# Australian Wildlife Conservancy

## KARAKAMIA WILDLIFE SANCTUARY Jan-Dec 2006

**Introduction**

Karakamia Wildlife Sanctuary owned by the Australian Wildlife Conservancy (AWC) covers 275 ha of Jarrah forest in the southwest of Western Australia, east of Perth. All key habitats found within the Jarrah forest vegetation complex, including the Jarrah forest itself, Marri woodland, Wandoo woodland, granitic heathlands and shrublands, and riparian (river) zones are found within the sanctuary.

Established in 1992, Karakamia Wildlife Sanctuary was the first property acquired by AWC. The primary goal of the sanctuary was to re-establish the medium-sized mammals that had either declined significantly in the region, or had become regionally extinct. The key to the success of this project was the protection and effective management of critical habitat, and the exclusion of all feral animals with a 9 km vermin-proof fence surrounding the entire property. After initial surveys to determine species present, six mammal species were re-introduced to Karakamia between1994-1998. These included the Quenda (Sept 1994) Numbat (Dec 1994), Woylie (Jan 1995), Western Ringtail Possum (Aug 1995), Quokka (Oct 1996) and Tammar Wallaby (Nov 1998; Table 1). Populations of other species already present such as the Western Brush Wallaby and Brushtail Possum were also supplemented (Table 1).

Monitoring of flora and fauna has been ongoing since 1992. Some species have responded so well to the feral animal exclusion within the sanctuary, that by December 2005 over 660 mammals (including 547 of which were Woylies) had been translocated from Karakamia, to a number of other suitable locations such as Paruna Wildlife Sanctuary (AWC), Avon Valley and Kalbarri National Parks and Cervantes (DEC; Table 2).

**Table 1:** Summary of mammals released at Karakamia.

| Year | Woylie | Quenda | Numbat | Ringtail possum | Quokka | Tammar | BT Possum | Brush Wallaby |
|---|---|---|---|---|---|---|---|---|
| 1994 | 3 | 6 | 3 | | | | 8 | 2 |
| 1995 | 15 | 21 | | 5 | | | | |
| 1996 | 5 | 4 | 1 | 6 | 3 | | | |
| 1997 | 1 | 6 | | | | | | |
| 1998 | 4 | | | 5 | 1 | 13 | | |
| 1999 | 2 | 1 | 2 | 5 | | | | |
| 2000 | | | | 4 | | | | |
| 2001 | 2 | | | 5 | | | | |
| 2002 | 1 | | | 12 | | | | |
| 2004 | 7 | | | | | | | |
| **Total** | **40** | **38** | **6** | **42** | **4** | **13** | **8** | **2** |

**Source of Animals**

Woylies – Dryandra, many from carers.
Quenda – Sites around Perth metropolitan area, many from carers.
Numbats – Dryandra Woodland
Ringtails – Busselton, hand reared from carers, also from development clearing.
Tammars – Tutanning Nature Reserve
Quokkas – Big Swamp Wildlife Park (Collie origin)
Brushtail Possums – from carer. Perth Hills origin

Brush Wallabies – from carer, Perth Hills origin

**Table 2:** Summary of Mammals translocated from Karakamia

| Date | Destination | Species | No. translocated |
|---|---|---|---|
| 1996 | Tutanning Nature Reserve | Numbat | 1 |
| 1997 | Perth Zoo | Chuditch | 1 |
| 1999 | Genaren (NSW) | Woylie | 12 |
| 2000 | Paruna Sanctuary | Woylie | 70 |
| 2000 | Paruna Sanctuary | Quenda | 32 |
| 2001 | Paruna Sanctuary | Woylie | 52 |
| 2002 | Paruna Sanctuary | Woylie | 40 |
| 2002 | Avon Valley National Park | Woylie | 41 |
| 2002 | Perth Zoo | Numbat | 1 |
| 2004 | Paruna Sanctuary | Woylie | 49 |
| 2004 | Paruna Sanctuary | Quenda | 13 |
| 2004 | Paruna Sanctuary | Brushtail Possum | 68 |
| 2004 | Avon Valley National Park | Woylie | 30 |
| 2004 | Julimar Conservation Reserve | Woylie | 15 |
| 2004 | Kalbarri National Park | Woylie | 28 |
| 2005 | Kalbarri National Park | Woylie | 40 |
| 2005 | Cervantes | Woylie | 34 |
| 2005 | North Kalgarin | Woylie | 40 |
| 2006 | Paruna | Woylie | 96 |
| 2006 | Paruna | Quenda | 5 |
| **Total** | | | **668** |

**Previous Reports**

Individual reports as part of on-going monitoring protocol between AWC and DEC (Department of Environment and Conservation) for each of the six reintroduced mammal species have been prepared every six months since release. After discussions with DEC and AWC staff, it was determined that these translocated species reports be replaced with an overall report for each sanctuary reflecting population establishment and trends over time.

