

# Annual Statewide Spotlight Surveys Tasmania 2012/13

## Regional Summary: Priority Harvested Species



Wildlife Management Branch  
Department of Primary Industries, Parks, Water and Environment



## Table of Contents

<b>OVERVIEW .....</b>	<b>1</b>
<b>PRIORITY SPECIES.....</b>	<b>2</b>
<b>BRUSHTAIL POSSUM.....</b>	<b>3</b>
<b>BENNETT'S WALLABY .....</b>	<b>4</b>
<b>TASMANIAN PADEMELON.....</b>	<b>6</b>
<b>APPENDIX 1: Raw counts of significant other species .....</b>	<b>11</b>
<b>APPENDIX 2: Management regions and survey routes.....</b>	<b>13</b>

## Overview

The Department of Primary Industries, Parks, Water and Environment have been carrying out annual nocturnal spotlight surveys in Tasmania since 1975. The surveys were designed to monitor the abundant harvested populations of Bennett's wallabies, Tasmanian pademelons and brushtail possums, however all native and non-native mammal species are recorded (see Appendix I for summary).

Surveys are undertaken across five management regions on mainland Tasmania and also on King and Flinders Islands. The results of these surveys provide a long term time-series of consistent data for detecting population trends. Surveys were originally undertaken along forty-two survey routes, however following a review by Southwell (1985), the number of survey routes was significantly increased and the methodology standardised for all surveys.

In 2002, a further change was made whereby more survey routes were added, and the distance an animal was sighted from the survey route was noted, allowing the calculation of density indexes for the three most abundant species. In 2006, the system was further upgraded to record the age class (immature, juvenile, adult) and exact location of particular species including the Eastern Quoll and Tasmanian Devil.

As of 2009, there have been 190 survey routes spread across Tasmania: 172 on mainland Tasmania, 8 on Flinders Island and 10 on King Island. Appendix 2 gives an overview of the establishment of new survey routes since surveys began.

Each survey route follows an existing road and is 10 km long. Surveys are conducted by vehicle at a steady speed of 20 km/h, with the driver operating a hand-held spotlight. The driver relays their observations to a passenger for recording. The distance of each animal from the roadside is estimated, allowing a detection function to be modelled, and an estimate of species density is produced. Population trends are analysed on a regional basis. Due to the inherent biases of surveying from roads, this estimate is intended as a density index only and should not be used as the basis for calculating estimates for species abundance. A more detailed description of survey methodology can be found in the *Tasmanian Spotlight Survey Manual*.

This report summarises the survey results for the three abundant harvested species, the Bennett's wallaby, Tasmanian pademelon and the brushtail possum from the 2012 surveys. Population trends are also shown since distance sampling methodology was first used in 2002.

### 2012 Surveys

The 2012 surveys were carried out by a number of DPIPWE staff from the Wildlife Management Branch, the Fox Eradication Branch, Policy and Conservation Assessment Branch and the Save the Tasmanian Devil Program between November 2012 and January 2013.

There were no issues of note for the 2012 survey. Climatic conditions leading up to and during the survey period were mixed ranging from average to dry and consequently there were no 'statewide' effects impacting on counts.

## Priority Species

In accordance with methods established by Dr Tony Pople, the Wildlife Management Branch has reviewed the 2012 spotlight survey data for Tasmania and calculated Density Index estimates for the three abundant harvested species, the Bennett's wallaby, Tasmanian pademelon and the brushtail possum, in the five mainland management regions and Flinders and King Islands.

Counts of other mammal species observed during the surveys are given in Appendix I.

## Regional Surveys

Table I gives details of the number of surveys carried out in 2012 and the numbers of animals sighted.

**Table I: Number of surveys and mammals sighted 2012**

Region	Surveys	Brushtail Possum	Bennett's Wallaby	Tasmanian Pademelon	Other Native	Non- Native
Central	27	278	301	171	59	226
Flinders Island	8	34	454	557	62	0
King Island	10	50	271	46	0	2
North East	59	242	428	1814	131	244
North West	30	79	142	678	73	26
South East	44	321	462	477	58	73
South West	12	21	45	118	10	0
<b>Total</b>	<b>190</b>	<b>1025</b>	<b>2103</b>	<b>3861</b>	<b>393</b>	<b>571</b>

## Brushtail Possums

A summary of 2012 Brushtail possum regional density indexes is given in Table . The density indexes from 2005 to 2012 are given in Table 3 and depicted in Figure 1. By comparison with the 2011 surveys, two regions recorded significant increases in density index (Central and Flinders Island), three regions were stable (North East, North West and South East) and one was significantly lower (South West). King Island was not covered in the previous year's survey so a similar comparison is not possible, however the density index recorded was within the range typically recorded there (see Table 3). The statewide density index for 2012 was 33.6 brushtail possums per square kilometre. This was slightly higher than that recorded in 2011 (31.54/km<sup>2</sup>).

