



015016

CALM LIBRARY ARCHIVE  
NOT FOR LOAN

FLORA AND VEGETATION SURVEY  
OF DRAGON ROCKS NATURE  
RESERVE (No. A 36128)

Prepared for: Department of Conservation and  
Land Management  
Western Australia

By: Anne Coates  
Consultant Botanist

29 May 1992

WESTERN AUSTRALIAN HERBARIUM LIBRARY	
Class No.	587.9(941)
Doc. No.	COA
607210	

*Transferred to Archives*

TABLE OF CONTENTS

1.0	ABSTRACT	1
2.0	INTRODUCTION	2
2.1	Project Description	2
2.2	Project Requirements	3
2.3	History of Dragon Rocks Nature Reserve	4
2.4	Physical Environment	5
	a) Climate	5
	b) Geology and soils	7
2.5	Location and Physical Features of the Reserve	13
2.6	Fire History of the Reserve	16
3.0	METHOD	18
4.0	VEGETATION SURVEY	20
4.1	Previous Surveys	20
4.2	Current Surveys	23
5.0	FLORA SURVEY	92
5.1	Flora of the Dragon Rocks Nature Reserve	92
5.2	Species of Interest	97
	a) Gazetted Rare Plants	99
	b) X: Declared Rare Flora - Presumed Extinct	105
	c) Other Species of Interest	105
6.0	ACKNOWLEDGMENTS	110
7.0	REFERENCES	111
APPENDIX 1 PLANT SPECIES LIST FOR DRAGON ROCKS NATURE RESERVE No. A36128		113
APPENDIX 2 MUIR VEGETATION DESCRIPTIONS		133
APPENDIX 3 VEGETATION FORMATIONS OF DRAGON ROCKS NATURE RESERVES Dr N G MARCHANT IN McKENZIE <i>et al</i> 1973		153
APPENDIX 4 PLANT SPECIES LIST FOR VEGETATION ASSOCIATIONS OF DRAGON ROCKS NATURE RESERVE		158
APPENDIX 5 WHEATBELT LATERITE HEATH SITES 14 AND 15 - DRAGON ROCKS NATURE RESERVE		182



## 1.0 ABSTRACT

The area of Dragon Rocks Nature Reserve No. A 36128 (32 219 hectares) was surveyed for vegetation and flora. The dominant landscape unit on the reserve is gently undulating uplands with very gentle slopes and occasional breakaways. Other features include duplex soils on low lying areas and drainage lines with granite outcrops common throughout. The reserve lies in the Hyden Vegetation System which is typified by large areas of mallee. These mallee areas largely cover duplex soils on the reserve.

Twenty eight vegetation associations are mapped and described including woodlands (8), mallee (7), kwongan (11) and lithic complexes including granite and breakaways. Kwongan covers the sandplain ridges, mallee covers the slopes and mallee with patches of woodland occur on upper valley soils. The vegetation associations form the complex mosaic characteristic of wheatbelt vegetation which becomes even more pronounced in the Hyden Vegetation system. The changes in vegetation are linked to topography, pedological and/or geological features.

A total of 576 plant species have been identified for the reserve including 2 species of fern, 3 gymnosperms and 571 angiosperms. Of these species 61 are undescribed. Eight gazetted rare plants were recorded along with 13 Department of Conservation and Land Management priority taxa. Five of the gazetted rare plants were not previously known from the reserve and 11 of the priority taxa were also first recordings.

Dragon Rocks Nature Reserve is outstanding for its size, complexity of vegetation and diversity of flora. Few nature reserves of this size are present in the Western Australian wheatbelt. The results of this project fully support the summary made by McKenzie *et al* (1973) that "The diversity and quality of the flora and fauna of the Dragon Rocks area makes it potentially one of the most valuable wildlife sanctuaries in Australia".

## 2.0 INTRODUCTION

### 2.1 Project Description

Dragon Rocks Nature Reserve, Reserve No. A 36128, lies between Hyden and Newdegate in the central eastern wheatbelt. The Reserve is 32 000 hectares in area and contains a number of species gazetted as endangered including the Western Mouse (*Pseudomys occidentalis*) and *Eucalyptus olivacea*. Reserves of this size are significant anywhere in the Western Australian wheatbelt, particularly when they are surrounded by agricultural land as in the case of Dragon Rocks. As would be expected for an area of this significance, it is listed on the Register of the National Estate.

While gazettal of the Reserve as a nature reserve was based on a biological survey, botanical work undertaken was cursory due to the constraints at the time. With further clearing of adjoining land and thus isolation of the Reserve in the 1970s and 80s, and with increasing recreational pressure, the need to better plan management of the Reserve has become vital to ensure the long term conservation of its flora and fauna.

Furthermore, the growing need to better understand the value of smaller remnants in the wheatbelt depends in part on knowing how well their biota are duplicated on larger, more secure areas like Dragon Rocks.

For these reasons the Department of Conservation and Land Management has, and continues to undertake, opportunistic collections of flora and fauna records from the Reserve. The present survey has been funded by a grant allocated under the National Estate Program and provides a more comprehensive plant species list and vegetation map. The project will be followed by further fauna work by the Department of Conservation and Land Management to better document the vertebrate fauna of Dragon Rocks Nature Reserve.

The objectives of the vegetation survey are to conduct a flora and vegetation survey of Dragon Rocks Nature Reserve to provide:

1. an accurate vegetation map and descriptions of the location of rare flora;
2. data on which to assess usage proposals; and
3. baseline information for monitoring vegetation changes and for use in operational planning.

## 2.2 Project Requirements

The requirements of this project area to:

- a. produce a vegetation map of Reserve No. 36128. The scale used will be 1:25 000;
- b. write one or more association descriptions, based on the classification system of B Muir, which typify each of the vegetation categories mapped as in (a) above. The site of each description must be accurately recorded on the vegetation map, and each description will be accompanied by a photograph;
- c. accurately map locations of declared and other rare flora encountered during field work;
- d. collect and identify a representative sample of the flora encountered and lodge field specimens with CALM's Katanning Office (including sufficient material for a second set for Narrogin Office) and samples of less common species with the WA Herbarium; and
- e. compile a detailed flora species list for the Reserve.

### 2.3 History of Dragon Rocks Nature Reserve

The proposal to set aside land in the Dragon Rocks area for a Nature Reserve was first put forward by Mr R J Lane, Secretary of the Lake Grace Zone of the Farmer's Union of Western Australia (now the W A Farmers Federation) in 1966. It was considered that a reserve would provide benefits in relation to both soil and flora and fauna conservation to the surrounding region and that the area of vacant Crown land was unsuitable for farming.

A decision by the Department of Lands and Surveys (now the Department of Land Administration) was deferred until a soil survey of the area was completed in February 1968 [East Newdegate Classification No. 811]. In July and August 1972 Department personnel surveyed the boundary, roads and tracks in the area.

The Department of Fisheries and Wildlife (now the Department of Conservation and Land Management) also supported the request for a reserve. A preliminary survey was made in April 1972, followed by recommendations on the equipment and staff required for a detailed survey of the flora and fauna. The main aims of the subsequent survey were to assist the Department of Lands and Surveys in delineating the boundaries of the proposed reserve and to assess the potential of the 40 000 hectares of vacant Crown land as a reserve for the conservation of flora and fauna (McKenzie *et al* 1973).

A team from the Fauna Research Branch carried out survey work during two field trips in July and August. On the second field trip the fauna team was accompanied by Dr N Marchant a botanist from the Western Australian Herbarium who conducted the flora survey.

The recommendations of the report were as follows:

1. that a reserve of at least 30 000 hectares be set aside;
2. that the reserve be for the purpose of "Conservation of Flora and Fauna" and that it be vested in the Western Australian Wildlife Authority; and
3. that, because of the great importance of the area as a wildlife sanctuary, the reserve should be of Class "A".

Reserve No. A 36128 with an area of 32 096.7 hectares was gazetted on 22 June 1979 for the purpose of "Conservation of Flora and Fauna" and vested in the Western Australian Wildlife Authority (now the National Parks and Nature Conservation Authority). On 20 May 1983 the reserve was named Dragon Rocks Nature Reserve.

The area of the reserve was amended to 32 218.8 hectares on 13 July 1984 with the inclusion of 122.03 hectares comprising Roe Locations 3084, 3085 and 3086. These areas included the central track south of the Varley-Pingaring Road and two small areas previously designated as road reserves.

## 2.4 Physical Environment

### a) Climate

Dragon Rocks Nature Reserve is situated in an area which has a typical wheatbelt climate with hot dry summers and mild wet winters. Rainfall recorded at the Hyden Post Office since 1928 gives a mean annual rainfall of 336 mm with a mean annual rainfall of 362 mm calculated for Newdegate from data collected between 1925 and 1990. The reserve is situated approximately 30 kilometres north of Newdegate and approximately 20 kilometres south south east of Hyden and therefore can be expected to have a mean annual rainfall varying between these two figures.

Most of the rain falls in winter from May to August. Rain in summer is unreliable but there can be sporadic heavy falls from thunderstorms. Heavy summer falls of rain of this kind are reported by Beard (1979) as occurring in one or more months in 20 out of 37 years at Hyden with as much as 150 mm in a month received. Beard points out the importance of summer rain for native vegetation. Trees and larger shrubs make growth in summer and most eucalypts and some other species flower in Autumn. Summer rain may also be important for the regeneration of many species especially those which inhabit the heaths, ensuring the survival of at least a portion of young seedlings throughout the summer period. No summer rain was received at Dragon Rocks Nature Reserve in the 1990/91 summer preceding the survey with high temperatures to 46°C experienced in February. It is possible that dead trees of *Allocasuarina huegeliana* and shrubs of *Allocasuarina campestris* adjacent to some of the granite outcrops can be attributed to this factor.

The closest meteorological recording station for data on temperatures and relative humidity in the region is Lake Grace. The temperature regime is one of mild winters and hot summers. The winters are mild in that the mean maximum temperatures of the coldest months are above 10°C with light frosts at night. The mean temperature of the hottest month exceeds 25°C with absolute maxima above 40°C recorded.

Mean maximum and minimum temperatures for each season taken from data recorded at Hyden since 1970 and made available by the Bureau of Meteorology (1992) are as follows:

	Maximum	Minimum
Autumn (March to May)	24.9°C	10.6°C
Winter (June to August)	16.6°C	4.9°C
Spring (September to November)	23.9°C	8.3°C
Summer (December to February)	32.6°C	14.9°C

The mean annual 0900 H recording of relative humidity at Hyden is 62% with the highest recording in July (83%) and the lowest in January (44%) [Bureau of Meteorology 1992].

This type of regime with wet winters and dry summers is known as a Mediterranean climate and Beard (1979) classifies this area with its 7½ dry months as Dry Warm Mediterranean following the classification system of Bagnouls and Gaussen (1957). This is characteristic of the Western Australian Wheatbelt in which there is an average growing season in the rainy months of 4-5 months each year.

b) Geology and soils

The region is underlain by the Yilgarn Block, a very ancient rigid "shield" area composed mainly of Archaean granite and gneiss with some altered volcanics and sediments known as "greenstone" (Beard 1980). The topography of the area is gently undulating over a relict duricrust peneplain partly covered by sandplain. The duricrust peneplain is thought to be of Eocene age (Chin *et al* 1984). This surface is preserved along drainage divides but elsewhere is extensively eroded. Broad valleys contain salt-lake systems and locally granite which is resistant to weathering approaches the surface or crops out to form rock domes and tors.

Present day drainage is internal into salt lakes. These salt lakes are the remnants of former river systems which existed at a time of higher rainfall when the region was drained by the Swan-Avon palaeodrainage system. The system is thought to have developed between the early Cretaceous and the late Miocene (Van de Graaf *et al* in Chin *et al* 1984).

Dragon Rocks Nature Reserve is situated on a ridge of higher ground lying between two ancient river systems. One ancient valley is marked by a chain of small salt lakes north of Lake King, these include Lake Varley and Lake Hurlstone. The valley

then turns westward passing close by the town of Hyden and continues west to the Swan-Avon drainage system (Beard 1979). The other ancient valley trends north west from Lake Biddy. The ridge of higher ground between the valleys is denoted by such points as Mount Sheridan situated in the south east section of the Reserve.

The information in Figure 1 has been taken from the Hyden grid square of the 1:250 000 Geological series. Table 1 provides a description of the map units covering Dragon Rocks Nature Reserve.

Map units Cz1 and Czg cover most of the reserve with Cz1 becoming more extensive north of the Pingaring-Varley Road.

The map unit Cz1 represents the duricrust peneplain which is predominantly a nodular laterite crust grading downwards into a leached kaolinized zone of deeply weathered bedrock, the transition from this zone into fresh bedrock occurs over a narrow interval (Chin *et al* 1986). The soft kaolinized zone is susceptible to erosion, so that distinctive low breakaways and benched slopes occur at this level in the profile.

Overlying the duricrust there is generally a veneer of white to yellow sand (Czg) commonly containing laterite pebbles. Chin *et al* (1984) quotes studies carried out by Brewer and Bettenay which indicate that the sand is derived from the degradation of the underlying duricrust and has been transported for only a short distance. The sand deposit is thinner on hills than on slopes and downslope it grades into alluvial deposits derived from the breakdown of both duricrust and bedrock. That the sand veneer is thickest in valleys is due to downslope creep and wash.



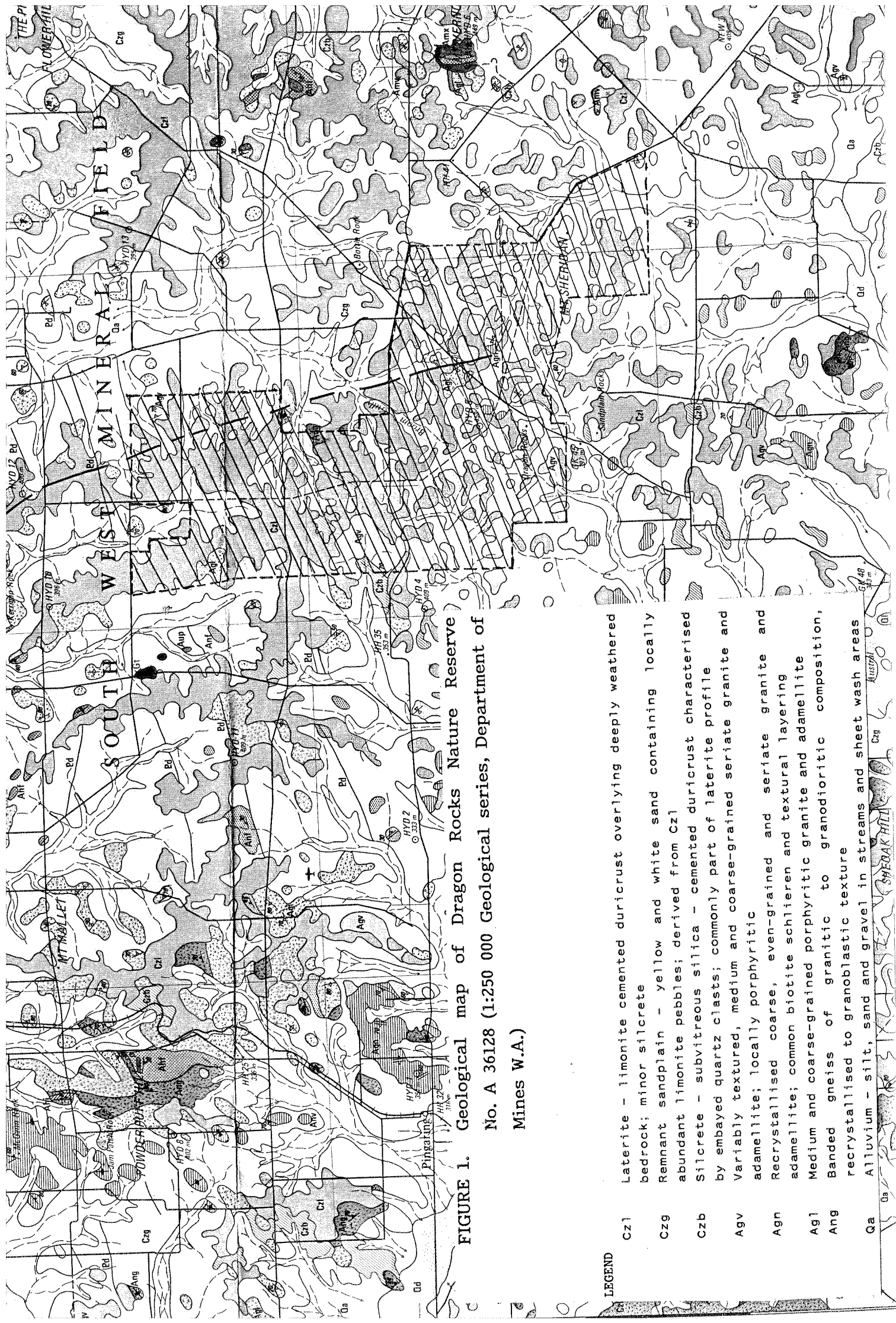


TABLE 1: A description of the geological map units covering Dragon Rocks Nature Reserve (No. A 36128). 1:250 000 Geological series, Department of Mines Western Australia.

Map Unit	Description
Czl	Laterite - limonite cemented duricrust overlying deeply weathered bedrock; minor silcrete
Czg	Remnant sandplain - yellow and white sand containing locally abundant limonite pebbles; derived from Czl
Czb	Silcrete - subvitreous silica - cemented duricrust characterised by embayed quartz clasts; commonly part of laterite profile
Agv	Variably textured, medium and coarse-grained seriate granite and adamellite; locally porphyritic
Agn	Recrystallised coarse, even-grained and seriate granite and adamellite; common biotite schlieren and textural layering
Ag1	Medium and coarse-grained porphyritic granite and adamellite
Ang	Banded gneiss of granitic to granodioritic composition, recrystallised to granoblastic texture
Qa	Alluvium - silt, sand and gravel in streams and sheet wash areas

Where the laterite duricrust overlying the granite-gneiss terrain has been completely removed by erosion, rounded and flat outcrops of granite occur (Chin *et al* 1984). Scattered throughout the reserve are areas of exposed granite mostly of map unit Agv.

The border valleys adjacent to the Dragon Rocks Nature Reserve are filled with recent alluvial deposits (Qa) consisting of sheet wash and braided-channel deposits. The sediment is predominantly sand derived from the sandplain and the granitic rock (Chin *et al* 1984). Three areas of map unit Qa can be seen on the peripheral area of the reserve where the drainage lines start to broaden into the valley areas adjacent.

The soils of the area have been mapped in Sheet 5 of the Atlas of Australian Soils (Northcote *et al* 1967). Table 2 provides a description of the Landscape/Map Units covering the area of the reserve. The prominent units are Ms8, X17 and JJ16 with only small areas of SL28 and Va66.

The soils of the majority of Dragon Rocks Nature Reserve have also been mapped at a scale of 50 chains to an inch (400 metres to 1 centimetre). See Figure 2 (Soil Survey North East of Newdegate, classn. 811) and Figure 3 (Soil Classification North of Lake Biddy CD 1290) for details. These maps do not cover the south eastern section of the reserve, south of Mount Sheridan.

The soils of the plateau area or uplands which are the dominant landscape unit on the reserve consist of areas of sand, sandy loam or loam (with or without gravel) over gravel or ironstone at depths divided into the following categories; 0-4 inches, 4-12 inches, 12-24 inches. Extensive areas of surface ironstone or gravel are depicted on the maps.

Characteristic soils in the low lying areas along gently sloping drainage lines are predominantly duplex soils of sand, sandy loam or loam (sometimes with gravel) over clay at depths varying from 0 to 36 inches divided into the above categories. Areas of sand and sandy loam soils (sometimes with gravel) over gravel at a depth of 4 inches or more are also found in low lying areas. These sandy surface soils are derived from the sandplain and granitic rock with sand deposits from high ground grading downslope into alluvial deposits.

TABLE 2: Descriptions of Landscape/Map Units covering Dragon Rocks Nature Reserve. Sheet 5 of the Atlas of Australian Soils (Northcote *et al* 1967)

Map Unit	Description
Ms8	Gently sloping to gently undulating plateau areas or uplands with long and very gentle slopes and, in places, abrupt erosional scarps: chief soils are (i) on depositional slopes, sandy yellow earths (Gn 2.21 and Gn 2.22) containing some ironstone gravels, and yellow earthy sands (Uc 5.22) often with ironstone gravels at depths below 6-7 feet; and (ii) on erosional ridges and slopes, ironstone gravels (kS-Uc 4.11) together with (Uc 4.11) and (Uc 2.12) (both containing ironstone gravels), all underlain by hardened mottled-zone material by depths of 12-24 inches. Soil dominance tends to vary locally between (i) and (ii) but overall the soils of (i) seem to have a slight dominance over the soils of (ii). Associated are smaller areas of other soils, such as (Dy 3.82) containing ironstone gravels in its surface horizons. As mapped, small areas of units JJ16, Va66, DD9, X17 and possibly SL28 are included.
JJ16	Broken terrain characterised by rock outcrops (granitic bosses and tors) which may cover very large areas within the unit: shallow and often stony or gritty sandy soils (Uc 4.11), (Uc 4.33) and Uc 4.22) form a soil scree around the areas of bare rock. Associated are small areas of many other soils, such as (Dr 2.62) and (Gc 2.2); their occurrence reflects the chemistry of the individual rock outcrop. As mapped, small areas of units Va66 and Mx8 are included.
X17	Slopes and valleys: Chief soils are sandy neutral and alkaline yellow mottled soils (Dy 5.42 and Dy 5.43). Associated are various related (Dy) soils such as (Dy 3.43) and (Dr) soils such as (Dr 5.43); leached sands such as (Uc 2.31); and areas of undescribed soils. There are similarities with unit Va66. As mapped, small areas of units JJ16, Ms8, SP28, S129, and DD11 are included.

## 2.5 Location and Physical Features of the Reserve

Dragon Rocks Nature Reserve is situated approximately 30 kilometres north of Newdegate and 20 kilometres south south east of Hyden. The reserve covers an area of 32 218.8 hectares and is surrounded by cleared farmland with only a few small areas of natural bushland adjoining the boundary (see Figure 4). The section of the reserve north of the Varley-Pingaring Road is situated in the Shire of Kulin with the southern portion in the Shire of Lake Grace. The area is irregular in shape with approximately 115 kilometres of boundary. The widest section from east to west is approximately 18 kilometres and the distance from the northern boundary to the southern boundary south of Dragon Rocks is 24 kilometres. The reserve extends south for a further 4.5 kilometres in the south eastern corner.

Cadastral and topographical information for the area of the reserve is available from Department of Land Administration lithographs. These maps include in the 1:50 000 series; 2732-III Dragon Rocks, 2732-IV Bottle Rock, 2632-I Kerrigan and 2632-II Eclipse Lake. In the 1:100 000 series 2632 Pederah and 2732 Hurlstone cover the area of the reserve and are presented in Figure 5.

The gently undulating uplands or plateau with breakaways and benched slopes are the dominant landscape unit reaching a height of 430 metres above sea level in places. The lowest points on the reserve occur in peripheral areas along drainage lines usually at 360 to 370 metres but grading down to 340 metres in some areas. The south east section of the reserve includes low lying areas at 340 metres along the southern boundary. Granite rocks occur as flat, partially soil covered expanses or as rounded domes such as Mount Sheridan at 380 metres.

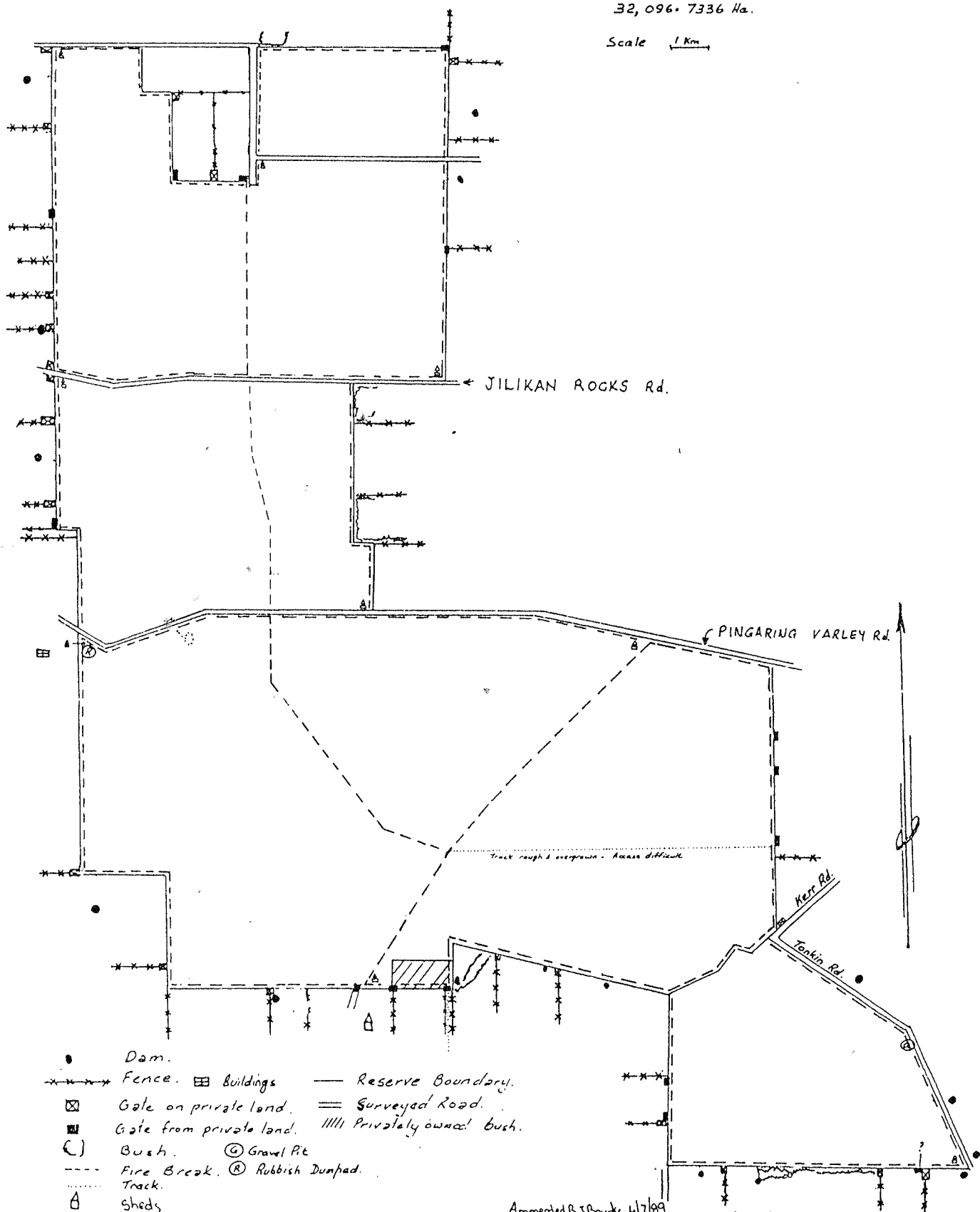
FIGURE 4.

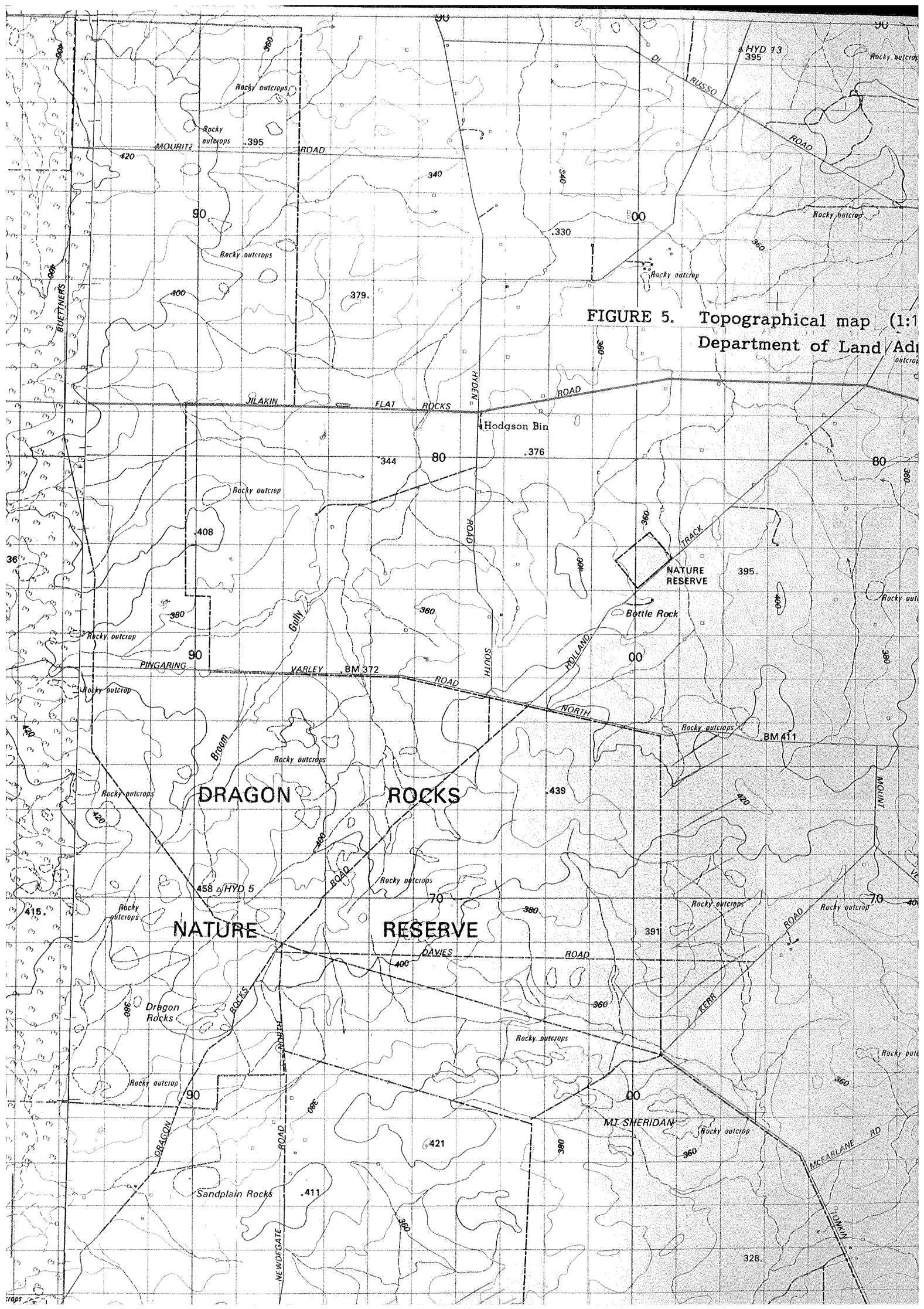
↑ A 36128

"DRAGON ROCKS"

32,096.7336 Ha.

Scale 1 Km





There is reasonable access to all sections of the reserve. Firebreaks are situated on the perimeter and through the centre of the area to Dragon Rocks Road. Several gravel roads run east west through the reserve including Mouritz Road, Jilakin-Flat Rocks Road and the Pingaring-Varley Road. Dragon Rocks Road runs south west to north east through the southern section but has not been developed forming only a track. Tonkin road and Buettners Road run along the boundary for a short distance.

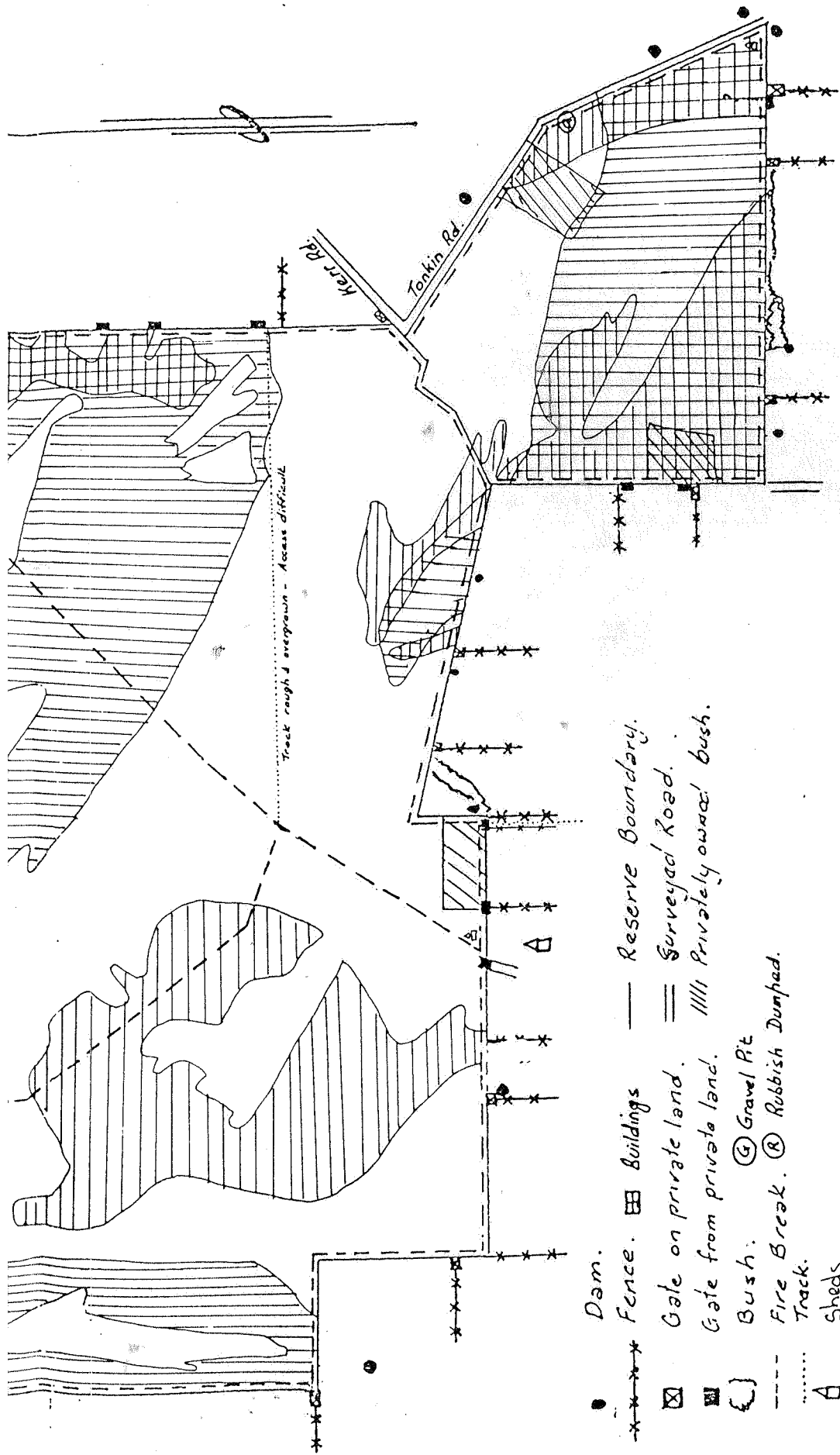
## 2.6 Fire History of the Reserve

The following extract relating to the fire history of the reserve is taken from a report by McKenzie *et al* (1973).

"the appearance of the vegetation supported Mr Lane's observation that the last major bushfire was in 1949. There is clear evidence however that a series of small fires had burnt some areas within the past 10 years."

Figure 6 depicts the approximate boundaries of major fire scars delineated from 1961 and 1980 black and white 1:40 000 and 1:50 000 aerial photography. The south eastern corner of the reserve has been frequently burnt with small sections in the region further disturbed by post 1961 clearing operations.





- Dam.
- Fence.
- ▢ Buildings
- Reserve Boundary.
- ⊠ Gate on private land.
- ≡ Surveyed Road.
- ⊞ Gate from private land.
- ||||| Privately owned bush.
- { Bush.
- ⊙ Gravel Pit
- Fire Break.
- ⊙ Rubbish Dump.
- Track.
- △ Sheds

### 3.0 METHOD

The ground survey of the vegetation and flora of Dragon Rocks Nature Reserve was carried out during June, August, September, October and November 1991 covering a total period of 7 weeks.

General vegetation divisions were noted using black and white aerial photography at a scale of 1:50 000. Areas of interest thus delineated were examined in the field and the vegetation and soils at selected sites described. Because of time limitations some areas were not covered in detail in the ground survey and mapping was carried out by extrapolation of known vegetation associations using the aerial photographs.

Vegetation association descriptions were based on the classification system devised by Muir (1977) which was specifically designed for describing wheatbelt vegetation (Table 3).

Voucher specimens of most plant species encountered were collected and identified using keys and by comparison with specimens at the Western Australian Herbarium. Experts involved in revising particular genera were consulted wherever possible to ensure accuracy with identification.

TABLE 3 - MUIR SYSTEM OF VEGETATION CLASSIFICATION

		CANOPY COVER			
LIFE FORM/BRIGHT CLASS		DENSE 70 - 100%	MID DENSE 30 - 70%	SPARSE 10 - 30%	VERY SPARSE 2 - 10%
T	Trees > 30 metres	Dense Tall Forest	Tall Forest	Tall Woodland	Open Tall Woodland
M	Trees 15 - 30 metres	Dense Forest	Forest	Woodland	Open Woodland
LA	Trees 5 - 15 metres	Dense Low Forest A	Low Forest A	Low Woodland A	Open Low Woodland A
LB	Trees < 5 metres	Dense Low Forest B	Low Forest B	Low Woodland B	Open Low Woodland B
KT	Mallee tree form	Dense Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
KS	Mallee shrub form	Dense Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
S	Shrubs > 2 metres	Dense Thicket	Thicket	Scrub	Open Scrub
SA	Shrubs 1.5 - 2.0 metres	Dense Heath A	Heath A	Low Scrub A	Open Low Scrub A
SB	Shrubs 1.0 - 1.5 metres	Dense Heath B	Heath B	Low Scrub B	Open Low Scrub B
SC	Shrubs 0.5 - 1.0 metres	Dense Low Heath C	Low Heath C	Dwarf Scrub C	Open Dwarf Scrub C
SD	Shrubs 0.0 - 0.5 metres	Dense Low Heath D	Low Heath D	Dwarf Scrub D	Open Dwarf Scrub D
P	Mat plants	Dense Mat Plants	Mat Plants	Open Mat Plants	Very Open Mat Plants
H	Hummock Grass	Dense Hummock Grass	Mid Dense Hummock Grass	Hummock Grass	Open Hummock Grass
GT	Bunch grass > 0.5 metres	Dense Tall Grass	Tall Grass	Open Tall Grass	Very Open Tall Grass
GL	Bunch grass < 0.5 metres	Dense Low Grass	Low Grass	Open Low Grass	Very Open Low Grass
J	Herbaceous spp.	Dense Herbs	Herbs	Open Herbs	Very Open Herbs
VT	Sedges > 0.5 metres	Dense Tall Sedges	Tall Sedges	Open Tall Sedges	Very Open Tall Sedges
VL	Sedges < 0.5 metres	Dense Low Sedges	Low Sedges	Open Low Sedges	Very Open Low Sedges
X	Ferns, Mosses, Liverwort	Dense Ferns Dense Mosses	Ferns Mosses	Open Ferns Open Mosses	Very Open Ferns Very Open Mosses

## 4.0 VEGETATION SURVEY

### 4.1 Previous Surveys

Dragon Rocks Nature Reserve is situated within the Hyden Vegetation system which is a subdivision of the Roe Botanical district. This District is characterised by extensive mallee areas. According to Beard (1980a) the highly mosaic character exhibited by the vegetation of the wheatbelt becomes even more pronounced within the Hyden Vegetation System with the plant cover varying in structure and composition every few yards. On a broad scale Beard describes a catena characteristic of the system comprising kwongan (heath and thicket) on sandplain ridges, mallee on the slopes covering the bulk of the area, mallee with patches of woodland on upper valley soils, woodland on low valley soils, and in saline areas a mosaic of woodland, shrubland and samphire. Granite rock outcrops may occur in any part of the area and have their own characteristic vegetation.

The Dragon Rocks Nature Reserve is situated within the Hyden grid square mapped by Beard (1979) at a scale of 1:250 000. From this work it can be noted that the map units covering the areas of the reserve include:

xSZc	Scrub Heath mixed Proteaceae - Myrtaceae
eSi	Mallee
eSi/e8Mi	Mallee with patches of salmon gum
e8Mi	Salmon gum Woodland

The Reserve area covers the upper portion of the landscape and is mapped mostly as mallee (eSi) and kwongan (xSZc).

