

SIXTH REVIEW OF DATA HELD BY THE CENTRAL DATA BANK FOR ANTARCTIC BIRD BANDING, JULY 1987–JUNE 1996

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SUMMARY

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This report covers the nine austral summer seasons 1987/88 to 1995/96. A total of 125 434 Southern Ocean birds of 62 species was banded by the 11 nations that submitted schedules in the nine seasons ending June 1996. The majority of effort was directed at penguins and procellariiforms (82%), much as part of on-going demographic studies. The 10 most banded species accounted for over 66% of all birds banded. As an integral part of demographic studies, banding has played a vital role in documenting the decreases of populations under pressure from longline fisheries.

INTRODUCTION

The Central Data Bank for Antarctic Bird Banding (CDB) was established by the Bird Biology Subcommittee of the Scientific Committee on Antarctic Research (SCAR) as a repository for all records of birds banded at Antarctic and sub-Antarctic localities. The CDB's primary purpose is to hold a complete set of banding schedules, independent of member countries' national records. These records enable SCAR to review banding operations throughout the entire Antarctic and sub-Antarctic regions. Further, should the records of a member country be lost for any reason, the years of work and valuable information contained in them can be restored. These records are housed at the South African Bird Ringing Unit (SAFRING) at the University of Cape Town, South Africa, which also serves to identify banding recoveries. Previously these records have been summarised for the seasons 1982/83 to 1986/87 (Oatley & Cooper 1985, Oatley 1987, 1988, 1989, 1991); this is the sixth review.

This report has been compiled despite the lack of submission of annual banding schedules by several participating nations. Subsequent reviews will be used to update records reflected in this report should such schedules be submitted later. Since the last published report covering banding for the 1982/83–1986/87 seasons (Oatley 1991), schedules have been received from 11 countries: Argentina, Australia, Brazil, Chile, France, New Zealand, South Africa, Spain, Sweden, United Kingdom and the United States of America. This report covers the nine austral summer banding seasons from 1987/88 to 1995/96, the most recent for which sufficient data were available at the time of writing.

METHODS

Summaries were compiled from information extracted from the schedules received. In keeping with previous reports, species

and national totals were subdivided into two age groups: 'chicks', containing all birds known to have hatched in the season of banding; and 'adults', containing all other records.

Many banders make use of common names to identify species but there is little consistency in common names between countries. A variety of resources was used to confirm the scientific names from the common names. Given the inconsistent classification of *Catharacta* skuas (Stercorariidae) by different national banding schemes, the report adopted the names used in previous reports, and by Olson & Larsson (1997), recognising three Southern Hemisphere breeding species: the South Polar Skua *C. maccormicki*, Subantarctic Skua *C. antarctica*, and the Chilean Skua *C. chilensis* (none reported banded). The new taxonomy proposed for albatrosses (Nunn *et al.* 1996, Robertson & Nunn 1998) is not used in this report, since no schedules submitted followed it.

RESULTS

In total 125 434 birds of 62 species are known to have been banded by 11 nations (Tables 1 & 2). Adult birds constituted 34%. Banding effort was concentrated on three families: the Spheniscidae, Diomedidae and Procellariidae (Table 2). Together these families accounted for 43 of the 62 species and 82% of all birds banded. Twenty species have been banded in each of the nine years 1987/88 to 1995/96. Overall, 66% of the banding effort was directed at the 10 most frequently banded species (Table 3). The Wandering Albatross *Diomedea exulans* alone received nearly 16% of the overall banding effort. Thirty species have totals of under 500 birds banded, of which 13 species account for less than 0.1% of the total banding effort. Three nations were responsible for 61% of the total banding effort (France 25%, U.K. 19%, New Zealand 17%, Table 2).

