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FLORISTIC AND VEGETATION SURVEY OF

CHARLES GARDNER RESERVE [A20041]

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And Land Management
Western Australia

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February 1990

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1.0 INTRODUCTION

1.1 Project Description

Charles Gardner Reserve [A20041] is situated about 15 kms south of the Tammin townsite and covers an area of 583.3920 ha. As with most of the old established farming areas the shire of Tammin has been cleared extensively with only 7% of the shire still covered with native vegetation [Coates 1987]. The flora of the reserve is diverse and of considerable value both botanically and historically. The Department of Conservation and Land Management District records show that three species of Declared Rare Flora [*Hemigenia viscidula*, *Stylidium scabridum* and *Allocasuarina fibrosa*] and seven other species of interest [*Calothamnus brevifolius*, *Dampiera carinata*, *Dryandra horrida*, *Dryandra speciosa*, *Hakea strumosa* and *Mesomelaena preissii*] are located within the reserve. This report includes a further 8 species of interest from the area.

Although Reserve A20041 has had a purpose of "Protection of Indigenous Flora" since 1929, no detailed vegetation surveys have been located. Muir [1978] refers to a study of the Charles Gardner Reserve conducted by the National Parks Authority [unpublished report] but this report has not been found. Muir is probably referring to a flora species list and notes compiled by Mr R.D. Royce and the staff of the Western Australian Herbarium in the 1960's and 70's. This information can now be found in the Herbarium Archives and Department of Conservation and Land Management files.

The "scrub-heath on sandplain [xSZc]" mapped by Beard [1980] as covering the area of the reserve is "confined to relatively small remnants" within the Mt Caroline Vegetation System. This sandplain vegetation usually has a diverse flora and is not represented in any of the ? nature reserves within 15 km of the reserve. These are:

- Patchy vegetation on granite outcrops [reserves 11047, 11048, 11039];
- York gum and Salmon gum woodland [reserves 10313, 11024 11776];
- Thicket with scattered wandoo [reserve 23566] and
- Salt country [reserves 28289, 30229, 25112].

The objective of this project is to map the vegetation types of the Charles Gardner Reserve [A20041] and adjoining land and gather further information on rare species of flora.

1.2 Project Requirements

The project requirements are to:

- a] produce a vegetation map at a scale of approximately 1:5000 showing the major vegetation types for the Charles Gardner Reserve and adjoining land;
- b] write one or more association descriptions, based on the classification system of B. Muir, which typify 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] for each of the formations/associations described, a species list will be given with an estimate of the abundance of each species;
- d] accurately map locations of declared and other rare flora encountered during field work;
- e] identify vegetation types which are found on adjoining land but are poorly represented on the Charles Gardner Reserve and
- f] collect and identify a representative sample of the flora encountered and lodge field specimens with CALM's Merredin Office and samples of less common species with the WA Herbarium.

1.3 History of the Reserve

Reserve 20041, was gazetted in 1929 for the purpose of the "Protection of Indigenous Flora". At this time the reserve consisted of location numbers 24441, 9382 and 9383. Charles Gardner outlined the history of the area in a letter to the Department of Lands and Surveys [now the Department of Land Administration] in 1947, indicating that the original Tammin sandplain was for many years used as a military manoeuvring ground and was known to both Australian and overseas botanists as a "rich botanical entity, containing a number of localised endemic plants". In about 1910, Kitchener received the troops there and from then on the area was called Kitchener Park and later South Tammin Reserve.

Charles Gardner grew up in the Tammin district and is said to be largely responsible for the retention of this nature reserve. While Gardner was away on a two year study tour, the government sold much of the land. On his return, Gardner insisted that areas which still remained uncleared be re purchased at great expense. Unfortunately, much of the best sandplain was lost [W.A. Wildflower Society 1975].

Gardner lists the following plant species as occurring only in this area and except for the first two species on the list, these plants were originally named from the area specifically.

Dryandra horrida, *D. speciosa*, *Allocasuarina fibrosa*, **Adenanthos argyrea*, *Conospermum eatoniae*, *Grevillea uncinulata*, *Hakea tamminensis* [now *H. strumosa*], *Drosera sewelliae* [now *D. platystigma*], *Drosera pycnoblata*, *Acacia tamminensis* [now *Acacia sphacelata*], **Acacia dielsii*, *Acacia merinthophora*, **Cryptandra polyclada*, *Verticordia stylotricha* [now *V. brachypoda*], *Beaufortia bracteosa*, *Leucopogon dielsianus*, **Leucopogon tamminensis*, *Scaevola arenaria* and **Scaevola helmsii*.

*These species do not appear on the reserve species list [Appendix 1].

The reserve was designated A Class in 1958 and in 1966 the National Parks Board approached the Department of Lands and Surveys outlining the floristic values of the area and seeking vesting. Information provided on the flora of the reserve included a plant species list and general notes compiled by Mr R.D. Royce who was the officer in charge of the W.A. Herbarium at that time and also a member of the National Parks Board. Royce's interest in the area appears to have inspired the application of the National Parks Board for vesting.

The reserve was vested in the National Parks Board on 30th July 1969 without change of purpose, presumably to avoid parliamentary procedure, and a subsequent application by the NPB to change the purpose to "National Park" was not successful.

The species list for Reserve 20041, now in the Archives of the W.A. Herbarium, includes 328 species. This list was compiled by R.D. Royce and T.E.H. Aplin from information gathered on collecting trips between 1967-1972.

A short report by the National Parks Board in 1970 lists plant species seen on a recent inspection. These included *Verticordia brownii*, *V. pennigera*, *V. serrata*, *V. acerosa*, smoke bush, yellow star, a number of "varieties" of *Grevillea* and *Dryandra* as well as smaller plants including "triggers", *Dampiera* and everlastings. York gum, Salmon gum, Mallee, Jam, *Allocasuarina* and Sandalwood trees were also included. Reference was made to a gravel pit in the south west section of the reserve which the shire wished to further develop, pegs were also found throughout the park, possibly for mining claims.

In 1973, on the request of the Tammin Shire, reserve A20041 was named "Charles Gardner Reserve" after the late Botanist.

A road realignment affecting the reserve area was approved by the National Parks Authority in 1981 subject to the rehabilitation of the exchanged area. As a result the area of the reserve was adjusted to 583.3920 ha with the inclusion of location number 28710 in 1982. Recent problems have been encountered with illegal picking of wildflowers on the reserve, mainly of *Verticordia aff brownii*.

1.4 Physical Environment

Climate

The area has a typical wheatbelt climate with hot dry summers and mild wet winters. Rainfall recorded at the Tammin Post Office between 1911 and 1988 gives a mean annual rainfall of 342mm [Bureau of Meteorology 1989]. The most effective rains are received in winter from May to August and are generally very reliable with some summer rain from thunderstorms. This summer rain though insufficient to be effective in initiating growth may be important for perennial native plants in helping to tide them over the dry season [Beard 1980]. The closest meteorological recording station for data on temperatures and relative humidity in the region is the Kellerberrin Post Office. The temperature regime is one of mild winters and hot summers. Winters are mild in that the mean temperature of the coldest month exceeds 10°C but light frosts may be experienced on winter nights in clear weather [Beard 1980]. The mean temperature of the hottest month exceeds 25°C with mean maximum temperatures reaching 34°C and absolute maxima above 40°C.