An initial report on the nature conservation value of an area of vacant Crown land, which is now part of the Dragon Rocks Nature Reserve (Department of Conservation and Land Management files April 1972) refers to vegetation boundaries marked on Sheet 384 of the East Newdegate Classification compiled in 1926. The map was originally drafted for agricultural

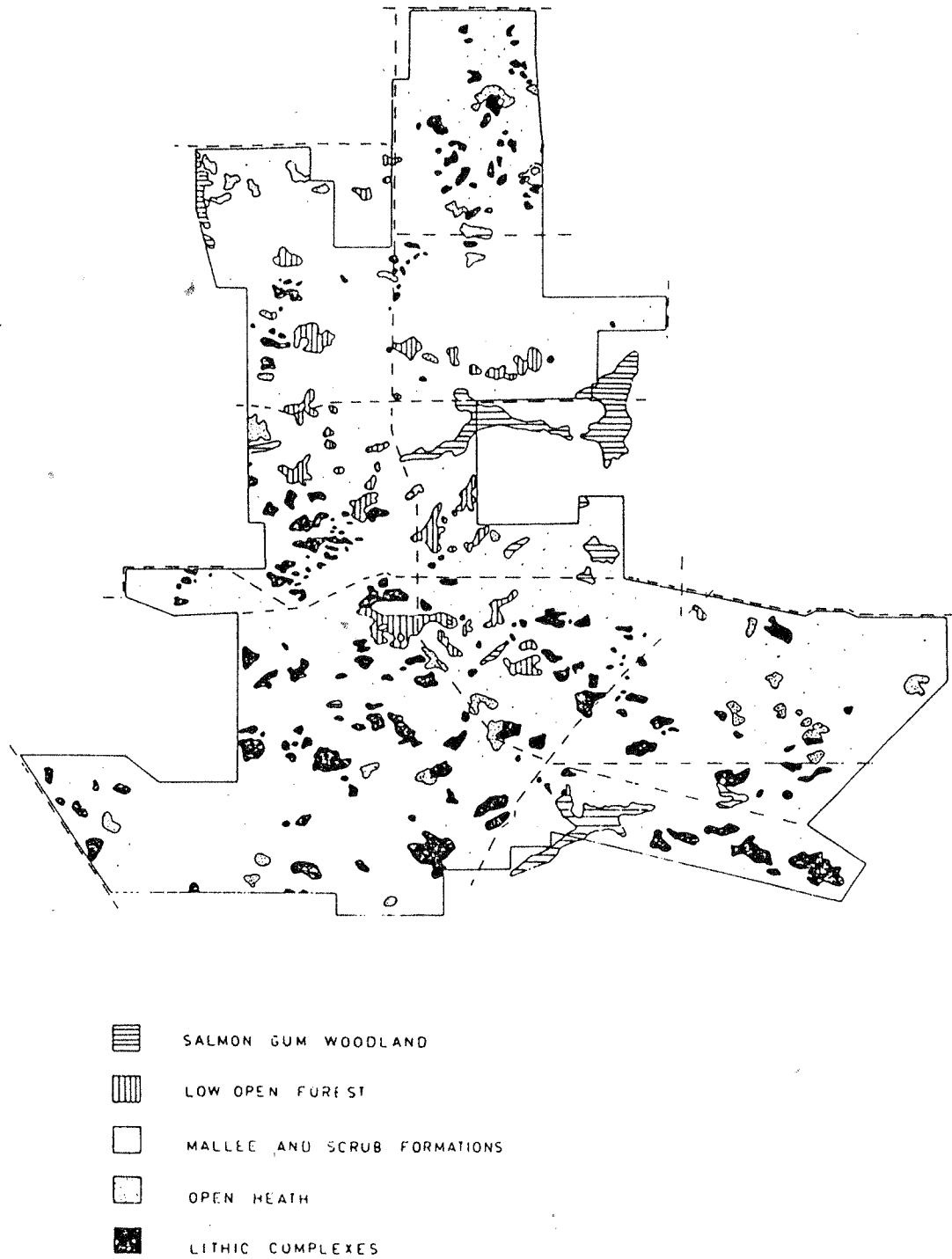
purposes and association descriptions use indicator species with importance to agriculture and not necessarily dominant. Unfortunately the Department of Land Administration has been unable to locate this map.

In 1972, the Department of Fisheries and Fauna conducted a biological survey which included most of the area of Dragon Rocks Nature Reserve (McKenzie *et al* 1973). Dr N Marchant from the W A Herbarium accompanied the survey team and described seven vegetation formations following the classification of Specht (1970). Details of these descriptions are presented in Appendix 3. Tree Formations included salmon gum Woodland and mallet Low Open Forest. Mallee and Scrub Formations included:

- a) Open Scrub;
- b) High Shrubland; and
- c) High Open Shrubland.

Other formations detailed were Open Heath and also Lithic Complexes including granite outcrops and breakaways. The vegetation map produced for the final report is presented in Figure 7.

FIGURE 7: Vegetation Map for a Proposed Wildlife Sanctuary at Dragon Rocks near Hyden, W.A. (McKenzie *et al* 1973)



## 4.2 Current Surveys

In the present survey the vegetation of Dragon Rocks Nature Reserve (No. A36128) is analysed in more detail. The plant communities form the intricate mosaic typical of wheatbelt vegetation and described by Beard (1980). A general catena or sequence is described for vegetation changes from the lateritic ridges to the drainage lines and upper valley soils. The changes in vegetation are linked to topography, pedological and/or geological features.

The vegetation was primarily divided into formations based on the following formation definitions provided by Muir (1977):

**Woodlands** are those formations in which the dominant life-form of the upper stratum is trees, the total canopy cover of which is greater than 2%.

**Mallee** formations are those in which the dominant life-form of the upper stratum is shrub-form or tree-form mallees the total canopy cover of which is greater than 2%.

**Shrublands** are formations where the upper stratum is dominated by the shrub life-form and the top of that stratum exceeds 2 metres from the ground and has a total canopy cover exceeding 2%.

*Heaths are formations where the upper stratum is dominated by the shrub life-form and the top of the stratum does not exceed 2 metres from the ground and has a total canopy cover exceeding 2%.*

**Lithic complexes** are mosaics of cryptogams, shrubs, sedges, trees and other life-form and the nature and distribution of which is directly affected by its proximity to granitic or other rock exposures. The term includes all the species growing in crevices or soil filled depressions and all the annual species occupying rock pools. The term is used where the scale of work is not large enough to map the various component formations of the lithic complex. Beard uses the term 'rock pavement vegetation' to describe the complex of lichens, mosses and low shrubs associated with granite outcrops. Marchant, (in McKenzie et al 1973) goes further, including tall shrubs and trees in the concept of the term 'lithic complex'.

**Breakaway complexes** are those plant species and physiognomic groups associated with the visor, pallid zone, and the scree or outwash zone of breakaways in the regions where the geomorphological characters are directly affecting the vegetation. a subjective decision must be made to where the outwash zone finishes, and the surrounding vegetation begins.

The vegetation was then further divided into species associations within these groupings. Table 4 lists the twenty eight vegetation associations described and mapped in this study. These include twenty one major associations, five of which have been further subdivided to clarify variation within the main groupings. The lithic complexes carry complex mosaics of several associations. The vegetations maps of Dragon Rocks Nature Reserve are presented in Figures 8 and 9 and Muir descriptions for the vegetation found at selected sites marked on the maps are listed in Appendix 2. A preliminary species list for each vegetation type is also presented in Appendix 4. Due to time limitations it was not possible to provide a more comprehensive species listing for vegetation types from all areas visited during field work. The preliminary list is based on data collected at sites selected for vegetation descriptions.

#### VEGETATION MAP

Stereo pairs of black and white aerial photographs at a scale of 1:50 000 (1980) were used for mapping the vegetation of Dragon Rocks Nature Reserve. A number of the 1:50 000 photographs were enlarged to 1:25 000 to provide a base for the final vegetation maps (Figures 8 and 9).

Aerial photo interpretation was made extremely difficult in some areas due to fire scars. Data such as soils and topography, observations in the field and aerial photographs at a scale of 1:40 000 (1961) were used to assist in delineating boundaries of recently burnt (pre 1980) vegetation associations. These



boundaries have been dotted on the maps to indicate some uncertainty in the interpretation work.

Aerial photography at a scale of 1:50 000 was not sufficient to allow accurate mapping in some areas where the vegetation formed complex mosaics. Where field work allowed detailed analysis map units in brackets indicate that small areas of the association occur within the boundaries delineated. Two map units marked together on the map eg. Mm/Kv indicate that the area delineated is covered by an intricate mosaic with both associations prominent.

Where mapping was carried out by extrapolation of known vegetation associations using the aerial photographs, major vegetation associations may contain small areas of subdivisions not delineated on the maps. For example, an area of Mm will probably include areas of Mma and Mmp although these areas are not marked on the maps. Boundaries between subdivisions are not always distinguishable and may not always appear.

The symbol K has been used as a map unit indicating kwongan vegetation, with M indicating areas of mallee and W woodland. The term Kwongan is defined by Beard in Pate and Beard (1984) as follows:

"Kwongan is any community of sclerophyll shrubland in south-western Australia which has a stratum  $\pm$  1 metre or less of leptophyllous and nanophyllos shrubs. It may also contain either taller shrubs, which may be dominant - so long as the dominants are of genera other than *Eucalyptus* - or scattered trees of any kind which are not dominant". (Pate and Beard 1984).

This definition includes Very Open Shrub Mallee areas regarded by Muir (1977) as Mallee formations because mallee eucalypts are present as emergents, for example, the *Eucalyptus albida* Very Open Shrub Mallee over Heath (Km) associations on Dragon Rocks Nature Reserve. Beard (1980) when referring to the vegetation of Tarin Rock Nature Reserve points out that these mallee are

normally sparse with a canopy cover <10% and consist of *Eucalyptus albidia* and *Eucalyptus incrassata* which occur widely in kwongan throughout the Hyden Vegetation System. It is regarded as normal by Beard for heath and scrub-heath components of kwongan vegetation to contain scattered mallee of this kind. The term mallee-heath is not considered appropriate in relation to *Eucalyptus albidia* since it has been used for formations in which mallees of a particularly gnarled form are an integral part of the structure of the heath such as *Eucalyptus tetragona* (Lake Magenta Nature Reserve) and *Eucalyptus burracoppinensis* (Bendering Nature Reserve). At Dragon Rocks and Tarin Rock Nature Reserves the mallees are of the erect form and occur as emergents from the heath. A classification of "scrub-heath with scattered mallee" was suggested (Beard 1980).

#### Vegetation of Dragon Rocks Nature Reserve (A36128)

Part of the catena outlined by Beard (1979) for the Hyden Vegetation System is found in a general sense on Dragon Rocks Nature Reserve. The relevant part of the catena was described as kwongan on the sand plain ridges, mallee on the slopes and mallee with patches of woodland on upper valley soils. The vegetation associations on Dragon Rocks Nature Reserve also form the complex mosaic characteristic of wheatbelt vegetation.

Large areas of the reserve cover the highest portion of the landscape which is capped with residual laterite and sand. Low Forests of blue mallet (*Eucalyptus gardneri*) and silver mallet (*Eucalyptus ornata* or *Eucalyptus argyrocaulon*) Wm, occur on the ironstone ridges on the highest sections above breakaways and benched slopes interspersed with *Allocasuarina acutivalvis* Thicket (Ka) in places.

Kwongan covers extensive areas of the residual laterite on sandy gravels with exposed ironstone locally. These areas include Heath (Kh) and *Eucalyptus albidia* Very Open Shrub Mallee over Heath (Km) on high points and upper slopes. These associations are rich in plant species especially members of the Myrtaceae,

Proteaceae and Papilionaceae families including *Banksia sphaerocarpa*, *Beaufortia interstans*, *Beaufortia micrantha*, *Dryandra erythrocephala*, *Dryandra* sp. 13 (ASG), *Gastrolobium spinosum*, *Hakea cygna*, *Isopogon teretifolius*, *Melaleuca leptospermoides*, *Melaleuca pungens*, *Petrophile trifida* and *Verticordia chrysantha*. Deeper soils which accumulate down slope or on level terrain on the gently undulating plateau support *Eucalyptus albida* Very Open Shrub Mallee over *Eremaea* Heath (Kme) where species such as *Banksia violacea*, *Eremaea pauciflora*, *Isopogon* aff. *buxifolius*, *Melaleuca subtrigona* and *Petrophile ericifolia* become prominent.

The edges of lateritic plateaux in the Hyden Vegetation System are seldom marked by breakaways and usually merge into other terrain down slope. However, breakaways are relatively common in the northern half of Dragon Rocks Nature Reserve with gently merging slopes still characteristic of many areas especially in southern sections. The breakaways carry a characteristic flora but scarp and scree areas are virtually bare of vegetation. On the out wash zone at the base of the breakaway the vegetation is extremely variable and usually sparse with characteristic species including *Acrotriche patula*, *Callitris canescens*, *Melaleuca* aff. *uncinata* and *Melaleuca haplantha*. Patches of mallee including *Eucalyptus phaenophylla* or occasionally *Eucalyptus capillosa* ssp. *polyclada* may also occur with Mallee over *Melaleuca haplantha* (Mmh) forming at the fringe of the zone. Small areas of *Eucalyptus astringens* (brown mallet, Wb) are also present below some of the breakaways on sandy clay soils. Brown mallet is found on laterite plateaux and breakaways further west but is replaced by blue and silver mallet in that habitat on the reserve.

Extensive areas of Mallee (Mm) cover areas of duplex soils of sand and sandy loam over clay below the lateritic ridges and along drainage lines. *Melaleuca* shrubs dominate the understorey with *Melaleuca uncinata* the most commonly occurring species. Other *Melaleuca* species may become prominent over short distances, for example, *Melaleuca adnata* and *Melaleuca coroncarpa*

(Mmc) on shallow soils over clay, *Melaleuca pentagona* (Mmp) on deeper surface sands and *Melaleuca acuminata* and *Melaleuca lateriflora* along drainage lines. A number of mallee species were recorded for this association with three or more species occurring at any one locality including *Eucalyptus anceps*, *Eucalyptus calycogona*, *Eucalyptus celastroides*, *Eucalyptus eremophila*, *Eucalyptus flocktoniae*, *Eucalyptus hypochlamydea*, *Eucalyptus loxophleba*, *Eucalyptus pileata*, *Eucalyptus sporadica*, *Eucalyptus spathulata* and *Eucalyptus phaenophylla*. Patches of *Melaleuca* Heath (Ku) occurring on poorly drained, winter wet, clay soils are interspersed with Mallee areas with Mallee (Ms) over a sparse understorey of scattered shrubs also covering small areas.

Deeper sands sometimes with gravel in low lying areas support the kwongan association of Low Mixed Heath (Kv). This association often forms a complex mosaic with Mallee over *Melaleuca uncinata* or *Allocasuarina campestris* near granite. The association is rich in plant species and is variable in structure and species composition.

*Eucalyptus salmonophloia*, salmon gum Woodland (Ws) occurs along drainage lines on loam soils over clay. These woodlands are not extensive and are present as narrow belts or patches amongst the Mallee over *Melaleuca*. Small areas of *Eucalyptus longicornis* (morrel, Wl) are found near the southern boundary adjacent to salmon gum woodlands and very rarely patches of *Eucalyptus salubris* (gimlet, Wg) occur on grey clay. *Eucalyptus occidentalis* (flat-topped yate, Wo) covers a small depression on the southern boundary on poorly drained clay soils. Woodland associations are poorly represented on Dragon Rocks Nature Reserve covering larger areas in adjacent valleys although these low lands have been extensively cleared for agriculture.

Areas of exposed granite rock are scattered throughout the reserve as granite pavement (flat, partially soil covered expanses) or as domes such as Mt. Sheridan or Dragon Rocks. Large outcrops (G) are a mosaic of bare granite and shallow or

deep soil pockets and are surrounded by shrublands or Low Woodland formations on detrital material receiving run-off from the rock. Mosses and lichens occur on the bare rock and *Borya constricta* or *Borya sphaerocephala* form a mat on flatter areas with shallow soils. Shrubs, ferns, herbs, sedges and grasses are scattered or occur in patches on shallow soil pockets and crevices and shallow border soils with characteristic species including *Cheilanthes austrotenuifolia*, *Dodonaea viscosa* ssp. *angustissima*, *Grevillea petrophiloides*, *Kunzea pulchella* (Mt Sheridan), *Leptospermum incanum*, *Melaleuca elliptica*, *Melaleuca fulgens*, *Phyllanthus calycinus*, *Ricinocarpos glaucus*, *Stylidium neglectum*, *Stypantra glauca*, *Thryptomene australis* and *Verticordia chrysanthella* and many species of orchid.

Deeper soils bordering the rock and adjacent areas support *Allocasuarina campestris* Thicket (Kt). *Lepidosperma ?longitudinale* and/or *Scirpodea spartochloa* often form dense to mid dense areas at the base of outcrops with *Thryptomene australis* or *Hakea petiolaris* sometimes present. Clumps of *Eucalyptus olivacea* with an understorey of shrubs with *Calothamnus quadrifidus* prominent were found at the base of five rock areas. Woodland formations associated with granite include *Allocasuarina huegeliana* Low Forest (rock sheoak, Wh) and *Acacia lasiocalyx* Low Forest (silver wattle, Wa) with *Eucalyptus loxophleba* Mallee (Ml) also occurring in adjacent areas on loam soils or on drainage lines often formed from run-off from the rocks.

The highly mosaic character exhibited by the vegetation becomes even more pronounced in areas where breakaways are less common and the lateritic plateau merges with the low lying areas of duplex soils and soil mixes become more complex. These patterns are typical of the Hyden Vegetation System. Small areas of *Allocasuarina acutivalvis* Scrub (Kas) occur on gravelly soils down slope from the lateritic ridges. Here *Allocasuarina acutivalvis* is joined by *Acacia assimilis* and *Allocasuarina corniculata*. *Allocasuarina corniculata* (Ka) is occasionally dominant over small areas on sandy soils and *Allocasuarina campestris* may also cover small areas on gravel soils. Heath

(laterite) is not as species rich on lower slopes and *Melaleuca leptospermoides* may become dominant in some areas (Khl). These lateritic heath areas tend to merge with Low Mixed Heath (Kv) on lower slopes with *Beaufortia interstans* common to both associations. Deeper sands usually on sloping terrain between the plateau and low lying areas support *Eremaea* Heath (Ke).

In the following pages vegetation descriptions of the structure and characteristic species composition of each vegetation association mapped in the present survey are detailed.

TABLE 4 - VEGETATION ASSOCIATIONS OF THE DRAGON ROCKS NATURE  
RESERVE (NO. A 36128)

### Woodland Formations

		Map Unit
1.	<i>Eucalyptus salmonophloia</i> (salmon gum) Woodland	Ws
2.	<i>Eucalyptus longicornis</i> (morell) Woodland	Wl
3.	<i>Eucalyptus occidentalis</i> (flat-topped yate) Woodland	Wo
4.	<i>Eucalyptus salubris</i> (gimlet) Low Forest	Wg
5.	<i>Eucalyptus gardneri</i> (blue mallet), <i>Eucalyptus</i> sp. (silver mallet) Low Forest	Wm
6.	<i>Eucalyptus astringens</i> (brown mallet) Low Forest	Wb
7.	<i>Allocasuarina huegeliana</i> (rock sheoak) Low Forest	Wh
8.	<i>Acacia lasiocalyx</i> (silver wattle) Low Forest	Wa

### Mallee Formations


9.	<i>Eucalyptus loxophleba</i> Mallee	Ml
	a) <i>Eucalyptus loxophleba</i> Mallee (granite)	Ml
	b) <i>Eucalyptus loxophleba</i> Mallee (drainage line)	Mld
10.	Mallee	Ms
11.	Mallee over <i>Melaleuca</i>	Mm
	a) Mallee over <i>Melaleuca uncinata</i> Thicket	Mm
	b) Mallee over <i>Melaleuca adnata</i> / <i>Melaleuca</i> <i>coronicarpa</i> Heath	Mma
	c) Mallee over <i>Melaleuca pentagona</i> Heath	Mmp
	d) Mallee over <i>Melaleuca haplantha</i> Heath	Mmh
12.	<i>Eucalyptus albidia</i> Very Open Shrub Mallee over Heath	Km
	a) <i>Eucalyptus albidia</i> Very Open Shrub Mallee over Heath (laterite)	Km
	b) <i>Eucalyptus albidia</i> Very Open Shrub Mallee over <i>Eremaea</i> Heath	Kme

### Shrublands and Heath formations

13.	Heath (laterite)	Kh
	a) Mixed Heath	Kh
	b) <i>Melaleuca leptospermoides</i> Heath	Kh1

- |     |   |     |
|-----|---|-----|
| 14. | Low Mixed Heath                             | Kv  |
| 15. | <i>Eremaea</i> Heath                        | Ke  |
| 16. | <i>Melaleuca</i> Heath                      | Ku  |
| 17. | <i>Allocasuarina acutivalvis</i> Thicket    | Ka  |
|     | a) <i>Allocasuarina acutivalvis</i> Thicket | Ka  |
|     | b) <i>Allocasuarina acutivalvis</i> Scrub   | Kas |
| 18. | <i>Allocasuarina corniculata</i> Thicket    | Kc  |
| 19. | <i>Allocasuarina campestris</i> Thicket     | Kt  |

#### Lithic Complex

- |     |                                     |   |
|-----|-------------------------------------|---|
| 20. | Granite Outcrop - Herbs, Shrublands | G   |
| 21. | Breakaway                           |  |



## WOODLAND FORMATIONS

Ws *Eucalyptus salmonophloia* (salmon gum) Woodland

**Diagnosis** Woodland (Open Woodland to Woodland) over Shrub Mallee or *Melaleuca* Thicket/Scrub/Heath A or variable understorey.

**Sites** 1.7, 2.10, 4.1a, 4.1b, 4.7, 9.7

**Description**

**Stratum 1** Woodland of *Eucalyptus salmonophloia*, 8 to 25 metres, to Open Woodland in some areas. *Eucalyptus densa* is occasionally present forming Low Forest A at site 4.7 over a short distance only. *Eucalyptus salmonophloia* Low Forrest A was recorded at site 2.10 where small areas were regenerating after a pre 1961 fire.

**Stratum 2** In some areas Shrub Mallee (Open Shrub Mallee rarely) forms a patchy stratum becoming continuous at the edge of the association adjacent to Mallee over *Melaleuca* areas. Species of Mallee recorded include *Eucalyptus anceps*, *Eucalyptus calycogona*, *Eucalyptus celastroides*, *Eucalyptus eremophila*, *Eucalyptus flocktoniae*, *Eucalyptus loxophleba* and *Eucalyptus spathulata*.

**Stratum 3** In some areas Low Scrub A to Thicket of *Melaleuca* species forms a patchy and discontinuous stratum. Dense thicket occurs occasionally in the gully areas of drainage lines. *Melaleuca* species recorded include *Melaleuca acuminata*, *Melaleuca adnata*, *Melaleuca lateriflora*, *Melaleuca pentagona* and *Melaleuca uncinata*.

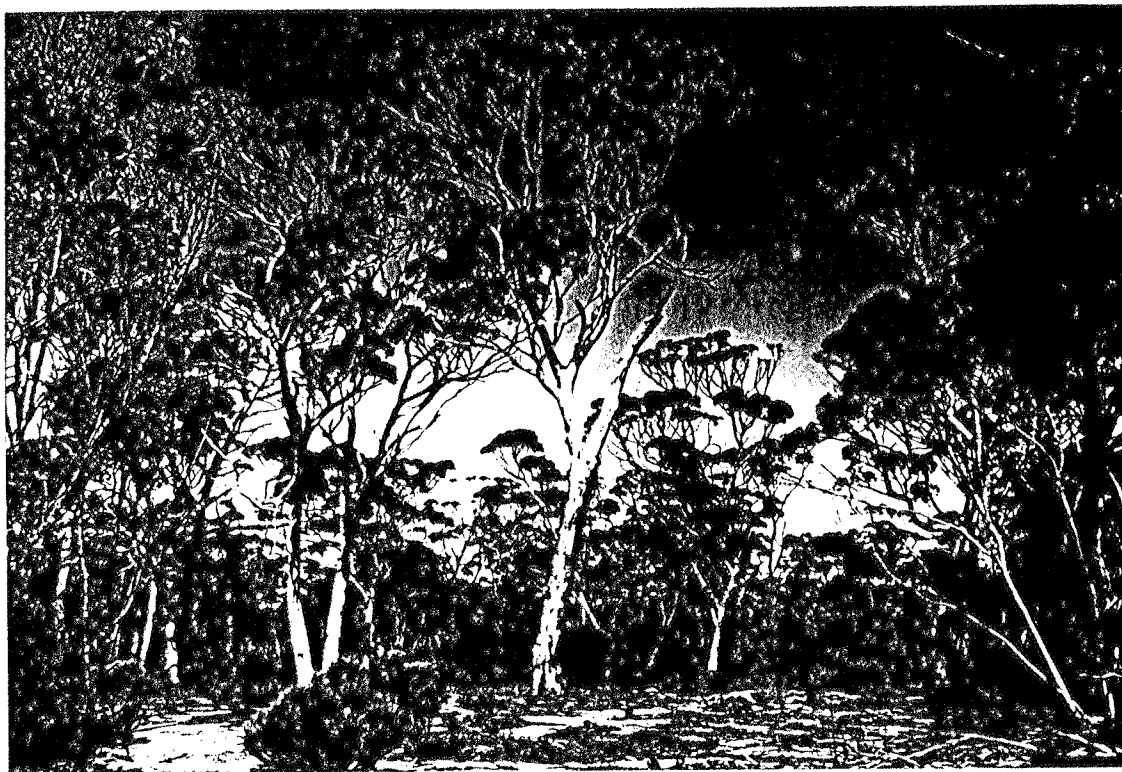
**Stratum 4** In areas where Shrub Mallee or *Melaleuca* Thicket are absent scattered shrubs of mixed species form Open Scrub to Low Scrub B in some areas. Characteristic

species include *Acacia microbotrya*, *Acacia tetanophylla*, *Alyxia buxifolia*, *Daviesia benthamii*, *Dodonaea ptarmicaefolia*, *Dodonaea viscosa*, *Eremophila drummondii*, *Exocarpos sparteus*, *Gastrolobium parviflorum*, *Hakea newbeyana*, *Pittosporum phylliraeoides*, *Santalum acuminatum*, *Scaevola spinescens* and *Templetonia sulcata*.

**Lower Stratum** In most areas shrubs with some herbaceous species and sedges form a lower stratum of Open Dwarf Scrub D to Dwarf Scrub D (Dwarf Scrub C occasionally). Characteristic species include *Acacia erinacea*, *Astroloma ?epacridis*, *Atriplex paludosa*, *Caladenia saccharata*, *Cryptandra nutans*, *Dianella revoluta*, *Dodonaea bursariifolia*, *Grevillea huegelii*, *Hakea lissocarpha*, *Lepidosperma* species, *Lomandra effusa*, *Melaleuca spicigera*, *Olearia muelleri*, *Olearia revoluta*, *Rhagodia preissii* and *Waitzia acuminata*.

**Comments** *Eucalyptus salmonophloia* Woodlands occur on soils of loam to sandy loam where clay is closer to the surface along the drainage lines in low lying areas. These woodlands are not extensive in the reserve and occur as narrow belts or patches amongst the Mallee over *Melaleuca* associations.

Photograph 1: *Eucalyptus salmonophloia* (salmon gum) Woodland at site 4.1a showing the patchy nature of the understorey



Photograph 2: *Eucalyptus salmonophloia* (salmon gum) Woodland at site 4.7 with an understorey of *Eucalyptus densa* and *Melaleuca* Thicket



W1 *Eucalyptus longicornis* Woodland

**Diagnosis** Woodland/Forest over Open Shrub Mallee in some areas or over Open Low Scrub A over Dwarf Scrub D/Open Dwarf Scrub D.

**Sites** 9.8, 9.9

**Description**

**Stratum 1** Forest to Woodland of *Eucalyptus longicornis*, 12 to 20 metres, with occasional *Eucalyptus salmonophloia* in some areas.

**Stratum 2** Occasionally Open Shrub Mallee to 5 metres forms a lower stratum. Characteristic species include *Eucalyptus anceps*, *Eucalyptus calycogona* and *Eucalyptus celastroides*.

**Stratum 3** Open Low Scrub A of mixed shrub species including *Daviesia benthamii*, *Dodonaea viscosa*, *Melaleuca acuminata*, *Melaleuca adnata*, *Pittosporum phylliraeoides*, *Santalum acuminatum* and *Senna artemisioides*. These species may be present only as scattered individuals in some areas.

**Stratum 4** Open Dwarf Scrub D to Dwarf Scrub D of mixed shrub species with some herbaceous plants form a patchy lower stratum in most areas. Commonly occurring species include *Acacia erinacea*, *Astroloma* sp., *Atriplex paludosa*, *Grevillea huegelii*, *Helichrysum leucopsidium*, *Lomandra effusa*, *Olearia muelleri*, *Ptilotus polystachyus* and *Rhagodia preissii*.

**Comments** *Eucalyptus longicornis* (morrel) Woodland occurs on alkaline soils of sandy loam with clay close to the surface in low lying areas along drainage lines. This association was only found near the southern boundary covering a small area adjacent to

Woodlands of *Eucalyptus salmonophloia*. Morrell Woodland cannot be distinguished from salmon gum Woodland on the aerial photographs and therefore map unit Ws as mapped may include small areas of morrel in the southern section of the reserve.

Photograph 3: *Eucalyptus longicornis* (morrel) at site 9.8



Wo *Eucalyptus occidentalis* (flat-topped yate) Woodland

Diagnosis Low Woodland A over *Melaleuca acuminata* Open Low Scrub B (Thicket in places).

Sites 10.9

Description

Stratum 1 Low Woodland A of *Eucalyptus occidentalis*, 3 to 12 metres, with occasional *Eucalyptus longicornis*.

Stratum 2 Open Low Scrub B of *Melaleuca acuminata* with patches of Thicket in some areas. An area of *Leptospermum erubescens*, *Santalum acuminatum* Heath B is also present up slope from the main woodland area.

Stratum 3 Very Open Tall Sedges of *Lomandra effusa* occur in places. Low Heath D of *Verticordia densiflora* covers a small area upslope from the main woodland area.

Comments *Eucalyptus occidentalis* (flat-topped yate) occurs on poorly drained clay soils in a depression. The woodland only covers a very small area on the southern boundary and extends into adjacent farmland.

Photograph 4: *Eucalyptus occidentalis* (flat-topped yate) at site 10.9



Wg *Eucalyptus salubris* (gimlet) Low Forest

Diagnosis Low Forest A over *Melaleuca acuminata* Low Scrub A to Thicket) over variable understorey.

Sites 3.3, 8.15

Description

Stratum 1 Low Forest A of *Eucalyptus salubris*, 7 to 10 metres, with scattered *Eucalyptus salmonophloia* emergent to 20 metres in some areas. Trees regenerating after a pre 1980 fire at site 8.15 form Dense Low Forest B.

Stratum 2 Low Scrub A to Thicket of *Melaleuca acuminata* in some areas. Open Scrub of *Santalum acuminatum* occurs in between *Melaleuca* areas at site 3.3 and Heath B of mixed shrub species occurs at site 8.15. Characteristic species include *Acacia brachyclada*, *Daviesia benthamii*, *Exocarpos aphyllus*, *Melaleuca adnata*, *Melaleuca lateriflora* and *Senna artemisioides*.

Comments *Eucalyptus salubris* (gimlet) Low Forest covers very small areas of grey clay soils, usually adjacent to *Eucalyptus salmonophloia*. The formation is rarely seen on the reserve. Areas of gimlet were mapped from observations made during fieldwork as this association cannot be delineated on the available aerial photography. As mapped, Ws (salmon gum Woodland) may include small areas of *Eucalyptus salubris* Low Forest.



Photograph 5: *Eucalyptus salubris* (gimlet) Low Forest at site 8.15



Wm *Eucalyptus gardneri* (blue mallet)/*Eucalyptus* sp. (silver mallet)  
Low Forest

Diagnosis Low Forest A over variable understorey.  
Regeneration - Low Forest B over Low Scrub B over  
Low Heath D.

Sites 1.16, 2.3, 3.5, 3.13, 4.13, 5.10, 7.2, 7.14, 8.11

Description

Stratum 1 Low Forest A of *Eucalyptus gardneri* and *Eucalyptus argyrocaulon* (southern section) or *Eucalyptus ornata* (northern section). Scattered trees of *Eucalyptus incrassata* and/or *Eucalyptus flocktoniae* may be present in some areas. Trees, 2 to 5 metres, regenerating after fire (pre 1980) form Low Forest B at site 8.11.

Stratum 2 In most areas Scrub to 3 metres forms a patchy stratum with *Allocasuarina acutivalvis* prominent. Thicket forms in some areas where Stratum 1 trees become more open.

Stratum 3 Low Scrub A/Open Low Scrub A or Heath B to Open Low Scrub B of mixed species usually form a lower stratum in areas where *Allocasuarina acutivalvis* is present as scattered shrubs only. Commonly occurring species include *Beyeria brevifolia*, *Callitris roei* (prominent in some areas), *Dodonaea amblyophylla*, *Dryandra* sp. (13 ASG), *Exocarpos aphyllus*, *Hakea multilineata*, *Hakea subsulcata*, *Isopogon* aff. *buxifolius*, *Melaleuca uncinata*, *Santalum acuminatum* and *Westringia cephalantha*.

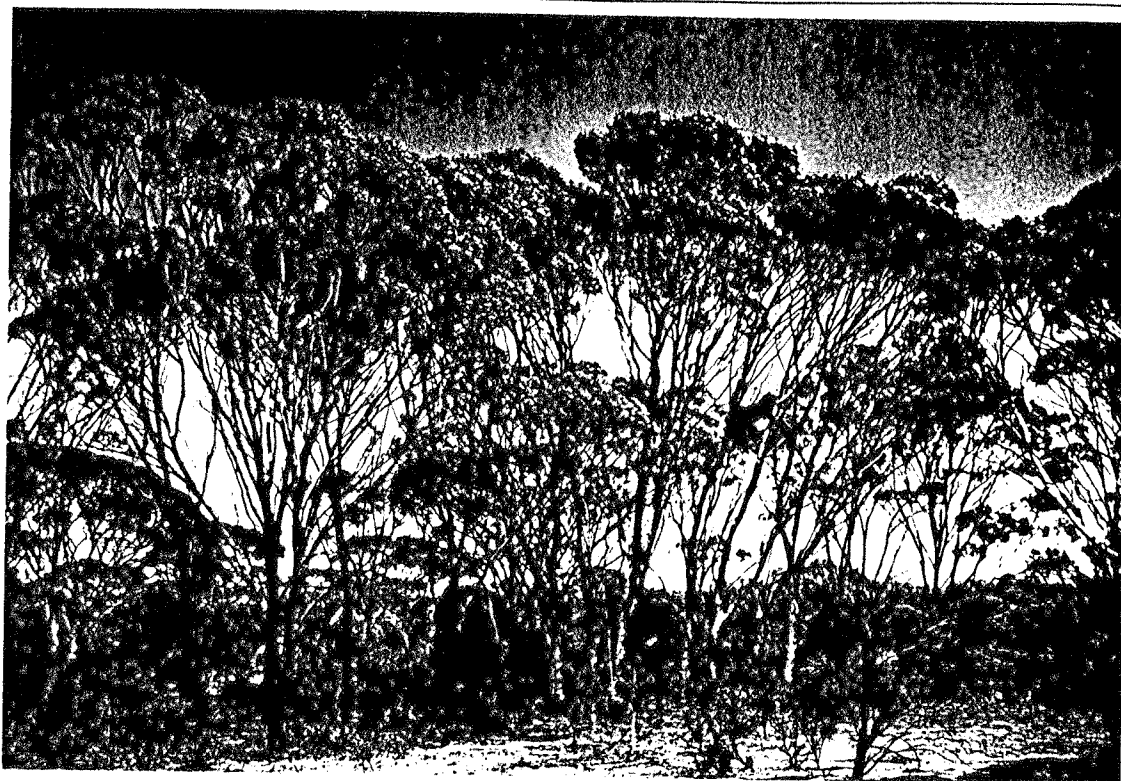
Stratum 4 Low Heath C to Dwarf Scrub C or Low Heath D to Dwarf Scrub D of mixed shrub species with some herbaceous plants forms a patchy stratum in most areas. Characteristic species include *Astroloma*

*serratifolium*, *Caladenia saccharata*, *Cryptandra parvifolia*, *Cyanicula caerulea*, *Gastrolobium spinosum*, *Goodenia pinifolia*, *Hibbertia exasperata*, *Persoonia ?coriacea*, *Phebalium filifolium*, *Phebalium ambiguum*, *Phebalium lepidotum*, *Phebalium tuberculatum* and *Spyridium subochreatum*.

#### Comments

*Eucalyptus gardneri* (blue mallet)/*Eucalyptus* sp. (silver mallet) Low Forest occurs on ironstone plateaux or ridges on the highest parts of the reserve. The formation is frequently located near breakaways and benched slopes with surface soils consisting of sandy loam with gravel and ironstone to the surface in places. Blue and silver mallet are relatively common on the reserve and are also found throughout the Hyden Vegetation System on lateritic ridges and breakaways. The trees are tender to fire and regenerate from seed, forming even-aged stands.

Photograph 6: *Eucalyptus gardneri* (blue mallet) and *Eucalyptus ornata* (silver mallet) at site 5.10



Photograph 7: *Eucalyptus gardneri* (blue mallet) and *Eucalyptus argyrocaulon* (ms) (silver mallet) regenerating after fire at site 8.11



Wb *Eucalyptus astringens* (brown mallet) Low Forest

Diagnosis Low Forest A over variable understorey.

Sites 1.9, 2.1, 2.14, 3.11, 3.16, 5.8

Description

Stratum 1 Low Forest A of *Eucalyptus astringens*, 8 to 12 metres in height. Scattered trees of *Eucalyptus incrassata* and scattered mallee of *Eucalyptus flocktoniae*, *Eucalyptus phaenophylla* and/or *Eucalyptus eremophila* are sometimes present.

Stratum 2 Open Low Woodland B of *Callitris canescens*, 2 to 4 metres, forming Low forest B over a small area at site 2.1. This stratum is not always present and *Callitris canescens* may be absent or occur as scattered individuals in some areas.

Stratum 3 Heath B to Low Scrub B or Low Heath C to Dwarf Scrub C forms a patchy, discontinuous stratum in some areas. Characteristic species include *Acrotriche patula*, *Daviesia benthamii*, *Exocarpos aphyllus*, *Gastrolobium parviflorum*, *Hakea newbeyana*, *Melaleuca acuminata*, *Melaleuca adnata*, *Melaleuca coronicarpa*, *Melaleuca haplantha*, *Melaleuca spicigera*, *Melaleuca uncinata*, *Mirbelia dilatata*, *Phebalium tuberosum* and *Santalum acuminatum* (Scrub at site 1.9). *Melaleuca haplantha* may be prominent in some areas.

Lower Stratum No discernible understorey is present in some areas with only scattered shrubs and herbaceous species recorded.

Comments *Eucalyptus astringens* (brown mallet) Low Forest occurs on shallow sand or loam soils over clay below breakaways in the out wash zone. The association covers only small areas and is not characteristic of

all breakaways on the reserve. Further west of Dragon Rocks Nature Reserve brown mallet is found on laterite.

