Monitoring Antipodean wandering albatross, 1999/2000

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ABSTRACT

This paper reports on progress made between 1 July 1999 and 30 June 2000 on measuring survival, productivity, and recruitment of Antipodean wandering albatross (*Diomedea antipodensis*), and the identification of their most important foraging areas. Productivity for the 1999 breeding season was 64.0%, lower than the average for the last six years of 74.6%. In 1999, 94 chicks were banded, making a total of 563 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 annual adult survival for 1994/95, 1995/96, 1996/97, and 1997/98 of 1.01, 0.97, 0.98, and 0.94, respectively. A total of 462 albatross nests were counted within a representative portion of the island; the average number of nests within this block between 1994 and 2000 was 483. Two new areas were established to assess productivity in areas of low researcher disturbance. In February 2000, 82 albatross nests were counted at Pipit Peak and 130 nests were counted in Block 32. At the end of the breeding season, the number of chicks in these areas will be counted to calculate breeding success. Eight satellite transmitters, with a planned life of two years, were attached to breeding albatross in February 2000. One bird abandoned its nest in February and another two in early May and all three of these transmitters stopped functioning in May. Foraging flights for the breeding birds showed slight changes from previous years' satellite tracking.

Keywords: Antipodean wandering albatross, *Diomedea antipodensis*, breeding success, recruitment, adult survival, nest census, satellite tracking, at-sea distribution.

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1. Introduction

Antipodean wandering albatrosses (*Diomedea antipodensis*) have been a regular bycatch on both foreign and New Zealand southern bluefin tuna fishing boats since long-lining began in the early 1960s (Murray et al. 1993). As wandering albatrosses are long-lived (> 40 years), breed late (> 10 years), and produce a chick only once every 2–3 years, the increased mortality caused by bycatch has the capacity to threaten the species.

A number of concurrent programmes are attempting to examine and resolve this issue: a variety of underwater bait-setting and other mitigation devices are being developed and tested; observers are placed on boats to accurately document the extent and patterns of bycatch; the zones of greatest potential conflict are being identified through satellite telemetry of foraging albatross, and the impact of the bycatch and any mitigation of it on albatross populations are being monitored.

This report describes progress during the 1999/2000 year on the latter two aspects: the at-sea distribution of Antipodean wandering albatrosses, and their population status. The population study focuses on estimating survival, productivity and recruitment rates so that the population can be modelled and sustainable bycatch levels estimated. Population trends are also monitored.

It is one of a series of annual progress reports on this research (Amey et al. 1994; Walker & Elliott 2002a, 2002b, 2002c; 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 will be published when sufficient data have been collected.

Athough wandering albatrosses spend most of their lives at sea, the most practical way to assess the fisheries impact is during the short period they concentrate on small subantarctic islands to breed. Every summer just less than half of the Antipodean wandering albatrosses gather to breed, or for adolescents to establish mates, on Antipodes I., about 730 km south-east of the New Zealand mainland (see map in Walker & Elliott 2002a, fig. 1). During this period, population parameters can be assessed, and satellite transmitters can be attached to follow the birds' life at sea.

In December 1999, a visit to Antipodes I. to band all 1999 season albatross chicks in the study area and to assess 1999 season productivity was attempted by Kath Walker and Graeme Elliott. The tour-ship *Akademik Shokalskiy* was used for transportation but a landing was unsuccessful due to an extremely large sea swell at the island. Therefore, during the 1999/2000 season, only one visit was made to Antipodes I.—by Sheryl Hamilton and Alan Wiltshire from 3 January to 14 February 2000. Transport to the island was provided by the *Akademik Shokalskiy* and from the island by the *Marine Countess*. The objectives were to assess the 1999 productivity of Antipodean wandering albatross; to band all the remaining chicks produced in the study area in 1999 to allow assessment of recruitment; to assess Antipodean wandering albatross adult survival and population changes; and to deploy eight satellite transmitters.

2. Population dynamics

A population study aimed at measuring productivity, survival and recruitment has been conducted in a study area at the northern end of Antipodes I. since 1994. Breeding birds are banded with coloured, plastic (darvic), numbered bands in addition to metal bands. The study area comprises about 50 ha at the northern end of Antipodes I., mostly bound by obvious geographical features (see Walker & Elliott 2002c). The study area is bounded by Hut Stream and the base of the hills west of Crater Bay, and is marked elsewhere by white plastic fence poles.

2.1 METHODS

On 4, 5, and 6 January 2000, all the study area nests that had eggs in February 1999 were visited and all chicks present were banded with both numbered metal and white darvic bands. We assessed the final outcome of nests using standard criteria (see Walker & Elliott 2002c).

On 26 January 2000, the 1999 season nests were re-visited to confirm the survival of all banded chicks. The 1999 metal nest tags were removed along with those from any earlier years' nests.

Between 4 January and 13 February 2000 we made daily trips to the study area and read the bands of all banded birds encountered in or near the study area, banded any unbanded nesting birds with both metal and blue darvic bands, put blue darvic bands on any already metal-banded study area birds, checked every nest and potential nest for an egg to determine laying dates and incubation shift lengths, and marked nests with numbered metal tags and mapped their positions using a compass and tape measure.

