



2014/15 Season.

Muttonbird Monitoring on Aboriginal Islands

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Species Targeted: Short-tailed Shearwater (*Puffinus tenuirostris*), (Muttonbird).

Islands Monitored: Babel Island; Big Dog Island (Great Dog Island); Hummocky (Mount Chappell Island).

Aims/ objectives of monitoring program

- To monitor the species over the long term to allow detection of major changes in the numbers of Short-tailed shearwaters.
- To obtain data with similar methods to those used by Department of Primary Industries, Parks, Water and Environment (DPIPWE) for several years. This is to allow valid comparison across islands with different tenure and harvesting regimes.

Background

Short-tailed shearwaters are an important cultural resource for the Aboriginal community. The cultural practices of harvesting and consuming the species remain important to life on country. The strong connections to these practices were pivotal in the argument for the return of Islands in Bass Strait. Of those lands returned to the Aboriginal Community, three islands have substantial muttonbird rookeries: Big Dog Island (Great Dog Is.), Babel Island and Hummocky (Mount Chappell Island). Much land management work carried out on these islands aims to nurture rookeries and to help facilitate cultural and commercial harvesting activities.

Monitoring of the species is identified as important in the 2014-2018 MERI plan (TAC Land management, 2014) because of the potential for population fluctuations to affect cultural practices. As noted by birders over the years, population numbers will fluctuate each season. It is valuable to have systematically recorded information, to compliment birder observations, in order to establish if large changes or trends in numbers of birds are outside of the “normally” experienced ebb and flow of numbers.

Long term annual monitoring of Short-tailed shearwater population trends has been carried out by the currently named DPIPWE for at least 17 years since 1997, with various other forms of research undertaken since the 1940s. The DPIPWE research is currently carried out on Little Green, Little Dog and Big Green Islands (which are all recreationally harvested), as well as East Kangaroo Island (closed to harvest since 1990) and Goose Island (never harvested). Information from the DPIPWE surveys feeds into decisions made in regards to recreational harvest management (bag limits for Tasmania, West Coast and Ocean Beach) (WMB, 2010).

The 2014/15 season is the second annual TAC survey, with the new addition of recording bird weights and March surveys for chick occupancy and weights, which indicate reproductive success.

Methods

The methods used were based on those used by DPIPWE, as stipulated in the Wildlife Management Branch establishment report (2010).

The monitoring that was carried out includes:

- Surveys (sampled count) of burrow occupancy percentage and occupied burrow density (breeding adults in December, chicks in March), (Big Dog and Babel Islands).
- Counts of burrows only (Mount Chappell Island, December).
- Weighing six birds per transect.

Permanent 100m transects were established in 2013, in areas known to have been surveyed by Irynej Skira, and others, in the past, to allow some comparison of surveys. GPS points were recorded for all start and finish points of transects (GDA94 MGA zone 55). Tablet devices with cybertracker applications¹ were used to record all data.

At each transect, a builders-line was stretched between the start and finish points, established by GPS points. This method was replaced in March 2015 with a calibrated and strong 100m line because some inconsistent transect lengths occurred when depending on GPS points. One person is designated the role of recorder – using the phone or tablet device to record data and photos while others assess the occupancy status of burrows, often dividing workload to each side of the transect line.

All burrows within 1 metre each side of the line (the centre of the burrow entrance burrow is within 1 metre, as measured by a 1m stick) are checked for the presence of a shearwater adult. This is usually done by inserting an arm and sometimes a thin wooden stick (approx.. 60cm long) down each burrow.

Pecking indicates presence of a shearwater, which is conveyed to the recorder with a shout of “bird”. The presence of eggs or two birds are recorded the same as “bird”, as the burrow is effectively occupied. Little penguins may be encountered, as indicated by distinctive calls. These are recorded separately.

If confident that a burrow has been comprehensively checked, and no birds are present, then an ‘empty’ call is shouted to the recorder. If it is not clear that the whole burrow has been reached, then an “unknown” is conveyed and recorded.

The results are used to determine shearwater occupancy rates and density of occupied burrows along all transects.

Six birds were weighed at each transect using a dark-coloured pillow case and accurate spring scales. This weighing was not done in 2013, so this current season is the first time.

Equipment

- Tablet or other data collection GPS device
- 1m sticks,
- 100m line (more durable line used from March 2015),

¹ Data collection and mapping applications customised by the Tasmanian Aboriginal Centre using android-run devices with GPS capabilities.

- Sticks for probing burrows,
- Gloves,
- Drawstring bag or pillowcase,
- 1kg spring scales,
- First Aid Kit with snake bandages,
- Wet weather gear.

2014 details

Personnel: Shaun Thurstans; Tim Brown; Rodney Newell; Brett Newell; Stuart Wheatley; Ambrose Macdonald, Jayde Macdonald, Larni Everett.

Dates: 9-12 December, 2014,

3 March 2015 (Hummocky), 4 March 2015 (Big Dog), 8 March 2015 (Babel).

It is important that surveys do not occur before the 3rd of Dec. which is recognised as the last known date of laying in a highly synchronised breeding season (Meathrel *et al*, 1993).



Sites

Big Dog Island (Great Dog Is.)

Four transects are established in the south and west of Big Dog Island. See appendix A.

Two (#1 & #2) are in an area subject to a non-commercial harvest.

Two (#3 & #4) are in an area in the west of the island in an area confirmed as monitored by Skira and others but not emulating exact transects used by Skira).



Babel Island

Six transects are situated along transects 1 and 2 that were used by Irynej Skira for burrow counts in January 1983 (Skira and Towney, 1983), see Appendix B.



Mount Chappell Island "Hummocky"

[Burrow counts only]

Four transects are established on this Island in healthy rookeries, see Appendix C. Because of the high risk of snake interactions, only burrow counts and weights are recorded here, not occupancy.

