AN ASSESSMENT OF THE STATUS OF THE NUMBAT *MYRMECOBIUS FASCIATUS* IN THE JANDAKOT - CANNING VALE AREA.

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C O N T E N T S

SUMMARY

Subsequent to several sightings and a road kill of the Numbat Myrmecobius fasciatus in the Jandakot-Canning Vale area, it was assessed in order to ascertain the local status of this animal.

Techniques included a series of close traverses through likely areas in an attempt to sight active animals or locate scats, scratchings, diggings and hollow logs containing evidence of Numbat habitation. Fox scats were collected and analysed for Numbat remains such as skeletal fragments and fur.

No Numbats were sighted and no primary evidence such as scats and burrows was located. One positive sample of Numbat fur was found in a series of twenty-eight fox scats collected during the survey of the Jandakot-Canning Vale area. On the basis of this sample two similar areas of Banksia woodland near Perth were briefly visited for comparison and an assessment made of their capacity to support Numbats. These were: Melaleuca Management Priority Area and the proposed Yeal Swamp Nature Reserve.

The results of the survey indicate that Numbats are present in the Jandakot-Canning Vale area, but because of the atypical habitat found in this sandplain country they are in very low numbers and probably not sustainable as a viable population. The two other locations surveyed are in a fairly pristine condition and, if present, the Numbat is likely to be more secure in the long term.

1.0 INTRODUCTION

Between 1972 and 1984, a number of sightings of the Numbat Myrmecobius fasciatus were reported from the vicinity of Jandakot and Canning Vale in the Perth Metropolitan Area, and are well documented by Connell (1985). These sighting records were supported by a road kill specimen which was presented to Dr J. A. Friend of the Department of Conservation and Land Management (CALM). This animal was collected in December 1982.

As this species is currently listed in the IUCN Mammal red data book (Anon. 1982) as endangered, and has a very restricted known distribution (Strahan 1983), it was considered by CALM that an assessment of the status of the Numbat in the Jandakot-Canning Vale area was necessary since these metropolitan locations are subject to ever-increasing development pressure. A survey was therefore commssioned by CALM, and was carried out between October and December 1985, these months being the period when Numbats, males in particular, are most active and visible (J. A. Friend pers. comm.).

1.1 STUDY OBJECTIVES

The primary objectives of this study were to:

- visit all locations of the reported sightings and road kills in the Jandakot-Canning Vale areas and assess whether there were any common elements in the vegetation and soils;

- collect primary evidence of the presence of Numbats such as sightings, scats, scratchings, diggings, and debris samples from hollow logs and burrows which could potentially indicate use by Numbats;

- collect secondary evidence such as Numbat remains in predator scats, Foxes being the main source of this material;

- identify hair retrieved from hollow logs, burrows and Fox scats by the methods described in Brunner and Coman (1974);

- assess the status of Numbats in the area should any positive evidence be obtained during the sampling;

- ascertain whether Numbats are likely to exist in similar vegetation types on the Swan Coastal Plain should a Numbat population be located at Jandakot-Canning Vale.

1.2 THE STUDY AREA

Land units and soils

The area lies between the Bassendean and Spearwood Dune Systems, in a gently undulating Pleistocene landscape of well drained, deep, coarse, siliceous, podsolized, white over yellow sand on the Swan Coastal Plain. On the hills and rises, the average depth of the water table is 24 - 28 m below ground surface (Milewski and Daridge 1981). On the flats it is only a matter of 10 - 45 cm through the sand to the undulating clay layer (Speck and Baird 1984). These topographic extremes enforce different climatic regimes. On the ridges the climate is more equitable and the dominant life forms are trees and shrubs, whereas the flats are subject to seasonal inundation and drying and support an ephemeral flora of a diverse nature. Between the two, ecotonal zones of mixed shrubs may be recognised (see Speck and Baird 1984). A land unit approach based on these main differences is adopted in this report.

Vegetation

The vegetation of the Jandakot-Canning Vale area is primarily a low open woodland of Banksia spp. with scattered Allocasuarina fraseriana, Eucalyptus marginata and E. todtiana. Low-lying

depressions support stands of Melaleuca preissiana and E. rudis in some locations. Shrubs characteristic of these situations are present in varying degrees of density. A list of plant species characterising the various communities of the area is provided in Appendix 1.

2.0 METHODS

2.1 NUMBAT SURVEY

Prior to commencement of the survey, members of the team spent one day with Dr J. A. Friend (Research officer, CALM) at Dryandra State Forest familiarising themselves with Numbat burrows and diggings. Typical Numbat scats were also shown to the team and captive animals observed.

The study location at Jandakot-Canning Vale was divided into nine intensive sampling areas as shown in Figure 1. Each area was number coded and visited for a minimum period of eight man-hours (Area 3) and a maximum of sixty man-hours (Area 1). The time spent in each area was dictated by: its size; density of vegetation; number of hollow logs and potential burrows; positive identification of primary or secondary evidence of the presence of Numbats.