We have been unable to determine if the absence of schedules from various nations (see Table 2) is as a result of lack of

TABLE 1

Banding effort by species and season for all Antarctic and sub-Antarctic bird banding. C = chick, A = adult (see text)

Common name	Scientific name	Season																		Species totals	% total
		1987/88		1988/89		1989/90		1990/91		1991/92		1992/93		1993/94		1994/95		1995/96			
		C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A		
Spheniscidae (10 species)																					
Emperor Penguin	<i>Aptenodytes forsteri</i>	0	133	31	131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	295	0.2
King Penguin	<i>A. patagonicus</i>	0	659	0	547	323	1512	216	639	2	260	274	108	47	331	0	25	9	27	4979	4.0
Rockhopper Penguin	<i>Eudyptes chrysocome</i>	80	41	290	496	0	0	6	273	13	181	79	35	19	49	25	140	751	228	2706	2.2
Macaroni Penguin	<i>E. chrysolophus</i>	323	525	594	249	442	36	300	43	0	0	0	200	27	333	1710	26	1532	33	6373	5.1
Snares Island Penguin	<i>E. robustus</i>	321	30	0	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	404	0.3
Erect-crested Penguin	<i>E. sclateri</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	250	0.2
Yellow-eyed Penguin	<i>Megadyptes antipodes</i>	141	78	4	0	135	106	0	0	0	0	0	0	0	0	0	0	0	0	464	0.4
Adélie Penguin	<i>Pygoscelis adeliae</i>	60	1306	0	37	0	999	17	942	0	204	24	110	0	0	1000	83	0	82	4864	3.9
Chinstrap Penguin	<i>P. antarctica</i>	2000	61	3724	662	3875	65	0	0	0	0	313	318	327	265	551	411	0	0	12 572	10.0
Gentoo Penguin	<i>P. papua</i>	650	296	300	460	500	23	43	116	0	0	0	200	0	0	0	0	0	0	2588	2.1
Totals: chick/adult		3575	3129	4943	2635	5275	2741	582	2013	15	645	690	971	420	978	3286	685	2292	620		
Totals: all birds		6704		7578		8016		2595		660		1661		1398		3971		2912		35 495	25.4
Diomededeidae (10 species)																					
Buller's Albatross	<i>Diomedea bulleri</i>	0	0	0	0	0	0	0	0	0	174	170	229	120	0	150	0	0	0	843	0.7
Amsterdam Albatross	<i>D. amsterdamensis</i>	8	2	0	0	9	0	0	2	10	0	5	2	0	0	6	0	9	0	53	<0.1
Shy Albatross	<i>D. cauta</i>	0	0	0	0	0	0	0	0	0	0	545	30	877	2	696	0	0	0	2150	1.7
Yellow-nosed Albatross	<i>D. chlororhynchos</i>	134	87	126	47	80	18	174	82	54	190	208	23	33	11	22	49	81	470	1889	1.5
Grey-headed Albatross	<i>D. chrysostoma</i>	43	505	97	527	33	488	52	0	7	0	62	151	293	35	313	186	850	185	3827	3.0
Wandering Albatross	<i>D. exulans</i>	1882	572	1425	257	1551	220	1786	201	1762	307	591	414	1382	684	2525	301	3585	542	19 987	15.9
Royal Albatross	<i>D. epomophora</i>	754	17	357	50	2	0	0	6	317	21	438	344	219	29	701	4	320	351	3930	3.1
Black-browed Albatross	<i>D. melanophrys</i>	406	64	950	107	508	152	422	77	124	0	720	51	210	49	866	107	826	384	6023	4.8
Dark Sooty Albatross	<i>Phoebastria fusca</i>	65	52	24	2	36	20	48	36	45	1	86	7	25	42	158	247	170	314	1378	1.1
Light Sooty Albatross	<i>P. palpebrata</i>	80	21	39	24	17	1	33	3	1	0	0	0	0	2	1	4	25	28	279	0.2
Totals: chick/adult		3372	1320	3018	1014	2236	899	2515	407	2320	693	2825	1251	3159	854	5438	898	5866	2274		
Totals: all birds		4692		4032		3135		2922		3013		4076		4013		6336		8140		40 359	28.9
Procellariidae (23 species)																					
Pintado Petrel	<i>Daption capense</i>	916	229	430	152	299	120	208	81	571	113	1346	106	504	34	341	101	331	3	5885	4.7
Antarctic Fulmar	<i>Fulmarus glacialisoides</i>	30	19	69	127	109	45	52	73	0	1	36	8	8	118	40	11	24	7	777	0.6
Snow Petrel	<i>Pagodroma nivea</i>	142	85	161	110	135	158	345	144	717	249	413	375	217	203	703	164	425	1265	6011	4.8
Blue Petrel	<i>Halobaena caerulea</i>	13	200	59	292	64	171	41	116	25	113	50	1200	42	657	22	340	25	137	3567	2.8
Northern Giant Petrel	<i>Macronectes halli</i>	319	145	946	112	299	112	397	193	395	207	515	141	190	146	292	26	800	4	5239	4.2
Southern Giant Petrel	<i>M. giganteus</i>	1132	409	3673	125	2439	48	104	40	120	50	162	77	500	11	429	84	1374	360	11 137	8.9
Thin-billed Prion	<i>Pachyptila belcheri</i>	11	218	59	52	65	73	59	211	87	191	102	688	93	191	77	30	44	21	2272	1.8