Results

The results from transects where occupancy was assessed are shown in Table 1. The fact that several burrows are of unknown occupancy status requires an adjustment. The numbers of “unknown” burrows are distributed according to the proportions otherwise found in that transect, using the formula: $(O/T \times U) + O$, where: O = Number of occupied burrows, T = Total burrows on transect, U = Unknown occupancy. Adjusted burrow densities are then calculated.

Those results are summarised for each island in Table 2a, with 2013 results in Table 2b. The counts of burrows on Mount Chappell Island are shown in Tables 3a and 3b. Figures from Tables 2 and 3 are also shown on maps in the appendices.

Table 1: December occupancy rates

Transect	Muttonbird	Empty	Unknown	No. of burrows	Burrow occupancy	Adjusted Occupancy	Occupied burrows (Unknowns distributed)	Transect Length (m)	Occupied burrow density (occupied burrows/m ²)	Adjusted occupied burrow density (occupied burrows/m ²)
Big Dog Island										
1	74	15	12	101	73%	83%	84	95	0.389	0.442
2	37	11	2	50	74%	77%	39	92	0.201	0.209
3	53	17	4	74	72%	76%	56	100	0.265	0.280
4	40	25	8	73	55%	62%	45	95	0.211	0.236
Babel Island										
1a	36	20	5	61	59%	64%	39	95	0.189	0.206
1b	28	9	1	38	74%	76%	29	121	0.116	0.119
1c	9	8	6	23	39%	53%	12	100	0.045	0.061
2a	15	8	1	24	63%	65%	16	100	0.075	0.078
2b	22	11	3	36	61%	67%	24	109	0.101	0.110
2c	38	18	10	66	58%	68%	45	110	0.173	0.204

Table 2: March 2015 Chick occupancy rates

Transect	No. Chicks	Empty	Unknown	No. of burrows	Burrow occupancy	Adjusted Occupancy
Big Dog Island						
1	44	24	20	88	50%	65%
2	31	32	8	71	44%	49%
3	11	26	6	44	25%	30%
4	19	24	9	52	37%	44%
Babel Island						
1a	12	10	5	27	44%	55%
1b	11	8	7	26	42%	58%
1c	9	10	2	21	43%	47%
2a	9	12	2	23	39%	43%
2b	12	13	2	27	44%	48%
2c	13	12	7	32	41%	52%

Table 3a: **2014/15** Whole island occupancy averages with standard deviations

Island	Number of Transects (100x2m)	Burrow occupancy (%)	Dec 2014 Adjusted Burrow occupancy	Occupied Burrow Density (occupied burrows/m ²)	Adjusted occupied burrow density (occupied burrows/m ²)	March 2015 Adjusted chick occupancy
Big Dog	4	68.46% ±9.14%	75.00% ±9.14%	0.267 ±0.09	0.293 ±0.10	49.76% ±14.43%
Babel	6	59.68% ±11.22%	66.67% ±7.34	0.117 ±0.056	0.391 ±0.062	50.38% ±5.44

Table 3b: **2013** (Dec only) Island occupancy summaries with standard deviations

Big Dog	4	42.89% ±3.078%	55.86% ±2.499%	0.249 ±0.045	0.325 ±0.093
Babel	6	55.19% ±14.884%	59.60% ±12.593%	0.240 ±0.069	0.256 ±0.080

Table 2a: **2014** Mount Chappell Island burrow counts only

Transect	No. burrows	Transect Length	Burrows density (per m2)
1	126	106	0.59
2	95	103	0.46
3	139	99	0.70
4	150	89	0.84
Average	128	99.25	0.64

