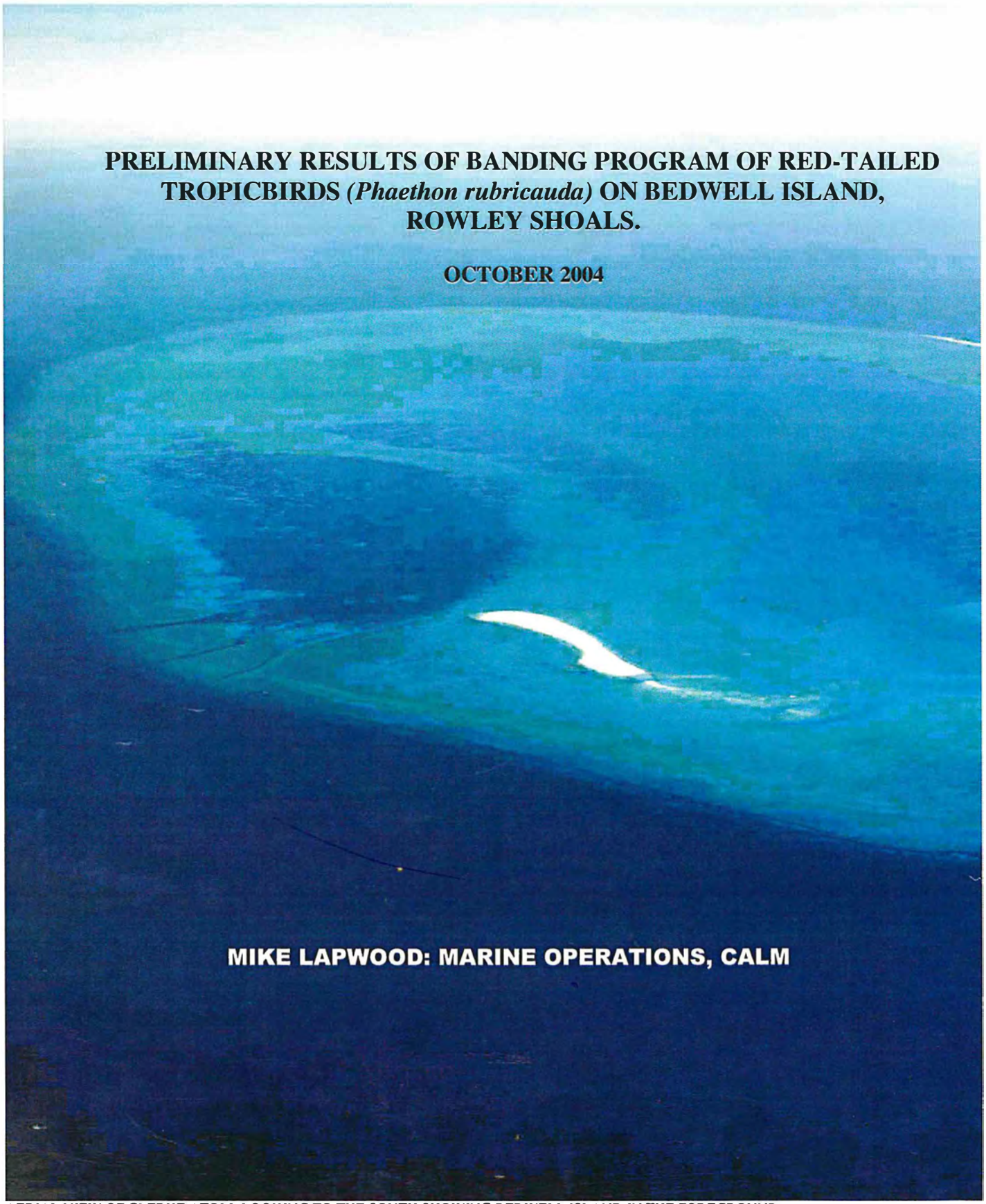
PRELIMINARY RESULTS OF BANDING PROGRAM OF RED-TAILED TROPICBIRDS *(Phaethon rubricauda)* ON BEDWELL ISLAND, ROWLEY SHOALS.