(TABLE 1 continued)

Common name	Scientific name	Season																		Species totals	% total
		1987/88		1988/89		1989/90		1990/91		1991/92		1992/93		1993/94		1994/95		1995/96			
		C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A		
(Procellariidae continued)																					
Fulmar Prion	<i>P. crassirostris</i>	1	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	<0.1
Antarctic Prion	<i>P. desolata</i>	0	54	0	0	0	0	0	41	0	1	0	100	29	181	24	138	272	46	886	0.7
Fairy Prion	<i>P. turtur</i>	28	77	0	2	0	72	14	0	0	0	0	0	0	1	0	0	0	27	221	0.2
Broad-billed Prion	<i>P. vittata</i>	42	196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	238	0.2
Grey Petrel	<i>Procellaria cinerea</i>	8	1	14	26	14	12	0	17	15	33	22	3	6	8	16	19	22	18	254	0.2
White-chinned Petrel	<i>P. aequinoctialis</i>	0	5	4	0	8	5	6	9	10	8	10	23	15	17	10	13	59	200	402	0.3
Chatham Island Petrel	<i>Pterodroma axillaris</i>	0	1	0	14	2	4	0	0	0	1	0	0	11	0	10	75	11	4	133	0.1
Kerguelen Petrel	<i>P. brevirostris</i>	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	<0.1
White-headed Petrel	<i>P. lessonii</i>	14	63	7	25	14	13	18	4	13	25	22	24	10	19	7	13	6	72	369	0.3
Mottled Petrel	<i>P. inexpectata</i>	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	<0.1
Great-winged Petrel	<i>P. macroptera</i>	3	78	28	83	25	0	1	6	4	22	11	8	2	0	0	1	0	0	272	0.2
Soft-plumaged Petrel	<i>P. mollis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	61	<0.1
Black-winged Petrel	<i>P. nigripennis</i>	2	42	0	3	0	0	0	6	0	0	0	0	0	0	0	11	0	0	64	<0.1
Little Shearwater	<i>Puffinus assimilis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	<0.1
Sooty Shearwater	<i>P. griseus</i>	3	9	0	1	0	0	0	30	0	0	0	0	21	1	0	0	29	55	149	0.1
Antarctic Petrel	<i>Thalassoica antarctica</i>	0	0	216	215	28	14	28	47	0	0	0	0	0	0	0	0	0	0	548	0.4
Totals: chick/adult		2674	1857	5666	1345	3501	847	1273	1018	1957	1014	2689	2753	1648	1587	1971	1026	3422	2290		
Totals: all birds		4531		7011		4348		2291		2971		5442		3235		2997		5712		38 538	27.6
Oceanitidae (6 species)																					
White-bellied Storm Petrel	<i>Fregretta grallaria</i>	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	<0.1
Black-bellied Storm Petrel	<i>F. tropica</i>	0	1	0	0	0	1	0	0	0	2	0	1	0	1	0	8	0	113	127	0.1
Grey-backed Storm Petrel	<i>Garrodia neries</i>	0	206	0	93	0	4	0	4	0	17	0	123	0	21	0	10	0	47	525	0.4
Wilson's Storm Petrel	<i>Oceanites oceanicus</i>	13	6	0	41	0	233	1	5	1	0	0	26	0	37	0	1	44	189	597	0.5
Leach's Storm Petrel	<i>Oceanodroma leucorhoa</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	<0.1
White-faced Storm Petrel	<i>Pelagodroma marina</i>	0	24	0	7	0	0	0	98	0	0	0	0	0	7	0	0	0	0	136	0.1
Totals: chick/adult		13	238	0	143	0	238	1	107	1	19	0	150	0	66	0	19	44	349		
Totals: all birds		251		143		238		108		20		150		66		19		393		1388	1.0
Pelecanoididae (2 species)																					
Georgian Diving Petrel	<i>Pelecanoides georgicus</i>	0	54	0	11	0	0	7	9	0	0	0	29	48	107	33	63	12	235	608	0.5
Common Diving Petrel	<i>P. urinatrix</i>	28	119	19	24	56	84	24	114	34	180	26	131	46	130	31	335	17	245	1643	1.3
Totals: chick/adult		28	173	19	35	56	84	31	123	34	180	26	160	94	237	64	398	29	480		
Totals: all birds		201		54		140		154		214		186		331		462		509		2251	1.6