Table 3b: **2013** Mount Chappell Island burrow counts only

1	78	113	0.35
2	89	100	0.45
3	99	100	0.50
4	111	105	0.53
Average	94	104.5	0.45

Chart 1a and b. TAC Bird Weights Dec 2014/ Mar 2015

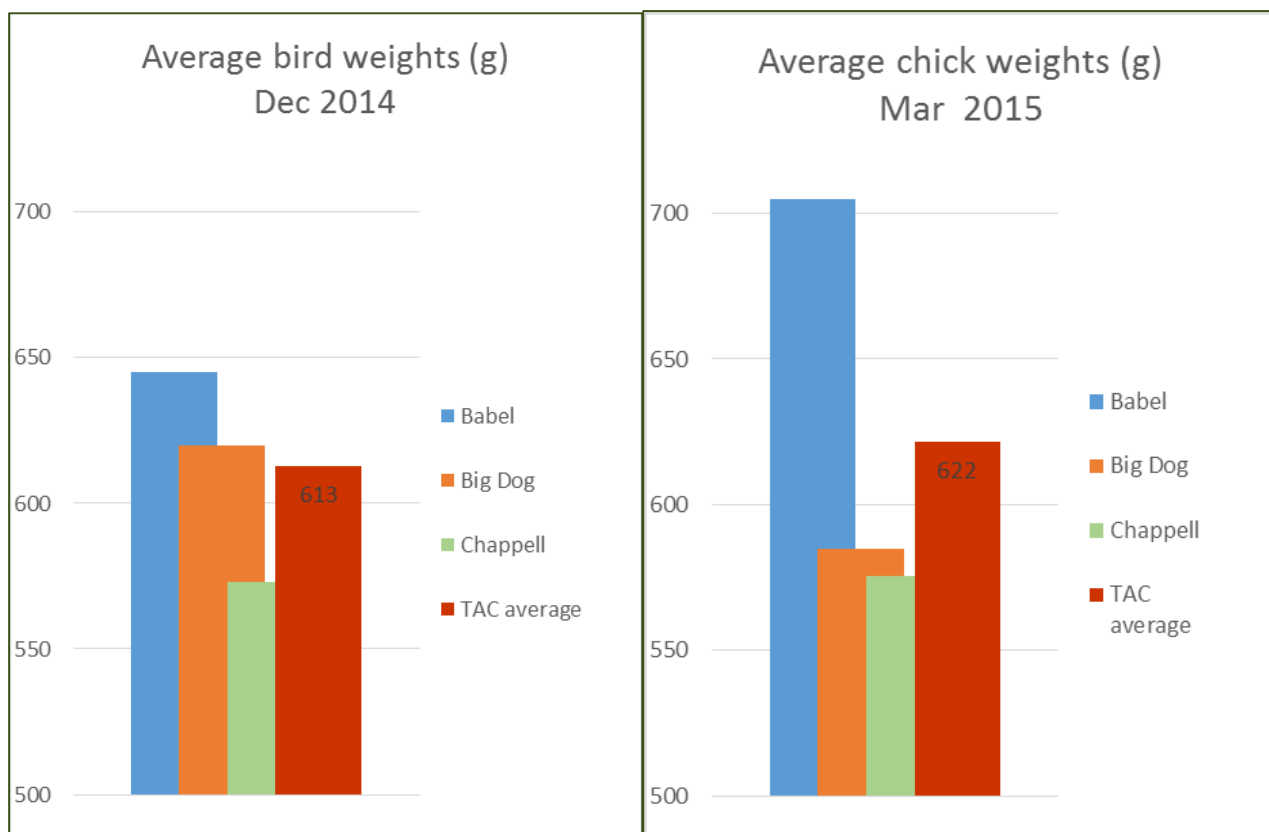
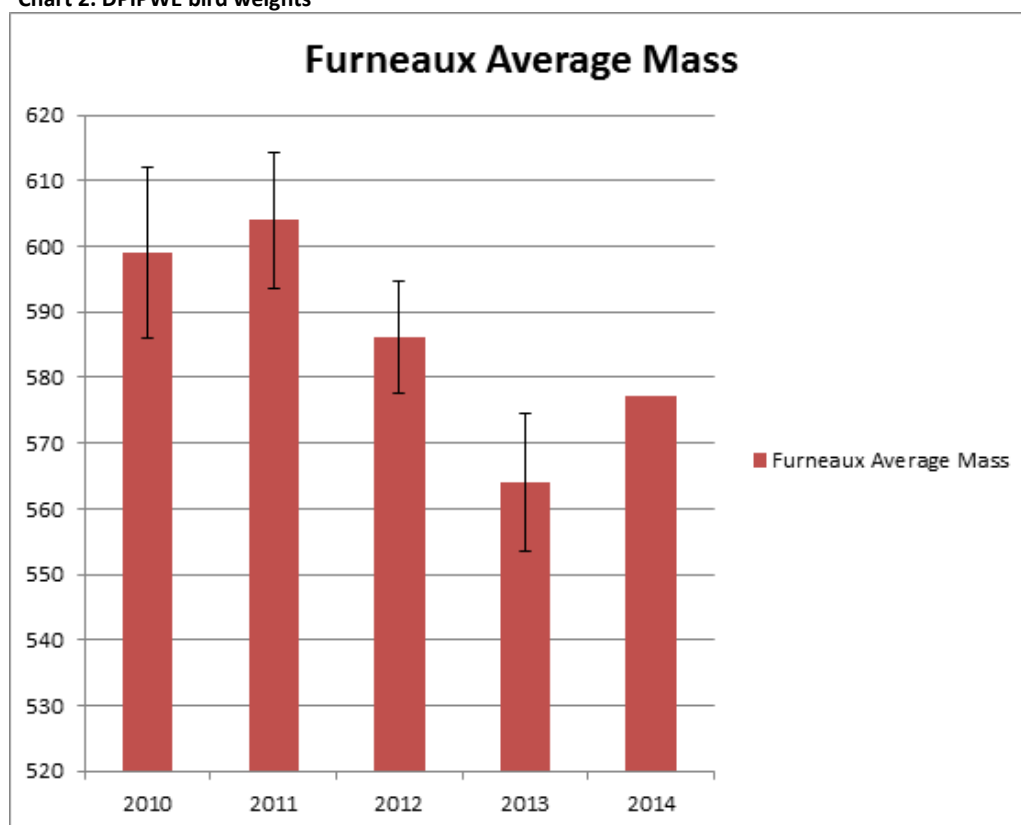


Chart 2. DPIPWE bird weights



Discussion

Getting results from a second year of long term surveys gives a small taste of the comparisons that will be possible into the future. 2013 was considered a poor year for muttonbird survivorship and breeding, to the point of halting most Aboriginal harvesting in early 2014. The occupancy rates were higher in this survey, but not all comparisons over the two years are in the same direction.

Big Dog island did have higher adjusted occupancy rates (average 75%, up from 56% in 2013), but the number of burrows was down across all transects. It is hard to say what the causes are to such number trends, but it is just the start of long term monitoring. There was some fireweed in transects 1 and 2 that was not present in Dec 2013. There was also some big tussocks in transect 2, that seemed to crowd out burrow opportunities. There were also much less 'unknowns' or empty burrows, which may indicate the birds being in healthy numbers and therefore being able to fill the burrows that were available.

Babel Island indicated a slight improvement in adjusted occupancy (67% up from 60% in 2013), but the trends in absolute burrow numbers varied across transects. The trend for more burrows with higher elevation was found again.

Chappell Island burrow counts were up consistently from 2013.

Reproductive success, as measured by the percentage occupancy of burrows with chicks, indicated a better success rate on Babel Island than Big Dog.

Weights were recorded for the first time and comparing across the three islands, on average, they were higher on Babel, lower on Chappell with Big Dog in the middle. Weights of chicks (in March) were noticeably higher on Babel Island than the other two islands. Only averages are shown in results, but there were a range of weights recorded, from 400g to 1100g.