OCTOBER 2004



AERIAL VIEW OF CLERKE ATOLL LOOKING TO THE SOUTH SHOWING BEDWELL ISLAND IN THE FOREGROUND.

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INTRODUCTION

The Rowley Shoals Marine Park lies approximately 180 nautical miles west of Broome, northern Western Australia. The Shoals comprise of three coral atolls, (Imperieuse, Clerke and Mermaid Reefs), each between 14 and 18 kilometres in length and 7 to 9 kilometres in width. They are 40 to 50 kilometres apart. The atolls are orientated south-west to north-east and rise near the edge of the continental shelf from 250 to 400 metres of water.

Although several species of seabirds have been recorded from the Rowley Shoals (see Appendix 1). The red-tailed tropicbird *(Phaethon rubricauda)*. These birds have been recorded nesting all year round with peak egg-laying occurring between the months of September and November.

Since charter vessels first began visiting the Shoals in the 1970's, coral slab shelters have been built to encourage the breeding of these birds. Because of the ad-hoc nature of the construction, periodical cyclonic disturbances and the 'sanding up' of the shelters in strong winds (predominantly easterly winds in May, June and July), little information has previously been collected on the visitation of these birds.

In November 2002, the shelters were numbered and since then no further shelters have been built. This enabled a quantitative assessment of usage of the shelters, but did not provide information on usage by individual birds.

This project intends to band as many of the birds to enable individuals to be recognised and breeding data recorded in the future. The data obtained will:

- ascertain visitation to any numbered shelter
- create a visitation matrix matching individual birds/ shelters
- help understand the breeding cycle on the island.

This information will also be used to assess the efectiveness of shelters and identify the best construction techniques to alleviate the possibility of shelters filling with sand.
Only eight licenced charter vessels are permitted to visit the area and accordingly, impact on the birds is small.

(Above) The author collecting nesting data on Bedwell Island, November 2003

(Above) An adult red-tailed tropicbird on nest.

The current conservation status of the species in Australia is 'Near Threatened' (Garnett and Crowley:, 2000) with other known breeding populations in and near Australia at Christmas Island (1,400 pairs), Lord Howe Island and Norfolk Island (400 pairs each), Herald Cay, Great Barrier Reef (300 pairs) and Ashmore Reef, Sugarloaf Rock (currently 10 pairs but numbers fluctuate with a general decline: Kim Williams *pers. comm.*) and Houtman Abrohlos Islands four pairs in 2000 (Burbage and Fuller in press).

The status of the species in Western Australia is currently difficult to ascertain, with numbers of breeding pairs at known colonies fluctuating and the possibility of birds traveling long distances to forage for food and possibly joining other colonies.

It is known that the red-tailed tropicbirds can range over vast distances, with one individual banded at Sugarloaf Rock, South West Australia in 1998 found at Reunion Island in 2001 (LeCorre et al 2003). This banding project will enhance the possibilities of further re-captures throughout the Indian Ocean region.

Data on the red-tailed tropicbird population on Bedwell Island have been collected since early 2000, but have been limited to recording the cyclic breeding patterns of the birds.
Table 1 sets out the major categories of the breeding cycle.

Date of visit	Adult on egg	Adult with chick	Lone chick	Lone fledgling	Lone adult
21-4-2000	11	1	0	0	0
1-12-2000	5	3	0	1	0
18-4-2002	4	0	0	0	0
27-9-2002	7	3	1	7	0
24-11-2002[1]	7	9	0	2	3
28-12-2002	1	6	0	9	4
13-9-2003	13	1	1	4	0
21-9-2003	18	0	2	3	0
30-9-2003	17	2	1	3	2
27-2-2004	9	4	3	1	1
21-6-2004	10	2	1	1	8

Table 1: Summary of numbers of red-tailed tropic birds and breeding cycles.