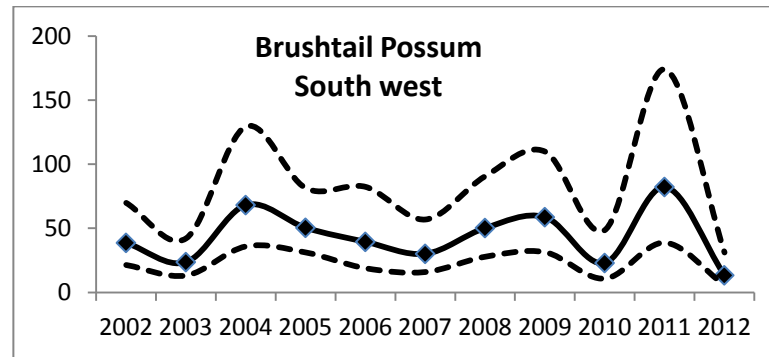
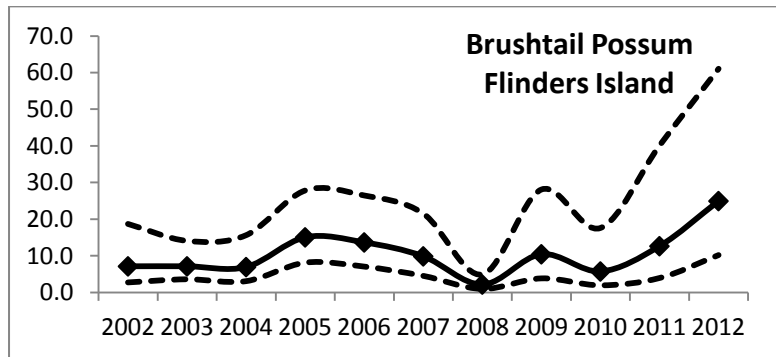
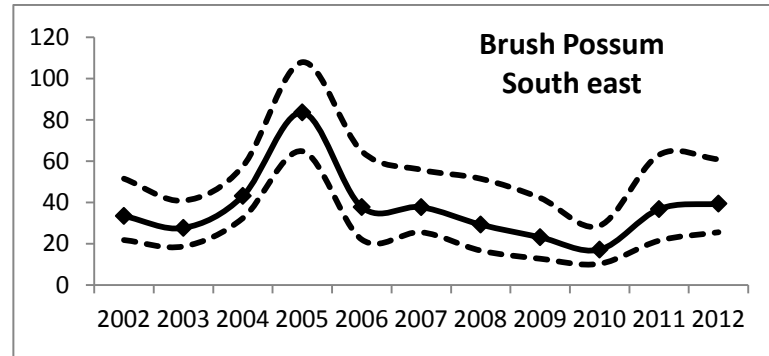
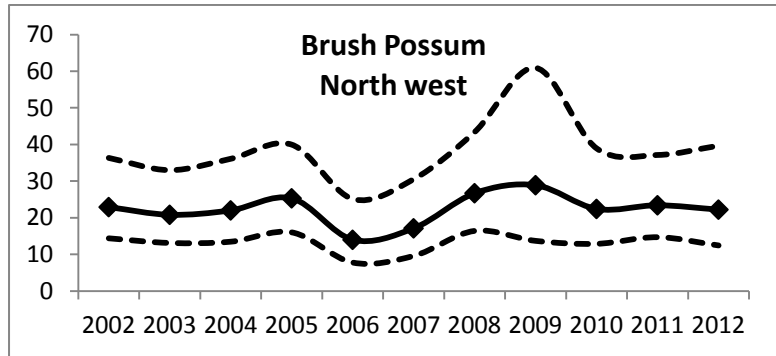
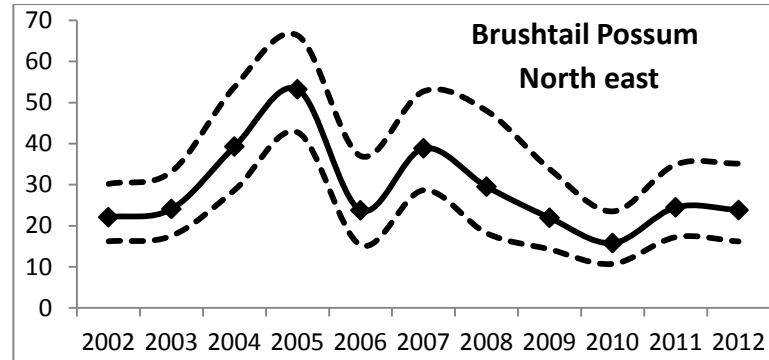
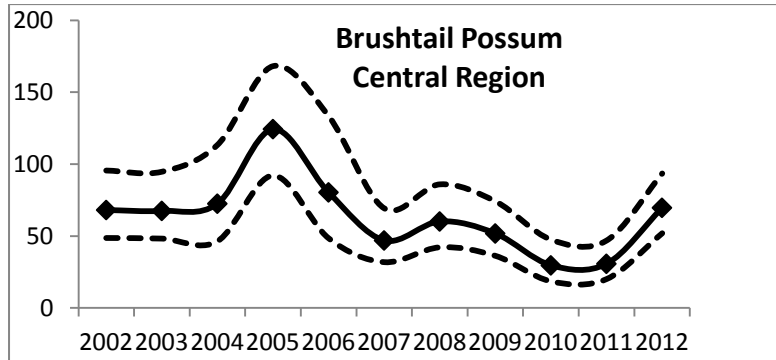
**Table 2: Regional Density Index Summary 2012: Brushtail Possums**