The inconsistent length of transects, in Dec surveys, arising from the reliance of GPS points for transect start and finish points, was rectified through the use of a calibrated 100m line in March 2015 surveys, and should not be a problem in the future.

The occupancy figures for Dec are compared with DPIPWE surveyed figures in appendix D. All islands showed increased occupancy rates compared to 2013, which indicated the lowest drop since monitoring started in 1997 (Figure 6). Babel Island, however showed only a slight increase, from 60% to 67% occupancy.

In comparison with 2013 results, the number of burrows were:

- lower on Big Dog Island
- similar on Babel Island
- higher on Chappell Island

The raw numbers of burrows recorded for the last two years on Babel Island can be compared superficially with burrow counts surveyed there in Feb 1983 (Skira and Towney, 1983) and Jan 2010 (TAC, unpublished) as shown in Appendix E. Despite the superficiality of such a comparison, it indicates a substantial decline in the average density of burrows on this Island over 30 years.

References

Meathrel, C. E., Skira, I. J., Bradley, J. S. and Wooller, R. D. 1993. The influence of egg-size, mass and composition upon hatching success in the short-tailed shearwater *Puffinus tenuirostris* (Aves: Procellariiformes). *Journal of Zoology*, 230: 679–686.

Skira, I. & Towney, G., 1983. *Babel Island Muttonbird Rookeries*. Unpublished letter.

Tasmanian Aboriginal Centre Land Management Program, 2014. *Monitoring Evaluation Reporting and Improvement Plan*.

Wildlife Management Branch, 2010. *Short-tailed Shearwater (Muttonbird) Puffinus tenuirostris*. Establishment Report for DPIWWE wildlife Monitoring Program. January 2010.

Appendix A. Big Dog Island (Great Dog Is.) transects and results.

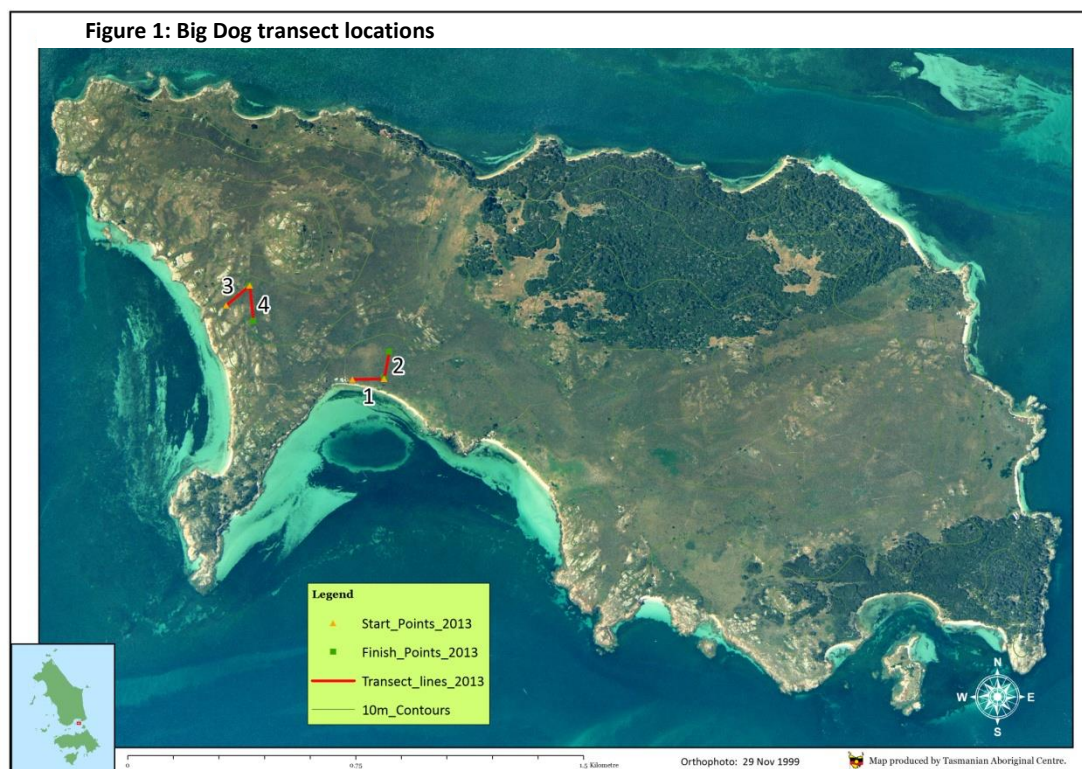
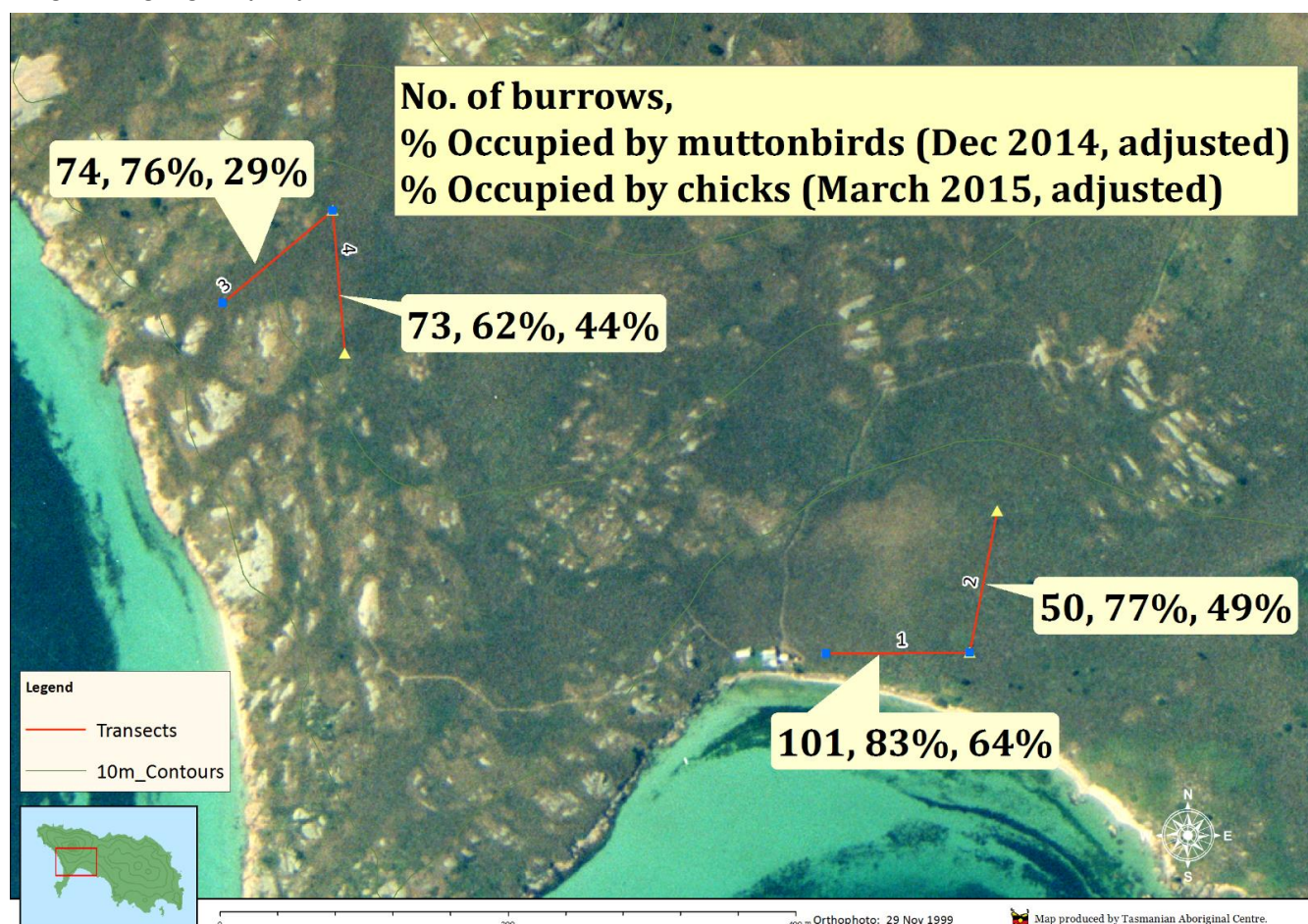