These data reveal an irregular breeding pattern that may be due to a number of variables, including food availability, migratory patterns (if the birds migrate) or weather/climate patterns.

Human visitation to the Rowley Shoals is restricted to eight licenced charter vessels with some visitation by private yachts, trawlers, etc. and the area is deemed 'near pristine' with very little human impacts.

Indonesian fishing vessels have a long history of visiting the Rowley Shoals for trepang, fish, trochus and clam but since Marine Park gazettal in 1991 and the implementation of the Memorandum of Understanding with Indonesia to allow access to Australian waters further north, little visitation occurs. However, interest in the area by Indonesian type 3 (motorised) vessels for the lucrative shark-fin fishery is increasing.

[1] Shelters numbered with no new shelters built

Table 2 shows the increase in visitation by charter vessels and the possibility of increasing human disturbance to the colony.

Year	Vessel voyages	Passengers	Number of RTTB surveys
1997	3	58	0
1998	13	92	0
1999	14	126	0
2000	17	115	2
2001	19	169	0
2002	23	230	4
2003	25	228	3
2004	28	294	2 (plus 7 banding visits)

Table 2: Visitation by charter operators and dates of red-tailed tropicbird censuses.

OBJECTIVES

The primary objective of this project is to band individual red-tailed tropicbirds nesting on Bedwell Island. This will enable specific data to be collected in regards to:

- Individual bird nesting preferences (shelter, log or other)
- Shelter use (does the same pair use the same shelter repeatedly?)
- How long birds remain paired
- Colony size
- Return date of juveniles banded at the colony
- Time between first banding and last record at Bedwell Island
- Full morphometric data collection (wing moult, wing length, tail streamer length, weight, bill and head/bill length and tarsus length).

METHODS

The Australian Bird and Bat Banding Scheme (ABBBS) provided 100 stainless steel bands for the project numbered 200-18001 to 200-18100. Chris Hassell supplied the necessary banding pliers, scales, micrometers and rulers for individual measurements.
Chris Hassell and the I arrived at Bedwell Island on the 18th October to commence banding and recording the individual birds. A total of 49 birds were recorded over the three day period of 18th , 19th and 20th October 2004.
A subsequent visit on the 27th October resulted in the banding of a further 8 birds and the last visits were on the 11th, 13th and 15th November 2004 when a further 18 birds were banded.

Birds were hand captured whilst *in-situ* on nests. This necessitated removing the bird wearing thick welder's gloves before the band was fixed to the left leg. Birds were then measured, with all measurements recorded on the ABBBS data sheet. The right wing was then examined for moult details, the bird weighed by placing it into a plastic tube and the tube placed onto scales via a frame. The bird was returned to the nest after about five minutes, when it recommenced brooding with no apparent ill effects.

With on-going banding, it is envisaged that eventually, a large proportion, if not all, of the colony will be recorded. This will require visits to the Island every three to four months to ensure as many birds are included in the census as possible.

Table 3 sets out the results of individual banding program and shelter occupation to date.

Date	Empty Nest	Juvenile only	Adult only	1 Adult & juv.	2 Adults & juv	2 Adults only	Total birds banded
18/10/04	3	12	11	8	-	-	31
19/10/04	2	1	12	-	-	2	15
20/10/04	2	-	3	-	-	-	3
27/10/04	2	-	8	-	-	-	8
11/11/04	2	1	4	2	-	-	7
13/11/04	3	-	3	-	-	2	5
15/11/04	2	1	5	-	-	-	6
TOTAL		**15**	**46**	**10**	**-**	**4**	**75**

Table 3: Results of banding

PRELIMINARY RESULTS

It would seem that the red-tail tropic bird population on Bedwell Island has increased substantially over the last few years. This could be due to many factors including disturbance of nesting islands further north (Ashmore Reef etc), cessation of illegal harvesting by Indonesian fishermen at the Rowley Shoals, the construction of the coral slab shelters on Bedwell Island, changes in climate, or changes in food availability.