2.2 RESULTS

2.2.1 1999 breeding success in the study area

There were 149 study area nests in the 1999 season. However, the ten nests where one of the pair had a transmitter attached in February 1999 (Walker et al. 2002) were not included in the calculations for the 1999 breeding success as it was thought that transmitter attachment may have disrupted the breeding cycle. By 24 February 1999 (i.e. the end of the 1999 season field visit), 10 nests had failed at the early egg stage. Therefore, at this early stage of the breeding season there was 7.2% nesting failure (i.e. 92.8% success). A field visit in June 1999 found that a further 24 nests had failed (M. Renner, pers. comm.). Therefore, by June 1999 there was 24.5% nesting failure (i.e. 75.5% success).

In early January 2000, 94 chicks were banded from study area nests. Two of these were found dead later in January and February 2000 and their metal and white darvic bands were removed (Table 1). Another four chicks were small and

TABLE 1. ANTIPODEAN WANDERING ALBATROSS CHICKS BANDED IN JANUARY 2000 IN THE STUDY AREA ON ANTIPODES ISLAND BUT FOUND DEAD LATER IN JANUARY AND FEBRUARY 2000 OR CONSIDERED TOO WEAK TO FLEDGE.

1999 NEST NO.	METAL BAND	DARVIC BAND	COMMENTS
660	R54050 (r)	White-341 (r)	Dead. Found dead on 12 Feb 2000.
650	R54064 (r)	White-358 (r)	Dead. Found dead on 9 Jan 2000.
609	R54009	White-318	Weak. Downy and small on 12 Feb 2000.
678	R54043	White-332	Weak. Downy and small.
788	R54048	White-344	Weak. 'Probably won't fledge': 12 Feb 2000 notes.
655	R54061	White-356	Weak. 'Probably won't fledge': 12 Feb 2000 notes.

r = removed.

weak when we left Antipodes I. in mid-February and we did not think they would be able to fledge (Table 1). However, we retained these four 'weak' chicks in the total number of successfully raised chicks. Five chicks (< 5% of fledglings) were thought to have fledged before we arrived at the island and began banding chicks. Therefore, 97 chicks fledged from 149 study area nests in 1999. However, after removing the ten transmitter bird nests, 64.0% (89 chicks) of 139 nests had chicks fledge, which is considerably less than the average breeding success for 1994–99 of 74.6% (Table 2). There was some concern that the low breeding success that season might have been due to a culmination of many years of researcher disturbance within the study area. However, it might also have been due to natural variation. Two new areas, where there has been low researcher disturbance, are now being monitored to assess breeding success; this was also to increase the sample size of the breeding success assessment sites in case of spatial variation across the island.

TABLE 2. BREEDING SUCCESS OF ANTIPODEAN WANDERING ALBATROSS 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	155	78.5
1997	146	80.8
1998	163	74.9
1999	139	64.0
Average		74.6

2.2.2 2000 season study area nests

The first egg was laid in the study area on 8 January 2000 with mean (and median) lay date being 25 January and the last egg laid on 12 February. This is very close to the mean lay date of 26 January recorded in 1996. In January/ February 2000, 123 new nests were tagged and mapped and their breeding

success will be assessed next summer (Fig. 1; Appendix 1). None of these nests had failed before we left the island, with our last nest check being on 13 February 2000. In the 1998/99 season we recorded a new egg on 16 February 1999 which was thought to have been laid on the 14 or 15 February. In 1996, the last egg was recorded on 15 February. Therefore, there is a possibility that we may have missed any very late eggs being laid after our last study area check on 13 February 2000.

2.2.3 Adult mortality

In 2000, of the 123 study area nests, 119 were within the study area and four pairs that had previously nested and been banded in the study area, nested within 150 m outside of the boundary. Of the 246 (2 × 123 pairs) breeding birds, 33 were unbanded adults that we banded (Appendix 2) and four were not checked for bands because we found the nest towards the end of our visit and we left the island before we had read the bands of the partner. In addition, we read the bands of 163 non-breeding birds that were visiting the study area.

Adult survival was estimated using the methods of Cormack (1964, 1972), which reliably estimate annual survival only for periods more than two years before the last visit to the island (Table 3).

TABLE 3. ESTIMATED ANNUAL SURVIVAL OF ADULT ANTIPODEAN WANDERING ALBATROSSES RETURNING TO THE STUDY AREA ON ANTIPODES ISLAND. STANDARD ERRORS IN PARENTHESES.

YEAR	ALL BIRDS	KNOWN MALES	KNOWN FEMALES
1994/95	1.01 (0.02)	1.01 (0.01)	0.99 (0.01)
1995/96	0.97 (0.02)	1.01 (0.02)	1.03 (0.02)
1996/97	0.98 (0.03)	0.98 (0.03)	0.97 (0.04)
1997/98	0.94 (0.04)	0.95 (0.05)	1.00 (0.07)
Average	0.97 (0.03)	0.99 (0.03)	1.00 (0.03)

2.2.4 Recruitment

In early January 2000, 94 chicks were banded in the study area. Table 4 shows the number of chicks that have been banded on Antipodes I. for future assessment of recruitment.

2.2.5 Darvic band loss

Of 386 darvic-banded Antipodean wandering albatross that were recorded in January and February 2000, 1.8% had either lost or broken darvic bands. Six of these had lost their darvic band and one bird had a broken darvic that was about to fall off (Table 5). These were the first records of darvic band loss for this study and all seven lost or damaged darvic bands had only been on a bird for two years.