Photograph 8: *Eucalyptus astringens* (brown mallet) below a breakaway at site 2.14



Wh *Allocasuarina huegeliana* (rock sheoak) Low Forest

- Diagnosis** Low Forest A to Dense Low Forest A over *Hakea petiolaris* Open Scrub (Thicket in places) over Open Tall Sedges/Tall Sedges (Tall Grass).
- Sites** 1.21, 6.6, 7.8, 8.9, 9.12, 10.3
- Description**
- Stratum 1** Low Forest A to Dense Low Forest A/Dense Low Forest B of *Allocasuarina huegeliana*, 4 to 15 metres. *Acacia lasiocalyx* and *Eucalyptus loxophleba* may be present in some areas as scattered individuals.
- Stratum 2** Open Scrub occasionally to Thicket of *Hakea petiolaris* to 7 metres in places. *Santalum acuminatum* is also a characteristic species with *Grevillea petrophiloides* and *Dodonaea ptarmicaefolia* occasional.
- Stratum 3** Open Tall Sedges/Tall Sedges [Open Tall Grass/Tall Grass] of *Lepidosperma ?longitudinale* and *Spartochloa scirpoidea* occur in most areas at the base of the granite rock. Scattered shrubs to 1.5 metres also occur in most areas forming Dwarf Scrub C at site 10.3 and Dwarf Scrub D at site 9.12. Species include *Acacia acutata*, *Allocasuarina campestris*, *Calothamnus quadrifidus*, *Calytrix leschenaultii*, *Hibbertia rupicola*, *Lomandra effusa*, *Melaleuca elliptica*, *Phyllanthus calycinus*, *Stypandra glauca*, *Thryptomene australis* and *Verticordia chrysanthella*.
- Comments** *Allocasuarina huegeliana* (rock sheoak) Low Forest occurs at the base of granite outcrops in the deeper soils bordering the exposed granite or in the deeper soils lodged in shoulders and clefts in the rock. The trees receive run-off from the rock surface. Rock sheoaks at the base of outcrops are usually taller reaching heights of 15 metres at some localities. The

association has been identified from observations made during fieldwork. Lithic complex (G) mapped from aerial photography alone may include small areas of *Allocasuarina huegeliana* Low Forest not delineated on the maps.

Photograph 9: *Allocasuarina huegeliana* (rock sheoak) at site 7.8  
(Lane's Rock)





Wa *Acacia lasiocalyx* (silver wattle) Low Forest

**Diagnosis** Dense Low Forest A/Low Forest A over *Hakea petiolaris* Thicket in places over *Allocasuarina campestris* Thicket to Low Scrub A over Tall Sedges/Tall Grass.

Regeneration - Dense Low Forest B over Dense Heath A.

**Sites** 3.15, 5.4, 7.5, 8.9, 9.12, 10.3

**Description**

**Stratum 1** Low Forest A to Dense Low Forest A of *Acacia lasiocalyx*, 6 to 15 metres in height. Scattered shrubs of *Hakea petiolaris* and trees of *Allocasuarina huegeliana* commonly occur.

**Stratum 2** Occasionally *Hakea petiolaris* thicket forms a separate stratum.

**Stratum 3** Thicket to Low Scrub A of *Allocasuarina campestris* occurs in most areas. Other characteristic species include *Santalum acuminatum*, *Thryptomene australis* and *Leptospermum ?incanum*. *Grevillea petrophiloides* and *Kunzea pulchella* were also recorded in the south eastern section of the reserve.

**Stratum 4** Tall Sedges/Tall Grass of *Lepidosperma ?longitudinale* and *Spartochloa scirpoidea* to Dense Tall Sedges/Dense Tall Grass occasionally.

**Comments** Deeper soils surrounding exposed granite sometimes support *Acacia lasiocalyx* Low Forest. Silver wattle may also occur as scattered individuals in some areas. Lithic complex (G) mapped from aerial photography alone may include areas of *Acacia lasiocalyx* Low Forest not delineated on the maps.

Photograph 10: *Acacia lasiocalyx* (silver wattle) over an understorey of *Hakea petiolaris* at the base of Mt. Sheridan (site 10.3)



## MALLEE FORMATIONS

### M1 *Eucalyptus loxophleba* Mallee

#### M1 *Eucalyptus loxophleba* Mallee (granite)

**Diagnosis** Tree Mallee/Shrub Mallee over *Allocasuarina campestris* Thicket/Heath A or Scrub/Open Scrub or Open Tall Sedges/Tall Sedges.

**Sites** 6.6, 7.7, 8.9, 9.22, 10.4

#### Description

**Stratum 1** Tree Mallee to 12 metres and/or Shrub Mallee to 6 metres of *Eucalyptus loxophleba*. Occasional *Allocasuarina huegeliana* and *Eucalyptus sporadica* at site 6.6.

**Stratum 2** Thicket to Heath A of *Allocasuarina campestris* to 4 metres in places. In some areas Open Scrub to Scrub of mixed shrub species form a second stratum. Characteristic species include *Allocasuarina campestris*, *Dodonaea ptarmaecifolia*, *Leptospermum erubescens*, *Leptospermum incanum*, *Melaleuca acuminata*, *Melaleuca elliptica*, *Melaleuca uncinata*, *Olearia revoluta* and *Santalum acuminatum*. These species may be present as scattered individuals only in some areas.

**Stratum 3** Open Dwarf Scrub D at site 7.7 and Open Tall Sedges to Tall Sedges of *Lepidosperma ?longitudinale* at site 6.6. Other Stratum 3 species include *Acacia erinacea*, *Dodonaea bursariifolia*, *Lepidosperma ?gracile*, *Lomandra effusa* and *Spartochloa scirpoidea*.

Mld *Eucalyptus loxophleba* Mallee (drainage line)

Diagnosis	Tree Mallee/Shrub Mallee over <i>Melaleuca</i> Thicket (Heath A).
Sites	1.3, 1.8, 9.13, 9.19
Description	
Stratum 1	Tree Mallee to 10 metres or Shrub Mallee to 6 metres of <i>Eucalyptus loxophleba</i> (Open Tree Mallee in some areas). <i>Eucalyptus salmonophloia</i> occurs occasionally as scattered individuals emergent to 18 metres.
Stratum 2	Thicket (Dense Heath A in some areas) of <i>Melaleuca</i> shrubs to 3 metres, form a patchy and discontinuous stratum. <i>Melaleuca</i> species include <i>Melaleuca acuminata</i> , <i>Melaleuca hamulosa</i> , <i>Melaleuca lateriflora</i> and <i>Melaleuca uncinata</i> .
Stratum 3	Scattered shrubs with some sedges and herbaceous species may form Dwarf Scrub C to Open Dwarf Scrub C or Tall Grass in some areas. Characteristic species include <i>Acacia acutata</i> , <i>Acacia verricula</i> , <i>Astroloma ?epacridis</i> , <i>Dodonaea ptarmicaefolia</i> , <i>Dodonaea viscosa</i> , <i>Hakea lissocarpha</i> , <i>Lepidosperma</i> species, <i>Leptospermum erubescens</i> , <i>Lomandra effusa</i> , <i>Loxocarya aspera</i> , <i>Melaleuca elliptica</i> , <i>Melaleuca laxiflora</i> , <i>Melaleuca pentagona</i> , <i>Mirbelia ramulosa</i> , <i>Olearia revoluta</i> , <i>Phebalium tuberculosum</i> , <i>Podolepis lessonii</i> , <i>Ptilotus manglesii</i> , <i>Spartochloa scirpoidea</i> and <i>Waitzia acuminata</i> .
Comments	<i>Eucalyptus loxophleba</i> Mallee occurs on loam soils (orange brown at some localities). Adjacent to granite the understorey is often <i>Allocasuarina campestris</i> and along drainage lines, frequently formed by run-off from rock outcrops, the understorey is <i>Melaleuca</i> shrubs. The association was

identified from observations made during field work. Areas of Mm (Mallee over *Melaleuca*) or G (Lithic complex - granite) may include small areas of *Eucalyptus loxophleba* Mallee not delineated on the vegetation maps.

Photograph 11: *Eucalyptus loxophleba* with an understorey of *Melaleuca acuminata* at site 1.3



# Ms Mallee

**Diagnosis** Tree Mallee/Shrub Mallee over variable understorey.

**Sites** 2.2, 2.11, 4.8

## Description

**Stratum 1** Shrub Mallee occasionally to Tree Mallee reaching 8 metres in places. Commonly occurring species include *Eucalyptus anceps*, *Eucalyptus calycogona*, *Eucalyptus celastroides*, *Eucalyptus eremophila*, *Eucalyptus flocktoniae* and *Eucalyptus phaenophylla*. Scattered trees of *Eucalyptus salmonophloia* are occasional emergents.

**Lower Stratum** Scattered shrubs with some sedges and herbaceous species form Dwarf Scrub C to Open Dwarf Scrub D in some areas. Understorey species include *Acacia erinacea*, *Dianella revoluta*, *Dodonaea bursariifolia*, *Exocarpos aphyllus*, *Grevillea huegelii*, *Hakea lissocarpha*, *Lepidosperma* species, *Melaleuca adnata*, *Melaleuca uncinata*, *Olearia muelleri*, *Spyridium subochreatum*, *Westringia cephalantha* and *Westringia rigida*. *Santalum acuminatum* occur as scattered individuals to 2 metres in some areas.

**Comments** Mallee (Ms) occurs on shallow sandy to loam soils over clay. The association is rare and often occurs as small patches amongst Mallee over *Melaleuca*. Areas delineated on the vegetation map have been identified from observations made during field work.

Photograph 12: Shrub Mallee including *Eucalyptus flocktoniae* and *Eucalyptus anceps* at site 4.8



## Mm Mallee over *Melaleuca*

### Mm Mallee over *Melaleuca uncinata* (broombush) Thicket

**Diagnosis** Shrub Mallee over *Melaleuca uncinata* thicket (including Dense Heath A to Scrub A to Heath B).

Regeneration - Shrub Mallee over Low Heath C/Dwarf Scrub C.

**Sites** 1.4, 2.15, 4.10, 4.2, 5.2a, 5.2b, 5.9, 6.1, 7.12, 8.12, 9.14

### Description

**Stratum 1** Shrub Mallee, 4 to 6 metres (rarely Tree Mallee to 8 metres) occasionally to Open Shrub Mallee. This stratum is patchy and discontinuous in places. *Eucalyptus salmonophloia* emergent to 20 metres, occur as scattered individuals in some areas. Shrub Mallee reach a height of 3 metres in areas regenerating after fire. Commonly occurring species include *Eucalyptus anceps*, *Eucalyptus calycogona*, *Eucalyptus celastroides*, *Eucalyptus eremophila*, *Eucalyptus flocktoniae*, *Eucalyptus hypoclamydea*, *Eucalyptus loxophleba*, *Eucalyptus phaenophylla*, *Eucalyptus pileata*, *Eucalyptus spathulata* and *Eucalyptus sporadica*.

**Stratum 2** Thicket to Heath B, occasionally Dense Heath A or Scrub to Low Scrub A. *Melaleuca uncinata* is abundant although other *Melaleuca* species may become prominent over short distances. Commonly occurring species include *Melaleuca adnata*, *Melaleuca coronicarpa*, *Melaleuca depauperata*, *Melaleuca haplantha*, *Melaleuca laxiflora*, *Melaleuca pentagona*, *Melaleuca platycalyx*, *Melaleuca spicigera* and *Melaleuca subtrigona*. *Melaleuca acuminata* and *Melaleuca lateriflora* become prominent in poorly drainage, winter wet areas along drainage lines.



*Leptospermum erubescens* may be prominent in some areas especially at the edge of this association bordering on areas of Mixed Low Heath or granite. Other characteristic species present as scattered individuals include *Callistemon phoeniceus*, *Callitris canescens*, *Callitris preissii* ssp. *verrucosa*, *Callitris roei*, *Daviesia benthamii*, *Exocarpos aphyllus*, *Hakea meisneriana* and *Santalum acuminatum*.

Areas regenerating after fire were recorded as Low Heath C.

#### Lower Stratum

In some areas scattered shrubs, with some sedges and herbaceous species form a lower stratum of Low Heath C/Low Scrub C to Dwarf Scrub D/Low Heath D. *Melaleuca pentagona* maybe prominent in some areas. Other characteristic species include *Acacia pulchella*, *Acacia tetanophylla*, *Acacia uncinella*, *Beyeria brevifolia*, *Cassythia melantha*, *Coleanthera myrtoides*, *Cryptandra parvifolia*, *Dianella revoluta*, *Dodonaea bursariifolia*, *Gahnia ancistrophylla*, *Gastrolobium parviflorum*, *Grevillea huegelii*, *Hakea lissocarpha*, *Hakea newbeyana*, *Hakea scoparia*, *Lepidosperma* species, *Leptomeria preissiana*, *Leucopogon tamminensis*, *Loxocarya aspera*, *Mesomelaena preissii*, *Phebalium filifolium*, *Phebalium tuberculosum*, *Tricostularia compressa*, *Westringia cephalantha* and *Westringia rigida*. Tall sedges may occur over short distances.

**Mma Mallee over *Melaleuca adnata*/*Melaleuca coronicarpa* Heath**

**Diagnosis** Shrub Mallee over *Melaleuca adnata*/*Melaleuca coronicarpa* Heath B (Heath C).

**Sites** 4.5, 4.11, 7.15, 10.12

**Description**

**Stratum 1** Shrub Mallee (3 to 7 metres) occasionally Tree Mallee (8 metres) or Open Shrub Mallee at different localities. Characteristic species include *Eucalyptus anceps*, *Eucalyptus calycogona*, *Eucalyptus eremophila*, *Eucalyptus flocktoniae* and *Eucalyptus pileata*.

**Stratum 2** Heath B to Dense Heath B in places, occasionally Heath C, of *Melaleuca adnata* and *Melaleuca coronicarpa*. Either species may become dominant locally. Other characteristic species present as scattered individuals include *Daviesia benthamii*, *Exocarpos aphyllus*, *Grevillea huegelii*, *Melaleuca acuminata*, *Melaleuca lateriflora*, *Melaleuca pentagona*, *Melaleuca platycalyx*, *Melaleuca uncinata* and *Melaleuca haplantha*.

Photograph 13: Mallee over *Melaleuca uncinata* (broombush) including *Eucalyptus flocktoniae*, *Eucalyptus anceps*, *Eucalyptus phaenophylla*



Photograph 14: Mallee over *Melaleuca adnata*/*Melaleuca coronicarpa* Heath at site 7.15. Mallee species include *Eucalyptus calycogona* and *Eucalyptus flocktoniae*



# Mmp Mallee over *Melaleuca pentagona* Heath

**Diagnosis** Shrub Mallee over *Melaleuca pentagona* Heath B (Low Heath C).

Regeneration - Shrub Mallee over Low Heath D.

**Sites** 1.11, 2.13, 7.9, 9.17

## Description

**Stratum 1** Shrub Mallee (2.5 to 5 metres) to Open Shrub Mallee in some areas. Stratum 1 species include *Eucalyptus albida*, *Eucalyptus anceps*, *Eucalyptus calycogona*, *Eucalyptus eremophila*, *Eucalyptus hypoclamydea*, *Eucalyptus phaenophylla* and *Eucalyptus sporadica*.

**Stratum 2** Heath B to Heath C with *Melaleuca pentagona* prominent. Scattered shrubs of *Melaleuca uncinata* and *Leptospermum erubescens* to 2 metres occur in some areas forming Open Low Scrub A occasionally. Characteristic plant species becoming more common in areas adjacent to Low Mixed Heath include *Acacia mimica*, *Astroloma serratifolium*, *Calytrix leschenaultii*, *Gastrolobium parviflorum*, *Hakea corymbosa*, *Hakea crassifolium*, *Hakea cygna*, *Hakea lissocarpha*, *Hibbertia pungens*, *Isopogon buxifolius*, *Melaleuca laxiflora*, *Melaleuca leptospermoides*, *Petrophile seminuda* and *Verticordia acerosa*.

Mmh . Mallee over *Melaleuca haplantha*

Diagnosis Shrub Mallee over *Melaleuca haplantha* Low Heath C to Heath B.

Sites 1.10, 2.14, 3.11a .

Description

Stratum 1 Shrub Mallee sometimes patchy and discontinuous. Commonly occurring species include *Eucalyptus calycogona*, *Eucalyptus eremophila* and *Eucalyptus phaenophylla*. *Callitris canescens* occurs as scattered individuals in some areas.

Stratum 2 Low Heath C to Heath B with *Melaleuca haplantha* dominant. Other plant species occurring as scattered individuals include *Acrotriche patula*, *Exocarpos aphyllus*, *Hakea lissocarpa*, *Melaleuca coronicarpa*, *Melaleuca pentagona* and *Melaleuca uncinata*.

Photograph 15.: Mallee over *Melaleuca pentagona* Heath at site 2.13.  
Mallee species include *Eucalyptus hypoclamydea*, *Eucalyptus phaenophylla* and *Eucalyptus sporadica*



Photograph 16: Mallee over *Melaleuca haplantha* below a small breakaway on Dragon Rocks Nature Reserve



Comments

Mallee over *Melaleuca uncinata* Thicket occurs on duplex soils of sand or sandy loam over clay. This association is widespread throughout the reserve covering low lying areas below the lateritic ridges and along drainage lines. Small areas of Mallee over *Melaleuca adnata*/*Melaleuca coronicarpa* occur where clay comes closer to the surface and Mallee over *Melaleuca pentagona* occurs in deeper surface soils. Patches of Mallee over *Melaleuca haplantha* typically occur on the edge of the out wash zone below breakaways and below bench slopes. Mm is the main map unit and may include small areas of Mma, Mmp and Mmh not delineated on the vegetation maps.

Km *Eucalyptus albida* Very Open Shrub Mallee over Heath

Km *Eucalyptus albida* Very Open Shrub Mallee over Heath (laterite)

**Diagnosis** Very Open Shrub Mallee over Open Scrub A in places over Heath A to Low Heath C over Dwarf Scrub D in places.

Regeneration - Very Open Shrub Mallee over Low Scrub C/Low Scrub B in places over Low Heath D/Low Heath C.

**Sites** 1.1, 1.5, 1.14, 2.7, 2.17, 3.17, 4.6, 7.4, 7.11, 8.2, 8.4, 8.10, 9.2, 10.10

**Description**

**Stratum 1** Very Open Shrub Mallee of *Eucalyptus albida* to 8 metres in places. *Eucalyptus albida* may occur as scattered individuals in some areas or occasionally form Open Shrub Mallee. Occasional *Eucalyptus incrassata* and/or *Eucalyptus hypoclamydea* were recorded at some localities.

**Stratum 2** Shrubs to 2 metres are usually scattered throughout the association but may form Open Low Scrub A in some areas. Characteristic species include *Callitris roei*, *Dryandra* sp. 13 (ASG), *Gastrolobium spinosum*, *Grevillea cagiana*, *Hakea crassifolia*, *Hakea cygna*, *Leptospermum inelegans*, *Leptospermum spinescens*, *Petrophile squamata* and *Regelia inops*.

In areas that have been burnt pre 1980 or pre 1961 Low Scrub B to Open Low Scrub B with *Gastrolobium spinosum* prominent is commonly found with *Dryandra* sp. 13 (ASG), *Grevillea cagiana* and *Hakea crassifolia* occasional.

**Stratum 3** Heath B occasionally to Dense Heath B or Heath A Low Heath C/Dense Low Heath C or Heath D occur in

areas regenerating after fire. *Melaleuca leptospermoides* may be prominent in some areas. Other commonly occurring species include *Adenanthos argyreus*, *Allocasuarina humilis*, *Banksia sphaerocarpa*, *Banksia violacea*, *Beaufortia micrantha*, *Beaufortia schaueri*, *Calothamnus huegelii*, *Chamelaucium naviculum*, *Daviesia audax*, *Dryandra erythrocephala*, *Dryandra* sp. 13 (ASG), *Gastrolobium spinosum*, *Hakea cygna*, *Isopogon* aff. *buxifolius*, *Isopogon teretifolius*, *Leptospermum spinescens*, *Melaleuca pungens*, *Petrophile squamata*, *Petrophile trifida*, *Regelia inops* and *Verticordia chrysantha*.

**Lower Stratum** Dwarf Scrub D, occasionally Low Scrub C, of mixed plant species form a distinct lower stratum in some areas. these species may also be present only as scattered individuals or form a continuous layer of shrubs 0 to 1.5 metres (2 metres) with Stratum 3 species. Characteristic shrub, sedge and herbaceous species include *Acacia shuttleworthiana*, *Beaufortia micrantha*, *Beaufortia schaueri*, *Dampiera species*, *Daviesia intricata*, *Daviesia rhombifolia*, *Dryandra drummondii*, *Dryandra ferruginea*, *Hakea incrassata*, *Hibbertia exasperata*, *Isopogon villosus*, *Lepidosperma species*, *Leucopogon dielsiana*, *Melaleuca cordata*, *Petrophile circinata*, *Petrophile trifida*, *Synaphea* sp., *Verticordia integra* (south eastern section), *Verticordia picta*, *Verticordia serrata*, *Verticordia tumida* and *Xanthorrhoea nana*.



Kme *Eucalyptus albida* Very open Shrub Mallee over *Eremaea* Heath

**Diagnosis** Very Open Shrub Mallee/Open Shrub Mallee over Open Low Scrub A (Open Scrub) in places over Low Heath C/Heath B over Dwarf Scrub D in places.

Regeneration - Very Open shrub Mallee/Open Shrub Mallee over Open Dwarf Scrub C/Open Low Scrub B over Heath C/Low Heath D.

**Sites** 1.17, 2.8, 3.8, 5.1, 7.13, 8.3, 8.5, 9.4, 9.11, 9.18, 10.6

**Description**

**Stratum 1** Open Shrub Mallee to Very Open shrub Mallee of *Eucalyptus albida* to 5 metres in height.

**Stratum 2** Open Low Scrub A, occasionally to Open Scrub. This stratum may be absent in some areas with shrubs to 2 metres or more present only as scattered individuals. shrubs in areas regenerating after fire form Open Dwarf Scrub C to Open Low Scrub B. Characteristic species include *Grevillea cagiana*, *Hakea crassifolia* and *Leptospermum inelegans*. Other commonly occurring species include *Banksia violacea*, *Callitris preissii* ssp. *verrucosa*, *Callitris roei*, *Daviesia audax*, *Grevillea integrifolia* ssp. aff. *shuttleworthiana* and *Isopogon* aff. *buxifolius*.

**Stratum 3** Low Heath C to Heath B of mixed shrub species forming Low Heath D in some areas regenerating after fire. Characteristic species usually occurring frequently throughout the association include *Banksia violacea*, *Calothamnus quadrifidus*, *Eremaea pauciflora*, *Isopogon* aff. *buxifolius*, *Melaleuca ?seriata*, *Melaleuca subtrigona* and *Petrophile ericifolia*. Other characteristic stratum 3 species include *Adenanthos argyreus*, *Allocasuarina humilis*, *Conospermum stoechadis*, *Dryandra erythrocephala*, *Hakea*

?*obliqua*, *Hakea cygna*, *Isopogon teretifolius*,  
*Leptospermum inelegans* and *Lysinema ciliatum*.

#### Stratum 4

In some areas shrubs with some sedges and herbaceous species form a distinct Lower Stratum of Open Dwarf Scrub D to Dwarf Scrub D. Lower Stratum species include *Beaufortia micrantha*, *Dampiera oligophylla*, *Daviesia abnormis*, *Daviesia uniflora*, *Dryandra cirsioides*, *Hibbertia exasperata*, *Isopogon villosus*, *Petrophile trifida*, *Synaphea* sp., *Verticordia chrysantha*, *Verticordia eriocephala*, *Verticordia serrata* and *Xanthorrhoea nana*. These species may form a continuous stratum with stratum 3, in places.

#### Comments

*Eucalyptus albida* Very Open Shrub Mallee over Heath is extensive throughout the reserve covering a substantial area of the lateritic plateau. On gravel or sandy gravel over ironstone or where ironstone comes to the surface the understorey is of mixed plant species (Km). On deeper sandy soils ± gravel, over ironstone or gravel *Eremaea pauciflora*, *Petrophile ericifolia* and other species become more prominent (Kme). These deeper soils often accumulate down slope or in the level low lying areas of the gently undulating lateritic plateau. These associations cannot always be distinguished from aerial photograph interpretation alone. As mapped, Km may include small areas of Kme.

Photograph 17: *Eucalyptus albida* Very Open Shrub Mallee over Heath  
(laterite)



Photograph 18: *Eucalyptus albida* Very Open Shrub Mallee over  
*Eremaea* Heath



## SHRUBLANDS AND HEATH FORMATIONS

## Kh Heath (laterite)

## Kh Mixed Heath

**Diagnosis** Open Low Scrub B (Low Scrub B) in places over Low Heath C (Dense Low Heath C) to Heath B (Dense Heath B) over Open Dwarf Scrub D in places.

Regeneration - Open Dwarf Scrub C (Dwarf Scrub C) in places over Low Heath D.

**Sites** 1.13, 1.19, 2.4, 3.4, 3.6, 5.7, 7.10, 8.7, 8.17, 10.7

**Description****Stratum 1**

Open Low Scrub B, occasionally to Low Scrub B, of mixed shrub species. Stratum 1 may be absent in some areas with shrub species to 2 metres present as scattered individuals only. Characteristic species include *Allocasuarina acutivalvis*, *Allocasuarina campestris*, *Dryandra* sp. 13 (ASG), *Gastrolobium spinosum*, *Grevillea cagiana*, *Grevillea integrifolia* ssp. *shuttleworthiana*, *Hakea crassifolia* and *Petrophile squamata*. Other occasional species include *Callitris preissii* ssp. *verrucosa*, *Callitris roei*, *Dryandra erythrocephala* and *Regelia inops*. Dwarf Scrub C to Open Dwarf Scrub C was recorded in areas regenerating after recent fire.

**Stratum 2**

Low Heath C to Heath B, occasionally Dense Heath C or Dense Heath B, with Low Heath D in areas regenerating after fire. Characteristic species occurring frequently in some areas include *Beaufortia interstans*, *Dryandra erythrocephala*, *Hakea cygna*, *Isopogon teretifolius* and *Melaleuca leptospermoides*. Other characteristic species include *Adenanthos argyreus*, *Banksia sphaerocarpa*, *Banksia violacea*, *Beaufortia micrantha*, *Beaufortia schaueri*, *Chamelaucium naviculum*, *Daviesia intricata*, *Hakea*

*incrassata*, *Hakea subsulcata*, *Isopogon* aff. *formosus*, *Isopogon villosus*, *Leptospermum spinescens*, *Melaleuca pungens*, *Melaleuca subtrigona*, *Petrophile seminuda*, *Petrophile trifida*, *Verticordia chrysantha*, *Verticordia roei* and *Xanthorrhoea nana*. *Acacia sedifolia* ssp. *pulvinata*, *Beaufortia orbifolia*, *Hakea subsulcata* and *Isopogon* aff. *formosus* are characteristic of ironstone areas.

#### Lower Stratum

Scattered shrubs form a distinct Lower Stratum of Dwarf Scrub D, occasionally Dwarf Scrub C, in some areas. Lower Stratum species include *Allocasuarina microstachya*, *Calectasia grandiflora*, *Daviesia rhombifolia*, *Dryandra ferruginea*, *Hakea incrassata*, *Hibbertia exasperata*, *Melaleuca cordata*, *Petrophile circinata*, *Verticordia picta* and *Xanthorrhoea nana*. In many areas this stratum is absent with shrubs to 1.0 metres forming a continuous stratum with Stratum 2 species.

**Kh1    *Melaleuca leptospermoides* Heath**

**Diagnosis**            Low Heath C (Dense Low Heath C) over Open Dwarf Scrub D/Dwarf Scrub D.

Regeneration - Low Heath D.

**Sites**                2.19, 6.3, 8.14, 9.6

**Description**

**Stratum 1**            Low Heath C, occasionally Dense Low Heath C, with Low Heath D in areas regenerating after fire. *Melaleuca leptospermoides* is prominent. Other commonly occurring species include *Beaufortia interstans*, *Dryandra erythrocephala*, *Isopogon teretifolius*, *Petrophile trifida* and *Verticordia roei*. Scattered shrubs or trees to 2.5 metres include *Allocasuarina acutivalvis*, *Allocasuarina campestris*, *Callitris preissii* ssp. *verrucosa*, *Grevillea cagiana*, *Hakea subsulcata* and *Isopogon* aff. *buxifolius*.

**Lower Stratum**      A Lower Stratum of mixed plant species forming Open Dwarf Scrub D to Dwarf Scrub D is usually present. Characteristic species include *Hakea incrassata*, *Hibbertia exasperata*, *Melaleuca cordata* and *Verticordia chrysantha*.

**Comments**            Heath (Kh) occurs on the lateritic ridges. Mixed Heath is relatively common on ironstone and gravelly soils often on the highest points of the landscape with *Melaleuca leptospermoides* Heath further down slope on sandy gravels. These associations are closely related to *Eucalyptus albida* Very Open Shrub Mallee over Heath (laterite) and areas of Km mapped by the interpretation of aerial photography alone may include areas of Kh and Kh1.

Photograph 19: Mixed Heath on gravel soils



Photograph 20: *Melaleuca leptospermoides* Heath at site 6.3



## Kv Low Mixed Heath

**Diagnosis** Open Dwarf Scrub C/Dwarf Scrub C to Open Low Scrub B/Low Scrub B over Heath D [in some areas Low Heath C over Dwarf Scrub D in places].

Regeneration - Low Heath D (scattered shrubs to 1.0 metres).

**Sites** 1.20, 2.5, 2.9, 2.12, 3.2, 3.7, 3.9, 4.3, 4.9, 5.6, 5.11, 6.2, 6.8, 8.1, 8.13, 9.21, 10.5

**Description**

**Upper Stratum** Open Dwarf Scrub C to Dwarf Scrub C or Open Low Scrub B to Low Scrub B of mixed shrub species. Occasionally two strata may be present. Shrubs greater than 1.5 metres in height often occur as scattered individuals including *Allocasuarina campestris*, *Callitris preissii* ssp. *verrucosa*, *Grevillea eriostachya* and *Melaleuca uncinata*. Other commonly occurring species include *Acacia multispicata*, *Allocasuarina acutivalvis*, *Banksia sphaerocarpa*, *Calothamnus quadrifidus* (near granite), *Grevillea cagiana*, *Grevillea didymobotrya*, *Grevillea integrifolia* ssp. *shuttleworthiana*, *Hakea cygna* (prominent in places), *Hakea erecta*, *Hakea scoparia*, *Isopogon scabriusculus*, *Isopogon teretifolius*, *Leptospermum erubescens*, *Leptospermum incanum* and *Petrophile seminuda* (prominent in places).

**Stratum 2** Low Heath D or Low Heath C in some areas. Characteristic species occurring frequently in places include *Allocasuarina microstachya*, *Beaufortia interstans* (prominent in places), *Beaufortia micrantha*, *Hakea incrassata*, *Isopogon teretifolius*, *Melaleuca subtrigona* (prominent in places) *Mesomelaena preissii*, *Petrophile seminuda*, *Verticordia chrysantha*, *Verticordia eriocephala* and *Verticordia roei*



(prominent in places). Characteristic species include *Andersonia lehmanniana*, *Astroloma serratifolium*, *Baeckea ?crispiflora*, *Baeckea ?preissiana*, *Borya sphaerocephala*, *Calectasia grandiflora*, *Calytrix leschenaultii*, *Dryandra cirsioides*, *Jacksonia ?racemosa*, *Lepidosperma species*, *Leucopogon dielsianus*, *Lysinema ciliatum*, *Melaleuca cordata*, *Melaleuca lecanantha*, *Melaleuca platycalyx*, *Persoonia ?coriacea*, *Schoenus* sp. *Verticordia acerosa* ssp. *preissii*, *Verticordia picta* and *Xanthorrhoea nana*.

Species characteristic of areas close to granite include *Acacia mimica*, *Andersonia lehmanniana*, *Baeckea* species, *Borya sphaerocephala*, *Calothamnus quadrifidus*, *Kunzea micromera*, *Melaleuca elliptica*, *Melaleuca platycalyx*, *Petrophile seminuda* and *Verticordia chrysanthella*.

#### Lower Stratum

In areas where Low Heath C forms Stratum 2 a lower stratum of Low Scrub D commonly occurs. This stratum includes many of the Stratum 2 species listed above. *Borya sphaerocephala* Herbs to Open Herbs occur in some areas often adjacent to granite.

#### Comments

Sand to sandy loam soils  $\pm$  gravel over clay or gravel at depth support areas of Low Mixed Heath. The association is extensive, covering low lying areas of the reserve below the lateritic plateau adjacent to Mallee over *Melaleuca* associations or *Allocasuarina campestris* Thicket. The surface soils are deeper than those of the Mallee associations and often occur on areas covered by soil map units indicating clay or gravel at a depth of 12 to 24 inches or 24 to 36 inches. Areas of Low Mixed Heath are often interspersed with areas of Mallee over *Melaleuca uncinata* Thicket forming a mosaic in places. A mosaic of Low Mixed Heath with *Allocasuarina campestris* Thicket may also occur in areas adjacent

to granite rock. The structure and species composition of this association is variable but subdividing the association was not possible due to project limitations involving the quality of aerial photography and time.

Photograph 21: Low Mixed Heath on Dragon Rocks Nature Reserve near site 2.9



Ke     *Eremaea* Heath

Diagnosis            Low Scrub B (occasionally) over Low Heath C over Dwarf Scrub D in places.

Regeneration - Open Dwarf Scrub C (occasionally) over Low Heath D.

Sites                1.22, 2.6, 2.16, 3.1, 5.5, 8.6, 8.8

Description

Stratum 1            Low Scrub B occurs occasionally. Shrubs greater than 1.0 metres in height are usually present as scattered individuals only. Stratum 1 species include *Callitris preissii* ssp. *verrucosa*, *Grevillea integrifolia* ssp. aff. *shuttleworthiana*. *Grevillea wittweri*, *Leptospermum incanum* and *Leptospermum inelegans*.

Stratum 2            Low Heath C, occasionally to Heath B with Low Heath D in areas regenerating after fire. *Eremaea pauciflora* is prominent in most areas. Other characteristic species usually occurring frequently within the association include *Banksia violacea*, *Dryandra erythrocephala*, *Hakea cygna*, *Isopogon* aff. *buxifolius*, *Isopogon teretifolius*, *Melaleuca ?seriata* and *Petrophile ericifolia*. Other characteristic species include *Allocasuarina humilis*, *Banksia sphaerocarpa*, *Beaufortia micrantha* *Conospermum stoechadis*, *Daviesia uniflora*, *Dryandra cirsioides*, *Hakea ?obliqua*, *Lysinema ciliatum*, *Melaleuca subtrigona*, *Verticordia chrysantha* and *Verticordia roei*.

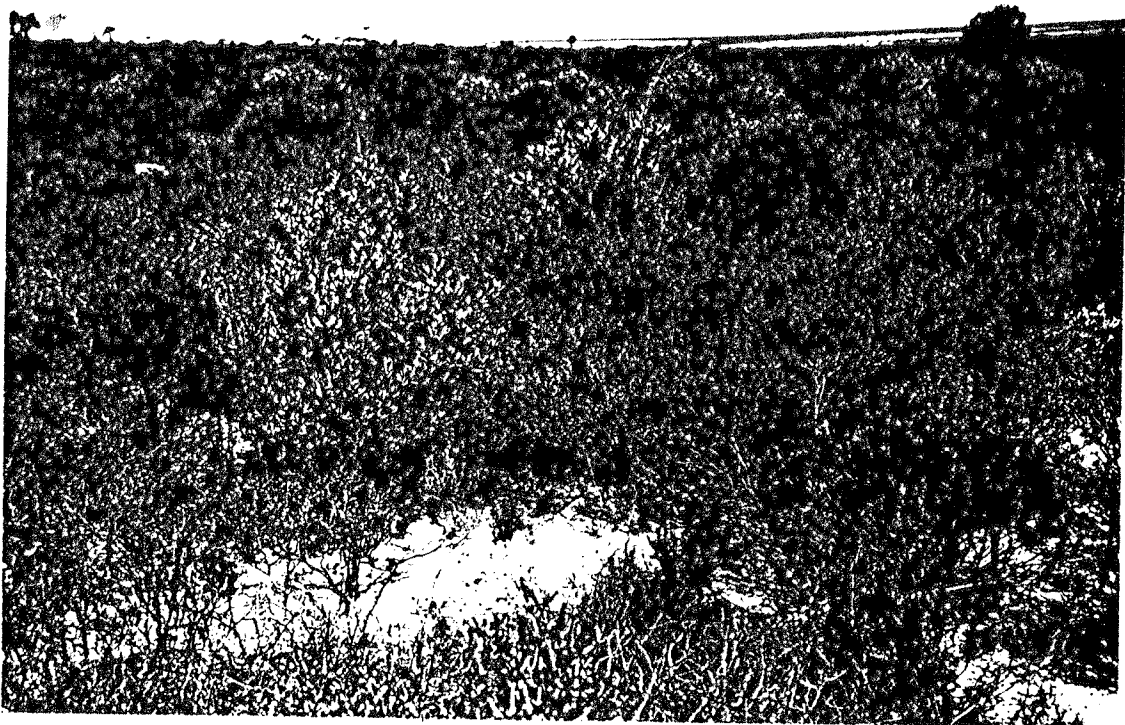
Stratum 3            Scattered shrubs form Dwarf Scrub D occasionally. Commonly occurring shrub species with some sedges and herbs include *Allocasuarina microstachya*, *Caustis dioica*, *Dampiera oligophylla*, *Daviesia rhombifolia*,

*Hakea incrassata*, *Isopogon villosus*, *Mesomelaena preissii* and *Persoonia striata*.

Comments

*Eremaea* Heath occurs on sandy soils over clay or gravel at depth in areas between the lateritic ridges and the low lying areas and drainage lines. This association is similar in structure and floristics to the understorey in the *Eucalyptus albidus* Very Open Shrub Mallee over *Eremaea* Heath association which usually occurs further up slope in sandy soils over ironstone.

Photograph 22: *Eremaea* Heath near site 2.6



# Ku    *Melaleuca* Heath

Diagnosis            Heath A to Heath B in places.

Regeneration - Low Heath C over Dwarf Scrub D.

Sites                3.12, 9.15, 10.1, 10.11, 10.13

## Description

Stratum 1            Heath A occasionally Heath B (Dense Heath B) or Thicket with *Melaleuca uncinata* usually dominant. Other *Melaleuca* species may become prominent at some localities, these species include *Melaleuca acuminata*, *Melaleuca adnata*, *Melaleuca lateriflora* and *Melaleuca pentagona*. Trees or mallee occur as scattered individuals in some areas forming Very Open Shrub Mallee occasionally. Commonly occurring species include *Callitris preissii* ssp. *verrucosa*, *Eucalyptus calycogona*, *Eucalyptus flocktoniae*, *Eucalyptus loxophleba*, *Eucalyptus salmonophloia* and *Eucalyptus salubris*. Other Stratum 1 species include *Melaleuca coronicarpa*, *Melaleuca haplantha*, *Melaleuca laxiflora* and *Melaleuca spicigera*.

Lower Stratum        In most areas a lower stratum is not discernible with shrubs, sedges and herbaceous species present as scattered individuals forming Open Low Sedges or Dwarf Scrub D occasionally. Lower stratum species include *Acacia sulcata* var. *platyphylla*, *Astroloma serratifolium*, *Dodonaea bursariifolia*, *Lepidosperma* species and *Phebalium tuberosum*.

Comments            *Melaleuca* Heath covers small areas of poorly drained, winter wet duplex soils of shallow sand over clay interspersed with areas of Mallee over *Melaleuca uncinata* Thicket. The map unit Mm includes small areas of *Melaleuca* Heath.

Photograph 23: *Melaleuca* Heath with *Melaleuca uncinata* (broombush)  
at site 3.12



# Ka *Allocasuarina acutivalvis* Thicket

## Ka *Allocasuarina acutivalvis* Thicket

**Diagnosis** Very Open Shrub Mallee in places over Scrub/Thicket over variable understorey.

**Sites** 1.18, 4.4, 4.12, 9.5, 9.20

## **Description**

**Stratum 1** Scattered Shrub Mallee occur in some areas and may form Very Open Shrub Mallee occasionally. Open Shrub Mallee was also recorded at site 4.12. Stratum 1 species include *Eucalyptus albid*a, *Eucalyptus flocktoniae* and *Eucalyptus phaenophylla*.

**Stratum 2** Scrub to Thicket, rarely Dense Thicket, of mixed shrub species with *Allocasuarina acutivalvis* prominent. Shrubs may reach a height of 4 metres in some areas. Other occasional stratum 2 species include *Callitris preissii* ssp. *verrucosa*, *Melaleuca uncinata* and *Santalum acuminatum*.

**Stratum 3** Low Scrub A/Open Low Scrub B to Heath B in some areas. Characteristic species include *Acacia assimilis*, *Beyeria brevifolia*, *Dryandra* sp. 13 (ASG), *Hakea multilineata*, *Hakea scoparia*, *Hakea subsulcata* (prominent in some areas), *Isopogon* aff. *buxifolius*, *Leptospermum incanum* and *Micromyrtus obovata*.