(TABLE 1 continued)

Common name	Scientific name	Season																		Species totals	% total	
		1987/88		1988/89		1989/90		1990/91		1991/92		1992/93		1993/94		1994/95		1995/96				
		C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A			
Phalacrocoracidae (3 species)																						
Imperial Cormorant	<i>P. atriceps</i>	1126	36	1123	46	55	2	0	0	0	0	0	0	0	0	266	70	49	0	2773	2.2	
Campbell Is. Cormorant	<i>P. campbelli</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	<0.1	
Kerguelen Cormorant	<i>P. verrucosus</i>	0	0	0	155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	155	0.1	
Totals: chick/adult		1126	37	1123	201	55	2	0	0	0	0	0	0	0	0	266	70	49	0			
Totals: all birds		1163		1324		57		0		0		0		0		336		49		2929	2.1	
Stercorariidae (2 species)																						
South Polar Skua	<i>Catharacta maccormicki</i>	107	53	46	23	70	25	84	36	100	20	35	69	54	21	49	30	89	19	930	0.7	
Subantarctic Skua	<i>C. antarctica</i>	500	315	261	174	217	79	65	14	208	94	96	16	233	61	50	50	239	59	2731	2.2	
Totals: chick/adult		607	368	307	197	287	104	149	50	308	114	131	85	287	82	99	80	328	78			
Totals: all birds		975		504		391		199		422		216		369		179		406		3661	2.6	
Laridae (1 species)																						
Kelp Gull	<i>Larus dominicanus</i>	37	0	31	0	4	0	4	0	7	0	17	0	14	1	18	0	22	7	162	0.1	
Totals: chick/adult		37	0	31	0	4	0	4	0	7	0	17	0	14	1	18	0	22	7			
Totals: all birds		37		31		4		4		7		17		15		18		29		162	0.1	
Sternidae (2 species)																						
Kerguelen Tern	<i>Sterna virgata</i>	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	<0.1	
Antarctic Tern	<i>S. vittata</i>	57	7	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	70	<0.1	
Totals: chick/adult		57	7	3	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0			
Totals: all birds		64		3		7		0		0		0		0		0		0		74	0.1	
Chionidae (2 species)																						
Greater Sheathbill	<i>Chionis alba</i>	6	0	8	2	7	2	7	0	5	0	3	0	2	0	3	0	0	0	45	<0.1	
Lesser Sheathbill	<i>C. minor</i>	25	4	92	159	25	8	13	8	23	25	35	5	25	6	33	46	0	0	532	0.4	
Totals: chick/adult		31	4	100	161	32	10	20	8	28	25	38	5	27	6	36	46	0	0			
Totals: all birds		35		261		42		28		53		43		33		82		0		577	0.5	
Annual totals for all species (61 species banded)		18 653		20 941		16 378		8301		7360		11 791		9460		14 400		18 150		125 434	100	

TABLE 2
Reported banding effort by nation and season, 1987/88–1995/96

Nation	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	Total	% Species banded	
Argentina	0	151	0	0	0	0	0	0	0	151	0.12	1
Australia	224	2106	217	627	239	397	471	889	2110	7280	5.8	22
Brazil	2375	3151	3244	0	0	0	0	0	0	8770	6.99	11
Chile	0	778	232	0	0	0	0	0	0	1010	0.81	4
France	2614	2599	3570	3405	3377	4554	3089	3500	4663	31 371	25.0	32
New Zealand	2646	2087	318	370	720	2854	2054	3910	6759	21 718	17.3	20
South Africa	2099	2435	2975	1810	1140	1321	906	2742	1549	16 977	13.5	14
Spain	0	0	0	0	0	631	592	961	0	2184	1.74	1
Sweden	0	0	0	0	112	400	74	21	36	643	0.51	1
UK	5004	5073	3178	1877	1244	1374	1681	2009	2057	23 497	18.7	17
USA	3691	2561	2644	212	528	260	593	368	976	11 833	9.43	10
Annual totals	18 653	20 941	16 378	8301	7360	11 791	9460	14 400	18 150	125 434	100	62

