# RECOLONIZATION OF WILDFIRE AREA (WILDFIRE 9, 1981) BY BRUSHTAILED POSSUMS (TRICHOSURUS VULPECULA)

By

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## INTRODUCTION

In January 1981 a wildfire swept through a section of Yendicup Block in the northern sector of the Perup River Fauna Priority Area. The fire burnt part of an area (Balbanup Road) where possums were known to be inhabiting.

The fire, which was very intense, defoliated most trees and removed the scrub layer throughout the area. Very few possums or signs of possums were noticed in the area after the burn but it was evident some possums had survived.

During a spotlight survey on the night of the 17/11/81 it was noticed that a large number of young possums had moved into the burn and seemed to be recolonizing the area. From that point on a close watch was kept on the area to observe the mechanisms of recolonization, as such information would complement two previous studies concerning the fire ecology of the Brushtail possum (Trichosurus vulpecula).

The first study involved the use of radio telemetry which observed the possums movements before, during and after a fire, while the second study involved the location of possum trees which were mapped and their parameters measured. After an intense fire these trees were relocated and a damage assessment taken.

It is the aim of this study to gather information concerning the recolonization of burnt areas by Brushtail possums. Although this study was limited by time it is hoped that what data was gathered will be useful for further studies on this topic.

METHODS

Yendicup Block is approximately 42 km east of Manjimup (fig. 1). Only a small proportion of the block was burnt by the wildfire in January, around the Balbanup Road area, and all trees in the burn were defoliated.

Possums were known to exist in the area prior to the burn and regular spotlight surveys were done along Balbanup Road since 1973 (fig. 2).

Three techniques were used to monitor the recolonization (a) Spotlight surveys, (b) Radio telemetry and (c) Faecal remains analysis.

(a) Spotlight Surveys

As from the night of the 17/11/81 spotlight surveys were done at regular intervals, along the same route. A total of 5.5 km was travelled each survey from the edge of the burn on Spencer Road, north to Wallaby Road to point 128, back to Spencer Road and again north along Spencer Road to Balbanup Road. Then east along Balbanup Road until the intersection where the survey was terminated.

Two 12 v spotlights were used one covering each side of the road. The movements of the spotlight was in broad arcs, with an emphasis on the understorey as most sightings were made while the possum was on the ground.

(b) Radio Telemetry

Three possums were fitted with radio transmitters of different frequencies and followed using a directional, 12-channel A.V.M. portable receiver and a hand held yagi antenna. Movements, home range and tree usage was determined using this technique.

(c) Faecal Remains Analysis

Using the procedure of Storr (1961) the epidermis of leaves in possum faecal remains was isolated and identified.

Mammalian hair was also identified from fox (Vulpes vulpes) faecal

remains collected from the area from 1976 onwards (Bartuccio, 1981).

