

Monitoring Antipodean wandering albatross, 2001/02

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Kath Walker, Graeme Elliott, Josh Kemp, and Chris Rickard

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Monitoring Antipodean wandering albatross, 2001/02

Kath Walker¹, Graeme Elliott¹, Josh Kemp², and Chris Rickard³

¹ 549 Rocks Road, Nelson; ² 350 Wharf Road, Colville, Coromandel;

³ c/- P.O. Box 14, Franz Josef, New Zealand

ABSTRACT

The Antipodean wandering albatross (*Diomedea antipodensis*) is endemic to Antipodes Island in the New Zealand subantarctic, and is caught as a bycatch of long-line fishing. In 1994 a study began to collect data for a model examining the sustainability of bycatch. This paper reports on progress made on this study between 1 July 2001 and 30 June 2002. Productivity for the 2001 breeding season was 78.0%, and the average for the last eight years was 75.1%. In 2001, 125 chicks were banded, making a total of 765 chicks banded since annual banding for assessment of recruitment began in 1995. Data on the return of banded adults to the study area enabled estimation of adult survival between 1994 and 2000 of 95%, with female percentage survival slightly lower than that of males. A total of 931 nests with eggs were counted in February 2002 in two representative blocks on Antipodes Island and the study area. The average number of nests in these blocks for 1994–2002 is 783 (range 705–931).

Keywords: Antipodean wandering albatross, *Diomedea antipodensis*, breeding success, recruitment, adult survival, nest census.

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1. Introduction

The great albatrosses (*Diomedea* spp.) are among the most spectacular sights of the Southern Ocean, with their huge wingspans (> 3 m) and graceful, soaring flight. Half of all the world's wandering albatross species nest in the New Zealand subantarctic on windswept islands far from human influence. However, most of their lives are spent at sea, and significant numbers have been killed as a bycatch of fishing activity since long-line fishing started in the Southern Ocean in the 1960s.

The well-studied South Atlantic and South Indian Ocean species of wandering albatross declined by more than 50% between 1964 and 1994 as a result of increased adult and juvenile mortality caused by fisheries bycatch (Croxall et al. 1990; de la Mare & Kerry 1994; Weimerskirch & Jouventin 1987; Weimerskirch et al. 1997). In New Zealand the endemic species of wandering albatross, Antipodean and Gibson's wandering albatrosses (*Diomedea antipodensis* and *D. gibsoni*) have been regularly observed as bycatch on both foreign and New Zealand southern bluefin tuna fishing boats (Murray et al. 1993), but there has been no information on whether the level of bycatch was having a significant impact on their populations.

In 1995, the New Zealand Government commissioned research on both Gibson's and Antipodean wandering albatrosses and levied the New Zealand tuna fishers (the Conservation Services Levy) to help pay for it. The main aim of the research was to determine whether the levels of bycatch were sustainable, and this required the collection of data on productivity, survival and recruitment. Wandering albatross are long-lived (> 40 years), mature late (> 10 years), and produce a chick only once every 2-3 years. These features not only make their populations particularly susceptible to increased mortality caused by fishing activity, but makes study of their population dynamics difficult and slow.

The second aim of the research was to identify ocean areas where albatross activity was concentrated and overlapped with fisheries.

From work on wandering albatrosses elsewhere, it was known in advance that it would take at least a decade to obtain reliable estimates of survival and productivity, and 15 years for recruitment. Similarly population trends would emerge only after many years of annual counts of nests, as the albatrosses' biennial breeding causes considerable inter-annual variation in the number of birds nesting.

This paper reports on progress made in studying the population dynamics and foraging distribution of Antipodean wandering albatrosses during the Department of Conservation's financial year 1 July 2001 to 30 June 2002. Albatross nesting takes a full year, and this paper describes the end of the breeding cycle for birds that started nesting in January 2001, and the beginning of the breeding cycle for birds that started nesting in January 2002.

It is one of a series of annual progress reports on this research (Amey et al. 1994, Hamilton et al. 2002; Walker & Elliott 2002a, 2002b, 2002c, 2002d;

Walker et al. 2002) and like the earlier reports, it describes only the work carried out in the previous year. Comprehensive analysis is being carried out and published as sufficient data are collected.

2. Overview of the study

Apart from a few pairs on Campbell Island, Antipodean wandering albatrosses nest on Antipodes Island, which is about 730 km south-east of the New Zealand mainland. The island is about 2025 ha, is treeless and covered in tussocks and ferns. Wandering albatross nest in relatively uniform densities all over the island, but avoid areas of tall vegetation and the bare exposed tops of hills and ridges.

The survivorship and breeding history of about 750 individually marked birds that regularly nest in a 29 ha study area at the north-eastern end of Antipodes I. have been followed since 1994. Each year all birds visiting the study area are identified so that survivorship can be calculated. Each nest is mapped so that its success can be judged a year later, and any chicks produced are banded for later estimation of recruitment. The number of pairs nesting in the study area and two other parts of the island are counted annually to assess population trends.

3. Population dynamics

3.1 METHODS

3.1.1 Breeding success

To assess breeding success in 2001 we counted the chicks present in late December 2001 in three areas in which the number of nests with eggs had been counted the previous February. The three areas were in different parts of the island to assess spatial variation in breeding success, and two were less visited than the other to assess the possible impact of disturbance.

The three areas were our study area (29 ha) on the North Plains, Pipit Peak (18 ha) on the slopes of Mt Waterhouse near the centre of the island, and Block 32 (21 ha) near the south coast. The chicks were counted in these three blocks on 22–24, 25, and 27 December 2001, respectively. Chicks at Pipit Peak and Block 32 were counted using our normal census ‘sweep’ technique (see Walker & Elliott 2002c), whereas nests in the study area had been mapped in the previous summer and were individually relocated.

To facilitate assessment of 2002 breeding success we counted the nests with eggs at Block 32 and Pipit Peak on 8 and 10 February 2002, respectively, and we mapped all the nests with eggs in our study area during repeated visits between 4 January and 12 February 2002.

3.1.2 Recruitment

To enable future assessment of recruitment, we banded all the chicks present in the study area on 22–25 December 2001 with both numbered metal and darvic bands.

3.1.3 Adult survival, productivity and incubation behaviour

Between 4 January and 12 February 2002 we visited the study area every second day and:

- read the bands of all birds encountered in or near the study area,
- marked nests with eggs and mapped their positions using GPS, and
- measured and banded with numbered metal and darvic bands any unbanded birds nesting in the study area.