Figure 2: Big Dog occupancy results

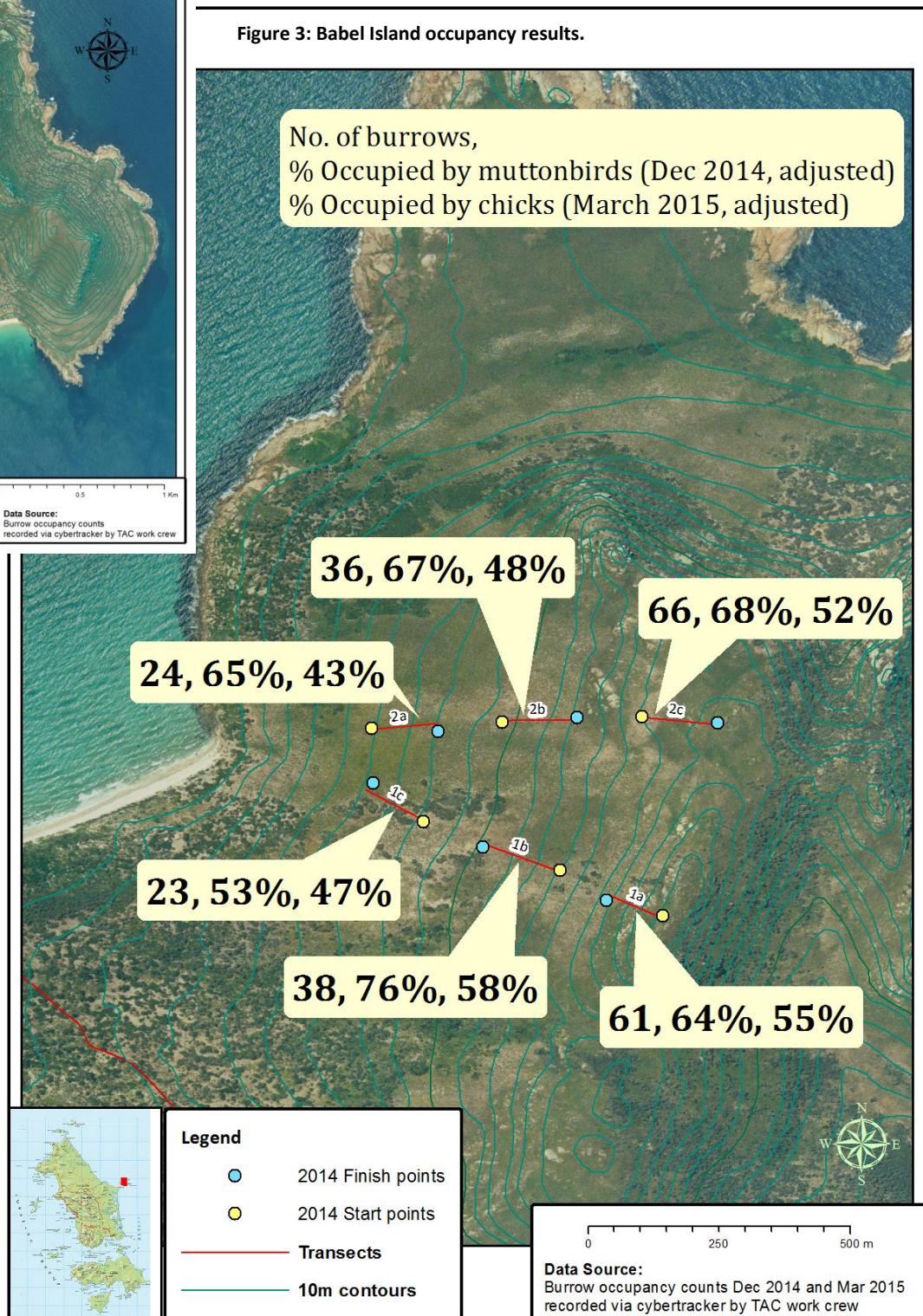


Appendix B. Babel Island transects and results

Figure 4: Babel Island transects



Figure 3: Babel Island occupancy results.