Beard [1980] classes the regime in the Tammin areas with its 7½ dry months as Dry Warm Mediterranean after the classification of Bagnouls and Gaussen.

Geology and Soils

The region is part of the Darling Plateau an area underlain by the Yilgarn Block, a very ancient rigid "shield" area composed mainly of Archaean granite and gneiss with some altered volcanics and sediments. The granitic rocks have been given ages varying from 2200 to 3100 million years [Beard 1980]. The region is bounded by the Darling Fault in the west and by the greenstone belts of the southern areas and Murchison provinces in the east.

The topography of the Tammin district is gently undulating. The peneplain may have originated in the Proterozoic, although extensive erosion probably took place during the Permian glaciations [Chin 1986]. An extensive cover of lateritic soil developed on the plateau probably during the late Cretaceous and Tertiary. This Tertiary duricrust is now largely eroded but is still preserved along drainage divides [Chin 1986].

The Darling Plateau was previously capped by an undulating sandplain [now largely eroded] overlying the tertiary duricrust. White to yellow sands occur widely along drainage divides being the remnants of this former continuous sandplain. This sandplain is now extensively reworked so that the sand veneer is much thinner on the top of hills than on the flanks, where it accumulates as colluvial deposits. The sand contains abundant ironstone pebbles which are especially concentrated near its base, above the laterite. Chin [1986] refers to work by Brewer and Bettenay which indicates that the sand is derived by degradation of the underlying duricrust and that it has not been transported far.

The soil profile of the divides today where the duricrust has been exposed is characterized by laterite or ironstone crust which grades downwards into a leached kaolinized [clay] zone of deeply weathered bedrock. The soft kaolinized zone is susceptible to erosion, so that distinctive low breakaways and benched slopes occur at this level in the profile [Chin 1986].

The valleys are generally broad and flat bottomed with extensive chains of salt lakes, remnants of former river systems, with marginal lunette dunes. The region lies within the Swan-Avon palaeo drainage system. There is now little surface flow through the major valleys and drainage is "internal".

The Tammin district consists mainly of plains underlain by hard setting loams. The residual sandplains which cover most of the area of the Charles Gardner Reserve are confined to relatively small remnants in the region. The dissection and removal of these sandplains in the past has exposed numerous granite domes and tors such as Mt Caroline [to the east of the reserve] and Mt Stirling [to the south east of the reserve]. Salt flats exist between these two outcrops a remnant of one of the former main branches of the Avon River.

The geology of the region has been mapped at a scale of 1:250,000. The information in figure 1 has been taken from the Kellerberrin grid square of the 1:250,000 Geological Survey series. From this figure it can be seen that most of the Charles Gardner Reserve occurs on map unit Czs [reworked sandplain]. The map unit Cz1 [laterite] extends into the middle of the reserve with areas of Agv [granite outcrops] covering small areas on the southern and northern boundaries. The map unit Qc [Colluvium and minor alluvium] covers a small portion of the northwest corner of the reserve and small areas on the eastern boundary.

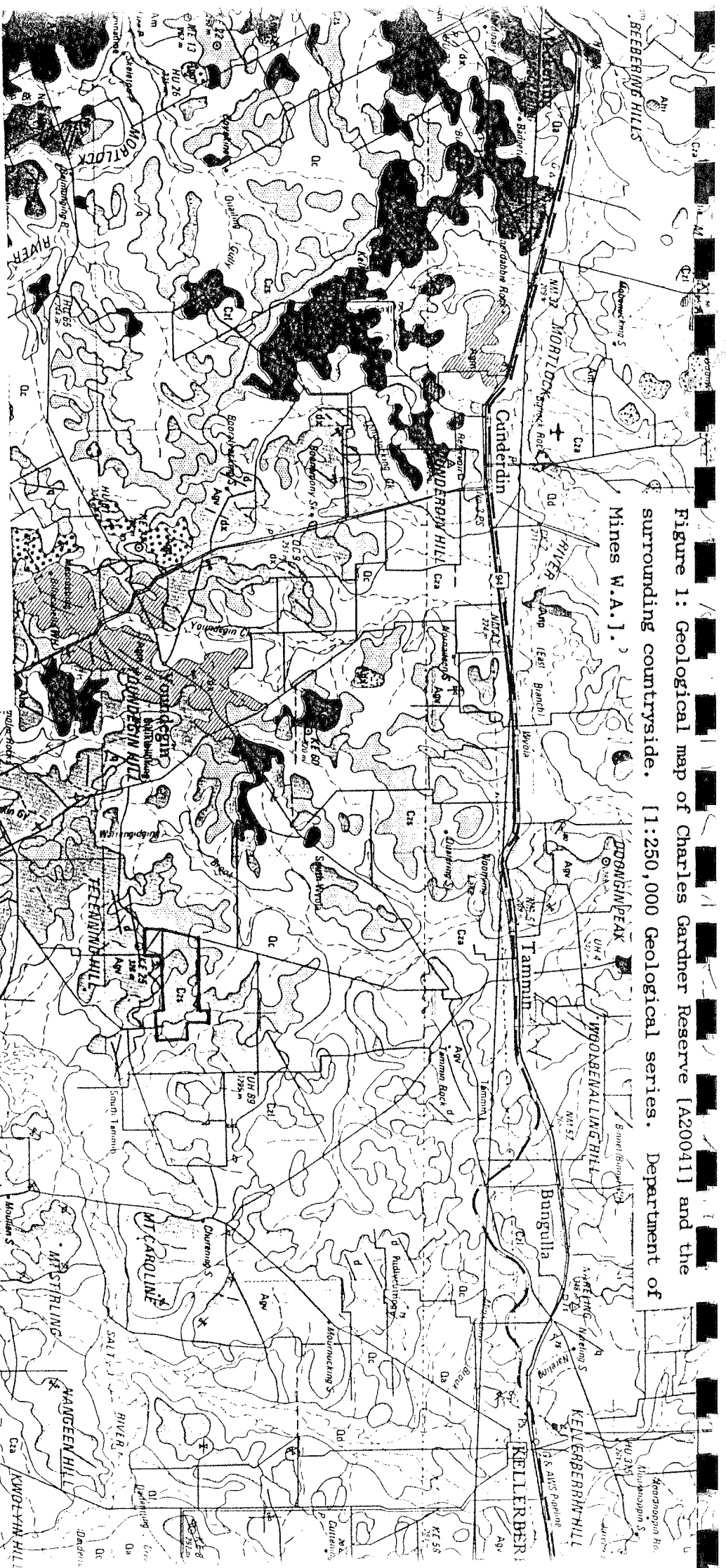
The soils of the area have been mapped in sheet 5 of the Atlas of Australian Soils [Northcote et al 1967]. The landscape/map unit covering the Charles Gardner Reserve is unit Ms7. As mapped this unit includes areas of Landscape/Map unit Uf1.

