# VEGETATION AND FLORA OF CORRIGIN RESERVES 16196 AND 28131

PREPARED FOR:

RESERVE MANAGEMENT OFFICER
PINGELLY MANAGEMENT DISTRICT
DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

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## ABSTRACT

*The area of the Corrigin Water Reserve (No. 16196) and Aerodrome Reserve (No. 38131) was surveyed for vegetation and flora. The reserves lie in the Avon Botanical District and the region was described by Beard (1980) as having a 'typical outer wheatbelt landscape'.*

*Fourteen vegetation associations were described and mapped. These included 6 types of forest/woodland, 3 types of mallee and 5 types of thicket/heath. As is characteristic of wheatbelt vegetation, associations were mixed and formed mosaics in some sections of the reserves. Soil type and topography were found to be closely related to vegetation types.*

*263 native plant species have been identified on the reserves representing 42 families. The most abundant families were Myrtaceae (56 species) and Proteaceae (42 species). One Gazetted Rare plant was collected (Grevillea dryandroides ) but was not found in large numbers. Some 8 other species were found to be possibly geographically restricted or poorly collected.*

*Because of the lack of well-preserved natural bushland in the Corrigin Shire, the diversity of habitats and flora richness on the reserve and the occurrence of now restricted areas of Blue and Brown Mallet it was recommended that the area be given a purpose for Conservation of Flora and Fauna.*

# 1.0 INTRODUCTION

## 1.1 PROJECT DESCRIPTION

The following Project Description is taken from the Consultancy Offer and Agreement and gives background information on the requirement for the current survey.

> The central wheatbelt area of Corrigin Shire, Wickepin Shire and the western section of the Kulin Shire is notably lacking in Nature Reserves, and especially large Nature Reserves. In the 4000km$^2$ area, or 35 km radius from Bullaring, in the Corrigin Shire, there are no vested Nature Reserves of 100 ha or greater, with the exception of White Water Lake. In this area there are a total of thirteen vested and five unvested Nature Reserves.
>
> The Corrigin Shire has a total of ten Nature Reserves, seven of which are vested, that cover 0.55% of the Shire. This coverage is the lowest for Department of Conservation and Land Management land for any Shire in the Narrogin District.
>
> The Corrigin Water Supply Reserve (No 16196) is centrally placed in an area devoid of conservation areas. It is some 1070 ha in size and is entirely bushland, not having any water or large granite rock areas. The reserve therefore has the potential to be a major conservation reserve.

The reserves studied lie some 2 km west of the Corrigin townsite. This report contains the findings of vegetation and flora surveys of Reserves 16196 and 28131 and an assessment of their wildlife conservation values.

## 1.2 PROJECT REQUIREMENTS

The vegetation survey is to address the following specific objectives :

a) Produce a vegetation map of reserves 16196 and 28131, showing floristic/structural vegetation types. The map should also include dominant geomorphological features such as granite outcrops and streamlines.

b) Provide a series of vegetation association descriptions, based on Muir (1977), with floristic clarifications, which cover the range of associations found on the reserves. The site of each description should be recorded on the appropriate map.

c) Collect and identify a representative sample of the flora of the reserve, and lodge any flowering specimens with the Western Australian Herbarium, and voucher specimens with the CALM office, Pingelly.

d) Compile separate species lists, for the two reserves, indicating any species restricted to areas that are not to be considered as proposed Nature Reserves.

e) Record the identity, location and estimated population size of any gazetted rare plants, and other plants of interest (e.g. restricted distribution) which may occur on the reserve.

f) Photograph each vegetation association and specific points of interest.

## 1.3 PHYSICAL ENVIRONMENT

### 1.3.1 GEOLOGY AND SOILS

The study area lies on the Yilgarn Block, a very ancient rigid 'shield' area composed mainly of Archaean granite and gneiss with some altered volcanics and sediments. The Corrigin area is included in the Jimperding Metamorphic Belt which consists of gneiss schist, quartzite, amphibolite and other rocks some of which are resistant to erosion and form topographic features. The remainder of the Corrigin area is underlain by granitic rocks covered by alluvia in the major valleys. (Williams 1975).

The Corrigin water reserve can be loosely divided into three soil types - alluvial sandy loams along the main water course, yellow sands on slopes and laterite on higher, plateau areas. Low, weathered breakaways delineate the laterite mesas in some cases and give way to the sandy loam slopes on the nothern part of the reserve. Sandy/clay/loam depressions are common on the southern side. The central drainage system is characterized by pale grey-brown sandy loam.

### 1.3.2 CLIMATE

The area has a typical wheatbelt climate with hot dry summers and mild wet winters. Meteorological data from Corrigin Post Office is given in Table 1. The region of the reserve is characterised by an average yearly rainfall of 379mm. Most of the rain is received in winter from May to August with occasional thunderstorms in late summer and early autumn. Winters are mild with the mean temperature of the coldest month above 10°C. The mean temperature of the hottest month exceeds 25°C and absolute maxima above 40°C occur. Beard (1980) classes the Corrigin regime with its 7 dry months as Dry Warm Mediterranean.

TABLE 1. SUMMARY OF METEOROLOGICAL DATA RECORDED AT CORRIGIN (FROM BUREAU OF METEOROLOGY 1985).

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | MEAN or TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean Rainfall (mm) | 11 | 17 | 23 | 23 | 49 | 65 | 62 | 49 | 30 | 24 | 14 | 12 | 379 |
| No. Rainy Days | 2 | 3 | 3 | 5 | 10 | 13 | 15 | 12 | 9 | 7 | 4 | 2 | 85 |
| Mean Max. Temp. °C. | 32.5 | 31.4 | 28.6 | 23.6 | 19.5 | 16.3 | 15.2 | 16.1 | 18.6 | 22.8 | 27.0 | 30.8 | 23.5 |
| Mean Min. Temp. °C. | 16.0 | 16.1 | 14.3 | 10.9 | 7.3 | 6.4 | 5.1 | 4.5 | 5.6 | 8.2 | 11.3 | 14.2 | 10.0 |
| Rel. Humidity % 3pm. | 25 | 28 | 31 | 41 | 49 | 61 | 61 | 55 | 47 | 34 | 27 | 24 | 40.0 |

## 1.4 PHYSICAL FEATURES AND LAND USES

The main feature of this reserve and the reason for its vesting as a water reserve is the extensive central drainage line which feeds into the town water supply dam situated at the eastern end. The main creekline and some of the major tributaries have been deepened to channels with a width of about 3 metres and depth of 1-2 metres. On either side and at the head of this east-west oriented drainage line the land rises gently some 30 - 40 metres to a maximum altitude of 350 metres above sea level. (See Fig. 1).

The two reserves surveyed (numbers 16196 and 28131) are bounded by the bitumenized Corrigin - Brookton road to the north and are surrounded by cleared farmland on all other sides. The northern third of reserve 16196 has had extensive human impact. This is detailed in the following extract from the Consultancy Offer and Agreement and shown in Fig. 2.

1. Aerodrome

   Although an Aerodrome Reserve (No. 28131) exists in the central north of the Water Reserve, the aerodrome has been established on the Water Reserve, occupying location 23263, with a small section protruding into the Aerodrome Reserve. It should be assumed that location 23263 is unavailable for acquisition.

2. Scenic Lookout

   Location 23262 has a road up to a scenic lookout. This receives many visitors and may be upgraded in the future.

3. Railway Lines

   An old railway line runs east-west across the reserve, while an existing railway line runs from the north-east to the central south of the reserve. Some natural revegetation has occurred on the old railway line banks but the area will not recover for some years.

4. Water Supply

   The Water Authority of Western Australia has developed catchments in location 11596. This includes two dams. It may be assumed that this location is unavailable for acquisition.

5. What appears to be some gravel or sand mining has occurred in the north east corner and on a part of the south - eastern boundary.

6. A gravel race track exists in the south east corner.

Despite this human impact the majority of this reserve is undisturbed, with that area south of the east-west line of the old railway line being in what appears to be pristine condition.

FIGURE 1. TOPOGRAPHY

(From Lands and Surveys sheet Kunjin 2433-II )