	Density (n/km <sup>2</sup> )	%CV	No. BP's	Length (km)	Enc. Rate (n/km)	Detec Prob.
Central	69.6	14.8	278	270	1.03	0.366
Flinders Is.	24.9	44.26	34	80	0.43	0.367
King Island	38.4	27.3	50	100	0.5	0.437
North East	23.8	19.8	242	590	0.41	0.349
North West	22.2	29.5	79	300	0.26	0.289
South East	38.4	18.8	321	440	0.73	0.361
South West	13.3	42.3	21	120	0.175	0.306

**Table 3: Regional Density Index Data 2005 – 2012: Brushtail Possum**

	2005	2006	2007	2008	2009	2010	2011	2012
Central	124.4	80.4	46.9	60.1	51.8	29.6	30.7	69.6
Flinders Is.	15.0	13.6	9.8	2.1	10.4	5.7	12.63	24.9
King Island	58.8	32.6	25.1	26.5	-	54.6	-	38.4
North East	53.2	23.8	38.9	29.5	22.0	15.8	24.5	23.8
North West	26.3	14.9	17.1	26.7	28.9	22.4	23.4	22.2
South East	83.6	37.8	37.8	29.3	23.2	17.2	36.8	38.4
South West	50.4	39.4	30.1	50.2	58.7	22.9	82.2	13.3

**Figure 1: Density index trends in each region – Brushtail possums 2002-2012.** Dotted lines represent 95% confidence limits.



## Bennett's Wallabies

A summary of the 2012 Bennett's wallaby density data is given in Table . The density indexes from 2005 to 2012 is shown in Table 5 and depicted in Figure 2. Flinders Island has a significantly higher density of Bennett's wallabies than mainland Tasmania, at 130.4/km<sup>2</sup>. Four regions recorded an increase from last year (Central, Flinders Island, North East, and South West), two regions were stable (North West and South East) and one recorded a decrease (King Island). The statewide density index in 2012 for Bennett's wallabies was 40.6 per square kilometre. This is a slight increase from last year (31.8 /km<sup>2</sup>).

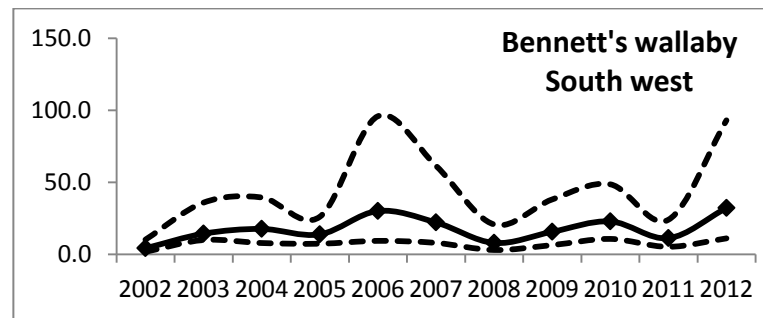
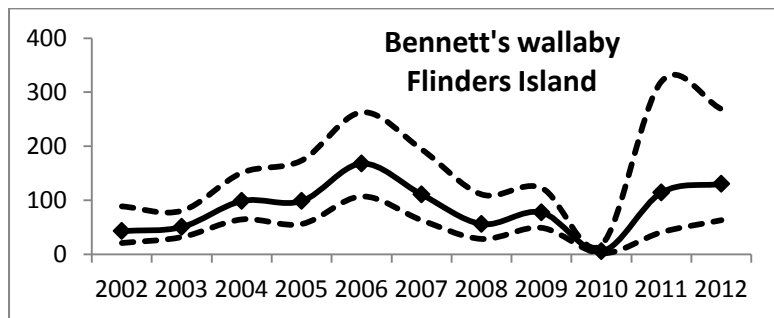
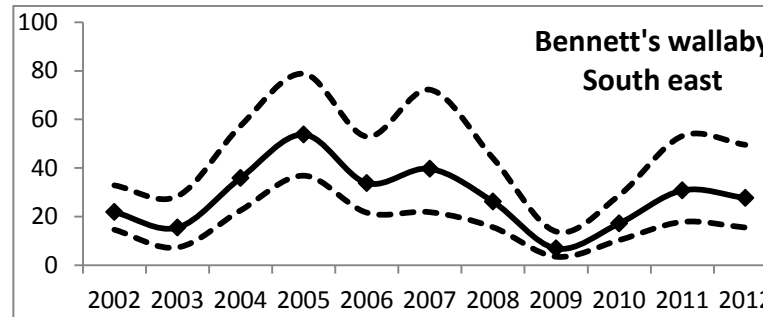
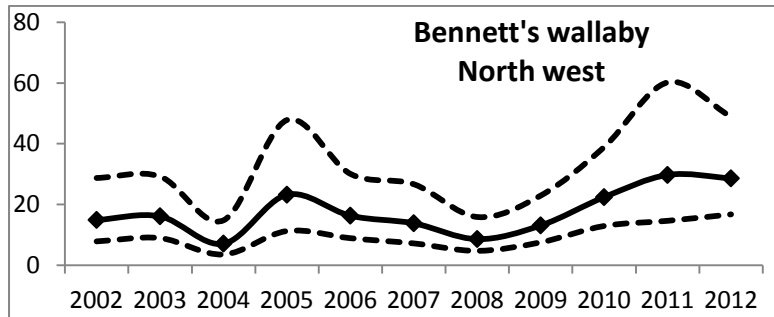
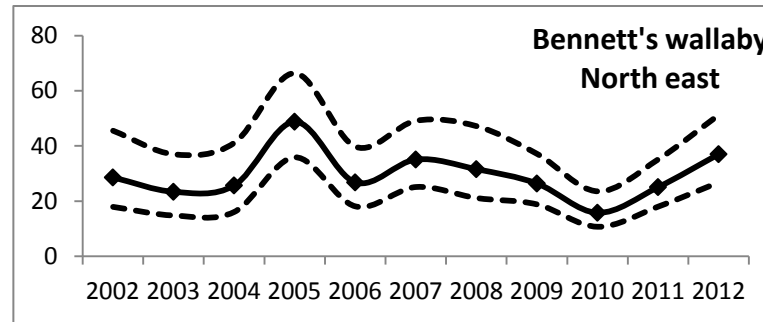
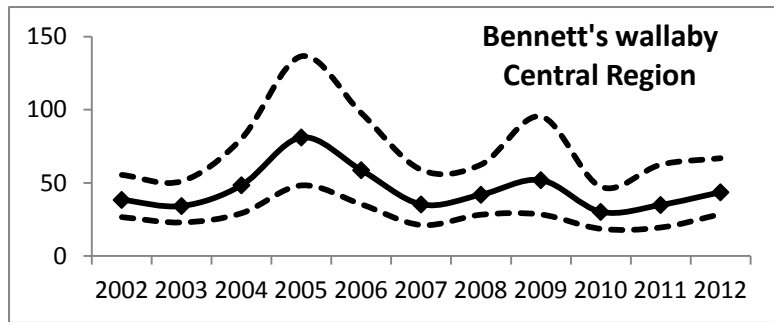
**Table 4: Regional Density Index Summary 2012: Bennett's Wallabies**