Whilst it appears likely that the coral slab shelters have enhanced the population of the red-tailed tropicbirds on Bedwell Island, the construction of the artificial breeding shelters is not without its negative side. In March 2001, a severe tropical cyclone passed directly over Rowley Shoals which resulted in many shelters being filled in by sand. It would appear that the birds remain on the nest and the result was that around 15 adult birds, along with an unknown number of chicks and eggs were suffocated. Some birds, however, have utilized other natural breeding sites including logs washed ashore and these have been included in the data sheet.

The overall aim of this banding project is to monitor individual birds against individual shelters and individual birds moving into or out of the Bedwell Island Colony. Allowing for one (or, in the case of a near-fledged chick, both) adult being absent from the nest, the ultimate aim is to band both adults and any juvenile on each nest.

The results of the seven individual surveys over October / November 2004 have been very encouraging. The initial data-set will hopefully be used to monitor the variation of the Bedwell Island population along with establishing the breeding cycle. Data should also show whether individual birds enter or leave the colony and if birds successively mate with the same partner.

Table 4 sets out what has been achieved with the 'blanks' representing birds that have not been banded so far.

Highlighted rows represent a second, subsequent use of the same shelter over the visitation dates (18th October to 15th November). This is due mainly to juveniles fledging early in the project and other pairs using the vacant shelter.

'A' = Adult, 'J' = juvenile with the last three digits of the band number in parentheses. Dates of banding also included in bold type.

Shelter #	Bird 1	Bird 2	Bird 3	Remarks
140	A (001) **18/10**		J (002) **18/10**	J (002) moved to 142 (central) 27/10 – 13/11
2nd use	A (058) **11/11**	A (070) **15/11**		On egg 15/11
141	A (003) **18/10**	A (047) **20/10**	Egg	11/11 dead chick- No adults
2nd use	A (065) **13/11**			
142 (West)	A (004) **18/10**		J (005) **18/10**	Log- J (005) abnormal bill
142 (Central	A (006) **18/10**		Egg	Log
142 (East)	A (007) **18/10**	A (066) **13/11**		Log
143	A (008) **18/10**		J (009) **18/10**	
144 (South)	A (048) **20/10**	A(059) **11/11**	-	Log
144 (North)			J (010) **18/10**	Log
New	A (060) **11/11**		J (012) **18/10**	New shelter- J (012) fledged 27/10 – 11/11
2nd use	A (060) **11/11**			On egg
145	A (050) **27/10**		J (011) **18/10**	J (011) fledged 27/10.
2nd use				15/11 nest empty
146	A (013) **18/10**	A (039) **19/10** Moved to 148	A (051) **20/10**	A (013) & A (039) left nest 20/10. A (051) on nest 27/10
2nd use				15/11 empty
147	A (014) **18/10**	A (038) **19/10**	J (040) **19/10**	
148				Nest empty
2nd use	A (039) **19/10**			On egg 15/11
149			J (015) **18/10**	Fledged 27/10 – 11/11
2nd use	A (052) **20/10**	A (072) **15/11**		Outside nest- on egg
150	A (036) **19/10**	A (037) **19/10**		No egg or chick as at 27/10
2nd use				Empty
151			J (016) **18/10**	J (016) near fully feathered
152	A (017) **18/10**	A (041) **19/10**	J (061) **11/11**	
153	A (042) **19/10**		J (018) **18/10**	J (018) downy chick
154			J (019) **18/10**	J (019) fledged 27/10 – 11/11
2nd use	A (073) **15/11**			
155	A (043) **19/10**		J (020) **18/10**	
156	A (021) **18/10**	A (062) **11/11**	J (063) **11/11**	
157	A (022) **18/10**	A (046) **19/10**	J (023) **18/10**	J (023) near fully feathered
158	A (024) **18/10**	A (044) **19/10**	J (025) **18/10**	J (025) downy chick
159	A (053) **20/10**			Nest empty 20/10. A (053) on nest 27/10
2nd use				Nest empty
160	A (035) **19/10**	A (049) **20/10**	J (026) **18/10**	J (026) Fledged 19/10. Nest empty 27/10
2nd use	A (035) **19/10**			
161 (East)	A (027) **18/10**	A (054) **20/10**	Egg	
161 (west)	A (028) **18/10**	A (045) **19/10**	J not banded	J- dead at 11/11-removed from nest
162	A (034) **19/10**		J (029) **18/10**	J (029) Fledged 13/11 – 15/11
2nd use				Empty