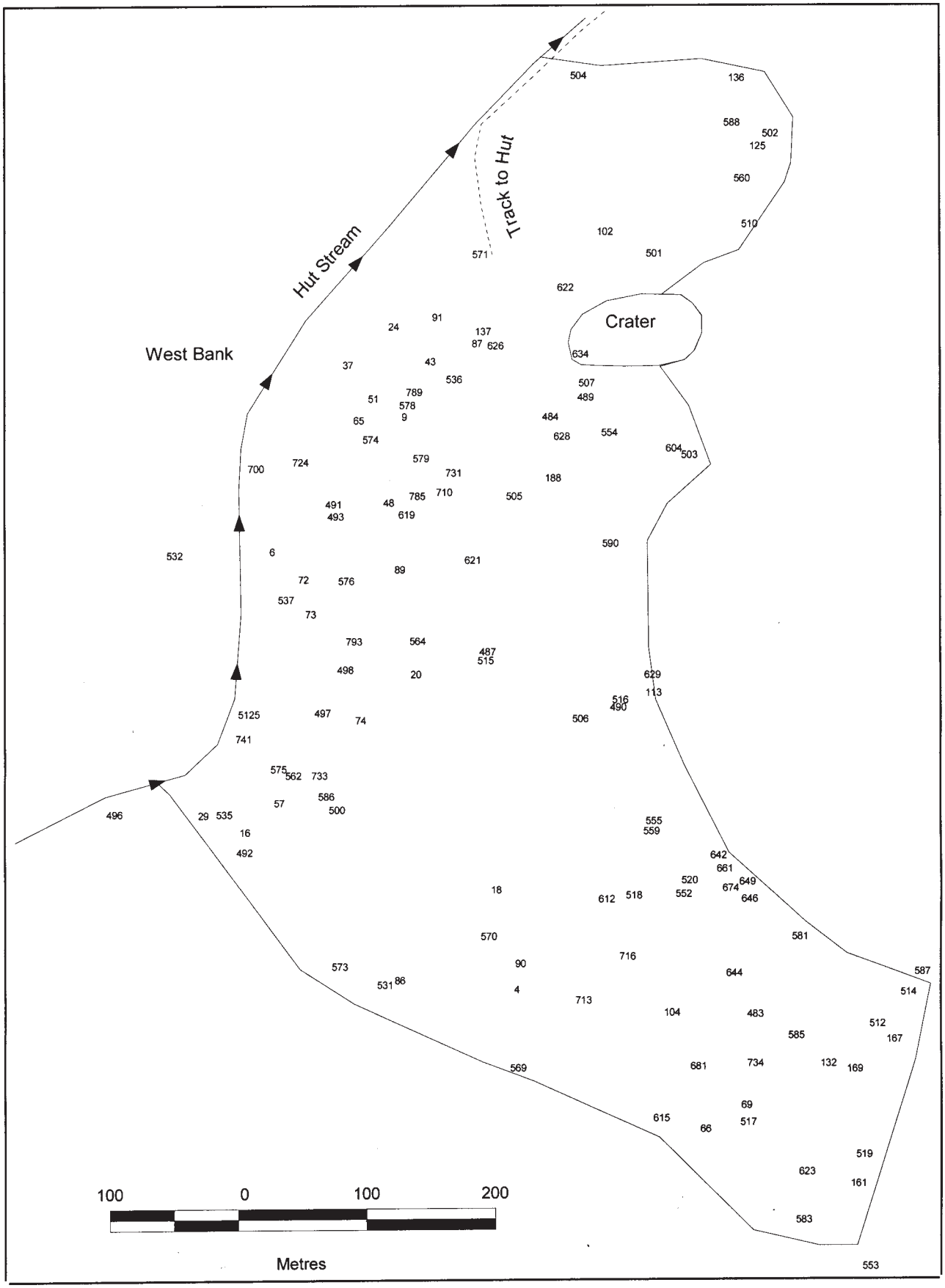

Figure 1. Antipodes Island study area nests for the 2000 breeding season.

TABLE 4. FLEDGLING ANTIPODEAN WANDERING ALBATROSSES BANDED ON ANTIPODES ISLAND, 1995–99.

YEAR	STUDY AREA	OUTSIDE STUDY AREA
1995[a]	116	1865
1996[b]	98	402
1997[c]	118	
1998[c]	137	
1999[c]	94	
Total	563	2267

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

TABLE 5. ANTIPODEAN WANDERING ALBATROSS WITH LOST OR BROKEN DARVIC BANDS IN JANUARY/FEBRUARY 2000.

METAL BAND	LOST DARVIC	NEW DARVIC	COMMENTS
R53817	Blue-439	Blue-725	
R47701	Blue-139	–	Only seen as BOG. Darvic not replaced.
R52732	Blue-171	Blue-704	
R47612	Blue-336	Blue-713	
R48044	Blue-298	Blue-708	
R47753	Blue-209	Blue-714	Blue-209 broken so replaced.
R47851	Blue-104	–	Blue-104 seen on 23 Jan 00 but missing on 31 Jan 00.

3. Population trends

Collecting information on population size in a deferred-breeding species such as the Antipodean wandering albatross is slow, since birds return to breed only once every 2–3 years. Between 1994 and 1997, a series of annual whole island counts were carried out. Results from these show that each year an average of 5136 pairs breed on Antipodes I. (Walker & Elliott 2002c). Now that there is a reasonable estimate of the total population size, annual counts are currently made of a representative portion of the island and are intended to monitor population change rather than assess total population size.