3.2 RESULTS

3.2.1 Breeding success in the study area in 2001

There were 164 study area nests in 2001, and 128 of these had chicks at them on 22–25 December. None of the chicks produced in the study area had fledged by 25 December, and none died between 25 December and 14 February when we left the island, so breeding success for the 2001 season was 78%.

However, one chick (R55787, White-588 from nest 7535) was small and undeveloped and may subsequently have died, so final fledging rate may be slightly lower than this.

Breeding success in the Antipodes I. study area since 1994 is presented in Table 1. These results should be treated with caution, however, as data collected in the last three years of the study are more reliable than those collected previously. Since 2000, nest checks have been made almost daily from the start till the finish of the laying period (7 January – 14 February), with an average failure rate of about 4% being recorded during this period. In 1994 and 1995,

TABLE 1. BREEDING SUCCESS OF ANTIPODEAN WANDERING ALBATROSSES NESTING IN THE STUDY AREA ON ANTIPODES ISLAND SINCE 1994.

YEAR	NO. OF NESTS MONITORED	BREEDING SUCCESS (%)
1994	110	74.8
1995	156	74.4
1996	149	78.5
1997	146	80.6
1998	163	74.8
1999	139	63.3
2000	115	76.5
2001	164	78.0
Average		75.1

nest checks were not started until 14 February, and in 1996, 1998 and 1999, they were started in mid-January. Some nests will have failed before checks started in all of these years and thus breeding success in Table 1 will be overestimated.

When the average nest loss rate during the laying period is better known we will be able to adjust the estimates of breeding success for years before 2000.

Chick fledging in the study area began soon after we assessed the breeding success on 25 Dec 2001. By 9 Jan 2002, 29% of chicks had fledged, by 19 Jan 2002, 53% had fledged, and by 29 Jan 2002, 84% had fledged.

No chicks had fledged before our count on 25 Dec 2001 at Pipit Peak, but in Block 32 one chick had already fledged by 27 Dec 2001. Breeding success in these two blocks is presented in Table 2, and Table 3 shows the breeding success in all three blocks over the past two years. The frequent presence of researchers in the main study area does not seem to be causing unusually low breeding success there.

3.2.2 Measuring breeding success in the 2002 season

In January and February 2002, 152 new nests were tagged and mapped to enable their outcome to be determined next summer (Fig. 1, Appendix 1). Of these, 148 nests were inside the study area and four were within 30 m of the study area but were laid by pairs that had previously nested within it. Seven of the 152 nests had already failed before we left the island on 14 February 2002 (Appendix 1).

TABLE 2. BREEDING SUCCESS OF ANTIPODEAN WANDERING ALBATROSSES NESTING AT PIPIT PEAK AND BLOCK 32 IN DECEMBER 2001.

PLACE	NO. OF SWEEPS (2 people/sweep)	COUNT TIME (people hours)	NUMBER OF CHICKS	NO. OF NESTS WHERE CHICKS HAD FLEDGED	TOTAL NO. OF SUCCESSFUL NESTS
Pipit Peak	11	7.2	52	0	52
Block 32	4	6.4	101	2	103

TABLE 3. BREEDING SUCCESS OF ANTIPODEAN WANDERING ALBATROSSES NESTING IN THREE DIFFERENT AREAS ON ANTIPODES ISLAND IN 2001 (2000 RESULTS IN BRACKETS).

PLACE	NESTS COUNTED IN JAN 2001	SUCCESSFUL NESTS IN DEC 2001	BREEDING SUCCESS (%)
Study Area	164	128	78.0 (76.5)
Pipit Peak	69	52	75.4 (64.6)
Block 32	144	103	71.5 (76.9)
Average			75.0%