## Methods

### Spotlighting

During this period a spotlighting drive transect was conducted at Karakamia incorporating the different habitats within the sanctuary. The spotlight transect was established for comparison with other AWC sanctuaries and DEC reserves. This transect is 9 km long and takes approximately an hour to complete. A map of the route is in the previous Karakamia Sanctuary 2005 report. It is conducted on three consecutive nights every three months. Spotlighting has been the principle monitoring technique for Karakamia Sanctuary as it is less intrusive and in some ways more effective than trapping within the sanctuary, where high capture rates and trap disturbance by some mammals, particularly Woylies, reduce the effectiveness of the trapping.

### Trapping

Trapping using Sheffield wire cage traps targeting Woylies was also conducted in 2006 to trap animals for the translocations of Woylies in July and August to Paruna. Andrew Hide an honours student from UWA, researched home range and dispersal of Woylies between March and October 2006 at both Karakamia and Paruna (see accompanying Paruna Sanctuary 2005 report) pre- and post-translocation of Woylies from Karakamia to Paruna Sanctuary. As a result of the dramatic

decline detected in many Woylie populations in the south-west of WA, AWC were also involved in research co-ordinated by Dr Adrian Wayne (DEC). This involved the establishment of a grid of 7 x 7 lines of cage traps (total 49), since reduced to 5 x 6 lines of six traps (total 30) placed 50 m apart and trapped for four consecutive nights. Similar grids have been set up at other known woylie populations to enable comparisons between the different locations.

In November AWC opened pit trap lines for three days (which had not been opened for several years).

**Table 3:** Trapping effort at Karakamia in 2006.

| Trap Type | No. traps | No. nights | Total |
|---|---|---|---|
| Pit | 38 | 3 | 114 |
| Sheffield | Up to 100 | 20 | 793 |
| **Total** | | | **907** |

**Radio-tracking**
Fourteen Woylies (seven males and seven females) were fitted with radio-collars at Karakamia. The animals were collared three months prior to their translocation to Paruna to determine home range and allow them to become accustomed to the collars. Woylies were collared with a closed loop brass radio collar weighing 20 g (Biotelemetry Tracking, SA). Each animal was anaesthetised by a veterinarian when fitting the collars to reduce stress. The 14 Woylies were released the night following capture. They were tracked several times a week to determine home range and sighted on a regular basis to check on collar fit and condition. In subsequent weeks, collars were removed if there were any signs of problems due to weight loss, chaffing or abrasions. Three weeks later an additional five animals were collared to replace the animals released earlier whose collars were removed due to health concerns. These animals were not collared under anaesthetic.

**Opportunistic observations**
Observations of interest are noted and recorded by AWC during routine sanctuary work, including evening spotlight tours which are regularly conducted for visitors to the sanctuary. This can include unusual sightings, calls, scats, tracks and breeding events that might not be detected by other monitoring techniques.

**Vegetation**
Monitoring of vegetation is undertaken by photographic record of 11 established photo points at six monthly intervals, which have been conducted since 1992. These photographs are available from AWC. Intensive species counts at all quadrats are undertaken every five years. An extensive field herbarium has been established and updated, with over 300 specimens.

As part of the Woylie Decline Research, truffle surveys were conducted in September 2006 to determine abundance and species of truffles available for the Woylie at Karakamia.

**Exclusion Quadrats**
Two adjacent 10 x 10 m quadrats were set up in 1994 one has a 1 m fence and skirt surrounding the quadrat to remove grazing pressure from Western Grey Kangaroos, Western Brush Wallabies and Tammar Wallabies (Brushtail Possums and possibly Woylies could gain access); the second is unfenced. The diversity and abundance of species in both quadrats is recorded annually.