3.1 METHODS

Between 7 and 9 February 2000, all active albatross nests with the Marked Census Block A (MCBA) were counted. This was done using a standard 'sweep' technique (see Walker & Elliott (2002c) for descriptions).

Once the whole area had been counted we tested the reliability of the census by walking straight transects along compass bearings at right angles to the census sweep lines until approximately 15% of the total nest count had been checked. We checked all nests within 5 m of the transect for paint marks which indicated that the nests had been counted.

3.2 RESULTS

In the MCBA, 462 nests with eggs were counted (Table 6). Nests that had recently failed (freshly broken egg found in the nest bowl) were not included as the proportion of failed nests missed during each census can not be quantified. The block was counted in 21 sweeps taking a total of 34 person hours. During this census we read the bands of 26 birds that had been banded on Antipodes I. prior to this study (Appendix 3), and four birds that had been banded in the study area (two of which were from this year's study nests).

In the transect checks, 76 nests were re-counted (16.5% of all the nests in the block), and no unpainted nests were found. This indicated that our original count of 462 nests with eggs was accurate.

In the 1998 census, nine nests (i.e. 1.66% of the 543 total) were counted in the small area of Block 5 that is not included in the MCBA (Walker & Elliott 2002c). Therefore, the Block 5 census data from 1994 to 1997 are adjusted by subtracting 1.66% from each of the totals (Table 7). The average number of nests in the MCBA for 1994–2000 was 483.

TABLE 6. CENSUS OF ANTIPODEAN WANDERING ALBATROSS IN THE MARKED CENSUS BLOCK A ON ANTIPODES ISLAND, 7–9 FEBRUARY 2000.

1999 chicks	69
Unbanded birds on eggs	440
Banded birds on eggs	22
Unbanded birds not nesting	273
Banded birds not nesting	8
Total number of banded birds	30
Total number of birds not nesting	281
Total number of nests	462

3.3 ADDITIONAL AREAS FOR PRODUCTIVITY ANALYSIS

In 2000, it was decided to establish two new areas where breeding success could be assessed using low impact methodology. There were separate (although not mutually exclusive) aims for the two areas. The relatively low breeding success recorded in the main study area for the 1999 season (Table 2) might have been due to natural variation but we were concerned that researcher disturbance might also have been having an effect. As the breeding

TABLE 7. NUMBER OF ANTIPODEAN WANDERING ALBATROSS NESTS WITH EGGS IN MARKED CENSUS BLOCK A (MCBA) BETWEEN 1994 AND 2000 .

YEAR	BLOCK 5	MCBA
1994	553	544*
1995	490	482*
1996	425	418*
1997	472	464*
1998	543	534
1999		479
2000		462
Average		483

* Figure extrapolated by subtracting 1.66% from the Block 5 nest total.

birds in the study area had all been banded and a large proportion had either had transmitters attached (either during early trials or actual PTT attachment), been regularly weighed during one season, or were partners of those intensively studied birds, it was thought that an area needed to be established, close to the study area, where there had been relatively low researcher disturbance (i.e. Pipit Peak area, Fig. 2). The second area, Block 32 (Fig. 2), was established at the opposite end of the island from the study area to cover the possibility that birds from different parts of the island might have distinct feeding zones which then might influence their demographic characteristics.

The aim was to count the number of nests (i.e. containing an egg) in Pipit Peak and Block 32 at the end of egg laying in February and the number of chicks in each of the two blocks the following December.

All active nests in the Pipit Peak area and Block 32 were counted using the same 'sweep' methods as used in the MCBA. On 9 February 2000, 82 active nests were counted in the Pipit Peak area. Once the whole area had been counted, we tested the reliability of the census by walking straight transects along compass bearings at right angles to the census sweep lines, as for MCBA. For Pipit Peak, this was completed as part of the transect cross-checking of MCBA. In the transect checks for Pipit Peak, 18 nests were re-counted (22% of all nests in Pipit Peak) and no unpainted nests were found. This indicated that our original count of 82 active nests was accurate.

On 11 February 2000, 130 active nests were counted in Block 32. Once the whole area had been counted, transect cross-checking was completed, as for MCBA. In these transect checks, 21 nests were re-counted (16% of all nests in Block 32) and no unpainted nests were found. This indicated that our original count of 130 active nests was accurate.