An initial assessment of each area was made by the consultants in association with a botanist to define common elements of vegetation and soil between the sites. Areas recently burnt were noted.

On final selection of likely areas of concentration (swamps for example were excluded) a series of close traverses on foot were made by up to four people. The aims were to: locate by sight or typical signs any Numbats in the area; check all hollow logs for debris including hair or scats; collect all Fox scats for later analysis; place double-sided masking tape at the entrance to hollow logs or suitable burrows to trap hairs from animals entering or leaving.

During the time spent in the study area, team members paid special attention to road verges in order to locate any road kill specimens.

FIGURE 1 Map of the Jandakot - Canning Vale area showing the location of study sites and Numbat records (after Connell 1985)

A Dec 1982, roadkill, preserved

B Jul 1983, sighted roadkill

C Jul 1983, sighted roadkill

D Jan 1981, live sighting

E April-Oct, 6 live sightings

F 1981, sighted roadkill

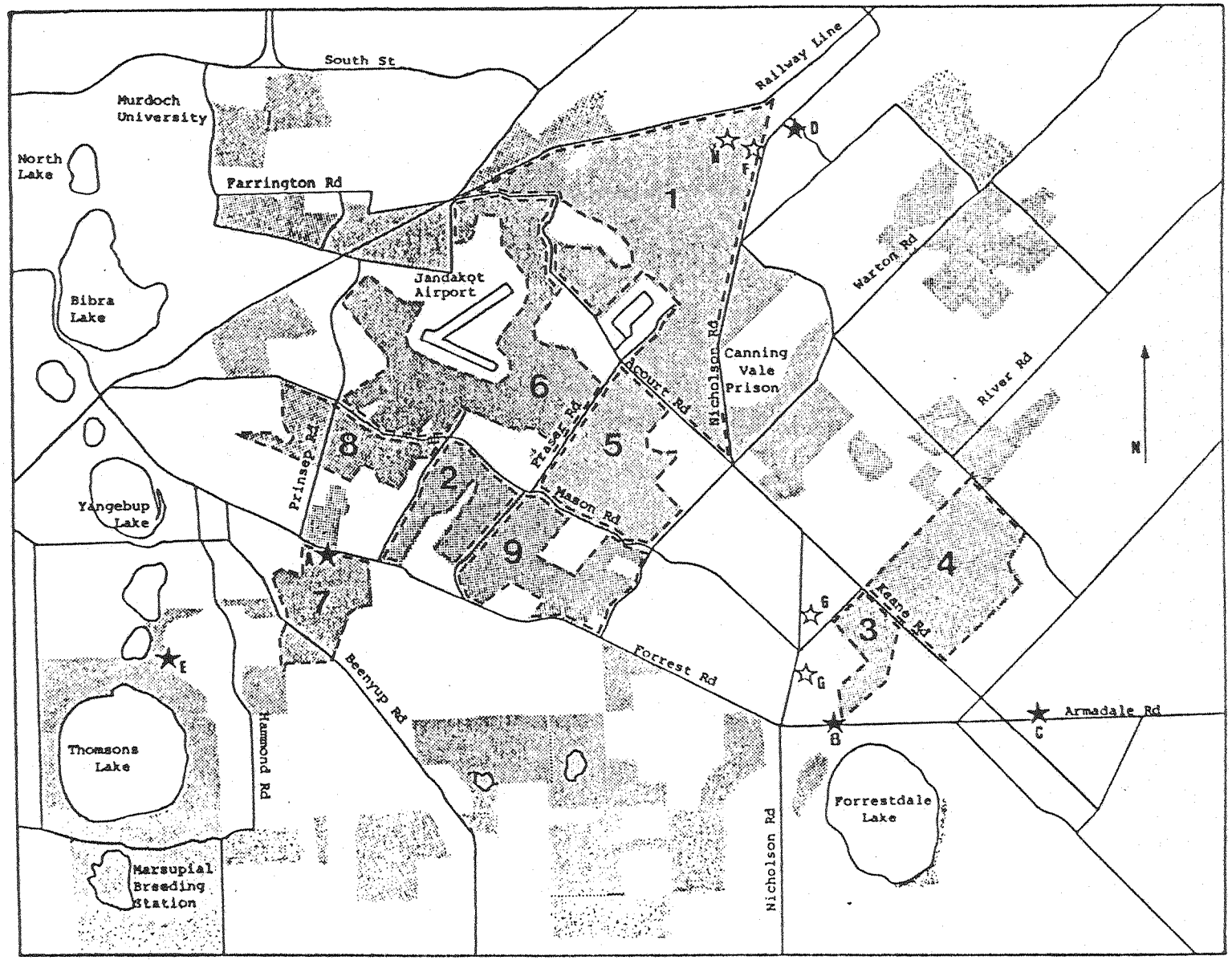
G 1972, sighted roadkill

H 4/7/84, possible Numbat burrows (2) and digging (1)

Uncleared woodland Jan 1984 aerial photography

★ Confirmed record

☆ Unconfirmed record



Notes were also taken on all other fauna observed during this survey (Appendix 2).

