Report on a remnant of vegetation on

Location 1409, Locality of Kooljerrenup

Prepared for

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1.0 INTRODUCTION

This report describes and discusses the remnant of native vegetation on Location 1409 Kooljerrenup (see Map 1) which would be impacted along it's western side by the of the proposed Peel Deviation Highway.

Of particular interest (in response to concern raised by the Department of Environmental Protection) for the study was whether or not any of the vegetation in the remnant, particularly vegetation dominated by *Corymbia calophylla* (Marri) over *Xanthorrhoea preissii* (grass tree), present in the remnant is referrable to any of the threatened ecological communities defined by English and Blythe (1997).

The remnant was visited once on 2/8/2000.

2.0 GEOMORPHOLOGY AND SOIL

The area the remnant is on has very slight relief and consists of a low drift of Bassendean Sand that is highest at the northern end, gradually sloping down to the southern end and more quickly to the east and west.

Referring the soil of the area to the Bassendean sand conflicts with the mapping of the area by Churchward and MacArthur (1980) as part of their Cannington unit, which they describe (see their map sheet key) as "Poorly drained plains with calcareous substrate; yellow duplex soils with minor areas of red and black clays over limestone." The apparent conflict is simply a result of the broad scale of Churchward and MacArthur's mapping, which ignores minor (mostly very low) areas of Bassendean sand that have transgressed the plain they describe.

A drain in the road reserve at the north end of the remnant shows that the sand at that point is at least 1.5 metres thick and the water table on the day the site was visited was about 1.5 metres below the surface. At the southern end of the remnant there was shallow (ca. 5-10 cm deep) free water present in lower places.

The soil at all sites recorded was grey or dark grey siliceous sand, where it was darker, this was due to higher levels of organic matter.

3.0 RELATIONSHIP OF THE SITE TO THE VEGETATION COMPLEX MAPPING OF THE SWAN COASTAL PLAIN

The remnant on Location 1409 lies within an area of the Cannington Vegetation Complex of Heddle *et al* (1980). The map key description of this unit is "Mosaic of vegetation from adjacent vegetation complexes of Bassendean, Karrakatta, Southern River and Vasse". Note in relation to the previous section that the Cannington Vegetation Complex has the same boundary as the Cannington unit of Churchward and MacArthur (1980). That is, the vegetation mapping of Heddle *et al* (1980) recognises the presence of areas of Bassendean sand within the Cannington unit

The Bassendean Central and South Vegetation Complex is entirely on Bassendean Sand but mostly on areas of higher relief for this dune system (less so in the southern part of its distribution). The Southern River Vegetation Complex occurs on areas of Bassendean Sand of low relief with clay or sandy clay soils in the lower parts.

The vegetation of the remnant on Location 1409 is similar to part of the diversity of vegetation described by Heddle *et al* (1980) for the Southern River Vegetation Complex. The map key description (by Heddle *et al*) for this vegetation complex is "Open woodland of *E. calophylla* - *E. marginata* - *Banksia* spp. with fringing woodland of *E. rudis* -*M. rhaphiophylla* along creek beds". In fact, the Southern River Vegetation Complex has very diverse vegetation (see, for example Trudgen and Keighery 1995) and easily encompasses the variation present on the remnant on Location 1409. However, significant parts of the variation present in the vegetation (the damplands and areas transitional to damplands) of the remnant on Location 1409 are also similar to vegetation that occurs in lower parts (damplands and areas transitional to damplands) of the Bassendean Central and South Vegetation Complex.

On the overall balance however at the vegetation complex level of mapping of Heddle *et al* (1980), the remnant on Location 1409 should be considered to be a part of the Cannington Vegetation Complex that consists of vegetation equivalent to the sandy portion of the Southern River Vegetation Complex.

4.0 METHODOLOGY

Two 10 by 10 metre plots were recorded, the first in a stand of Banksia woodland and the second in a stand of *Corymbia calophylla* (Marri) over *Xanthorrhoea preissii* (Grasstree). In addition, three releve sites were recorded to sample vegetation with *Melaleuca preissiana* over various dampland shrub understories.

At each of the sites recorded the vegetation structure was described and habitat and vegetation condition noted. The two 10 by 10 metre plots were searched intensively for flora species and the releve sites less thoroughly.

The AMG locations of the sites recorded were noted using a hand held GPS unit.

Photographs were taken of the sites recorded using a digital camera.

4.0 LIMITATIONS

The floristic data for the two 10 by 10 metre plots is limited as they have only been sampled once, at a time of the year when few species are flowering.

A complete flora inventory of the remnant was not attempted.