## Results

**Spotlighting**
Results are displaced in Figure 1 below.

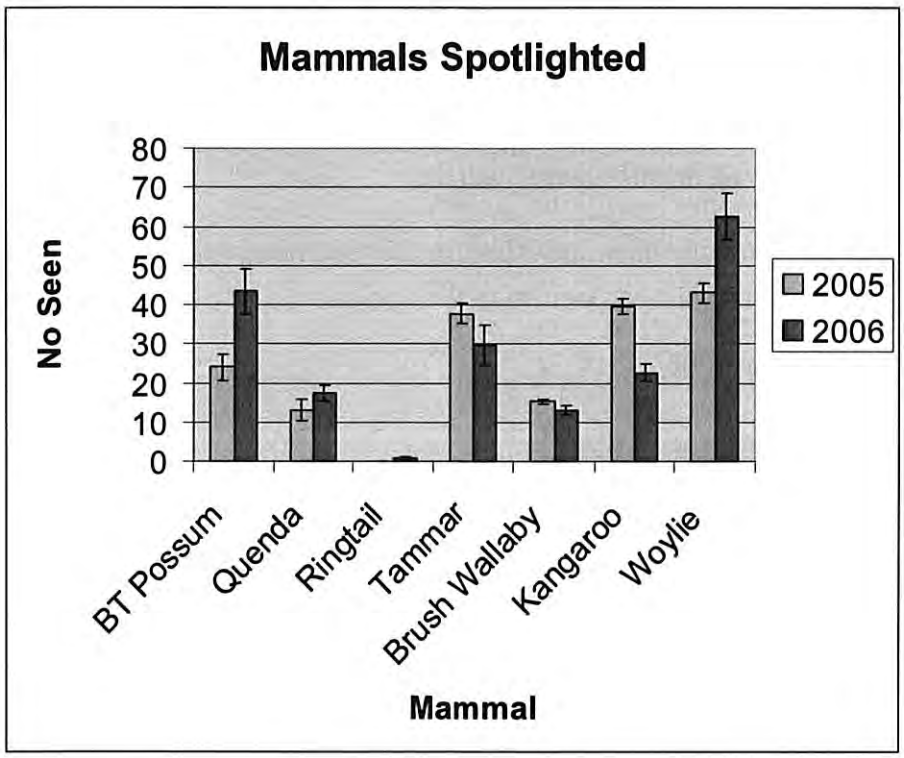


**Figure 1:** Mammals sighted on 9 km spotlight drive transect at Karakamia.

**Trapping**
Results are outlined in Table 4 below.

**Table 4:** Trapping results at Karakamia in 2006

| **Species** | **No. trapped** |
|---|---|
| Woylie | 519 (Including 96 translocated and 253retraps) |
| Brushtail Possum | 48 |
| Quenda | 58 |
| Ringtail Possum | 2 |
| Bobtail | 13 |
| *Crinia georgiana* | 15 |
| *Crinia glauerti* | 3 |
| *Geocrinia leai* | 2 |
| *Limnodynastes dorsalis* | 2 |
| *Cryptoblepharus plagiocephalus* | 5 |
| *Egernia kingii* | 2 |
| *Hemiergis initialis* | 2 |
| *Lerista distinguenda* | 6 |
| *Menetia greyii* | 2 |
| *Morethia obscura* | 9 |
| | |
| **Total Animals Trapped** | **688** |
| **No Trap nights** | **907** |
| **% Trap Rate** | **75.85%** |