**Lower Stratum** Open Dwarf Scrub C to Low Heath C in some areas, rarely Dwarf Scrub D. Lower stratum species include *Dryandra ferruginea*, *Hakea cygna*, *Lepidosperma* species, *Leucopogon cuneifolius*, *Melaleuca cordata*, *Melaleuca leptospermoides*, *Melaleuca pungens*, *Phebalium lepidotum* and *Phebalium tuberculatum*.

# Kas *Allocasuarina acutivalvis* Scrub

**Diagnosis** Scrub/Thicket over variable understorey.

Regeneration - Low Scrub B over Dwarf Scrub D.

**Sites** 6.4, 8.16, 9.16, 10.2, 10.8

## Description

**Stratum 1** Thicket to Scrub of mixed shrubs to 5 metres form a patchy, discontinuous stratum with *Allocasuarina acutivalvis* usually prominent. *Allocasuarina corniculata* or *Acacia assimilis* may become prominent over short distances. Other Stratum 1 species include *Callitris preissii* ssp. *verrucosa*, *Eucalyptus albida*, *Eucalyptus loxophleba*, *Eucalyptus sporadica*, *Hakea multilineata*, *Hakea subsulcata*, *Leptospermum incanum* and *Santalum acuminatum*.

**Stratum 2** Open Low Scrub C to Open Low Scrub A forms a second stratum in most areas. Characteristic species include *Allocasuarina campestris*, *Allocasuarina corniculata*, *Beyeria brevifolia*, *Grevillea integrifolia* ssp. *biformis*, *Hakea cygna*, *Hakea scoparia*, *Hakea subsulcata*, *Isopogon scabriusculus*, *Melaleuca uncinata* and *Micromyrtus obovata*.

**Lower Stratum** Low Heath D to Open Dwarf Scrub D or Low Heath C in some areas. *Beaufortia interstans*, *Melaleuca cordata*, *Melaleuca leptospermoides* and *Verticordia roei* become prominent in some areas. Other lower stratum species include *Astroloma serratifolium*, *Baeckea* sp., *Lepidosperma* species, *Melaleuca platycalyx*, *Verticordia chrysantha*, *Verticordia eriocéphala*, *Verticordia picta* and *Verticordia tumida*.



## Comments

*Allocasuarina acutivalvis* Thicket occurs on gravelly soils over ironstone on the lateritic ridges and breakaways often interspersed with areas of blue and silver mallet. The association becomes *Allocasuarina acutivalvis* Scrub on gravelly soils further down slope where *Allocasuarina acutivalis* is joined by *Acacia assimilis* and *Allocasuarina corniculata* to form a very patchy association. *Allocasuarina acutivalvis* is common throughout the reserve but usually covering only short distances often too small to map. Areas where an Upper Stratum of Mallee is present are indicated on the vegetation map by the symbol (m).

Photograph 24: *Allocasuarina acutivalvis* Thicket at site 9.5



Kc *Allocasuarina corniculata* Thicket

Diagnosis Thicket over Dwarf Scrub C/Low Heath C in places.

Sites 1.12, 3.14, 9.10

Description

Stratum 1 Thicket to 4 metres with *Allocasuarina corniculata* prominent. Other stratum 1 species include *Acacia assimilis*, *Acacia beauverdiana*, *Callitris preissii* ssp. *verrucosa* and *Grevillea integrifolia* ssp. *biformis*.

Lower Stratum Low Heath C to Dwarf Scrub C of mixed shrub species, sedges and herbaceous plants. Commonly occurring species include *Astroloma serratifolium*, *Beyeria brevifolia*, *Hakea erecta*, *Isopogon scabriusculus*, *Leucopogon hamulosus*, *Melaleuca cordata*, *Melaleuca laxiflora*, *Melaleuca leptospermoides*, *Thryptomene obovata*, *Verticordia chrysantha* and *Verticordia roei*.

Comments *Allocasuarina corniculata* Thicket covers small areas of sandy soil with gravel in the low lying areas of the reserve. The association is rare and areas have been mapped from information gathered during field work. *Allocasuarina acutivalvis* Scrub (Kas) includes small areas of this association where the *Allocasuarina corniculata* shrubs become dominant.

Photograph 25: *Allocasuarina acutivalvis* Scrub at site 10.2



Photograph 26: *Allocasuarina corniculata* Thicket at site 3.14



Kt     *Allocasuarina campestris* Thicket

Diagnosis             Low Heath C to Dense Thicket over *Borya* Herbs in places.

Sites                   1.2, 1.15, 2.18, 3.10, 3.15, 5.3, 6.5, 7.3, 7.5, 9.3, 9.22, 10.3

Description

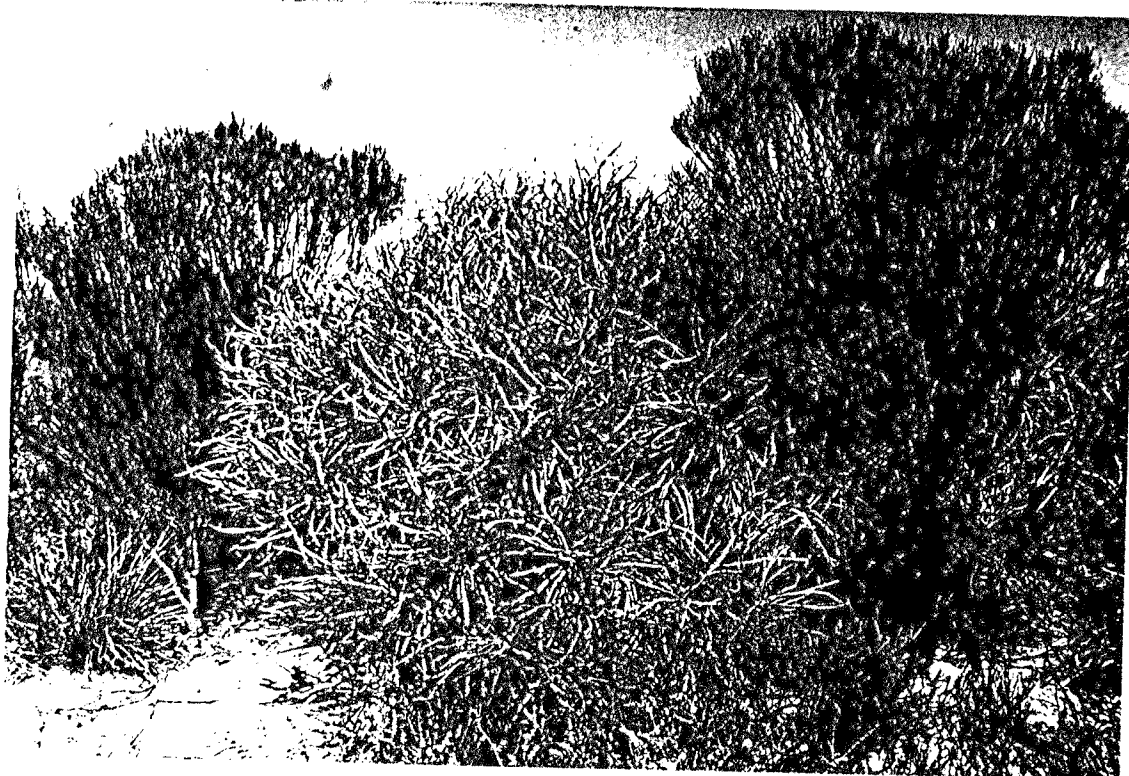
Stratum 1             Scattered trees, shrubs or mallee may form Open Low Woodland B, Open Scrub or Very Open Shrub (Tree) Mallee occasionally. Characteristic species include *Acacia lasiocalyx*, *Callitris preissii* ssp. *verrucosa*, *Eucalyptus loxophleba*, *Eucalyptus sporadica*, *Hakea petiolaris*, *Leptospermum erubescens*, *Leptospermum incanum* and *Santalum acuminatum*.

Stratum 2             Bordering rock outcrops Heath A/Dense Heath A to Thicket/Dense Thicket of *Allocasuarina campestris* occurs. Low Heath C to Heath A (Thicket) with *Allocasuarina campestris* prominent usually occurs adjacent to areas surrounding granite outcrops or granite pavement. Characteristic species which may become frequent within the association include *Astroloma serratifolium*, *Calothamnus quadrifidus*, *Hakea scoparia*, *Melaleuca elliptica*, *Melaleuca fulgens*, *Melaleuca scabra*, *Petrophile seminuda*, *Thryptomene australis*, *Verticordia chrysanthella* and *Verticordia roei*.

Lower Stratum        The Lower Stratum is very variable with Tall Sedges of *Lepidosperma ?longitudinale* or Tall Grass of *Spartochloa scirpoidea* forming a patchy understorey usually at the edge of the association. Dwarf Scrub D may be present in open areas. *Borya constricta* or *Borya sphaerocephala* Herbs usually form a patchy stratum in places.

Comments      *Allocasuarina campestris* Thicket usually occurs in deeper sandy soils in areas bordering granite outcrops but occasionally occurs on gravelly sand where granite is not evident.

Photograph 27: *Allocasuarina campestris* with *Banksia elderiana* on sand with gravel at site 1.5



## Lithic Complex - Granite

Sites                      5.3, 5.4, 6.5, 6.6, 7.1, 7.6, 7.7, 9.12, 10.3

### Description

#### Rock Surface

- Shallow Soil      Dense Herbs to Open Herbs of *Borya constricta* or *Borya sphaerocephala* from a mat on flat areas on shallow soils where the rock is sub surface. Low Heath D to Open Dwarf Scrub D of Shrubs occur in places with *Verticordia chrysanthella* sometimes prominent. Granite areas have a characteristic flora of mosses, lichens, ferns, sedges, shrubs and herbaceous species. Some of these species recorded on the reserve include *Baeckea ?crispiflora*, *Baeckea ?preissiana*, *Caladenia dimidia*, *Caladenia flava*, *Chamaescilla corymbosa*, *Cheilanthes austrotenuifolia*, *Cheilanthes distans*, *Diuris* aff. *corymbosa*, *Drosera stricticaulis*, *Gahnia ancistrophylla*, *Gnephosis tridens*, *Hibbertia rupicola*, *Hyalochlamys globifera*, *Isotoma petraea*, *Phyllanthus calycinus*, *Pimelea graniticola*, *Podolepis lessonii*, *Prasophyllum ringens*, *Rutidosia multiflora*, *Spiculaea ciliata*, *Stackhousia monogyna*, *Stylidium neglectum*, *Stypandra glauca* and *Thelymitra antennifera*.

#### Rock Crevices

- Shallow Soil      Scattered shrubs or patches of shrubs to 2 metres (2.5 metres) occur in rock crevices and at the base of the rock. Characteristic species include *Calothamnus quadrifidus*, *Dodonaea viscosa* ssp. *angustissima*, *Grevillea petrophiloides*, *Kunzea pulchella* (Mt. Sheridan), *Leptospermum incanum*, *Melaleuca elliptica*, *Melaleuca fulgens*, *Ricinocarpos glaucus* and *Thryptomene australis*. These species are also present in *Allocasuarina campestris* Thicket at the base of the rocks. Scattered sedges and grasses forming patches of Tall Sedges/Tall Grasses in some areas are

also characteristic. Prominent species include *Lepidosperma ?longitudinale* and *Spartochloa scirpoidea*.

#### Deeper Soil-border

of Rock Outcrop Tall Sedges (Dense Tall Sedges) of *Lepidosperma ?longitudinale* and/or Tall Grass of *Spartochloa scirpoidea* occur at the base of the rock in some areas. Heath B to Thicket of *Thryptomene australis* also occurs over short distances. *Eucalyptus olivacea* forms clumps at the base of five granite outcrops usually with an understorey of Heath B with *Calothamnus quadrifidus* prominent. Dense Thicket of *Callitris preissii* ssp. *verrucosa* and *Leptospermum erubescens* was recorded at site 5.3.

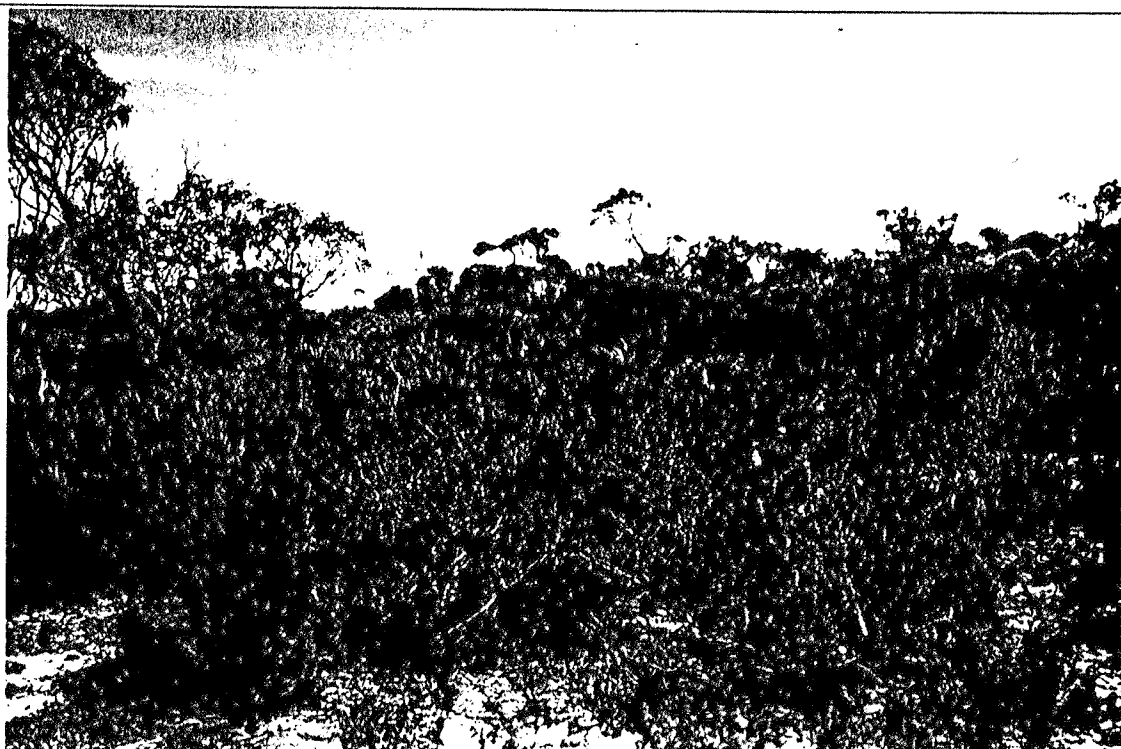
#### Comments

Thickets of *Allocasuarina campestris* surround the exposed rock with areas of *Allocasuarina huegeliana* Low Forest, *Acacia lasiocalyx* Low forest and *Eucalyptus loxophleba* Tree Mallee on deeper soils receiving run-off at the base of outcrops. Lithic Complex (G) includes areas of *Allocasuarina campestris* Thicket and may also include small areas of *Allocasuarina huegeliana* Low Forest (Wh), *Acacia lasiocalyx* Low Forest (Wa) and *Eucalyptus loxophleba* Tree Mallee (M1) not delineated on the vegetation maps.

Photograph 28: *Allocasuarina campestris* Thicket at the base of the rock at Mt. Sheridan (site 10.3). *Lepidosperma ?longitudinale*, *Spartochloa scirpoidea* and *Borya* species are in the foreground with trees of *Allocasuarina huegeliana* and *Acacia lasiocalyx* in the background



Photograph 29: *Allocasuarina campestris* Thicket in an area adjacent to a granite outcrop with scattered trees of *Acacia lasiocalyx* and *Callothamnus quadrifidus* in the foreground





Photograph 30: Granite outcrop (part of Dragon Rocks) at site 6.6 with *Allocasuarina huegeliana* in the background and shrubs of *Dodonaea viscosa* and *Melaleuca elliptica* growing in shallow soils in rock crevices.



## Lithic Complex - Breakaway

Sites 1.10., 2.1, 2.20, 2.21, 3.11

### Platform Above the Breakaway

*Allocasuarina acutivalvis* Thicket usually occurs above the breakaway with areas of *Eucalyptus gardneri* (blue mallet)/*Eucalyptus* sp. (silver mallet) also characteristic. *Eucalyptus albid*a Very Open Shrub Mallee over Heath (laterite) or Heath (laterite) occur occasionally.

### Scarp and Scree Area

These areas are virtually bare of vegetation. On lower lateritic scarps *Eucalyptus astringens* may be present.

### Out Wash Zone

The vegetation on the Out Wash Zone at the base of the breakaway is very variable and usually sparse with *Callitris canescens* forming Open Low Forest B in some areas. A patchy stratum of scattered shrubs occasionally forming Heath B may be present. *Melaleuca haplantha* is usually prominent. Other characteristic species include *Acrotriche patula*, *Melaleuca acuminata*, *Melaleuca adnata*, *Melaleuca aff. uncinata* and *Mirbelia dilatata*.

Patches of Shrub Mallee including *Eucalyptus calycogona*, *Eucalyptus capillosa* ssp. *polyclada* and *Eucalyptus phaenophylla* form an incomplete stratum occasionally of Very Open Shrub Mallee. At the fringes of the Out Wash Zone Mallee over *Melaleuca haplantha* (Mmh) is often found.

Small areas of *Eucalyptus astringens* Low Forest A are sometimes present.

Photograph 31: Breakaway at site 2.21 with *Callitris canescens*, *Melaleuca haplantha* and *Melaleuca* aff. *uncinata* in the Out Wash Zone



## 5.0 FLORA SURVEY

### 5.1 Flora of the Dragon Rocks Nature Reserve

A total of 576 plant species are recorded in Appendix 1 as occurring in the area of Dragon Rocks Nature Reserve, including 2 species of fern, 3 gymnosperms and 571 angiosperms. A further twelve taxa are distinguished at the level of sub species. Thirteen of the species recorded are exotic or introduced. Manuscript names (ms) have been included to help differentiate between undescribed species within a particular genus. Identifications with the generic name followed by "?" are uncertain due to a lack of flowering or fruiting material or to confusion in the current taxonomy of the group concerned. Affinity of "aff." is used in relation to undescribed species which are very similar to named species yet different enough to be kept as separate taxa. The generic name followed by sp. without a query signifies a recognised undescribed species for which a manuscript name is not yet available. The nomenclature follows that of Green (1985) and Supplement 7 (Nov. 1988 unpublished) unless otherwise specified below.

Undescribed species identified in Appendix 1 by manuscript names, "sp." or "aff." total sixty one. Eighteen species included in the species list have been described since the completion of Supplement 7. These eighteen species are listed below:

*Allocasuarina tortiramula* (Bennett 1989)

*Eucalyptus capillosa* ssp. *polyclada*, *Eucalyptus densa*, *Eucalyptus microschemata*, *Eucalyptus phaenophylla* and *Eucalyptus plauricaulis* (Brooker and Hopper 1991)

*Eucalyptus dissimulata* and *Eucalyptus hypochlamydea* (Brooker 1988)

*Hakea horrida*, *Hakea newbeyana* (Barker 1990)

*Leptospermum inelegans* (Thompson 1989)

*Verticordia chrysanthella*, *Verticordia eriocephala*, *Verticordia gracilis*, *Verticordia inclusa*, *Verticordia integra* and *Verticordia tumida* (George 1991)

*Nemcia punctata* (Crisp and Weston 1987)

The nomenclature further differs from Green (1985) and Supplement 7 in including the new combinations in *Nemcia*, *Burtonia* and *Gastrolobium* published by Crisp and Weston (1987). *Conospermum croninae* is retained as distinct from *Conospermum amoenum* following the nomenclature of other specimens lodged at the W A Herbarium. *Senna artemisioides* is a new combination published in a revision of the genus *Cassia* (Randell 1988). Information provided by Barry Conn (pers. comm.) has resulted in the retention of *Westringia rigida* which is recognised as occurring in the wheatbelt with *Westringia dampieri* typical of coastal areas.

Thirty nine of the species listed in Appendix 1 were not found during the present survey and the person or organisation who recorded the species for the reserve is indicated. The identity of some of these species is in doubt due to changes in the taxonomy of many groups since the time of recording. Unfortunately time restrictions did not allow for the checking of voucher specimens if any were collected.

The high proportion of undescribed species, recently published descriptions and queries where confusion in the nomenclature exists reflects the current state of taxonomy in Western Australia. Only one specimen *Gompholobium* sp. (3368) is possibly a first collection as no other specimens were found at the W A Herbarium in the limited time available for checking.

Due to the time constraints of the survey Appendix 1 only represents part of the flora of the area, possibly 60%. Further survey work, especially in September when little of the present survey was carried out, would provide a more comprehensive record of the flora of the reserve particularly granite rock flora.

The families with the largest representatives of genera and species are listed below.

Family	No. of Species	No. of Genera	No. of Exotics
Myrtaceae (Eucalyptus, Bottlebrushes etc)	107	16	0
Proteaceae (Banksia, Dryandra etc)	72	11	0
Papilionaceae (pea flowers)	42	12	0
Mimosaceae (wattles)	39	1	0
Asteraceae (daisies)	28	20	3
Orchidaceae (orchids)	28	9	0
Epacridaceae (heath plants)	21	7	0
Goodeniaceae (Lechenaultia, Dampiera etc)	21	7	0
Cyperaceae (sedges)	21	6	0
Stylidiaceae (trigger plants)	16	2	0
Anthericaceae (lilies)	13	5	0
Rutaceae (Boronia, Phebalium etc)	12	5	0
Poaceae (grasses)	9	8	6

The families Myrtaceae, Proteaceae, Papilionaceae and Mimosaceae were the most strongly represented in the flora of Dragon Rocks Nature reserve. Of the monocotyledons, members of the family Cyperaceae, Orchidaceae and Anthericaceae are the most common.

Using the present data, the overall floristic diversity of the reserve can be estimated at 1.8 species/square kilometre. This is low when compared to other reserves such as Bendering Nature Reserve (5.9 species/square kilometre), Tarin Rock/North Tarin Rock Nature Reserves (8.7 species/square kilometre) and Tutanning Nature Reserve (22 species/square kilometre). As Muir (1977) points out such estimates will depend on the distribution of vegetation types within the reserve boundary and reserve size, both of which are largely fortuitous. Dragon Rocks Nature Reserve is considerably larger than the other reserves mentioned

and has not been as extensively studied as Tutanning Nature Reserve. Species rich kwongan cover large areas and a subjective assessment would indicate that the reserve has a high level of floristic diversity comparable to other areas in the wheatbelt with similar proportions of these vegetation formations.

The species lists for vegetation associations provided in Appendix 3 are only preliminary and the number of species listed may in part reflect the extent of the associations on the reserve and therefore the number of sites where data was collected. However an indication of species diversity for each association can be ascertained. The number of species recorded for floristically diverse associations are listed below.

Vegetation Association	No. of Species Recorded
<b>KWONGAN</b>	
Km <i>Eucalyptus albid</i> a Very Open Shrub Mallee over Heath (laterite)	145
Kml <i>Eucalyptus albid</i> a Very Open Shrub Mallee over <i>Eremaea</i> Heath	102
Kh Heath (laterite)	121
Kv Low Mixed Heath	184
Ke <i>Eremaea</i> Heath	116
<b>MALLEE</b>	
Ml <i>Eucalyptus loxophleba</i> Mallee	36
Mm Mallee over <i>Melaleuca</i>	115
<b>WOODLAND</b>	
Ws <i>Eucalyptus salmonophloia</i> (salmon gum)	68
Wm <i>Eucalyptus gardneri</i> (blue mallet)/ <i>Eucalyptus</i> sp. (silver mallet) Low Forest	56

Brown (1989) examined the floristic variation at 20 sites of kwongan occurring on lateritic soils in the wheatbelt from

Brookton to east of Lake King. Sites 14 and 15 were situated on Dragon Rocks Nature Reserve (see Appendix 5 for site details). The results of this study show that this kwongan is as floristically rich and varied as the kwongan on the northern and southern sandplain areas of the south west of Western Australia.

Brown notes that the kwongan vegetation is complex, containing a rich mixture of species largely from the families Proteaceae, Myrtaceae and Papilionaceae. In most of the sites surveyed Proteaceae was the best represented family except for sites 17, 18 and 19 which are situated east of Dragon Rocks Nature Reserve. On these sites a greater proportion of species of the Myrtaceae than of the Proteaceae were found. Data collected during the present survey supports these findings.

Family	<i>Eucalyptus albidia</i> Very Open Shrub Mallee over Heath (laterite)	Heath (laterite)
Proteaceae	39 species	41 species
Myrtaceae	34 species	27 species
Papilionaceae	12 species	13 species

The flora of Dragon Rocks Nature Reserve shows a mixing of floral elements including Eremean, central wheatbelt and southern species (Marchant in McKenzie *et al* 1973). Species which are at the western extent of their range of distribution include *Acrotriche patula* and *Banksia elderiana*. Those species at the southern extent of their range include *Eucalyptus capillosa* ssp. *polyclada*, *Grevillea petrophiloides*, *Kunzea pulchella*, *Verticordia gracilis* and *Xanthorrhoea nana*. And those species with their main area of distribution south of Dragon Rocks Nature Reserve include *Calothamnus huegelii*, *Eucalyptus incrassata*, *Goodenia scapigera*, *Hakea crassifolia*, *Hakea corymbosa* and *Verticordia habrantha*.



## 5.2 Species of Interest

Plant species of interest recorded for Dragon Rocks Nature Reserve are listed in Table 5. These species have been classified by the Department of Conservation and Land Management into categories which reflect their conservation status. These categories are listed below. Eight gazetted rare plants are recorded in Table 5 along with 13 priority taxa which include two subspecies. Five of the gazetted rare plants were not previously known from the reserve and 11 of the priority taxa were also first recordings.

### CONSERVATION CODES

#### R: Declared Rare Flora - Extant Taxa

Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

#### X: Declared Rare Flora - Presumed Extinct Flora

Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.

#### 1: Priority One - Poorly Known Taxa

Taxa which are known from one or a few (generally <5) populations, which are under threat, either due to small population size, or being on lands under immediate threat, eg. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, eg. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

#### 2: Priority Two - Poorly Known Taxa

Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (ie. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

#### 3: Priority Three - Poorly Known Taxa

Taxa which are known from several populations, at least some of which are not believed to be under immediate threat (ie. not currently endangered). Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

TABLE 5: DRAGON ROCKS NATURE RESERVE - DECLARED RARE  
AND PRIORITY FLORA

Species	Conservation Status	Geographical Distribution
<i>Acacia newbeyi</i>	3	Ongerup, Nyabing, Dragon Rocks NR, Boxwood Hills, Ravensthorpe
<i>Allocasuarina tortiramula</i>	R	Lake King, Dragon Rocks NR
<i>Caladenia hoffmanii</i>	R	Geraldton-Kalbarri, Pingaring ~32 kms east of Newdegate
<i>Calectasia</i> sp. (central wheatbelt) K Dixon 861	R	Quairading, Dragon Rocks NR
<i>Daviesia ?spiralis</i>	R	Kulin, Dragon Rocks NR, SW Newdegate
<i>Eucalyptus microschemata</i>	2	Newdegate, Dunn Rock
<i>Eucalyptus olivacea</i>	R	Pingaring, Dragon Rocks NR
<i>Gastrolobium densifolium</i>	2	Dudin, Kukerin, Lake Grace
<i>Grevillea involucrata</i>	R	Hyden, Lake Magenta
<i>Grevillea prostrata</i>	R	Newdegate-Lake King
<i>Grevillea wittweri</i>	2	Lake Cronin, Lake King, Lake Grace, Ravensthorpe
<i>Melaleuca fissurata</i> (ms)	2	Dragon Rocks NR, Mt Ney-Lake King
<i>Melaleuca polycephala</i>	3	?Dragon Rocks NR, Pingrup, Amelup, Gnowangerup, Ongerup, Toolbrunup Siding

Species	Conservation Status	Geographical Distribution
<i>Persoonia hakeiformis</i>	2	Mogumber, Grass Patch, Dryandra
<i>Pimelea graniticola</i>	2	Mt Gibbs, Peak Charles, Chiddarcooping Hill
<i>Stylidium neglectum</i>	X	Wongan Hills, Dragon Rocks NR
<i>Thelymitra psammophila</i>	R	Dragon Rocks NR, Stirling Range
<i>Verticordia gracilis</i>	1	Mt Holland Road, Korbel Siding, Koonadgin Siding, Dragon Rocks NR
<i>Verticordia integra</i>	3	Newdegate, Lake King, Ravensthorpe
<i>Verticordia multiflora</i> ssp. <i>multiflora</i>	3	Porongorups, Newdegate, Darkan Swamp
<i>Verticordia multiflora</i> ssp. <i>solox</i>	1	Cockatoo Tank, Mt Holland Road, Dragon Rocks NR

a) Gazetted Rare Plants

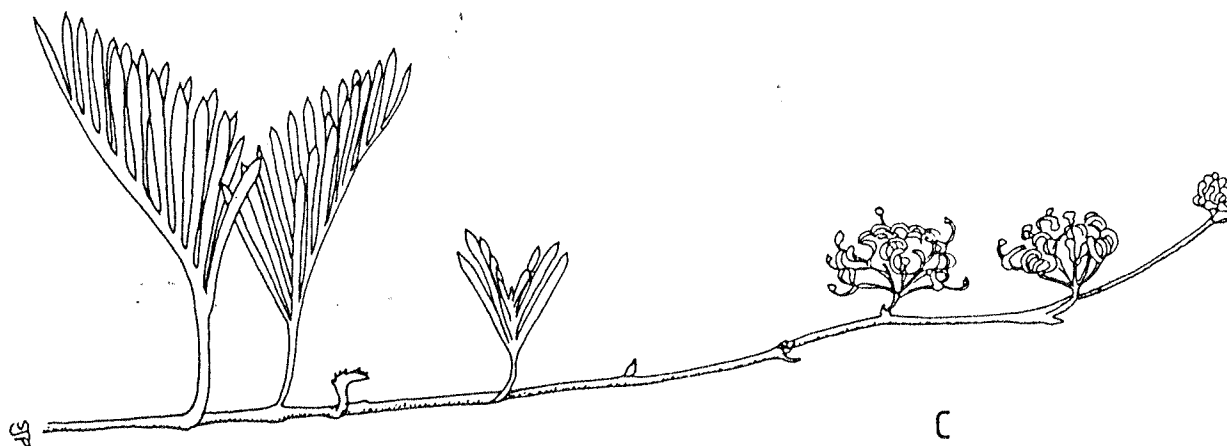
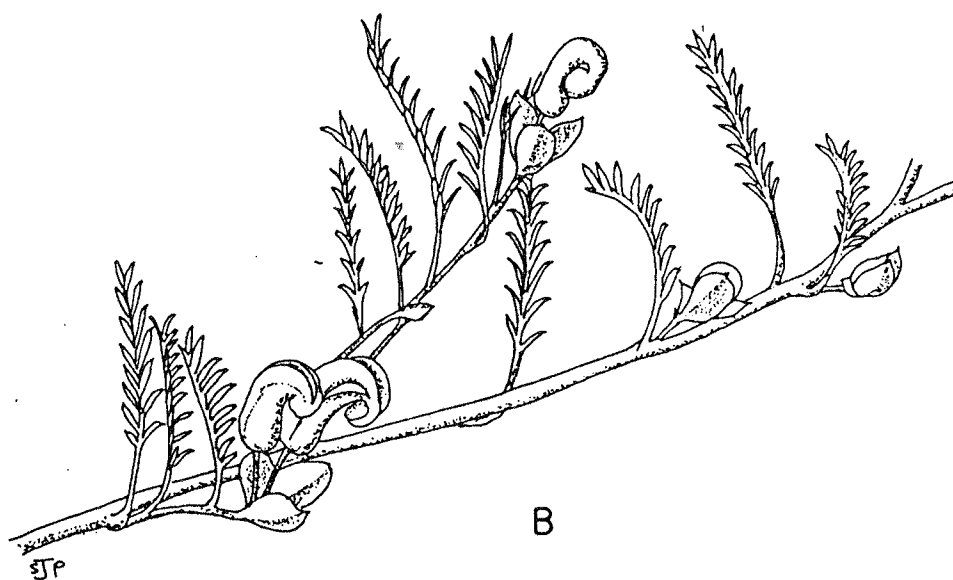
*Allocasuarina tortiramula* has previously been known only from 2 populations in the Lake King areas occurring in dense high heath on loam over granite. Only one plant was found on Dragon Rocks Nature Reserve approximately 400 metres north of the Pingaring Varley Road on the western boundary. The plant was situated on the firebreak adjacent to a fence line. Due to time restrictions it was not possible to survey the adjacent area of granite for further plants. *Allocasuarina tortiramula* is illustrated in Figure 10a.

*Caladenia hoffmanii* has previously been known from 8 populations, two occurring on Dragon Rocks Nature Reserve. Another population was discovered during the present survey on a granite outcrop adjacent to the southern boundary at site 9.12. The population was discovered by the author, Dianne McDonald (Rare flora Volunteer) and Mal Graham (Department of Conservation and Land Management). Ten plants were recorded in Dense Low Forest B of *Allocasuarina huegeliana* occurring on a deep soil pocket between large granite boulders. The location of the other populations on the reserve are listed below:

1. Dragon Rocks in Dragon Rocks Nature Reserve - near site 6.6 - 30+, plants not relocated; and
2. Lanes Rock, at Dragon Rocks Nature Reserve - near site 7.8 - not relocated.

*Calectasia* sp. (central wheatbelt) K Dixon 861 is known from the Quairading area. Dr G Keighery (Department of Conservation and Land Management) has recently located this species approximately 32 kilometres east of Newdegate on the Newdegate-lake King Road near the corner of Tuck Road. Two new populations were also discovered during the present survey of Dragon Rocks Nature Reserve at sites 5.5 and 2.6. Due to the limited survey time available the number of plants at these sites was not ascertained but the species was rare in the *Eremaea* Heath association growing in sandy soils.

FIGURE 10: Line Drawings of *Allocastrum tortirama* (a), *Grevillea involucrata* (b) and *Grevillea prostrata* (c)



*Daviesia spiralis* is known only from eight populations in the Wongan Hills area. *Daviesia ?spiralis* collected during the present survey is not uncommon on Dragon Rocks Nature Reserve and has also been collected in the Kulin area by Dr K J Atkins (Department of Conservation and Land Management). The Dragon Rocks *Daviesia* differs slightly from *Daviesia spiralis* (Wongan Hills) in having a 3 flowered raceme and leaves with only one or two twists. Confirmation is needed from Dr M Crisp who is at present revising the genus that the Dragon Rocks and Wongan Hills taxa are the same. *Daviesia ?spiralis* was recorded at 16 localities within the reserve including sites 2.12, 5.11, 7.13, 8.1, 8.8, 10.5 and 10.6. Twelve to twenty five plants were recorded at most sites however over 100 plants were counted at sites 8.8 and 10.7. These sites were in areas that had been burnt approximately 11 or 12 years before the survey. The plants were growing in Low Mixed Heath (sandy soils), *Eremaea* Heath (sandy soils) and *Eucalyptus albidula* Very Open Shrub Mallee over *Eremaea* Heath (sandy soils over laterite) usually in undisturbed areas but also occasionally at the edge of firebreaks. *Daviesia ?spiralis* has also been sighted on the South Burngup Road, southwest of Newdegate, on the road verge with *Grevillea prostrata*.

Four populations of *Eucalyptus olivacea* [sp. Pingaring, Brooker MH 9109] have previously been located, three of which occur on Dragon Rocks Nature Reserve. Two new populations were discovered on the reserve during the present survey with the assistance of Rosemary Cugley (Rare Flora Volunteer). Two of the populations already recorded for the reserve were confirmed and extended to include a number of plants in adjacent areas of the granite outcrops on which they occur. Estimating the number of individual plants was difficult as the mallees occur in "clump" formations. The populations of *Eucalyptus olivacea* occurring on Dragon Rocks Nature Reserve are listed below:

- i. Dragon Rocks, near Dragon Rocks Road - population confirmed and extended to include plants on the northern section of the rocks (55 plants estimated);
- ii. Granite complex adjacent to the central firebreak - population confirmed and extended to include plants at site 7.1 (47 plants estimated);
- iii. site 5.3 - new population (one "clump" of mallee);
- iv. site 7.6 - new population (9 plants estimated); and
- v. northern boundary, eastern section - not relocated.

*Eucalyptus olivacea* grows in sandy soils, receiving run-off, at the base of granite outcrops. Associated vegetation is Heath B to Low Heath C with *Calothamnus quadrifidus* prominent. Other associated species include *Acacia lasiocalyx*, *Allocasuarina campestris*, *Bossiaea concinna*, *Leptospermum incanum*, *Lepidosperma ?longitudinale*, *Petrophile seminuda*, *Spartochloa scirpoidea* and *Thryptomene australis*.

Photograph 32: Buds and Fruits of *Eucalyptus olivacea*



Three new populations of *Grevillea involucrata* were recorded during the present survey at sites 2.17 (4 plants), near site 1.1 (3 plants) and approximately 1.6 kilometres south of the Pingaring-Varley Road on the western boundary (9 plants). Populations of this species have been previously recorded at localities ranging from Hyden to Lake Magenta and Dunn Rock Nature Reserves. The plants on Dragon Rocks Nature Reserve were found in disturbed areas on firebreaks or roadside verge growing on lateritic soils adjacent to *Eucalyptus albida* Very Open Shrub Mallee over Heath (laterite). *Grevillea involucrata* is illustrated in Figure 10b.

*Grevillea prostrata* was recorded for Dragon Rocks Nature Reserve during the present survey. Thirty three populations of this species have previously been found, four of which occur on Nature Reserves. Although a number of populations have been recorded *Grevillea prostrata* is considered endangered as little is known about the biology of this species which grows in disturbed areas and appears to be relatively short lived. Only one plant was sighted on the reserve on the central firebreak near site 7.13 growing in sandy soils over laterite adjacent to the *Eucalyptus albida* Very Open Shrub Mallee over *Eremaea* Heath. *Grevillea prostrata* is illustrated in Figure 10c.

*Thelymitra psammophila* has been recorded as occurring on the granite outcrop known as Dragon Rocks but was not relocated during the present survey. Six populations of this species have been found ranging from the Stirling Range to the Fitzgerald National Park and Ravensthorpe.

*Verticordia staminosa* and *Tribonanthus purpurea* both occur in shallow soils on granite outcrops and have been recorded at localities near the Dragon Rocks Nature Reserve. Further survey of the granite areas in June to August may find new populations of these gazetted rare plants on the reserve.



b) X: Declared Rare Flora - Presumed Extinct

*Stylidium neglectum* was recorded on granite outcrops on Dragon Rocks Nature Reserve and also in the Wongan Hills area. This species has been classified as Presumed Extinct due to past confusion in the taxonomy of this group. The voucher specimens collected at Dragon Rocks and Wongan Hills were identified by Allen Lowrie.

c) Other Species of Interest

Table 6 presents information on location, soil type, associated vegetation and an estimate of abundance for Department of Conservation and Land Management priority species found on Dragon Rocks Nature Reserve. *Melaleuca polycephala* (Priority 3) has been recorded for the reserve file (K20/06-58) but was not relocated during the present survey. *Verticordia integra* is also frequent in gravelly soils over ironstone usually in *Eucalyptus tetragona* mallee/heath on the South Burngup and Lockhart Roads south and south-east of Newdegate.

Other species of interest found on Dragon Rocks Nature Reserve include six species listed in Briggs and Leigh (1988) "Rare or Threatened Australian Plants" but not included in Department of Conservation and Land Management priority listings. These species are listed below together with their conservation code and distribution category (see page 106 for the definitions of codes and categories.)

<i>Acacia tetanophylla</i>	3Kc <sup>-</sup>
<i>Cryptandra leucopogon</i>	2Kc <sup>-</sup>
<i>Gnephosis tenuissima</i>	3Kc <sup>-</sup>
<i>Kunzea jucunda</i>	3Rca
<i>Leucopogon ozothamnoides</i>	3K
<i>Platysace deflexa</i>	2Rca

## Distribution Category

- '2' Species with a very restricted distribution in Australia and with a maximum geographic range of less than 100 kilometres.
- '3' Species with a range over 100 kilometres in Australia but occurring only in small populations which are mainly restricted to highly specific and localised habitats.

## Conservation Status

- 'R' Rare - species which are rare in Australia but which overall are not currently considered Endangered or Vulnerable.
- 'K' Poorly known - species that are suspected, but not definitely known, to belong to any of the endangered, vulnerable or rare categories.

## Codes Relating to Reservation and Adequacy of Reservation

- 'c' This symbol is used to indicate when a species is known to be represented within a national park or other proclaimed reserve.
- 'a' when used in conjunction with the conservation Coding indicated that the species is considered adequately reserved.
- '-i' indicates that the species has been recorded from a reserve or reserves but that the population size within the reserve is unknown.