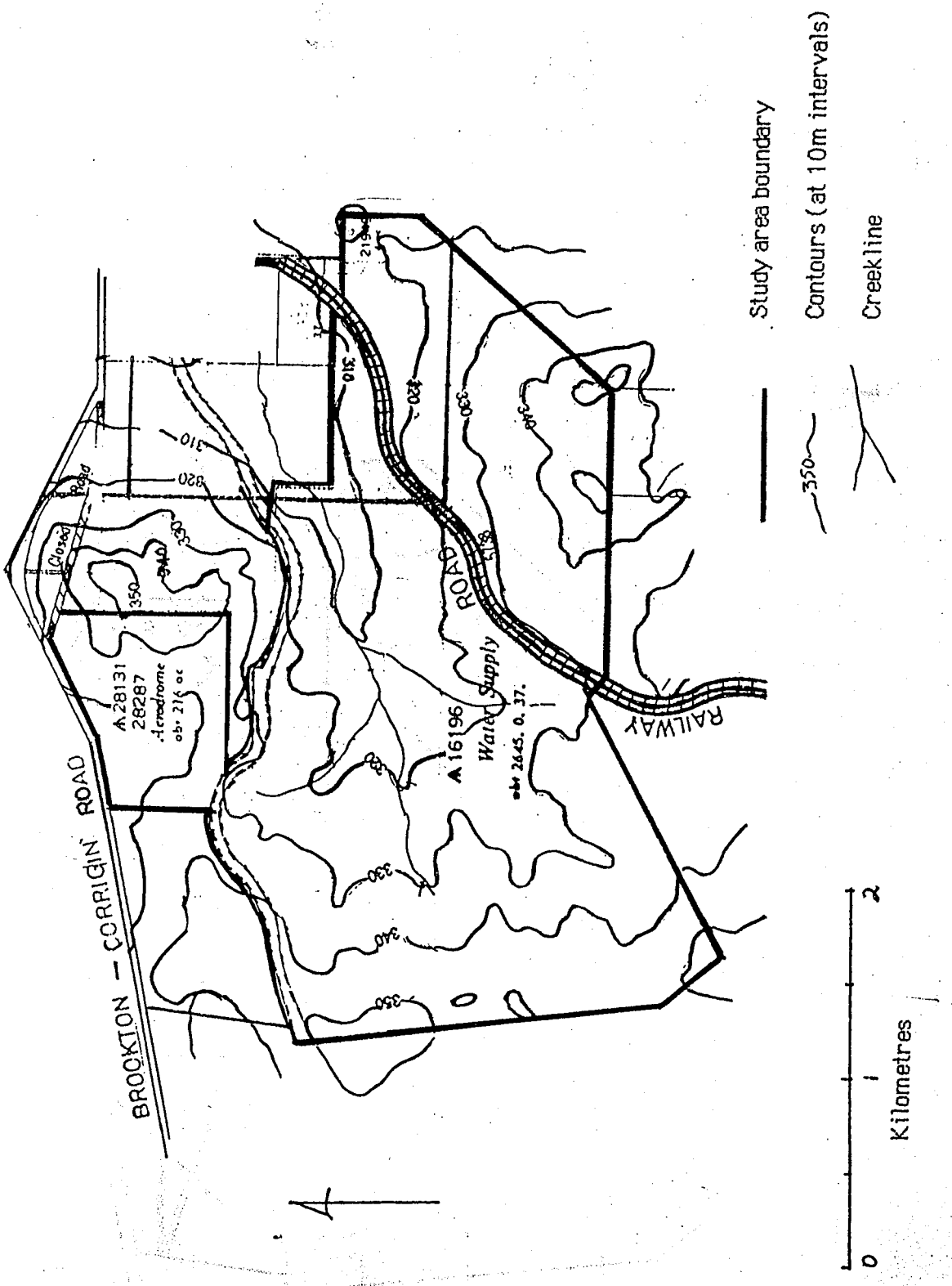
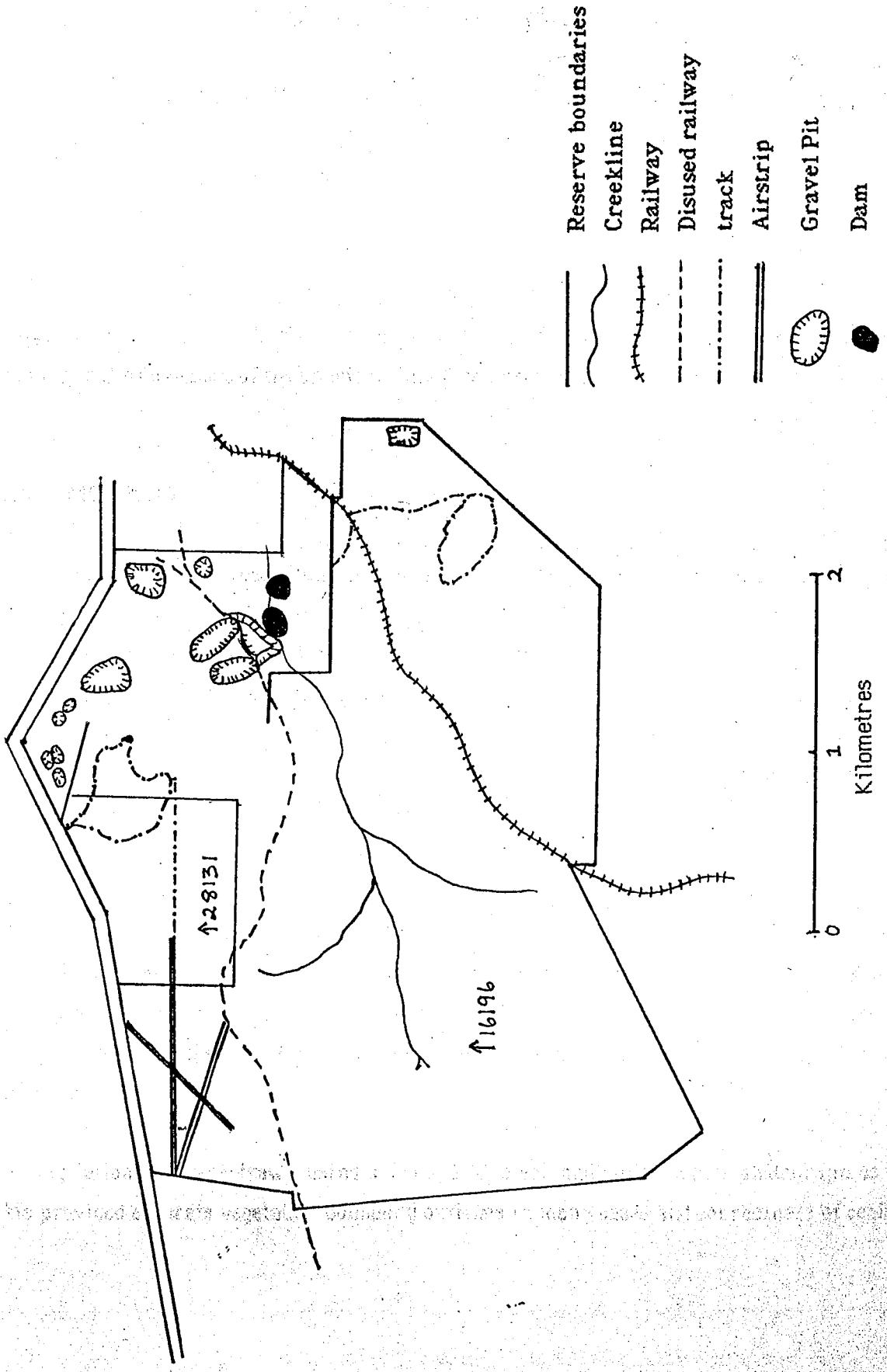


FIGURE 2. LAND USE FEATURES



## 1.5 HISTORY OF THE RESERVE

The Corrigin Water reserve (No. 16196) was first created as a water supply catchment area in 1922 but was not vested in the Minister for Water Supply, Sewerage and Drainage until 1972. In 1966, 216 acres in the central north of the reserve was excised and recreated as an aerodrome reserve (No. 28131). Since 1977 efforts have been made by the then Department of Fisheries and Wildlife to change the vesting of the reserve to include Conservation of Flora and Fauna but these have not yet been successful due to the stated requirement of the land for water catchment purposes and dam building.

The reserve has been unaffected by bushfire for some time. A long term nearby resident stated that approximately one third of the area had been burnt 20 years ago (P. Connolly, Pers. Comm.) but no evidence of the effects of this fire is now seen.

## 2.0 METHODS

Ground surveys of the vegetation and flora of the reserves were carried out on two separate visits - the first in mid October 1985 (one person) and the second in mid January 1986 (two persons). General vegetation divisions were noted using black and white aerial photographs of a scale 1:40,000 and areas of interest thus delineated were visited and examined on foot traverses or in a vehicle. Where shadings and texture between vegetation areas appeared similar on the aerial photographs and time did not permit ground surveys, mappping was carried out by extrapolation of known vegetation associations. Type descriptions were based on the work of Muir (1977) and incorporate his naming system (Table 2).

Flora collections were made on both field trips with flowering specimens being taken wherever possible. A total of 233 specimens were collected, pressed and dried and these were identified using keys and then by comaprison with named specimens at the Western Australian Herbarium. Experts in particular genera were consulted wherever possible to ensure identification accuracy.

The vegetation map was drawn using a 1:10,000 black and white aerial photograph as a base. This provided accurate vegetation boundary outlines in many cases and correctness of scale.

## 3.0 RESULTS

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## 3.1 VEGETATION SURVEY

PREVIOUS SURVEYS

Beard (1980) mapped the Corrigin grid square at a scale of 1 : 250,000 and it can be noted from this work that the Water Reserve ranges over two general vegetation formations. These formations were Heterogenous Scrub Heath and *Eucalyptus* Woodlands the latter of which included *Eucalyptus salmonophloia* (Salmon Gum) and *E. loxophleba* (York Gum). Beard defines a Corrigin vegetation system which has a typical 'outer wheatbelt' landscape and lies between the more deeply dissected landscape of the 'Inner Wheatbelt' and the systems with dominant mallee formations. Within the Corrigin System he delineated vegetation formations of Kwongan (thickets and heath) on sandplains, woodland on slopes and flats, patches of mallee intermediately and in the bottomlands teatree thickets or teatree and samphire. Beard found an example of Kwongan vegetation on Reserve 16196 and listed major associations and associated species for the type. Woodland species of *Eucalyptus wandoo, E. loxophleba, E. salmonophloia, E. astringens* (on laterite breakaways) and *E. gardneri* were noted as common species in the Corrigin System and mallee species recorded were principally *E. redunca, E. incrassata, E. eremophila* and *E. pileata.*

A general survey of the Water Reserve was carried out by a Wildlife Officer in the spring of 1977. He reported 8 major vegetation types using divisions based on topography and vegetation structure and listed the principal species in those types. Assocations of *Eucalyptus falcata* (Silver mallett), Wandoo and Salmon Gum were noted as well as areas of sandplain and laterite heath. A brief fauna list was also provided.

CURRENT SURVEY

Beard's (1980) findings are reiterated and established in more detail in the current survey. The vegetation was primarily divided into groupings of woodland, mallee and heath and further into species associations within those groupings. Table 3 lists the 14 vegetation associations described and mapped in this study.

A character of wheatbelt vegetation types is their mosaic arrangement. Beard (1980) wrote "Soil and vegetation types merge into one another, mallee and thicket are usually mingled and the

woodland occurs mixed with mallee and as patches in mallee and thicket". This is certainly true in the Corrigin Water reserve where mallee, woodland and heath types join to form broad interzones and patches of Tamma (*Allocasuarina campestris*) are found in both heath and woodland communities. Additionally mallee (*Eucalyptus*) species were often difficult to identify in the field due to the paucity or inaccessibility of buds and nuts. Some mallee dominants were noted but in many cases the delineation of species associations within mallee formations was not possible.

Generally, vegetation types could be equated with soil or topography changes over the area. Low heaths were mostly observed on the lateritic uplands or on the limited areas of sandplain slopes whereas mallee areas were usually restricted to the heavier clay loams on breakaways, upland slopes and slight depressions. Photograph 1 shows a broad view of the south eastern section of reserve 16196 as viewed from the tourist lookout in a southerly direction.