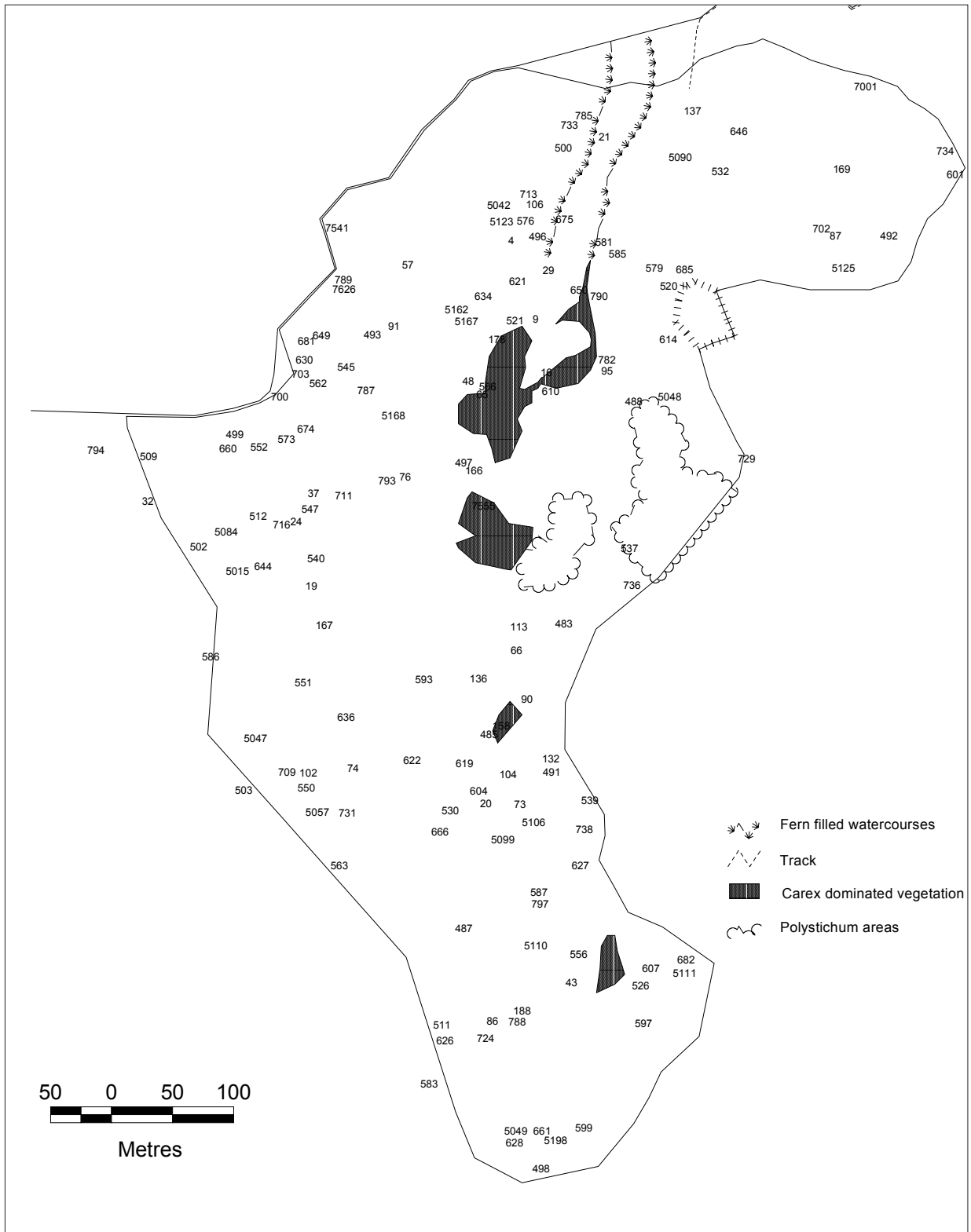


Figure 1. Antipodean wandering albatross nests in the study area on Antipodes Island in January and February 2002.

In Block 32 on 8 February 2002 there were 178 nests with eggs and at least three nests that had already failed. At Pipit Peak on 10 February 2002 there were 104 nests with eggs and no evidence that any nests had already failed on this date. However, failed nests are more difficult to find than nests which still have incubating birds, so the failed nests we found are almost certainly an underestimate.

By 8 February in the repeatedly visited study area, 4% of nests had failed. If 4% of nests in the census blocks are also assumed to have failed by the time the census was made, there were originally 185 nests with eggs laid in 2002 in Block 32, and 108 nests at Pipit Peak, from which to assess breeding success in December 2002.

3.2.3 Laying dates

Median laying dates and the laying dates of the first and last eggs in the study area during this and previous breeding seasons are presented in Table 4. In both 1996 and 1999 the last eggs were laid on 15 February, so it is possible that eggs were laid in 2002 after our last check of the nests on 12 February 2002.

TABLE 4. MEDIAN LAYING DATES AND THE DATES OF FIRST AND LAST EGGS OF ANTIPODEAN WANDERING ALBATROSSES NESTING IN THE STUDY AREA ON ANTIPODES ISLAND IN 1996-2002.

YEAR	DATE OF FIRST EGG	MEDIAN LAYING DATE	DATE OF LAST EGG
1996		26 Jan 1996	15 Feb 1996
1997	07 Jan 1997	23 Jan 1997	16 Feb 1997
1998		26 Jan 1998	11 Feb 1998
1999		26 Jan 1999	15 Feb 1999
2000	08 Jan 2000	25 Jan 2000	12 Feb 2000
2001	07 Jan 2001	23 Jan 2001	09 Feb 2001
2002	07 Jan 2002		12 Feb 2002

3.2.4 Adult mortality

Between 22 December 2001 and 14 February 2002 we read the bands of birds that had previously nested in the study area. They included nesting and non-nesting birds both inside the study area and up to 200 m outside it.

Adult survival was estimated from the banded birds recovered using the method of Cormack (1964, 1972) incorporating the modifications suggested by Croxall et al. (1990) for biennially breeding albatrosses (Table 5).

For future assessment of survival we banded 78 previously unbanded adults that were nesting in the study area for the first time (Appendix 2). There were six nests in the study area at which we read the bands of only one of the pair. Four of these were laid very late in the season and only one bird had incubated before we left the island, and the other two failed before both birds had incubated.

Of the 395 already banded wandering albatrosses recorded between 22 December 2001 and 12 February 2002, two had a broken darvic band and

TABLE 5. SURVIVAL OF ADULT ANTIPODEAN WANDERING ALBATROSSES THAT HAVE NESTED IN THE STUDY AREA ON ANTIPODES ISLAND SINCE 1994. STANDARD ERRORS IN BRACKETS.

YEAR	BOTH SEXES	MALES*	FEMALES*
1995	0.993 (0.006)		
1996	0.982 (0.006)		
1997	0.945 (0.013)	0.939 (0.019)	0.973 (0.013)
1998	0.946 (0.020)	0.955 (0.026)	0.946 (0.029)
1999	0.940 (0.022)	0.935 (0.030)	0.950 (0.030)
2000	0.902 (0.030)	0.919 (0.038)	0.880 (0.049)
Average	0.954 (0.034)	0.949 (0.026)	0.942 (0.045)

* Males and females were not reliably distinguished until 1997.

eleven had lost the darvic band entirely. One bird had lost its metal band, but was still carrying a (broken) darvic band (Appendix 2); all lost bands were replaced.

3.2.5 Recruitment

During December 2001, 125 fledglings were banded in the study area and two (mistakenly) outside the study area. Table 6 shows the number of chicks banded since 1995 for assessment of recruitment.

We found 92 non-breeding birds that had been banded as fledglings in previous years. Of these one was 3 years old, four were 4 years old, 11 were 5 years old, 31 were 6 years old, and 43 were 7 years old (Appendix 3). Most (81%) of these birds were seen only once, but 17% were seen twice, and one bird (1%) was seen four times.

If Antipodean wandering albatrosses are like the wandering albatrosses (*Diomedea exulans*) in the south Atlantic they will start returning to Antipodes Island from about 3 years old (mean 5 years old), with all those alive returning

TABLE 6. FLEDGLING ANTIPODEAN WANDERING ALBATROSSES BANDED ON ANTIPODES ISLAND SINCE 1995.

YEAR	STUDY AREA	OUTSIDE STUDY AREA
1995 ^a	116	1865
1996 ^b	98	402
1997 ^c	118	
1998 ^c	128	
1999 ^c	91	
2000 ^c	89	
2001 ^c	125	2
Total	765	2269

^a banded with metal bands only. ^b banded with metal and orange darvic bands. ^c banded with metal and white darvic bands.

by age 7 (Croxall et al. 1990). We cannot accurately estimate recruitment until fledglings start breeding, which is from about 11 years old, and this means that our first estimate of recruitment will not be possible until about 2007. We may soon however, be able to estimate the survival of the fledglings banded in 1995 and 1996 since all those still alive should have returned to the island by 2003.

4. Population trends

Collecting information on population size in a deferred breeding species such as the Wandering Albatross is slow since birds return to breed only once every two or three years. Between 1994 and 1997, a series of annual whole island counts were carried out. The counts show that, in those years, an average of 5136 pairs bred on Antipodes Island (Walker & Elliott 2002b). Since 1998 counts of only a representative portion of the island have been undertaken to monitor population change.