Two other areas on the Swan Coastal Plain supporting similar vegetation were also assessed. These were: Melaleuca Management Priority Area, 10 km NE of Wanneroo, and the proposed Yeal Swamp Nature Reserve, 10 km SW of Gingin. Each of these areas was surveyed for 18 man-hours but less intensively than that described for Jandakot-Canning Vale in that close traverses were not used. Time constraints and the size of these locations dictated a series of spot-checks in likely areas for Numbat signs and Fox scats.

2.2 VEGETATION SURVEY

Vegetation sampling was conducted in conjunction with the Numbat survey and followed the same traverse approach. Major community components were progressively recorded as they occurred in the areas chosen for survey (Figure 1). There were no fixed sampling points and as the survey was not constructed to be definitive, the delineation of land units and associations is acknowledged as fairly subjective. Vegetation types are broadly mapped in Appendix 3.

3.0 RESULTS

3.1 JANDAKOT - CANNING VALE AREA

No Numbats were seen by any member of the survey team during the course of this study.

Twenty-eight Fox scats were collected and the contents analysed (Table 1) by the methods described in Brunner and Coman (1974). Nine species of mammal (three native, six introduced or domestic species) were identified from hair samples removed from the scats. Identifications were made by comparisons with known reference slides. One sample from Area 1 (Figure 1) contained Numbat hair. As a result, Area 1 was re-visited for more intensive sampling and observation. No further positive results were obtained.

Fallen hollow logs and trees were scarce in the Jandakot-Canning Vale area. It was apparent that firewood collecting for domestic use was common, and as a consequence suitable logs for refuge for Numbats and other similar sized animals were rare. Uncontrolled bushfires have probably contributed to this situation. Of the major tree species in the area (Banksia spp., Allocasuarina fraseriana, Eucalyptus marginata, E. rudis, E. todtiana, Nuytsia floribunda and Melaleuca rhaphiophylla) only E. marginata and E. rudis were found to form suitable refuge logs. Of the logs sampled for hair and scats, one contained hair from two species of native mammal, the Common Brushtail Possum Trichosurus vulpecula and the Quenda or Southern Brown Bandicoot Isoodon obesulus. Another contained scales from a monitor lizard (Table 1). No Numbat evidence was detected. Results were also negative from the masking tape which was placed at the entrance to hollow logs.

Two possible Numbat burrows were located in Area 1 and both were taped with double-sided masking tape which was left in place for one week then retrieved. No hair was found on the tape and the burrows were subsequently dug out. Again, no positive results were obtained.

Two scats which superficially resembled the distinctive Numbat scat (Connell 1985) were retrieved from open ground in Area 1. Subsequent analysis showed that the animal had been feeding on termites, ants and other invertebrates, ingested along with large amounts of sand. On inspection of the contents Dr Friend considered that the percentage of insect remains other than termites was too high for the scats to be from a Numbat.

Although the collectors of the 1982 road kill specimen from Forest Road had removed the gut of the animal prior to presenting it to Dr Friend, it was possible to obtain one scat from the lower part of the intestine left in the animal. This scat was sorted for termite remains, which were given to Mr D. H. Perry for identification. It was hoped that identification of the termite species might confirm whether this animal had in fact been feeding on Swan Coastal Plain termites or had been transported in some way from the more typical Numbat habitat on the Darling Scarp or Range. The termites were subsequently identified by Mr Perry as one of two species from the genus Heterotermes, both of which are common to the Jarrah forest and the Swan Coastal Plain. The contents of this scat bore little resemblance to the two scats collected from Area 1.

During the course of this survey Dr Friend received a report of two possible Numbats which had been killed by dogs. The owners of the dogs had buried the carcases. Attempts by Dr Friend and the survey team to retrieve these remains were unsuccessful but W. A. Museum study skins of Numbats and other medium-sized native mammals such as the Southern Brown Bandicoot I. obesulus

TABLE 1 Tabulation of Fox scat and hollow log debris results from the Jandakot-Canning Vale area (1-8); Melaleuca MPA (10); proposed Yeal Swamp Nature Reserve (11). N.B. no material was collected in Area 9.

* = hollow log sample
† = introduced species

STUDY AREA	JANDAKOT-CANNING VALE								other areas	
SITE CODES	1	2	3	4	5	6	7	8	10	11
MAMMAL SPECIES										
MYRMECOBIIDAE										
Myrmecobius fasciatus, Numbat	1									
PERAMELIDAE										
Isoodon obesulus, Southern Brown Bandicoot	2*			2		1				
PHALANGERIDAE										
Trichosurus vulpecula, Common Brushtail Possum	*									
BURRAMYIDAE										
Cercartetus concinnus, Western Pygmy-possum	1									
MACROPODIDAE										
Macropus fuliginosus, Western Grey Kangaroo									1	
MURIDAE										
Mus musculus, House Mouse†					1	1				
Rattus rattus, Black Rat†	1				1			1		
LEPORIDAE										
Oryctolagus cuniculus, Rabbit†	1	1		2	2	2	1	2		
CANIDAE										
Vulpes vulpes, Fox† (grooming hair)	3									
FELIDAE										
Felis catus, Cat†						3				
BOVIDAE										
Ovis aries, Sheep†	1			2		1				

TABLE 1 - Cont.