**FIGURE 1**

**Map of the South-west of Western Australia showing location of study area**

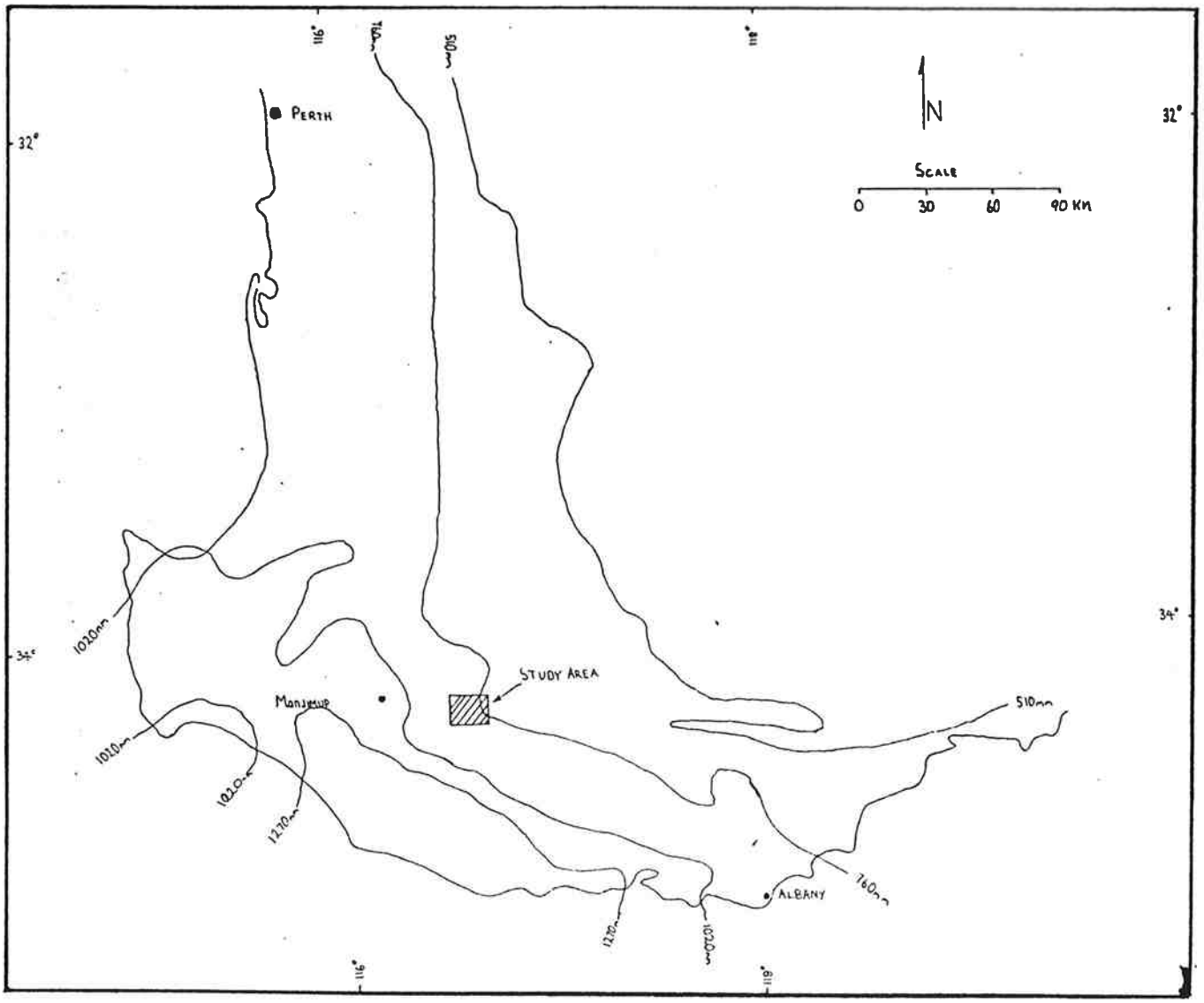
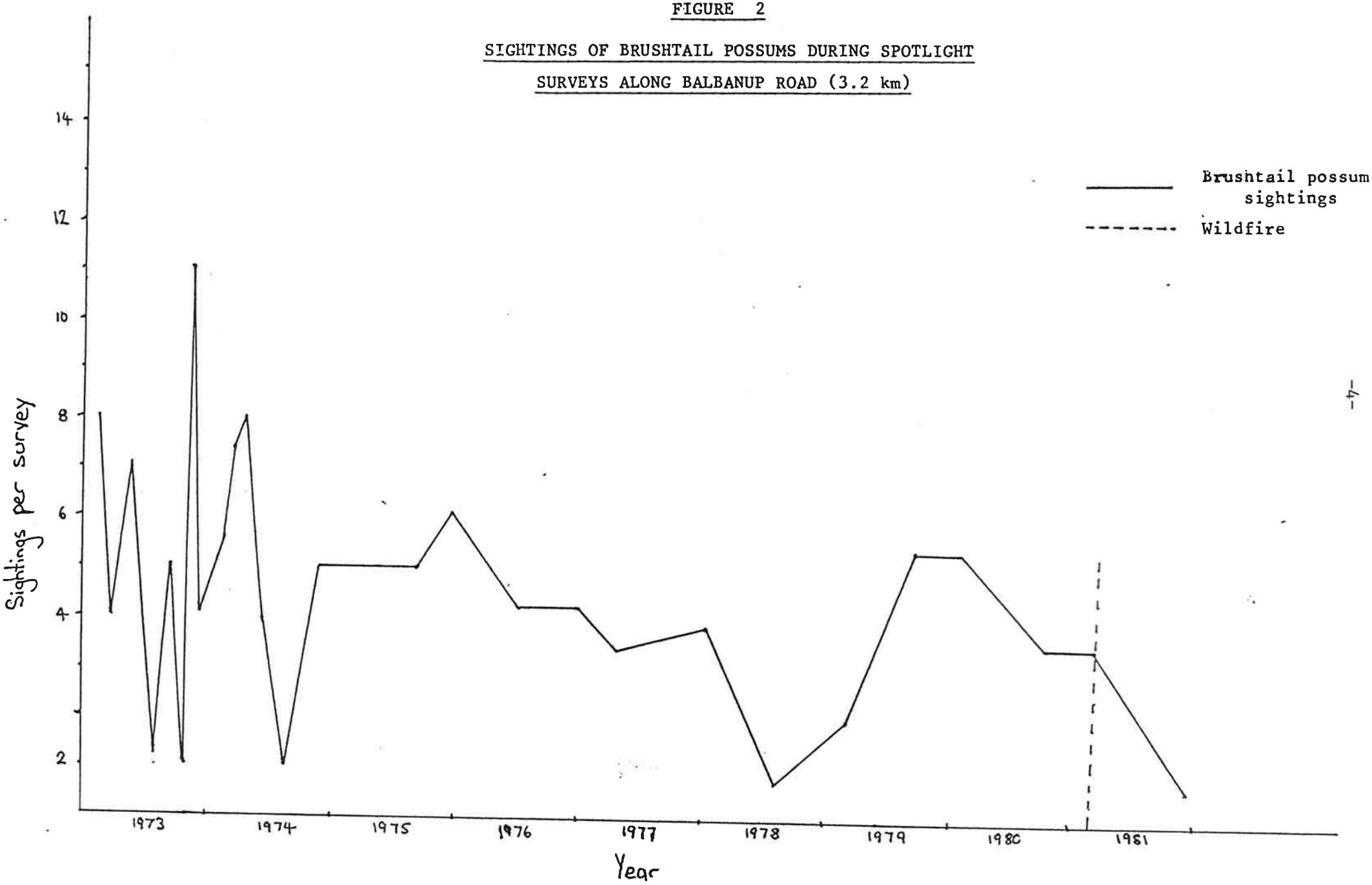