4.1 METHODS

Between 5 and 10 February 2002, all nests with eggs within Marked Census Block A (MCBA) were counted, and on 8 February 2002 all nests with eggs in Block 32 were counted (see Walker & Elliott (2002c) for a description of counting methods and sites).

Once an area had been counted, the precision of the census was tested. This was done by walking straight transects along compass bearings at right angles to the census sweep lines and checking all nests within 5 m of the transect for paint marks indicating that the nests had been counted.

Nests in the study area were counted between 7 January and 12 February 2002 by marking and mapping every nest during repeated visits (see Section 3.1).

4.2 RESULTS

Details of the counts are presented in Table 7. In total, 783 nests were counted, with nest numbers higher than the previous year in both the MCBA and Block 32, but slightly lower in the study area.

In the precision checks of the blocks, 19–28% of the total number of nests in the blocks were recounted, and only one unpainted nest was found. This indicated we had reliably counted the number of nests with eggs in our original counts.

The number of nests with eggs counted in the two census blocks and the study area in 2002 are compared with those in earlier years in Table 8 and Figure 2.

There is no significant trend in these data.

TABLE 7. ANTIPODEAN WANDERING ALBATROSS NEST CENSUS RESULTS FROM TWO AREAS ON ANTIPODES ISLAND, FEBRUARY 2002.

Block	Date	Sweeps	Count time ¹	No. of chicks	Un-banded on eggs	Banded on eggs	Un-banded BOGs ²	Banded BOGs	Total BOGs	Total nests
MCBA	5-7,10 Feb 02	39	30	30	576	29	360	28	388	605
Block 32	8 Feb 01	6	8	5	176	2	141	4	145	178

¹ Person hours. ² Birds on ground.

TABLE 8. NUMBERS OF ANTIPODEAN WANDERING ALBATROSS NESTS WITH EGGS IN THREE BLOCKS ON ANTIPODES ISLAND SINCE 1994.

YEAR	MCBA	STUDY AREA	BLOCK 32	TOTAL
1994	544*	114	125	783
1995	482*	156	185	823
1996	418*	154	133	705
1997	464*	150		
1998	534	160		
1999	479	142		
2000	462	119	130	711
2001	443	160	141	744
2002	605	148	178	931
Average				783

* estimated (see Walker and Elliott 2002c).

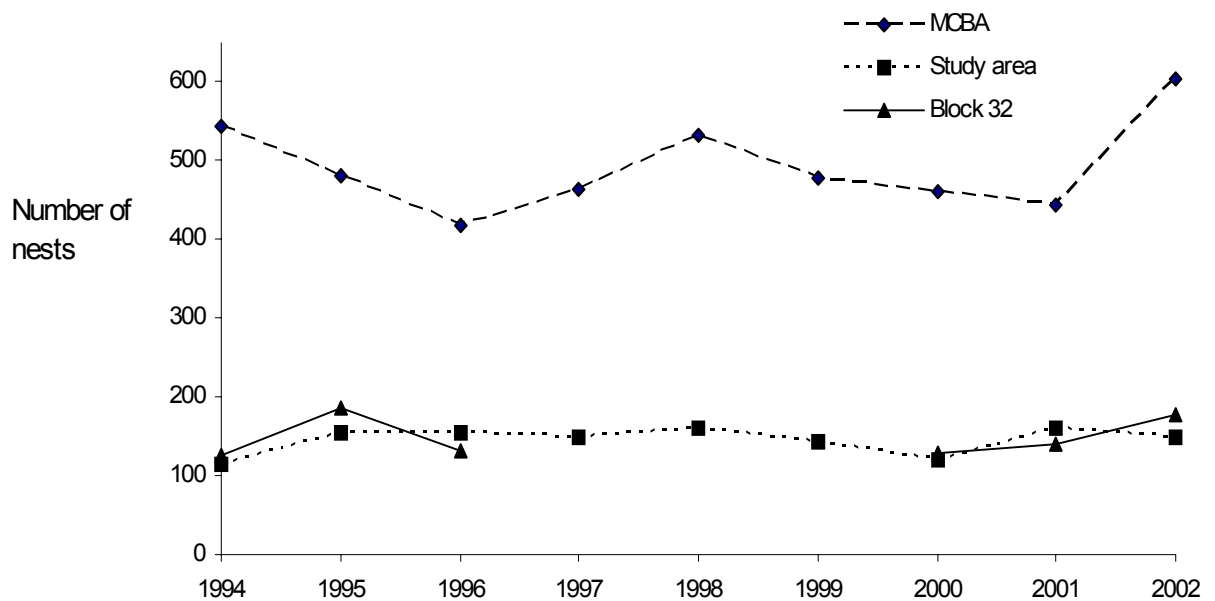


Figure 2. Number of Antipodean wandering albatross nests with eggs counted in February in three areas on Antipodes Island since 1994.

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Appendix 1

STUDY AREA NESTS ON ANTIPODES ISLAND, JAN 2002

NEST	MALE		FEMALE		COMMENTS
	METAL 'R' BAND	DARVIC	METAL 'R' BAND	DARVIC	
4	47987	Blue-041	55675	Blue-817	
9	52646	Blue-046	55663	Blue-805	
16	53640	Blue-492	55835	Blue-865	
19	55844	Blue-879	55825	Blue-853	
20	47871	Blue-530	48033	Blue-546	
21	28609	Blue-179	28746	Blue-364	
24	48053	Blue-476	47916	Blue-626	
29	55872	Blue-924	55889	Blue-943	
32	53773	Blue-286	19227	Blue-210	3 m outside study area
37	55895	Blue-950	55886	Blue-940	
43	47961	Blue-122	47854	Blue-301	
48	53978	Blue-502	52734	Blue-028	
57	47804	Blue-195	47649	Blue-040	
65	52613	Blue-201	52651	Blue-261	
66	47776	Blue-145	47638	Blue-310	
73	53975	Blue-517	47669	Blue-135	
74	47749	Blue-079	47700	Blue-332	
76	47655	Blue-205	47783	Blue-075	
86	53763	Blue-093	55518	Blue-710	
87	52612	Blue-252	52641	Blue-253	
90	52643	Blue-841	47666	Blue-236	
91	47901	Blue-299	52615	Blue-051	
95	47823	Blue-248	47942	Blue-674	
102	55668	Blue-778	55636	Blue-770	
104	53777	Blue-296	53771	Blue-278	
106	53603	Blue-827	53632	Blue-396	
113	55516	Blue-706	53984	Blue-562	
132	55893	Blue-948	51830	Blue-944	
136	47664	Blue-143	47946	Blue-550	
137	55833	Blue-863	55827	Blue-855	
158	55880	Blue-933	55876	Blue-929	
166	53827	Blue-422	53799	Blue-409	
167	55851	Blue-888	48014	Blue-540	
169	53651	Blue-506	47757	Blue-304	
178	47733	Blue-043	55845	Blue-882	
188	55848	Blue-885	55843	Blue-878	
483	53643	Blue-279	53638	Blue-457	
485	47949	Blue-542	47836	Blue-277	
487	53621	Blue-627	53623	Blue-585	
488	47772	Blue-693	47631	Blue-682	
491	55512	Blue-701	55513	Blue-702	
492	53772	Blue-285	47952	Blue-175	
493	47641	Blue-057	47677	Blue-227	
496	47626	Blue-185	47719	Blue-029	