TABLE 6: DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT PRIORITY SPECIES OCCURRING ON DRAGON ROCKS NATURE RESERVE NO. 'A' 36128

SPECIES	PRIORITY CODE	LOCATION	ASSOCIATED VEGETATION	SOIL TYPE	ABUNDANCE
<i>Verticordia gracilis</i>	1	Site 5.5 and 2.17	<i>Eremaea</i> Heath	Sandy soils	Occasional
<i>Verticordia gracilis</i>	1	~250 metres SE site 3.14	Low Mixed Heath	Sandy soils	Occasional
<i>Verticordia gracilis</i>	1	Site 8.3	<i>Eucalyptus albida</i> over <i>Eremaea</i> Heath	Sandy soils over laterite	Occasional
<i>Verticordia multiflora</i> ssp. <i>solox</i>	1	West of site 1.22	Low Mixed Heath	Sandy soils	Rare
<i>Eucalyptus microschema</i>	2	Between sites 9.6 and 9.9	<i>Melaleuca leptospermoides</i> Heath	Sandy gravel	Occasional to Frequent
<i>Grevillea wittweri</i>	2	Recorded at 6 localities including sites 2.6, 5.1, 5.5 and 8.6	<i>Eremaea</i> Heath (Low Mixed Heath one recording)	Sandy soils	Rare or Occasional
<i>Melaleuca fissurata</i> (ms)	2	Site 2.21	Mallee over <i>Melaleuca haplantha</i>	Sand over Clay (below Breakaway)	Frequent to Occasional
<i>Melaleuca fissurata</i> (ms)	2	Near site 8.12 (adjacent to track)	Mallee over <i>Melaleuca adnata</i>	Sand over Clay	Frequent to Occasional

SPECIES	PRIORITY CODE	LOCATION	ASSOCIATED VEGETATION	SOIL TYPE	ABUNDANCE
<i>Melaleuca fissurata</i> (ms)	2	Site 9.21	Low Mixed Heath	Sandy soils	Frequent to Occasional
<i>Melaleuca fissurata</i> (ms)	2	North of site 9.20	Mallee over <i>Melaleuca uncinata</i>	Sand over Clay	Frequent to Occasional
<i>Persoonia hakeiformis</i>	2	~1.75 km ENE of site 5.1 (S. of Pingaring Varley Road	<i>Eucalyptus albida</i> over Heath (laterite)	Gravel Soils Ironstone in places	Rare
<i>Persoonia hakeiformis</i>	2	Near site 1.1	<i>Eucalyptus albida</i> over Heath (laterite)	Gravel Soils Ironstone in places	Rare
<i>Pimelea graniticola</i>	2	Site 5.4, Site 10,3 ~500 m SW of site 8.9	Granite Outcrop flora including <i>Borya</i> species, <i>Spartochloa scirpoidea</i> , <i>Lepidosperma ?longitudinale</i>	Shallow Soil Pocket over Granite	Rare to occasional
<i>Gastrolobium densifolium</i>	2	Site 2.12	Low Mixed Heath	Sandy Soils	Occasional
<i>Gastrolobium densifolium</i>	2	Site 2.21	Low Mixed Heath and adjacent firebreak	Sandy Soils	Occasional

SPECIES	PRIORITY CODE	LOCATION	ASSOCIATED VEGETATION	SOIL TYPE	ABUNDANCE
<i>Acacia newbeyi</i>	3	Site 4.12	Open Shrub Mallee over <i>Allocasuarina acutivalvis</i> Thicket	Shallow Soils over Ironstone	Rare to Occasional
<i>Verticordia integra</i>	3	Near site 1.1 ~2.5 km S of Jilakin Rocks Road on central firebreak	<i>Eucalyptus albida</i> over Heath (laterite)	Gravelly Soils Ironstone in places	Occasional
<i>Verticordia integra</i>	3	S. of Pingaring-Varley Road and E. of Dragon Rocks Road (SE section of reserve)	<i>Eucalyptus albida</i> over Heath (laterite) (Heath-laterite, occasional)	Gravelly Soils Ironstone in places	Frequent-Abundant on firebreaks in places
<i>Verticordia multiflora</i> ssp. <i>multiflora</i>	3	~750 m SW of site 7.10	Granite Rock flora, <i>Allocasuarina campestris</i>	Shallow Soils adjacent to Granite	Occasional
<i>Verticordia multiflora</i> ssp. <i>multiflora</i>	3	~2 kms S. of Jilikan Rocks Road along eastern boundary	Granite Rock flora, <i>Allocasuarina campestris</i>	Shallow Soils adjacent to Granite	Occasional

## 6.0 ACKNOWLEDGMENTS

Thanks are given to the following people:

For confirmation or identification of plant species Dr J Armstrong (*Drummondita*), Ms E Bennett (*Allocasuarina tortiramula*), Dr B Conn (*Logania*), Mr A Brown (Orchidaceae), Mrs E George (*Verticordia*), Dr G Keighery (Dasypogonaceae, Anthericaceae), Dr S Hopper (*Eucalyptus*), Mr B Maslin (*Acacia*), Mr A Lowrie (*Drosera*, *Stylidium*), Dr T McFarlane (*Mirbelia*), Mrs B Rye (*Pimelea*), Mr M Trudgeon (*Baeckea*), Mrs J Wheeler (*Hibbertia*) and Mr P Wilson (Chenopodiaceae, *Phebalium*).

Rosemary Cugley, Dianne McDonald and Mal Graham for their rare flora work.

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

Mrs B Kennington for her excellent word-processing, arranging and checking.

The survey was made possible by a grant under the National Estate Program.

## 7.0 REFERENCES

- Barker, R M (1990) "New species, new combinations and other name changes in *Hakea* (Proteaceae)". *J. Adelaide Bot. Gard.* 13:95-100
- Beard, J S (1979) "The Vegetation of the Hyden Area, W.A." Vegmap Publications, Perth
- Beard, J S (1980) "The Vegetation of the Dumbleyung Area, W.A." Vegmap Publications, Perth
- Beard, J S (1980a) "The Vegetation of the Corrigin Area, W.A." Vegmap Publications, Perth
- Bennett, E (1989) "Flora of Australia" 3:pl90 Aust. Gov. Pub. Service, Canberra
- Briggs, J D and Leigh, J H (1988) "Rare or threatened Australian Plants. 1988 Revised Edition." CSIRO Canberra
- Brooker, M I H (1988) "Eucalyptus foecunda revisited and six related new species (Myrtaceae)." *Nuytsia* Vol 6 (3)
- Brooker, M I H and Hopper, S D (1991) "A taxonomic revision of *Eucalyptus wandoo*, *Eucalyptus redunda* and allied species (*Eucalyptus* series *Levispermae* Maiden - Myrtaceae) in W.A." *Nuytsia* Vol 8 (1)
- Brown, J M (1989) "Regional variation in kwongan in the central wheatbelt of south-western Australia". *Aust. J. of Ecology* 14, 345-355
- Chin, R J., Hickman, A H and Thom, R (1984) "Hyden Western Australia." Geological Survey of W.A. 1:250 000 series. Dept. Mines, W.A.

- Chin, R J (1986) "Kellerberrin Western Australia" Geological Survey of W.A. 1:250 000 series. Dept. of Mines, W.A.
- Crisp, M D and Weston, P H (1987) "Cladistics and Legume systematics with an analysis of the Bossiaceae, Brongniartieae and Mirbelieae." In *Advances in Legume Systematics Part 3* Edited by C H Stirton. Royal Bot. Gardens, Kew
- George, A S (1991) "New taxa, combinations and typifications in *Verticordia* (Myrtaceae: Chamelaucieae). *Nuytsia* Vol 7 (3)
- Green, J W (1985) "Census of the Vascular Plants of W.A." Dept. of Agriculture, Perth.
- McKenzie, N L., Burbidge, A A and Marchant, N G (1973) "Results of a Biological Survey of a Proposed Wildlife Sanctuary at Dragon Rocks Near Hyden, Western Australia. Report No. 12." Dept of Fisheries and Fauna W.A.
- Muir, B G (1977) "Vegetation and Habitat of Bendering Reserve". Part 2 of Biological Survey of Western Australian Wheatbelt. Rec. West. Aust. Mus. Suppl. No. 3
- Northcote, K H., Bettenay, E., McArthur, W M and Churchward, J M (1967) "Dominant Soils of the Perth-Albany-Esperance Area". Atlas of Australian Soils, Sheet 5, CSIRO Melbourne
- Pate, J S and Beard, J S (1984) "Kwongan Plant Life of the Sandplain" Uni of W.A. Press, Nedlands, W.A.
- Randell, B (1988) "Revision of the Cassiinae in Australia 1. *Senna* Miller Sect, *Chamaefistula* (Colladon) Irwin and Barneby. *J. Adelaide Bot. Gard.* 11:19-49
- Thompson, J (1989) "A revision of the genus *Leptospermum* (Myrtaceae)." *Telopea* 3(3):301-449



APPENDIX 1 - PLANT SPECIES LIST FOR DRAGON ROCKS NATURE  
RESERVE No. A36128

ms	Manuscript name
*	Introduced Species
1234	Collecting Number for Voucher Specimen
CSNC	Central South Naturalists Club
RAOU	Royal Australasian Ornithologists Union
J.M.Brown	Recorded for the reserve by J M Brown

PTERIDOPHYTA (ferns)

ADIANTACEAE

Cheilanthes austrotenuifolia

Cheilanthes distans 2838

GYMNOSPERMAE

CUPRESSACEAE

Callitris canescens 2570

Callitris preissii ssp. verrucosa 2318

Callitris roei 2353

MONOCOTYLEDONAE

POACEAE

\* Aira cupaniana 3216

Amhipogon turbinatus J.M.Brown 363

\* Briza maxima

\* Briza minor

\* Bromus diandrus

\* Lolium rigidum

Neurachne alopecuroidea

\* Pentaschistis airoides 3220

Spartochloa scirpoidea

## CYPERACEAE

<i>Caustis dioica</i>	3358
<i>Gahnia ancistrophylla</i>	3192
<i>Gahnia drummondii</i>	J.M.Brown
<i>Isolepis marginata</i>	J.M.Brown
<i>Lepidosperma ?angustatum</i>	2526
<i>Lepidosperma ?brunonianum</i>	2525
<i>Lepidosperma ?drummondii</i>	2514
<i>Lepidosperma ?gracile</i>	2317
<i>Lepidosperma ?longitudinale</i>	2852
<i>Lepidosperma ?pruinsum</i>	2542
<i>Lepidosperma ?pubisquameum</i>	2397
<i>Lepidosperma ?resinosum</i>	2309
<i>Lepidosperma ?tenue</i>	2600
<i>Lepidosperma ?tuberculatum</i>	2316
<i>Mesomelaena preissii</i>	3184, 2328
<i>Schoenus brevisetis</i>	J.M.Brown
<i>Schoenus</i> aff. <i>pleiostemoneus</i>	J.M.Brown
<i>Schoenus</i> aff. <i>subflavus</i>	J.M.Brown
<i>Schoenus</i> aff. <i>armeria</i>	J.M.Brown
<i>Schoenus</i> sp.	2401
<i>Schoenus</i> ?sp.	2311

## RESTIONACEAE

<i>Lepidobolus chaetocephalus</i>	3381
<i>Loxocarya aspera</i> (ms)	2545
<i>Loxocarya ?cinerea</i>	3182b
<i>Loxocarya myrioclada</i>	2685
<i>Loxocarya parthenica</i> (ms)	2651
<i>Restio megalotheca</i>	J.M.Brown

## DASYPOGONACEAE

<i>Calectasia grandiflora</i>	2870
<i>Calectasia</i> sp. (central wheatbelt)	3497
<i>Chamaexeros fimbriata</i>	2512
<i>Lomandra collina</i>	J.M.Brown
<i>Lomandra effusa</i>	
<i>Lomandra mucronata</i>	2313

## XANTHORRHOEACEAE

*Xanthorrhoea nana* 3334

## PHORMIACEAE

*Dianella revoluta*

*Stypandra glauca*

## ANTHERICACEAE

*Borya constricta* 2616

*Borya sphaerocephala* 3549, 2837b

*Chamaescilla corymbosa* 2842

*Chamaescilla spiralis*

*Laxmannia paleacea* 2863

*Laxmannia squarrosa* 3333

*Thysanotus dichotomus* 3506

*Thysanotus ?patersonii*

*Thysanotus sparteus* 3511

*Thysanotus ?thyrsoides* 3488

*Thysanotus ?sp.* 3334, 3382, 3236

*Tricoryne ?elator* 3336a

*Tricoryne tenella* 3336

## COLCHICACEAE

*Wurmbea sinora* 2829

## HAEMODORACEAE

*Anigozanthos humilis*

*Conostylis aculeata* ssp. ?aculeata 3550, 3315

*Conostylis argentea* 2393

*Conostylis petrophiloides* 3530

*Conostylis setigera* J.M.Brown

*Conostylis ?villosa* M.Graham

*Haemodorum ?sp.*

## HYPOXIDACEAE

*Hypoxis glabella* 2843

*Hypoxis occidentalis* 2631

## IRIDACEAE

Patersonia juncea	3238
-------------------	------

## ORCHIDACEAE

Caladenia dimidia (ms)	2831, 2828
Caladenia ?doutchae	RAOU
Caladenia ?falcata (ms)	M.Graham and CSNC
Caladenia flava ssp. flava	2835c
Caladenia hirta ssp. rosea	2832
Caladenia hoffmanii (ms)	2830
Caladenia ?microchila (ms)	CSNC and M.Graham
Caladenia roei	2835
Caladenia saccharata	2522
Cyanicula ashbyi (ms)	3317
Cyanicula caerulea ssp. apertila (ms)	2594
Cyanicula ?deformis (ms)	CSNC and M.Graham
Cyanicula gemmata (ms)	
Diuris aff. corymbosa	2834a
Elythranthera brunonis	2840a
?Microtis media (ms)	RAOU
Prasophyllum ringens (ms)	2829a
Prasophyllum ovale	M.Graham 1362
Prasophyllum sargentii	2998
Pterostylis recurva	J.M.Brown
Pterostylis ?aff. rufa	RAOU
Pterostylis sanguineus (ms)	2615
Spiculaea ciliata	
Thelymitra azurea (ms)	3316
Thelymitra antennifera	2834
Thelymitra aff. macrophylla (ms)	3179
Thelymitra psammophila,	(CALM records)
Thelymitra spiralis	2841

DICOTYLEDONAE

## CASUARINACEAE

<i>Allocasuarina acutivalvis</i>	2423
<i>Allocasuarina campestris</i>	2582
<i>Allocasuarina corniculata</i>	2540
<i>Allocasuarina huegeliana</i>	
<i>Allocasuarina humilis</i>	2344
<i>Allocasuarina microstachya</i>	2317
<i>Allocasuarina thuyoides</i>	2339
<i>Allocasuarina tortiramula</i>	3491

## PROTEACEAE

<i>Adenanthos argyreus</i>	2292
<i>Adenanthos flavidiflorus</i>	2378
<i>Banksia audax</i>	2435
<i>Banksia elderiana</i>	2635
<i>Banksia sphaerocarpa</i> var. <i>caesia</i>	2292
<i>Banksia violacea</i>	2336
<i>Conospermum bracteosum</i>	2877
<i>Conospermum croninae</i> (ms)	3111
<i>Conospermum filifolium</i> (ms)	3119
<i>Conospermum stoechadis</i>	3108
<i>Dryandra cirsioides</i>	2379
<i>Dryandra drummondii</i>	2345
<i>Dryandra erythrocephala</i>	3472
<i>Dryandra ferruginea</i>	3468
<i>Dryandra</i> aff. <i>ferruginea</i>	3505
<i>Dryandra</i> aff. <i>nivea</i>	K. Atkins and K. Wallace
<i>Dryandra</i> sp. 13 A.S. George	2460
<i>Grevillea cagiana</i>	2341
<i>Grevillea eriostachya</i>	
<i>Grevillea eryngioides</i>	
<i>Grevillea didymobotrya</i> ssp. <i>didymobotrya</i>	2489
<i>Grevillea haplantha</i>	2561
<i>Grevillea huegelii</i>	3258
<i>Grevillea integrifolia</i> ssp. <i>biformis</i>	3151
<i>Grevillea integrifolia</i> ssp. <i>shuttleworthiana</i>	2856

<i>Grevillea integrifolia</i> ssp. aff. <i>shuttleworthiana</i>	2878
<i>Grevillea involucrata</i>	3303
<i>Grevillea oligantha</i>	3347
<i>Grevillea petrophiloides</i>	
<i>Grevillea pilosa</i>	3520
<i>Grevillea prostrata</i>	2450
<i>Grevillea teretifolia</i>	3191
<i>Grevillea wittweri</i>	3213
<i>Hakea corymbosa</i>	
<i>Hakea crassifolia</i>	2352
<i>Hakea cygna</i> ssp. <i>cygna</i>	2330
<i>Hakea erecta</i>	2536
<i>Hakea gilbertii</i>	
<i>Hakea ?horrida</i>	2324
<i>Hakea incrassata</i>	
<i>Hakea lissocarpha</i>	
<i>Hakea marginata</i>	2322
<i>Hakea meisneriana</i>	3536, 2636
<i>Hakea multilineata</i>	2536a
<i>Hakea newbeyana</i>	2529
<i>Hakea ?obliqua</i>	2407
<i>Hakea petiolaris</i>	
<i>Hakea prostrata</i>	2572
<i>Hakea scoparia</i>	2565
<i>Hakea strumosa</i>	2531
<i>Hakea subsulcata</i>	2415
<i>Hakea trifurcata</i>	2552
<i>Hakea ?sp.</i>	3312
<i>Isopogon</i> aff. <i>buxifolius</i>	2293
<i>Isopogon divergens</i>	2652
<i>Isopogon</i> aff. <i>formosus</i>	3117
<i>Isopogon scabriusculus</i>	2488
<i>Isopogon teretifolius</i>	2488
<i>Isopogon villosus</i>	
<i>Persoonia ?coriacea</i>	2409
<i>Persoonia diadema</i>	3207
<i>Persoonia hakeiformis</i>	3498
<i>Persoonia ?quinquenervis</i>	3232, 3481

<i>Persoonia striata</i>	3496
<i>Persoonia trinervis</i>	3538
<i>Petrophile circinata</i>	2412
<i>Petrophile ericifolia</i>	2879
<i>Petrophile ?longifolia</i>	M.Graham
<i>Petrophile seminuda</i>	2510
<i>Petrophile squamata</i>	2340
<i>Petrophile trifida</i>	2333
<i>Stirlingia simplex</i>	3530
<i>Synaphea aff. spinulosa</i>	3361, 2859
<i>Synaphea sp.</i>	3255

## SANTALACEAE

<i>Exocarpos aphyllus</i>	2456
<i>Exocarpos sparteus</i>	2589, 3513
<i>Leptomeria pauciflora</i>	2527
<i>Leptomeria preissiana</i>	3124
<i>Santalum acuminatum</i>	
<i>Santalum murrayanum</i>	3372

## OLACACEAE

<i>Olax benthamiana</i>	2597
-------------------------	------

## POLYGONACEAE

<i>Muehlenbeckia adpressa</i>	2844
-------------------------------	------

## CHENOPODIACEAE

<i>Atriplex paludosa</i> ssp. <i>baudinii</i>	3196
<i>Enchylaena ?tomentosa</i>	
<i>Rhagodia preissii</i>	2562

## AMARANTHACEAE

<i>Ptilotus manglesii</i>	3364
<i>Ptilotus polystachyus</i>	

## GYROSTEMONACEAE

<i>Gyrostemon subnudus</i>	3527
----------------------------	------

## PORTULACACEAE

Calandrinia eremaea

K.Atkins

## LAURACEAE

Cassytha melantha

Cassytha pomiformis

3278

## DROSERACEAE

Drosera androsacea (ms)

2827b

Drosera barbigera

2855

Drosera leucoblasta

J.M.Brown

Drosera macrantha ssp. planchonii

2539

Drosera pycnoblata

3363

Drosera stricticaulis

3284

Drosera subhirtella ssp. subhirtella

2647

Drosera zonaria

J.M.Brown

## CRASSULACEAE

Crassula colorata

## PITTOSPORACEAE

Cheiranthra filifolia var. filifolia

3383

Pittosporum phylliraeoides var. microcarpa

3259

## MIMOSACEAE

Acacia acanthoclada

2314

Acacia acuminata

Acacia acutata

2853

Acacia assimilis

3290, 2882

Acacia assimilis ssp. atroviridis

3515

Acacia beauverdiana

2543

Acacia bidentata

3539

Acacia brumalis (ms)

S.D.Hopper 5244

Acacia brachyclada

3519

Acacia ?chrysella

2625, 2509

Acacia chrysocephala

2414

Acacia chrysopoda

2592

Acacia ephedroides

3331



<i>Acacia erinacea</i>	
<i>Acacia intricata</i>	2654
<i>Acacia lasiocalyx</i>	
<i>Acacia lasiocarpa</i> var. <i>sedifolia</i>	Marchant 72/031
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i>	2608, 3062
<i>Acacia leptopetala</i>	3493
<i>Acacia leptospermoides</i> ssp. <i>leptospermoides</i>	2592, 2742
<i>Acacia merinthophora</i>	3495
<i>Acacia ?merrallii</i>	K. Atkins
<i>Acacia microbotrya</i>	3187
<i>Acacia mimica</i> (ms)	2365
<i>Acacia moirii</i> ssp. <i>recurvistipula</i>	2386
<i>Acacia multispicata</i>	2575, 2643
<i>Acacia myrtifolia</i>	2633
<i>Acacia newbeyi</i>	2581
<i>Acacia pulchella</i> var. <i>glaberrima</i>	2477
<i>Acacia pulchella</i> var. <i>goadbyi</i>	2557
<i>Acacia pycnocephala</i>	2598
<i>Acacia rostellata</i> (ms)	3244
<i>Acacia saligna</i>	2850
<i>Acacia sedifolia</i> ssp. <i>pulvinata</i>	3483
<i>Acacia shuttleworthii</i>	3474
<i>Acacia sphacelata</i> ssp. <i>recurva</i>	2549
<i>Acacia sphacelata</i> ssp. <i>sphacelata</i>	2405
<i>Acacia sulcata</i> var. <i>platyphylla</i>	2550
<i>Acacia tetanophylla</i> Dragon Rocks Variant	2607
<i>Acacia trigonophylla</i>	3277
<i>Acacia uncinella</i>	3123
<i>Acacia unifissilis</i>	2406
<i>Acacia verricula</i> (ms)	2624
CAESALPINIACEAE	
<i>Labichea stellata</i>	3261
<i>Senna artemisioides</i>	3262
PAPILIONACEAE	
<i>Bossiaea concinna</i>	2846
<i>Bossiaea preissii</i>	2585

<i>Bossiaea walkeri</i>	3517
<i>Chorizema aciculare</i>	
<i>Daviesia abnormis</i>	2403
<i>Daviesia audax</i> (ms)	2880
<i>Daviesia benthamii</i>	3134
<i>Daviesia ?hakeoides</i>	2644
<i>Daviesia ?intricata</i> (ms)	2554
<i>Daviesia lancifolia</i>	3305
<i>Daviesia ?patens</i> (ms)	2559, 3555
<i>Daviesia rhombifolia</i>	3535
<i>Daviesia ?spiralis</i>	3365
<i>Daviesia uncinata</i> (ms)	3469
<i>Daviesia uniflora</i>	2873
<i>Daviesia ?sp. A</i>	2869, 2872
<i>Daviesia ?sp. B</i>	3350
<i>Daviesia ?sp. C</i>	3269, 3509
<i>Daviesia ?sp. D</i>	2398
<i>Daviesia ?sp. E</i>	3369
<i>Dillwynia uncinata</i>	2628
<i>Gastrolobium crassifolium</i>	
<i>Gastrolobium densifolium</i>	3366
<i>Gastrolobium parviflorum</i>	
<i>Gastrolobium spinosum</i>	
<i>Gastrolobium spinosum</i> var. <i>crassifolium</i>	3490
<i>Gompholobium aristatum</i>	3297
<i>Gompholobium gompholobioides</i>	3342
<i>Gompholobium</i> sp.	3368
<i>Isotropis drummondii</i>	3500
<i>Jacksonia condensata</i>	3197
<i>Jacksonia racemosa</i>	3335
<i>Mirbelia dilatata</i>	2579
<i>Mirbelia floribunda</i>	2614
<i>Mirbelia ramulosa</i>	3279
<i>Mirbelia spinosa</i>	
<i>Nemcia carinata</i>	3128
<i>Nemcia hookeri</i>	2864
<i>Nemcia punctata</i>	3140b
<i>Pultenaea neurocalyx</i>	3308

<i>Pultenaea</i> aff. <i>verruculosa</i>	3163
<i>Templetonia</i> <i>sulcata</i>	
<i>Urodon</i> <i>dasyphyllus</i> (ms)	2881

## GERANIACEAE

<i>Pelargonium</i> <i>havlasae</i>	3548
------------------------------------	------

## RUTACEAE

<i>Boronia</i> <i>coerulescens</i>	
<i>Boronia</i> <i>crassifolia</i>	3395
<i>Boronia</i> <i>crenulata</i> var. <i>crenulata</i>	2605
<i>Boronia</i> <i>subsessilis</i>	2567
<i>Drummondita</i> <i>hassellii</i> var. <i>hassellii</i>	2642
<i>Eriostemon</i> <i>gardneri</i>	3252
<i>Microcybe</i> <i>multiflora</i> var. <i>baccharoides</i>	3347
<i>Phebalium</i> <i>ambiguum</i>	3153
<i>Phebalium</i> <i>filifolium</i>	2871
<i>Phebalium</i> aff. <i>filifolium</i>	2576
<i>Phebalium</i> <i>lepidotum</i>	2568, 3156
<i>Phebalium</i> <i>tuberculosum</i>	2481
<i>Phebalium</i> <i>tuberculosum</i> var. <i>megaphyllum</i>	2430

## POLYGALACEAE

<i>Comesperma</i> <i>calymega</i>	3357
<i>Comesperma</i> <i>drummondii</i>	3113
<i>Comesperma</i> <i>scoparium</i>	
<i>Comesperma</i> <i>volubile</i>	2606

## EUPHORBIACEAE

<i>Beyeria</i> <i>brevifolia</i>	2433
<i>Monotaxis</i> <i>grandiflora</i>	3162
<i>Phyllanthus</i> <i>calycinus</i>	2837
<i>Ricinocarpos</i> <i>glaucus</i>	2385
<i>Stachystemon</i> <i>polyandrus</i>	3552

## CELASTRACEAE

<i>Psammomoya</i> <i>choretroides</i>	
---------------------------------------	--

## STACKHOUSIACEAE

Stackhousia monogyna	3121
Stackhousia muricata	M.Graham 1989
Stackhousia scoparia	3165
Tripterococcus brunonis	3367

## SAPINDACEAE

Dodonaea amblyophylla	2426
Dodonaea bursariifolia	
Dodonaea caespitosa	3194
Dodonaea pinifolia	3339
Dodonaea ptarmicaefolia	2627
Dodonaea viscosa ssp. angustissima	2847

## RHAMNACEAE

Cryptandra glabriflora	2611
Cryptandra leucopogon	3114
Cryptandra nutans	2537
Cryptandra parvifolia	2590
Cryptandra pungens	
Spyridium subochreatum	2599
Spyridium subochreatum (short leaved variant)	3501

## STERCULIACEAE

Lasiopetalum indutum	2428
Lasiopetalum microcardium	2595
Lysiosepalum involucreatum	3212

## DILLENIACEAE

Hibbertia crassifolia	J.M.Brown
Hibbertia enervia	2551, 3167
Hibbertia exasperata	2413
Hibbertia glomerosa	2875
Hibbertia gracilipes	2574, 2857
Hibbertia aff. mucronata	3298
Hibbertia recurvifolia	2602
Hibbertia rupicola	3301

## VIOLACEAE

Hybanthus floribundus

K. Atkins

## THYMELAEACEAE

Pimelea aeruginosa	2560
Pimelea angustifolia	3136
Pimelea argentea	
Pimelea brevifolia	2867
Pimelea graniticola	3295
Pimelea imbricata var. piligera	3328
Pimelea suaveolens ssp. flava	2866
Pimelea sulphurea	3164

## MYRTACEAE

Baeckea crispiflora	3524
Baeckea aff. crispiflora A	3355
Baeckea aff. crispiflora B	3533, 3529
Baeckea aff. cryptandroides	2617
Baeckea aff. preissiana	2862
Baeckea ?sp.	3129
Beaufortia bracteosa	2505b
Beaufortia interstans	2486
Beaufortia micrantha	2301
Beaufortia orbifolia	3478
Beaufortia schaueri	3360
Callistemon phoeniceus	3287
Calothamnus huegelii	2421
Calothamnus quadrifidus	3202
Calothamnus ?sp.	3459
Calytrix breviseta ssp. stipulosa	3170
Calytrix leschenaultii	3264
Calytrix simplex ssp. suboppositifolia	3508
Calytrix stipulosa	J.M. Brown
Calytrix ?strigosa	3118, 3177
Calytrix violacea	3324
Chamelaucium ciliatum	3141
Chamelaucium pauciflorum ssp. pauciflorum	3148
Chamelaucium naviculum (ms)	2638

<i>Eremaea pauciflora</i>	3176
<i>Eucalyptus albida</i>	2356
<i>Eucalyptus anceps</i>	2544
<i>Eucalyptus astringens</i>	
<i>Eucalyptus argyrocaulon</i> (ms)	3276
<i>Eucalyptus calycogona</i>	2532
<i>Eucalyptus capillosa</i> ssp. <i>polyclada</i>	3396, 2619
<i>Eucalyptus celastroides</i>	
<i>Eucalyptus densa</i>	2573
<i>Eucalyptus dissimulata</i>	3273
<i>Eucalyptus eremophila</i>	2490
<i>Eucalyptus flocktoniae</i>	2482
<i>Eucalyptus gardneri</i>	2454
<i>Eucalyptus hypoclamydea</i> ssp. <i>ecdysiastes</i>	3516
<i>Eucalyptus incrassata</i>	3322
<i>Eucalyptus loxophleba</i>	2564
<i>Eucalyptus longicornis</i>	
<i>Eucalyptus microschema</i>	3257
<i>Eucalyptus occidentalis</i>	
<i>Eucalyptus olivacea</i> (ms)	2845
<i>Eucalyptus ornata</i>	3307, 2571
<i>Eucalyptus phaenophylla</i>	2620
<i>Eucalyptus pileata</i>	3494
<i>Eucalyptus plauricaulis</i>	
<i>Eucalyptus salmonophloia</i>	
<i>Eucalyptus salubris</i>	
<i>Eucalyptus spathulata</i>	2499
<i>Eucalyptus sporadica</i> (ms)	2587, 2851
<i>Eucalyptus</i> aff. <i>transcontinentalis</i>	3208
<i>Kunzea jucunda</i>	3219
<i>Kunzea micromera</i>	3198
<i>Kunzea preissiana</i>	3107
<i>Kunzea pulchella</i>	
<i>Leptospermum erubescens</i>	2849
<i>Leptospermum incanum</i>	2848
<i>Leptospermum inelegans</i>	2865
<i>Leptospermum nitens</i>	2297b
<i>Leptospermum spinescens</i>	2335

Melaleuca acuminata	
Melaleuca adnata	2494
Melaleuca cordata	2337
Melaleuca coronicarpa ssp. coronicarpa (ms)	2495
Melaleuca depauperata	3274
Melaleuca elliptica	
Melaleuca eleuterostachya	3373
Melaleuca fissurata (ms)	2623
Melaleuca fulgens	3280
Melaleuca hamulosa	3460
Melaleuca haplantha (ms)	2508
Melaleuca lateriflora	
Melaleuca laxiflora	3479
Melaleuca lecanantha (ms)	3200
Melaleuca leptospermoides	3110
Melaleuca pentagona	3211
Melaleuca platycalyx	
Melaleuca pungens	
Melaleuca scabra	3376b
Melaleuca ?seriata	3390
Melaleuca spicigera	3193
Melaleuca subtrigona	3240, ?3199
Melaleuca uncinata	
Melaleuca aff. uncinata	3306
Melaleuca ?laxiflora x glaberrima hybrid	3480
Melaleuca ?laxiflora x spicigera hybrid	2530
Melaleuca ?laxiflora x depauperata hybrid	2468
Micromyrtus obovata	3233
Micromyrtus racemosa var. latifolia	2861
Regelia inops	2448
Rinzia ?sp.	3209b
Thryptomene australis	3144
Verticordia acerosa var. preissii	2854
Verticordia chrysantha	3155
Verticordia chrysanthella	3471
Verticordia densiflora var. cespitosa	3523, 3518
Verticordia eriocephala	3477
Verticordia gracilis	3487

<i>Verticordia habrantha</i>	3214
<i>Verticordia inclusa</i>	3389
<i>Verticordia integra</i>	3475
<i>Verticordia multiflora</i> ssp. <i>multiflora</i>	3534, 3341
<i>Verticordia multiflora</i> ssp. <i>solox</i>	3217
<i>Verticordia pennigera</i>	3536
<i>Verticordia picta</i>	3154
<i>Verticordia plumosa</i> var. <i>incrassata</i>	3485
<i>Verticordia roei</i>	3387
<i>Verticordia serrata</i>	3388
<i>Verticordia tumida</i>	3489, 3473
<i>Verticordia tumida</i> ssp. <i>therogana</i>	2387

## HALORAGACEAE

<i>Glischrocaryon aureum</i>	3300
<i>Glischrocaryon flavescens</i>	3299

## APIACEAE

<i>Actinotus</i> ? <i>superbus</i>	3514
<i>Platysace deflexa</i>	3330
<i>Platysace maxwellii</i>	3544
<i>Trachymene cyanopetala</i>	3220
<i>Trachymene pilosa</i>	2748

## EPACRIDACEAE

<i>Acrotriche patula</i>	2618
<i>Andersonia lehmanniana</i> ssp. <i>pubescens</i>	3183
<i>Andersonia parvifolia</i>	2604
<i>Astroloma epacridis</i>	
<i>Astroloma recurvum</i> (ms)	2497
<i>Astroloma serratifolium</i>	2369
<i>Astroloma</i> ?sp.	2470
<i>Astroloma</i> ?sp.	2389
<i>Coleanthera myrtoides</i>	3201
<i>Leucopogon conostephioides</i>	2443
<i>Leucopogon crassifolius</i>	2645
<i>Leucopogon cuneifolius</i>	2520
<i>Leucopogon dielsianus</i>	2375



<i>Leucopogon hamulosus</i>	3377
<i>Leucopogon minutifolius</i>	2609
<i>Leucopogon ?obtusatus</i>	2376
<i>Leucopogon oxycedrus</i>	2384
<i>Leucopogon ozothamnoides</i>	J.M.Brown
<i>Leucopogon tamminensis</i>	3308b
<i>Lysinema ciliatum</i>	2555
<i>Styphelia tenuiflora</i> (Lake Grace variant)	2444

## LOGANIACEAE

<i>Logania flaviflora</i>	3352
<i>Logania tortuosa</i>	3127

## GENTIANACEAE

- \* *Centaurium erythraea*

## APOCYNACEAE

*Alyxia buxifolia*

## CONVOLVULACEAE

<i>Wilsonia humilis</i>	3418
-------------------------	------

## BORAGINACEAE

<i>Halgania integerrima</i>	3394
<i>Halgania ?preissiana</i>	

## CHLOANTHACEAE

<i>Cyanostegia lanceolata</i>	2860
<i>Pityrodia terminalis</i>	3105
<i>Physopsis lachnostachya</i>	3543

## LAMIACEAE

<i>Microcorys ericifolia</i>	3386, 3318
<i>Microcorys obovata</i>	3159
<i>Microcorys subcanescens</i>	3512
<i>Westringia cephalantha</i>	3227
<i>Westringia rigida</i>	3135

## SOLANACEAE

- \* *Solanum nigrum*

## SCROPHULARIACEAE

- \* *Parentucellia latifolia* 2833b

## OROBANCHACEAE

- \* *Orobanche minor* 3188b

## MYOPORACEAE

- Eremophila decipiens* 3285  
*Eremophila drummondii* 2547  
*Eremophila aff. drummondii* 3545

## RUBIACEAE

- Opercularia vaginata* 3325

## LOBELIACEAE

- Isotoma hypocrateriformis* 3340a  
*Lobelia rarifolia* 3340b

## GOODENIACEAE

- Anthotium rubriflorum* 3140d  
*Cooperhooikia strophiolata* 3319  
*Dampiera angulata* 2610  
*Dampiera eriocephala* 3397  
*Dampiera ?heteroptera* 2864  
*Dampiera haematotricha* 3169  
*Dampiera lavandulacea*  
*Dampiera ?obliqua* 2630  
*Dampiera oligophylla* 3150  
*Dampiera oligophylla ssp. juncea* 3150  
*Dampiera wellsiana* 3385  
*Goodenia caerulea* 3343  
*Goodenia ?incana* K. Atkins  
*Goodenia pinifolia*  
*Goodenia scapigera* 3251  
*Goodenia watsonii* 3344

Goodenia ?sp.	3374
Lechenaultia biloba	3499
Lechenaultia formosa	3345
Scaevola helmsii	3380
Scaevola spinescens	2531
Velleia trinervis	3482

## STYLIDIACEAE

Levenhookia pauciflora	J.M.Brown
Levenhookia pusilla	J.M.Brown
Stylidium breviscapum	3378, 3140
Stylidium ?calcaratum	
Stylidium dichotomum	3332
Stylidium leptophyllum	3375
Stylidium luteum ssp. olavatum	
Stylidium neglectum	3486
Stylidium nungarinense	3147
Stylidium piliiferum	3101
Stylidium piliiferum ssp. minor	3221
Stylidium repens	3504
Stylidium sacculatum (ms)	3161
Stylidium schoenoides	J.M.Brown
Stylidium squamellosum	3102
Stylidium sp. "narembeen"	3353

## ASTERACEAE

Actinobole uliginosum	3216b
* Arctotheca calendula	
Angianthus tomentosus	3320
Asteridea nivea	3143
Brachycome ?bellidioides	3220d
Brachycome perpusilla var. tenella	2838c
Gnephosis tenuissima	3216
Gnephosis tridens	2833b
Helichrysum leucopsideum	3263
Helipterum manglesii	
Helipterum niveum	3337
Hyalochlamys globifera	2838

* Hypochaeris glabra	J.M.Brown
Millotia tenuifolia	2829b
Olearia muelleri	
Olearia ramosissima	2593
Olearia revoluta	
Ozothamnus lepidophyllus (ms)	
Podolepis capillaris	
Podolepis lessonii	2836c
Podotheca angustifolia	3220
Podotheca gnaphalioides	2836a
Rutidosis multiflora	2836b
Senecio lautus ssp. dissectifolius	3260
* Ursinia anthemoides	
Vittadinia australasica	3329
Waitzia acuminata	
Waitzia paniculata	3188

## APPENDIX 2 - MUIR VEGETATION DESCRIPTIONS

**Ws *Eucalyptus salmonophloia* (salmon gum) Woodland**

- Site 4.1a      Woodland over Shrub Mallee in some areas or over *Melaleuca* Low Scrub A/Heath A in places or over Open Dwarf Scrub C over Dwarf Scrub D.
- Site 4.1b      Woodland over Open Low Scrub B/Low Scrub B over Dwarf Scrub D. Areas of Shrub Mallee also occur. Patches of *Melaleuca* thicket becoming Dense Thicket in the gully area of the drainage line.
- Site 4.7      Open Woodland/Woodland over Shrub Mallee or over patches of *Melaleuca* Scrub/Thicket/Heath A or over Dwarf Scrub D in places.
- Area of *Eucalyptus densa* Low Forest A over *Melaleuca uncinata* Heath A.
- Site 1.7      Woodland over Shrub Mallee/Open Shrub Mallee over scattered shrubs.
- Site 9.7      Woodland over Open Low Scrub A over Dwarf Scrub C (patchy).
- Site 2.10      Woodland over Open Scrub over Dwarf Scrub C (patchy). Trees to 6 metres probably regenerating after pre 1961 fire form Low Forest A over a small area.

**W1 *Eucalyptus longicornis* (morrel) Woodland**

- Site 9.8      Forest/Woodland over Open Low Scrub A over Dwarf Scrub D/Open Dwarf Scrub D.
- Site 9.9      Woodland over Open Shrub Mallee (patchy) over Dwarf Scrub D (shrubs to 2 metres scattered).