	Density (n/km <sup>2</sup> )	%CV	No. BW's	Length (km)	Enc. Rate (n/km)	Detec Prob.
Central	43.6	21.2	301	270	1.11	0.099
Flinders Is.	130.4	33.3	454	80	5.7	0.150
King Island	57.5	33.2	271	100	2.71	0.372
North East	37.0	16.5	428	590	0.73	0.292
North West	28.6	27.1	142	300	0.47	0.213
South East	33.8	22.9	462	440	1.05	0.526
South West	32.2	51.6	45	120	0.38	0.0580

**Table 5: Regional Density Index Data 2005 – 2012: Bennett's Wallabies**

	2005	2006	2007	2008	2009	2010	2011	2012
Central	81.1	58.7	35.3	41.9	51.9	30.2	34.9	43.6
Flinders Is.	98.8	168.0	110.8	56.2	77.6	54.1	114.4	130.4
King Island	97.0	136.0	72.7	26.9	-	199.2	-	57.5
North East	48.8	26.8	35.1	31.6	26.4	18.8	25.1	37.0
North West	23.2	16.3	13.8	8.6	13.1	10.1	29.7	28.6
South East	53.8	33.8	39.7	26.2	6.9	9.0	30.8	33.8
South West	13.9	30.1	22.2	8.0	15.7	15.0	11.3	32.2

**Figure 2: Density index trends in each region – Bennett’s wallaby 2002-2012.** Dotted lines represent 95% confidence limits. Density is measured in individuals per square kilometre.





## Tasmanian Pademelons

A summary of the 2012 Tasmanian pademelons regional density indexes is given in Table . The density indexes from 2005 to 2012 are given in Table 7 and depicted in Figure 3. On a regional basis four regions have recorded an increase in density since last year's surveys (Central, North East, North West and South West), one region was stable (Flinders Island) and one region recorded a decrease (South East). King Island was not surveyed last year however the density recorded for 2012 is within the range typically recorded there (Table 7). The state-wide density index for Tasmanian pademelons in 2012 was 74.1 per square kilometre. This was slightly higher than in 2011 (61.1/km<sup>2</sup>).