STUDY AREA	JANDAKOT-CANNING VALE								other areas	
SITE CODES	1	2	3	4	5	6	7	8	10	11
REPTILE SPECIES										
SCINCIDAE Skinks										
Tiliqua r. rugosa, Bobtail		1				2				
VARANIDAE Monitors										
Varanus sp.	*									
UNIDENTIFIED										
Small reptile	1	1				1				
Bird	3	1	1	1		2	1	2		
Invertebrate	3	1		2			1	1	1	1
Bone fragments	1		1				3		1	
Vegetation	4			2	1	1		1	1	1

and the Water Rat Hydromys chrysogaster were shown to the dog owners. They confirmed that the animals had been I. obesulus which is still moderately common in this part of the Perth Metropolitan Area (Kitchener and Vicker 1981, see also Table 1).

3.2 MELALEUCA MANAGEMENT PRIORITY AREA

This location is approximately 3200 ha in area and supports very similar vegetation to Jandakot-Canning Vale in that it is dominated by a low woodland or low open forest of Banksia spp., with occasional swampy depressions surrounded by Melaleuca spp. Scattered stands of Eucalyptus todtiana are present (Muir 1983).

No evidence of Numbats was found but the fairly pristine environment would advantage the species if it was present. The area is in much better condition than Jandakot-Canning Vale and would require an intensive survey to confirm the presence or absence of Numbats.

As in the Jandakot-Canning Vale area the nature of the dominant tree species is such that hollow logs are extremely scarce. This would tend to limit the number of animals present unless they more commonly burrow in sandy soils.

A single fox scat was found in this area; both Foxes and Rabbits appear to be very uncommon, confirming the findings of Kitchener et al. (1978). The Fox scat contained remains of a Western Grey Kangaroo Macropus fuliginosus (probably carrion), bone fragments, unidentified invertebrates and plant remains.

3.3 PROPOSED YEAL SWAMP NATURE RESERVE

This area comprises mainly vacant Crown land but includes a vested flora and fauna reserve, a non-vested reserve and Gingin Airfield owned by the Commonwealth of Australia (Department of Conservation and Environment 1983).

The area includes a low woodland of Banksia spp., Nuytsia floribunda and Eucalyptus todtiana, with some stands of E. marginata and E. calophylla supporting a varied understorey. In low lying areas there is a low woodland of B. ilicifolia and a closed forest of Melaleuca spp., sometimes associated with E. rudis (Department of Conservation and Environment 1983).

As with Melaleuca MPA, medium-sized introduced mammals appeared to be scarce. Kitchener et al. (1978) recorded two Foxes during their survey of this area. Only one Fox scat was collected by us during this inspection. Analysis of the contents revealed only vegetation and insect material.

Fallen or hollow logs were again scarce as in other Banksia dominated woodlands, and no hair or scat debris were retrieved from this source. Comments made for the previous location apply here.

4.0 DISCUSSION AND CONCLUSIONS

The current known distribution of the Numbat, in combination with historical records, suggests that the Jandakot-Canning Vale area is atypical habitat for this species. The lack of large hollow logs and of concentrations of sub-surface termite galleries tend to confirm this. Further, given that these animals are diurnal and relatively conspicuous (Friend 1982) when present (in comparison to the Southern Brown Bandicoot *I. obesulus*, for example) the very few actual sightings by residents and the failure of this survey to locate foraging animals or evidence thereof after two weeks of intensive study, indicates that population densities are very low. This aligns with the preliminary findings of Connell (1985).

The single positive hair sample from a series of twenty-eight Fox scats (Table 1) taken on face value also suggests that population densities are low for the Jandakot-Canning Vale area. However, the Numbat hairs came from one of six scats collected from Area 1 (Figure 1). This area was particularly rich in vertebrate hair samples from Fox scats and other sources with nine species of mammal being positively identified (Table 1). Area 1, while degraded by fire, appears to be the most likely location where Numbats persist since the vegetation is in relatively good condition. Connell (1985) lists two unconfirmed and one confirmed Numbat records from this area; possible Numbat diggings were also found here during this current survey. Numbat diggings are distinctive and unique (Connell 1985) in soil where termite galleries are attacked. Diggings in sand are not as readily identifiable as in clayey soils so there is doubt as to the identification of the animal concerned in Area 1.