TABLE 3
Reported banding effort for the 10 most-banded species of Antarctic and sub-Antarctic birds, 1978/88–1995/96

Taxon	Bandings	Percentage of total
Wandering Albatross <i>Diomedea exulans</i>	19 987	15.9
Chinstrap Penguin <i>Pygoscelis antarctica</i>	12 572	10.0
Southern Giant Petrel <i>Macronectes giganteus</i>	11 137	8.9
Macaroni Penguin <i>Eudyptes chrysolophus</i>	6373	5.1
Black-browed Albatross <i>D. melanophrys</i>	6023	4.8
Snow Petrel <i>Pagodroma nivea</i>	6011	4.8
Pintado Petrel <i>Daption capense</i>	5885	4.7
Northern Giant Petrel <i>M. halli</i>	5239	4.2
King Penguin <i>Aptenodytes patagonicus</i>	4979	4.0
Adélie Penguin <i>P. adeliae</i>	4864	3.9
Total banded	83 070	66.2

submission, or because no banding has been undertaken in the time period covered in this report. All zeros in Table 2 therefore reflect only an absence of records for the CDB, since no nations reported a 'no banding effort'. Some nations, however, band only occasionally, so a zero banding effort in any season should not necessarily be interpreted as due to unsubmitted schedules. Complete banding schedules for the 1996/97 season were available only from South Africa, the United Kingdom and the United States of America, so this season is consequently excluded from this report.

DISCUSSION

The quality of the data contained in this report is compromised by the absence of schedules from a number of nations. Despite this absence, for most seasons more than 10 000 new bands were placed on birds. Banding has been instrumental for much of what is presently known of seabird demographics. It is especially encouraging to note the consistent effort aimed at several species that are currently experiencing population decreases (notably the procellariiforms) (Robertson & Gales 1998, Brothers *et al.* 1999). Future efforts should be also be directed at species or populations that are believed to be under threat.

White-chinned Petrels *Procellaria aequinoctialis* received relatively little banding attention during the period covered by this report, although the species is known to be especially vulnerable to longline fisheries throughout its range (Barnes *et al.* 1997, CCAMLR 1998). The Spectacled Petrel *P. conspicillata*, recently split from the White-chinned Petrel (Ryan 1998), is also known to be killed by tuna longline vessels off southern Brazil (Vaske 1991, Neves & Olmos 1998), but no banding of this species has been regularly undertaken. The albatrosses and giant petrels, by contrast, have been the subjects of several long-term population studies (e.g. Weimerskirch & Jouventin 1987, Croxall *et al.* 1990, Wooller *et al.* 1992). Since the 1970s several albatross and giant petrel populations have decreased (Croxall 1979, 1991, Weimerskirch & Jouventin 1987, Croxall *et al.* 1990, Gales 1993, Woehler & Croxall 1997, Robertson & Gales 1998). Had banding not established population records before these decreases began, many would probably have gone unnoticed. Long-term banding studies are essential if the status of a species is to be accurately assessed or if decreases in survival rates, or other demographic parameters, are to be demonstrated statistically (Croxall & Saether 1998).

Brothers (1991) estimated that 250 000 seabirds (predomi-

nantly sub-Antarctic species) were being killed by Japanese tuna longline fishing vessels annually. Unofficial reports have hinted at high numbers of banded birds being killed by longliners, yet vessels fail to report recovery information for fear of the consequences (Prince *et al.* 1997, R.M.W. pers. obs.). Many of the regulated fisheries operating in the Southern Ocean (and elsewhere where sub-Antarctic birds forage) now have observer programmes that greatly assist in the gathering of seabird information (e.g. Bartle 1991, Brothers 1991, Barnes *et al.* 1997, CCAMLR 1997, CCAMLR 1998). The few confirmed recoveries from longliners have proven useful in tracing the movements of birds (Croxall & Prince 1990, Prince *et al.* 1998). The impacts of fisheries can also be linked to population decreases at breeding localities if recoveries are reported. Banding operations have provided crucial evidence of populations being at risk from longlining. The Central Data Bank for Antarctic Bird Banding provides an essential archival service for such population studies.

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