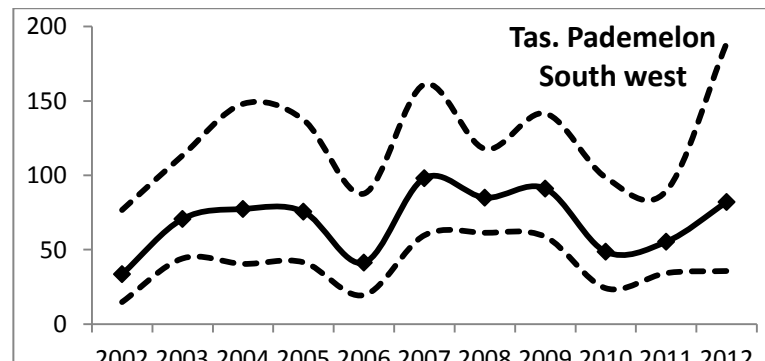
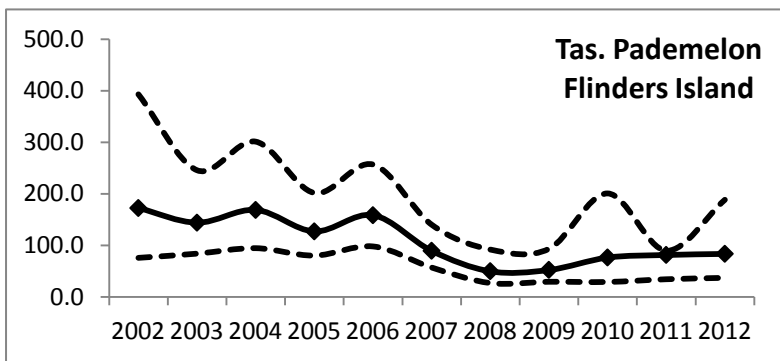
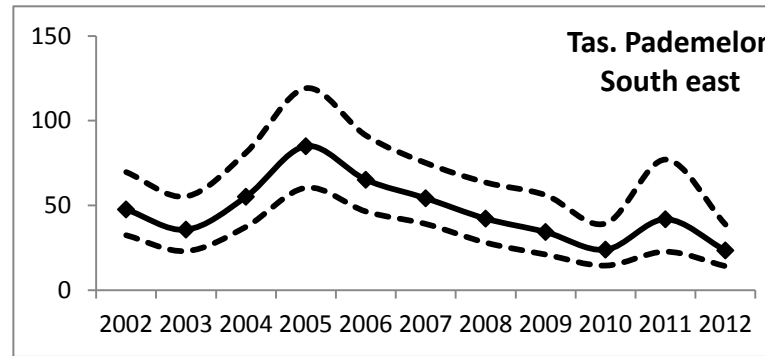
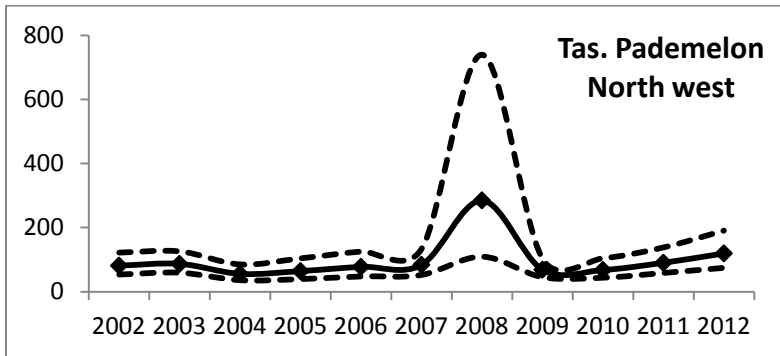
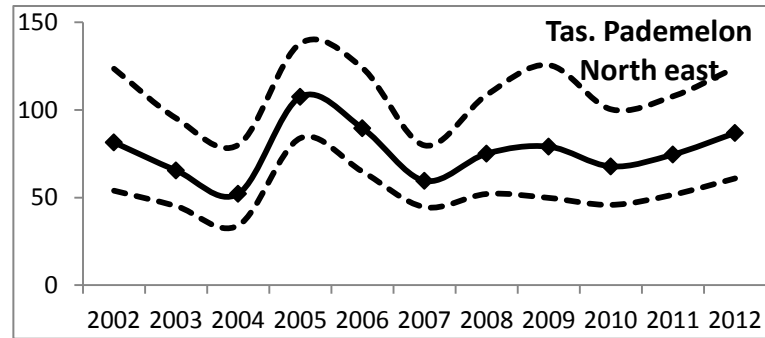
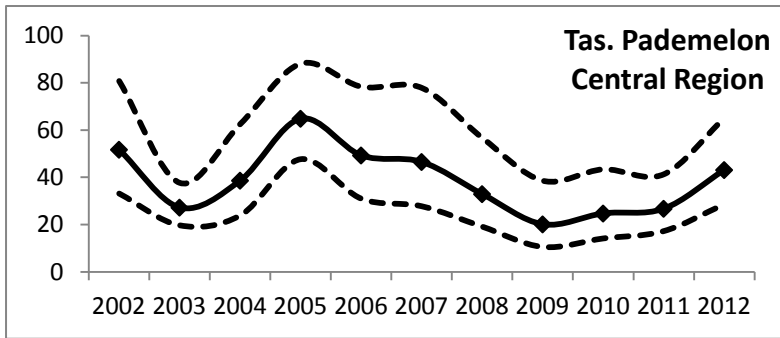
**Table 6: Regional Density Index Summary 2012: Tasmanian pademelons**

	Density (n/km <sup>2</sup> )	%CV	No. TP's	Length (km)	Enc. Rate (n/km)	Detec Prob.
Central	43.1	20.7	171	270	0.63	0.303
Flinders Is.	83.4	36.4	557	80	6.96	0.070
King Island	7.8	42.8	46	100	0.46	0.207
North East	86.8	18.0	1814	590	3.07	0.154
North West	119.3	23.4	678	300	2.26	0.099
South East	23.4	25.9	477	440	1.08	0.095
South West	82.1	32.6	118	120	0.98	0.043

**Table 7: Regional Density Index Data 2005 – 2012: Tasmanian pademelons**

	2005	2006	2007	2008	2009	2010	2011	2012
Central	64.8	49.3	46.5	32.9	20.1	24.7	26.7	43.1
Flinders Is.	126.9	158.3	89.3	49.7	52.3	76.3	81.3	83.4
King Island	7.0	11.6	4.4	2.2	-	-	-	7.8
North East	107.5	89.6	59.6	75.1	79.1	67.8	74.6	86.8
North West	64.0	77.3	83.7	284.8	68.4	67.5	90.0	119.3
South East	84.9	65.1	54.2	42.2	34.3	23.9	41.8	23.4
South West	75.6	41.4	98.1	85.0	91.1	48.7	55.4	82.1

**Figure 3: Density index trends in each region – Tasmanian pademelon 2002-2012.** Dotted lines represent 95% confidence limits. Density is measured in individuals per square kilometre.