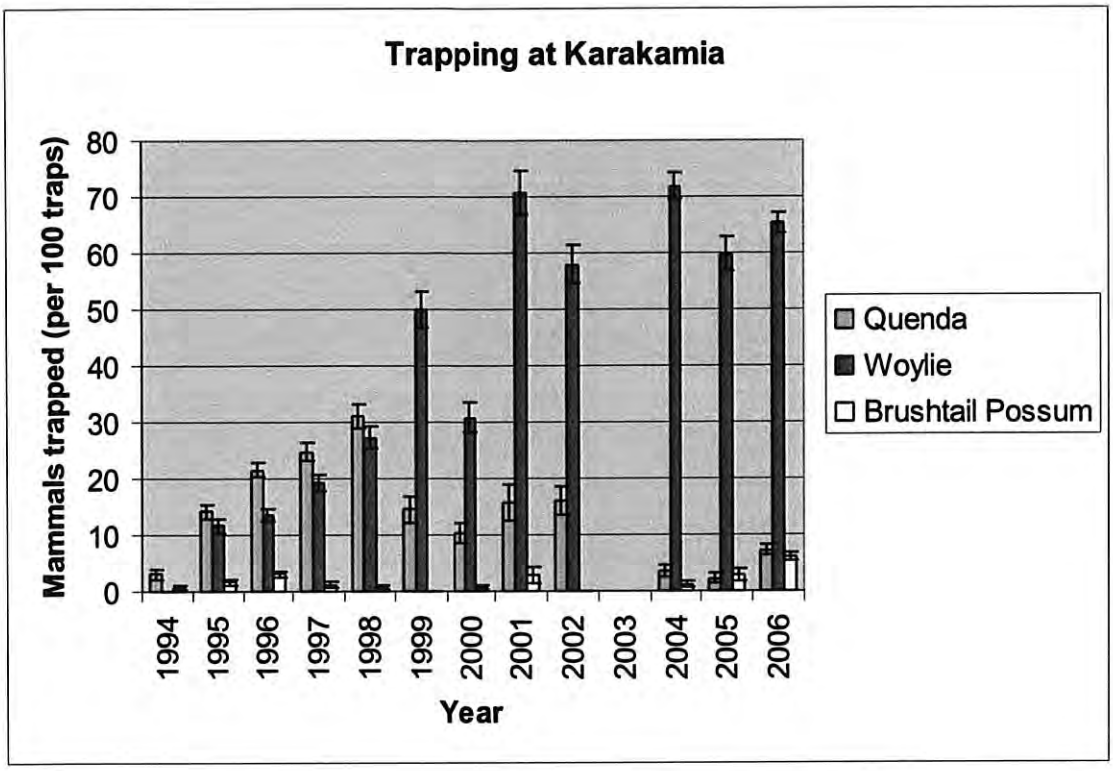


**Figure 2:** Mammal trapping at Karakamia from 1994 – 2006. Note that no standard trapping was conducted in 2003, that both Sheffield and Elliott traps were used prior to 2000 and Sheffields only from 2000.

## Discussion

### Woylies

Trapping was conducted at Karakamia in July and August 2006 to provide 96 animals for translocation to Paruna Wildlife Sanctuary. Numbers of Woylies spotlighted continued to be exceedingly high, especially the first half of the year where the average number of Woylies seen over the first six transects was 78. This dropped to 47 for the second six transects after the July translocation.

Grid trapping as part DEC's Woylie Decline Research commenced in September (196 trap nights) and was repeated in November (120 trap nights). In September, 145 Woylie captures were recorded (including 83 retraps, 46 new recruits and 15 previously marked animals (one escapee). In November, 87 Woylies (including 32 retraps, 17 new recruits and 36 previously marked animals (and two escapees) were captured.

The average home range of Woylies radio-tracked at Karakamia was estimated to be 5 ha, though one female had a much larger range of 24.5 ha (Figures 3 and 4).