163			J (030) **18/10**	J (030)
164	A (031) **18/10**	A (056) **20/10**	J (075) **15/11**	
165	A (055) **20/10**		Egg	
2nd use	A (074) **15/11**			Outside- other adult flew off.
New -East	A (067) **13/11**	A (068) **13/11**		Dropped egg- both flew off
166			J (033) **19/10**	J (033) fledged <27/10.
2nd use	A (057) **20/10**		Egg	
167	A (032) **19/10**			
2nd use	A (064) **11/11**	A (069) **13/11**	Egg	

Table 4: Shelter and occupation after 4 days banding at Bedwell Island

FUTURE STUDIES

An ongoing budget is needed to continue banding at Bedwell Island and possibly commence a similar banding program at Ashmore Reef and Christmas Island. Initial interest has been shown by the Department of Environment and Heritage.

Follow-up visits to Bedwell Island are tentatively planned for February, July and November 2005 aboard charter vessels to expand on these data.

Footnote: Fears were held for the survival of the red-tail tropicbirds following the devastating earthquake and tsunami event on December 26th 2004.
I was fortunate to fly over Bedwell Island on the 31st December courtesy of a scheduled Coastwatch flight, to quantify damage to the Island and the nesting shelters. Initial analysis of the video footage taken shows no visible damage in the area. It would appear that the Rowley Shoals escaped damage due to the very deep water surrounding the atolls and the subsequent dissipation of the sub surface energy wave.

Appendix 1

List of seabirds recorded from Bedwell Island and the Rowley Shoals.[2]

Wedge-tailed Shearwater	*(Puffinus pacificus)*
Red-tailed Tropicbird	*(Phaethon rubricauda)*
White-tailed Tropicbird	*(Phaethon lepturus)*
Brown Booby	*(Sula leucogaster)*
Eastern Reef Egret	*(Egretta sacra)*
White-bellied Sea-Eagle	*(Haliaeetus leucogaster)*
Ruddy Turnstone	*(Arenaria interpres)*
Greater Sand Plover	*(Charadrius leschenaultii)*
Sanderling	*(Calidris alba)*
Crested Tern	*(Sterna bergii)*
Little Tern	*(Sterna albifrons)*
Sooty Tern	*(Sterna fuscata)*
White-throated Needletail	*(Hirundapus caudacutus)*

Additional species from October 2004 banding programme.

Tahiti Petrel	*Psuedobulweria rostrata*
Bulwer's Petrel	*Bulweria bulweria*
Bar-tailed Godwit	*Limosa lapponica* (dead specimen)
Grey-tailed Tattler	*Tringa brevipes*
Great Knot	*Calidris tenuirostris* (dead specimen)
Curlew Sandpiper	*Calidris ferruginea* (dead specimen)
Arctic Skua	*Stercorarius parasiticus*
Skua sp.	
Sacred Kingfisher	*Todiramphus sanctus*

In addition, Bedwell Island and Cunningham Island are believed to be important resting places for northern migratory species *en route* to or from Australia as large flocks of unidentified waders have been seen at Rowley Shoals (Berry, 1993).

During the October 2004 banding programme very small numbers of shorebirds were recorded, 7 Ruddy Turnstone and 1 Grey-tailed Tattler were the only live birds seen. A single dead specimen of Bar-tailed Godwit, Great Knot and Curlew Sandpiper were also found. It would be expected that at this time of year for shorebirds to be at Bedwell Island in reasonable numbers if past reports are accurate.