Ms7 Gently sloping to gently undulating plateau areas with long and very gentle slopes and, in places, abrupt erosional scarps: chief soils are [i] on gently convex slopes of the plateau, sandy yellow earths [Gn2.21] containing ironstone gravels and with clay D horizons; [ii] on depositional slopes flanking erosional sites, yellow earthy sands [Uc5.22] sometimes with ironstone gravels at depth; [iii] on erosional ridges and slopes, leached sands [Uc2.12] containing ironstone gravels and overlying mottled or pallid-tone clays; and [iv] sandy depressions of leached sands [Uc2.22] with some [Dy] soils. Soil dominance tends to vary locally between [i] and [iii] [Northcote et al 1967].

Uf1 Undulating terrain with ridges, spurs, and lateritic mesas and buttes: chief soils on the broad undulating ridges and spurs are hard, and also sandy, neutral, and also acidic, yellow mottled soils [Dy3.82 and Dy3.81], [Dy5.82 and Dy5.81], all containing ironstone gravels. Associated are a variety of soils on the shorter pediment slopes, including [Dr2.32], [Dr3.41], [Dy2.33], and others of similar form; and dissection products of the lateritic mesas and buttes. [Northcote et al 1967].

Figure 1: Geological map of Charles Gardner Reserve [A20041] and the surrounding countryside. [1:250,000 Geological series. Department of

Mines W.A.]



Legend

- Czs Reworked sandplain - yellow and white sand containing locally abundant limonite pebbles.
- Agv Seriate adamellite; medium and coarse-grained, variably textured, locally porphyritic.
- C21 Laterite - limonite cemented, nodular and massive duricrust overlying deeply weathered bedrock.
- C0 Colluvium and minor alluvium - silt, sand and gravel derived from underlying and adjacent laterite and bedrock.

Landscape/Map unit Va63 occurs immediately adjacent to the reserve.

Va63 Valley plains and terraces: chief soils are hard alkaline yellow mottled soils [Dy3.453]. Associated are small areas of a range of soils including [Dy3.42], and [Dr5.8] and [Dy5.8], both containing laterite or large amounts of ironstone gravels; and some [Dr2.4] and [Uc2.34] soils. [Northcote et al 1967].

Beard [1980] describes the soils below the sandplains and on the slopes of the country as hard alkaline yellow mottled soils and hard alkaline red soils with acid lateritic strata common below 1.20 to 1.50 m. In the valley bottoms there are hard alkaline yellow or hard alkaline red soils underlain by acid lateritic clays below 60 to 120 cm. Salt lake systems with saline loams occupy the lowest portions of the major valley and drainage lines.

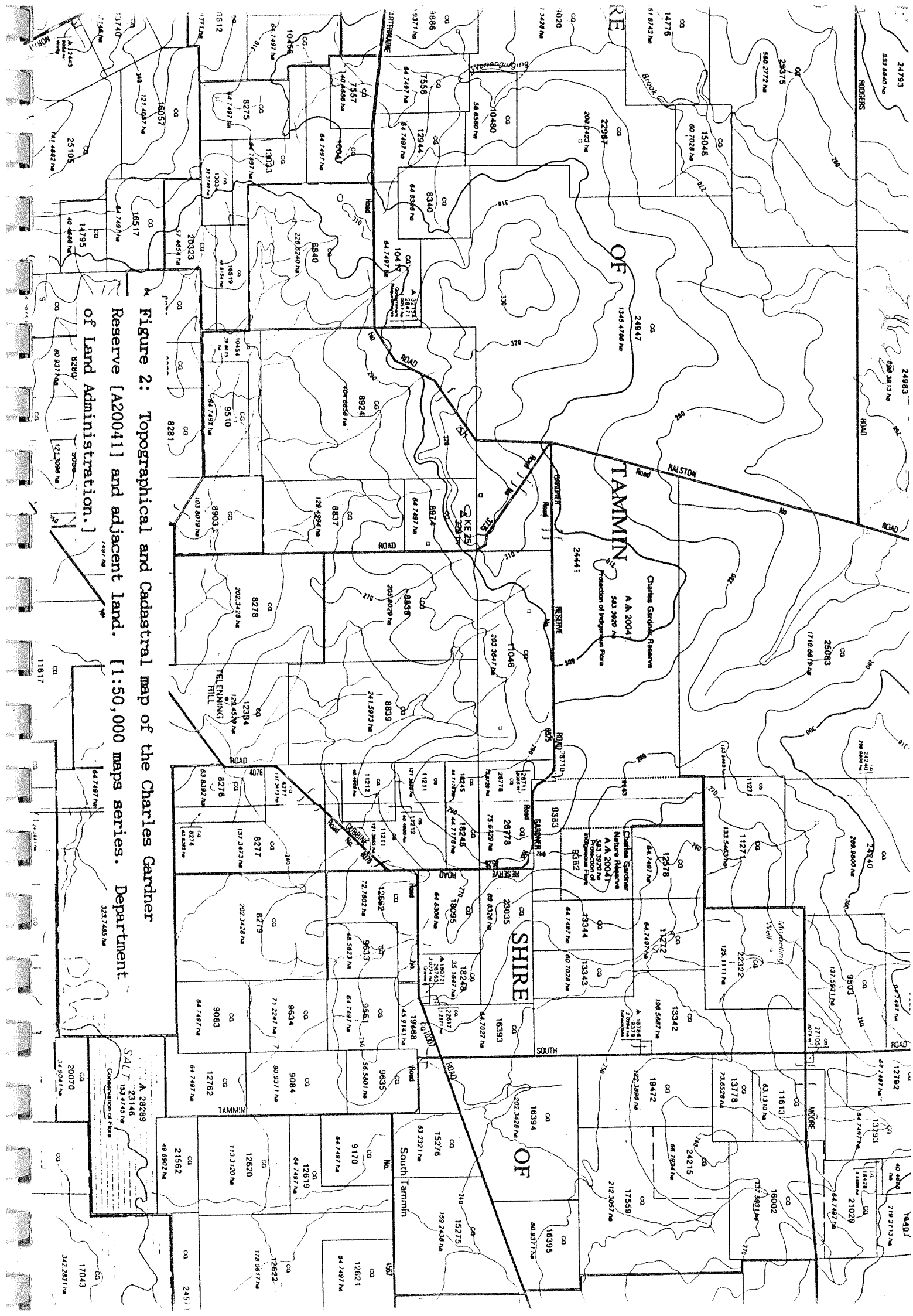
1.5 Physical Environment

The Charles Gardner Reserve [A20041] is situated 15 kms south of Tammin and covers an area of 584 ha. The reserve lies within the Wheatbelt of W.A in a district which has been almost totally cleared for agricultural use. Only 7% of the Tammin Shire is still covered by native vegetation [Coates 1987].

The reserve is irregular in shape [Figure 2] and includes location numbers 9382, 9383, 28710 and 24441. It is completely surrounded by farmland with only small areas of uncleared bushland on the northern and southern boundaries. Mt Caroline a large granite outcrop is found 10.5 kms east of the reserve and Mt Stirling 9 kms south east.