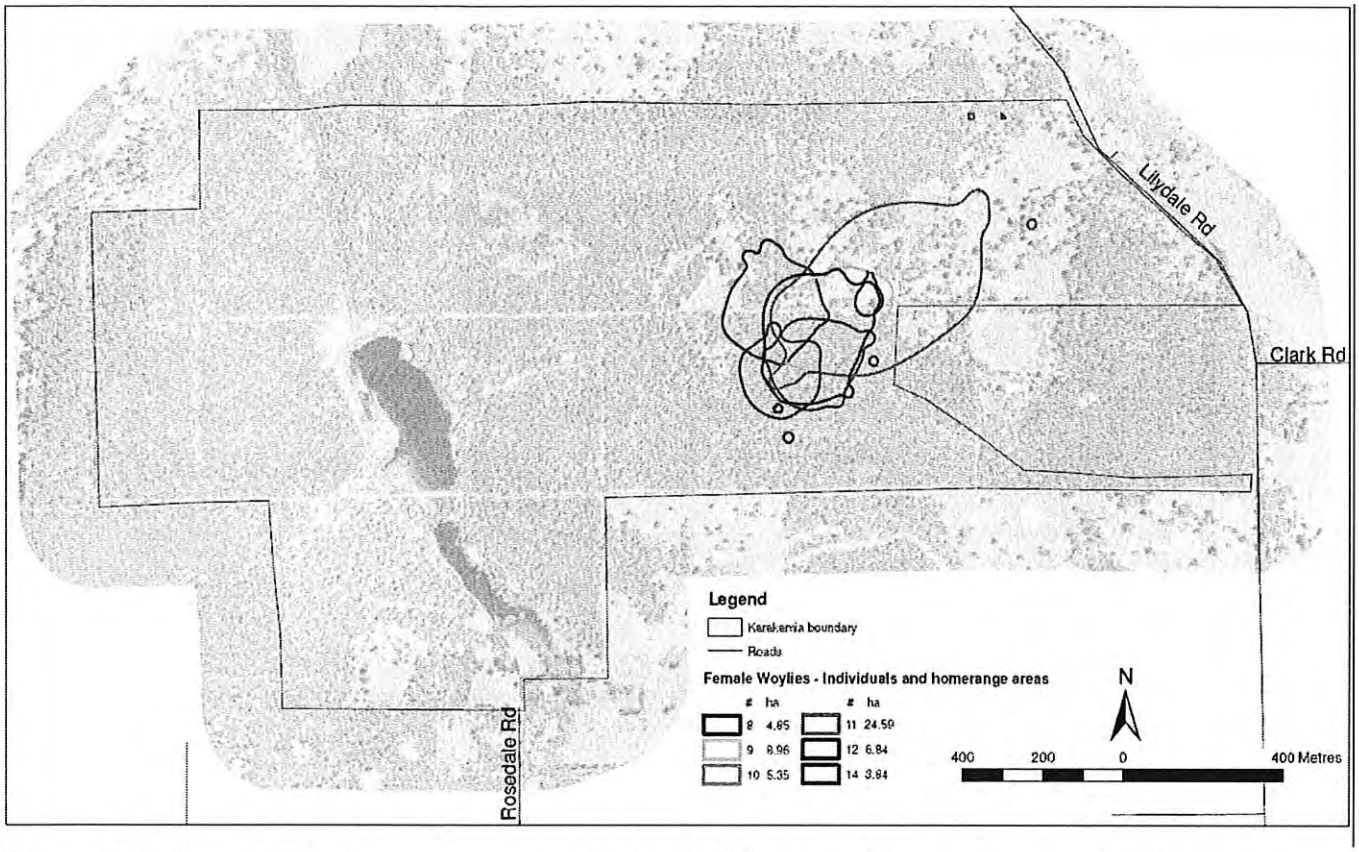


**Figure 3:** 95% probability home range areas for female Woylies at Karakamia using the Minimum Convex Polygon method..

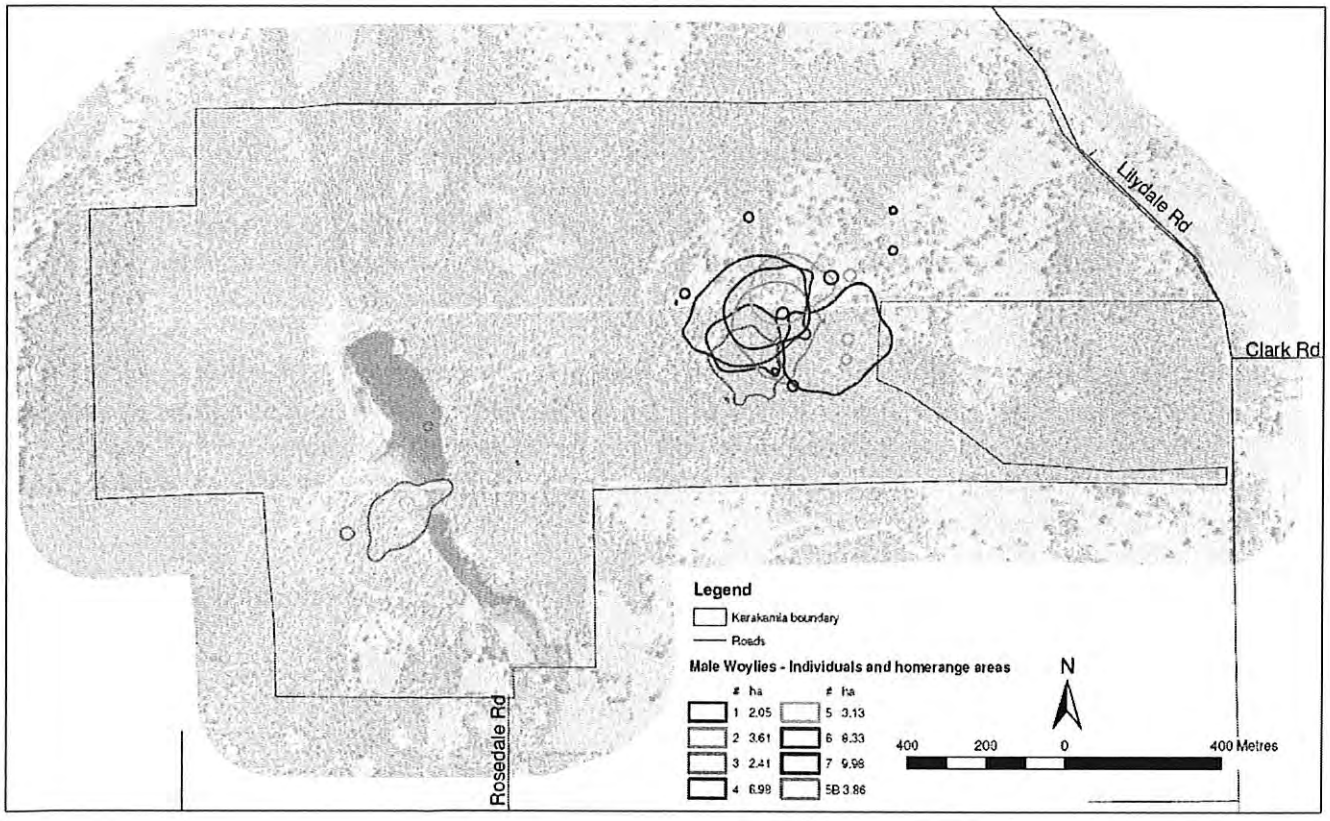


**Figure 4:** 95% probability home range areas for male Woylies at Karakamia using the Minimum Convex Polygon method.

**Quenda**
The spotlight drive transect showed an increased number of Quenda in 2006, which is in contrast to previous years where a decline was recorded. This was also supported by trapping results (Figure 2), which showed a significant increase in the number of Quenda trapped. This increase may be due to the translocation of 200 Woylies from Karakamia in the past two years, reducing inter-specific competition with Quenda. High competition rates among Quenda in the sanctuary are still evident with observations from staff of individuals with scars, and missing fur and tails. Larger slow individuals were very evident last summer, observed in poor condition and sometimes feeding in the middle of the day.

**Numbats**
Two numbats were sighted during 2006 and a track was found on one of the sand pads, all in the same area of the sanctuary so likely to be a single individual.

**Quokka**
One Quokka was sighted during the spotlight transect in November 2006.

A dead male quokka with no tags was found June 2006. The cause of death was unknown. As mentioned in previous reports, this population could benefit significantly from the addition of mainland Quokkas DEC have been approached to source animals from southern WA.