The accuracy of the vegetation mapping boundaries is limited as only a poor reproduction of aerial photography was available and due to time limitations.

5.0 VEGETATION RECORDED

Six vegetation units are described for the remnant, they are considered to be six different plant communities representing at least four different vegetation associations.

Unit 1: Scattered trees of *Eucalyptus marginata* over *Banksia attenuata, Banksia ilicifolia* low woodland over *Melaleuca thymoides* shrubland/high shrubland over *Xanthorrhoea preissii* shrubland over *Hypocalymma angustifolia* low open shrubland over *Dasypogon bromeliifolius* open herbland.

Recorded at site 1 (50H 03 82 499E UTM 63 71174 N). The vegetation was in good condition. It had obviously been grazed at some time in the past but retained its structure and probably most of its species diversity. Weed invasion was moderate, mostly being **Hypochaeris glabra, *Ursinia anthemoides* and **Briza maxima* although, other species may be apparent in spring. If the weed invasion was lower the vegetation would have been rated as good to very-good. There were some scattered dead *Banksia attenuata* and *Banksia ilcifolia* but, this was not though to be due to dieback caused by *Phytophthora cinnamomi*. A 10 by 10 m quadrat was recorded. See the first photograph in Appendix 2.

Unit 2: Scattered low trees of *Banksia ilicifolia* and *Banksia attenuata* over scattered tall shrubs of *Xanthorrhoea preissii* over *Melaleuca thymoides* shrubland over *Hypocalymma angustifolia* low open shrubland over *Dasypogon bromeliifolius, Hypolaena exsulca* open herbland/sedgeland.

Recorded at site 2 (50H 03 82 517E UTM 63 71 689 N). The vegetation was in good condition. Weed invasion was moderate, mostly **Hypochaeris glabra* and **Ursinia anthemoides* . There were some large dead burnt out bases of either Marri or Jarrah. A releve site was recorded. See the second photograph in Appendix 2.

Unit 3a: *Corymbia calophylla* open forest over scattered low trees of *Melaleuca preissiana* over *Xanthorrhoea preissii* low shrubland/shrubland to open heath over *Cyathochaete avenacea* sedgeland.

Recorded at site 3 (50H 03 82 564E UTM 63 71 482 N). The vegetation was in good to very good condition. Weed invasion was low, mostly **Hypochaeris glabra.* There were some small patches near the plot that had been disturbed, these had

more weeds. *Melaleuca preissiana, Nuytsia floribunda* and *Kinga australis* were near the plot. *Sowerbaea laxiflora* was common in the herb layer and could possibly constitute a separate layer in the vegetation, observations in spring would clarify this. A 10 by 10 metre plot was recorded. See the third photograph in Appendix 2.

Unit 3b: *Corymbia calophylla, Eucalyptus marginata* open forest over *Xanthorrhoea preissii* low shrubland/shrubland to open heath over *Dasypogon bromeliifolius* herbland.

No site was recorded in this unit, which surrounded unit 3a. It differed in having an open herb layer of *Dasypogon bromeliifolius* rather than a sedge layer of *Cyathochete avenacea*. apparently where it occurs being slightly drier than where unit 3a occurs. The area of this unit seemed to be more prone to disturbance than that of 3a and it was rated as in poor to good condition with some parts in good condition.

Unit 4: *Melaleuca preissiana* open woodland over *Regelia ciliata* open heath over *Hypocalymma angustifolia* low open shrubland.

Recorded at site 4 (50H 03 82 511E UTM 63 71 337 N). The vegetation was in good to very good condition. Weed invasion was moderate, but small open patches were more heavily invaded. Associated species included Marri and Jarrah but these two species may be invading the unit. See the fourth photograph in Appendix 2.

Unit 5: *Melaleuca preissiana* low open woodland over *Acacia pulchella* open shrubland over *Hypocalymma angustifolia* low shrubland to low open heath *Hypolaena exsulca* low open sedgeland.

Recorded at site 5 (50H 03 82 523E UTM 63 71 381 N). The vegetation was in good to very good condition. Weed invasion was low to moderate, with some small weedy patches. See the fifth photograph in Appendix 2.

6.0 OVERALL CONDITION OF THE VEGETATION OF THE REMNANT

The vegetation of the remnant was mostly in good condition or good to very good condition, except for the area mapped as unit 3b which was partly in poor to good condition and partly in good condition. Some small areas were in poor condition and others in very good condition. The lowering of condition seems to reflect past grazing but the area does not seem to be being grazed to any significant extent at the present time or in the recent past.