While no positive evidence of Numbats was recorded from Jandakot Airfield (Area 6), it is contiguous with Area 1 and the Banksia woodland peripheral to the runways is in very good condition. It has the potential to support a viable population of these animals, albeit in lower densities than their preferred habitat

of Wandoo woodland. Unlike the rest of the study area, a continuing fire management policy exists at Jandakot Airfield which assists in maintaining the integrity of the woodlands and provides successional vegetation types. Thompson's Lake is a potential area of concentration since a management policy also exists for this area; Connell (1985) notes confirmed sightings here. As Thompson's Lake has been visited on numerous occasions by CALM staff and is adjacent to the Marsupial Breeding Station, no intensive work was carried out during this survey. Considering the number of experienced field workers who have visited this area, and the Numbat's diurnal behaviour and high mobility (Friend 1982), it is surprising that more Numbat sightings have not been made. This, perhaps, reflects the low numbers of animals present.

An interesting aspect of this study, which possibly has some bearing on the low numbers of Numbats in the area, is that there appears to be competition for the few suitable hollow logs present. One log sampled in Area 1 contained hair from the Southern Brown Bandicoot Isoodon obesulus and the Common Brushtail Possum Trichosurus vulpecula; both these species are potentially more aggressive than the Numbat, therefore limiting the number of possible refuge and breeding sites. Scales from a large Monitor, probably Varanus gouldii, were also found in a log in Area 1. This reptile is likely to predate young Numbats.

We do not consider the Fox Vulpes vulpes to be a significant predator of Numbats in the area. Data from other survey work conducted by us (see Worsley Alumina 1985 and Reynolds Australia Mines, in prep.), suggests that given the choice the Fox will concentrate on introduced species such as the House Mouse Mus musculus, the Black Rat Rattus rattus and the Rabbit Oryctolagus cuniculus. These animals are usually more common than native species in semi-rural or outer suburban locations infested with exotic grasses and weeds. Scavenged road kills and carrion also appear to form a large proportion of the Fox's diet. The number

of Bobtail Tiliqua r. rugosa, Cat Felis catus and Sheep Ovis aries remains in the samples was high. It is unlikely that Foxes would predate live animals of the latter two species, while dead Bobtails were common on the roads.

In summation, the results of this survey indicate that:

- Numbats are present in the Jandakot-Canning Vale area, but due to the atypical, badly degraded nature of the available habitat their numbers are very low;

- Areas 1 and 6 and Thompson's Lake have the greatest potential as conservation localities since they are large and, in the case of the latter two sites, managed to reduce the effect of wildfires;

- There is preliminary evidence to suggest that there is competition with more aggressive species for suitable nesting sites or refuge areas in hollow logs;

- Foxes are probably not a significant predator on Numbats since more readily available sources of prey are present.

The two other Swan Coastal Plain areas inspected during this study, Melaleuca MPA, and Yeal Swamp Reserve were both in very good condition when compared with Jandakot-Canning Vale. Both are managed for fire and have relatively restricted public access. Very little rubbish dumping or wood collection was noted. Introduced mammals such as Foxes and Rabbits were obviously scarce in both locations (see also Kitchener et al. 1978) with only one Fox scat being collected from each and few signs of Rabbit, such as scat mounds or warrens. Given the possibility that Numbats may be able to persist in lightly wooded Banksia habitats, their presence in Melaleuca MPA, and/or Yeal Swamp Reserve would be fortunate in that their protection and preservation would be more feasible in these locations than at Jandakot-Canning Vale.

5.0 REFERENCES

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6.0 APPENDICES

APPENDIX 1 Vegetation of the Jandakot-Canning Vale area.

* = species dominant in their respective land units
† = species tending to dominate openings in the upper canopy

1. Jandakot-Canning Vale - Primary Site (areas 1-2 and 5-9)

DUNES Banksia woodland composed of sandy rises, interbanks and slight swales between the dunes. Low lying flatter areas nominally sand covered and just above the watertable are also present.

TREES (4-15m)

Main dominants

Banksia attenuata R.Br.
B. menziesii R.Br.
B. ilicifolia R.Br.
Allocasuarina fraseriana (Miq.)L.Johnson

Less frequent

B. grandis Willd
Eucalyptus todtiana F.Muell.
E. marginata Donn ex Sm.
E. calophylla Lindl.
Nuytsia floribunda (Labill.)R.Br. ex Fenzl

SHRUBS (1-2m)

*†*Adenanthos cygnorum* Diels
†*Allocasuarina humilis* (Otto & Dietr.)L.Johnson
Beaufortia elegans Schauer
Eremaea sp.
Jacksonia furcellata (Bonpl.) DC.
Macrozamia riedlei (Fisch. ex Gaud.2.)C.A.Gardener.
**Melaleuca scabra* R.Br.
M. seriata Lindl.
**M. thymoides* Labill.
Persoonia saccata R.Br.
Pimelia rosea R.Br.
Regelia inops (Schauer)Schauer
**Stirlingia latifolia* (R.Br)Steudel

APPENDIX 1 - Cont.