[2] pp 28: Rowley Shoals Draft Management Plan

Appendix 2

Below is tabled all data collected for individual birds over the banding project for 2004.

Band #	Date banded	Shelter #	Age[3]	Bill[4]	HB[5]	WL[6]	Wt[7]	Moult	TS[8] 1	TS[9] 2
200-18001	18/10/04	140	A	64.5	131.1	340	683	$5^6 2^1 0^3$	236	67
200-18002	18/10/04	140	J	48.5	109.8	-	530	$4^5 3^5$	-	-
200-18003	18/10/04	141	A	65.4	131.5	344	777	$5^7 0^3$	309	66
200-18004	18/10/04	142 (1)	A	63.3	128.5	345	724	$5^8 0^2$	436	120
200-18005	18/10/04	142 (1)	J	-	-	-	365	-	-	-
200-18006	18/10/04	142 (2)	A	68.6	130	351	790	Rw- $6^7 0^2 5^1$ Lw- $5^6 0^4$	455	86
200-18007	18/10/04	142 (3)	A	67	128.6	330	768	5^{10}	347	84
200-18008	18/10/04	143	A	64.8	131.1	353	775	$6^5 0^1 5^2 0^2$	-	106
200-18009	18/10/04	143	J	-	-	-	397	-	-	-
200-18010	18/10/04	144 (n)	J	-	-	-	852	-	-	-
200-18011	18/10/04	145	J	-	-	-	877	5^{10}	-	-
200-18012	18/10/04	New w	J	-	-	-	863	$5^4 4^6$	-	-
200-18013	18/10/04	146	A	66.0	131.6	349	-	$6^5 0^1 5^3 0^1$	374	54
200-18014	18/10/04	147	J	-	-	-	832	-	-	-
200-18015	18/10/04	149	J	-	-	-	979	$5^3 4^7$	-	-
200-18016	18/10/04	151	J	-	-	-	776	-	-	-
200-18017	18/10/04	152	A	62.9	125.5	346	738	Rw- 5^9 broken p10 Lw- $5^8 0^2$	483	62
200-18018	18/10/04	153	J	-	-	-	380	-	-	-
200-18019	18/10/04	154	J	-	-	-	770	$5^4 4^6$	-	-
200-18020	18/10/04	155	J	-	-	-	730	-	-	-
200-18021	18/10/04	156	A	65.6	131.6	348	817	$5^4 4^1 0^6$	256	60
200-18022	18/10/04	157	A	63.9	130.4	350	-	$5^6 0^4$	349	135
200-18023	18/10/04	157	J	-	-	-	920	$5^1 4^9$	-	-
200-18024	18/10/04	158	A	66.1	129.3	352	770	$6^6 0^1 5^3$	381	330
200-18025	18/10/04	158	J	-	-	-	470	-	-	-
200-18026	18/10/04	160	J	-	-	-	813	5^{10}	-	-
200-18027	18/10/04	161 (E)	A	65.8	129.2	358	748	5^{10}	453	123
200-18028	18/10/04	161 (W	A	68.4	133.6	356	735	5^{10}	-	292
200-18029	18/10/04	162	J	-	-	-	797	-	-	-
200-18030	18/10/04	163	J	-	-	-	868	-	-	-
200-18031	18/10/04	164	A	66.2	129.8	347	720	$5^7 v^1 0^2$	323	-
200-18032	19/10/04	167	A	66.9	127.9	345	708	$5^5 1^1 0^4$	214	38

[3] A – Adult, J - Juvenile
[4] Total length of bill (mm)
[5] Total length of head + bill (mm)
[6] Wing length elbow to tip of feather (mm)
[7] Weight (grams)
[8] Tail Streamer 1
[9] Tail Streamer 2