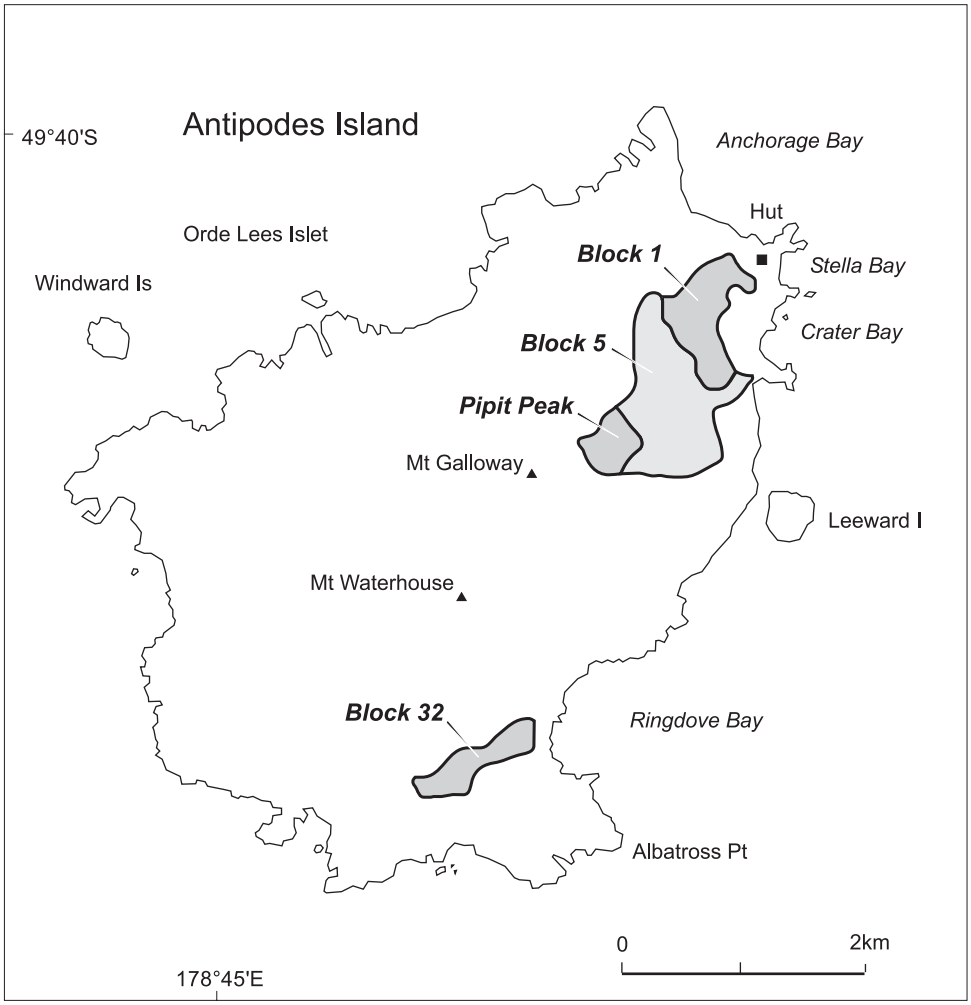

Figure 2. Location of main study area (Block 1) on Antipodes I. and two additional blocks used for assessing productivity.

4. Monitoring at-sea distribution

4.1 METHODS

We put Microwave Telemetry 'Pico' satellite transmitters on four male and four female Antipodean wandering albatrosses between 5 and 10 February 2000 (Table 8). All birds were incubating at the time the transmitters were attached. We made sure that the eggs of transmitter birds did not have any defects eg. dents. Pairs were chosen if they had successfully bred two, but preferably three, times, had never failed, and were considered to be 'calm'. The shock cord harness design with a release mechanism (Walker & Elliott 2002c) was used for all transmitter attachments.

The battery life for all transmitters was about 27 months, and the release mechanisms were set to release the transmitters after 750 days. The total package, including transmitter, harness, batteries, and release mechanism weighed 70 g, which is 0.7–1.5 % of the birds' body weight. The duty cycle for all eight transmitters was six hours on, 20.5 hours off.

TABLE 8. DETAILS OF ANTIPODEAN WANDERING ALBATROSSES WHICH HAD SATELLITE TRANSMITTERS ATTACHED IN FEBRUARY 2000.

METAL BAND NO.	DARVIC BAND NO.	BIRD NAME	SEX	NEST NO.	PTT NO.
R52672	Blue-128	Martin	Male	734	10107
R47789	Blue-226	Mercury	Male	512	10075
R47643	Blue-408	Numulgi	Male	72	10119
R28624	Blue-240	Tane	Male	505	6116
R47741	Blue-102	Anja	Female	161	10031
R47671	Blue-338	Mizzle	Female	661	10037
R47783	Blue-075	Mrs Harold	Female	20	17394
R47719	Blue-029	Millie	Female	579	6118

4.2 RESULTS

One bird with a transmitter abandoned its nest in February 2000 and another two abandoned at the end of the guard period in early May. In May, these three transmitters stopped functioning, presumably because of battery or transmitter failure. The other five birds with transmitters continued to raise their chicks through June, alternating short and long flights.

Between February and June 2000, all 5–7 breeding birds foraged east of New Zealand in the Pacific Ocean. However, unlike earlier years, this season birds spent the majority of time away from the Chatham Rise. Many did longer, wider, looping flights from Antipodes I. to the Louisville Ridge, to East Cape and back to the island. One male made repeated foraging trips south of Antipodes I. to Antarctic waters at 66°S.

The non-breeding females (who abandoned their nests in February and May) both foraged exclusively off the north-east coast of New Zealand, particularly off the Chatham Rise and off Hawkes Bay and East Cape. The non-breeding male (who abandoned his nest in May) headed directly east to the shelf edge off Chile.

4.3 PRODUCTIVITY OF BIRDS WITH TRANSMITTERS ATTACHED IN 1999

Of the ten pairs of Antipodean wandering albatross where one of the pair had a transmitter attached in February 1999, eight successfully fledged a chick at the end of the season (Table 9). Three birds have not been seen since the harness attachment and, therefore, it is 'unknown' whether or not they are still carrying the transmitter. However, although there had been no signals from these transmitters since June 1999, all three birds successfully raised a chick, and it is probable that the harness broke and the transmitter fell off all three of these birds.