Ralston Road [gravel] runs through the reserve in the south west corner and along the western boundary and the Gardner Reserve Road [gravel] runs through part of the reserve and along the southern boundary. The rest of the reserve area is bounded by a track/firebreak which runs around the periphery. Access is provided through the reserve by two tracks running north south from Gardner Reserve Road to the northern boundary.

The terrain of the reserve is very gently undulating. The area covers the upper portion of the landscape including substantial areas of residual sandplain and an area of laterite crusted plateau with a small breakaway. Granite outcrops are found near the south eastern and south western corners with small areas of exposed granite occurring on the northern boundary, usually with soils supporting Jam woodlands



The highest point on the reserve is 320 meters above sea level and is found in the south west corner. The reserve slopes down to 280 meters in the north west corner and 260 meters in the south east section with the lateritic plateau reaching 310 meters [Figure 2].

An area in the south eastern section of the reserve has been at least partially cleared [chained and possibly ploughed] at some time prior to 1962 [Figure 3].

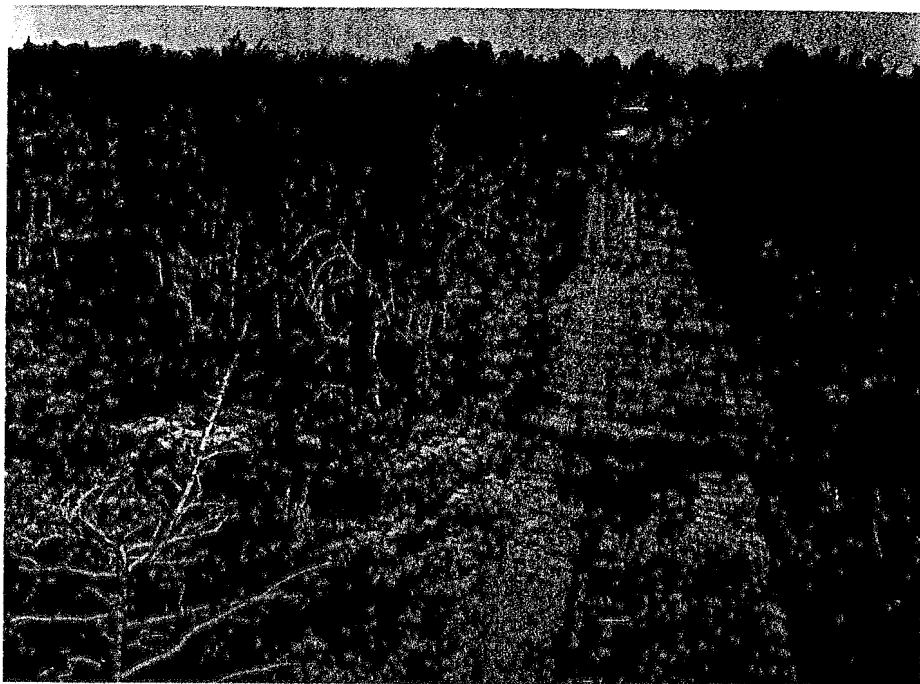
1.6 Fire History of the Reserve

Aerial photographs taken in 1962 and 1972 show two fire scars [see Figure 3]. Three quarters of the reserve was fiercely burnt in 1966. Photographs 1, 2 and 3 taken in 1967 by T.E.H. Aplin show some of the heavily burnt areas. The original photographs are stored in the herbarium archives. Herbarium staff established plots to monitor the regeneration of burnt areas, however data collected was never published. [Aplin pers comm.].

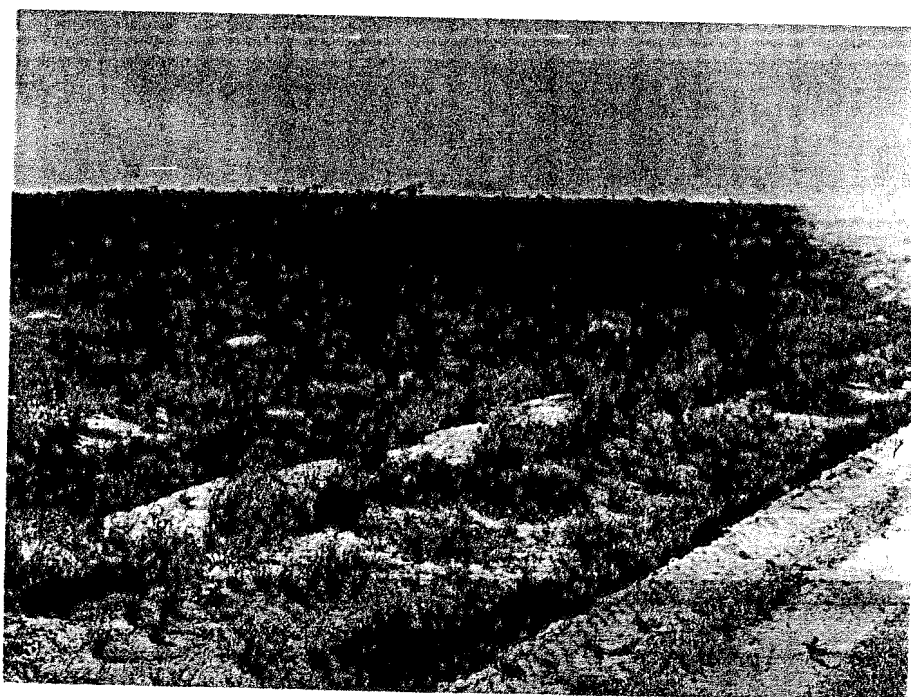
Photograph 1: *Actinostrobus arenarius* in the eastern section of the reserve [facing south]. The 1966 fire stopped in the foreground.



Photograph 2: Heavily burnt *Actinostrobus arenarius* in the eastern section of the Charles Gardner Reserve. [Facing south].



Photograph 3 Burnt sand heath in the western section of the Charles Gardner Reserve. [Facing south east]. The main road to Tarmin [Ralston Road] is in the foreground.



2.0 METHOD

The ground survey of the vegetation and flora of the Charles Gardner Reserve was carried out during October 1989.

General vegetation divisions were noted using black and white aerial photography at a scale of 1:50,000 and 1:5,000. 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 1].

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.

Figure 3: Sketch map of part of the fire history of the Charles Gardner Reserve.