Photograph 1. View of the south east of reserve 16196 from the lookout. Note the variable mallee to the left of the picture and laterite heath and tamma in the foreground.

The 14 vegetation associations found on the reserve are listed and described below. A list of species recorded at each of the 24 sites examined can be found in Appendix 2.

TABLE 3 - VEGETATION ASSOCIATIONS ON RESERVES 16196 AND 28131

| | |
|---|---|
| WOODLANDS - | 1. *Eucalyptus loxophleba* Woodland |
| | 2. *Eucalyptus wandoo* Woodland |
| | 3. *Eucalyptus salmonophloia* Woodland |
| | 4. *Eucalyptus salmonophloia* /Mallee woodland |
| | 5. *Eucalyptus myriadena* Woodland |
| | 6. *Eucalyptus falcata* Forest |
| MALLEES - | 7. Mixed Mallee |
| | 8. *Eucalyptus albida* over Scrub |
| | 9. Mallee over Thicket |
| THICKETS/HEATHS - | 10. Laterite Mixed Heath |
| | 11. Tamma Thicket |
| | 12. Sandplain Heath |
| | 13. Low Heath |
| | 14. Prostrate *Grevillea* Heath |

**Woodland Formations**

1. YORK GUM WOODLAND (SITE 10)

Key Description - Low Forest A over Open Low Woodland A/B over Herbs on light brown clayey loam with some sand.

Stratum 1. *Eucalyptus loxophleba* (York Gum) trees to 12 m and with 30-70% cover.

Stratum 2. *Acacia acuminata* (Jam) to 5-6 m and <10% cover.

Stratum 3. Ephemerals and grasses including *Briza maxima, Aira cupaniana* (both introduced species) and *Waitzia acuminata.*

Comments - Found only along the creek flats in this reserve to a distance of approximately 200m from the creek bed.

Photograph 2. York Gum Woodland with Jam (*Acacia acuminata*) and dry grass and herb layer.

## 2. WANDOO WOODLAND (SITES 1, 8, 19, 20, 21, 22)

Key Description - Low Forest A/Low Woodland A over Thicket/Heath A over Open Dwarf Scrub D on light brown sandy loam to heavier sandy clay loam with scattered laterite pebbles.

Stratum 1. *Eucalyptus wandoo* (Wandoo) to 15 m and varying from 10% to 60% cover.

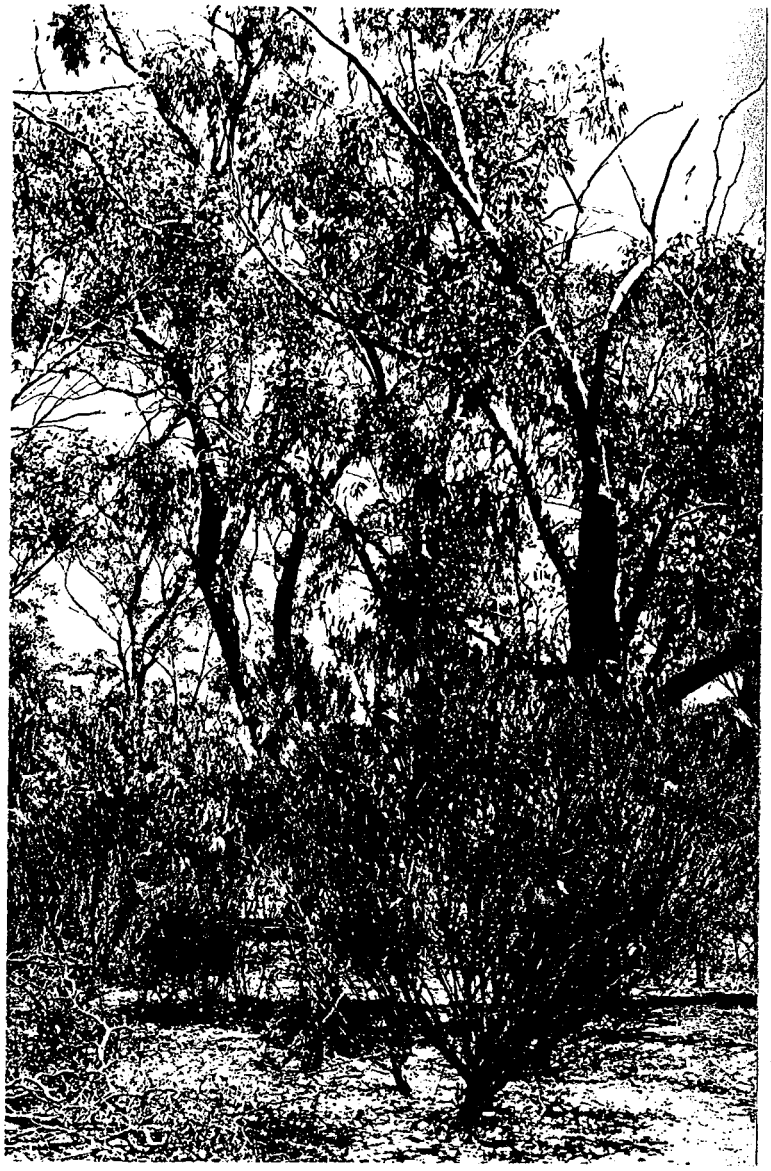
Stratum 2. Variable dwarf scrub layer 0 - 10% cover.

Comments - This vegetation association is very variable and is delineated mainly by the presence of *Eucalyptus wandoo*. Understorey layers vary considerably in species dominance and % cover and dense patches of *Allocasuarina campestris* (Tamma), *Melaleuca lasiflora* and *Hakea lissocarpha* can be found in some areas. Additionally, areas of Mallee (*Eucalyptus eremophila, E. conglobata*) and Brown Mallet (*Eucalyptus astringens*) occur on heavier soils and although they are distinct they are too small and scattered to map. The Wandoo association occurs widely over the southern two thirds of the reserve on gentle slopes below the laterite plateau areas.

Photograph 3. Wandoo woodland (Site 21) showing scattered, sparse understorey.

Photograph 4. Wandoo Woodland with an area of mixed mallee (mostly *Eucalyptus eremophila*) to the left.

Photograph 5. A dense patch of *Eucalyptus astringens* which is typical of those found within the broader association of Wandoo Woodland.



Photograph 6. Wandoo woodland (Site 19) with Tamma (*Allocasuarina campestris*) in Stratum 2.

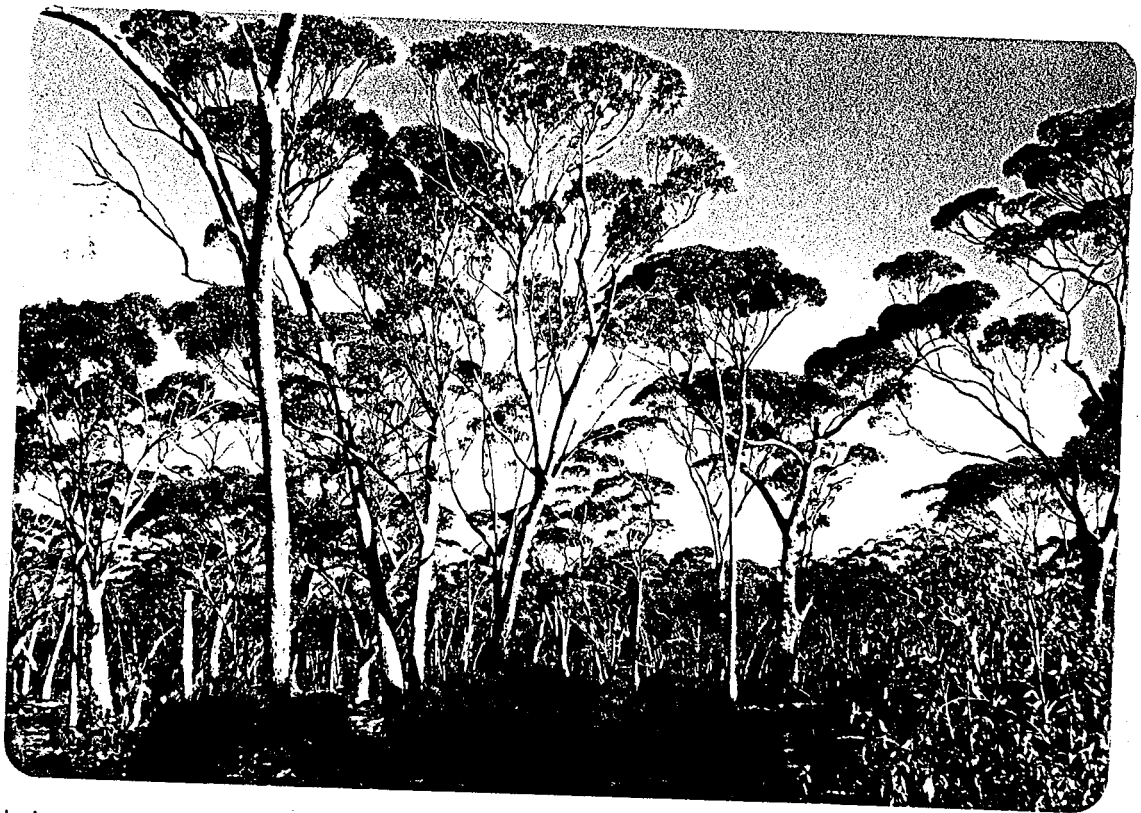
3. SALMON GUM WOODLAND (SITE 23)

Key Description - Woodland over Open Dwarf Scrub C/D on brown/grey sandy clay loam.

Stratum 1. *Eucalyptus salmoniphloia* to 20m and 10 - 30% cover.

Stratum 2. Very scattered shrubs (1 - 10%) including *Acacia erinacea*, *Olearia muelleri*, *Templetonia sulcata* and *Melaleuca uncinata*.

Comments - A few separate areas of this association occur on the reserve. The understorey is characteristically sparse and includes only a few species.



Photograph 7. Salmon Gum Woodland with *Melaleuca uncinata* as an understorey.