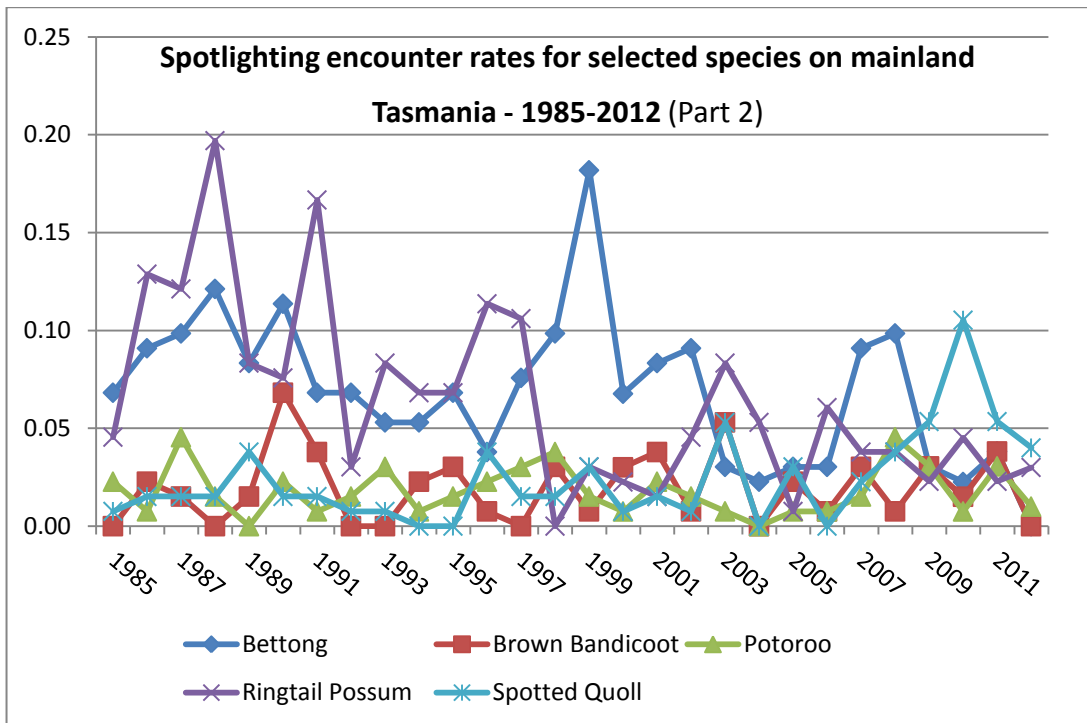
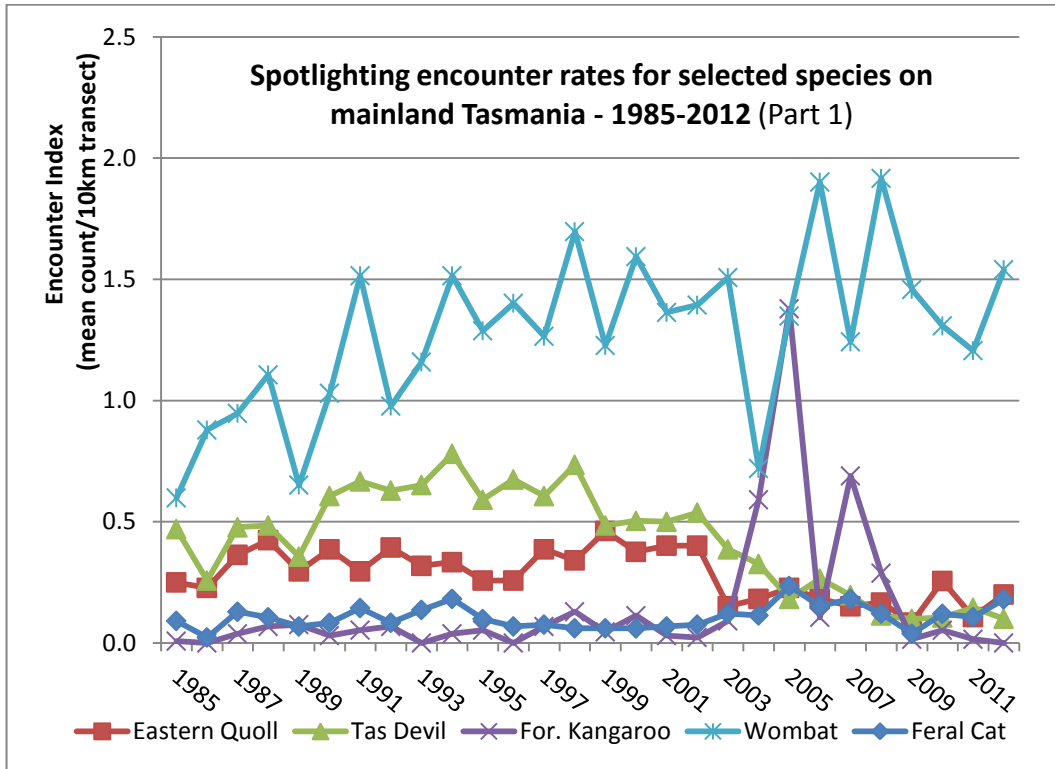