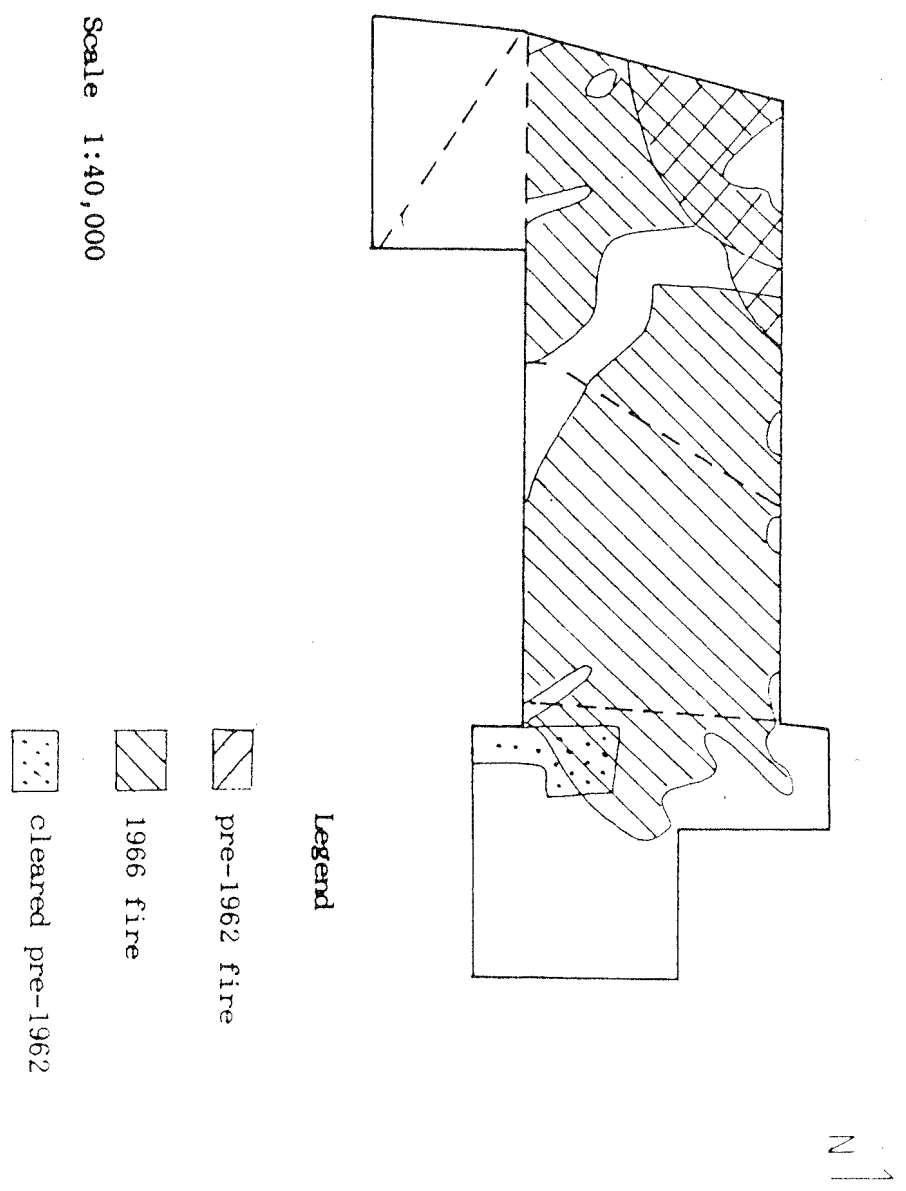


TABLE 1 MUIR SYSTEM OF VEGETATION CLASSIFICATION

LIFE FORM/HEIGHT CLASS	CANOPY COVER			
	DENSE 70 - 100% d	MID DENSE 30 - 70% c	SPARSE 10 - 30% ¹	VERY SPARSE 2 - 10% r
T Trees > 30 m M Trees 15 - 30 m LA Trees 5 - 15 m LB Trees < 5 m	Dense Tall Forest Dense Forest Dense Low Forest A Dense Low Forest B	Tall Forest Forest Low Forest A Low Forest B	Tall Woodland Woodland Low Woodland A Low Woodland B	Open Tall Woodland Open Woodland Open Low Woodland A Open Low Woodland B
KT Mallee tree form KS Mallee shrub form	Dense Tree Mallee Dense shrub Mallee	Tree Mallee Shrub Mallee	Open Tree Mallee Open Shrub Mallee	Very Open Tree Mallee Very Open Shrub Mallee
S Shrubs > 2 m SA Shrubs 1.5 - 2.0 m SB Shrubs 1.0-1.5 m SC Shrubs 0.5 - 1.0 m SD Shrubs 0.0 - 0.5 m	Dense Thicket Dense Heath A Dense Heath B Dense Low Heath C Dense Low Heath D	Thicket Heath A Heath B Low Heath C Low Heath D	Scrub Low Scrub A Low Scrub B Dwarf Scrub C Dwarf Scrub D	Open Scrub Open Low Scrub A Open Low Scrub B Open Dwarf Scrub C Open Dwarf Scrub D
P Mat plants H Hummock Grass	Dense Mat Plants Dense Hummock Grass	Mat Plants Mid Dense Hummock Grass	Open Mat Plants Hummock Grass	Very Open Mat Plants Open Hummock Grass
GT Bunch grass > 0.5 m GL Bunch grass < 0.5 m J Herbaceous spp.	Dense Tall Grass Dense Low Grass Dense Herbs	Tall Grass Low Grass Herbs	Open Tall Grass Open Low Grass Open Herbs	Very Open Tall Grass Very Open Low Grass Very Open Herbs
VT Sedges > 0.5 m VL Sedges < 0.5 m	Dense Tall Sedges Dense Low Sedges	Tall Sedges Low Sedges	Open Tall Sedges Open Low Sedges	Very Open Tall 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

3.0 VEGETATION SURVEY

3.1 Previous Survey

The Charles Gardner Reserve [A20041] and surrounding countryside are situated in the Avon Botanical District. This district includes much of the Wheatbelt Region west of the extensive mallee areas of the Roe Botanical District. Beard [1980] has mapped the vegetation of the Kellerberrin grid square, which includes the reserve area, at a scale of 1:250,000. From this work it can be noted that three map units cover the Charles Gardner Reserve. These are as follows:

1. xSZc [undifferentiated kwongan communities];
2. e₆8Mi [*Eucalyptus loxophleba*, *E. salmonophloia* woodland];
3. a₁₉c₅Li [Jam and Sheoak on granite rock outcrops].

The map unit xSZc covers most of the reserve with a small area of e₆8Mi in the eastern section and a₁₉c₅Li covering the eastern corner south of Ralston road.

According to the map delineating vegetation systems in Beard [1980] the Charles Gardner Reserve is situated in the Mt Caroline System where residual sandplains are confined to relatively small remnants. Beard, however, places the reserve in the Meckering System, which occurs a relatively short distance to the west. In the Mt Caroline system dissection and removal of the sandplain areas has exposed numerous granite domes and tors including Mt Caroline and Mt Stirling. These granite outcrops are patchily vegetated and are surrounded by shrublands or low woodlands including areas of *Leptospermum erubescens*, *Allocasuarina huegeliana*, *Acacia acuminata* and *Eucalyptus loxophleba*. Mallee is not extensive in the system and consists of relatively small areas. Woodlands of *Eucalyptus wandoo*, *E. loxophleba*, *E. salmonophloia* and *E. salubris* also occur.

On salt country Samphire communities are found with thickets of *Melaleuca* species on sandy rises and woodlands of *Eucalyptus loxophleba* and *Eucalyptus salubris*. *E. gracilis* is sometimes present in these woodland areas. Kwongan communities are related to soil types and include:

- a] *Allocasuarina campestris* thickets on ironstone gravel.
- b] Mixed thicket and scrub heath on yellow sandy soils containing ironstone gravel. *Acacia*, *Allocasuarina* or more rarely *Melaleuca* species are dominant.
- c] Scrub-heath of the "*Banksia-Xylomelum* Association" on yellow sand.
- d] *Melaleuca uncinata* thicket on poorly drained sand.
- e] *Leptospermum erubescens* thickets and heath usually in outcrop areas receiving run-off.
- f] *Melaleuca scabra* - *Acacia leptospermoides* association [Only one record].