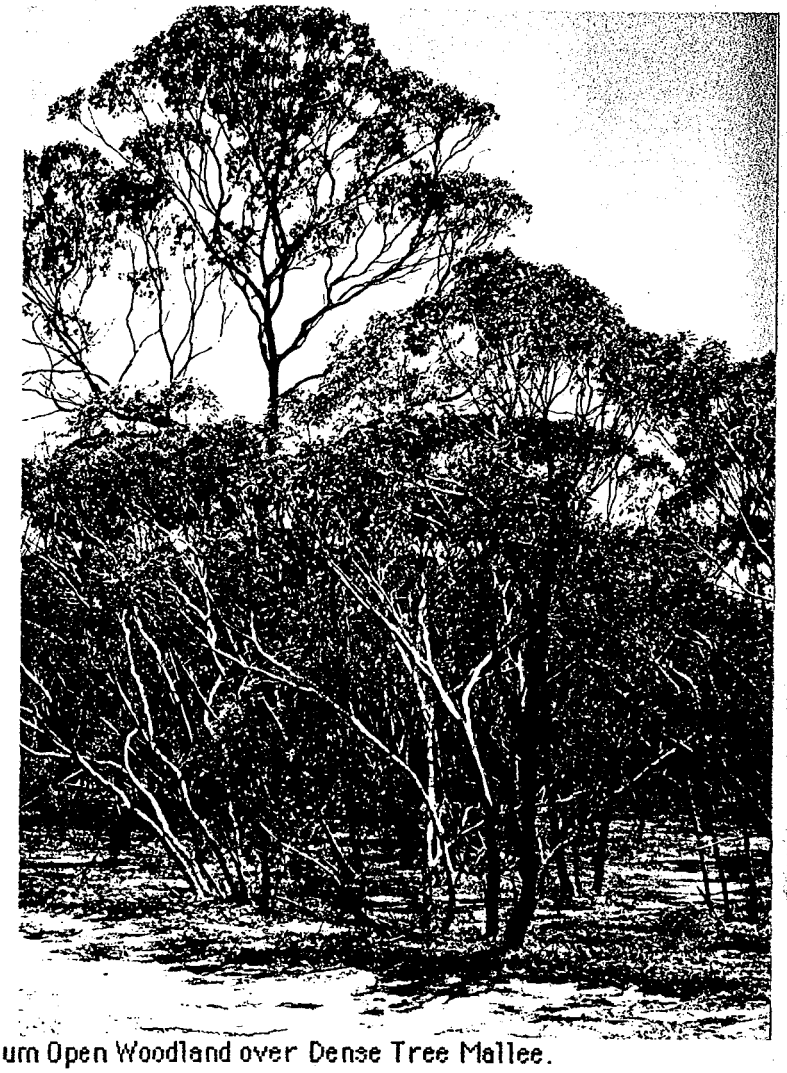
4. SALMON GUM OPEN WOODLAND WITH MALLEE (SITES 2, 18)

Key Description - Open Woodland over Dense Tree Mallee on light brown sandy clay loam with scattered laterite pebbles.

Stratum 1. *Eucalyptus salmonophloia* to 20 m and 2 - 10% cover.

Stratum 2. *Eucalyptus celastroides, E. conglobata* to 8m and 70 - 100% cover.

Comments - This association is restricted to the eastern central portion of the reserve although scattered Salmon Gums occur with other mallee vegetation types in some areas. The mallee stratum is often dense and there is consequently very little in the way of ground cover. Similar low shrub species as are found in Type 3 are found here.



**Photograph 8.** Salmon Gum Open Woodland over Dense Tree Mallee.

## 5. *EUCALYPTUS MYRIADENA* WOODLAND (SITE 16)

Key Description - Low Forest A on red-brown sandy clay loam.

Stratum 1. *Eucalyptus myriadena* to 15m with *E. eremophila* 10m, 30 - 70% cover.

Comments - Only one area of this association was observed at the reserve. The rough-barked trunks of *Eucalyptus myriadena* were distinctive and the species was also associated with occasional plants of Salmon Gum and a very scattered low shrub understorey which included *Microcybe multiflora, Dodonaea attenuata* and *D. stenozyga*.

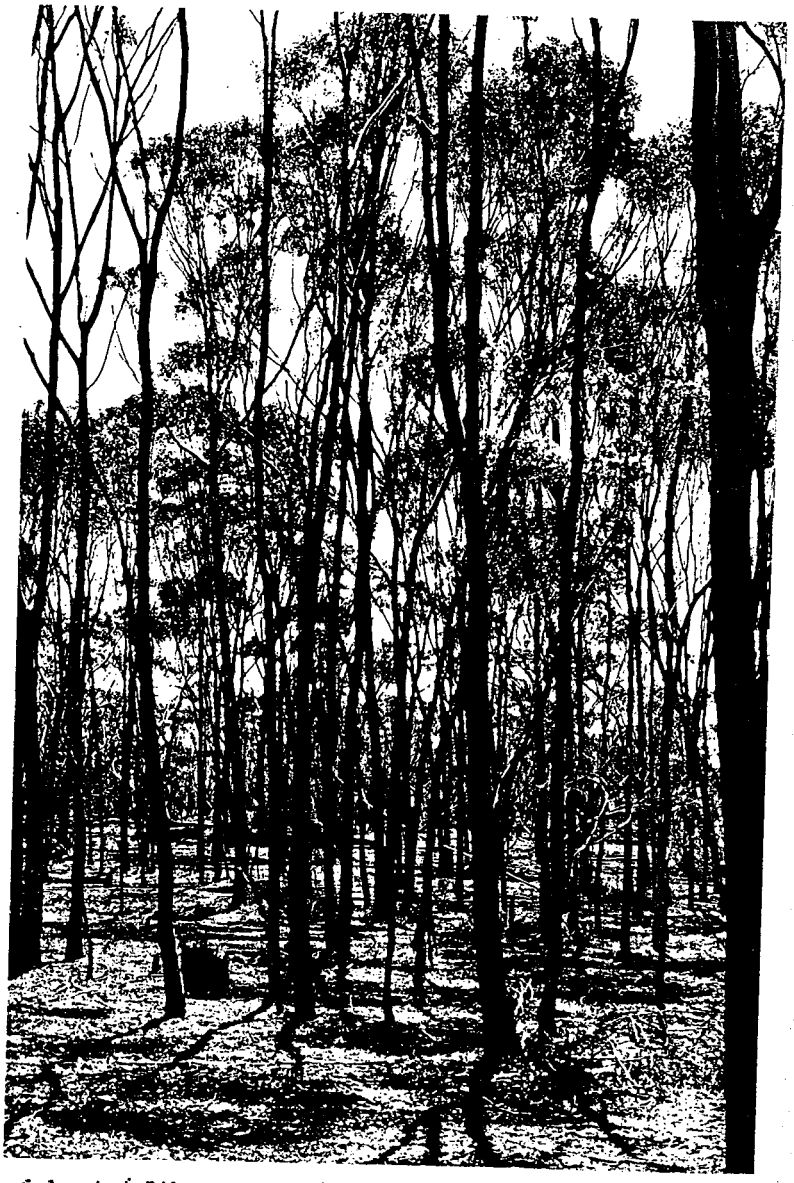
Photograph 9. *Eucalyptus myriadena* Woodland.

## 6. *EUCALYPTUS FALCATA* FOREST (SITES 9, 17)

Key Description - Low Forest A on red - brown clay loam with 10 % laterite pebbles.

Stratum 1. *Eucalyptus falcata* to 12 m and 30 - 70% cover.

Comments - Small areas of Silver Mallet occur on breakaways mainly in the southern half of the reserve. These are pure stands with negligible understorey and usually surrounded by mixed mallee associations.



Photograph 10. *Eucalyptus falcata* ( Silver Mallet) stand.

**Mallee Formations**

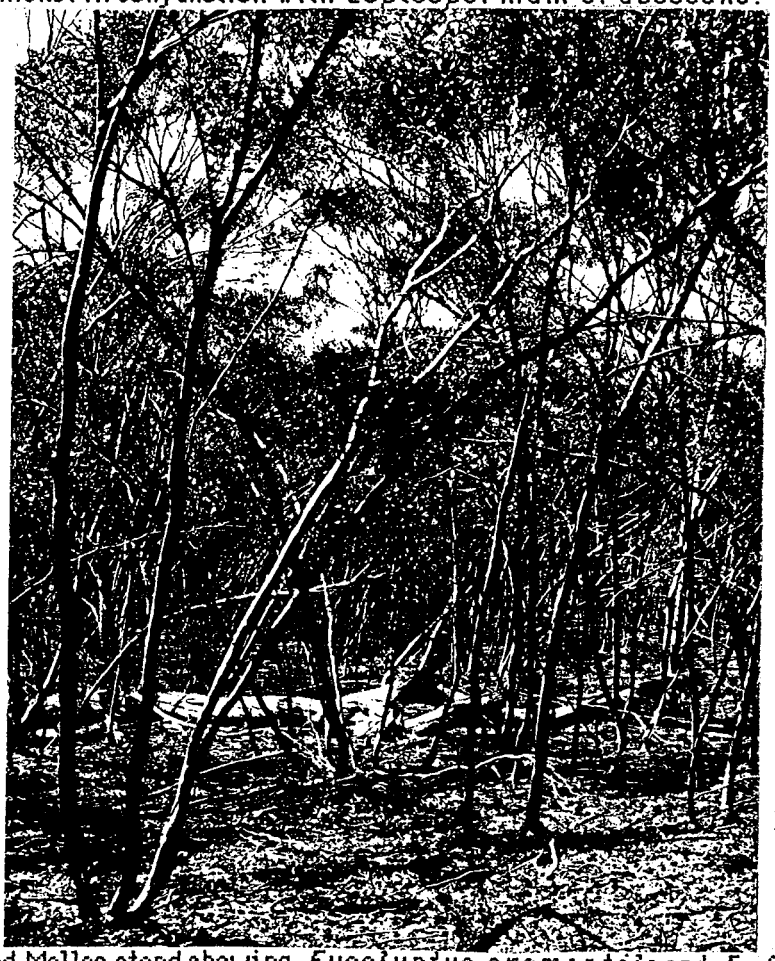
7. MIXED MALLEE (SITES 11, 15)

Key Description - Dense Tree Mallee/Tree Mallee over Open Dwarf Scrub D.

Stratum 1. *Eucalyptus flocktoniae, E. eremophila, E. conglobata* and the Blue Mallet *E. gardneri* to 6-8 m and 70 - 100% cover.