Band #	Date banded	Shelter #	Age	Bill	HB	WL	Wt	Moult	TS 1	TS 2
200-18033	19/10/04	166	J	-	-	-	906	$5^5 4^5$	-	-
200-18034	19/10/04	162	A	64.0	131.1	355	625	$5^7 0^3$	456	197
200-18035	19/10/04	160	A	62.6	131.7	349	735	$4^1 6^4 v^1 5^2 4^1 0^1$	396	253
200-18036	19/10/04	150	A	68.0	131.1	336	729	$5^5 0^5$	368	106
200-18037	19/10/04	150	A	63.0	127.4	328	682	$5^6 0^4$	338	130
200-18038	19/10/04	147	A	66.7	132.5	360	769	$5^8 0^2$	352	113
200-18039	19/10/04	146-8	A	65.8	130.0	363	960	5^{10}	416	266
200-18040	19/10/04	147	A	66.1	129.6	353	754	$5^6 0^4$	392	257
200-18041	19/10/04	152	A	64.4	126.4	340	814	$6^5 0^1 5^4$	359	-
200-18042	19/10/04	153	A	68.1	130.5	327	703	$6^3 2^1 5^3 0^3$	246	-
200-18043	19/10/04	155	A	68.0	131.6	355	759	$5^8 0^2$	422	78
200-18044	19/10/04	158	A	66.0	130.1	357	680	$6^7 0^1 5^2$ ($5^7 v^1 0^2$)	380	-
200-18045	19/10/04	161 (W	A	72.5	139.6	357	802	$6^8 0^1 5^1$	426	323
200-18046	19/10/04	157	A	62.4	123.2	350	790	$5^7 0^3$	392	166
200-18047	20/10/04	141	A	71.7	136.2	345	722	Lw-$1^1 6^2 2^1 0^1 5^2 0^3$ Rw-$1^1 5^6 0^3$	316	131
200-18048	20/10/04	144 (s)	A	68.5	131.1	349	750	$5^9 0^1$	405	356
200-18049	20/10/04	160	A	63.9	125.7	346	705	Rw- $7^1 4^1 6^3 1^1 5^2 0^2$	408	226
200-18050	27/10/04	145	A	65.0	129.0	343	-	-	317	260
200-18051	27/10/04	146	A	62.8	126.0	350	-	-	338	267
200-18052	27/10/04	149	A	60.5	123.0	341	-	-	69	-
200-18053	27/10/04	159	A	69.0	133.0	330	-	-	359	43
200-18054	27/10/04	161 (E)	A	66.0	135.0	357	-	-	376	137
200-18055	27/10/04	165	A	62.5	134	347	-	-	453	309
200-18056	27/10/04	164	A	70.0	137.0	358	-	-	385	144
200-18057	27/10/04	166	A	63.0	128.0	346	-	-	472	38
200-18058	11/11/04	140	A	67.0	135.0	359	-	-	387	321
200-18059	11/11/04	144 (s)	A	65.8	129.0	335	-	-	333	200
200-18060	11/11/04	New w	A	66.0	132.0	348	-	-	371	76
200-18061	11/11/04	152	J	-	-	-	-	-	-	-
200-18062	11/11/04	156	A	64.5	139	359	-	-	180	-
200-18063	11/11/04	156	J	-	-	-	-	-	-	-
200-18064	11/11/04	167	A	63.0	122.5	348	-	-	411	359
200-18065	13/11/04	141	A	63.8	129.2	342	-	-	388	228
200-18066	13/11/04	142 (3)	A	67.5	134.5	353	-	-	385	336
200-18067	13/11/04	New e	A	62.0	127.2	344	-	-	399	332
200-18068	13/11/04	New e	A	60.8	126.8	347	-	-	379	276
200-18069	13/11/04	167	A	63.5	130.0	350	-	-	424	330
200-18070	15/11/04	140	A	64.0	129.3	346	-	-	455	340
200-18071	15/11/04	144 (s)	A	66.5	128.0	343	-	-	401	-
200-18072	15/11/04	149	A	65.0	137.0	366	-	-	416	87
200-18073	15/11/04	154	A	-	-	-	-	-	-	-
200-18074	15/11/04	165	A	-	-	-	-	-	-	-
200-18075	15/11/04	164	J	-	-	-	-	-	-	-