Wo *Eucalyptus occidentalis* (flat-topped yate) Woodland

- Site 10.9 Low Woodland A over Open Dwarf Scrub C of *Melaleuca acuminata* (Thicket in places). Upslope - Heath B of *Leptospermum erubescens* and *Santalum acuminatum* and Low Heath D of *Verticordia densiflora* (small area)

Wg *Eucalyptus salubris* (gimlet) Low Forest

- Site 3.3 Low Forest A over *Melaleuca acuminata* Thicket in places or Open Scrub *Santalum acuminatum* (scattered *Eucalyptus salmonophloia* emergent to 20 metres).
- Site 8.15 Low Forest A over *Melaleuca acuminata* Low Scrub A to Heath A in places over Heath B.
- Regeneration pre 1980 fire Dense Low Forest B over Low Heath C.

Wm *Eucalyptus gardneri*/*Eucalyptus* sp. Low forest

- Site 1.16 Low forest A over *Allocasuarina acutivalvis* Scrub (Thicket at edges) over Open Low Scrub B.
- Site 2.3 Low Forest A over Open Low Scrub A over Low Heath C/Dwarf Scrub C [patch *Allocasuarina acutivalvis* Scrub]. *Eucalyptus ornata* and *Eucalyptus gardneri* recorded.
- Site 3.5 Low Forest A over *Allocasuarina acutivalvis* Scrub over Heath B.
- Site 3.13 Low Forest A over *Allocasuarina acutivalvis* Scrub to Thicket in places over Low Heath C.

- Site 4.13 Low Forest A over Low Scrub B to Low Scrub A in places.
- Site 7.14 a) Low Forest A over Low Scrub A over Dwarf Scrub C.  
 Site 7.14 b) Low Forest A over Heath B (*Allocasuarina acutivalvis* Scrub in places) [*Eucalyptus gardneri*, *Eucalyptus argyrocaulon*].
- Site 5.10 Low Forest A over *Allocasuarina acutivalvis* Scrub (Thicket in places) over Heath B in some areas (patchy) over Dwarf Scrub D.
- Site 7.2 Low Forest A over *Allocasuarina acutivalvis* Scrub/Thicket over Low Scrub B in places.
- Site 8.11 Regeneration - Low Forest B over *Melaleuca uncinata* Low Scrub B over Low Heath D. [*Eucalyptus gardneri*, *Eucalyptus argyrocaulon*]

**Wb *Eucalyptus astringens* Low Forest**

- Site 1.9 Low Forest A over *Santalum acuminatum* Scrub (patch) (scattered shrub).
- Site 2.1 Low Forest A over *Callitris canescens* Low Forest B in places.
- Site 2.14 Low Forest A over *Melaleuca haplantha* Heath B in places (small area of *Melaleuca acuminata* Scrub).
- Site 3.11 Low Forest A over *Callitris canescens* Open Low Woodland B over *Melaleuca haplantha* Heath B patchy.
- Site 3.16 Low Forest A over Low Scrub B over *Melaleuca haplantha* Heath C to Open Dwarf Scrub C in places. [Burnt pre 1961].

- Site 5.8            Low Forest A over Heath B (Low Heath C of *Melaleuca coroncarpa* and *Melaleuca haplantha* over small area).

**Wh *Allocasuarina huegeliana* Low Forest**

- Site 1.21           Low Forest A (scattered shrubs).
- Site 6.6            Low Forest A (with *Eucalyptus loxophleba*) over *Leptospermum erubescens*, *Leptospermum incanum* Thicket (near granite rock) over Open Tall Sedges/Tall Sedges (near granite rock).
- Site 7.8            Low Forest A/Dense Low Forest A over *Hakea petiolaris* Thicket over Tall Sedges/Tall Grass (edge rock).
- Site 8.9            Low Forest A (scattered shrubs).
- Site 10.3           Low Forest A over *Hakea petiolaris* Open Scrub over Dwarf Scrub C/Tall Sedges (patchy).

**Wa *Acacia lasiocalyx* (silver wattle) Low Forest**

- Site 3.15           Low Forest A (patchy) over *Allocasuarina campestris* Thicket.
- Site 5.4            Dense Low Forest A (scattered shrubs and sedges)
- Site 7.5            Dense Low Forest B over *Allocasuarina campestris*  
Dense Heath A in places [area Tall Sedges]  
regenerating after a pre 1980 fire.
- Site 8.9            Dense Low Forest A/Low Forest A over *Allocasuarina campestris* Low Scrub A/Heath A over Tall Sedges/Tall Grass.



Site 9.12 Dense Low Forest A over Tall Sedges/Tall Grass in places. Scattered shrubs of *Hakea petiolaris* and *Santalum acuminatum*.

Site 10.3 Low Forest A (with *Allocasuarina huegeliana*) over *Hakea petiolaris* Thicket over *Allocasuarina campestris* Scrub over Tall Sedges/Tall Grass.

Ml *Eucalyptus loxophleba* (York gum) Tree Mallee

Mld Drainage line

Site 1.3 Tree Mallee/Open Tree Mallee over *Melaleuca acuminata* Thicket over Open Dwarf Scrub C.

Site 1.8 Tree Mallee over *Melaleuca acuminata* Thicket over Dwarf Scrub C in places (scattered *Eucalyptus salmonophloia*).

Site 9.13 Shrub Mallee (patchy) over *Melaleuca hamulosa* Thicket over Tall Grass (in some areas).

Site 9.19 Shrub Mallee over *Melaleuca lateriflora*, *Melaleuca uncinata* Dense Heath A.

Ml Granite

Site 7.7 Shrub Mallee over Scrub/Thicket.

Site 8.9 Tree Mallee/Shrub Mallee over *Allocasuarina campestris* Heath A.

Site 9.22 Tree Mallee/Shrub Mallee (patchy) over *Allocasuarina campestris* Thicket.

Site 10.4 Shrub Mallee over Scrub/Thicket.

### Ms Mallee

- Site 2.2 Shrub Mallee over Dwarf Scrub C.
- Site 2.11 Tree Mallee/Shrub Mallee over Dwarf Scrub C over Open Dwarf Scrub D (scattered shrubs to 2 metres).
- Site 4.8 Tree Mallee (scattered shrubs).

### Mm Mallee over *Melaleuca uncinata*

- Site 1.4 Tree Mallee/Shrub Mallee over *Melaleuca uncinata* Scrub/Thicket over Low Scrub C. [*Eucalyptus capillosa* ssp. *polyclada* - near breakaway, *Eucalyptus phaenophylla*, *Eucalyptus eremophila*].
- Site 2.15 Shrub Mallee over *Melaleuca uncinata* Scrub/Thicket (scattered shrubs to 1.5 metres) [*Eucalyptus* aff. *transcontinentalis*, *Eucalyptus phaenophylla*, *Eucalyptus anceps*, *Eucalyptus flocktoniae*, *Eucalyptus eremophila*, *Melaleuca eleuterostachya*, *Melaleuca acuminata*, *Melaleuca lateriflora*].
- Site 4.10 Shrub Mallee over *Melaleuca uncinata* Dense Heath A/Heath A. [*Eucalyptus spathulata*, *Eucalyptus phaenophylla*, *Eucalyptus celastroides*, *Eucalyptus loxophleba*, *Eucalyptus flocktoniae*, *Eucalyptus ?eremophila*]. Gully - *Melaleuca acuminata* also prominent, *Melaleuca spicigera*, *Melaleuca lateriflora*.
- Site 4.2 Shrub Mallee (scattered salmons emergent 8-20 metres) over *Melaleuca uncinata* Heath A (Scrub in places) over Dwarf Scrub D/Open Dwarf Scrub D. [*Eucalyptus calycogona*, *Eucalyptus flocktoniae*, *Eucalyptus ?eremophila*, *Melaleuca adnata*, *Melaleuca acuminata*].
- Site 5.2 a) Shrub Mallee over *Melaleuca uncinata* Heath A. Scattered *Eucalyptus salmonophloia*. [*Eucalyptus*

*calycogona*, *Eucalyptus pileata*, *Eucalyptus ?eremophila*, *Eucalyptus flocktoniae*]. Also *Melaleuca acuminata*, *Melaleuca adnata* and *Melaleuca lateriflora*.

- Site 5.2 a) Regeneration Shrub Mallee (to 3 metres) over *Melaleuca uncinata* Heath C. Pre 1980 fire.
- Site 5.9 Shrub Mallee over *Melaleuca uncinata* Heath A over *Melaleuca pentagona* Low Heath C in places. [*Eucalyptus sporadica*, *Eucalyptus flocktoniae*, *Eucalyptus spathulata*, *Eucalyptus hypoclamydea*, *Melaleuca spicigera*, *Melaleuca depauperata*, *Melaleuca ?laxiflora* x *depauperata*, *Melaleuca laxiflora*].
- Site 6.1 Shrub Mallee over *Melaleuca uncinata* Heath B (Dense Heath B in places) over scattered shrubs under 1.0 metres. [*Eucalyptus phaenophylla*, *Eucalyptus ?pileata*].
- Site 7.12 Shrub Mallee/Open Shrub Mallee over *Melaleuca uncinata* Low Scrub A (patchy) over Tall Sedges in places. [*Eucalyptus hypoclamydea*, *Eucalyptus sporadica*, *Melaleuca spicigera*].
- Site 8.12 Shrub Mallee/Open Shrub Mallee over *Melaleuca uncinata* Heath B over Open Dwarf Scrub D to Heath D in places. Area *Melaleuca pentagona* Heath C. [*Eucalyptus flocktoniae*, *Eucalyptus eremophila*].
- Site 9.14 Shrub Mallee over *Melaleuca uncinata* Thicket over Dwarf Scrub D/Open Dwarf Scrub D. Scattered *Eucalyptus salmonophloia* in places. [*Eucalyptus spathulata*, *Eucalyptus loxophleba*, *Eucalyptus hypoclamydea*, *Eucalyptus flocktoniae*, *Eucalyptus anceps*].

**Mma Mallee over *Melaleuca adnata*/*Melaleuca coronicarpa***

- Site 4.5            Shrub Mallee over *Melaleuca adnata*, *Exocarpos aphyllus* Heath C to Heath B in places. *Melaleuca coronicarpa* occasional. [*Eucalyptus flocktoniae*, *Eucalyptus anceps*, *Eucalyptus calycogona*].
- Site 4.11           Shrub Mallee over *Melaleuca coronicarpa* Heath B. [*Eucalyptus calycogona*, *Eucalyptus ?eremophila*, *Melaleuca adnata* occasional].
- Site 7.15           Open Shrub Mallee over *Melaleuca adnata* *Melaleuca coronicarpa* Heath B to Dense Heath B in places. [*Eucalyptus flocktoniae*, *Eucalyptus calycogona*, *Eucalyptus ?eremophila*].
- Site 10.12          Tree Mallee over *Melaleuca adnata* Heath B. *Melaleuca lateriflora* and *Melaleuca acuminata* occur frequently and *Melaleuca coronicarpa* shrubs occur occasionally. [*Eucalyptus flocktoniae*, *Eucalyptus calycogona*, *Eucalyptus ?eremophila*, *Eucalyptus pileata*].

**Mmp Mallee over *Melaleuca pentagona***

- Site 1.11           Open Shrub Mallee over *Melaleuca pentagona* Low Heath C to Heath B in places. [*Eucalyptus phaenophylla*, *Eucalyptus hypoclamydea*, *Callitris preissii* ssp. *verrucosa*, *Leptospermum erubescens*, *Melaleuca leptospermoides*].
- Site 2.13           Shrub Mallee over *Melaleuca pentagona* Heath B. Scattered *Melaleuca uncinata* to 2 metres. [*Eucalyptus phaenophylla*, *Eucalyptus sporadica*, *Eucalyptus hypoclamydea*].
- Site 7.9            Regeneration Shrub Mallee (2-4 metres) over *Melaleuca pentagona* Low Heath D. [*Eucalyptus anceps*, *Eucalyptus calycogona*, *Eucalyptus eremophila*].

Site 9.17 Shrub Mallee over *Melaleuca uncinata*, *Leptospermum erubescens* Open Low Scrub A over *Melaleuca pentagona* Heath B. [*Eucalyptus albida*, *Eucalyptus hypoclamydea*, *Eucalyptus sporadica*].

**Mmh Mallee over *Melaleuca haplantha***

Site 1.10 Shrub Mallee (patchy) over *Melaleuca haplantha* Low Heath C. [*Eucalyptus phaenophylla*, *Eucalyptus calycogona*, *Eucalyptus eremophila*].

Site 2.14 Shrub Mallee over *Melaleuca haplantha* Heath B. [*Eucalyptus phaenophylla*, *Eucalyptus eremophila*].

Site 3.11a Shrub Mallee over *Melaleuca haplantha* Low Heath C. [*Eucalyptus eremophila*].

**Km *Eucalyptus albida* Very Open Shrub Mallee over Heath**

**Km Very Open Shrub Mallee over Heath (laterite)**

Site 1.1 Very Open Shrub Mallee (scattered in some areas) over Heath B over Dwarf Scrub D. [*Grevillea involucrata*].

Site 1.5 Very Open Shrub Mallee (scattered in some areas) over Heath A over Low Scrub C (scattered *Allocasuarina acutivalvis*).

Site 1.14 Very Open Shrub Mallee (scattered in some areas) over Heath B/Dense Heath B) over Dwarf Scrub D in places (scattered *Allocasuarina acutivalvis* to 3 metres).

Site 2.7 Burnt pre 1961. Very Open Shrub Mallee over *Dryandra* sp. 13. Open Low Scrub B over Low Scrub C over Dwarf Scrub D.

- Site 2.17      *Eucalyptus albida* scattered. Heath A over Low Heath C/Low Scrub C [*Grevillea involucrata* adjacent].
- Site 3.17      Burnt pre 1980. Very Open Shrub Mallee (1.5 to 2.5 metres) over Low Scrub C over Low Heath D.
- Site 4.6      Very Open Shrub Mallee (scattered in places) over Heath B over Dwarf Scrub D.
- Site 7.4      Very Open Shrub Mallee over Heath B (*Melaleuca leptospermoides* prominent) over Dwarf Scrub D.
- Regeneration - burnt pre 1980. Very Open Shrub Mallee (3 metres) over *Gastrolobium spinosum* Low Scrub B over Low Heath C.
- Site 7.11      Open Shrub Mallee/Very Open Shrub Mallee over Open Low Scrub A over Low Scrub C over Dwarf Scrub D.
- Site 8.2      Very Open Shrub Mallee over *Gastrolobium spinosum* Open Low Scrub B over Low Heath C/Dense Low Heath C. Burnt pre 1980.
- Site 8.4      Very Open Shrub Mallee over Low Heath C (*Melaleuca leptospermoides* prominent) over Dwarf Scrub D. Burnt pre 1980.
- Site 8.10      Open Shrub Mallee/Very Open Shrub Mallee over Open Low Scrub B (*Gastrolobium spinosum*, *Hakea crassifolia*, *Grevillea cagiana*) over Low Heath D (*Melaleuca leptospermoides*, *Hakea cygna*, *Isopogon teretifolius*). Burnt pre 1980.
- Site 9.2      Open Shrub Mallee/Very Open Shrub Mallee over Low Scrub A to Heath B in places over Low Heath C over Open Dwarf Scrub D in places.

- Site 10.10      Open Shrub Mallee (2.5 metres) over *Gastrolobium spinosum* Low scrub B over Low Scrub C over Low Heath D. Burnt pre 1980.
- Kme *Eucalyptus albida* Very Open shrub Mallee over *Eremaea* Heath
- Site 1.17      Very Open Shrub Mallee/Open Shrub Mallee over Low Heath C over Dwarf Scrub D in places (scattered shrubs to 3 metres).
- Site 2.8      Very Open Shrub Mallee over Low Heath C over Dwarf Scrub D/Open Dwarf Scrub D. Burnt pre 1966.
- Site 3.8      Very Open shrub Mallee/Open shrub Mallee over Low Scrub B (Low Scrub A in places) over Low Heath C over Dwarf Scrub D in places. Burnt pre 1966.
- Site 5.1      Regeneration - Very Open Shrub Mallee (1.5 to 2 metres) over Open Dwarf Scrub C over Low Heath D. Burnt pre 1980.
- Site 7.13      Very Open Shrub Mallee over Open Low Scrub A over Heath C.
- Site 8.3      Regeneration Open Shrub Mallee over Low Heath D (scattered shrubs to 1.0 metres including *Grevillea cagiana* and *Daviesia audax*). Burnt pre 1980.
- Site 8.5      Regeneration - Very Open Shrub Mallee over Open Low Scrub B (*Hakea crassifolia*, *Grevillea cagiana*, *Leptospermum inelegans*) over Heath C over Open Dwarf Scrub D. Burnt pre 1980.
- Site 9.4      Open Shrub Mallee over Open Low Scrub A over Low Heath C over Dwarf Scrub D.

Site 9.11      Open Shrub Mallee/Very Open Shrub Mallee over Open Low Scrub A over Heath B over Dwarf Scrub D in places.

Site 9.18      Very Open Shrub Mallee/Open Shrub Mallee over Open Scrub over Heath B over Dwarf Scrub D.

Site 10.6      Very Open Shrub Mallee over Open Dwarf Scrub C over Low Heath D. Burnt pre 1980.

#### Kh Heath (laterite)

##### Kh      Mixed Heath

Site 1.13      Open Low Scrub B/Low Scrub B over Low Heath C over Open Dwarf Scrub D.

Site 1.19      Low Heath C/Dwarf Scrub C over Low Heath D/Dwarf Scrub D.

Site 2.4      Dense Heath B/Heath B over Dwarf Scrub C.

Site 3.4      Dwarf Scrub C over Low Heath D. (*Allocasuarina campestris* and *Grevillea cagiana* 1.5-2 metres, scattered). Burnt pre 1961.

Site 3.6      Open Low Scrub B over Low Heath C over Dwarf Scrub D.

Site 5.7      Heath B over Open Dwarf Scrub D.

Site 7.10      Dense Heath C/Heath C (scattered shrubs 1.5-2 metres, *Allocasuarina campestris*, *Grevillea cagiana*, *Gastrolobium spinosum*).

Site 8.7      Regeneration - Open Dwarf Scrub C/Dwarf Scrub C over Low Heath D. Burnt pre 1980.



Site 10.7            Regeneration - Dwarf Scrub C over Low Heath D.  
Burnt pre 1980.

Khl    *Melaleuca leptospermoides* Heath

Site 2.19            Low Heath C/Dense Low Heath C over Dwarf Scrub D.

Site 6.3            Low Heath C over Open Dwarf Scrub D (*Callitris preissii* ssp. *verrucosa* to 2 metres, scattered).

Site 8.14            Regeneration - Low Heath D. Burnt pre 1980.

Site 9.6            Low Heath C over Open Dwarf Scrub D (*Callitris preissii* ssp. *verrucosa* to 2 metres, scattered Open Low Woodland B in places).

Kv Low Mixed Heath

Site 1.20            Open Dwarf Scrub C/Dwarf Scrub C over Low Heath D  
[areas of Mallee over *Melaleuca uncinata* Heath).

Site 2.5            Open Low Scrub B (patchy) over Heath D over *Borya sphaerocephala* Open Herbs in places [areas of Mallee over *Melaleuca uncinata*] [scattered shrubs to 3 metres].

Site 2.9            Dwarf Scrub C/Open Dwarf Scrub C Low Heath D  
[area of *Allocasuarina campestris* Low Heath C].

Site 2.12            Dwarf Scrub C/Open Dwarf Scrub C over Low Heath D  
[*Leptospermum* sp. Open Low Scrub B and/or *Borya sphaerocephala* Open Herbs in places].

Site 3.2            Low Heath D.

Site 3.7            Open Low Scrub B over Low Heath C over Dwarf Scrub D (Low Heath D in places). Scattered shrubs of *Allocasuarina acutivalvis* to 3 metres.

- Site 3.9      Open Low Scrub B over Dwarf Scrub C over Low Heath D.
- Site 4.3      Dwarf Scrub C over Low Heath D.
- Site 4.9      Open Low Scrub B over Low Heath C over Dwarf Scrub D in places (*Callitris preissii* ssp. *verrucosa* to 3 metres scattered in places).
- Site 5.6      Regeneration - Low Heath D [scattered shrubs to 1.0 metres].
- Site 5.11     Open Low Scrub B over Dwarf Scrub C/Low Heath C over Low Heath D/Dwarf Scrub D.
- Site 6.2      Low Scrub B over Low Heath C over Dwarf Scrub D.
- Site 6.8      Dwarf Scrub C over Low Heath D (*Callitris* sp. 3-4 metres, and *Allocasuarina campestris* 2.5 metres scattered throughout).
- Site 8.1      Dwarf Scrub C/Low Heath C (patchy) over Heath D [Open Low Scrub B of *Callitris preissii* ssp. *verrucosa* in places].
- Site 8.13     Regeneration - Open Low Scrub C over Low Heath D. Burnt pre 1980.
- Site 9.21     Open Dwarf Scrub C in places over Heath D over *Borya sphaerocephala* Herbs in places. [Area *Allocasuarina campestris* Heath B near granite].
- Site 10.5     Regeneration - Low Heath D. Burnt pre 1980.

Ke    *Eremaea pauciflora* Heath

- Site 1.22     Low Scrub B over Low Heath C.

- Site 2.6 Low Heath C over Dwarf Scrub D [scattered shrub emergent].
- Site 2.16 Low Heath C (Heath B in places) over Dwarf Scrub D.
- Site 3.1 Low Heath C (Heath B in places) over Dwarf Scrub D in places [scattered shrubs to 2 metres].
- Site 5.5 Regeneration - Low Heath D [scattered shrubs to 1.0 metre]. Burnt pre 1980.
- Site 8.6 Regeneration - Open Dwarf Scrub C over Low Heath D/Dense Low Heath D. Burnt pre 1980.
- Site 8.8 Regeneration - Low Heath D (Dwarf Scrub C in places). Burnt pre 1980.

#### Ku *Melaleuca* Heath

- Site 3.12 Heath A (thicket in places) [*Melaleuca uncinata* prominent].
- Site 9.15 Heath B to Heath A. [*Melaleuca uncinata*, *Melaleuca acuminata* and *Melaleuca lateriflora*].
- Site 10.1 Heath B to Dense Heath B in places. Scattered *Eucalyptus flocktoniae*, *Eucalyptus salmonophloia* and *Eucalyptus salubris*. [*Melaleuca lateriflora*, *Melaleuca adnata*, *Melaleuca acuminata*, with *Melaleuca uncinata* occasional].
- Site 10.11 Regeneration - Low Heath C over Dwarf Scrub D. [*Melaleuca uncinata*]. Burnt pre 1980.
- Site 10.13 Open Shrub Mallee in places over Heath A [*Melaleuca uncinata*, *Melaleuca pentagona*, *Melaleuca lateriflora*].

**Ka *Allocasuarina acutivalvis* Thicket**

**Ka *Allocasuarina acutivalvis* Thicket**

- Site 1.18 Thicket over *Leptospermum* Low Scrub A over Dwarf Scrub C.
- Site 4.4 Very Open Shrub Mallee (patchy) over *Allocasuarina acutivalvis* Scrub over Open Low Scrub B over Low Heath C.
- Site 4.12 Open Shrub Mallee over Thicket/Scrub over Heath B/Low Scrub B.
- Site 9.5 Thicket (Dense Thicket) over Open Dwarf Scrub C Very Open Shrub Mallee in places.
- Site 9.20 Scrub over Heath B over Dwarf Scrub D.

**Kas *Allocasuarina acutivalvis* Scrub**

- Site 6.4 Thicket over Open Low Scrub C patchy over Low Heath D.
- Site 8.16 Scrub/Thicket over Open Low Scrub A over Low Heath C.
- Site 9.16 Scrub (*Acacia assimilis* prominent) over Low Heath C patchy over Dwarf Scrub D.
- Site 10.2 Scrub/Thicket over Open Low Scrub B over Low Heath C over Open Dwarf Scrub D/Dwarf Scrub D.
- Site 10.8 Regeneration - Low Scrub B over Dwarf Scrub D. Burnt pre 1980.

**Kc *Allocasuarina corniculata* Thicket**

- Site 1.12 Thicket

- Site 3.14 Thicket over Dwarf Scrub C.
- Site 9.10 Thicket (patchy) over Low Heath C/Dwarf Scrub C.

*Kt Allocasuarina campestris* Thicket

- Site 1.2 Low Heath C to Dense Low Heath C in places over *Borya* Herbs [area *Eucalyptus loxophleba* Very Open Tree Mallee over Thicket adjacent to granite] Granite pavement.
- Site 1.15 Heath A (Thicket) over *Borya* Open Herbs (sandy loam with gravel).
- Site 2.18 Heath B to Low Heath C over Dwarf Scrub D (patchy) over *Borya* Herbs (sandy loam with gravel).
- Site 3.10 Dense Thicket/thicket (edge of granite).
- Site 3.15 Dense Thicket/Thicket over *Borya* Herbs in places (edge of granite).
- Site 5.3 Very Open Tree Mallee of *Eucalyptus loxophleba* over Dense Heath A to Thicket in places [area of Dense Thicket of *Leptospermum erubescens* and *Callitris preissii* ssp. *verrucosa* with *Eucalyptus olivaceae*].
- Site 6.5 Heath B to Dense Thicket adjacent to granite over *Borya* Herbs in places. Scattered *Acacia lasiocalyx* to 5 metres. Very Open Tree Mallee of *Eucalyptus loxophleba* in places.
- Site 7.3 Heath A to Thicket (adjacent to granite) over *Calothamnus quadrifidus* Low Scrub B in places over *Borya* Herbs (patchy) [scattered *Leptospermum erubescens*, *Leptospermum incanum*, *Acacia lasiocalyx*, *Hakea petiolaris* forming Open Scrub/Open Low

Woodland B in places. *Spartochloa scirpoidea* Open Tall Grass in some areas] Granite rock and pavement adjacent.

Site 7.5                      Regeneration, burnt pre 1980 - Low Heath C. Unburnt - Dense thicket to Dense Heath B adjacent to granite [area of *Lepidosperma ?longitudinale* Tall Sedge edge] Granite.

Site 9.3                      Heath B (Low Heath C in places) over Low Scrub D patchy over *Borya* Herbs (Granite pavement).

Site 9.22                     Thicket to Dense Thicket (adjacent to Granite).

Site 10.3                    *Eucalyptus loxophleba* Very Open Tree Mallee/Shrub Mallee in places over Thicket (Heath A) over *Lepidosperma ?longitudinale* Tall Sedges/*Spartochloa scirpoidea* Tall Grass at edges over *Borya* Herbs (patchy) (Granite).

#### Lithic Complex - Granite

##### Shallow Soils - Rock Surface

Site 5.4                      *Borya* Herbs (patchy), Dense Herbs in places. Dwarf Scrub D (*Verticordia chrysanthella*) in places. Scattered shrubs in rock crevices.

Site 6.5                      *Borya* Herbs (patchy), Low Heath D (*Verticordia chrysanthella*) in places. Scattered shrubs in rock crevices.

Site 6.6                      *Borya* Herbs (patchy), Dense Herbs in places. Dwarf Scrub D/Low Heath D in places. Scattered shrubs in rock crevices.

Site 7.1                      *Borya* Herbs (patchy). Scattered shrubs in rock crevices and in association with *Borya* sp.

Site 7.6            *Borya* Herbs (patchy). Dwarf Scrub D/Open Dwarf Scrub D in places. Scattered shrubs in rock crevices.

Site 9.12           *Borya* Herbs (patchy). Dwarf Scrub D/Open Dwarf Scrub D in places. Scattered shrubs in rock crevices.

Site 10.3           *Borya* Herbs/Open Herbs (patchy), Dense Herbs in places. Scattered shrubs in rock crevices and in association with *Borya*.

#### Deeper Soil-border of Rock Outcrop

Site 5.3            Patch *Eucalyptus olivaceae* Shrub Mallee over Dense Thicket *Callitris preissii* ssp. *verrucosa*, *Leptospermum erubescens*.

Site 5.4            Tall Sedges and/or Tall Grass in places. Thicket (patchy) of *Thryptomene australis*.

Site 6.5            Tall Sedges/Tall Grass in places. Heath A of *Thryptomene australis* in places.

Site 6.6            Tall Sedges/Tall Grass in places. Patch *Eucalyptus olivaceae* Shrub Mallee over Heath B (*Calothamnus quadrifidus* prominent).

Site 7.1            Tall Sedges in places. Patch *Eucalyptus olivaceae* Shrub Mallee over Heath B (*Calothamnus quadrifidus* prominent).

Site 7.6            Tall Grass and/or Tall Sedges in places. *Hakea petiolaris* Open Scrub over *Calothamnus quadrifidus* Heath B over Open Dwarf Scrub D. [Patch of *Eucalyptus olivaceae* and *Leptospermum incanum* Scrub].

Site 9.12           Tall Sedges/Tall Grass.

## Lithic Complex - Breakaway

- Site 1.6            Very Open Shrub Mallee over *Callitris canescens*  
Open Low Woodland B in places over *Melaleuca*  
*uncinata* Open Scrub over Low Heath C of *Melaleuca*  
*haplantha*.
- Site 1.10           Shrub Mallee (patchy) over Low Heath C of *Melaleuca*  
*haplantha*. Scattered shrubs and Shrub Mallee at  
base of breakaway.
- Site 2.1            Area of *Melaleuca haplantha* Heath B (patchy). Area  
of Very Open Shrub Mallee over *Melaleuca* aff.  
*uncinata* Heath B. Area of *Eucalyptus astringens* Low  
forest A over *Callitris canescens* Low Forest B in  
places. Scattered shrubs of *Melaleuca haplantha*,  
*Melaleuca* aff. *uncinata* and *Acrotriche patula*.
- Site 2.20           Shrub Mallee clump with scattered *Callitris*  
*canescens* over *Melaleuca haplantha* Heath B/Open  
Scrub B in places. Scattered shrubs of *Melaleuca* aff.  
*uncinata* to 2 metres, *Acrotriche patula* and *Melaleuca*  
*haplantha* in places.
- Site 3.11           Area *Eucalyptus astringens* Low Forest A, *Callitris*  
*canescens* Open Low Woodland B in places. Area of  
*Melaleuca haplantha* Heath B, patch of Shrub Mallee.  
Scattered shrubs of *Melaleuca haplantha*, *Melaleuca*  
*adnata*, *Acrotriche patula* and *Melaleuca coroncarpa*.



APPENDIX 3 - VEGETATION FORMATIONS OF DRAGON ROCKS NATURE  
RESERVES

Dr N G MARCHANT IN McKENZIE *et al* 1973

1. TREE FORMATIONS

a) Woodland

Low lying areas of alluvial soil support a Salmon Gum (*Eucalyptus salmonophloia* F Muell.) woodland. These are widely spaced trees up to 25 metres with a low projective foliage cover which allows considerable light penetration to the woodland floor.

This woodland is typical of the areas further east. the associated shrubs are: *Acacia merrallii* F Muell., *Boronia capitata* Benth., and species of *Eremophila*, *Thryptomene* and *Santalum*. On more alkaline soils with poorer drainage the Morrel (*Eucalyptus longicornis* F Muell.) occurs, though this is nowhere common.

The total area of this formation is small. Mostly it occurs in narrow belts following alluvial soils along well defined drainage lines running east and west from the ridge.

Most extensive areas occur on uncleared private land bordering the block particularly on the east side.

b) Low Open Forest

The highest parts of the ridge generally have small stands of White Mallet, *Eucalyptus falcata* Turcz. and Blue Mallet, *Eucalyptus gardneri* Maiden. These occur as small trees or "Marlocks" up to 10 metres, growing closely together with a medium-dense projective foliage cover. Understorey is generally very sparse, the litter layer being well developed. Frequently

associated with this formation is *Eucalyptus incrassata* Labill., and shrubs such as *Melaleuca pungens* Schau., *Acacia ericifolia* Benth., *Hybanthus floribundus* F Muell., *Leptospermum erubescens* Schau., and *Pimelea suaveolens* Meisn.

This formation is scattered as small areas on gravelly rises, frequently near breakaways. Similar White and Blue Mallet formations occur throughout the Hyden district. Although a number of these have been set aside as small timber reserves the species is readily killed by fire and most Mallet stands have either vanished or have deteriorated.

## 2. MALLEE AND SCRUB FORMATIONS

Mallee forming open to very open shrublands cover most of the Dragon Rocks reserve proposal. Four species of mallee are particularly common. These are *Eucalyptus eremophila* Maiden, *Eucalyptus redunca* Schau., *Eucalyptus albida* Maiden and Blakely, and *Eucalyptus foecunda* Schau. Other mallees recorded are *Eucalyptus ovularis* Maiden and Blakely, *Eucalyptus brachycorys* Blakely and *Eucalyptus calycogona* Turcz.

These shrublands are particularly variable in density and floristic composition. They can be divided into three formations which are nowhere distinct because they are only separated on the density of the highest stratum. In the vegetation map (Figure 7) they have been grouped together as one unit.

### a) Open Scrub

This formation is characterised by mallees 2 to 8 metres high and a medium-dense foliage cover so that trees are closely packed. *Eucalyptus eremophila* Maiden, is the most common mallee in this formation. Other eucalypts occur sporadically or form localised pure stands. Examples are *Eucalyptus redunca* Schau. and *Eucalyptus foecunda* Schau.

b) High Shrubland

In this formation the mallees are more scattered giving a sparse total foliage cover. *Eucalyptus eremophila* Maiden, *Eucalyptus redunca* Schau., and *Eucalyptus albida* Maiden and Blakely are also recorded in this formation.

The understorey is richer than the previous formation. Common species are *Calytrix brachyphylla* Turcz., *Isopogon buxifolius* R Br., *Gastrolobium spinosum* Benth., and *Leptospermum spinescens* Endl.

c) High Open Shrubland

Where mallees are very scattered so that the foliage cover is very sparse the formation is a high open shrubland with a well developed heath understorey. The mallees are mostly *Eucalyptus eremophila* Maiden, *Eucalyptus redunca* Schau., and *Eucalyptus albida* Maiden and Blakely.

3. **OPEN HEATH**

This is a medium-dense heath of shrubs usually less than 2 metres high. Popularly known as "sandplain" this formation generally occurs on gravel or sandy gravel. It is by far the richest in species of any formation in the area, containing possibly two thirds of the total number of species. It is this formation which shows the mixing of Eremean, central Wheatbelt and southern species. The species composition includes most of the low shrubs recorded for the Mallee and Scrub Formations. Small thickets of *Casuarina* sp., mainly *Casuarina campestris* Diels., up to 2 metres high are common on gravelly and coarse sandy soils. Some of the species which have their main areas of distribution further south of Dragon Rocks are *Calectasia cyanea* R Br., *Chamelaucium megalopetalum* Benth., and *Isopogon teretifolius* R Br.

#### 4. LITHIC COMPLEXES

Granitic outcrops form a substantial proportion of the ridge. Where an outcrop is subsurface a dense cover of *Borya nitida* Labill., grows in association with *Verticordia preissii* Schau., ephemeral species and various sedges. Exposed granitic sheets and low domes are usually surrounded by an apron of coarse sandy loam. Where the soil is sufficiently deep, thickets of *Acacia lasiocalyx* C Andrews and *Casuarina huegeliana* Miq. are developed. Shrubs of this formation include *Melaleuca elliptica* Labill., *Melaleuca radula* Lindl., *Calothamnus quadrifidus* R Br., and *Phyllanthus calycinus* Labill.

The other type of lithic complex developed is that of the breakaways. Some of these support small areas of Brown Mallet (*Eucalyptus astringens* Maiden). One shrub, *Acrotriche ramiflora* R Br., from this formation is the most northerly record of this south coast species.