Stratum 2. Very sparse shrubs to 1m including *Gastrolobium trilobum, Olearia muelleri,* and *Acacia erinacea*.

Comments - This association occurs in small patches throughout the reserve on heavier soils and below laterite breakaways. The mixture of species is variable and sometimes difficult to identify but areas of mallee and areas ofmallet are quite distinct. Occasional patches of *Melaleuca cuticularis* and *M. uncinata* occur within the mallee and in some cases form a surrounding belt of thicket in conjunction with *Leptospermum erubescens*.



Photograph 11. Mixed Mallee stand showing *Eucalyptus eremophila* and *E. flocktoniae*.

8. EUCALYPTUS ALBIDA OVER SCRUB (SITES 4, 13)

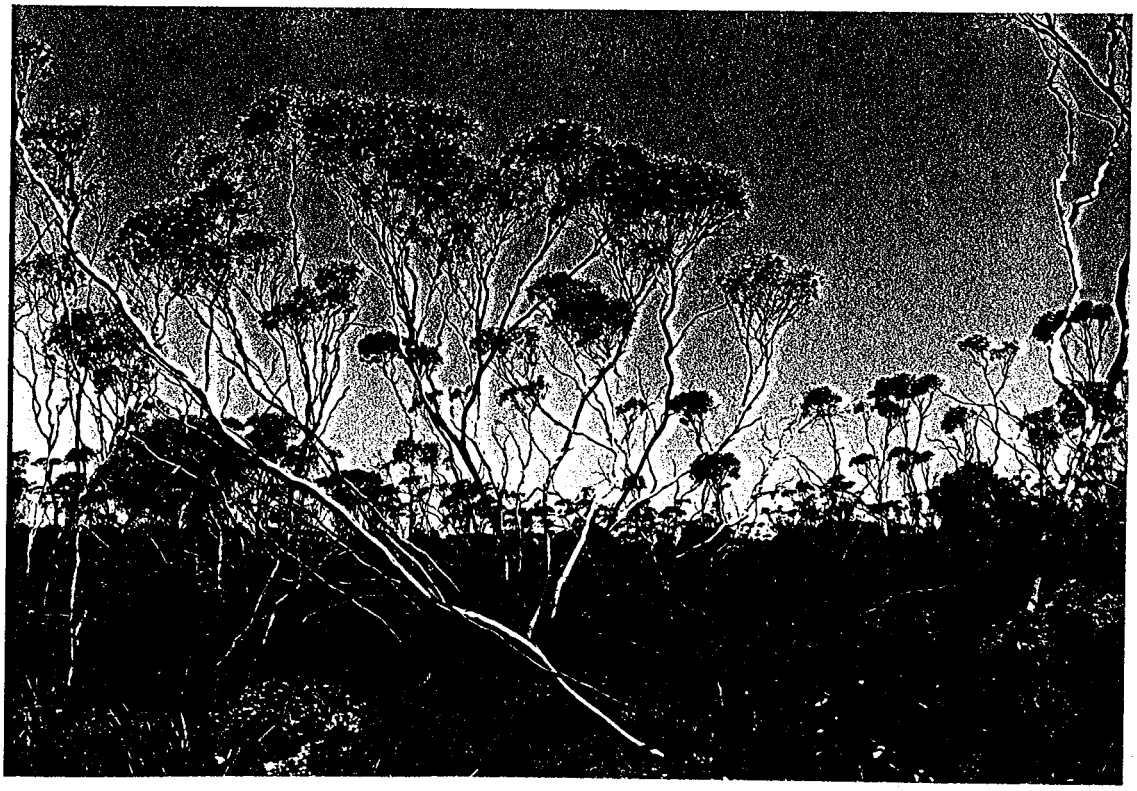
Key Description - Very Open Shrub Mallee over Open Low Scrub A over Low Heath C on yellow-brown sandy loam.

Stratum 1. *Eucalyptus albida* to 6 m and < 10% cover.

Stratum 2. Mixed scrub species including *Melaleuca pungens, Gastrolobium spinosum* and *Allocasuarina campestris.*

Stratum 3. Mixed heath of *Hakea lissocarpha, H. incrassata, Xanthorrhoea nana* and *Calothamnus quadrifidus.*

Comments - This is an extensive type which runs generally in a north-south direction through the centre of the Reserve. It sometimes occurs in association with other heath types and can include thickets of Tamma.



Photograph 12. *Eucalyptus albida* over mixed heath species and sedges.

9. MALLEE OVER THICKET (SITE 24)

Key Description - Open Shrub Mallee over Heath A on yellow-grey sandy clay loam with 10% laterite.

Stratum 1. *Eucalyptus spathulata, E. leptophylla* to 4-5 m and 10-30% cover.

Stratum 2. *Melaleuca uncinata, Leptospermum erubescens* and *Allocasuarina campestris* to 2-3 m and 70-100% cover.

Comments - This association is found only on the western edge of the reserve on higher ground and grades into heath type 13 and mixed mallee. The mallee species can have a 30-70% cover in some areas.

Photograph 13. *Eucalyptus spathulata* over thicket of *Melaleuca uncinata*.

**Thicket and Heath Formations**

10. LATERITE MIXED HEATH (SITE 5)

Key Description - Heath B/Low Heath C on yellow-brown sandy loam with to up 80% laterite.

The dominant heath species are *Petrophile aff. formosa* (<40%), *Hakea invaginata* (10-15%), *Dryandra vestita* and *Melaleuca pungens*.

Comments - This heath is very species-rich and contains a number of *Hakea*, *Petrophile* and *Dryandra* species. Occasional plants of *Allocasuarina campestris* (Tamma) to 2m and *Eucalyptus albida* to 2.5m are seen. The association is found mainly on the higher laterite plateau areas where crusting remains and is quite distinctive.

Photograph 14. Laterite mixed heath showing the dominant *Petrophile aff. formosa* in the right foreground and middle picture.

11. TAMMA THICKET (SITES 14, 7)

Key Description - Thicket/Heath A over Open Dwarf Scrub D over very Open Low Sedges on brown-yellow sandy loam with <10% laterite surface pebbles.

Stratum 1. *Allocasuarina campestris* 1.8 - 3.0 m and up to 70-100% cover. Also *Hakea subsulcata* may be present.

Stratum 2. *Dryandra aff. cirsoides, Hakea falcata, H. scoparia* to 50cm.

Stratum 3. Scattered plants of sedges *Schoenus globifer* and *Mesomalaena preissii*.

Comments - Tamma thickets are often seen growing with other vegetation associations, particularly with Wandoo and laterite heath. The type is extensive but scattered and very variable in density and tends to occur on higher ground.

Photograph 15. Tamma heath in background with Prostrate *Grevillea* Heath type in foreground.

Sand

12. SANDPLAIN HEATH (SITE 5)

Key Description - Open Scrub/Open low Scrub A over Low Heath C/Heath B over Open Tall Sedges on yellow loamy sand.

Stratum 1. Scattered *Nuytsia floribunda* and *Xylomelum occidentale* to 5m.

Stratum 2. *Dryandra sessilis, Allocasuarina campestris* and young plants of *Actinostrobus psammophila* to 3m and 10 - 30 % cover.

Stratum 3. A mixed heath to 1.3 m and 10 - 30% cover inlcuding *Allocasuarina humilis, Hakea trifurcata, Verticordia picta, V. chrysantha* and *Grevillea eriostachys.*

Stratum 4. *Mesomalaena preissii* to 1m and with 10 - 30% cover.

Comments - This association differs from other heath types in that it supports scattered scrub species. It was only seen near the airstrip on sandy slopes below the laterite uplands and running down to a creekline.

Photograph 16. Sandplain heath with *Nuytsia floribunda* (Christmas tree) in right background and *Actinostrobus psammophila* at centre background.

13. LOW HEATH (SITE 12)

Key Description - Open Low Scrub B over Low Heath C/D over Very Open Low Sedges.

Stratum 1. *Grevillea hookeriana, Hakea falcata* and scattered shrubs of *Allocasuarina campestris* with <10% cover.

Stratum 2. Includes *Grevillea paniculata, Hakea incrassata, Verticordia picta, V. acerosa* and *Grevillea uncinulata* to 30-70% cover.

Stratum 3. Sedges to 50cm are *Schoenus globifer, Lepidobolus chaetocephalus* and *Caustis dioica.*

Comments - Occurs in extensive areas on uplands and gentle slopes but differs from Laterite Mixed Heath in species dominance and soil type.

Photograph 17. Low Heath (note *Verticordia acerosa* at centre left).

## 14. PROSTRATE *GREVILLEA* HEATH (SITE 6)

Key Description - Open Low Scrub B over Open Tall Sedges over Low Heath D.

Stratum 1. Scattered *Leptospermum erubescens* and *Grevillea hookeriana* to 1.5 m.

Stratum 2. *Mesomalaena preissii* to 1m and 10 - 30% cover.

Stratum 3. Mixed heath species including *Calytrix sapphirina, Grevillea hookeriana, Conospermum stoechadis* and *Grevillea dryandroides* to 30-70% cover.

Comments - Scattered clumps or individuals of *Allocasuarina campestris* occur within this type but are too small to map and often grade into the heath. This heath was only seen to occur on the western side of the reserve near the airstrips on open sandy flats with gentle undulation.

Photograph 18. Prostrate *Grevillea* Heath with the gazetted rare *Grevillea dryandroides* in flower at left front and the common sedge *Mesomalaena preissii* in the centre ground.

## 3.2 FLORA SURVEY

The Corrigin Water Reserve lies in the Avon Botanical District (Beard 1979).

A total of 267 species is listed for reserves 16196 and 28131. Of these 51 were identified by J. M Brown on a laterite heath site and were not found in the present survey due to time limitations and seasonal restraints. A complete list of species identified is found in Appendix 1.

Four species of the family Poaceae (grasses) are introduced and one of the family Scrophulariaceae. Plant collections were made in mid-October and mid-January and although collecting in October produced many good flowering specimens a number of ephemeral and herbaceous species may not have been present at that time. The flora was not exhaustively sampled and the total of 267 is high when such limitations are taken into account.