Appendix C Mount Chappell Island transects and burrow counts.

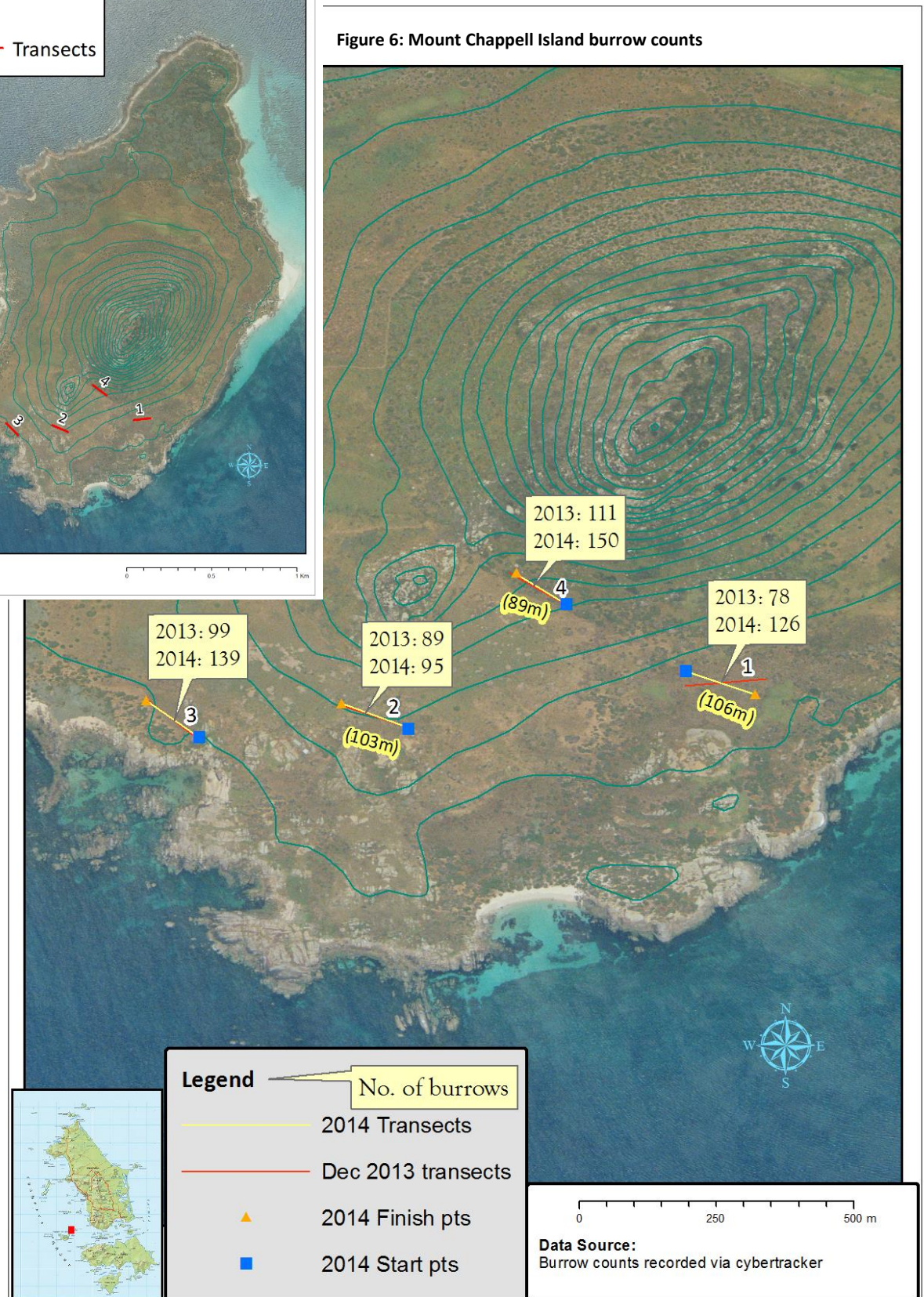