**Tammar Wallabies**
Spotlighting data recorded lower Tammar Wallaby numbers than in 2005, though staff have observed large numbers, especially young animals on the walk trail in recent weeks as the young emerge from the pouch. Although numbers are lower than 2005, the number has still increased significantly since their reintroduction in 2002. Results from the vegetation quadrat indicate that grazing within the sanctuary is having an adverse effect on some species of plants. Increasing numbers of Tammar Wallabies within the sanctuary will contribute to increased grazing pressure and consideration should be given to translocating some individuals off the sanctuary to suitable locations in 2007 if they can be successfully captured.

**Ringtail Possums**
Thirteen Ringtail Possums were sighted during this period; ten during the spotlight drive transect and a further three were opportunistically by staff during sanctuary work.

**Other species recorded and opportunistic observations**
Brushtail Possums were noted in high numbers in 2006. Spotlighting data showed a significant increase from 2005 where numbers were already recorded as high and the flowers of the *Banksia grandis* (which were spectacular in 2006) have been knocked badly by possums feeding on them. Suitable shelter is obviously in limited supply as staff have noted possums sheltering everywhere they can, including any objects left on the office verandah and under BBQ covers in the full sun. Many possums were noted in poor condition (low weight, mangy fur, feeding during the day), particularly during the autumn months before the winter rains. Further translocations of this species from the sanctuary to other suitable locations during 2007 should be considered.

Kangaroo numbers are notably lower this year. Seasonal changes plus an annual ongoing culling program implemented as per licence no SW 2714.