The Meckering System in which Beard places the Charles Gardner Reserve is mostly undulating with loam soils that were originally covered by mixed woodlands of *Eucalyptus loxophleba* and *E. wandoo* with occasional *E. salmonophloia*. The area has been so extensively cleared that Beard notes that he can only guess at the original vegetation of the lateritic residuals which were probably covered with areas of *Eucalyptus astringens* woodland and thickets featuring *Allocasuarina campestris* and *Leptospermum erubescens* of which *E. macrocarpa* was a component. Most granite outcrops are still covered by *Acacia acuminata* low woodland sometimes in association with *Allocasuarina huegeliana*. Sandplains apparently carried Scrub-Heath with an open upper layer of shrubs over a denser small Shrub layer. Beard describes the vegetation of the Charles Gardner Reserve as mostly Scrub-heath.

"The heathland had an open appearance with a generally extensive heath layer of some 60 cm tall, relatively few scattered larger shrubs including a spindly *Acacia merinthophora* and large patches with Cyperaceae and Restionaceae dominant".

Beard also refers to thicket which survived the 1966 fire as "2 m tall, dominated by *Actinostrobus arenarius* and *Allocasuarina campestris*".

3.2 Current Survey

In the present survey the vegetation of the Charles Gardner Reserve is analysed in more detail. The plant communities form the intricate mosaic typical of wheatbelt vegetation. This mosaic is linked to topography, pedological and /or geological features.

The vegetation was primarily divided into tree communities [Low Woodland, Woodland, Low Forest], Mallee communities [Very Open Shrub Mallee to Shrub Mallee], Kwongan communities [Heathland, Shrubland], Sedgeland and Lithic Complex. The vegetation was then further divided into species associations within these groupings. Table 2 lists the 17 vegetation associations described and mapped in this study. Three of these associations have been further sub-divided to clarify variations within the association which are usually due to fire. The vegetation map of the area surveyed is presented in Figure 4 and Muir descriptions for the vegetation found at each site are listed in Appendix 2. A plant species list for each vegetation association is provided in Appendix 3 with an estimate of the abundance of each species. The frequency at which each species occurs within a vegetation type is not always uniform and different estimates of abundance may be recorded at different sites within the same vegetation association. The estimates provided in Appendix 3 are therefore only given as a guide and must be viewed with caution.

Vegetation Map

It was not always possible to distinguish areas of *Allocasuarina campestris* Heath from areas of Scrub-Heath with the available black and white aerial photography. These associations tend to gradually merge in places and have been mapped as a mosaic unit. Delineating boundaries between the *Actinostrobus* Heath and the Scrub-Heath mosaic areas in the south eastern corner of the reserve has been complicated by the effect on these associations of fire and previous clearing operations. The vegetation boundaries are therefore only approximate.

Vegetation of the Charles Gardner Reserve

The greater part of the reserve is covered by sandplain vegetation. These Kwongan communities form a complex mosaic pattern mainly determined by soil variation and topography and rich in plant species. Covering extensive areas is the *Allocasuarina campestris* Heath/Scrub-Heath Mosaic. This vegetation unit was found on bleached grey sandy soils with gravel in some areas. *Allocasuarina campestris* may become dominant in areas where laterite is more prevalent or is found closer to the surface but further soil surveys are needed to explain the distribution of the vegetation types within this mosaic unit.

On yellow sandy soils over laterite in poorly drained low lying areas *Mesomelaena preissii* Low Sedges are found while deeper yellow sandy soils on higher ground support *Actinostrobus arenarius* Heath. *Xylomelum angustifolium* occurs in a small section of the *Actinostrobus* Heath area. This Heath association is related to the *Banksia-Xylomelum* alliance which is here at the limit of its range. Typical species of the alliance include *Actinostrobus arenarius*, *Xylomelum angustifolium*, *Eremaea pauciflora* and *Pileanthus peduncularis* [recorded by Royce and Aplin]. The only *Banksia* species found on the reserve however is *Banksia sphaerocarpa* which is not a characteristic species.

In small areas on higher ground on residual laterite where ironstone is often exposed *Open Allocasuarina campestris* over *Melaleuca holosericea* Heath is supported on gravelly soils. The gazetted rare plants *Hemigenia viscida* and *Allocasuarina fibrosa* both occur in this association with *Banksia sphaerocarpa*, *Dryandra vestita*, *Dryandra aff cirsioides*, *Leptospermum spinescens* and *Petrophile circinata*. *Allocasuarina campestris* Thicket grows in areas adjacent to granite outcrops, on higher ground on gravelly soils and adjacent to and interspersed amongst the woodlands in the eastern sections of the reserve. These areas have remained unburnt for some time.

Covering the summit of the laterite crusted plateau growing on shallow gravelly soils over ironstone are areas of *Eucalyptus falcata* [silver mallet] woodlands. Some of these areas are regenerating after the 1966 fire. Beard [1980] suggested that *Eucalyptus astringens* [brown mallet] would probably occupy this position on the landscape. *Eucalyptus falcata* is usually found further to the south and south-east of the Tammin region. Adjacent to the silver mallet on the periphery of the exposed lateritic duricrust on gravelly soils Open Mallee over *Allocasuarina campestris* Heath is found. *Eucalyptus leptophylla* is the most commonly occurring mallee in the association and is present only as scattered individuals in some areas. *Allocasuarina campestris* forms a dense understorey with other species including *Allocasuarina acutivalvis*, *Dryandra aff. cirsioides*, *Hakea multilineata* and *Gastrolobium spinosum* scattered throughout.

Where the laterite has been breached on the reserve, Mallee over *Melaleuca aff. undulata* Heath occurs immediately below the breakaway in small areas on shallow soil overlying the residual laterite debris on the scarp slopes. This association was also found on privately owned land adjacent to the reserve on fairly flat areas interspersed with the Mallee association. Only a small area of Mallee with scattered shrubs was found on the reserve on clay loam soils on sloping terrain below the lateritic plateau. Mallee over *Melaleuca uncinata* Heath was also found on clay loams on slopes below the summit but this association extends onto the lower more level terrain and covers a greater area. The mosaic pattern becomes more complex on this lower ground with the occurrence of Mallee over *Gastrolobium spinosum* growing on sandy loam possibly with laterite below the surface. The association has been burnt twice in the past 30 years. *Eucalyptus wandoo* Open Woodland over *Allocasuarina campestris* Heath is found just below the plateau amongst ironstone boulders and also below a small lateritic ridge on gravelly soils. This association is similar to the "*Allocasuarina campestris* thicket with scattered wandoo" mapped by Beard [1980] as occurring in the south of the Mt Caroline system on some of the roughest stoney country.

Woodlands tend to occur on the lower portion of the landscape and are found mainly in the eastern section of the reserve. The mosaic of woodland associations is related to soil and topography with *Eucalyptus salmonophloia* Woodland growing on the heavier clay loam soils.