Lowering of the water table may be allowing species such as *Banksia attenuata* and Jarrah (*Eucalyptus marginata*) to invade the dampland shrubland areas where they would probably not normally occur. If the water table has been lowered, possibly mostly in summer, then there may be some long term effects in movement of vegetation boundaries and possibly loss of some species.

7.0 CONSERVATION ASSESSMENT OF THE VEGETATION OF THE REMNANT

The vegetation of the remnant on Location 1409 has significant conservation value because of the extent of clearing in the surrounding region. This overall value is partly due to its size and partly due to the diversity of vegetation (six or more plant communities) in the remnant. The significance of the conservation value for the remnant is appropriately rated as medium on a regional scale and high on local scale.

Vegetation unit 3a of this study is considered to be referrable to Floristic Community Type 3 of Gibson *et al* (1994). However until the plot can be recorded in spring or early summer so that a more complete species list can be obtained and computer comparison of this list then made to the database of sites compiled by Gibson *et al* (1994) the allocation must by somewhat uncertain. The list of species recorded at this site during the site visit is given in Table 1 (see below).

However, the quadrat in unit 3a has sandy soil, which suggests that it should be referred to Floristic Community Type 3b, which has been recorded near the remnant on Location 1409 by Gibson *et al* (1994) - see the map in their appendix 1. It should be noted however, that the lists of typical species given by Gibson *et al* for Floristic Community Types 3a and 3c (which are considered critically endangered threatened ecological communities by English and Blythe 1997) have much in common with the species list for the quadrat in unit 3a. Therefore,

there must be some uncertainty in referring units 3a and 3b of this study to a subtype of Floristic Community Type 3 of Gibson *et al* (1994) in the absence of spring sampling and making the appropriate comparisons using the PATN computer package.

Table 1. Species recorded at site 3 or close to it (the latter indicated by near)

*Briza maxima	3
Cyathochaete avenacea	3
Lepidosperma squamatum (narrow form)	3
Schoenus ?grandiflorus	3
Desmocladus (Loxocarya) fasciculata	3
Xanthorrhoea preissii	3
Caesia occidentalis	3
Chamaescilla corymbosa	3
Sowerbaea laxiflora	3
Burchardia congesta	3
Haemodorum laxum	3
Haemodorum ?paniculatum	3
Patersonia occidentalis	3
Caladenia flava ssp. flava	3
Caladenia latifolia	3
Caladenia sp.	3
Pterostylis ?concava	3
Pterostylis vittata	3
Pterostylis aff. nana	3
Nuytsia floribunda	3
Drosera erythrorhiza ssp. erythrorhiza	near 3
Kennedia prostrata	3
*Trifolium sp.	3
Corymbia calophylla	3
Melaleuca preissiana	3
Stylidium piliferum ssp. piliferum	3
*Hypochaeris glabra	3
Lagenophora huegelii	3

Unit and 3b of this study may also be referrable to Floristic Community Type 3 of Gibson *et ala* (1994), however, the ground flora layer was different to that of unit 3a although the overstorey and main shrub layer were the same. The most obvious difference in the ground layer was the absence of *Cyathochete avenacea* as a dominant in the this layer and its replacement by *Dasypogon bromeliifolius*.

The *Banksia* woodland of unit 1 is probably referrable to Florisitic Community Type 21a of Gibson *et al* (1994), which was recorded at two places by Gibson *et al* close to the remnant on Location 1409. Again, this would need to be confirmed

when a more complete list for the quadrat recorded in it can be compiled after a spring visit. The species recorded in it are indicated by a "1" in the species list given in Appendix 1.

No attempt is made here to refer the dampland vegetation units (2, 4, 5) to the floristic community types of Gibson *et al* (1994) partly because detailed sites were not recorded in these units as they were not the concern raised by the Department of Environmental Protection and partly because of the poor definition of the floristic community types in these vegetation types.

8.0 REFERENCES

Churchward, H.M. and W.M. McArthur (1980). *Landforms and soils of the Darling System, Western Australia.* In: Atlas of natural resources, Darling System, Western Australia. Maps and explanatory text. Department of Conservation and Environment, Western Australia.