NEST	MALE		FEMALE		COMMENTS
	METAL 'R' BAND	DARVIC	METAL 'R' BAND	DARVIC	
497	55883	Blue-937	55836	Blue-867	
498	55838	Blue-871	55846	Blue-883	
499	55506	Blue-683	55507	Blue-695	
500	52618	Blue-025	52604	Blue-026	
502	55525	Blue-727	55524	Blue-724	
503	53774	Blue-289	53829	Blue-424	8 m outside study area
509	55826	Blue-854	55837	Blue-870	
511	52656	Blue-873	52627	Blue-220	
512			53806	Blue-419	Nest discovered on 12 Feb, male not seen at all
520	55892	Blue-947	53814	Blue-434	
521	55502	Blue-689	55503	Blue-697	
526	55632	Blue-765	55623	Blue-739	
530	55839	Blue-872	55821	Blue-849	
532	47933	Blue-574	47810	Blue-509	
537	47774	Blue-319	47634	Blue-331	
539	47672	Blue-134	47730	Blue-350	
540	55531	Blue-734	55527	Blue-729	
545	53768	Blue-262	53760	Blue-058	
547	48012	Blue-071	47919	Blue-287	
550	55829	Blue-857	55823	Blue-851	
551	55870	Blue-922	55852	Blue-892	
552	48018	Blue-062	47926	Blue-207	
556	52633	Blue-123	55822	Blue-850	
562			48057	Blue-722	Male Blue-730 on nest a lot before egg laid 3 Feb
563	47702	Blue 721	47751	Blue-715	
566	28626	Blue-202	47894	Blue-293	
573			55881	Blue-934	Male Blue-393 on nest a lot before egg laid 2 Feb
576	52619	Blue-033	52620	Blue-032	
579	55890	Blue-945	55864	Blue-914	
581	28608	Blue-306	52628	Blue-015	
583	52748	Blue-659	47688	Blue-927	Mr Nettie, re-mated 14 m outside study area
585	55686	Blue-836	47888	Blue-821	
586	53779	Blue-354	53818	Blue-440	
587	55857	Blue-903	55849	Blue-887	
593	47977	Blue-141	47874	Blue-838	
597	47790	Blue-273	55819	Blue-846	
599	55885	Blue-939	55679	Blue-824	
601	47754	Blue-003	47604	Blue-343	
604	Not determined		55869	Blue-921	Failed 3 Feb 02
607	48031		55866	Blue-916	New darvic not fitted to avoid excessive handling
610	53997	Blue-639	54006	Blue-677	
614	47759	Blue-156	47612	Blue-713	
619	47975	Blue -138	53812	Blue-436	
621	53816	Blue-437	52733	Blue-521	
622	55888	Blue-942	55868	Blue-920	
626	55867	Blue-917	55856	Blue-902	
627	48028	Blue-333	47839	Blue-132	
628	52630	Blue-222	52655	Blue-356	

NEST	MALE		FEMALE		COMMENTS
	METAL 'R' BAND	DARVIC	METAL 'R' BAND	DARVIC	
630	55887	Blue-941	55894	Blue-949	
634	Unbanded		55840	Blue-875	Failed 3 Feb 02
636	28664	Blue-214	53824	Blue-446	
644	53988	Blue-598	53980	Blue-503	
646	53614	Blue-251	53624	Blue-317	
649	Unbanded		55834	Blue-864	Failed 23 Jan 02
650	47627	Blue-389	47768	Blue-187	
660	52617	Blue-368	55862	Blue-912	
661	47684	Blue-101	47740	Blue-385	
666	47794	Blue-216	47969	Blue-793	
674	48052	Blue-263	48010	Blue-382	
675	55871	Blue-923	55854	Blue-894	
681	47650	Blue-569	47729	Blue-662	
682	47848	Blue-115	47958	Blue-117	
685	55891	Blue-946	55828	Blue-856	
700	55624	Blue-533	53979	Blue-536	
702	55832	Blue-862	55818	Blue-845	
703	Unbanded		55877	Blue-930	
709	55830	Blue-858	55824	Blue-852	
711	47732	Blue-381	55501	Blue-684	
713	47625	Blue-035	47767	Blue-375	
716	55521	Blue-716	55522	Blue-718	
724	55526	Blue-728	54002	Blue-663	
729					Failed on about 17 Jan 02
731	55884	Blue-938	55858	Blue-904	
733	Unbanded		55865	Blue-915	Failed 2 Feb 02
734	55530	Blue-733	55517	Blue-709	
736	55680	Blue-825	55645	Blue-756	
738	55509	Blue-687	55505	Blue-692	
782	53767	Blue-258	55863	Blue-913	
785	55873	Blue-925	47990	Blue-653	
787	55820	Blue-848	55878	Blue-931	
788	53775	Blue-294	55847	Blue-884	
789	55860	Blue-906	55882	Blue-936	Failed 25 Jan 02
790	53789	Blue-390	47714	Blue-243	
793	55859	Blue-905	55841	Blue-876	
794	47753	Blue-714	52667	Blue-266	32 m outside study area
797	48029	Blue-228	47840	Blue-229	
5015	55861	Blue-907	55853	Blue-893	
5042	Not determined		53803	Blue-347	Nest failed 31 Jan 02. Old partner R53815 on nest before egg laid
5047	48003	Blue-656	48064	Blue-603	
5048	52740	Blue-308	53609	Blue-552	
5049	55874	Blue-926	55850	Blue-895	
5057	47698	Blue-290	28683	Blue-538	
5084	47921	Blue-352	48021	Blue-267	
5090	55515	Blue-705	55511	Blue-700	
5099	47746	Blue-136	47694	Blue-874	
5106	28666	Blue-233	47668	Blue-234	
5110	47690	Blue-087	47793	Blue-270	
5111	47847	Blue-797	47845	Blue-302	
5123	52738	Blue-192	52741	Blue-034	
5125	55875	Blue-928	55842	Blue-877	