The families Myrtaceae and Proteaceae were the most strongly represented with six other families providing significant numbers of species. A breakdown of numbers is as follows:

| Family | No. of species |
|---|---|
| Myrtaceae | 56 |
| Proteaceae | 43 |
| Papilionaceae (pea flowers) | 19 |
| Liliaceae (lilies, blackboys) | 13 |
| Mimosaceae (wattles) | 12 |
| Cyperaceae (sedges) | 12 |
| Asteraceae (daisys) | 12 |
| Stylidiaceae (trigger plants) | 9 |

42 families were represented in the area surveyed.

A measure of the relative floristic diversity of the area can be gained by calculating the average number of species per square kilometre. An estimated area of 12 km2 was surveyed giving a figure of 22.2 species per km 2. This compares well with the more westerly and well studied Tuttanning Reserve (22 species/km2) but is lower than the result for Boollanelling Nature Reserve which lies some 22 km NNW of Corrigin and has had 28.6 species/km2 recorded recently (Coates, 1985). The figure for Corrigin is considerably higher than those gained for

the more easterly reserves of Tarin Rock (8.7 spp/km2) and Bendering (5.9 spp/km2) (Muir 1977). Although these figures depend on the distribution of vegetation types within the reserve boundaries they do give some comparative indication of species richness.

The high number of species of Proteaceae and Myrtaceae is characteristic of laterite and sand heath vegetation types and the 15 Eucalyptus species recorded for the Myrtaceae indicates the diversity of mallee and woodland formations.

Photograph 19. Laterite Heath near lookout showing flowering plants of *Verticordia chrysantha* (yellow) and *Petrophile aff. formosa* (pink flowers, left mid-ground).

### 3.2.1 SPECIES OF INTEREST

**Gazetted Rare Plants**

One Gazetted Rare plant was collected and identified. ***Grevillea dryandroides*** has previously only been collected between Cadoux and Ballidu some 190 km north-north west of Corrigin (Rye and Hopper, 1981). The plant was observed in limited numbers (<100) in

sandplain heath vegetation near the junction of the aerodrome reserve and Reserve 28131 (Fig. 3).

Another Gazetted Rare species, ***Leschenaultia pulvinaris*** is found in the Corrigin to Harrismith area and there is a possibility that it also occurs on the Reserve.

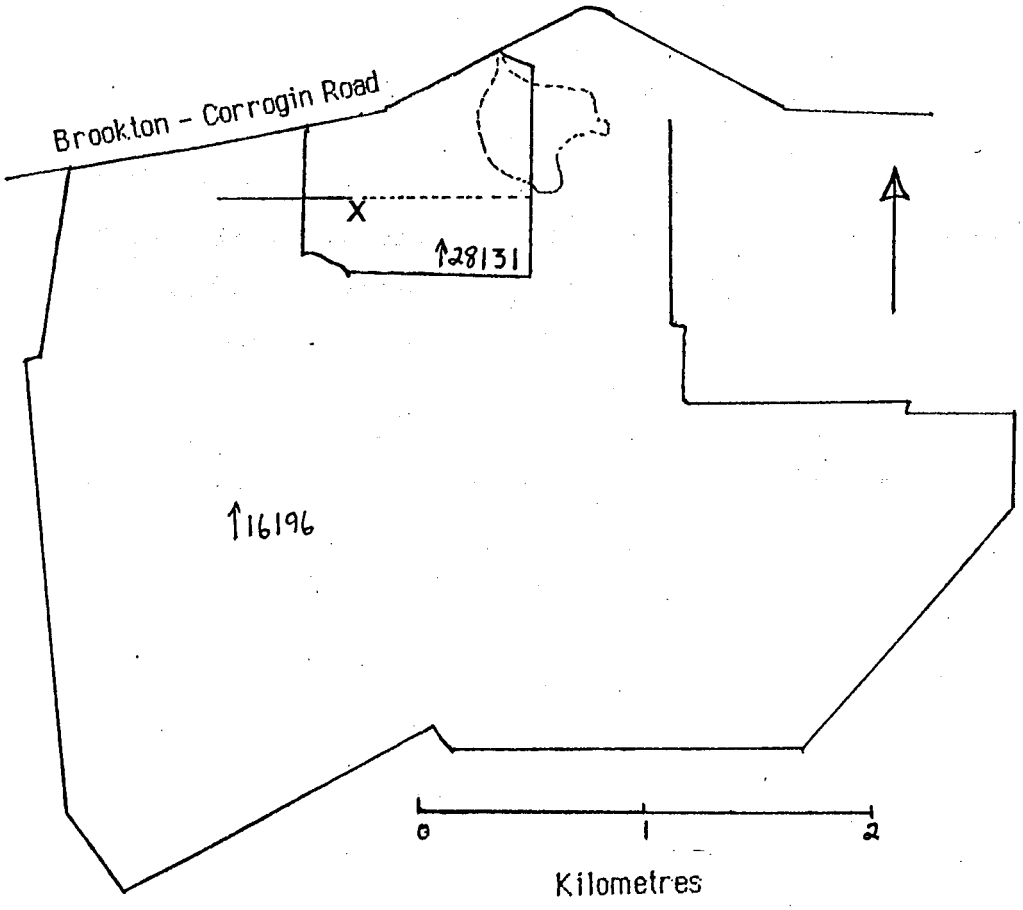



FIGURE 3. LOCATION OF THE GAZETTED RARE SPECIES *GREVILLEA DRYANDROIDES*

**Geographically Restricted Species**

***Dryandra cynaroides,*** although not found in the present survey has been collected in the laterite heath area (map 1). This species is regarded as apparently rare and quite restricted in distribution although it has a range of at least 130 km (Millar, 1982).

***Eucalyptus gardneri*** (Blue Mallet) was found extensively on the Reserve in association with mallee species or in almost monospecific stands. Leigh et. al. (1981) describe this species as not currently considered endangered or vulnerable with a range >100 km but occurring only in small populations which are mainly restricted to highly specific habitats.

***Hakea baxteri*** **and** ***Xanthorrhoea nana*** are placed in the same category as *Eucalyptus gardneri* by Leigh et. al. (1981) but both species were found in good numbers on the Reserve. Although *Hakea baxteri* was not recorded as being present in National Parks or other declared reserves it has since been listed in the flora of the Boolanelling Nature Reserve, north of Corrigin (Coates, 1985) and other Nature Reserves (C.A.L.M. pers. comm.).

Nine species recorded at the Corrigin Water Reserve are listed by Marchant and Keighery (1979) in their work on rare and poorly known plants. Of these species, however, ***Mesomalaena preissii, Schoenus armeria, Cassytha melantha*** and ***Dryandra ferruginea*** have since been widely collected and ***Persoonia striata*** is currently being revised so the situation with regards to the number of specimens is not clear.

***Leucopogon woodsii*** is only represented by 8 specimens in the W.A. Herbarium which have been collected from Manmanning to the Fitzgerald River - Esperance area.

Of the remainder of species listed by Marchant and Keighery, three (***Acacia deflexa, Cryptandra leucopogon*** **and** ***Platysace commutata*** ) are restricted to a distribution of <100 km (Category E) and although the former two species have since been more widely collected *Platysace commutata* is still represented by only 5 specimens collected from Tammin, Albany, Stirling Range, Cranbrook and Esperance.

***Dodonaea divaricata*** was found to be represented by <10 collections from between Paynes Find and Quairading and as such the identification of the species at Corrigin extends its range southwards by some 70 km.

***Stylidium luteum ssp. clavatum*** was only represented by 3 specimens at the W.A. Herbarium and may be considered rare and/or restricted.

Finally, ***Pultenaea verrucosa var. brachyphylla*** has only been collected south of the Ongerup - Needilup area and thus the record at Corrigin represents a considerable range extension to the north.

# 4.0 SUMMARY AND RECOMMENDATIONS

## 4.1 IMPORTANCE OF THE VEGETATION AND FLORA

The wheatbelt region of Western Australia is noted for its extensive tracts of cleared land and the area around Corrigin is no exception. The Corrigin Water Supply Reserve (no. 16196) and Aerodrome Reserve (No. 28131) are located in a shire which has the lowest percentage area of Nature Reserve for any shire in the Narrogin District.

The occurrence of a large area of uncleared and in many parts, almost pristine, bushland is rare and for this reason alone the reserves surveyed are of some importance. Additionally, the reserves incorporate a wide range of typical wheatbelt vegetation formations including woodland, mallee, mallet, thicket and heathlands and in doing so support an extensive and diverse flora. The species richness compares very favourably with other reserves surveyed in the wheatbelt and cannot be matched in the forests and woodlands of the extreme west and south west. Of particular importance are tree species such as *Eucalyptus astringens* (Brown Mallet) and *E. gardneri* (Blue Mallet) which have both limited distributions and more importantly limited remaining occurrence (Erikson et. al. 1973). The heath associations are very diverse and include many species of the Proteaceae and Myrtaceae families. Among them is *Grevillea dryandroides* a Gazetted Rare plant found previously only between Cadoux and Ballidu, 190 km NNW of Corrigin. The occurrence of this species at Corrigin is of some interest and the population should be carefully monitored, A number of other species are of limited geographical distribution and/or have been poorly collected.

## 4.2 MANAGEMENT CONSIDERATIONS

The reserves have not been burnt in any part for some 20 years and the vegetation has reached a level of maturity which does not often occur in areas of wheatbelt bushland. Mallet species are very fire sensitive, the trees being killed by fire and regenerating from seed. Although fire is a natural part of many ecosystems in Western Australia its elimination or careful control in this case is recommended. Because the reserves are surrounded by farmland and have a main road to the north burning would render them vulnerable to the invasion of weeds, especially crop species, and thus upset the natural vegetation balance. At present weed invasion is minimal and care should be taken to keep it that way.

Public useage of some parts of the reserves is well established with the presence of a gravel car

racing track and lookout. It is likely also that wood collecting, picnicking and possibly wildflower picking also occurs in areas with good access. Such areas include those along and near the disused and current railway lines, on tracks along the central water course and near the airstrip and main road. Despite this, however, there is little evidence of plant damage, littering or other despoilation and this serves to increase the value of the area for conservation purposes. As the reserve is very close to the Corrigin townsite and one of the few large bushland areas in the Shire its use for passive and active recreation is likely to be defended by local residents. Consideration for this fact would therefore have to be given in any future management plans.