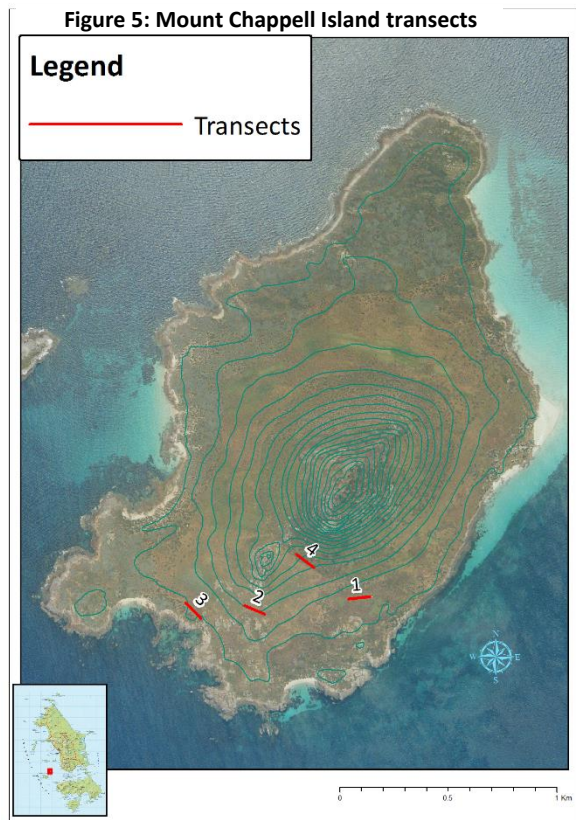
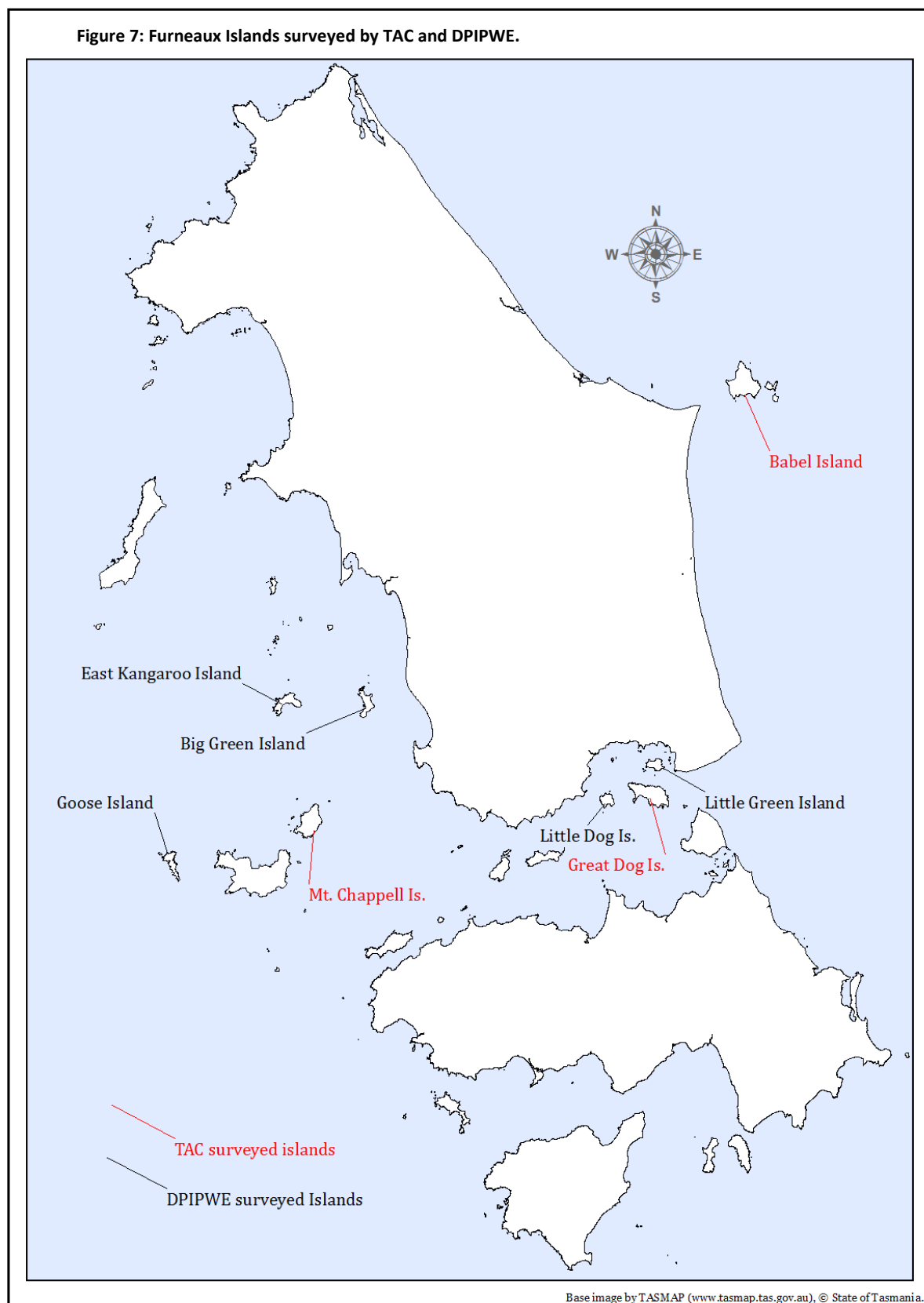