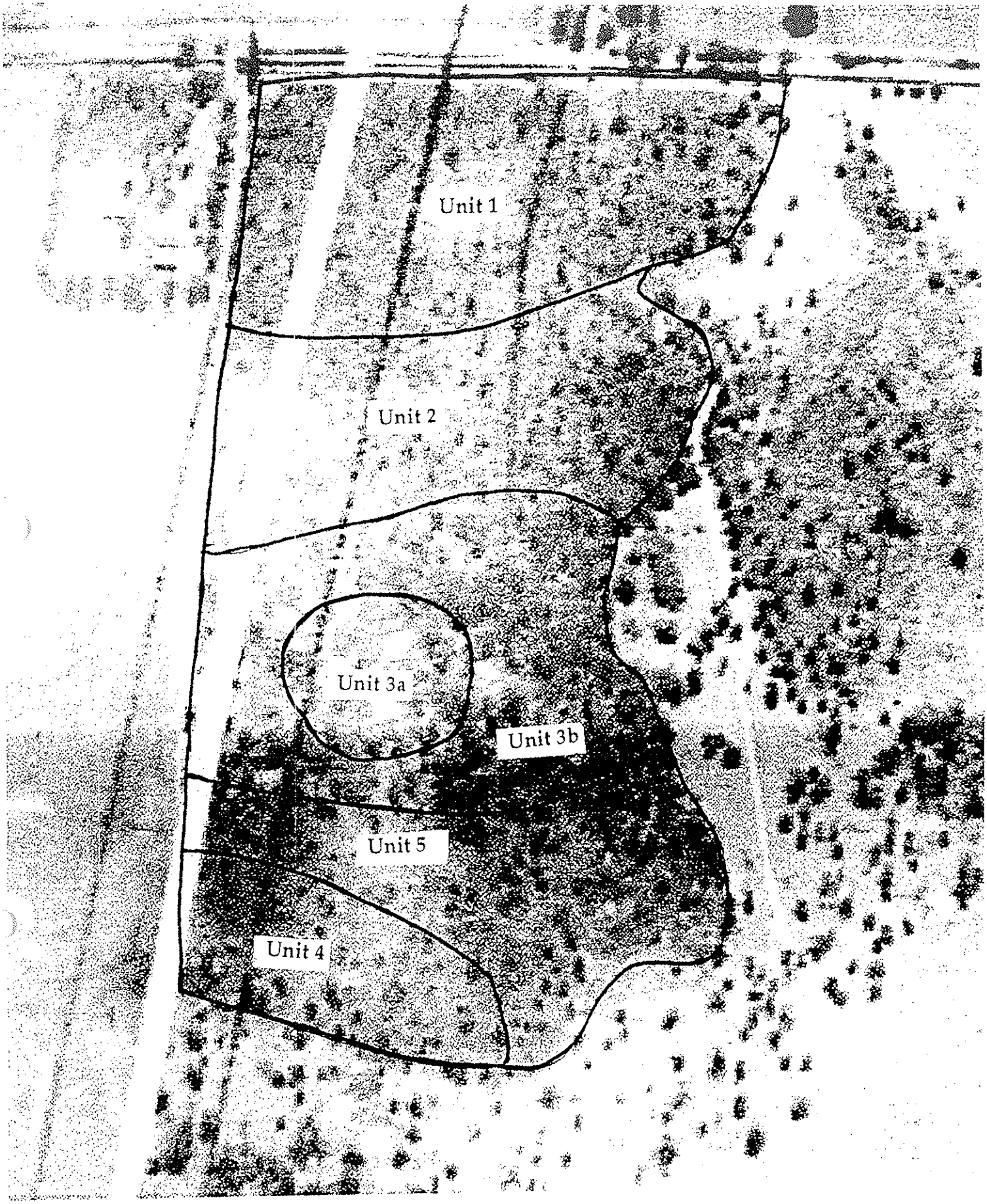
English, V., and Blyth, J. (1997) *Identifying and conserving threatened ecological communities (TECs) in the South West Botanical Province.* ANCA National Reserves System Cooperative Program: Project Number N702, Australian National Conservation Agency, Canberra.

Gibson, N., B. Keighery, G. Keighery, A. Burbidge & M. Lyons (1994). *A floristic survey of the southern Swan Coastal Plain.* Unpublished report prepared for the Western Australian Department of Conservation and Land Management, the Conservation Council of Western Australia and the Australian Heritage Commission.

Heddle, E.M., Loneragan, O.W. & Havel. J.J. (1980). *Vegetation complexes of the Darling System, Western Australia.* In atlas of natural resources, Darling System Western Australia. Maps and explanatory text. Department of Conservation and environment, Western Australia.

Trudgen, M.E. and B.J. Kieghery (1995). *A survey of remnant vegetation in the City of Gosnells west of the Darling Scarp.* Unpublished report prepared for the City of Gosnells

MAP 1: Vegetation communities described for the remnant of native vegetation surveyed on Lot 1, Locality of Kooljerrenup



Map 1: Vegetation of Location 1409, Kooljerrenup, on an aerial photograph base.

See the text of the report for the descriptions of the vegetation units.