Finally, local sightings suggest the presence of mallee fowl on the reserve and although no nests (old or fresh) were observed during the current survey the birds were seen 2-3 years ago by Mr. P. Connolly, a neighbouring farmer. These animals are no longer common in the central wheatbelt and further investigations should be made to ascertain their presence or absence. The woodlands and heaths are also likely to provide food and nesting resources for a number of other bird species and again a lack of other nearby bushland renders the reserves valuable.

It is therefore recommended that the reserves 16196 (excluding locations 23263, 11596, 8885 and 23262) and 28131 have 'Conservation of Flora and Fauna' added to their purpose. Joint vesting of most of reserve 16196 with that of Water Supply, Sewerage and Drainage does not appear to be unmutable as current Public Works Department useage of these areas is restricted to keeping the central drainage channel clear. The retention of a scenic lookout in an area vested for nature conservation is also not a conflicting use as the area is not heavily visited and is clean and with restricted vehicular access.

## 5.0 ACKNOWLEDGEMENTS

Thanks are given to the following people -

Mr B. Maslin for identification of *Acacia* species and Dr. S. Hopper for identification of *Eucalyptus* species.

The Curator of the Western Australian Herbarium for persmission to consult the collection.

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# APPENDIX 1 - SPECIES LIST

## KEY

* Introduced species
J Species collected by J. Brown but not in the present survey.
(632) Collecting number.

## GYMNOSPERMAE

### CUPRESSACEAE

Actinostrobus psammophila
Callitris canescens (632)

## ANGIOSPERMAE

### POACEAE

*Aira cupaniana
*Briza maxima
Neurachne alopecuroidea (638A)
Stipa elegantissima
*Vulpia ?myuros J

### CYPERACEAE

Caustia dioecia (649)
Isolepis marginata (514)
Lepidosperma drummondii (612)
L. gracile (741)
L. longitudinale
L. ?tenue (710)
Mesomalaena preissii (645)
M. stygia (526)
Schoenus armeria (742)
S. globifer (738)
S. aff. pleistemoneus
S. subflavus (515) J

two page 36's

### RESTIONACEAE

Lepidobolus chaetocephalus (594)
Loxocarya aspera (764)
[illegible] (501)

LILIACEAE

Borya nitida
Caesia sp. J
Chamaeoxerus fimbriata J
Chamaescilla corymbosa J
Dianella revoluta
Laxmannia paleacea (602)
Lomandra collina J
Stypandra imbricata (675B)
Thysanotus arenarius (746)
T. patersonii
T. thyrsoides (681B, 682B)
Trichoryne elatior
Xanthorrhoea nana

HAEMODORACEAE

Anigozanthos humilis (698)
Conostylis androstemma (541)
C. setigera J
C. villosa (670A, 593, 700)

ORCHIDACEAE

Caladenia roei (719)
C. saccarata J
Elythranthera brunonis J
Pterostylis nana J
P. recurva J

CASUARINACEAE

Allocasuarina campestris
A. humilis
A. microstachya

PROTEACEAE

Banksia sphaerocarpa var. caesia
Conospermum stoechadis
Dryandra aff. cirsoides (576)
D. aff. conferta J
D. conferta (727)
D. cyanaroides J
D. ferruginea
D. nivea
D. sessilis
D. vestita (581)
Grevillea dryandroides
G. hookeriana (589)

Grevillea integrifolia ?var. incurva (601)
G. paniculata (657)
G. patentiloba (694A)
G. uncinulata (641)
H. baxteri
H. falcata (619)
H. gilbertii
H. incrassata (732)
H. invaginata (638)
H. invaginata var. pachycarpa (750)
H. lissocarpha (611)
H. multilineata (714)
H. scoparia
H. subsulcata (720)
Isopogon divergens (647)
I. aff. formosus (584)
I. polycephalus
I. scabriusculus (618)
I. teretifolius (674A0
Persoonia ?quinquinervis (650)
P. striata (675A)
Petrophile brevifolia (603)
P. ericifolia
P. media J
P. seminuda (613)
P. trifida (605)
Synaphaea petiolaris (614)
S. polymorpha (652)
Xylomelum angustifolium

SANTALACEAE

Choretrum glomeratum (769)
Exocarpos sparteus (658)
Santalum acuminatum
Santalum murrayanum J

LORANTHACEAE

Nuytsia floribunda

LAURACEAE

Cassytha ?glabella (616)
C. melantha J
C. poiformis J

DROSERACEAE

Drosera androstemma J
D. glanduligera

Drosera macrantha J
D. paleacea ssp. paleacea (697B)

PITTOSPORACEAE

Billardiera bicolor var. bicolor (728)
B. coriacea (615)

MIMOSACEAE

Acacia acuminata
A. brachyclada (762)
A. chrysocephala (677A)
A. deflexa (640)
A. erinacea (683B)
A. lasiocalyx (716)
A. lasiocarpha var. sedifolia (655, 709)
A. leptopetala (688A)
A. microbotrya (674B)
A. pulchella var. glaberrima J
A. sp. nov. (ms rigida) (580)
A. stenoptera J

CESALPINACEAE

Cassia nemophila (684B)

PAPILIONACEAE

Chorizema aciculare (645)
Daviesia ?benthamii/brevifolia (665)
D. brachyphylla (744)
D. drummondii (690B)
D. longifolia (687A)
D. scoparia (767, 725)
D. uniflora (668)
Gastrolobium hookeri J
G. spinosum J
G. trilobum
Gompholobium obcordatum J
Jacksonia capitata (672A)
Mirbelia ?spinosa (648)
Oxylobium parviflorum (630)
Pultenaea capitata (703)
P. neurocalyx (678A0
P. verrucosa var. brachyphylla (627)
Templetonia sulcata

GERANIACEAE

Erodium cygnorum (685A)

RUTACEAE

Boronia capitata ssp. capitata (604)
Microcybe multiflora (757)
Phebalium filifolium (734, 686A)
P. microphyllum (599)

POLYGALACEAE

Comesperma scoparium (597)

EUPHORBIACEAE

Poranthera microphylla

CELASTRACEAE

Psammomoya choretroides J

STACKHOUSIACEAE

Stackhousia huegelii (672A)
S. scoparia (680B)

SAPINDACEAE

Dodonaea attenuata (629)
D. bursarifolia (637)
D. divaricata (686B)
D. pinifolia J
D. stenozyga (759)

RHAMNACEAE

Cryptandra glabriflora J
C. leucopogon (642)
C. parvifolia (634)
Trymalium daphnifolium (684A)

STERCULIACEAE

Guichenotia sarotes (717)
Keraudrenia integrifolia (718)

DILLENIACEAE

Hibbertia aff. eatoniae J
H. exasperata (582)
H. gracilipes (707)
H. rupicola (598, 689A, 656)
H. scandens (6[illegible])

THYMELACEAE

Pimelea brevifolia var. modesta (653)
P. imbricata var. piligera (691A, 654)

MYRTACEAE

Baeckea crispiflora (696, 643)
Baeckea preissiana (578)
Beaufortia cyrtodonta (606)
B. aff. heterophylla J
B. micrantha var. pubenula (579)
Calothamnus quadrifidus (595)
C. sanguineus J
Calytrix fraseri (651, 740)
C. lechenaultii
C. saphirrina (691B, 699, 591)
C. strigosa J
Chamalaucium nivicolum J
Eremaea pauciflora (695B)
Eucalyptus albida (735, 607)
E. astringens (770, 721)
E. celastroides (763)
E. eremophila (569, 761, 723, 752)
E. conglobata (695A, 748, 753, 742)
E. ?falcata
E. flocktoniae (712, 724, 755)
E. gardneri (now E. redunca ssp. pluricaulis) (765, 751, 715, 766)
E. incrassata (592)
E. leptophylla
E. loxophleba
E. myriadena (758)
E. salmoniphloia
E. spathulata (771, 620, 677B)
E. wandoo
Kunzea aff. preissiana (692A, 635)
Leptospermum erubescens (575, 702)
L. roei (574)
Melaleuca cuticularis (571)
M. ?densa (631)
M. aff. eleutherostachya (722)
M. holosericea (729)
M. laxiflora (626)
M. leptospermoides (577, 646, 731)
M. pentagona (644)
M. platycalyx (670B, 745)
M. pungens (679A)
M. aff. scabra J
M. aff. seriata (583, 730, 660)
M. spathulata J
M. spicigera (621)

Melaleuca subtrigona J
M. undulata (690A)
Melaleuca sp. (756)
Thryptomene racemulosus (671A)
Verticordia acerosa (663)
V. brachypoda (697A)
V. brownii
V. chrysantha (573)
V. grandiflora (689 B)
V. picta (736, 664)
V. roei (624, 749)
V. serrata (596)

ONAGRACEAE

Glischrocaryon aureum var aureum (588)

APIACEAE

Hydrocotyle callicarpa J
Platysace commutata
Trachymene cyanopetala (693A)

EPACRIDACEAE

Andersonia brevifolia (698A)
A. parvifolia (706, 633)
Astroloma serratifolium (590)
Leucopgon cymbiformis (673A, 622)
L. dielsianaus (625)
L. ?glaucifolius (685A)
L. woodsii J
Lysinema ciliatum

LOGANIACEAE

Logania tortuosa (688B)

APOCYNACEAE

Alyxia buxifolia

BORAGINACEAE

Halgania preissiana (660)

CHLOANTHACEAE

Chloanthes coccinea (610)
Cyanostegia lanceolata (693B)
Pityrodia axillaris (608)

LAMIACEAE

Westringia rigida (636)

SCROPHULARIACEAE

*Parentucellia latifolia (685C)

RUBIACEAE

Opercularia vaginata J

GOODENIACEAE

Brunonia australis (673B)
Dampiera oligophylla ssp. juncea (587)
D. sacculata (705)
D. wellsiana (661)
Dampiera sp. (JMB 061) J
Goodenia pinifolia J

STYLIDIACEAE

Levenhookia pusilla J
L. stipitata J
Stylidium adpressum (669)
S. breviscapum J
S. caricifolium (713)
S. luteum ssp. clavatum (617)
S. leptophyllum (677C)
S. piliferum (600, 696B)
S. schoenoides (586)