TABLE 9. PRODUCTIVITY OF TEN ANTIPODEAN WANDERING ALBATROSSES WHICH HAD SATELLITE TRANSMITTERS ATTACHED IN FEBRUARY 1999.

BAND NO.	BIRD NAME	SEX	NEST NO.	PTT NO.	FATE OF PTT AND HARNESS	NESTING OUTCOME AT JAN/FEB 2000
R48069	Totorore	Male	706	10007	Unknown	Healthy fledgling
R48003	Jesse	Male	677	10047	Fell off	Early fail
R47995	Angus	Male	175	10107	Removed	Late fail
R47927	Aotea	Male	584	10119	Removed	Healthy fledgling
R47941	Tainui	Male	656	10124	Unknown	Healthy fledgling
R48033	Countess	Female	638	10031	Removed	Healthy fledgling
R47816	Poa-iti	Female	606	10035	Unknown	Healthy fledgling
R47855	Heather	Female	639	10037	Removed	Healthy fledgling
R47990	Jacinda	Female	7542	10075	Fell off	Healthy fledgling
R47843	Tarremah	Female	683	10086	Fell off	Healthy fledgling

5. Acknowledgements

Investigation of the impact of fisheries bycatch on Antipodean wandering albatrosses began in the 1993/94 season, using private and DOC funds, and has been funded since the 1995/96 season from the Conservation Services Levy.

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Appendix 1

STUDY AREA NESTS, ANTIPODEAN WANDERING ALBATROSS, ANTIPODES I., FEB 2000

NEST	MALE		FEMALE		COMMENTS
	METAL 'R' BAND	DARVIC	METAL 'R' BAND	DARVIC	
4	47698	Blue-290	28683	Blue-538	
6	28620	Blue-054	47646	Blue-055	
9	53603	Blue-183	53632	Blue-396	
16	55525	Blue-727	55524	Blue-724	
18	47977	Blue-141	47874	Blue-142	Male not recorded on egg
20	47655	Blue-205	47783	Blue-075	Female is transmitter bird Mrs Harold
24	47620	Blue-182	47765	Blue-284	
29	53773	Blue-286	19227	Blue-210	
37	53633	Blue-335	52739	Blue-723	
43	47805	Blue-257	47716	Blue-027	
48	53977	Blue-525	55504	Blue-694	
51	47625	Blue-035	47767	Blue-375	
57	53817	Blue-725	53806	Blue-419	
65	53815	Blue-435	53803	Blue-347	Male not recorded on egg
66	52656	Blue-094	52627	Blue-220	
69	53763	Blue-093	55518	Blue-710	
72	47643	Blue-408	47726	Blue-053	Male is transmitter bird Numulgi
73	47911	Blue-380	48008	Blue-412	
74	47732	Blue-381	55501	Blue-684	
86	52622	Blue-077	52664	Blue-268	
87	55515	Blue-705	55511	Blue-700	
89	52613	Blue-201	52651	Blue-261	
90	47796	Blue-371	47699	Blue-300	
91	28609	Blue-179	28746	Blue-364	
102	47756	Blue-014	28954	Blue-013	
104	52624	Blue-292	52675	Blue-084	
113	47637	Blue-320	47775	Blue-315	
125	47754	Blue-003	47604	Blue-343	
132	53791	Blue-394	53776	Blue-295	
136	55530	Blue-733	55517	Blue-709	
137	53789	Blue-390	47714	Blue-243	
161	47686	Blue-386	47741	Blue-102	Female is transmitter bird Anja
167	47738	Blue-344	28634	Blue-272	
169	47960	Blue-717	47868	Blue-738	
188	48026	Blue-247	47827	Blue-151	
483	47690	Blue-087	47793	Blue-270	
484	47823	Blue-248	47942	Blue-674	
487	47980	Blue-507	47877	Blue-577	
489	47772	Blue-693	47631	Blue-682	
490	52643	Blue-311	47666	Blue-236	
491	47804	Blue-195	47649	Blue-040	