## Appendix 1.

Table 1: Raw counts of additional mammal species observed during the Annual Statewide Spotlight Surveys, MAINLAND TASMANIA<sup>1</sup> 2002-2012.

MAINLAND TASMANIA		COUNT												
		Native Species										Non-native Species		
Year	# Surveys	Tasmanian Devils	Spotted- tailed quoll	Eastern quoll	Forester kangaroo	Tasmanian bettong*	Eastern barred bandicoot	Southern brown bandicoot	Common wombat	Ringtail possum	Long- nosed potoroo	Fallow deer	Feral cat	Rabbit
2002	172	87	1	67	3	23	4	1	248	7	3	149	19	155
2003	173	63	8	29	12	7	3	7	236	11	2	160	20	167
2004	173	51	0	50	86	11	1	0	121	9	0	256	21	129
2005	172	34	5	40	183	7	1	3	219	2	1	619	33	311
2006	173	46	1	42	15	12	4	4	313	11	1	449	25	249
2007	172	32	3	43	91	18	0	5	215	6	2	231	28	197
2008	170	19	5	41	40	25	2	1	294	7	6	165	20	289
2009	172	18	7	20	45	19	6	5	262	5	5	80	9	187
2010	172	19	14	45	7	6	4	2	194	9	2	123	21	203
2011	171	20	10	25	2	12	0	7	200	4	4	154	14	194
2012	172	21	5	26	6	9	2	2	304	4	1	392	29	197

<sup>1</sup> Does not include results for 'Lake St Clair' transects: not been completed every year and standard survey methodology was not followed.



**Table 2: Raw counts of additional mammal species observed during the Annual Statewide Spotlight Surveys, FLINDERS ISLAND 2002-2012.**

<b>FLINDERS ISLAND</b>		<b>Count</b>			
<b>Year</b>	<b># Surveys</b>	<b>Common wombat</b>	<b>Ringtail possum</b>	<b>Long-nosed potoroo</b>	<b>Feral cat</b>
<b>2002</b>	16	30	0	0	1
<b>2003</b>	16	45	3	1	10
<b>2004</b>	16	73	0	0	4
<b>2005</b>	16	110	0	0	3
<b>2006</b>	16	112	1	0	5
<b>2007</b>	16	68	0	0	8
<b>2008</b>	16	41	0	0	0
<b>2009</b>	16	51	0	0	2
<b>2010</b>	16	55	0	0	1
<b>2011</b>	8	18	0	0	0
<b>2012</b>	8	62	0	0	2

**Table 3: Raw counts of additional mammal species observed during the Annual Statewide Spotlight Surveys, KING ISLAND 2002-2012.**

<b>KING ISLAND</b>		<b>Count</b>	
<b>Year</b>	<b># Surveys</b>	<b>Ringtail possum</b>	<b>Feral cat</b>
<b>2002</b>	10	0	0
<b>2003</b>	20	0	0
<b>2004</b>	20	1	5
<b>2005</b>	20	0	5
<b>2006</b>	20	0	2
<b>2007</b>	10	0	0
<b>2008</b>	10	0	2
<b>2009</b>	10	0	4
<b>2010</b>	10	0	0
<b>2011</b>	No survey	No survey	No survey
<b>2012</b>	10	0	2

## **Appendix 2: Management Regions and Survey Routes**

The management regions reflect the areas covered by the existing population-monitoring program and correlate closely with IBRA bioregions. These regions are presented in Figure 1.

### **Southwest Region (20,490 km<sup>2</sup>)**

The southwest region is the largest of the regions, extending from Sandy Cape on the west coast to New River Lagoon on the south coast. The area consists predominantly of the World Heritage Area and other conservation reserves, with very little agricultural activity taking place in most of the region.

### **Southeast Region (12,610 km<sup>2</sup>)**

The Southeast Region extends from New River Lagoon on the south coast to Long Point on the east coast. It adjoins the southwest, central and northeast regions. This region includes the D'Entrecasteaux Channel area, the Tasman Peninsula, and much of the Derwent River Valley and the east coast. This region is highly developed for agriculture, including high-value crops, and therefore there is a large demand for crop protection permits.

### **Central Region (9,041 km<sup>2</sup>)**

The Central region is bounded by all other regions and encompasses much of the Central Plateau and the Midlands. The Midlands area has been highly modified since European settlement and is dominated by agricultural land use. In particular, the loss of natural habitat through native vegetation clearance and the growing of crops have seen the encroachment of browsing wildlife onto farming properties and they have particularly flourished in this region.