ASTERACEAE

Arctotheca calendula J
Blennospora drummondii J
Helichrysum lepidophyllum (768)
Helipterum hyalospermum (680B)
H. laeve J
H. verrecundum (676B)
*Hypochoeris glabra J
Millotia tenuifolia J
Olearia muelleri (726)
Podolepis lessonii (662)
Waitzia acuminata (659)
W. paniculata J

## APPENDIX 2 - SPECIES LISTINGS BY SITE

SITE 1

Eucalyptus astringens
Melaleuca aff. eleutherostachya

SITE 2

Acacia erinacea
Daviesia scoparia
Eucalyptus eremophila
E. flocktoniae
E. salmoniphloia
Olearia muelleri
Templetonia sulcata

SITE 3

Hakea invaginata
Allocasuarina campestris
Dryandra ferruginea
Melaleuca aff. scabra
Petrophile seminuda
Dryandra vestita
Banksia sphaerocarpa var. caesia
Isopogon scabriusculus
Dryandra aff. cirsoides
Billardiera bicolor
Xanthorrhoea nana
Melaleuca aff. holosericea
Melaleuca leptospermoides
Eucalyptus albida
Glischrocaryon aureum
Phebalium filifolium
Laxmannia paleacea
Verticordia grandiflora
Persoonia striata
Gastrolobium spinosum
Grevillea hookeriana
Petrophile aff. formosa
Dryandra conferta
Leucopogon minutifolia
Beaufortia micrantha var. puberula
Melaleuca pungens
Baeckea crispiflora
Petrophile brevifolia
Hakea subsulcata
Calytrix fraseri
Chloanthes coccinea
Hakea gilbertii
Verticordia ?chrysantha
Mesomalaena preissii
Daviesia drummondii
Astroloma serratifolium
Synaphaea petiolaris
Logania tortuosa
Hibbertia pungens
Dampiera oligophylla
Allocasuarina campestris
Verticordia picta

SITE 4

Eucalyptus albida
Hakea gilbertii
Beaufortia micrantha
Phebalium filifolium
Billardiera bicolor
Gastrolobium spinosum
Synaphaea petiolaris
Dryandra aff. cirsoides
Hakea lissocarpha
Pityrodia axillaris
Melaleuca pungens
Mesomalaena preissii
Melaleuca leptospermoides
Dryandra vestita
Isopogon polycephalus
Hibbertia pungens
Dodonaea stenozyga
Lepidobolus chaetocephalus

SITE 4 (cont.)
Hakea incrassata
Xanthorrhoea nana
Santalum acuminatum
Calothamnus quadrifidus

SITE 5

Dryandra sessilis
Actinostrobus psammophila
Eremaea pauciflora
Calytrix saphirrina
Verticordia picta
Petrophile ericifolia
Banksia sphaerocarpa var. caesia
Andersonia parvifolia
Isopogon polycephalus
Xylomelum angustifolium
Isopogon scabriusculus
Grevillea hookeriana
Leucopogon dielsiana
Leptospermum erubescens
Calothamnus quadrifidus
Grevillea integrifolia
Cyanostegia lanceolata
Petrophile brevifolia
Conostylis villosa
Dampiera sacculata
Alocasuarina microstachya
Hakea trifurcata
Allocasuarina humilis
Anigozanthos humilis
Stackhousia huegelii
Mesomalaena preissii
Hibbertia pungens
Gastrolobium spinosum
Baeckea crispiflora
Mirbelia ?spinosum
Grevillea eriostachya
Dryandra aff. cirsoides
Caustis dioica
Verticordia chrysantha
Halkea falcata
Glischrocaryon aureum
Daviesia drummondii
Nuytsia floribunda
Stylidium piliferum
Drosera paleacea
Verticordia serrata
Hakea incrassata

SITE 6

Isopogon polycephalus
Xanthorrhoea nana
Mesomalaena preissii
Calytrix saphirrina
Grevilliea hokeriana
Comesperma scoparia
Grevillea dryandroides
Petrophile ericifolia
Verticordia brownii
Hakea incrassata
Dampiera sacculata
Conospermum stoechadis
Eremaea pauciflora
Leptospermum erubescens
Hibbertia gracilipes
Verticordia chrysantha
Baeckea crispiflora
Glischrocaryon aureum
Conostylis villosa
Laxmannia paleacea
Astroloma serratifolium
Synaphaea polymorpha
Thysanotus patersonii
Persoonia striata
Dryandra nivea
Daviesia ?benthamii
Petrophile brevifolia
Allcasuarina microstachya
Pultenaea capitata
Allocasuarina campestris

SITE 7
Allocasuarina campestris
Trichoryne elatior
Dryandra aff. cirsoides
Hakea scoparia
Melaleuca leptospermoides
Astroloma serratifolium
Borya nitida
Hakea falcata
Schoenus globifer
Isotoma capitata

SITE 8

Eucalyptus astringens

SITE 9

Eucalyptus ?falcata
E. gardneri
E. salmoniphloia

SITE 10

Eucalyptus loxophleba
Acacia acuminata
Acacia microbotrya
Stypandra imbricata
Helipterum verrecundum
Thysanotus thyrsoides
Cassia nemophila
*Aira cupaniana
*Parentucellia latifolia
Stackhousia huegelii
Brunonia australis
*Ursinia anthemoides
*Briza maxima
Helipterum hyalospermum
Acacia erinaceae
Waitzia acuminata
*Vulpia myuros

SITE 11

Eucalyptus conglobata
Eucalyptus sp.
Melaleuca undulata
Acacia erinacea
Melaleuca uncinata

SITE 12

Isopogon polycephalus
Hakea invaginata
Petrophile pauciflora
Xanthorrhoea nana
Verticorida roei
Hakea incrassata
Grevillea uncinulata
Baeckea crispiflora
Mesomalaena preissii
Melaleuca leptospermoides
Mirbelia ?spinosum
Calytris fraseri
Pimelea brevifolia
Acacia lasiocarpha var sedifolia
Exocarpos sparteus
Verticordia acerosa
Daviesia ?benthamii
Dryandra nivea
Beaufortia cyrtodonta
Stylidium adpressum
Thryptomene racemulosus
Gastrolobium spinosum
Leucopogon dielsiana
Hibbertia rupicola
Acacia deflexa
Verticordia picta
Hakea scoparia
Cryptandra leucopogon
Melaleuca pentagona
Chorizema aciculare
Isopogon divergens
Caustis dioica
Persoonia striata
Pimelea imbricata var piligera
Grevillea paniculata
Waitzia acuminata
Verticordia picta
Melaleuca aff. seriata
Daviesia uniflora
Hakea baxteri
Conostylis villosa
Jacksonia capitata

SITE 12 (cont.)
Leucopogon cymbiformis
Acacia chrysocephala
Melaleuca pungens
Grevillea hookeriana
Dampiera wellsiana
Hakea incrassata
Lepidobolus chaetocephalus
Isopogon teretifolius
Pultenaea neurocalyx
Stackhousia scoparia
Halgania preissiana
Podlepis lessonii
Schoenus globifer

SITE 13

Eucalyptus albida
Petrophile aff. formosa
Dryandra ferruginea
Dryandra vestita
Melaleuca pungens
Hakea incrassata
Dryandra aff. cirsoides
Dampiera sacculata
Beaufortia cyrtodonta
Hibbertia pungens
Xanthorrhoea nana
Leucopogon minutifolius
Dryandra ?conferta
Grevillea hookeriana
Verticordia chrysantha
Hakea falcata
Comesperma scoparia
Allocasuarina campestris
Gastrolobium spinsoum
Persoonia quinqinervis
Beaufortia micrantha
Melaleuca leptospermoides
Mesomalaena preissii
Banksia sphaerocarpa var. caesia
Petrophile ericifolia
Astroloma serratifolium
Melaleuca aff. holosericea
Isopogon polycephalus
Isopogon scabruisculus
Calytrix leschenaultii
Acacia sp. nov. ('rigida')
Hakea baxteri
Hakea scoparia
Verticorida serrata

SITE 14

Allocasuarina campestris
Isopogon scabruisculus
Hakea invaginata
Leptospermum erubescens

SITE 15

Eucalyptus flocktoniae
Eucalyptus eremophila
Olearia muelleri
Eucalyptus conglobata
Eucalyptus gardneri
Melaleuca aff. eleutherostachya

SITE 16

Eucalyptus myriadena
Eucalyptus sp.
Santalum acuminatum
Dodonaea attenuata
Eucalyptus salmoniphloia
Microcybe multiflora
Olearia muelleri
Dodonaea stenozyga

SITE 17

Eucalyptus falcata
Melaleuca ?adnata

SITE 18

Eucalyptus salmoniphloia
Eucalyptus celastroides
Acacia brachyclada
Templetonia sulcata
Eucalyptus conglobata
Olearia muelleri
Loxocarya aspera
Grevillea patentiloba

SITE 19

Eucalyptus wandoo
Allocasuarina campestris
Hakea lissocarpha
Borya nitida
Loxocarya aspera
Melaleuca uncinata
Santalum acuminatum
Acacia lasiocarpha var. sedifolia
Lepidobolus chaetocephalus
Hakea scoparia

SITE 20

Eucalyptus gardneri
Eucalyptus flocktoniae
Trymalium daphnifolium
Gastrolobium trilobum
Eucalyptus eremophila
Melaleuca uncinata

SITE 21

Eucalyptus eremophila
Callitris canescens
Melaleuca uncinata
Santalum acuminatum
Eucalyptus gardneri
Hakea scoparia
Gastrolobium spinosum

SITE 22

Eucalyptus gardneri
Gastrolobium spinosum
Daviesia scoparia

SITE 23

Eucalyptus salmoniphloia
Acacia brachyclada
Olearia muelleri
Grevillea patentiloba
Eucalyptus wandoo
Acacia erinaceae
Melaleuca uncinata
Templetonia sulcata

SITE 24

Eucalyptus eremophila
Eucalyptus leptophylla
Melaleuca uncinata
Petrophile seminuda
Mesomalaena preissii
Cassytha ?glabella
Melaleuca spicigera
Eucalyptus spathulata
Allocasuarina campestris
Lepidosperma drummondii
Hakea incrassata
Synaphaea petiolaris
Billardiera ?coriacea
Leptospermum erubescens