SUB-SHRUBS (<2m)

Acacia huegelii Benth.
*A. pulchella R.Br.
A. stenoptera Benth.
*Amphipogon turbinatus R.Br.
Anigozanthus manglesii D.Don
Arnocrinum preissii Lehm.
Astroloma stomarrhena Sond.
*Bossiaea eriocarpa Benth.
Burtonia conferta DC.
Calytrix flavescens A.Cunn.
Conostephium pendulum Benth.
*Conostylis aculeata R.Br.
C. setigera R.Br.
Dampiera linearis R.Br.
*Dasypogon bromeliifolius R.Br. (in swales)
Daviesia gracilis M.D.Crisp
*Gompholobium tomentosum Labill.
Hemiandra pungens R.Br.
Hibbertia aurea Steud.
H. huegelii (End.)F.Muell.
H. hypericoides (DC.)Benth.
H. racemosa (Endl.)Gilg
*H. subvaginata (Steud.)F.Muell.
Hovea trisperma Benth.
Laxmannia squarrosa Lindl.
Lechenaultia biloba Lindl.
L. expansa R.Br.
Leucopogon aff. kingianus (F.Muell.)C.A.Gardener
*Lomandra sp.
Loxocarya flexuosa (R.Br.)Benth.
*L. pubescens (R.Br.)Benth.
Lyginia barbata R.Br.
Lysinema ciliatum R.Br.
Oxylobium capitatum Benth.
*Patersonia occidentalis R.Br.
*Petrophile linearis R.Br.
Pithocarpa pulchella Lindl.
Platysace compressa (Labill.)Norman
Scaevola paludosa R.Br.
Stipa aff. compressa R.Br.
Stylidium sp.

APPENDIX 1 - Cont.

Thysanotus patersonii R.Br.
Xanthorrhoea gracilis Endl.
X. preissii Endl.

INTERBANK ECOTONAL ZONES

TREES

Fringing depressions
Eucalyptus rudis Endl.

Fringing and spreading into depressions
Melaleuca preissiana Schauer

SHRUBS

Adenanthos obovatus Labill.
*Beaufortia elegans Schauer
*Conostephium pendulum Benth.
*Eremaea pauciflora (Endl.)Druce
Melaleuca aff. acerosa Schauer
M. aff. incana R.Br.
M. aff. lateritia A.Dietr.
*M. seriata Lindl.
M. thymoides Labill.
*Pimelea rosea R.Br.
*Regelia ciliata Schauer
R. inops (Schauer)Schauer

SUB-SHRUBS

*Boronia crenulata Sm.
Burchardia umbellata R.Br.
Burtonia conferta DC.
Conostylis aculeata R.Br.
C. festucacea Endl.
*Dampiera linearis R.Br.
*Dasypogon bromeliifolius R.Br.
Hibbertia stellaris endl.
H. subvaginata (Steud.)F.Meull.
Hypocalymma angustifolium Endl.
H. robustum Endl.

APPENDIX 1 - Cont.

Leptocarpus coangustatus Nees
Loxocarya pubescens (R.Br.)Benth.
*Lyginia barbata R.Br.
Platytheca gallioides Steetz
Podotheca aff. chrysantha (Steetz)F.Muell.
Sowerbaea laxiflora Lindl.
Stackhousia sp.
Stipa sp.
Stylidium brunonianum Benth.
S. repens R.Br.
Wahlenbergia capensis (L.)A.DC.
Waitzia paniculata (Steetz)F.Muell. ex Benth.

FLATS AND DRAINAGE FOCI

SHRUBS

*Acacia pulchella R.Br.
Adenanthos obovatus Labill.
Calothamnus lateralis Lindl.
*Hypocalymma robustum Endl.
*Leptospermum pericalymma
Melaleuca hamulosa Turcz
M. aff. teretifolia Endl.

SUB-SHRUBS

Central and dominant

Lepidosperma angustatum R.Br.
Leptocarpus aristatus R.Br.
L. canus Lindl. & Nees

Mixed

Drosera gigantea Lindl.
Eriostemon spicatus A.Rich
Euchilopsis linearis (Benth.)F.Muell.
Gahnia trifida Labill.
Juncus pallidus R.Br.
Lechenaultia biloba Lindl.
Lyginia barbata R.Br.
Oxylobium microphyllum Benth.
Tribonanthes australis Endl.

APPENDIX 1 - Cont.

2. Jandakot-Canning Vale - Keane Road Swamp (area 4)

CENTRAL FLAT

SHRUBS

Acacia pulchella R.Br.
Actinostrobus pyramidalis Miq.
Adenanthos obovatus Labill.
Banksia sphaerocarpa R.Br.
Calothamnus villosus R.Br.
Leptospermum pericalymma
Melaleuca viminea Lindl.