Eucalyptus loxophleba becomes dominant in low lying areas and along some drainage or stream lines on loamy soils and *Acacia acuminata* Woodland is supported by loamy soils where small granite outcrops or granite pavement occur.

Granite outcrops have a characteristic flora with mosses and liverworts on bare rock and *Borya sphaerocephala* herbs forming a mat on flat areas of the rock surface. Scattered ferns, shrubs, herbs and sedges are found on shallow soils and crevices including *Dodonaea viscosa*, species of *Lepidosperma*, *Stackhousia monogyna*, *Stypandra glauca*, *Cheilanthes austrotenuifolia*, *Podolepis canescens*, *Waitzia acuminata* and *Brunonia australis*. Deeper soils receiving run-off from the rock outcrop carry *Allocasuarina campestris* Thicket or *Allocasuarina huegeliana* woodland. *Allocasuarina huegeliana* is joined by *Acacia lasiocalyx* and *Acacia acuminata* in some areas. *Allocasuarina huegeliana* woodlands are also found growing on sandy soils in areas more distant from the outcrops.

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

Table 2 - Vegetation Associations of the Charles Gardner Reserve
[A20041].

Woodlands [Low Woodland, Woodland, Low Forest]

- | | |
|---|-----|
| 1. <i>Acacia acuminata</i> [jam] Low Woodland | Wa |
| 2. <i>Allocasuarina huegeliana</i> [sheoak] Woodland | Wh |
| 3. a) <i>Eucalyptus falcata</i> [silver mullet] Woodland | Wf1 |
| b) Regenerating <i>Eucalyptus falcata</i> [silver mullet]
Woodland | Wf2 |
| 4. <i>Eucalyptus loxophleba</i> [york gum] Woodland | Wl |
| 5. <i>Eucalyptus salmonophloia</i> [salmon gum] Woodland | Ws |
| 6. <i>Eucalyptus wandoo</i> [white gum] Open Woodland over
<i>Allocasuarina campestris</i> Heath | Ww |

Mallee

- | | |
|--|----|
| 7. Mallee | M |
| 8. Mallee over <i>Gastrolobium spinosum</i> | Mg |
| 9. Mallee over <i>Melaleuca uncinata</i> Heath | Mm |
| 10. Mallee over <i>Melaleuca</i> aff <i>undulata</i> Heath | Mc |
| 11. Open Mallee over <i>Allocasuarina campestris</i> Heath | Ma |

Kwongan [Heath, Thicket and Scrub]

- | | |
|---|-------|
| 12. <i>Allocasuarina campestris</i> Heath/Scrub Heath Mosaic | Kc/Km |
| 13. a) Open <i>Allocasuarina campestris</i> over <i>Melaleuca</i>
<i>holosericea</i> Heath | Kh1 |
| b) <i>Allocasuarina campestris</i> / <i>Melaleuca holosericea</i>
Heath | Kh2 |
| 14. <i>Allocasuarina campestris</i> Thicket | Kt |
| 15. a) <i>Actinostrobus arenarius</i> Heath | Ka1 |
| b) <i>Xylomelum angustifolium</i> / <i>Actinostrobus arenarius</i>
Heath | Ka2 |

Sedgelands

- | | |
|--|---|
| 16. <i>Mesomelaena preissii</i> Low Sedges | S |
|--|---|

Lithic Complex

- | | |
|---------------------------------|---|
| 17. Granite rock surface, Herbs | G |
|---------------------------------|---|

WOODLANDS, LOW WOODLANDS, LOW FORESTS

Wa *Acacia acuminata* [jam] Low Woodland

Diagnosis Low Forest B/Low Woodland B.

Sites 23, 25, 29, 35.

Description

Stratum 1 *Acacia acuminata* trees to 5 m, form a sparse to mid dense stratum with scattered trees of *Eucalyptus loxophleba* emergent to 8 m. *Allocasuarina huegeliana* trees are occasionally present.

Lower Stratum *Borya sphaerocephala* and other herbaceous species form a sparse to mid dense stratum in some areas. Scattered shrubs and sedges are occasionally found. Common lower stratum species include *Brunonia australis*, *Dampiera lavandulacea*, *Gnephosis tenuissima*, *Lepidosperma ?costale*, *Loxocarya ?aspera* [ms], *Podolepis lessonii*, *Stylidium leptophyllum*, *Trachymene ornata*, *Waitzia acuminata* and *Waitzia citrina*.

Comments *Acacia acuminata* trees become dominant on brown loamy soils often with small granite outcrops or granite pavement. Scattered *Eucalyptus loxophleba* mark the transition to *E. loxophleba* Woodland. *Acacia acuminata* trees are also found in the deeper soils adjacent to Granite outcrops but *Allocasuarina huegeliana* is usually dominant.

Wh *Allocasuarina huegeliana* [Sheoak] Woodland

Diagnosis Low Forest A/Low Woodland A over variable understorey.

Sites 39, 70, 72, 74, 75

Description

- Stratum 1 *Allocasuarina huegeliana* trees form a sparse to mid dense stratum to 7 m. Scattered trees of *Acacia acuminata* and *A. lasiocalyx* are usually present in areas adjacent to granite outcrops.
- Stratum 2 In areas adjacent to granite outcrops shrubs and sedges are present only as scattered individuals. At site 70 a very sparse stratum of shrubs to 2 m was recorded. These stratum 2 species include *Calothamnus quadrifidus* and *Grevillea pritzelii*.
- Stratum 3 An understorey of sedges and shrubs to 0.5 m form a sparse to mid dense stratum at sites 70 and 75. Commonly occurring species include *Calytrix leschenaultii*, *Dodonaea pinifolia*, *Eremaea pauciflora*, *Lepidobolus chaetocephalus*, *Lepidosperma? angustatum*, *Loxocarya* sp and *Mesomelaena preissii*.
- Comments This vegetation association is found on deeper soils adjacent to granite outcrops receiving run-on and in sandy soils at a further distance from the outcrops where an understorey is usually present.

Photograph 3: *Acacia acuminata* [jam] Woodland at Site 35.



Photograph 4: *Allocasuarina huegeliana* [sheoak] Woodland at Site 39



Wf1 *Eucalyptus falcata* [silver mallet] Woodland

Diagnosis Low Woodland A over Low Scrub B.

Site 55

Description

Stratum 1 *Eucalyptus falcata* trees to 15 m form a sparse stratum.

Stratum 2 Shrubs to 1.5 m form a sparse understorey. *Allocasuarina campestris* and *Melaleuca uncinata* are abundant. *Trymalium ledifolium*, *Phebalium tuberosum* and *Gastrolobium spinosum* are also characteristic understorey species.

Comments This associations covers the unburnt areas of the summit of the ironstone plateau growing on gravelly soils.

Photograph 5: *Eucalyptus falcata* [silver mallet] woodland at Site 55.



Wf2 Regenerating *Eucalyptus falcata* [silverallet] Woodland

Diagnosis Low Forest A over Heath A.