### **Northeast Region (11,300 km<sup>2</sup>)**

The Northeast region extends from Long Point on the east coast to the mouth of the Rubicon River on the north coast. It encompasses the hinterland south of Launceston to Longford and westward to Westbury, as well as the Tamar Valley and the Fingal Valley in the south. This region has several important agricultural areas, particularly in the vicinities of Longford and Scottsdale as well as the northeast coast.

### **Northwest Region (9,949 km<sup>2</sup>)**

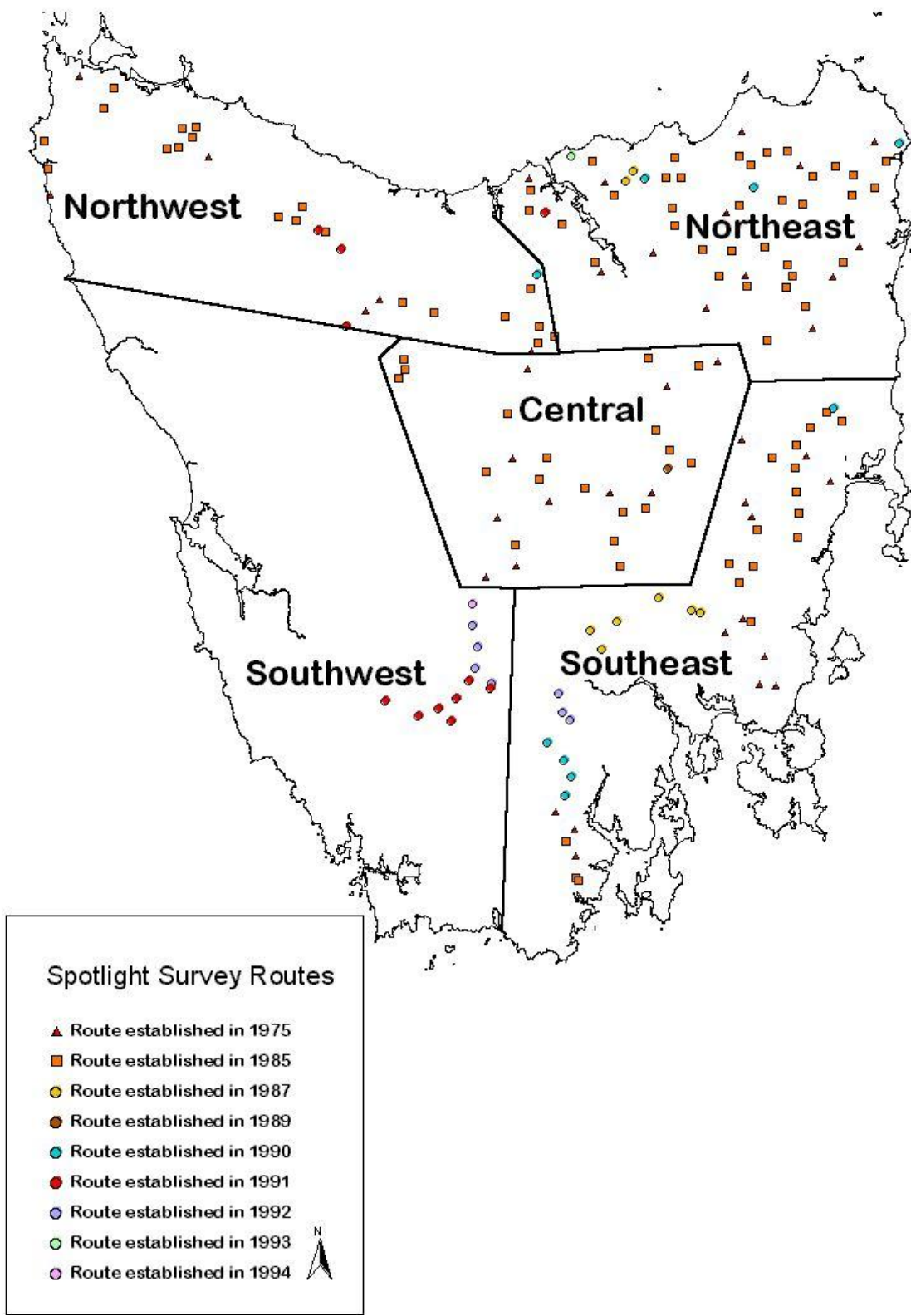
The Northwest region extends from Liffey at the boundary of the Central region through Westbury to the north coast and to Sandy Cape on the west coast. It includes the far northwest as well as the Smithton, Somerset, Burnie, Devonport and Deloraine areas. Impacts to farming activities on high value agricultural lands are felt in the region although to a lesser extent than the central region due to the larger area of natural habitat available to browsing wildlife.

### **Flinders Island (1,333 km<sup>2</sup>)**

Eight spotlight survey routes were established on Flinders Island in 1991 and were surveyed twice each fiscal year until 2010. Since then they have been surveyed only once per year.

### **King Island (1,098 km<sup>2</sup>)**

Ten spotlight survey routes were established on King Island in 2001 and until 2006 they were surveyed twice each fiscal year. Since then they have been surveyed only once per year, although no surveys were undertaken in 2011.



**Figure 1: Management regions and survey routes for wildlife population monitoring, mainland Tasmania.**