NEST	MALE		FEMALE		COMMENTS
	METAL 'R' BAND	DARVIC	METAL 'R' BAND	DARVIC	
492	47921	Blue-352	48021	Blue-267	
493	55533	Blue-737	55529	Blue-732	
496	47753	Blue-714	52667	Blue-266	30 m outside study area
497	48052	Blue-263	48010	Blue-382	
498	47928	Blue-730	48057	Blue-722	
500	55531	Blue-734	55527	Blue-729	
501	47606	Blue-010	52640	Blue-177	
502	47712	Blue-173	47605	Blue-174	
503	52637	Blue-162	52608	Blue-256	
504	53614	Blue-251	53624	Blue-317	
505	28624	Blue-240	47771	Blue-323	Male is transmitter bird Tane
506	55516	Blue-706	53984	Blue-562	
507	47759	Blue-156	47612	Blue-713	
510	52612	Blue-252	52641	Blue-253	
512	47789	Blue-226	47679	Blue-114	Male is transmitter bird Mercury
514	47848	Blue-115	47958	Blue-117	
515	28610	Blue-148	52614	Blue-392	
516	47776	Blue-145	47638	Blue-310	
517	55526	Blue-728	54002	Blue-663	
518	53777	Blue-296	53771	Blue-278	
519	55520	Blue-712	55514	Blue-703	
520	28666	Blue-233	47668	Blue-234	
531	48003	Blue-656	48064	Blue-603	
532			47935	Blue-004	Male not recorded; nest outside study area (West Bank)
535	55532	Blue-735	55523	Blue-720	
536	47616	Blue-167	47715	Blue-250	
537	47644	Blue-259	47780	Blue-260	
552	55512	Blue-701	55513	Blue-702	
553	28695	Blue-736	52677	Blue-450	40 m outside study area
554	52740	Blue-308	53609	Blue-552	
555	48027	Blue-349	47834	Blue-144	
559	52635	Blue-312	52650	Blue-275	
560	53772	Blue-285	47952	Blue-175	
562	48053	Blue-476	47916	Blue-626	
564	47999	Blue-204	48068	Blue-397	
569	47702	Blue-721	47751	Blue-715	
570	47749	Blue-079	47700	Blue-332	Male not recorded on egg
571	53631	Blue-002	52732	Blue-704	
573	53779	Blue-354	53818	Blue-440	
574	52738	Blue-192	52741	Blue-034	
575	48011	Blue-265	47985	Blue-070	
576	55528	Blue-731	53987	Blue-599	
578	48044	Blue-708	47891	Blue-184	
579	47626	Blue-185	47719	Blue-029	Female is transmitter bird Millie
581	53619	Blue-719	53617	Blue-672	
583	52630	Blue-222	52655	Blue-356	
585	47961	Blue-122	47854	Blue-301	
586	55521	Blue-716	55522	Blue-718	
587	47678	Blue-120	47788	Blue-121	10 m outside study area
588	47603	Blue-172	47803	Blue-327	
590			47634	Blue-331	Male not recorded

NEST	MALE		FEMALE		COMMENTS
	METAL 'R' BAND	DARVIC	METAL 'R' BAND	DARVIC	
604			47773	Blue-282	Male not recorded
612			53812	Blue-436	Male not recorded
615	28771	Blue-221	52676	Blue-449	
619	47628	Blue-589	47720	Blue-568	
621	53827	Blue-422	53799	Blue-409	
622	47821	Blue-460	47939	Blue-556	
623	47684	Blue-101	47740	Blue-385	
626	48023	Blue-487	47819	Blue-558	
628	47614	Blue-245	47760	Blue-246	
629	53643	Blue-279	53638	Blue-457	
634	52609	Blue-307	52669	Blue-163	
642	47672	Blue-134	47730	Blue-350	
644	48029	Blue-228	47840	Blue-229	
646	55509	Blue-687	55505	Blue-692	
649	47674	Blue-130	47675	Blue-231	
661	47670	Blue-133	47671	Blue-338	Female is transmitter bird Mizzle
674	48028	Blue-333	47839	Blue-132	
681	52654	Blue-414	52626	Blue-085	
700	53634	Blue-726	52742	Blue-592	
710	55502	Blue-689	55503	Blue-697	
713	55519	Blue-711	55508	Blue-685	
716	47746	Blue-136	47694	Blue-235	
724	47648	Blue-038	47728	Blue-194	
731	47627	Blue-389	47768	Blue-187	
733	48012	Blue-071	47919	Blue-287	
734	52672	Blue-128	52634	Blue-404	Male is transmitter bird Martin
741	55506	Blue-683	55507	Blue-695	
785	47887	Blue-707	55510	Blue-679	
789	52618	Blue-025	52604	Blue-026	
793	47779	Blue-052	35837	Blue-318	
5125	48018	Blue-062	47926	Blue-207	Female not recorded on egg

Appendix 2

ADULT ANTIPODEAN WANDERING ALBATROSS BANDED WITH NEW METAL 'R' BANDS AND/OR NEW DARVIC BANDS ON ANTIPODES I., JAN–FEB 2000

DATE	NEST	NEW METAL 'R' BAND	NEW DARVIC	OLD METAL 'R' BAND	SEX
13 Feb 00	553		Blue-736	28695	M
26 Jan 00	507		Blue-713	47612	F
13 Feb 00	489		Blue-682	47631	F
13 Feb 00	569		Blue-721	47702	M
27 Jan 00	569		Blue-715	47751	F
3 Feb 00	496		Blue-714	47753	M
30 Jan 00	489		Blue-693	47772	M
12 Feb 00	169		Blue-738	47868	F
25 Jan 00	785		Blue-707	47887	M
2 Feb 00	498		Blue-730	47928	M
29 Jan 00	169		Blue-717	47960	M
25 Jan 00	578		Blue-708	48044	M
28 Jan 00	498		Blue-722	48057	F
23 Jan 00	571		Blue-704	52732	F
28 Jan 00	37		Blue-723	52739	F
29 Jan 00	581		Blue-719	53619	M
1 Feb 00	700		Blue-726	53634	M
30 Jan 00	57		Blue-725	53817	M
8 Jan 00	74	55501	Blue-684		F
17 Jan 00	710	55502	Blue-689		M
17 Jan 00	710	55503	Blue-697		F
17 Jan 00	48	55504	Blue-694		F
18 Jan 00	646	55505	Blue-692		F
18 Jan 00	741	55506	Blue-683		M
18 Jan 00	741	55507	Blue-695		F
20 Jan 00	713	55508	Blue-685		F
20 Jan 00	646	55509	Blue-687		M
20 Jan 00	785	55510	Blue-679		F
20 Jan 00	87	55511	Blue-700		F
22 Jan 00	552	55512	Blue-701		M
22 Jan 00	552	55513	Blue-702		F
23 Jan 00	519	55514	Blue-703		F
23 Jan 00	87	55515	Blue-705		M
25 Jan 00	506	55516	Blue-706		M
25 Jan 00	136	55517	Blue-709		F
26 Jan 00	69	55518	Blue-710		F
26 Jan 00	713	55519	Blue-711		M
27 Jan 00	519	55520	Blue-712		M
29 Jan 00	586	55521	Blue-716		M
29 Jan 00	586	55522	Blue-718		F
29 Jan 00	535	55523	Blue-720		F
30 Jan 00	16	55524	Blue-724		F