SUB-SHRUBS

Anigozanthus viridus Endl.
Burchardia umbellata R.Br.
Cassytha sp.
Drayndra nivea (Labill.)R.Br.
Gahnia trifida Labill.
Leptocarpus aristatus R.Br.
L. coangustatus Nees
Mesomelaena tetragona (R.Br.)Benth.
Parentucellia viscosa (L.)Caruel
Stylidium sp.
Tribonanthes australis Endl.

DRAIN

Carpobrotus aequilaterus (Haw.)N.E.Br.
Cotula coronopifolia L.
Rumex sp.
Trifolium sp.

APPENDIX 1 - Cont.

FRINGE AREAS

TREES

Banksia ilicifolia R.Br.
Melaleuca preissiana Schauer
M. cardiophylla F.Muell.

SHRUBS

Hakea sulcata R.Br.
Jacksonia furcellata (Bonpl.)DC.
Melaleuca thymoides Labill.
Verticordia aff. *densiflora* Lindley

SUB-SHRUBS

Conostylis aculeata R.Br.
Dampiera linearis R.Br.
Gompholobium tomentosum Labill.
Hovea trisperma Benth.
Lechenaultia biloba Lindley
Lomandra sp.
Stipa variablis Hughes
Stirlingia latifolia (R.Br.)Steudel
Tetratheca sp.
Thysanotus patersonii R.Br.

3. Invasive species in the Jandakot-Canning Vale area

Briza maxima L.
Carpobrotus aequilaterus (Haw.)N.E.Br.
Ehrhartia calycina Smith
Gladiolius caryophyllaceus Poir.
Nicotiana glauca Graham
Papaver aculeatum Thunb.
Pelargonium sp.
Scaevola crassifolia Labill.
Ursinia anthemoides (L.)Poir.
affinity *Digitalis* sp.

APPENDIX 2 List of other fauna recorded during the traverses through the Jandakot-Canning Vale area.

BIRDS

ARDEIDAE	
Ardea novaehollandiae	White-faced Heron
THRESKIORNITHIDAE	
Threskiornis aethiopicus	Sacred Ibis
ANATIDAE	
Tadorna tadornoides	Mountain Duck
Anas superciliosa	Black Duck
ACCIPITRIDAE	
Haliastur sphenurus	Whistling Kite
FALCONIDAE	
Falco cenchroides	Australian Kestrel
RALLIDAE	
Porphyrio porphyrio	Swamphen
COLUMBIDAE	
Phaps chalcoptera	Common Bronzewing
PSITTACIDAE	
Platycercus zonarius	Ring-necked Parrot
P. spurius	Red-capped Parrot
CUCULIDAE	
Chrysococcyx lucidus	Shining Bronze Cuckoo
ALCEDINIDAE	
Halcyon sancta	Sacred Kingfisher
MEROPIDAE	
Merops ornatus	Rainbow Bee-eater
HIRUNDINIDAE	
Hirundo neoxena	Welcome Swallow
H. nigricans	Tree Martin

APPENDIX 2 - Cont.

BIRDS

CAMPEPHAGIDAE	
Coracina novaehollandiae	Black-faced Cuckoo-shrike
Lalage sueurii	White-winged Triller
PACHYCEPHALIDAE	
Pachycephala rufiventris	Rufous Whistler
Colluricincla harmonica	Grey Shrike-thrush
MONARCHIDAE	
Rhipidura fuliginosa	Grey Fantail
R. leucophrys	Willie Wagtail
ACANTHIZIDAE	
Gerygone fusca	Western Flyeater
Acanthiza apicalis	Broad-tailed Thornbill
A. inornata	Western Thornbill
A. chrysorrhoa	Yellow-rumped Thornbill
MALURIDAE	
Malurus splendens	Splendid Fairy-wren
SYLVIIDAE	
Acrocephalus stentoreus	Clamorous Reed Warbler
PARDALOTIDAE	
Pardalotus striatus	Striated Pardalote
ZOSTEROPIDAE	
Zosterops lateralis	Grey-breasted White-eye
MELIPHAGIDAE	
Lichmera indistincta	Brown Honeyeater
Meliphaga virescens	Singing Honeyeater
Phylidonyris novaehollandiae	New Holland Honeyeater
Acanthorhynchus superciliosus	Western Spinebill
Anthochaera carunculata	Red Wattlebird

APPENDIX 2 - Cont.