FIGURE 2

SIGHTINGS OF BRUSHTAIL POSSUMS DURING SPOTLIGHT SURVEYS ALONG BALBANUP ROAD (3.2 km)



## RESULTS

### Spotlight Surveys

The first survey was on the night of 17/11/81. Nine possums were seen and they all appeared to be young. They were very approachable and extremely unsure of themselves. On a number of occasions the possums were approached, which did not seem to disturb the possums who would casually climb the nearest tree to a height of approximately 2 m where they remained.

All but one possum was seen in pairs which were not "mother and young". Most possums were spotted on the ground, although one pair of young were seen in the foliage of a blackboy (Xanthorrhoea preissii) and when approached did not move at all.

The second survey on the night of 23/11/81 located 8 possums. Only 2 pairs were spotted, one of which was a mother and joey. In general, the possums did not appear as bewildered as the previous survey and were by no means as approachable. Again most possums were seen on the ground and climbed the nearest tree when approached. One possum was sighted in the foliage of a blackboy.

On the third survey on the night of 30/11/81 only one possum was seen up a large marri (Eucalyptus calophylla), even though the climatic conditions, route and time of the survey was the same as the previous two.

The fourth survey (2/12/81) produced four separate sightings. One possum was very young while the other three were mature. The fifth survey (7/12/81) produced only 2 sightings while the sixth (17/1/82) produced four and the seventh (25/1/82) produced no sightings of possums at all.