Figure 7: Furneaux Islands surveyed by TAC and DPIPWE.



Appendix D Comparison with DPIPWE monitoring on other Furneaux Islands.

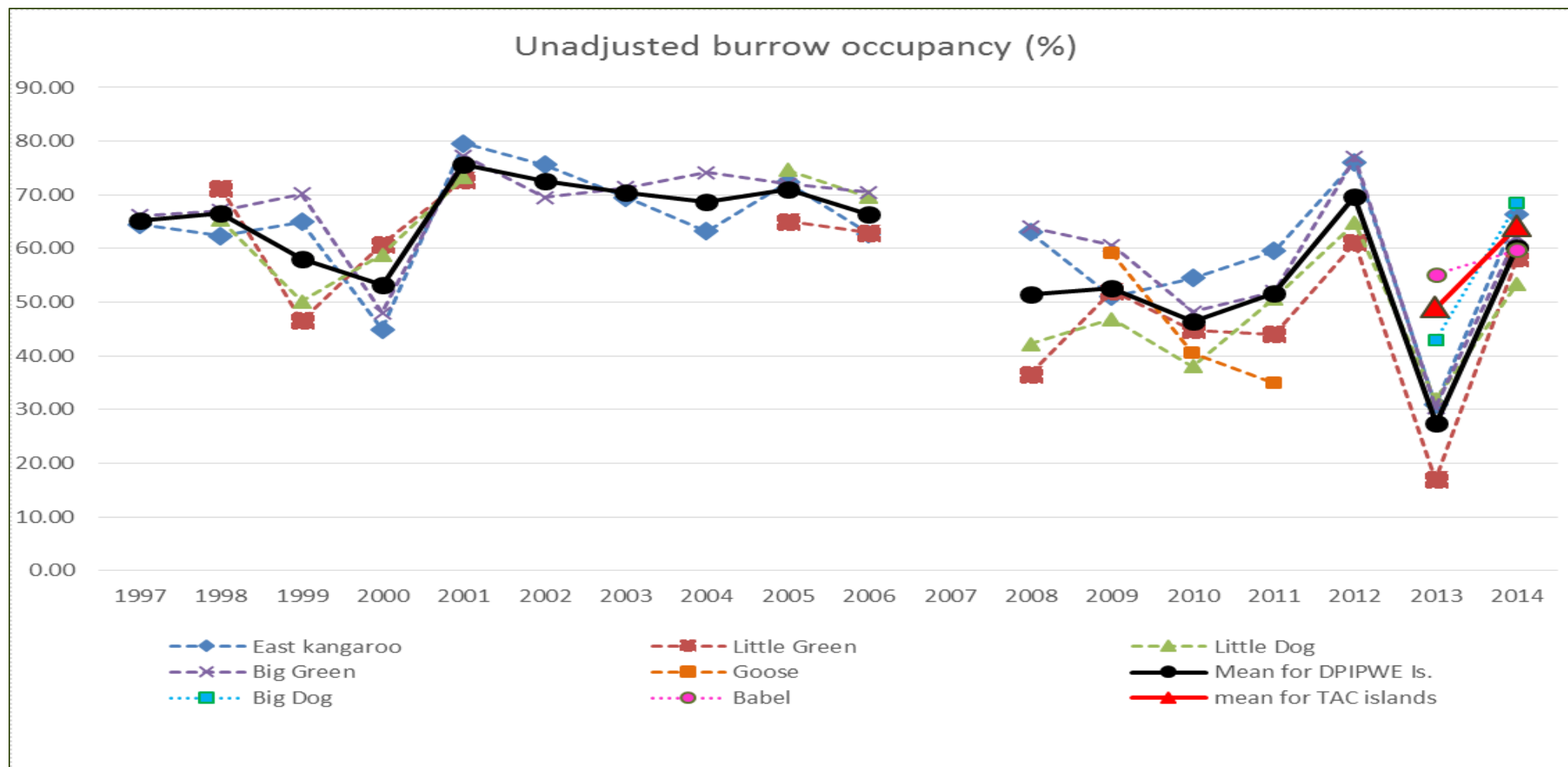
Table 5 DPIPWE surveyed burrow occupancy across all Islands surveyed 1-5 December 2014

Island	Number of Transects (100x2m)	Unadjusted Burrow occupancy (%)	Adjusted Burrow occupancy (%)	Occupied Burrow Density (occupied burrows/m ²)	Adjusted occupied burrow density (occupied burrows/m ²)
Little Dog	6	53.50% (±2.4)	0.5957 (±2.6)	0.2 (±0.02)	0.23 (±0.02)
Little Green	6	58.25% (±3.4)	0.6328 (±3.5)	0.28 (±0.02)	0.3 (±0.02)
East Kangaroo	10	66.30% (±3.0)	70.89% (±32.7)	0.1 (±0.01)	0.11 (±0.01)
Big Green	10	0.6233 (±3.58)	66.98% (±3.6)	0.14 (±0.02)	0.15 (±0.02)
DPIPWE Furneaux (Average)	32	58.25%	66.12%	0.17	0.18

Table 2a (repeated) TAC surveyed burrow occupancy surveyed 10-12 December 2014

Island	Number of Transects (100x2m)	Burrow occupancy (%)	Adjusted Burrow occupancy	Occupied Burrow Density (occupied burrows/m ²)	Adjusted occupied burrow density (occupied burrows/m ²)
Big Dog	4	68.46% ±9.14%	75.00% ±9.14%	0.267 ±0.09	0.293 ±0.10
Babel	6	59.68% ±11.22%	66.67% ±7.34	0.117 ±0.056	0.391 ±0.062

Figure 8: Showing UNADJUSTED burrow occupancy as a percentage of all burrows surveyed.



Appendix E Babel Island Burrow counts

Note that comparing these figures is somewhat superficial because methods may have differed between counting 'active' burrows in Feb 1983 & Jan 2010 and counting all burrows in Dec 2013 and 2014.

Sources : Skira & Towney (1983), TAC (2010, unpublished data) and surveys documented here.

Table 4: Babel Island burrow counts

Transect	Number of burrows				Burrow density			
	Feb-83	Jan-10	Dec-13	Dec-14	Feb-83	Jan-10	Dec-13	Dec-14
1a	157	112	84	61	0.785	0.56	0.42	0.32
b	160	124	40	38	0.8	0.62	0.2	0.16
c	126	56	15	23	0.63	0.28	0.075	0.12
d	54	11			0.27	0.055		
2a	135	24	24	24	0.675	0.12	0.12	0.12
b	173	84	25	36	0.865	0.42	0.125	0.17
c	123	156	82	66	0.615	0.78	0.41	0.30
3	117	159			0.585	0.795		
	144	231			0.72	1.155		
	194	159			0.97	0.795		
	220	142			1.1	0.71		
4	72				0.36			
5	77				0.385			
6	89				0.445			
7	223	108			1.115	0.54		
	122	169			0.61	0.845		
8	130				0.65			
9	236				1.18			
10	173				0.865			
11	232				1.16			
12	98				0.49			
13	208				1.04			
14	196				0.98			
			Averages		0.752	0.590	0.225	0.196

Figure 5: All Babel Island transects