The number of Brush Wallabies spotlighted appears to be similar to 2005. There were quite a number found dead, especially juveniles, in early 2006. Some were killed by Wedge-tailed Eagles. The cause of death of many remains unknown.

Mardos (*Antechinus flavipes*) and their scats have been found on a number of occasions this year in the Visitors Centre, office and Rosedale House, and one was sighted during a spotlight walk. None were captured in pit traps and no other small mammals such as Pygmy Possums and Dunnarts were captured either.

**Birds**
An Owlet Nightjar was seen on a number of occasions, usually sitting on the road.

Flocks of 50-100 individuals of both Baudin's and Red-tailed Black Cockatoos have been noted in the sanctuary during 2006, feeding primarily on Marri and Jarrah nuts. Sanctuary staff have also noted young Red-tailed Black Cockatoos being fed on a number of occasions during the year.

The resident pair of Wedge-tailed Eagles built a new nest in 2006, approx 0.5 km north of the 2005 nest in a large dead Marri tree on a neighbouring property. One chick was raised, and the diet consisted of brush-tailed possums and ravens.

Water bird observations included single or pairs of White-faced Herons observed on numerous occasions on the main and Rosedale dams. Single or pairs of Black Swans were observed on the main dam. Black and Maned Ducks were observed in small groups and sometimes large flocks on both dams. Australasian Grebes were observed as single or pairs on the Rosedale dam late in the year. Several (at least four) pairs of Coots built nests and raised chicks successfully on the Rosedale dam. Two pairs of Little Pied Cormorants raised two young each on nests built in a loose colony on the Rosedale Dam.

Western Yellow Robins were heard calling in Jarrah forest west of the main dam on several occasions. Most resident nectivorous passerines (New Holland Honeyeater, Western Spinebill, Brown Honeyeater, Little Wattlebird) were recorded breeding on the sanctuary, mainly in thickets of *Dryandra* species.

Rainbow Bee-eaters arrived in late September and one pair may have a nest near the bridge on the walk trail.

**Amphibians**
Six species of frog were recorded on the spotlight transect in 2006: Slender Tree Frog (*Litoria adelaidensis*), Banjo Frog (*Limnodynastes dorsalis*), Quacking Frog (*Crinia georgiana*), Glauert's Froglet (*Crinia glauerti*), Bleating Froglet (*Crinia pseudinsignifera*) and Motorbike Frog (*Litoria moorei*). While Lea's frog (*Geocrinia leai*) was not detected during the transects, they were heard by staff during winter calling near the creek and one was captured in a pit in November. It was mentioned in the previous report that *Helioporus barycragus* and *Pseudophyryne guentheri* had not been recorded calling within the sanctuary in recent years. While neither was recorded in the transect one *H. barycragus* was heard calling in Autumn and one was sighted on the walk trail by staff in spring. Quacking Frogs did not start calling until August, very late in the season presumably due to the exceedingly low winter rainfall. Very few juvenile frogs were found this year, with only one trapped in a pit, though plenty of adult *Crinia* spp. were found in pits near the creekline.

**Reptiles**
A number of carpet pythons were sighted during the year. Pit trapping in November captured a number of small skinks and a large King Skink all of which have previously been recorded in the sanctuary.

**Vegetation**

The results showed that the plant diversity between the two vegetation quadrats was very similar, though there was evidence of extensive grazing on some species in the control plot, especially the reed *Lepidosperma leptostachyum*, which had extensive flowers in the exclusion plot but no flowers in the control plot. The fresh shoots on the prostrate Woolly Bush *Adenanthos cygnorum chamaephyton* was grazed heavily in the control plot but not in the exclusion plot, the Pygmy Sundew *Drosera hyperstigma* had no flowers in the control plot and many *Bossiaea pulchella* had new seedlings in the exclusion quadrat but not in the control plot. Several plants of *Hibbertia hypercoides* were dead and had been heavily grazed in the control plot. There were also several white fringe lily plants *Thysanotus* sp. in the control plot which were not present anywhere in the vicinity. A specimen was collected for the herbarium. The other observation of note was that 5 % of the exclusion quadrat was noted as bare ground but 15 % in the control plot.

This evidence of heavy grazing, especially the lack of flowers in some species, suggests that grazing pressure is high in the sanctuary. This id due to the lack of good winter rainfall and consideration should be given to translocating a portion of the population of some species such as the Tammar Wallaby and Brushtail Possum to other suitable locations.