Generally possums were spotted in trees or occasionally in blackboys,

but usually on the ground. More possums were seen during the first few weeks of the surveys than was the case during later spotlight runs.

Radio Telemetry

Three possums were caught, one by hand and two in cage traps, and fitted with radio transmitter collars.

The first was a young mature male captured on 3/12/81 at pt. 169, Balbanup Road. He was tagged 2271/2272 and weighed 1900 gms and was dubbed "Cuthbert" by his captores. The second possum "Beryl" was caught in a cage trap at pt. 174 on Balbanup Road on the 17/12/81. She was a young mature female weighing 1494 gms and was tagged 2266/2274. Her pouch was empty on the day of capture. "Sheryl" was caught on the 17/12/81 in a cage trap at pt. 176.5, Balbanup Road. She was a young immature female weighing 1042 gms and had probably only recently left her mother. She was tagged 2273/2275 and her pouch was empty.

All three possums were tracked periodically over a seven week period and during the day they were located in trees which were tagged and mapped (Appendix 1).

"Cuthbert"

Cuthbert was tracked intensively for 3 nights and on two other occasions bearings were taken from a known point on Balbanup Road. Cuthbert generally rose one hour after sundown and returned one hour before sunrise. This also was the case for possums in the Boyicup study (Vellios, 1981 unpublished F.D. report).

Once up and about Cuthbert's movements became very predictable. He stayed around his tree for up to an hour then move gradually in a Nor-west direction for approximately 200 - 250 m. This process could take up to four hours. Once in the desired area he would move about slowly then reverse the procedure until he was back at his tree. He never once moved

in a southerly direction upon descending from his tree (Appendix 1).

Difficulty was experienced in determining whether the possum was in a tree or on the ground. However there is reason to believe that a fair proportion of time is spent on the ground foraging for food, although any estimation at a figure would be unqualified.

Fitzgerald and Harvie (1973) both found that possums forage for scrub species as part of their feeding behaviour. Harvie found that approximately 30% of the possums diet in Waverley, New Zealand consisted of pasture foliage such as clover. Although it seems only a relatively small proportion of scrub species are eaten, it would be far more time consuming than the aboreal feeding.

Cuthbert used one tree only for daytime refuge which is uncommon.

Vellios (1981) found while studying the fire ecology of the Brushtail possum, approximately 20 km south of the wildfire area, that male possums used 11 and 6 trees while two females used 10 and 4 trees.

Cuthbert had a home range of 2 - 3 ha which again is reduced when compared with the norm. The two male possums Vellios' study used 9.85 ha and 4.5 ha.

The tree used by Cuthbert during the day was at the extreme edge of his home range on the southern border (Appendix 1). Although not shown on the map (Appendix 1), there were well used possum trees south of Cuthbert's tree and despite attempts, no possums could be caught from this area. Perhaps the reason Cuthbert did not move south is that there is territorial behaviour active between Cuthbert and neighbouring possums. Males are known to establish and defend territories with vigour (Winter, 1976).

"Beryl"

Beryl also rose approximately one hour after sunset and returned to her tree one hour before sunrise. Her movements were very similar to Cuthberts, although they were not unidirectional.

Initially Beryl used four trees before settling down to a tree she had started with originally. Towards the end of the study she used one tree only.

Her home range of 2.6 ha was similar to female possums in Vellios' study (1.05 - 3.22 ha) and her trees were randomly spread over the area.

"Sheryl"

Sheryl used the same pattern of movements as Beryl. She used six trees but only two twice, while the remaining four were only used once. Her home range consisted of 1.97 ha.

The home ranges of Sheryl and Beryl overlapped which is common among females (Winter, 1976) but they used separate trees at all times. At one stage Sheryl was released 2 metres from one of Beryl's trees but chose to ignore this tree and climbed a sapling.

Faecal Remains Analysis

The procedure laid down by Storr (1961) is an adequate and useful technique for ascertaining the diet of the Brushtail possum. However, due to insufficient time available to complete this study, only a small reference library of epidermis was made only of Eucalyptus leaves and not of the understorey species which was previously planned. Storr's technique would be very useful for anyone planning further studies on the possums diet.