APPENDIX 1: **Flora list for the remnant of native vegetation (see Map 1) surveyed on Lot 1, Locality of Kooljerrenup**

Notes: 1. This list is based on recording of a limited number of sites (5, only 2 of which were searched intensively) and one walk along the length of the remnant and back on one day in winter. It is therefore not complete.

2. The numbers after species are the sites they were recorded at.

PTERIDOPHYTA	
XXXX. APLENIACEAE	
Asplenium flabellifolium	3b
ANGIOPHYTA	
31. POACEAE	
*Briza maxima	3, 1
32. CYPERACEAE	
Cyathochaete avenacea	3
Lepidosperma squamatum (narrow form)	5, 3
Lepidosperma longitudinale (in a mostly cleared area at the edge of the western end of the remnant)	near 4
Schoenus curvifolius	1
Schoenus efoliatus	5
Schoenus ?grandiflorus	3
39. RESTIONACEAE	
Desmocladus (Loxocarya) fasciculata	3
Hypolaena exsulca	1,2
Lyginia barbata	1
54C. DASYPOGONACEAE	
Dasypogon bromeliifolius	1, 2, 3b, 4
Kingia australis	near 3
Lomandra caespitosa	1
Lomandra integra	1
Lomandra nigricans	1
Lomandra sericea	1, 5
54D. XANTHORRHOEACEAE	
Xanthorrhoea preissii	1, 2, 3
Xanthorrhoea brunonis	1 (uncommon there)
54F. ANTHERICACEAE	
Caesia occidentalis	3
Chamaescilla corymbosa	1, 3

Sowerbaea laxiflora	3
Thysanotus ?patersonii	5, 1, 3b
54J. COLCHICACEAE	
Burchardia congesta	3
55. HAEMODORACEAE	
Conostylis juncea	1
Haemodorum laxum	3
Haemodorum ?paniculatum	3
?Haemodoraceae sp.	5
60. IRIDACEAE	
Patersonia occidentalis	1, 3, 4
*Romulea rosea	3b, 5
66. ORCHIDACEAE	
Caladenia flava ssp. flava	3, 1
Caladenia latifolia	3
Caladenia sp.	3
Leporella fimbriata	4, 1
*Monadenia bracteata	1
Pterostylis ?concava	3
Pterostylis vittata	3, 4
Pterostylis aff. nana	3
90. PROTEACEAE	
Adenanthos obovatus	5
Banksia attenuata	1
Banksia ilicifolia	1
Petrophile linearis	1
97. LORANTHACEAE	
Nuytsia floribunda	3, 4
131. LAURACEAE	
Cassytha ?pomiformis	5
143. DROSERACEAE	
Drosera erythrorhiza ssp. erythrorhiza	1, near 3, 4
Drosera menziesii ssp menziesii	1
163. MIMOSACEAE	
Acacia huegelii	1
Acacia pulchella var. pulchella	1, 3b, 4, 5

165. PAPILIONACEAE	
Aotus procumbens	1
Euchilopsis linearis	4
Gompholobium tomentosum	4
Hovea trisperma var. trisperma	5
Kennedia prostrata	3
*Trifolium sp.	3
Viminaria juncea	near 3
175. RUTACEAE	
Philotheca (Eriostemon) spicata	1
226. DILLENIACEAE	
Hibbertia subvaginata	1
Hibbertia vaginata	5
273. MYRTACEAE	
Calytrix flavescens	1
Corymbia calophylla	3, 4
Eucalyptus marginata	1, ?2 (dead), 3b, 4
Hypocalymma angustifolium	1, 4
Kunzea ericifolia	near 4
Melaleuca preissiana	3, 4, 5
Melaleuca thymoides	1, 2
Pericalymma ellipticum	4, 5
Regelia ciliata	4
Scholtzia involucrata	5
281. APIACEAE	
Trachymene pilosa	1
288. EPACRIDACEAE	
Leucopogon ?polymorphus	1
Leucopogon propinqus	1
341. GOODENIACEAE	
Dampiera linearis	1
343. STYLIDIACEAE	
Stylidium brunonianum var. brunonianum	4
Stylidium carnosum	1, 4
Stylidium piliferum ssp. piliferum	5, 3
Stylidium repens	4
345. ASTERACEAE	
*Hypochaeris glabra	1,2,3,5

Lagenophora huegelii	3
*Ursinia anthemoides	1, 2, 5

APPENDIX 2: Photographs of vegetation communities described for the remnant of native vegetation surveyed on Lot 1, Locality of Kooljerrenup

[illegible] over Banksia attenuata, Ban[illegible] [illegible]cifolia [illegible]

Aerial photograph of Lot 1409 (north to right) showing the approximate location of the proposed road reserve (centreline yellow)