NEST	MALE		FEMALE		COMMENTS
	METAL 'R' BAND	DARVIC	METAL 'R' BAND	DARVIC	
5162	53977	Blue-525	55504	Blue-694	
5167	53759	Blue-044	55652	Blue-783	
5168	47779	Blue-840	35837	Blue-318	
5198	55879	Blue-932	55855	Blue-897	
7001	55666	Blue-812	55631	Blue-762	Polar Front - originally nest thought to be outside study area
7541	53634	Blue-726	52742	Blue-592	
7555	47980	Blue-507	47877	Blue-577	
7626	28620	Blue-054	47646	Blue-055	

Appendix 2

NESTING ADULT ANTIPODEAN WANDERING ALBATROSS BANDED WITH NEW METAL 'R' BANDS AND/OR NEW DARVIC BANDS IN THE ANTIPODES I. STUDY AREA, JAN-FEB 2002

CURRENT METAL	DATE	NEW METAL	NEW DARVIC	PREVIOUS METAL	PREVIOUS DARVIC	SEX
47688	30 Jan 02		Blue-927		Blue-225	M
47694	22 Jan 02		Blue-874		Blue-235	F
47779	7 Jan 02		Blue-840		Blue-052	M
47781	19 Jan 02		Blue-859			
47851	11 Jan 02		Blue-844		Blue-104	F
47874	7 Jan 02		Blue-838		Blue-142	F
47899	9 Jan 02		Blue-843			M
47959	13 Jan 02		Blue-847		Blue-223	M
51830	6 Feb 02		Blue-944			F
52616	7 Jan 02		Blue-839		Blue-359	M
52637	3 Feb 02		Blue-935		Blue-162	M
52643	9 Jan 02		Blue-841		Blue-311	M
52656	22 Jan 02		Blue-873		Blue-094	M
53982	7 Jan 02		Blue-837		Blue-565	M
	9 Jan 02	55817	Blue-842	53791	Blue-394	M
	13 Jan 02	55818	Blue-845			F
	13 Jan 02	55819	Blue-846			F
	13 Jan 02	55820	Blue-848			M
	15 Jan 02	55821	Blue-849			F
	15 Jan 02	55822	Blue-850			F
	15 Jan 02	55823	Blue-851			F
	15 Jan 02	55824	Blue-852			F
	15 Jan 02	55825	Blue-853			F
	15 Jan 02	55826	Blue-854			M
	17 Jan 02	55827	Blue-855			F
	17 Jan 02	55828	Blue-856			F
	17 Jan 02	55829	Blue-857			M
	17 Jan 02	55830	Blue-858			M
	19 Jan 02	55832	Blue-862			M
	21 Jan 02	55833	Blue-863			M
	21 Jan 02	55834	Blue-864			F
	21 Jan 02	55835	Blue-865			M
	21 Jan 02	55836	Blue-867			F
	21 Jan 02	55837	Blue-870			F
	21 Jan 02	55838	Blue-871			M
	21 Jan 02	55839	Blue-872			M
	22 Jan 02	55840	Blue-875			F
	22 Jan 02	55841	Blue-876			F
	23 Jan 02	55842	Blue-877			F
	23 Jan 02	55843	Blue-878			F
	23 Jan 02	55844	Blue-879			M

CURRENT METAL	DATE	NEW METAL	NEW DARVIC	PREVIOUS METAL	PREVIOUS DARVIC	SEX
	23 Jan 02	55845	Blue-882			F
	25 Jan 02	55846	Blue-883			F
	25 Jan 02	55847	Blue-884			F
	25 Jan 02	55848	Blue-885			M
	25 Jan 02	55849	Blue-887			F
	26 Jan 02	55850	Blue-895			F
	25 Jan 02	55851	Blue-888			M
	25 Jan 02	55852	Blue-892			F
	25 Jan 02	55853	Blue-893			F
	25 Jan 02	55854	Blue-894			F
	26 Jan 02	55855	Blue-897			F
	26 Jan 02	55856	Blue-902			F
	26 Jan 02	55857	Blue-903			M
	26 Jan 02	55858	Blue-904			F
	26 Jan 02	55859	Blue-905			M
	26 Jan 02	55860	Blue-906			M
	27 Jan 02	55861	Blue-907			M
	27 Jan 02	55862	Blue-912			F
	27 Jan 02	55863	Blue-913			F
	27 Jan 02	55864	Blue-914			F
	27 Jan 02	55865	Blue-915			F
	29 Jan 02	55866	Blue-916			F
	29 Jan 02	55867	Blue-917			M
	29 Jan 02	55868	Blue-920			F
	29 Jan 02	55869	Blue-921			F
	29 Jan 02	55870	Blue-922			M
	29 Jan 02	55871	Blue-923			M
	29 Jan 02	55872	Blue-924			M
	29 Jan 02	55873	Blue-925			M
	30 Jan 02	55874	Blue-926			M
	31 Jan 02	55875	Blue-928			M
	31 Jan 02	55876	Blue-929			F
	31 Jan 02	55877	Blue-930			F
	1 Feb 02	55878	Blue-931			F
	1 Feb 02	55879	Blue-932			M
	2 Feb 02	55880	Blue-933			M
	2 Feb 02	55881	Blue-934			F
	3 Feb 02	55882	Blue-936			F
	4 Feb 02	55883	Blue-937			M
	4 Feb 02	55884	Blue-938			M
	4 Feb 02	55885	Blue-939			M
	4 Feb 02	55886	Blue-940			F
	4 Feb 02	55887	Blue-941			M
	5 Feb 02	55888	Blue-942			M
	5 Feb 02	55889	Blue-943			F
	6 Feb 02	55890	Blue-945			M
	9 Feb 02	55891	Blue-946			M
	9 Feb 02	55892	Blue-947			M
	12 Feb 02	55893	Blue-948			M
	14 Feb 02	55894	Blue-949			F
	14 Feb 02	55895	Blue-950			F

Appendix 3

NON-STUDY AREA BIRDS RECOVERED ON ANTIPODES I., JAN-FEB 2002

SA = study area; BOG = birds on ground; Or = Orange; Wh = White.