Five lots of analysis were done over the period of the study. Two lots of remains were collected from out of the burn while 2 from inside

the burn. A dead possum was found outside the burn and its stomach contents were also analysed.

Remains from outside seemed to contain more eucalyptus epidermis than those from within the burn.

Scat 1 from inside the burn area contained very little eucalyptus epidermis but did contain ground foliage.

Scat 2 from inside the burn area contained no eucalyptus epidermis but did contain remains of grasses.

Scat 3 from inside the burn area contained grasses only.

Grasses were very common in the burn area as a result of encroachment from a neighbouring farm. None of the three possums tracked were located in the pasture at any stage, however it would have been very easy for them to graze on the grasses growing in the forest areas.

Harvie found that because of the intense grazing of pasture in Waverley, New Zealand that the farmers could increase their sheep number/ ha by 2.5 sheep, if the possums were not present.

Scat 4 was from a possum outside the burn area and contained, in order of quantity epidermis of marri leaf, understorey species, Bossiaea ornata, remains of a beetle and marri bark.

The stomach content of a possum found outside the burn area contained mainly marri leaf digested to the epidermis state and fully intact. The stomach also contained the epidermis of an unknown scrub species.

## DISCUSSION & CONCLUSIONS

Information gained from faecal analysis suggest that the possums in the burn area tend to spend more time on the ground feeding on scrub and grass species than their counter parts outside the burn. At present, February 1982, there is an abundance of young, succulent scrub species present in the area which may well prove appetizing to possums.

On numerous occasions the possums were found to be eating the young epicormic growth of marri. The possums seemed to be very selective when choosing which leaf to eat. Generally the growing tips were not touched nor were the small fresh growth next to the tips, however the soft, succulent growth next to the under developed leaf were the main targets (figs. 3 & 4). The large leaves next to these leaves were also avoided. Although they appeared the same as the leaves eaten, they were by no means succulent.

Post studies suggest (Vellios 1981, Inions 1981) that the mortality rate of possums during and after an intense fire might be high. This was probably the case after the Yendicup wildfire, as very few signs of surviving possums were evident. However, by November possums were seen in abundance during the spotlight surveys, at least initially.

These possums probably moved into the wildfire area from the unburnt forest. Most of the new inhabitants were young and may have been forced to leave old areas by other established possums once they had grown old enough to fend for themselves (Winter 1976, Dunnet 1956). This coincides with the time young possums leave their mothers which is October - November in Western Australia (Forests Department trap data).

For young possums forced to move to other territories the burn area would propose an attractive proposition. By November the epicormic growth was in full bloom, the scrub layer had regenerated and was succulent and abundant, there was also ample vacant territory. Therefore it is probable

Figure 3: Brushtailed possums (Trichosurus vulpecula) were observed feeding upon Eucalyptus leaves such as this marri (Eucalyptus calophylla) epicormic shoot.

Figure 4: Close up of leaves eaten by Brushtailed possums (Trichosurus vulpecula).

that the young possums seen on the night of the first spotlight survey were young transients searching for new areas.

Judging from the activities of Sheryl, Beryl and Cuthbert the establishment of a home range or territory follows a particular pattern. Upon moving into an area the possum seems to move about randomly trying different trees and assessing there suitability for permanent possum trees. Sheryl seemed to be a transient before moving to her present area. She tried six different trees some of which were not at all suitable for permanent possum trees. Beryl, who was young but fully grown, eshibited the same pattern of tree usage as Sheryl but eventually used one tree only. Cuthbert, also young but fully grown, used one tree only though there is no way of telling whether or not he initially used more than one tree.

Cuthbert's home range was reduced compared to other possums (Vellios, 1981) probably as he had no need to travel any further than he did, as abundant food is available in the immediate vicinity of his tree. As farmland boarders the northern boundary of his territory, little could be gained by moving further. As the burnt forest gradually returns to its original state and the succulent growth, which is abundant at present hardens, the possums may find it necessary to extend their home range to gather adequate quantities of food.