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Appendix 2 EXAMPLE OF COMPLETED DATA SHEET

2002 RED TAILED TROPIC BIRD SHELTERS REGISTER- BEDWELL ISLAND, ROWLEY SHOALS.				
#	**LAT**	**LONG**	**STRUCTURE DETAILS**	**COMMENTS**
SOUTHERN SECTION				
140	17° 16.574'	119° 21.641'	DESTROYED- 2 DEAD BIRDS	EMPTY
141	17° 16.574'	119° 21.643'	OK	1 ADULT ON EGG
142	17° 16.572'	119° 21.643'	LOG- EAST / WEST	1 LONE CHICK
143	17° 16.569'	119° 21.639'	OK	2 ADULTS – 1 WITH CHICK
144	17° 16.565'	119° 21.642'	LOG- NORTH / SOUTH	1 ADULT ON EGG
145	17° 16.558'	119° 21.640'	OK	1 ADULT ON EGG
146	17° 16.549'	119° 21.624'	NEEDS REPAIR	REPAIRED- EMPTY
CENTRAL SECTION			NEW SHELTER	1 ADULT ON EGG
147	17° 16.479'	119° 21.596'	'TAJ MAHAL'	1 ADULT ON EGG
148	17° 16.471'	119° 21.592'	OK	1 ADULT ON EGG
149	17° 16.444'	119° 21.583'	OK	1 ADULT ON EGG (OUTSIDE)- 1 ADULT WHITE-TAILED ON EGG (INSIDE)
150	17° 16.430'	119° 21.580'	OK	1 ADULT ON EGG (OUTSIDE)- 1 ADULT ON EGG (INSIDE)
151	17° 16.397'	119° 21.568'	OK	1 ADULT ON EGG
152	17° 16.372'	119° 21.568'	'TWIN TOWERS'	EMPTY
153	17° 16.359'	119° 21.561'	OK	EMPTY
154	17° 16.340'	119° 21.564'	'BIG LOG ROOF'	1 LONE FLEDGLING
155	17° 16.301'	119° 21.556'	OK	1 ADULT ON EGG
156	17° 16.287'	119° 21.570'	LOG	1 ADULT ON EGG
NORTHERN SECTION				
157	17° 16.138'	119° 21.549'	OK	1 ADULT ON EGG
158	17° 16.139'	119° 21.526'	OK	1 LONE JUVENILE
159	17° 16.136'	119° 21.525'	BIG UPRIGHT POST	EMPTY (RECENTLY OCCUPIED)
160	17° 16.122'	119° 21.522'	OK	1 ADULT ON EGG
161	17° 16.109'	119° 21.522'	'PRAWN CRATE'	1 LONE ADULT
162	17° 16.103'	119° 21.521'	'THE DUPLEX'	1 ADULT ON EGG
163	17° 16.077'	119° 21.517'	NEEDS REPAIR	EMPTY
164	17° 16.072'	119° 21.510'	NORTHERNMOST SHELTER	EMPTY
165	17° 16.073'	119° 21.511'	NEEDS REPAIR	1 LONE JUVENILE
EASTERN SIDE				
166	17° 16.481'	119° 21.656'	EAST SIDE- OK	1 ADULT AND NEW CHICK
167	17° 16.493'	119° 21.660'	EAST SIDE- OK	1 ADULT ON EGG

RECORDER/S	DATE AND TIME	ANY OTHER COMMENTS (OTHER SPECIES SEEN etc)
Mike Lapwood	30 September 2003 1000hrs	Log, east side: 1 white-tail chick- newly hatched.

Please return completed sheets to: Mike Lapwood, DCLM, Broome. Fax (08) 9193 5027.