Metal band	Darvic band	RECOVERY				Location	Activity	FIRST CAPTURE			
		Date	In SA	Grid ref.	Age			Date	In SA	Grid ref.	Location
11805		22 Jan 02	No	11318, 8934	Near S end SA	BOG					
140-26315		10 Feb 02	No	10700, 8205	Block 5	BOG					
140-50121		11 Feb 02	Yes	11391, 9526		BOG					
140-50268		6 Feb 02	No	11306, 8222	Block 5	Nesting					
140-50271		3 Feb 02	No	11264, 9628	West Bank	BOG					
18805		16 Jan 02	No	11300, 8700	Block 5	BOG					
18978	Blue-373	27 Jan 02	No	11222, 9054		Nesting					
19245		7 Feb 02	No	11040, 9147	Block 5	Nesting					
19416		6 Feb 02	No	10948, 8114	Block 5	BOG					
19422		6 Feb 02	No	11070, 8250	Block 5	Nesting					
28646		29 Jan 02	No	11606, 8803	N Plains, W of Carex Corner	BOG					
28658		22 Jan 02	No	11554, 9194	W slopes of Thum Thar Hills	Nesting					
28660		16 Jan 02	No	11162, 9418	West Bank	Nesting					
28691		3 Feb 02	No	11515, 8747	Block 5	Nesting					
28711		7 Feb 02	No	11026, 9261	Block 5	Nesting					
28712		7 Feb 02	No	11168, 8861	Block 5	Nesting					
28745		7 Feb 02	No	11119, 9025	Block 5	BOG					
28772		22 Jan 02	No	11240, 8949	W of SA, near pillock	Nesting					
28774		22 Jan 02	No	11268, 8917	W of SA, near pillock	BOG					
28797		5 Feb 02	No	11197, 8578	Block 5	Nesting					
28805		6 Feb 02	No	10918, 8589	Block 5	BOG					
28822		10 Feb 02	No	10671, 8151	Block 5	Nesting					
28867		7 Feb 02	No	11261, 8846	Block 5	Nesting					
28882		10 Feb 02	No	10840, 8452	Block 5	Nesting					
28922		10 Feb 02	No	10824, 8491	Block 5	Nesting					
28944		7 Feb 02	No	10966, 9025	Block 5	Nesting					
29033		7 Feb 02	No	11141, 8915	Block 5	Nesting					
29076		6 Feb 02	No	10911, 8781	Block 5	Nesting					
35128		8 Feb 02	No	9081, 5480	Block 32	Nesting					
35130		8 Feb 02	No	8993, 5418	Block 32	Nesting					
35320		6 Feb 02	No	11421, 8308	Block 5	Nesting					
35625		5 Feb 02	No	11269, 8472	Block 5	Nesting					
35653		6 Feb 02	No	11398, 8054	Block 5	Nesting					
35667		6 Feb 02	No	10997, 8051	Block 5	Nesting					
35674		5 Feb 02	No	11064, 8375	Block 5	Nesting					
35712		6 Feb 02	No	11469, 8324	Block 5	Nesting					
35785		6 Feb 02	No	10960, 8118	Block 5	Nesting					

Metal band	Darvic band	RECOVERY			Grid ref.	Location	Activity	Age	FIRST CAPTURE				
		Date	In SA						Date	In SA	Grid ref.	Location	
47659		11 Feb 02	Yes		11577, 9563		BOG						
50214	Or-559	13 Jan 02	Yes				BOG	6					
50225	Or-570	26 Jan 02	Yes				BOG	6					
50228	Or-574	5 Feb 02	Yes		11379, 9007		BOG	6					
50229	Or-575	26 Jan 02	Yes				BOG	6					
50230	Or-576	9 Feb 02	Yes		11616, 9562		BOG	6					
50241	Or-587	4 Feb 02	No		11199, 9181	Block 5	BOG	6	4 Jan 97	Yes			
50249	Or-595	11 Feb 02	Yes		11398, 9532		BOG	6					
50278	Or-633	3 Feb 02	No		11661, 9762	Hut Stream	BOG	6	4 Jan 97	Yes			
50282	Or-677	26 Jan 02	Yes				BOG	6					
50307	Or-653	7 Feb 02	No		11361, 8873	Block 5	BOG	6	4 Jan 97	Yes			
50311	Or-657	12 Feb 02	No		11196, 9202	Block 5	BOG	6	4 Jan 97	Yes			
50316	Or-664	7 Feb 02	No		11394, 8747	Block 5	BOG	6	4 Jan 97	Yes			
50340	Or-730	4 Feb 02	No		11185, 9197	Block 5	BOG	6	5 Jan 97	No	11300, 8900	SW of SA in Block 5	
51153	Or-707	12 Feb 02	No		11154, 9319	Block 5	BOG	6	5 Jan 97	No	11000, 9400	Block 5	
51176	Or-821	10 Feb 02	No		11500, 8500	Block 5	BOG	6	6 Jan 97	No	11300, 8400	Block 5	
51209	Or-812	3 Feb 02	Yes		11600, 9523	SA	BOG	6	6 Jan 97	No	11300, 8500	Block 5	
51228	Or-865	12 Feb 02	Yes		11605, 9531		BOG	6					
51261	Or-920	10 Feb 02	No		10700, 8205	Block 5	BOG	6	6 Jan 97	No	11300, 8500	Block 5	
51265	Or-924	5 Feb 02	No		11331, 8557	Block 5	BOG	6	6 Jan 97	No	11300, 8500	Block 5	
51283	Or-942	6 Feb 02	No		11355, 8282	Block 5	BOG	6	6 Jan 97	No	11400, 8300	Block 5	
51291	Or-750	6 Feb 02	No		11155, 8012	Block 5	BOG	6	6 Jan 97	No	11300, 8100	Block 5	
51335	Or-982	27 Jan 02	Yes		11383, 9035		BOG	6					
51365		7 Feb 02	No		11203, 9099	Block 5	BOG	7	2 Nov 95	No		Block 2	
51401		12 Feb 02	Yes		11598, 9658		BOG	7					
51402		17 Jan 02	Yes				BOG	7					
51416		14 Feb 02	Yes		11536, 9561		BOG	7	14 Feb 02	Yes	11536, 9561		
51436		3 Feb 02	No		11540, 8796	Block 5	BOG	7	3 Nov 95	Yes			
51460		11 Feb 02	Yes		11444, 8817		BOG	7					
51464		3 Feb 02	Yes		11388, 8931	SA	BOG	7	4 Nov 95	Yes			
51481		26 Jan 02	Yes				BOG	7	26 Jan 02	Yes			
51482		11 Feb 02	Yes		11380, 9482		BOG	7					
51488		11 Feb 02	Yes		11382, 9491		BOG	7					
51495		7 Feb 02	No		11176, 9047	Block 5	BOG	7	4 Nov 95	Yes			
51531		11 Feb 02	Yes		11408, 9584		BOG	7					
51563		12 Feb 02	Yes		11331, 9063		BOG	7					
51572		12 Feb 02	Yes		11476, 9144		BOG	7					
51690		3 Feb 02	Yes		11438, 9606	SA	BOG	7	6 Nov 95	Yes			
51702		5 Feb 02	Yes		11612, 9512		BOG	7					
51708		12 Feb 02	No		11209, 9095	Block 5	BOG	7	6 Nov 95	Yes			
51714		4 Feb 02	Yes		11368, 9233	SA	BOG	7	7 Nov 95	Yes			
51724		5 Feb 02	Yes		11421, 9568		BOG	7					
51754		12 Feb 02	No		11189, 9095	Block 5	BOG						
51762		7 Feb 02	No		11008, 9244	Block 5	BOG						
51768		4 Feb 02	Yes		11366, 9230	SA	BOG						
51808		10 Feb 02	No		10717, 8160	Block 5	BOG						
51813		7 Feb 02	No		11087, 8568	Block 5	BOG						
51814		3 Feb 02	Yes		11309, 9097	SA	BOG						
51840		7 Feb 02	No		11166, 8760	Block 5	BOG						
51848		11 Feb 02	Yes		11437, 8863		BOG						