PLANT COMMUNITIES - MAJOR STRUCTURAL FORMATIONS SPECHT'S  
CLASSIFICATION

LIFE-FORM AND HEIGHT OF TALLEST STRATUM	FOLIAGE COVER OF TALLEST STRATUM (%)	DESCRIPTION
Trees over 30 metres	70-100 30-70 10-30 under 10	High closed forest High open forest High woodland High open woodland
Trees 10-30 metres	70-100 30-70 10-30 Under 10	Closed forest Open forest Woodland Open woodland
Trees under 10 metres	70-100 30-70 10-30 under 10	Low closed forest Low open forest Low woodland Low open woodland
Shrubs over 2 metres	70-100 30-70 10-30 under 10	Closed scrub Open scrub Shrubland High open shrubland
Shrubs 1-2 metres	70-100 30-70 10-30 under 10	Closed heath Open heath Shrubland Open shrubland
Shrubs under 1 metre	70-100 30-70 10-30 under 10	Low closed heath Low open heath Low shrubland Low open shrubland
Herbs	70-100  30-70 10-30	Low closed herbland, closed tussock grassland, closed sedgeland etc Herbland etc Open herbland etc
Hummock grasses	10-30 under 10	Hammock grassland Open Hammock grassland

APPENDIX 4 - PLANT SPECIES LIST FOR VEGETATION ASSOCIATIONS OF DRAGON  
ROCKS NATURE RESERVE

*Eucalyptus salmonophloia* Woodland

Acacia brachyclada	Exocarpos aphyllus
Acacia erinacea	Exocarpos sparteus
Acacia leptopetala	Gastrolobium parviflorum
Acacia microbotrya	Grevillea ?teretifolia
Acacia tetanophylla	Grevillea huegelii
Acacia verricula	Hakea lissocarpha
Alyxia buxifolia	Hakea newbeyana
Astroloma ?epacridis	Hypoxis occidentalis
Astroloma recurvum	Lepidosperma ?angustatum
Atriplex paludosa ssp. baudinii	Lepidosperma ?brunonianum
Caladenia saccharata	Leptomeria pauciflora
Callitris preissii ssp. verrucosa	Leucopogon tamminensis
Callitris roei	Lomandra effusa
Coopernookia strophiolata	Melaleuca ?laxiflora x spicigera hybrid
Cryptandra ?spinescens	Melaleuca acuminata
Cryptandra nutans	Melaleuca adnata
Daviesia benthamii	Melaleuca coronicarpa
Dianella revoluta	Melaleuca lateriflora
Dodonaea amblyophylla	Melaleuca laxiflora
Dodonaea bursariifolia	Melaleuca pentagona
Dodonaea ptarmicaefolia	Melaleuca uncinata
Dodonaea viscosa	Melaleucas spicigera
Eremophila drummondii	Olearia muelleri
Eucalyptus "anceps"	Olearia revoluta
Eucalyptus calycogona	Pimelea argentea
Eucalyptus celastroides	Pittosporum phylliraeoides
Eucalyptus densa	Podolepis capillaris
Eucalyptus eremophila	Rhagodia preissii
Eucalyptus flocktoniae	Santalum acuminatum
Eucalyptus longicornis (edge)	Scaevola spinescens
Eucalyptus loxophleba	Senecio lautus ssp. dissectifolius
Eucalyptus salmonophloia	Senna artemisioides
Eucalyptus salubris (edge)	Templetonia sulcata
Eucalyptus spathulata	Waitzia acuminata

*Eucalyptus longicornis* Woodland

Acacia erinacea	Labichea stellata
Astroloma sp.,	Lomandra effusa
Atriplex paludosa	Melaleuca adnata
Daviesia benthamii	Melaleuca acuminata
Dodonaea viscosa	Olearia muelleri
Eucalyptus "anceps"	Pittosporum phylliraeoides
Eucalyptus calycogona	Ptilotus polystachyus
Eucalyptus celastroides	Rhagodia preissii
Eucalyptus longicornis	Santalum acuminatum
Eucalyptus salmonophloia	Senecio lautus ssp. dissectifolius
Grevillea huegelii	Senna artemisioides
Helichrysum leucopsidium	

*Eucalyptus occidentalis* Woodland

Eucalyptus longicornis	Loxocarya aspera
Eucalyptus occidentalis	Melaleuca acuminata
Lepidosperma sp.	Melaleuca adnata
Leptospermum erubescens	Santalum acuminatum
Lomandra effusa	Verticordia densiflora

*Eucalyptus salubris* Low Forest

Acacia brachyclada	Melaleuca adnata
Acacia erinacea	Melaleuca coronicarpa
Daviesia benthamii	Melaleuca lateriflora
Eucalyptus salmonophloia	Santalum acuminatum
Eucalyptus salubris	Senna artemisioides
Exocarpos aphyllus	Thelymitra aff. macrophylla
Melaleuca acuminata	

*Eucalyptus gardneri*/*Eucalyptus* sp. Low Forest

<i>Acacia newbeyi</i>	<i>Hakea subsulcata</i>
<i>Acacia sedifolia</i>	<i>Hibbertia exasperata</i>
<i>Allocasuarina acutivalvis</i>	<i>Isopogon</i> aff. <i>buxifolius</i>
<i>Astroloma serratifolium</i>	<i>Lasiopetalum microcardium</i>
<i>Beaufortia orbifolia</i>	<i>Lepidosperma</i> sp.
<i>Beaufortia schaueri</i>	<i>Leptospermum</i> ? <i>incanum</i>
<i>Beyeria brevifolia</i>	<i>Leptospermum erubescens</i>
<i>Caladenia saccharata</i>	<i>Leptospermum spinescens</i>
<i>Callitris preissii</i> ssp. <i>verrucosa</i>	<i>Leucopogon cuneifolius</i>
<i>Callitris roei</i>	<i>Melaleuca laxiflora</i>
<i>Cryptandra parvifolia</i>	<i>Melaleuca leptospermoides</i>
<i>Cyanicula caerulea</i>	<i>Melaleuca pungens</i>
<i>Dianella revoluta</i>	<i>Melaleuca spicigera</i>
<i>Dodonaea amblyophylla</i>	<i>Melaleuca uncinata</i>
<i>Dryandra drummondii</i>	<i>Persoonia</i> ? <i>coriacea</i>
<i>Dryandra ferruginea</i>	<i>Persoonia</i> ? <i>quinquenervis</i>
<i>Dryandra</i> sp. 13 (ASG)	<i>Petrophile trifida</i>
<i>Eucalyptus argyrocaulon</i>	<i>Phebalium ambiguum</i>
<i>Eucalyptus flocktoniae</i>	<i>Phebalium filifolium</i>
<i>Eucalyptus gardneri</i>	<i>Phebalium lepidotum</i>
<i>Eucalyptus incrassata</i>	<i>Phebalium tuberculatum</i>
<i>Eucalyptus ornata</i>	<i>Platysace maxwellii</i>
<i>Exocarpos aphyllus</i>	<i>Santalum acuminatum</i>
<i>Gastrolobium crassifolium</i>	<i>Spyridium subochreatum</i>
<i>Gastrolobium spinosum</i>	<i>Thelymitra azurea</i>
<i>Goodenia pinifolia</i>	<i>Thysanotus</i> ? <i>patersonii</i>
<i>Hakea multilineata</i>	<i>Westringia cephalantha</i>
<i>Hakea scoparia</i>	



*Eucalyptus astringens* Low Forest

Acrotriche patula	Melaleuca acuminata
Allocasuarina acutivalvis	Melaleuca adnata
Andersonia sp.	Melaleuca coronicarpa
Beaufortia schaueri	Melaleuca haplantha
Callitris canescens	Melaleuca spicigera
Daviesia benthamii	Melaleuca uncinata
Eucalyptus astringens	Melaleuca aff. uncinata
Eucalyptus eremophila	Mirbelia dilatata
Eucalyptus flocktoniae	Petrophile trifida
Eucalyptus incrassata	Phebalium tuberculosum
Eucalyptus phaenophylla	Regelia inops
Eucalyptus ?sporadica	Santalum acuminatum
Exocarpos aphyllus	Spyridium subochreatum
Gastrolobium parviflorum	Westringia cephalantha
Hakea newbeyana	

*Allocasuarina huegeliana* Low Forest

Acacia acutata	Eucalyptus loxophleba
Acacia lasiocalyx	Grevillea petrophiloides
Acacia trigonophylla	Hakea lissocarpa
Allocasuarina campestris	Hakea petiolaris
Allocasuarina huegeliana	Hibbertia rupicola
Astroloma serratifolium	Lepidosperma ?longitudinale
Borya ?spaerocephala	Leptospermum erubescens
Bossiaea concinna	Leptospermum incanum
Caladenia flava	Lomandra effusa
Callitris preissii ssp. verrucosa	Melaleuca elliptica
Calothamnus quadrifidus	Olearia revoluta
Calytrix leschenaultii	Platysace maxwellii
Cassytha melantha	Podolepis lessonii
Dianella revoluta	Santalum acuminatum
Diuris sp.	Spartochloa scirpoidea
Dodonaea ptaermicaefolia	Stypantra glauca
Dodonaea viscosa	Thryptomene australis
Drosera subhirtella	Verticordia chrysanthella

*Acacia lasiocalyx* (silver wattle) Low Forest

<i>Acacia lasiocalyx</i>	<i>Lepidosperma</i> ?longitudinale
<i>Allocasuarina campestris</i>	<i>Leptospermum</i> ?incanum
<i>Allocasuarina huegeliana</i>	<i>Santalum acuminatum</i>
<i>Grevillea petrophiloides</i>	<i>Spartochloa scirpoidea</i>
<i>Hakea petiolaris</i>	<i>Thryptomene australis</i>
<i>Kunzea pulchella</i>	

*Eucalyptus loxophleba* Tree Mallee

<i>Acacia acutata</i>	<i>Lomandra effusa</i>
<i>Acacia</i> ?chrysella	<i>Loxocarya aspera</i>
<i>Acacia erinacea</i>	<i>Melaleuca acuminata</i>
<i>Acacia leptospermoides</i>	<i>Melaleuca elliptica</i>
<i>Acacia verricula</i>	<i>Melaleuca hamulosa</i>
<i>Allocasuarina campestris</i>	<i>Melaleuca lateriflora</i>
<i>Astroloma</i> ?epacridis	<i>Melaleuca laxiflora</i>
<i>Beyeria brevifolia</i>	<i>Melaleuca pentagona</i>
<i>Dodonaea bursariifolia</i>	<i>Melaleuca uncinata</i>
<i>Dodonaea ptarmicaefolia</i>	<i>Mirbelia ramulosa</i>
<i>Dodonaea viscosa</i>	<i>Olearia revoluta</i>
<i>Eremophila drummondii</i>	<i>Phebalium tuberculosum</i>
<i>Eucalyptus loxophleba</i>	<i>Podolepis lessonii</i>
<i>Eucalyptus salmonophloia</i>	<i>Ptilotus manglesii</i>
<i>Exocarpos aphyllus</i>	<i>Rhagodia preissii</i>
<i>Hakea lissocarpha</i>	<i>Santalum acuminatum</i>
<i>Lepidosperma</i> sp.	<i>Spartochloa scirpoidea</i>
<i>Leptospermum erubescens</i>	<i>Waitzia acuminata</i>

## Mallee

Acacia erinacea	Hakea lissocarpa
Acrotriche patula	Hakea newbeyana
Angianthus tomentosus	Lepidosperma sp.
Atriplex paludosa	Melaleuca acuminata
Coopernookia strophiolata	Melaleuca adnata
Daviesia benthamii	Melaleuca coronicarpa
Dianella revoluta	Melaleuca haplantha
Dodonaea bursariifolia	Melaleuca uncinata
Eucalyptus "anceps"	Microcorys ericifolia
Eucalyptus calycogona	Microcybe multiflora
Eucalyptus celastroides	Olearia muelleri
Eucalyptus eremophila	Phebalium filifolium
Eucalyptus flocktoniae	Rhagodia preissii
Eucalyptus phaenophylla	Santalum acuminatum
Exocarpos aphyllus	Spyridium subochreatum
Gastrolobium parviflorum	Templetonia sulcata
Grevillea huegelii	Westringia cephalantha
Grevillea oligantha	Westringia rigida

Mallee over *Melaleuca*

Acacia acanthoclada	Borya ?constricta
Acacia erinacea	Bossiaea concinna
Acacia mimica	Bossiaea walkeri
Acacia pulchella var. glaberrima	Callistemon phoeniceus
Acacia shuttleworthii	Callitris canescens
Acacia sulcata var. platyphylla	Callitris preissii ssp. verrucosa
Acacia tetanophylla	Callitris roei
Acacia uncinella	Calytrix leschenaultii
Acrotriche patula (breakaway)	Cassytha melantha
Allocasuarina campestris	Coleanthera myrtoides
Astroloma recurvum	Comesperma scoparium
Astroloma sp.	Coopernookia strophiolata
Baeckea ?crispiflora	Cryptandra nutans
Beyeria brevifolia	Cryptandra parvifolia
Boronia crassifolia	Daviesia benthamii

Daviesia sp. A	Lepidosperma ?gracile
Dianella revoluta	Lepidosperma ?resinosum
Dodonaea bursariifolia	Lepidosperma ?tuberculatum
Eremophila decipiens	Leptomeria preissiana
Eremophila drummondii	Leptospermum erubescens
Eucalyptus 'anceps'	Leptospermum nitens
Eucalyptus aff. transcontinentalis	Leucopogon minutifolius
Eucalyptus calycogona	Leucopogon tamminensis
Eucalyptus capillosa ssp. polyclada	Lomandra effusa
Eucalyptus celastroides	Lomandra mucronata
Eucalyptus eremophila	Loxocarya aspera
Eucalyptus flocktoniae	Melaleuca ?laxiflora x depauperata
Eucalyptus hypoclamydea	hybrid
Eucalyptus loxophleba	Melaleuca acuminata
Eucalyptus phaenophylla	Melaleuca adnata
Eucalyptus pileata	Melaleuca coronicarpa
Eucalyptus salmonophloia	Melaleuca depauperata
Eucalyptus spathulata	Melaleuca haplantha
Eucalyptus sporadica	Melaleuca lateriflora
Exocarpos aphyllus	Melaleuca laxiflora
Gahnia ancistrophylla	Melaleuca leptospermoides
Gastrolobium parviflorum	Melaleuca pentagona
Grevillea huegelii	Melaleuca platycalyx
Hakea ?horrida	Melaleuca subtrigona
Hakea corymbosa	Melaleuca uncinata
Hakea crassifolia	Mesomelaena preissii
Hakea cygna ssp. cygna	Nemcia punctata
Hakea cygna	Olearia muelleri
Hakea lissocarpha	Olearia revoluta
Hakea marginata	Persoonia ?coriacea
Hakea meisneriana	Petrophile ericifolia
Hakea newbeyana	Petrophile seminuda
Hakea scoparia	Phebalium filifolium
Hibbertia exasperata	Phebalium tuberculosum
Hypoxis occidentalis	Platysace maxwellii
Isopogon aff. buxifolia	Santalum acuminatum
Lepidobolus chaetocephalus	Santalum murrayanum

Schoenus sp.	Tricostularia compressa
Spartochloa scirpoidea	Verticordia acerosa ssp. preissii
Stylidium nungarinense	Westringia cephalantha
Synaphea aff. spinulosa	Westringia rigida
Thysanotus ?patersonii	

*Eucalyptus albida* Very Open Shrub Mallee over Heath (laterite) [Km]

Acacia chrysocephala	Chamelaucium naviculum
Acacia pycnocephala	Chamelaucium pauciflorum
Acacia shuttleworthii	Comesperma drummondii
Adenanthos argyreus	Conospermum croniniae
Adenanthos flavidiflorus	Conospermum filifolium
Allocasuarina acutivalvis	Cryptandra leucopogon
Allocasuarina humilis	Dampiera haematotricha
Allocasuarina microstachya	Dampiera oligophylla
Allocasuarina thyoides	Daviesia ?intricata
Astroloma serratifolium	Daviesia abnormis
Baeckea ?preissiana	Daviesia audax
Baeckea aff. cryptandroides	Daviesia rhombifolia
Banksia audax	Daviesia rhombifolia
Banksia sphaerocarpa	Daviesia sp. C
Banksia violacea	Daviesia uniflora
Beaufortia interstans	Drosera macrantha
Beaufortia micrantha	Dryandra cirsioides
Beaufortia orbifolia	Dryandra drummondii
Beaufortia schaueri	Dryandra erythrocephala
Beyeria brevifolia	Dryandra ferruginea
Calectasia grandiflora	Dryandra sp. 13 (ASG)
Callitris preissii ssp. verrucosa	Eremaea pauciflora
Callitris roei	Eucalyptus albida
Calothamnus huegelii	Eucalyptus hypoclamydea
Calothamnus quadrifidus	Eucalyptus incrassata
Calytrix ?strigosa	Exocarpos sparteus
Calytrix leschenaultii	Gastrolobium spinosum
Calytrix simplex ssp. suboppositifolia	Glischrocaryon aureum
Caustis dioica	Glischrocaryon flavescens

Goodenia pinifolia	Mesomelaena preissii
Grevillea cagiana	Microcorys ?subcanescens
Grevillea integra	Monotaxis grandiflora
Grevillea involucrata	Nemcia ?carinata
Hakea ?horrida	Olax benthamii
Hakea crassifolia	Patersonia juncea
Hakea cygna	Persoonia ?coriacea
Hakea gilbertii	Persoonia hakeiformis
Hakea incrassata	Persoonia striata
Hakea multilineata	Persoonia trinervis
Hakea prostrata	Petrophile circinata
Hakea subsulcata	Petrophile ericifolia
Hakea trifurcata	Petrophile seminuda
Hibbertia exasperata	Petrophile squamata
Hibbertia gracilipes	Petrophile trifida
Isopogon aff. buxifolius	Phebalium ambiguum
Isopogon aff. formosus	Phebalium lepidotum
Isopogon teretifolius	Phebalium tuberculosum
Isopogon villosus	Physopsis lachnostachya
Lepidosperma ?brunonianum	Pimelea imbricata
Lepidosperma ?drummondii	Pimelea sulphurea
Lepidosperma ?pubisquameum	Pityrodia terminalis
Lepidosperma ?tenue	Platysace commutata
Leptomeria preissiana	Psammomoya choretroides
Leptospermum inelegans	Pultenaea aff. verruculosa
Leptospermum spinescens	Regelia inops
Leucopogon cuneifolius	Santalum murrayanum
Leucopogon dielsianus	Spyridium subochreatum
Leucopogon hamulosum	Stackhousia monogyna
Logania nuda	Stackhousia scoparia
Loxocarya parthenica	Stylidium breviscapum
Lysinema ciliatum	Stylidium nungarinense
Melaleuca cordata	Stylidium piliferum
Melaleuca leptospermoides	Stylidium sacculatum
Melaleuca platycalyx	Stylidium squamellosum
Melaleuca pungens	Synaphea sp.
Melaleuca subtrigona	Thryptomene racemosa
Melaleuca uncinata	Thysanotus ?sparteus

Tricoryne tenella	Verticordia picta
Urodon dasyphyllus	Verticordia roei
Verticordia chrysantha	Verticordia serrata
Verticordia inclusa	Verticordia tumida
Verticordia integra	Xanthorrhoea nana

*Eucalyptus albida* Very Open shrub Mallee over *Eremaea* Heath [Kme]

Acacia ?assimilis	Conostylis petrophiloides
Acacia chrysocephala	Dampiera oligophylla
Acacia microbotrya	Dampiera wellsiana
Acacia rostellata	Daviesia ?spiralis
Acacia uncinella	Daviesia abnormis
Adenanthos argyreus	Daviesia audax
Adenanthos flavidiflorus	Daviesia sp. C
Allocasuarina humilis	Daviesia uniflora
Allocasuarina microstachya	Dryandra cirsioides
Allocasuarina thyoides	Dryandra drummondii
Andersonia sp.	Dryandra erythrocephala
Anigozanthos humilis	Dryandra ferruginea
Astroloma serratifolium	Dryandra sp. 13 (ASG)
Banksia sphaerocarpa	Eremaea pauciflora
Banksia violacea	Eucalyptus albida
Beaufortia interstans	Exocarpos sparteus
Beaufortia micrantha	Gastrolobium spinosum
Callitris preissii ssp. verrucosa	Goodenia caerulea
Callitris roei	Grevillea cagiana
Calothamnus quadrifidus	Grevillea integrifolia ssp. aff.
Calytrix ?strigosa	shuttleworthiana
Calytrix leschenaultii	Grevillea prostrata
Caustis dioica	Grevillea wittweri
Chamelaucium naviculum	Hakea ?oldfieldii
Conospermum bracteosum	Hakea corymbosa
Conospermum filifolium	Hakea crassifolia
Conospermum stoechadis	Hakea cygna

Hakea incrassata	Nemcia carinata
Hakea trifurcata	Persoonia ?coriacea
Hibbertia exasperata	Petrophile circinata
Hibbertia glomerosa	Petrophile ericifolia
Isopogon aff. buxifolia	Petrophile seminuda
Isopogon teretifolius	Petrophile squamata
Isopogon villosus	Petrophile trifida
Jacksonia ?racemosa	Pityrodia terminalis
Laxmannia paleacea	Santalum murrayanum
Lepidobolus chaetocephalus	Stachystemon polyandrus
Lepidosperma ?tenue	Styphelia tenuiflora
Leptospermum inelegans	Synaphea sp.
Leptospermum spinescens	Tricostularia compressa
Leucopogon conostephioides	Verticordia chrysantha
Leucopogon dielsianus	Verticordia densiflora
Leucopogon minutifolius	Verticordia eriocephala
Logania tortuosa	Verticordia gracilis
Lomandra mucronata	Verticordia habrantha
Loxocarya aspera	Verticordia inclusa
Loxocarya parthenica	Verticordia integra
Lysiana ciliatum	Verticordia picta
Melaleuca leptospermoides	Verticordia roei
Melaleuca pungens	Verticordia serrata
Mesomelaena preissii	Verticordia tumida
Mirbelia floribunda	Xanthorrhoea nana

#### Heath (laterite) [Kh]

Acacia moirii ssp. recurvistipula	Allocasuarina microstachya
Adenanthos argyreus	Astroloma serratifolium
Adenanthos flavidiflorus	Baeckea crispiflora
Allocasuarina acutivalvis	Banksia audax
Allocasuarina campestris	Banksia sphaerocarpa
Allocasuarina corniculata	Banksia violacea
Allocasuarina humilis	Beaufortia interstans



- Beaufortia micrantha*  
*Beaufortia orbifolia*  
*Beaufortia schaueri*  
*Calectasia grandiflora*  
*Callitris preissii* ssp. *verrucosa*  
*Callitris roei*  
*Calothamnus huegelii*  
*Calytrix leschenaultii*  
*Caustis dioica*  
*Chamelaucium naviculum*  
*Conospermum croniniae*  
*Conostylis argentea*  
*Cryptandra leucopogon*  
*Dampiera oligophylla*  
*Daviesia ?spiralis*  
*Daviesia ?uncinata*  
*Daviesia audax*  
*Daviesia hakeoides*  
*Daviesia intricata*  
*Daviesia lancifolia*  
*Daviesia rhombifolia*  
*Daviesia* sp. D  
*Daviesia uniflora*  
*Dryandra cirsioides*  
*Dryandra drummondii*  
*Dryandra erythrocephala*  
*Dryandra ferruginea*  
*Dryandra* sp. 13 (ASG)  
*Eremaea pauciflora*  
*Eucalyptus albida*  
*Exocarpos sparteus*  
*Gastrolobium spinosum*  
*Grevillea cagiana*  
*Grevillea eriostachya*  
*Grevillea eryngioides*  
*Grevillea integrifolia* ssp. *shuttleworthiana*  
*Grevillea integrifolia* ssp. *biformis*  
*Grevillea pilosa*  
*Grevillea teretifolia*  
*Hakea ?horrida*  
*Hakea crassifolia*  
*Hakea cygna*  
*Hakea incrassata*  
*Hakea multilineata*  
*Hakea scoparia*  
*Hakea subsulcata*  
*Hibbertia exasperata*  
*Isopogon* aff. *buxifolius*  
*Isopogon* aff. *formosus*  
*Isopogon scabriusculus*  
*Isopogon teretifolius*  
*Isopogon villosus*  
*Laxmannia paleacea*  
*Lepidosperma ?pubisquameum*  
*Leptomeria preissiana*  
*Leptospermum inelegans*  
*Leptospermum spinescens*  
*Leucopogon crassifolius*  
*Leucopogon dielsiana*  
*Leucopogon hamulosus*  
*Lomandra mucronata*  
*Lysinema ciliatum*  
*Melaleuca cordata*  
*Melaleuca leptospermoides*  
*Melaleuca pungens*  
*Melaleuca subtrigona*  
*Mesomelaena preissii*  
*Micromyrtus obovata*  
*Mirbelia floribunda*  
*Mirbelia ramulosa*  
*Nemcia hookeri*  
*Olax benthamiana*  
*Persoonia ?coriacea*

Persoonia diadena  
 Persoonia trinervis  
 Petrophile circinata  
 Petrophile ericifolia  
 Petrophile seminuda  
 Petrophile squamata  
 Petrophile trifida  
 Phebalium ambiguum  
 Physopsis lachnostachya  
 Pultenaea aff. verruculosa  
 Regelia inops  
 Stylidium breviscopum  
 Stylidium dichotomum  
 Stylidium leptophyllum

Synaphea aff. spinulosa  
 Synaphea sp.  
 Thysanotus ?thrysoideus  
 Verticordia chrysantha  
 Verticordia eriocephala  
 Verticordia inclusa  
 Verticordia integra  
 Verticordia picta  
 Verticordia roei  
 Verticordia serrata  
 Verticordia tuminda ssp. therogona  
 Waitzia paniculata  
 Xanthorrhoea nana

*Melaleuca leptospermoides* Heath [Khl]

Adenanthos argyreus  
 Allocasuarina acutivalvis  
 Allocasuarina campestris  
 Allocasuarina microstachya  
 Astroloma serratifolium  
 Baeckea sp.  
 Banksia sphaerocarpa  
 Banksia violacea  
 Beaufortia interstans  
 Beaufortia micrantha  
 Calectasia grandiflora  
 Callitris preissii ssp. verrucosa  
 Daviesia ?intricata  
 Daviesia ?spiralis  
 Dryandra erythrocephala  
 Dryandra ferruginea  
 Gastrolobium spinosum  
 Grevillea cagiana  
 Grevillea eriostachya  
 Hakea cygna

Hakea incrassata  
 Hakea scoparia  
 Hakea subsulcata  
 Hibbertia exasperata  
 Isopogon scabriusculus  
 Isopogon teretifolius  
 Isopogon villosus  
 Leptospermum sp.  
 Lysinema ciliatum  
 Melaleuca cordata  
 Melaleuca leptospermoides  
 Melaleuca pungens  
 Melaleuca subtrigona  
 Mesomelaena preissii  
 Micromyrtus racemosa  
 Petrophile circinata  
 Petrophile seminuda  
 Petrophile trifida  
 Stylidium breviscopum  
 Synaphea sp.

*Verticordia chrysantha*  
*Verticordia eriocephala*

*Verticordia picta*  
*Verticordia roei*

### Low Mixed Heath

*Acacia ephedroides*  
*Acacia lasiocalyx*  
*Acacia merinthophora*  
*Acacia mimica*  
*Acacia multispicata*  
*Acacia rostellata*  
*Acacia saligna*  
*Acacia sulcata* ssp. *platyphylla*  
*Acacia uncinella*  
*Adenanthos argyreus*  
*Adenanthos flavidiflorus*  
*Allocasuarina acutivalvis*  
*Allocasuarina campestris*  
*Allocasuarina corniculata*  
*Allocasuarina humilis*  
*Allocasuarina microstachya*  
*Andersonia lehmanniana*  
*Andersonia parvifolia*  
*Anigozanthos humilis*  
*Anthotium rubriflorum*  
*Astroloma serratifolium*  
*Baeckea crispiflora*  
*Baeckea* aff. *crispiflora*  
*Baeckea preissiana*  
*Banksia sphaerocarpa*  
*Banksia violacea*  
*Beaufortia interstans*  
*Beaufortia micrantha*

*Beaufortia schaueri*  
*Borya ?sphaerocephala*  
*Brachycome ?bellidioides*  
*Calectasia grandiflora*  
*Callitris preissii* ssp. *verrucosa*  
*Callitris roei*  
*Calothamnus quadrifidus*  
*Calytrix leschenaultii*  
*Calytrix violacea*  
*Caustis dioica*  
*Chamaexeros fimbriata*  
*Chamelaucium pauciflorum*  
*Coleanthera myrtoides*  
*Comesperma scoparium*  
*Conospermum stoechadis*  
*Conostylis argentea*  
*Conostylis ?petrophiloides*  
*Crassula colorata*  
*Cryptandra leucopogon*  
*Cryptandra nutans*  
*Dampiera ?angulata*  
*Dampiera lavandulacea*  
*Dampiera oligophylla*  
*Daviesia hakeoides*  
*Daviesia intricata*  
*Daviesia rhombifolia*  
*Daviesia ?spiralis*  
*Daviesia* sp. A

Daviesia sp. B	Jacksonia ?racemosa
Daviesia sp. E	Kunzea jucunda
Drosera macrantha	Kunzea micromera
Drosera pycnoblata	Kunzea preissiana
Dryandra cirsioides	Laxmannia paleacea
Dryandra erythrocephala	Laxmannia squarrosa
Eremaea pauciflora	Lepidobolus chaetocephalus
Eucalyptus dissimulata	Lepidosperma ?drummondii
Eucalyptus hypoclamydea	Lepidosperma ?gracile
Eucalyptus sporadica	Lepidosperma ?pubisquameum
Gahnia ancistrophylla	Lepidosperma tuberculosum
Gastrolobium densifolium	Leptospermum erubescens
Gastrolobium spinosum	Leptospermum incanum
Gompholobium sp.	Leucopogon crassifolius
Grevillea cagiana	Leucopogon dielsianus
Grevillea didymobotrya	Leucopogon ?obtusatus
Grevillea eriostachya	Leucopogon tamminensis
Grevillea eryngioides	Logania flaviflora
Grevillea integrifolia ssp.	Lomandra muricata
shuttleworthiana	Lysinema ciliatum
Grevillea ?teretifolia	Melaleuca cordata
Grevillea wittweri	Melaleuca elliptica
Hakea crassifolia	Melaleuca lecanantha
Hakea cygna	Melaleuca leptospermoides
Hakea erecta	Melaleuca pentagona
Hakea ?horrida	Melaleuca platycalyx
Hakea incrassata	Melaleuca pungens
Hakea lissocarpa	Melaleuca scabra
Hakea marginata	Melaleuca ?seriata
Hakea scoparia	Melaleuca spicigera
Hakea subsulcata	Melaleuca subtrigona
Hibbertia exasperata	Melaleuca uncinata
Isopogon aff. buxifolius	Mesomelaena preissii
Isopogon divergens	Micromyrtus obovata
Isopogon scabriusculus	Mirbelia floribunda
Isopogon teretifolius	Mirbelia spinosa
Isopogon villosus	Neurachne alopecuroidea
Jacksonia condensata	Opercularia vaginata

Persoonia ?coriacea	Stylidium piliiferum
Persoonia trinervis	Stylidium repens
Petrophile circinata	Stylidium ?squamellosum
Petrophile ericifolia	Synapheae sp.
Petrophile seminuda	Thysanotus ?patersonii
Petrophile trifida	Thysanotus ?thyrsoideus
Phebalium tuberculatum	Thysanotus sp.
Pimelea imbricata	Trachymene cyanopetala
Pityrodia terminalis	Tricoryne tenella
Platysace deflexa	Tricostularia compressa
Platysace maxwellii	Tripterococcus brunonis
Podolepis lessonii	Urodon dasyphyllus
Podotheca angustifolia	Verticordia acerosa ssp. preissii
Psammomoya choretroides	Verticordia chrysantha
Ptilotus manglesii	Verticordia densiflora
Ptilotus polystachyus	Verticordia eriocephala
Pultenaea aff. verrucosa	Verticordia gracilis
Pultenaea neurocalyx	Verticordia multiflora ssp. solox
Santalum acuminatum	Verticordia picta
Schoenus sp.	Verticordia roei
Spartochloa scirpoidea	Verticordia serrata
Stirlingia simplex	Verticordia tumida
Stylidium breviscapum	Vittadinia australasica
Stylidium dichotomum	Waitzia paniculata
Stylidium leptophyllum	Xanthorrhoea nana

*Eremaea pauciflora* Heath

Acacia ?assimilis	Allocasuarina microstachya
Acacia lasiocalyx	Allocasuarina thyoides
Acacia lasiocarpa	Andersonia lehmanniana ssp. pubescens
Acacia merinthophora	Anigozanthos humilis
Acacia microbotrya	Baeckea preissiana
Adenanthos argyreus	Baeckea sp.
Allocasuarina acutivalvis	Banksia sphaerocarpa
Allocasuarina humilis	Banksia violacea

Beaufortia micrantha	Hakea cygna
Caladenia caniculata	Hakea incrassata
Calectasia sp.	Hakea lissocarpha
Callitris preissii ssp. verrucosa	Hakea prostrata
Callitris roei	Hakea trifurcata
Calothamnus quadrifidus	Hemigenia sp.
Calytrix leschenaultii	Hibbertia exasperata
Calytrix ?strigosa	Isopogon aff. buxifolius
Caustis dioica	Isopogon teretifolius
Chamaescilla spiralis	Isopogon villosus
Comesperma scoparia	Jacksonia condensata
Conospermum filifolium	Jacksonia ?racemosa
Conospermum stoechadis	Laxmannia paleacea
Conostylis aculeata	Lepidobolus chaetocephalus
Conostylis petrophiloides	Lepidosperma ?pubisquameum
Dampiera heteroptera	Lepidosperma ?tenue
Dampiera lavandulacea	Leptospermum erubescens
Dampiera oligophylla	Leptospermum incanum
Daviesia audax	Leptospermum inelegans
Daviesia ?hakeoides	Leptospermum spinescens
Daviesia rhombifolia	Leucopogon hamulosus
Daviesia ?spiralis	Leucopogon ?minutifolius
Daviesia uniflora	Logania tortuosa
Dryandra cirsioides	Lomandra mucronata
Dryandra erythrocephala	Loxocarya ?cinerea
Dryandra sp. 13 (ASG)	Lysinema ciliatum
Eremaea pauciflora	Melaleuca leptospermoides
Eucalyptus albida	Melaleuca scabra
Gastrolobium spinosum	Melaleuca ?seriata
Grevillea cagiana	Melaleuca subtrigona
Grevillea eriostachya	Mesomelaena preissii
Grevillea integrifolia ssp. shuttleworthiana	Mirbelia spinosa
Grevillea aff. integrifolia ssp. shuttleworthiana	Neurachne alopecuroidea
Grevillea wittweri	Persoonia ?coriacea
Hakea ?obliqua	Persoonia ?striata
Hakea crassifolia	Petrophile ericifolia
	Petrophile seminuda
	Petrophile trifida

<i>Pimelea imbricata</i>	<i>Urodon dasyphyllus</i>
<i>Ptilotus polystachyus</i>	* <i>Ursinia anthemoides</i>
<i>Pultenaea</i> aff. <i>verrucosa</i>	<i>Verticordia acerosa</i> ssp. <i>preissii</i>
<i>Santalum murrayanum</i>	<i>Verticordia chrysantha</i>
<i>Stackhousia monogyna</i>	<i>Verticordia eriocephala</i>
<i>Stylidium breviscapum</i>	<i>Verticordia gracilis</i>
<i>Stylidium leptophyllum</i>	<i>Verticordia plumosa</i>
<i>Stylidium piliferum</i>	<i>Verticordia roei</i>
<i>Stylidium repens</i>	<i>Verticordia serrata</i>
<i>Synaphea</i> sp.	<i>Verticordia tumida</i>
<i>Tricoryne tenella</i>	<i>Xanthorrhoea nana</i>

\* Introduced species

#### *Meleluca* Heath

<i>Acacia sulcata</i> var. <i>platyphylla</i>	<i>Hakea scoparia</i>
<i>Acrotriche patula</i> (near breakaway)	<i>Hibbertia exasperata</i>
<i>Allocasuarina acutivalvis</i>	<i>Lepidosperma</i> sp.
<i>Astroloma</i> ? <i>epacridis</i>	<i>Leucopogon cuneifolius</i>
<i>Astroloma serratifolium</i>	<i>Melaleuca acuminata</i>
<i>Baeckea crispiflora</i>	<i>Melaleuca adnata</i>
<i>Beyeria brevifolia</i>	<i>Melaleuca coronicarpa</i>
<i>Borya</i> ? <i>sphaerocephalus</i>	<i>Melaleuca haplantha</i>
<i>Callitris preissii</i> ssp. <i>verrucosa</i>	<i>Melaleuca lateriflora</i>
<i>Daviesia benthamii</i>	<i>Melaleuca laxiflora</i>
<i>Dodonaea bursariifolia</i>	<i>Melaleuca pentagona</i>
<i>Eucalyptus calycogona</i>	<i>Melaleuca spicigera</i>
<i>Eucalyptus flocktoniae</i>	<i>Melaleuca uncinata</i>
<i>Eucalyptus salmonophloia</i>	<i>Micromyrtus obovata</i>
<i>Eucalyptus salubris</i>	<i>Petrophile seminuda</i>
<i>Exocarpos aphyllus</i>	<i>Petrophile trifida</i>
<i>Gastrolobium parviflorum</i>	<i>Phebalium tuberculatum</i>
<i>Hakea cygna</i>	<i>Santalum acuminatum</i>
<i>Hakea lissocarpha</i>	<i>Westringia cephalantha</i>
<i>Hakea marginata</i>	

*Allocasuarina acutivalvis* Thicket [Ka]

<i>Acacia assimilis</i>	<i>Gastrolobium spinosum</i>
<i>Acacia newbeyi</i>	<i>Glischrocaryon aureum</i>
<i>Adenanthos argyreus</i>	<i>Grevillea eriostachya</i>
<i>Allocasuarina acutivalvis</i>	<i>Grevillea shuttleworthiana</i> ssp. <i>biformis</i>
<i>Allocasuarina campestris</i>	<i>Hakea crassifolia</i>
<i>Allocasuarina corniculata</i>	<i>Hakea cygna</i>
<i>Astroloma serratifolium</i>	<i>Hakea erecta</i>
<i>Baeckea ?crispiflora</i>	<i>Hakea ?horrida</i>
<i>Baeckea</i> sp.	<i>Hakea lissocarpa</i>
<i>Banksia sphaerocarpa</i>	<i>Hakea multilineata</i>
<i>Banksia violacea</i>	<i>Hakea scoparia</i>
<i>Beaufortia interstans</i>	<i>Hakea subsulcata</i>
<i>Beaufortia orbifolia</i>	<i>Hibbertia exasperata</i>
<i>Beaufortia schaueri</i>	<i>Hibbertia</i> aff. <i>mucronata</i>
<i>Beyeria brevifolia</i>	<i>Isopogon</i> aff. <i>buxifolius</i>
<i>Boronia subsessilis</i>	<i>Isopogon scabriusculus</i>
<i>Callitris preissii</i> ssp. <i>verrucosa</i>	<i>Isopogon teretifolius</i>
<i>Callitris roei</i>	<i>Lepidosperma ?pubisquameum</i>
<i>Calothamnus quadrifidus</i>	<i>Lepidosperma</i> sp.
<i>Calytrix leschenaultii</i>	<i>Leptospermum incanum</i>
<i>Chamelaucium pauciflorum</i>	<i>Leucopogon cuneifolius</i>
<i>Cyanostegia lanceolata</i>	<i>Melaleuca cordata</i>
<i>Dampiera oligophylla</i>	<i>Melaleuca laxiflora</i>
<i>Daviesia rhombifolia</i>	<i>Melaleuca ?laxiflora</i> x <i>spicigera</i> hybrid
<i>Drosera macrantha</i>	<i>Melaleuca leptospermoides</i>
<i>Dryandra drummondii</i>	<i>Melaleuca pungens</i>
<i>Dryandra erythrocephala</i>	<i>Melaleuca spicigera</i>
<i>Dryandra ferruginea</i>	<i>Melaleuca uncinata</i>
<i>Dryandra</i> sp. 13 (ASG)	<i>Micromyrtus obovata</i>
<i>Eriostemon gardneri</i>	<i>Micromyrtus racemosa</i>
<i>Eucalyptus albida</i>	<i>Mirbelia dilatata</i>
<i>Eucalyptus flocktoniae</i>	<i>Persoonia ?quinquenervis</i>
<i>Eucalyptus phaenophylla</i>	<i>Petrophile trifida</i>
<i>Gastrolobium parviflorum</i>	<i>Phebalium ambiguum</i>



Phebalium lepidotum  
 Phebalium tuberosum  
 Platysace maxwellii  
 Santalum acuminatum  
 Scaevola scapigera

Stylidium breviscapum  
 Stylidium piliferum  
 Verticordia chrysantha  
 Verticordia picta  
 Verticordia roei

*Allocasuarina acutivalvis* Scrub [Kas]

Acacia assimilis  
 Acacia mimica  
 Adenanthos argyreus  
 Allocasuarina acutivalvis  
 Allocasuarina campestris  
 Allocasuarina corniculata  
 Astroloma serratifolium  
 Baeckea ?crispiflora  
 Banksia sphaerocarpa  
 Banksia violacea  
 Beaufortia interstans  
 Beaufortia schaueri  
 Beyeria brevifolia  
 Callitris preissii ssp. verrucosa  
 Calytrix sp.  
 Conostylis petrophiloides  
 Dryandra erythrocephala  
 Eriostemon gardneri  
 Eucalyptus albida  
 Eucalyptus loxophleba  
 Eucalyptus sporadica  
 Gastrolobium spinosum  
 Goodenia scapigera  
 Grevillea eriostachya  
 Grevillea eryngioides  
 Grevillea integrifolia ssp. biformis  
 Hakea cygna  
 Hakea multilineata  
 Hakea scoparia

Hakea subsulcata  
 Hibbertia exasperata  
 Hibbertia recurvifolia  
 Isopogon aff. formosus  
 Isopogon scabriusculus  
 Lepidosperma sp.  
 Leptomeria ?preissiana  
 Leptospermum erubescens  
 Leptospermum incanum  
 Leucopogon cuneifolius  
 Loxocarya myrioclada  
 Melaleuca cordata  
 Melaleuca leptospermoides  
 Melaleuca platycalyx  
 Melaleuca uncinata  
 Persoonia ?coriacea  
 Petrophile seminuda  
 Phebalium filifolium  
 Phebalium tuberosum  
 Platysace maxwellii  
 Santalum acuminatum  
 Stylidium breviscapum  
 Thryptomene obovata  
 Verticordia chrysantha  
 Verticordia eriocephala  
 Verticordia picta  
 Verticordia roei  
 Verticordia tumida  
 Waitzia paniculata

*Allocasuarina corniculata* Thicket

Acacia assimilis	Lepidosperma sp.
Acacia beauverdiana	Leptospermum ?incanum
Acacia uncinella	Leptospermum erubescens
Allocasuarina acutivalvis	Leucopogon hamulosus
Allocasuarina corniculata	Melaleuca cordata
Astroloma serratifolium	Melaleuca laxiflora
Beaufortia interstans	Melaleuca leptospermoides
Beaufortia schaueri	Melaleuca platycalyx
Beyeria brevifolia	Melaleuca spicigera
Caladenia saccharata	Melaleuca subtrigona
Callitris preissii ssp. verrucosa	Melaleuca uncinata
Cryptandra pungens	Neurachne alopecuroidea
Daviesia ?intricata	Persoonia ?coriacea
Drosera macrantha	Phebalium ambiguum
Drummondita hassellii	Santalum acuminatum
Eucalyptus hypoclamydea	Schoenus sp.
Gastrolobium spinosum	Thryptomene obovata
Grevillea integrifolia ssp. biformis	Thysanotus ?patersonii
Hakea erecta	Verticordia chrysantha
Hakea multilineata	Verticordia gracilis
Hakea scoparia	Verticordia picta
Hakea subsulcata	Verticordia roei
Isopogon scabriusculus	Waitzia paniculata
Lepidobolus chaetocephalus	

Lithic Complex - Granite

Including *Allocasuarina campestris* Thicket

Acacia assimilis	*Aira cupaniana
Acacia lasiocalyx	Allocasuarina acutivalvis
Acacia mimica	Allocasuarina campestris
Acacia saligna	Allocasuarina huegeliana
Acacia sulcata ssp. platyphylla	Allocasuarina microstachya
Actinotus ?superbus	*Anagallis arvensis

Andersonia sp.	Eucalyptus loxophleba
*Arctotheca calendula	Eucalyptus olivaceae
Astroloma epacridis	Eucalyptus sporadica
Astroloma serratifolium	Glischrocaryon aureum
Baeckea ?crispiflora	Glischrocaryon flavescens
Baeckea ?preissiana	Gnephosis tenuissima
Banksia sphaerocarpa	Gnephosis tridens
Borya constricta	Grevillea petrophiloides
Borya sphaerocephala	Grevillea ?teretifolia
Bossiaea concinna	Hakea erecta
Brachycome perpusilla var. tenella	Hakea marginata
Caladenia dimidia	Hakea meisneriana
Caladenia flava	Hakea petiolaris
Caladenia hirta ssp. rosea	Hakea scoparia
Caladenia hoffmanii	Helipterum manglesii
Caladenia roei	Hibbertia exasperata
Caladenia saccharata	Hibbertia rupicola
Calectasia grandiflora	Hyalochlamys globifera
Callitris preissii ssp. verrucosa	Hypoxis glabella
Calothamnus quadrifidus	Isotoma petraea
Calytrix leschenaultii	Kunzea micromera
Chamaescilla corymbosa	Kunzea pulchella
Cheilanthes austrotenuifolia	Lepidosperma ?gracile
Cheilanthes distans	Lepidosperma ?longitudinale
Comesperma scoparia	Leptospermum erubescens
Conospermum stoechadis	Leptospermum incanum
Crassula colorata	Leucopogon dielsianus
Cyanicula ashbyi	Leucopogon oxycedrus
Dampiera lavandulacea	Melaleuca elliptica
Dianella revoluta	Melaleuca fulgens
Diuris corymbosa	Melaleuca pentagona
Diuris aff. corymbosa	Melaleuca platycalyx
Dodonaea viscosa ssp. angustissima	Melaleuca scabra
Drosera androsacea	Melaleuca spicigera
Drosera stricticaulis	Melaleuca subtrigona
Drosera subhirtella	Melaleuca uncinata
Dryandra cirsioides	Muehlenbeckia adpressa
Elythranthera brunonis	Neurachne alopecuroidea

*Parentucellia latifolia	Stylidium leptophyllum
Persoonia ?coriacea	Stylidium neglectum
Persoonia ?quinquenervis	Stylidium piliferum
Petrophile seminuda	Stylidium squamellosum
Phyllanthus calycinus	Stypandra glauca
Pimelea angustifolia	Thelymitra antennifera
Pimelea graniticola	Thelymitra spiralis
Platysace maxwellii	Thryptomene australis
Podolepis lessonii	Thysanotus ?patersonii
Podotheca gnaphalioides	Trachymene ornata
Prasophyllum ringens	*Ursinia anthemoides
Pterostylis sanguineus	Verticordia chrysanthella
Ricinocarpos glaucus	Verticordia eriocephala
Rutidosis multiflora	Verticordia multiflora ssp. multiflora
Santalum acuminatum	Verticordia picta
Schoenus sp.	Verticordia roei
Spartochloa scirpoidea	Waitzia acuminata
Spiculaea ciliata	Waitzia paniculata
Stackhousia monogyna	Wurmbea sinora
Stylidium breviscapum	

\* Introduced species

#### Lithic Complex - Breakaway

Acrotriche patula	Gastrolobium pauciflorum
Allocasuarina acutivalvis	Hakea lissocarpa
Beaufortia schaueri	Hakea subsulcata
Callitris canescens	Kunzea ?micromera
Daviesia lancifolia	Lepidosperma sp.
Eucalyptus astringens	Leptospermum erubescens
Eucalyptus calycogona	Leucopogon cuneifolius
Eucalyptus capillosa ssp. polyclada	Melaleuca acuminata
Eucalyptus eremophila	Melaleuca adnata
Eucalyptus phaenophylla	Melaleuca coronicarpa
Eucalyptus sporadica	Melaleuca fissurata
Exocarpos aphyllus	Melaleuca haplantha

Melaleuca laxiflora

Melaleuca spicigera

Melaleuca aff. uncinata

Mirbelia dilatata

Petrophile trifida

Regelia inops

Stylidium nungarinense

APPENDIX 5 - WHEATBELT LATERITE HEATH SITES 14 AND 15 - DRAGON ROCKS  
NATURE RESERVE

Data used in the analysis of regional variation in Kwongan J M BROWN (1989)

**Locality:** Dragon Rock Nature Reserve No. 36128, 75 kilometres  
east of Kulin

**Collector:** J M Brown **Date:** 7 September 1984

**Voucher for:** Wheatbelt Laterite Heath Site 14

**Associated Vegetation:** Heath - 1 metre

**Characteristic Species:** No obvious dominants. *Petrophile ericifolia*, *Melaleuca  
pungens* and *Calytrix leschenaultii* present.

