOMASS Working Party on Bird Ecology. Cambridge, UK, 13-14 August 1982. *BIOMASS Report Series* 27: 1-21.

BIOMASS WORKING PARTY ON BIRD ECOLOGY 1983. Meeting of BIOMASS Working Party on Bird Ecology. Wilderness, South Africa, 9-10 September 1983. *BIOMASS Report Series* 34: 1-33.

BIOMASS WORKING PARTY ON BIRD ECOLOGY 1984. Recording observations of seabirds at sea. Revised Edition. *BIOMASS Handbook* 18: 1-20.

BIOMASS WORKING PARTY ON BIRD ECOLOGY 1984. Meeting of BIOMASS Working Party on Bird Ecology. Marburg, West Germany 20-22 September 1984. *BIOMASS Report Series* 41: 1-42.

BIOMASS WORKING PARTY ON BIRD ECOLOGY 1985. Report on the FIBEX Seabird Data Interpretation Workshop. Cape Town, South Africa 10-18 April 1985. *BIOMASS Report Series* 44: 1-40 + Figs.

BIOMASS WORKING PARTY ON BIRD ECOLOGY 1992. Recording distribution and abundance of seabirds at sea in the Southern Ocean: methods used in the BIOMASS Programme. *Marine Ornithology* 20: 51-59.

COOPER, J. 1987 Publications and theses on Antarctic and sub-Antarctic birds, 1984-1986. *Cormorant* 15: 67-88.

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COOPER, J. & PILLAY, D. 1989. Publications and theses on Antarctic and sub-Antarctic birds, 1988. *Cormorant* 17: 19-26.

COOPER, J. & PLÖS A.L. 1992. Publications and theses on Antarctic and sub-Antarctic birds, 1991. *Marine Ornithology* 20: 43-49.

HARPER, P.C., CROXALL, J.P. & COOPER, J. 1985. A guide to foraging methods used by marine birds in Antarctic and Subantarctic seas. *BIOMASS Handbook* 24: 1-22.

OATLEY, T.B. 1988. Antarctic and sub-Antarctic bird banding, July 1985-June 1986. *Cormorant* 16: 46-50.

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SCAR BIRD BIOLOGY SUBCOMMITTEE 1988. Scientific Committee on Antarctic Research Working Group on Biology Bird Biology Subcommittee. Minutes of meetings, 22 & 28 August 1988, Hobart, Australia. *Cormorant* 16: 138-158.

SCAR BIRD BIOLOGY SUBCOMMITTEE 1990. Scientific Committee on Antarctic Research Working Group on Biology Bird Biology Subcommittee. Minutes of meetings, 16-18 July 1990, Sao Paulo, Brazil. *Marine Ornithology* 18: 79-89.

SCAR BIRD BIOLOGY SUBCOMMITTEE 1993. Scientific Committee on Antarctic Research Working Group on Biology Bird Biology Subcommittee. Minutes of meetings, 7-8 June 1992, Bariloche, Argentina. *Marine Ornithology* 21: 79-104.

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SCAR SUBCOMMITTEE ON BIRD BIOLOGY 1979. SCAR Antarctic bird biology. Working Group on Biology Subcommittee on Bird Biology. Report on the meeting held in Pretoria, South Africa, 6 to 11 August 1979. *BIOMASS Report Series* 8: 1-21.

WILLIAMS, A.J., COOPER, J., NEWTON, I.P, PHILLIPS, C.M. & WATKINS, B.P. 1985. *Penguins of the world: a bibliography.* Cambridge: British Antarctic Survey.255 pp.

WILSON, G.J. 1983. Distribution and abundance of Antarctic and sub-Antarctic penguins: a synthesis of current knowledge. *BIOMASS Scientific Series* 4:1-46.

WOEHLER, E.J. 1993. *The distribution and abundance of Antarctic and Subantarctic penguins.* Cambridge: Scientific Committee on Antarctic Research.