Metal band	Darvic band	RECOVERY			Location	Activity	Age	FIRST CAPTURE				
		Date	In SA	Grid ref.				Date	In SA	Grid ref.	Location	
51859		11 Feb 02	Yes	11380, 9482		BOG	7					
51891		10 Feb 02	No	11248, 8129	Block 5	BOG	7	21 Nov 95	No			Block 5
51949		8 Feb 02	No	9933, 5900	Block 32	BOG	7	22 Nov 95	No			Block 32
51954		9 Feb 02	Yes	11583, 9574		BOG						
51963		3 Feb 02	No	11552, 8773	Block 5	BOG						
51983		6 Feb 02	No	11370, 8089	Block 5	BOG						
51989		4 Feb 02	Yes	11437, 8846	SA	BOG						
52056		7 Feb 02	No	11488, 8761	Block 5	BOG	7	8 Nov 95	No			Block 8
52291		8 Feb 02	No	9112, 5372	Block 32	BOG	7	9 Nov 95	No			Block 3
52312		5 Feb 02	No	11114, 8377	Block 5	BOG						
52394		3 Feb 02	No	11314, 8909	Block 5	BOG	7	12 Nov 95	No			Block 8
52682	Or-763	10 Feb 02	No	10759, 8168	Block 5	BOG	6	7 Jan 97	No	10700, 8100		Block 4
52694	Or-775	10 Feb 02	No	10266, 8612	Block 4	BOG	6	7 Jan 97	No	10700, 8300		Block 4
52706	Or-A91	7 Feb 02	No	11070, 8759	Block 5	BOG	6	8 Jan 97	No	10300, 8800		Block 4
52707	Or-A92	11 Feb 02	Yes	11292, 9432		BOG	6	11 Feb 02	Yes	11292, 9432		
52760	Or-A14	27 Jan 02	Yes	11401, 8900		BOG	6	27 Jan 02	Yes	11401, 8900		
52796	Or-B08	10 Feb 02	No	10370, 8852	Block 4	BOG	6	8 Jan 97	No	10600, 8800		Block 4
52797	Or-B09	11 Feb 02	Yes	11577, 9563		BOG	6					
52821	Or-A52	29 Jan 02	Yes	11587, 8850		BOG	6					
52846	Or-A81	10 Feb 02	No	10368, 8860	Block 4	BOG	6	8 Jan 97	No	10300, 8800		Block 4
53138		10 Feb 02	No	10730, 8352	Block 5	BOG	7	14 Nov 95	No			Block 4
53254		10 Feb 02	No	10177, 8091	Block 10	BOG	7	14 Nov 95	No			Block 9
53350		8 Feb 02	No	9621, 5639	Block 32	BOG	7	10 Nov 95	No			Block 5
53360		8 Feb 02	No	11167, 7439	Block 8	BOG						
53386		3 Feb 02	No	11543, 8789	Block 5	BOG						
53625	Wh-000	5 Feb 02	Yes	11696, 9591		BOG	5					
53648	Wh-015	14 Feb 02	Yes	11374, 9520		BOG	5	18 Jan 98	Yes			
53655	Wh-024	10 Feb 02	No	10266, 8612	Block 4	BOG	5	19 Jan 98	Yes			
53657	Wh-026	10 Feb 02	No	10700, 8205	Block 5	BOG	5	19 Jan 98	Yes			
53668	Wh-037	11 Feb 02	Yes	11380, 9482		BOG	5					
53670	Wh-039	14 Feb 02	Yes	11512, 9585		BOG	5					
53700	Wh-074	12 Feb 02	No	11188, 9312	Block 5	BOG	5	22 Nov 97	Yes			
53702	Wh-076	8 Feb 02	No	9567, 5619	Block 32	BOG	5	22 Nov 97	Yes			
53734	Wh-125	10 Feb 02	No	10266, 8612	Block 4	BOG	5	23 Nov 97	Yes			
53737	Wh-128	6 Feb 02	Yes	11413, 8803		BOG	5					
53738	Wh-129	7 Feb 02	No	11182, 9138	Block 5	BOG	5	23 Nov 97	Yes			
53851	Wh-173	9 Feb 02	Yes	11597, 9570		BOG	4					
53890	Wh-221	7 Feb 02	No	11034, 9392	Block 5	BOG	4	24 Oct 98	Yes			
53917	Wh-247	12 Feb 02	Yes	11436, 9165		BOG	4					
53943	Wh-273	6 Feb 02	No	11419, 8385	Block 5	BOG	4	25 Oct 98	Yes			
54015	Wh-300	12 Feb 02	Yes	11404, 8839		BOG	3					