**Topography:** Very gently sloping hill, easterly aspect.

**Underlying Rocks:** Laterite

**Soil Colour:** Yellow **Soil Type:** Sand

SPECIES LIST

Acacia moirii ssp. recurvistipula	Cyperaceae sp. indet JMB 131
Adenanthos argyreus	Dampiera oligophylla
Allocasuarina humilis	Dampiera oligophylla ssp. juncea
Allocasuarina microstachya	Daviesia abnormis
Allocasuarina thuyoides	Daviesia rhombifolia
Amphipogon turbinatus	Drosera macrantha
Astroloma epacridis	Drosera pycnoblata
Baeckea crispiflora	Drosera zonaria
Baeckea preissiana	Dryandra armata
Banksia sphaerocarpa var. caesia	Dryandra cynaroides
Banksia violacea	Eremaea pauciflora
Beaufortia micrantha	Grevillea sp. aff. baxteri
Calectasia cyanea	Hakea erecta
Calytrix stipulosa	Hakea incrassata
Calytrix strigosa	Hakea obliqua
Cassytha melantha	Hibbertia exasperata
Cassytha poiformis	Hibbertia gracilipes
Caustis dioica	Hypochoeris glabra
Chamaescilla spiralis	Isolepis marginata
Chamaexeros fimbriata	Isopogon polycephalus
Chamelaucium megalopetalum	Isopogon teretifolius
Conostylis petrophiloides	Isopogon villosus
Conostylis setigera	Jacksonia lehmannii
Cryptandra nudiflora	Laxmannia paleacea

Lepidobolus chaetocephalus  
 Lepidobolus sp. aff.  
     chaetocephalus  
 Lepidosperma gracile  
 Lepidosperma tenue  
 Leptospermum roei  
 Leptospermum spinescens  
 Leucopogon minutifolius  
 Leucopogon ozothamnoides  
 Leucopogon sp. indet JMB 101  
 Lysinema ciliatum  
 Melaleuca subtrigona  
 Mesomelaena stygia  
 Microcorys subcanescens  
 Mirbelia spinosa  
 Neurachne alopecuroides  
 Opercularia vaginalis  
 Persoonia coriacea  
 Persoonia quinquenervis  
 Persoonia sulcata var. flexuae  
 Petrophile ericifolia  
 Petrophile squamata  
 Petrophile teretifolia

Petrophile trifida  
 Pimelea suaveolens  
 Prasophyllum sp. indet JMB 041  
 Prasophyllum sp. indet JMB 134  
 Psammomoya choretroides  
 Pterostylis recurva  
 Pultenaea sp. aff. ericifolia  
 Schoenus brevisetis  
 Schoenus sp. aff. pleiostemoneus  
 Schoenus sp. aff. subflavus  
 Stylidium breviscapum  
 Stylidium piliferum  
 Stylidium repens  
 Stylidium schoenoides  
 Synaphea polymorpha  
 Thysanotus sp. indet JMB 022  
 Verticordia acerosa  
 Verticordia chrysantha  
 Verticordia habrantha  
 Verticordia pennigera  
 Verticordia roei  
 Xanthorrhoea nana

**Locality:** Dragon Rock Nature Reserve No. 36128, 75 kilometres  
 east of Kulin  
**Collector:** J M Brown **Date:** 10 October 1984  
**Voucher for:** Wheatbelt Laterite Heath Site 15  
**Associated Vegetation:** Heath  
**Characteristic Species:** No obvious dominants. *Melaleuca subtrigona*, *Hakea*  
*falcata*, *Dryandra ferruginea* and *Isopogon*  
*teretifolia* present.  
**Topography:** Hill top, flat  
**Underlying Rocks:** Laterite  
**Soil Colour:** Brown **Soil Type:** Laterite

#### SPECIES LIST

Acacia moirii ssp. recurvistipula	Allocasuarina microstachya
Acacia pycnocephala	Amphipogon turbinatus
Adenanthos argyreus	Baeckea preissiana
Allocasuarina campestris	Banksia sphaerocarpa var. caesia
Allocasuarina humilis	Banksia violacea

- Beaufortia bracteosa*  
*Beaufortia micrantha*  
*Beaufortia orbifolia*  
*Calectasia cyanea*  
*Callitris roei*  
*Calytrix leschenaultii*  
*Calytrix strigosa*  
*Cassytha poiformis*  
*Chamelaucium naviculum*  
*Coleanthera myrtoides*  
*Conostylis androstemma*  
*Conostylis petrophiloides*  
*Cryptandra leucopogon*  
*Dampiera lindleyi*  
*Dampiera oligophylla* ssp. *junceae*  
*Daviesia daphnoides*  
*Daviesia incrassata*  
*Drosera leucoblasta*  
*Drosera macrantha*  
*Drosera zonaria*  
*Dryandra armata*  
*Dryandra cynaroides*  
*Dryandra ferruginea*  
*Eucalyptus* sp. indet JMB 148  
*Gahnia drummondii*  
*Gastrolobium hookeri*  
*Gastrolobium spinosum*  
*Goodenia pinifolia*  
*Grevillea* sp. aff. *baxteri*  
*Hakea crassifolia*  
*Hakea falcata*  
*Hakea incrassata*  
*Hibbertia crassifolia*  
*Hibbertia gracilipes*  
*Hypochoeris glabra*  
*Isopogon polycephalus*  
*Isopogon* sp. aff. *formosus*  
*Isopogon teretifolius*  
*Isopogon villosus*  
*Lepidobolus chaetocephalus*  
*Lepidosperma gracile*  
*Lepidosperma* sp. indet JMB 145  
*Lepidosperma tenue*  
*Leptospermum roei*  
*Leptospermum spinescens*  
*Leucopogon ozothamnoides*  
*Levenhookia pusilla*  
*Logania tortuosa*  
*Lomandra collina*  
*Lysinema ciliatum*  
*Melaleuca cordata*  
*Melaleuca pungens*  
*Melaleuca leptospermoides* complex  
*Micromyrtus racemosa*  
*Mirbelia* sp. JMB 146  
*Monotaxis grandiflora*  
*Myrtaceae* sp. indet JMB 141  
*Neurachne alopecuroides*  
*Petrophile circinata*  
*Petrophile* sp. aff. *divaricata*  
*Petrophile trifida*  
*Pultenaea* sp. aff. *ericifolia*  
*Regelia inops*  
*Restio megalotheca*  
*Schoenus* sp. aff. *armeria*  
*Schoenus subflavus*  
*Stachystemon polyandrus*  
*Stylidium breviscopum*  
*Stylidium luteum* ssp. *olavatum*  
*Stylidium repens*  
*Stylidium schoenoides*  
*Synaphea polymorpha*  
*Thryptomene* sp. indet JMB 144  
*Thysanotus sparteus*  
*Tricoryne elatior*  
*Verticordia acerosa*  
*Verticordia chrysantha*  
*Verticordia insignis*  
*Verticordia pennigera*  
*Verticordia roei*  
*Xanthorrhoea nana*



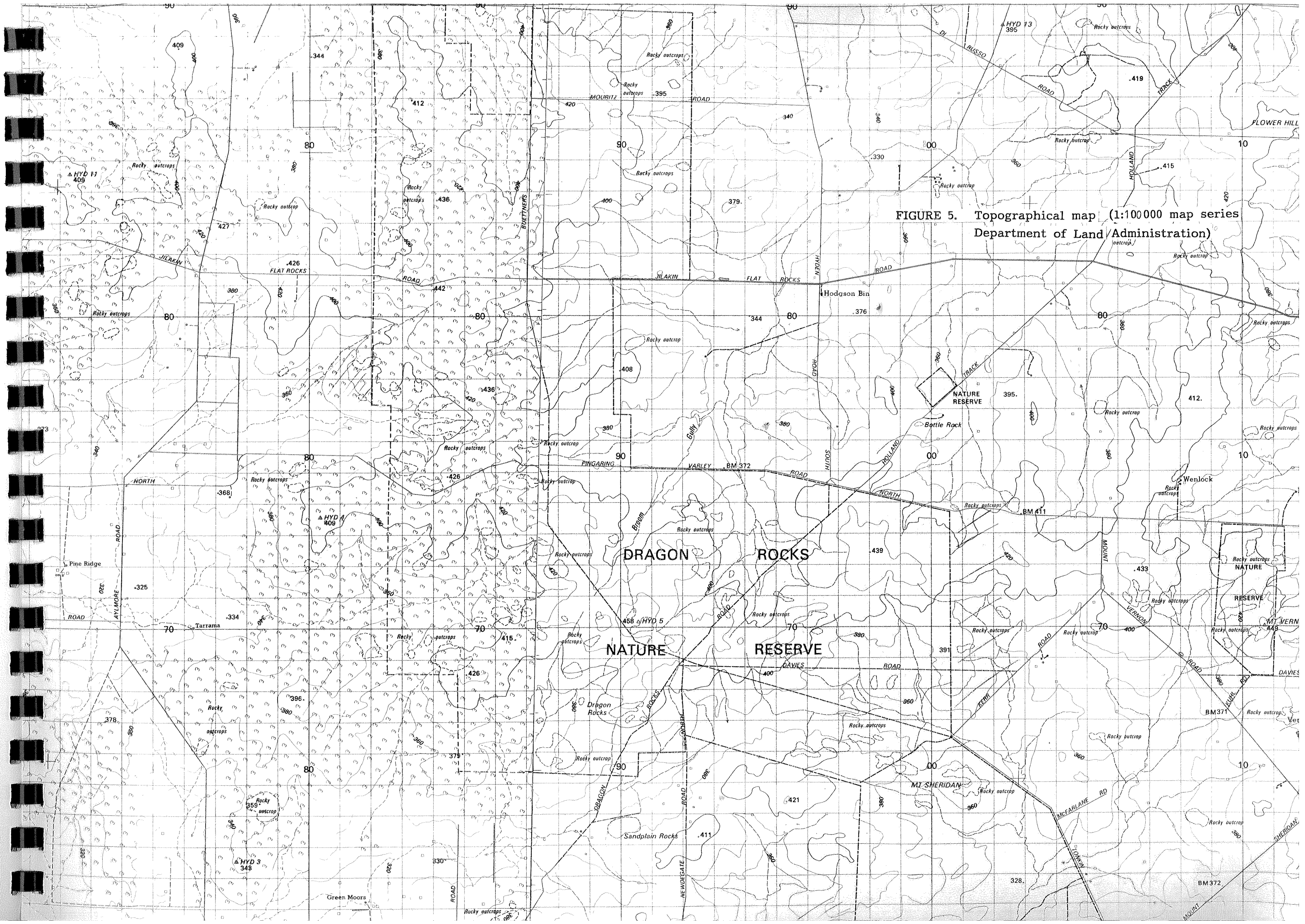


FIGURE 5. Topographical map (1:100000 map series  
Department of Land Administration)




A 36128

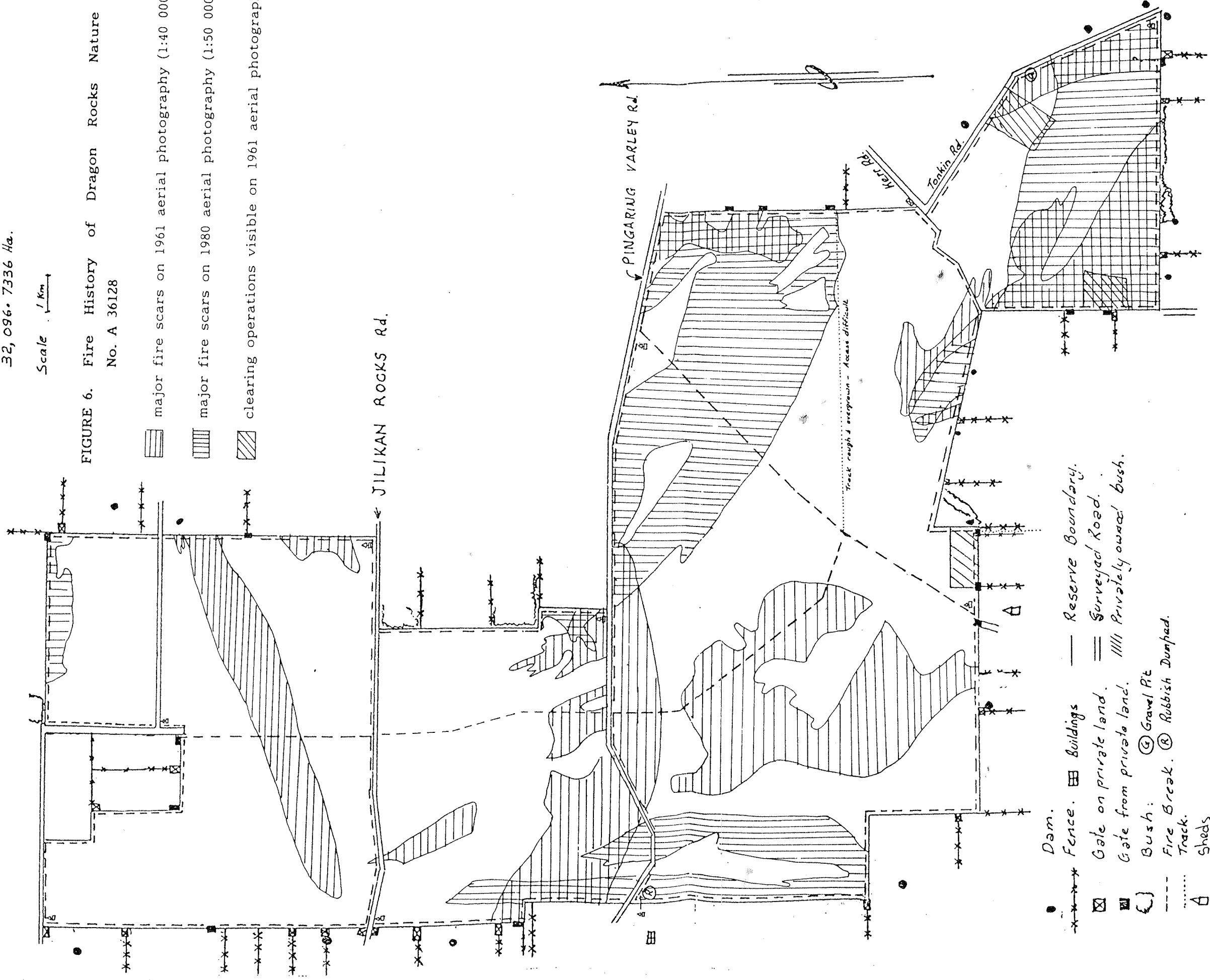
"Dragon Rocks"

32,096.7336 Ha.

Scale 1 Km

FIGURE 6. Fire History of Dragon Rocks Nature Reserve  
No. A 36128

-  major fire scars on 1961 aerial photography (1:40 000)
-  major fire scars on 1980 aerial photography (1:50 000)
-  clearing operations visible on 1961 aerial photography



- Dam.
- x-x-x- Fence.
- ▣ Buildings
- Reserve Boundary.
- ⊠ Gate on private land.
- = Surveyed Road.
- ▤ Gate from private land.
- ||||| Privately owned bush.
- Ⓒ Bush.
- Ⓒ Gravel Pit
- - - Fire Break.
- Ⓒ Rubbish Dumped.
- ⋯ Track.
- △ Sheds

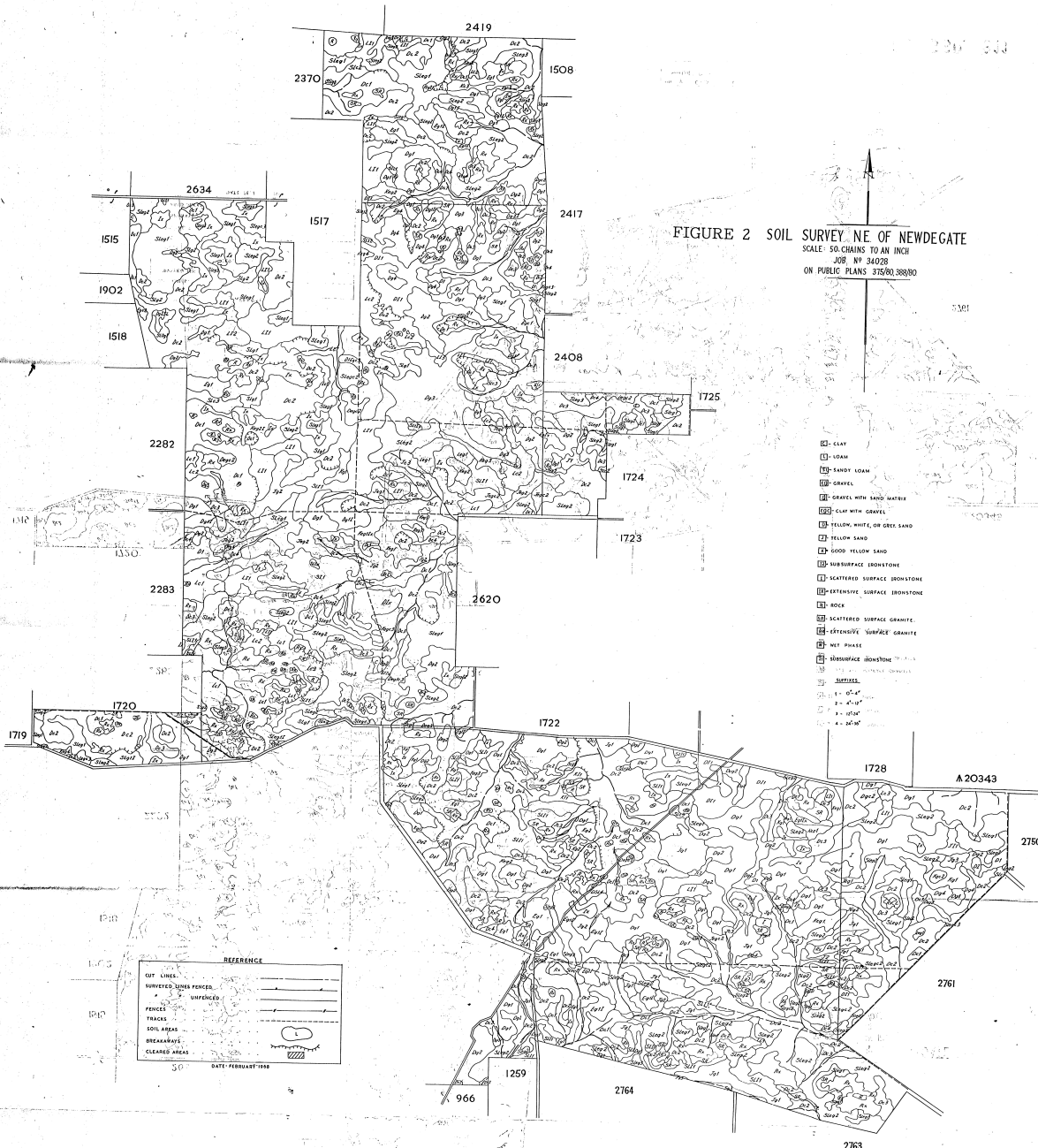


FIGURE 2 SOIL SURVEY NE OF NEWDEGATE  
 SCALE: 50 CHAINS TO AN INCH  
 JOB NY 34028  
 ON PUBLIC PLANS 375/80 388/80

- CLAY
- LOAM
- SANDY LOAM
- GRAVEL
- GRAVEL WITH SANDY MATRIX
- CLAY WITH GRAVEL
- YELLOW, WHITE, OR GREY SAND
- YELLOW SAND
- GOOD YELLOW SAND
- SUBSURFACE IRONSTONE
- SCATTERED SURFACE IRONSTONE
- EXTENSIVE SURFACE IRONSTONE
- ROCK
- SCATTERED SURFACE GRANITE
- EXTENSIVE SURFACE GRANITE
- NEW FENCE
- SUBSURFACE IRONSTONE
- SURFACES
- 1" - 10" x 10"
- 1" - 10" x 10"
- 1" - 10" x 10"

REFERENCE

OUT LINES	---
SURVEYED LINE FORCES	---
FENCES	---
TRACKS	---
SOIL AREAS	---
DRAINAGE	---
CLEARED AREAS	---

DATE FEBRUARY 1988

Surveyor: E.A. McKinnon  
 Compiled & Drawn by: G.J. Myers  
 G.S. Diggins

SOIL CLASSIFICATION NORTH OF LAKE BIDDY CD.1290

03 \

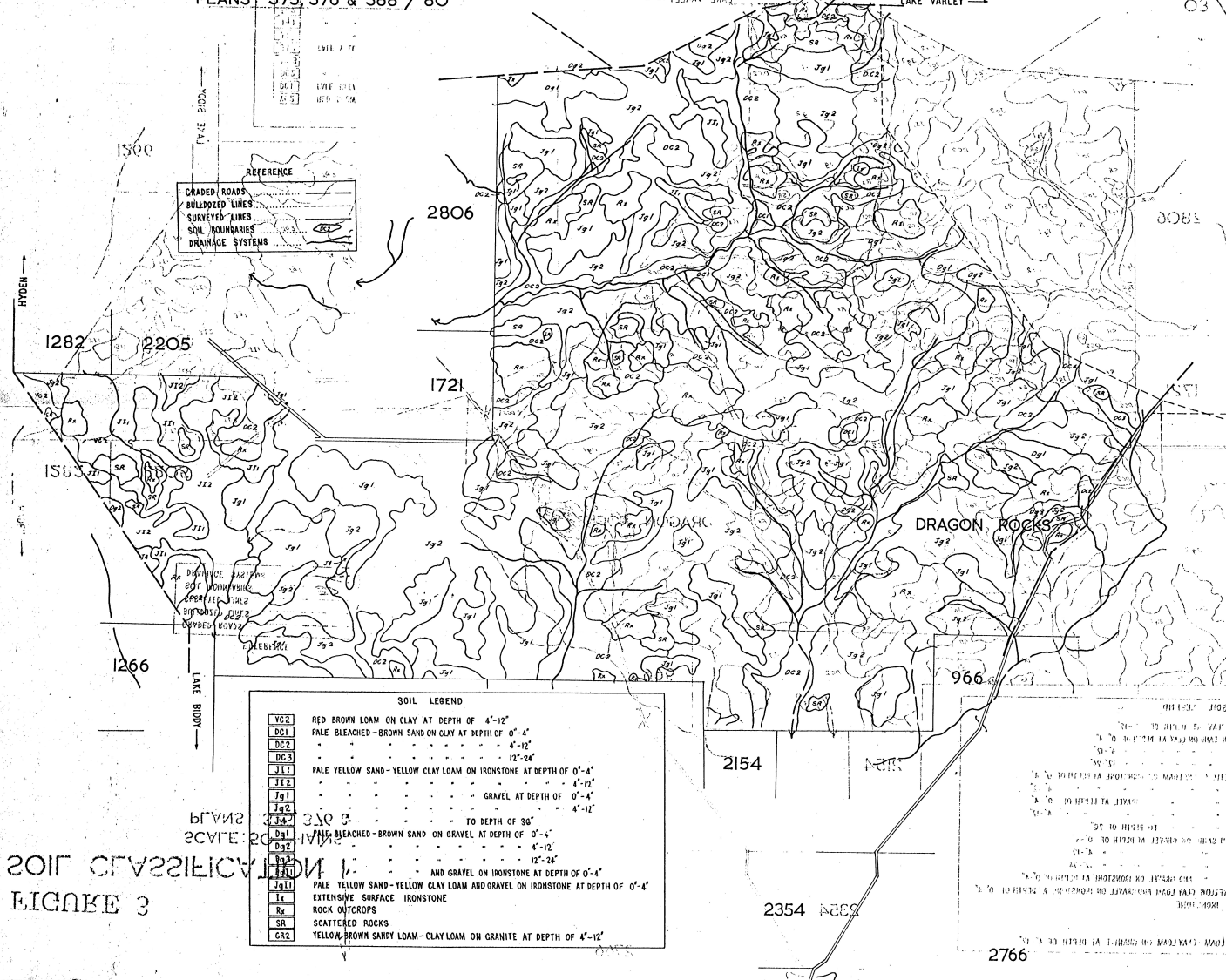
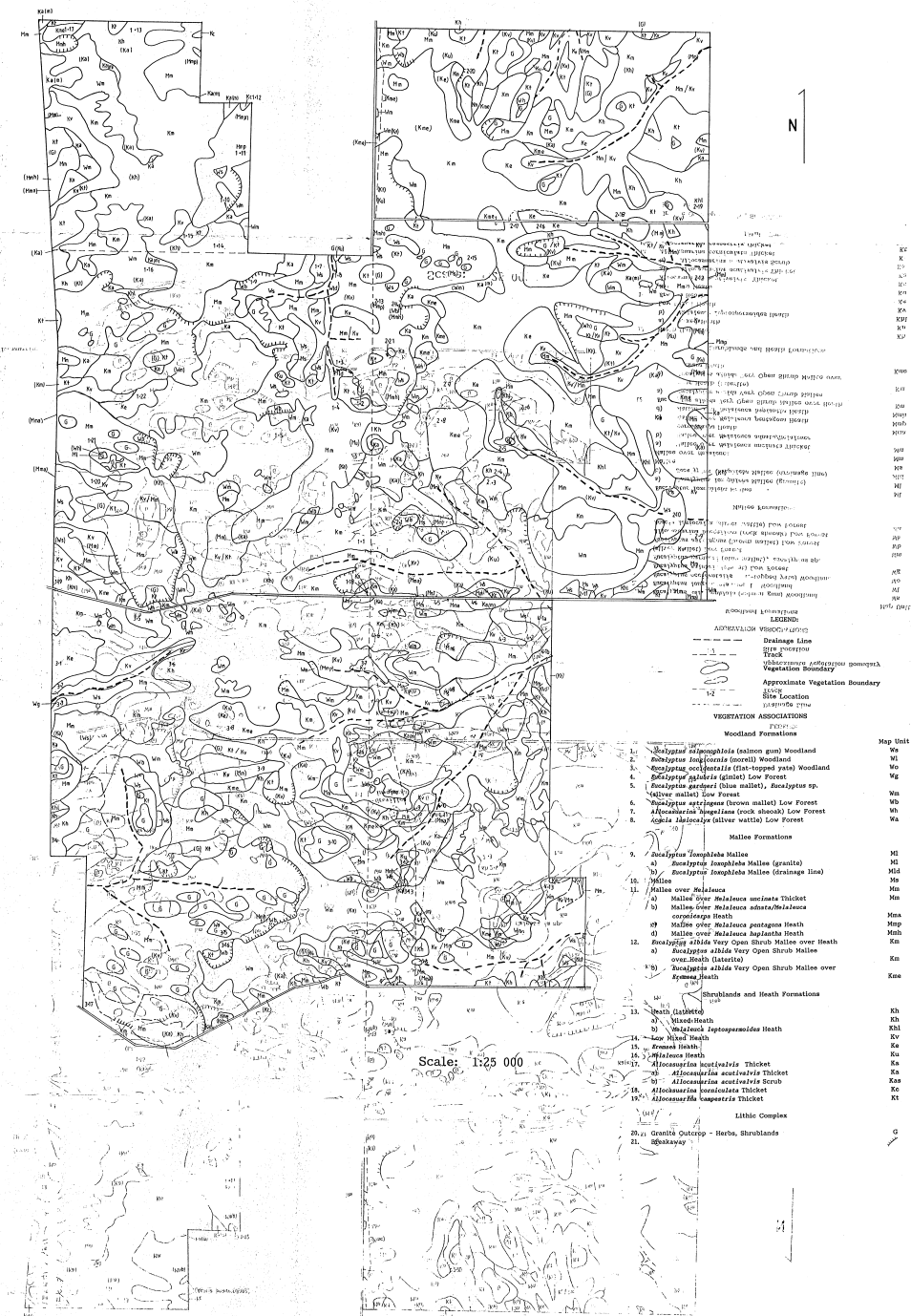


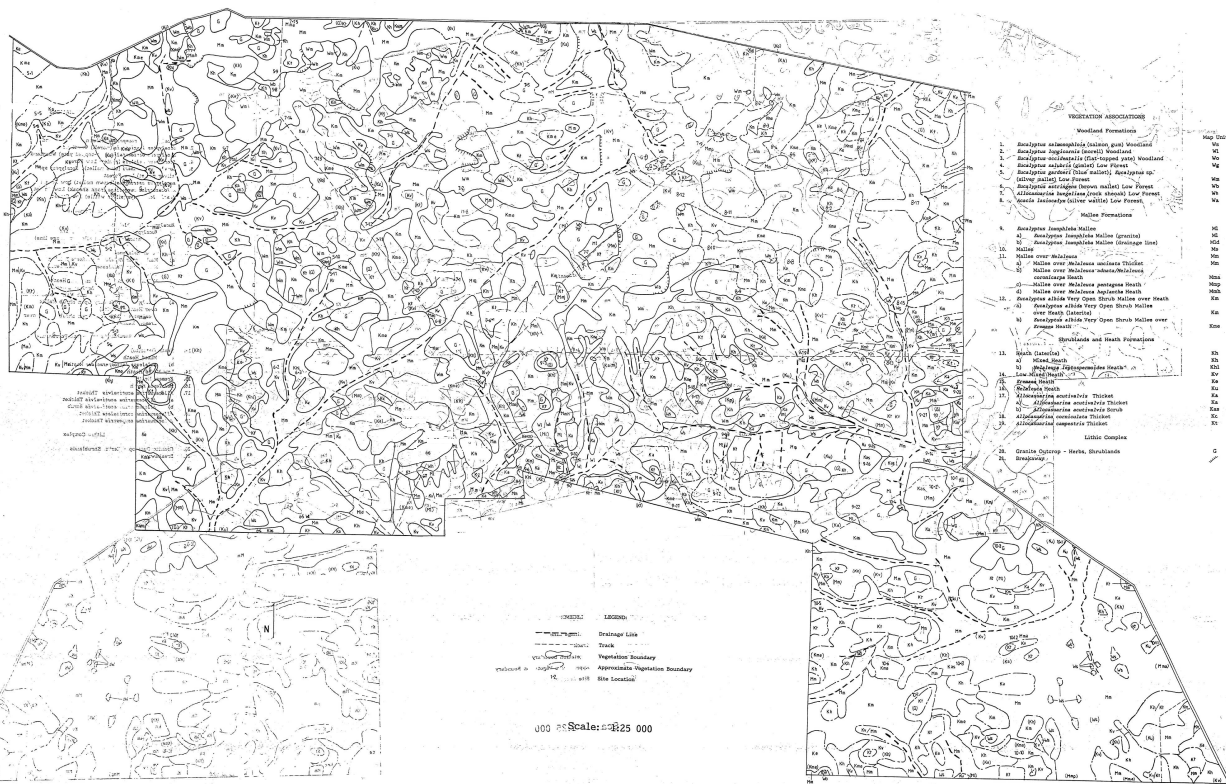
FIGURE 8: VEGETATION OF DRAGON ROCKS NATURE RESERVE No. A 36128  
NORTH OF THE VARLEY-PINGARING ROAD.



MAP OF THE DRAGON ROCKS NATURE RESERVE  
NORTH OF THE VARLEY-PINGARING ROAD.



FIGURE 9: VEGETATION OF DRAGON ROCKS NATURE RESERVE NO. A 36128  
SOUTH OF THE VARLEY-PINGARING ROAD





Dragon Rocks Nature Reserve: Vegetation



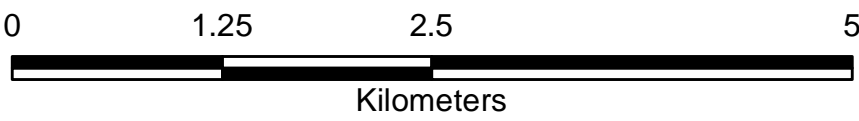
VEGETATION ASSOCIATIONS OF THE DRAGON ROCKS NATURE RESERVE (NO. A 36128)

Formation	Map Unit
Woodland Formations	
1. Eucalyptus salmonophloia (salmon gum) Woodland	Ws
2. Eucalyptus longicarpis (morell) Woodland	Wl
3. Eucalyptus occidentalis (flat-topped yate) Woodland	Wo
4. Eucalyptus salubris (gimlet) Low Forest	Wg
5. Eucalyptus gardenii (blue mallet), Eucalyptus sp. (silver mallet) Low Forest	Wm
6. Eucalyptus astingens (brown mallet) Low Forest	Wb
7. Allocasuarina huegeliana (rock sheoak) Low Forest	Wh
8. Acacia lasiocalyx (silver wattle) Low Forest	Wa
Mallee Formations	
9. Eucalyptus loxophleba Mallee	Ml
(a) Eucalyptus loxophleba Mallee (granite)	Mi
(b) Eucalyptus loxophleba Mallee (drainage line)	Md
10. Mallee	Ms
11. Mallee over Melaleuca	Mm
(a) Mallee over Melaleuca uncinata Thicket	Mn
(b) Mallee over Melaleuca adnata/Melaleuca coriolaria Heath	Mma
(c) Mallee over Melaleuca pentagona Heath	Mmp
(d) Mallee over Melaleuca haplantha Heath	Mmh
12. Eucalyptus albidus Very Open Shrub Mallee over Heath	Km
(a) Eucalyptus albidus Very Open Shrub Mallee over Heath (laterite)	Km
(b) Eucalyptus albidus Very Open Shrub Mallee over Eremaea Heath	Kme
Shrublands and Heath formations	
13. Heath (laterite)	Kh
(a) Mixed Heath	Kh
(b) Melaleuca leptospermoides Heath	Khl
14. Low Mixed Heath	Kv
15. Eremaea Heath	Ke
16. Melaleuca Heath	Ku
17. Allocasuarina acutivalvis Thicket	Ka
(a) Allocasuarina acutivalvis Thicket	Ka
(b) Allocasuarina acutivalvis Scrub	Kas
18. Allocasuarina comulata Thicket	Kc
19. Allocasuarina campestris Thicket	Kt
Lithic Complex	
20. Granite Outcrop Herbs, Shrublands	G
21. Breakaway	

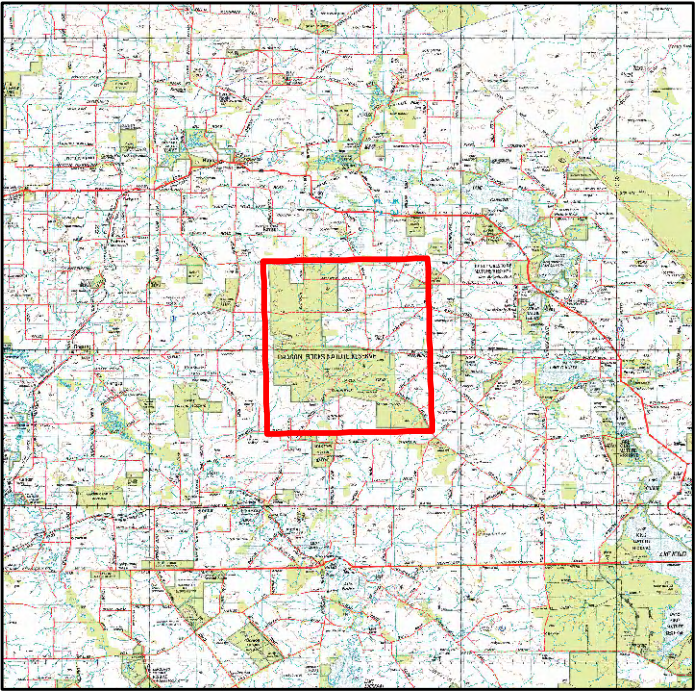
Graticule shown at 2 minutes intervals  
Grid shown at 2000 metre intervals

0

1:45,000 (A1)



Projection: Universal Transverse Mercator  
MGA Zone 50. Datum: GDA94



Produced by B. Bayliss,  
Department of  
Environment and Conservation

Job Ref: ANVMP RefID: 095  
Produced at 11:44am, on September 30, 2011

The Native Vegetation units represented in this dataset were digitised from hardcopy maps appended to: Coates A (1992) Flora and vegetation survey of Dragon Rocks Nature Reserve (No. A36128). Department of Conservation and Land Management, Western Australia. The digitised spatial layers and attribute data set were generated as part of the Avon Vegetation Map Project. This project was initiated under the DEC Terrestrial Baseline 001 component of the Avon Catchment Council Natural Diversity Program, 2007 and partly extended under the Wheatbelt NRM to 2011.

The Dept. of Environment and Conservation does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence which may arise from relying on any information depicted.