DATE	NEST	NEW METAL 'R' BAND	NEW DARVIC	OLD METAL 'R' BAND	SEX
1 Feb 00	16	55525	Blue-727		M
2 Feb 00	517	55526	Blue-728		M
3 Feb 00	500	55527	Blue-729		F
3 Feb 00	576	55528	Blue-731		M
3 Feb 00	493	55529	Blue-732		F
3 Feb 00	136	55530	Blue-733		M
7 Feb 00	500	55531	Blue-734		M
8 Feb 00	535	55532	Blue-735		M
7 Feb 00	493	55533	Blue-737		M

Appendix 3

NON-STUDY AREA BANDED ANTIPODEAN WANDERING ALBATROSS RECOVERED ON ANTIPODES I., IN 2000

Band	Date	Sex	On egg?	Grid ref.	Location	Head	Back	Wing	Tail	Comment
R28955	07 Jan 00	M	No		On West Bank					
R18736	07 Jan 00	M	No		On North Cape					With female R28606
R28606	07 Jan 00	F	No		On North Cape					With male R18736
R28654	09 Jan 00	M	No		In study area					
R35509	10 Jan 00	F	No	113/078						
R28601	10 Jan 00	M	No	119/095						
R28660	15 Jan 00	F	No		On West Bank					
R28955	15 Jan 00	M	No		On West Bank					
R28729	15 Jan 00	F	No		On West Bank					With male R28960
R28960	15 Jan 00	M	No		On West Bank					With female R28729
R28658	15 Jan 00	M	No		In study area					
R28774	21 Jan 00	M	No		In study area					With unbanded female
R35204	22 Jan 00	M	No		In study area					Poor band and upside down
R28660	28 Jan 00	F	Yes		West Bank					
R52725	05 Feb 00	F	Yes		West Bank					
R35307	07 Feb 00	M	Yes	110/093	MCBA	2.5	2	1	1	
R28711	07 Feb 00	M	Yes	110/093	MCBA	2.5	3	1.5	1.5	
R28737	07 Feb 00	M	Yes	109/090	MCBA	2.5	4	1	1	
R28753	07 Feb 00	M	Yes	109/088	MCBA	3	3.5	1	1	
R28760	07 Feb 00	M	Yes	109/086	MCBA	3.5	4	1	1	
R29076	07 Feb 00	F	Yes	111/087	MCBA	1.5	1	1	1	
R18974	07 Feb 00	F	Yes	111/089	MCBA	1.5	1	1	1	
R29033	07 Feb 00	F	Yes	113/087	MCBA	1.5	1	1	1	
R35674	07 Feb 00	M	Yes	111/083	MCBA	2.5	3	1	1	
R28752	07 Feb 00	M	No	113/087	MCBA	3	3.5	1	1	Beside nesting unbanded female
R47818	07 Feb 00	F	No	111/093	MCBA	1	1	1	1	Beside nesting unbanded male
R51769	07 Feb 00	F	No		In study area					
R35625	08 Feb 00	M	Yes	114/084	MCBA	4	4	1.5	1.5	
R35785	08 Feb 00	F	Yes	110/082	MCBA	1	1	1	1	
140-50268	08 Feb 00	M	Yes	115/083	MCBA	2.5	2	1	1	Banded as an adult (2+ yrs) in the Tasman Sea east of Wollongong, Aust. on 26 Sep 99
R35666	08 Feb 00	F	Yes	116/082	MCBA	4	4	1.5	1.5	
R28774	08 Feb 00	M	Yes	113/087	MCBA	3	3	1	1	
R35630	08 Feb 00	M	Yes	111/083	MCBA	2.5	3	1	1	
R28691	08 Feb 00	M	Yes	116/087	MCBA	3	4	1	1	
R35889	08 Feb 00	F	Yes	114/084	MCBA	1.5	1.5	1	1	
R35204	09 Feb 00	F	No		In study area					With Blue-137
R35712	09 Feb 00	F	Yes	116/083	MCBA	1.5	1	1	1	
R19416	09 Feb 00	M	No	110/081	MCBA	3.5	3.5	1	1	
R29043	09 Feb 00	M	Yes	107/081	MCBA	2.5	2	1	1	
R35653	09 Feb 00	M	Yes	115/081	MCBA	2.5	3	1	1.5	

Band	Date	Sex	On egg?	Grid ref.	Location	Head	Back	Wing	Tail	Comment
140-26315	09 Feb 00	M	No	107/082	MCBA	3	4	1	1	Banded as an adult, 18 Oct 69 off Malabar, NSW, Australia
R35130	11 Feb 00	F	No	091/055	Block 32	1.5	1.5	1	1	
R35329	11 Feb 00	F	Yes	094/055	Block 32	1.5	1	1	1	
R51771	13 Feb 00	M	No		In study area					