BIRDS

GRALLINIDAE	
Grallina cyanoleuca	Magpie-lark
ARTAMIDAE	
Artamus cinereus	Black-faced Woodswallow
CRACTICIDAE	
Cracticus torquatus	Grey Butcherbird
C. tibicen	Australian Magpie
CORVIDAE	
Corvus coronoides	Australian Raven

MAMMALS

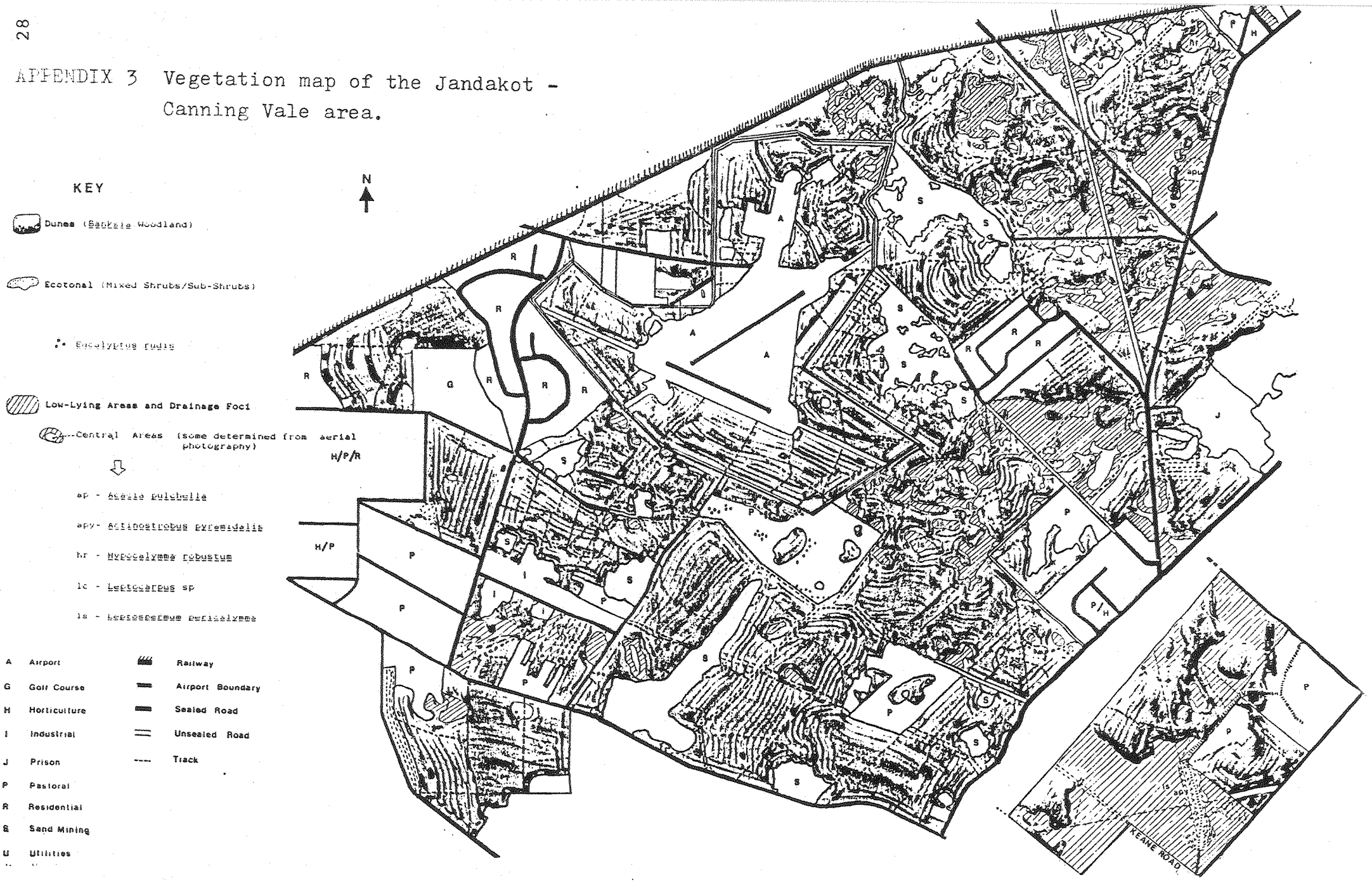
TACHYGLOSSIDAE	
Tachyglossus aculeatus	Echidna
MACROPODIDAE	
Macropus fuliginosus	Western Grey Kangaroo
M. irma	Western Brush Wallaby
LEPORIDAE	
Oryctolagus cuniculus	Rabbit
CANIDAE	
Vulpes vulpes	Fox
FELIDAE	
Felis catus	Cat

APPENDIX 2 - Cont.

AMPHIBIANS AND REPTILES

	HYLIDAE	
Litoria adelaidensis		Slender Tree Frog
	LEPTODACTYLIDAE	
Limnodynastes dorsalis		Banjo Frog
	AGAMIDAE	
Pogona m. minor		
	SCINCIDAE	
Ctenotus impar		
Tiliqua r. rugosa		Bobtail
	VARANIDAE	
Varanus gouldii		Bungarra
	ELAPIDAE	
Pseudonaja a. affinis		Dugite

APPENDIX 3 Vegetation map of the Jandakot - Canning Vale area.



7.0 PARTICIPANTS AND ACKNOWLEDGEMENTS

The following individuals participated in this project:

J. Henry	- Field survey, report drafting
K. Youngson	- Scat analysis, report editing
N. Casson	- Vegetation Mapping, field survey
A. Sanders	- Field survey, scat preparation
C. O'Reilly	- Field survey

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