The behavioural characteristics of the possum such as forcing the young to move and the regeneration properties of the forest at Yendicup block seem to complement each other and provide excellent conditions for recolonization. However, this proved not to be so as the spotlight surveys showed and most young possums disappeared within a fortnight of being sighted.

The only probable explanation is predation. The young possums seen on spotlight surveys were very approachable and did not seem to know

where they were in relation to trees or escape routes. It would have been a simple matter for the fox or dingo to catch the unsuspecting young. Forty fox faecal remains were analysed for mammalian hair over the past three years which showed that 25% of the scats contained Brushtail possum hair. All scats were collected from the Yendicup area. On one occasion a possum was found presumable killed by a fox and left uneaten. Apart from teeth marks around the neck the possum was unscathed. Christensen (1980) found that the predation rate of the woylie (Bettongia penicillata Gray, 1837) and tammar (Macropus eugenii Desmarest, 1817) increased after fire.

Therefore, what evidence there is, suggests that possums recolonize burnt areas rapidly although inhibited by heavy predation.

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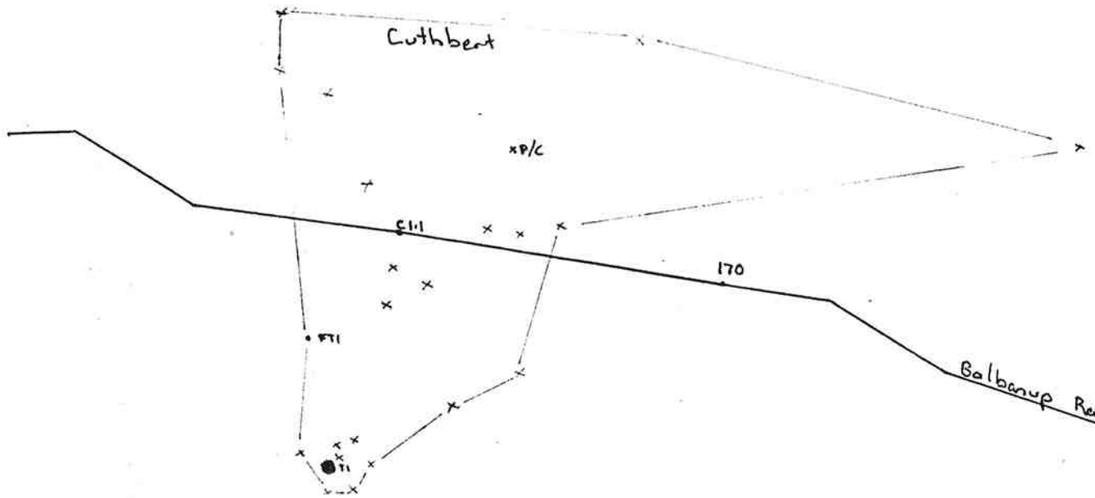
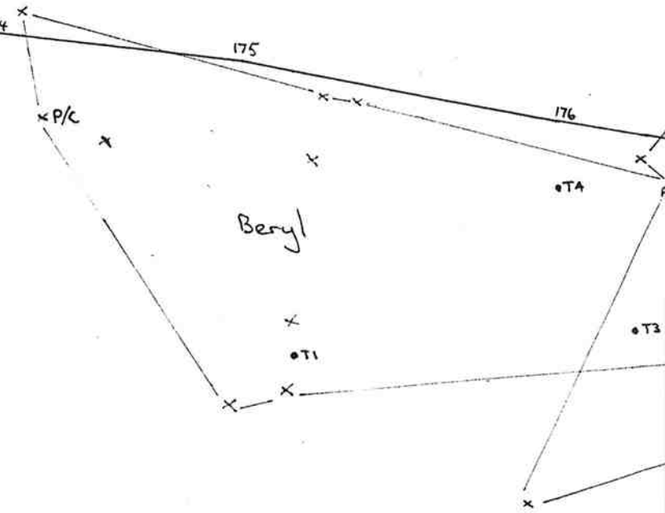
## APPENDIX 1

## HOME RANGE OF THREE POSSUMS ALONG BALBANUP ROAD




Balbanup Road.



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