Site 56

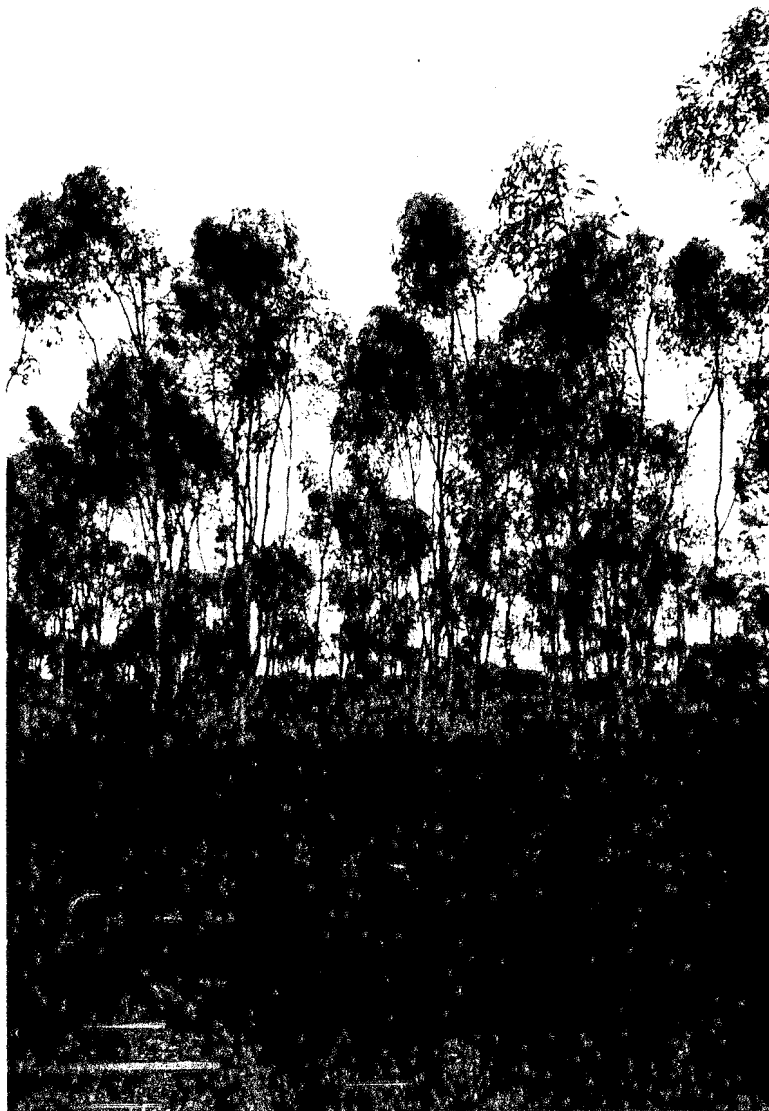
Description

Stratum 1 *Eucalyptus falcata* trees form a mid dense stratum to 6 m.

Stratum 2 Shrubs of *Allocasuarina campestris* and *Melaleuca uncinata* form a mid dense stratum to 2 m. Other less common species characteristic of the association include *Allocasuarina acutivalvis*, *Bossiaea eriocarpa*, *Dodonaea bursariifolia*, *Gastrolobium spinosum*, *Hakea scoparia*, *Trymalium ledifolium*, *Westringia dampieri* and *Scholtzia drummondii*.

Comments *Eucalyptus falcata* on the summit of the lateritic plateau are regenerating after wildfire burnt most of the area in 1966.

Photograph 6: Regenerating *Eucalyptus falcata* [silverallet] at Site 56.



W1 *Eucalyptus loxophleba* [york gum] Woodland.

Diagnosis Low Woodland A/Low forest A over variable understorey.

Sites 17, 27, 31, 32, 36, 63, 71, 73.

Description

Stratum 1 *Eucalyptus loxophleba* trees form a sparse to mid dense stratum, 5 - 15 m, with scattered *Eucalyptus salmonophloia* emergent in some areas.

Stratum 2 *Acacia acuminata* trees are usually present as scattered individuals in some places forming a very sparse to mid dense understorey 3 - 5 m in height.

Stratum 3 In low lying areas *Melaleuca* shrubs form a discontinuous stratum to 3 m, mid dense in patches. *Melaleuca* species include *Melaleuca uncinata*, *M. adnata*, *M. acuminata*, *M. seriata* and *M. laxiflora*. At site 32 *Borya sphaerocephala* herbs form a mid dense stratum and at site 27, shrubs and sedges form a mid dense stratum to 1 m in some areas. Commonly occurring species include *Allocasuarina campestris*, *Dianella revoluta*, *Dodonaea burseriifolia*, *Lomandra effusa*, *Loxocarya aspera* [ms], *Dampiera lavandulacea*, *Gnephosis tenuissima*, *Podolepis lessonii*, *Waitzia acuminata* and *Santalum acuminatum*.

Comments *Eucalyptus loxophleba* Woodland is found on loamy soils in low lying areas and along some drainage lines. In the wetter areas *Melaleuca* shrubs form an understorey. The woodlands tend to occur in areas mapped as Qc [colluvium and minor alluvium] on the Geological map of the area.

Photograph 7: *Eucalyptus loxophleba* [york gum] Woodland at Site 27.



Photograph 8: *Eucalyptus salmonophloia* Woodland at Site 33.



WS *Eucalyptus salmonophloia* [salmon gum] Woodland

Diagnosis Open Woodland/Woodland over variable understorey.

Sites 18, 22, 28, 33.

Description

Stratum 1 *Eucalyptus salmonophloia* trees, 12 - 25 m, form a very sparse to sparse stratum.

Stratum 2 *Eucalyptus loxophleba* trees to 5 m form a very sparse to sparse stratum at site 18. At site 19, on privately owned land, Shrub Mallee to 5 m form a sparse to mid dense understorey. *Eucalyptus* species include *Eucalyptus celestroides*, *E. erythronema* and *E. transcontinentalis*.

Lower Stratum A lower shrub stratum is variable and sometimes absent with shrubs occurring only as scattered individuals. In some areas a very sparse to mid dense understorey to 2 m is present. Characteristic species include *Acacia hemiteles*, *A. erinacea*, *Dodonaea bursariifolia*, *Eremophila drummondii*, *Enchylaena lanata*, *Loxocarya aspera* [ms], *Olearia* ? *revoluta*, *Rhagodia preissii*, *Templetonia sulcata*, *Grevillea huegelii*, *Daviesia benthamii*, *Lomandra effusa* and *Olearia muelleri*.

Comments *Eucalyptus salmonophloia* woodland is found on clay loam soils in the eastern section of the reserve. This vegetation association merges with *E. loxophleba* woodlands in places.

Ww *Eucalyptus wandoo* [white gum] Open Woodland over *Allocasuarina campestris* Heath.

Diagnosis Open Low Woodland A/Woodland over Heath [from Heath B - Dense Heath B - Heath A].

Sites 46, 58.

Description

Stratum 1 *Eucalyptus wandoo* trees to 18 m form a very sparse to sparse stratum, patchy in places.

Low Stratum *Allocasuarina campestris* shrubs, 1 - 2 m, form a mid dense to dense understorey. *Loxocarya* sedges form a sparse stratum in open areas at site 6 where *Boyra sphaerocephala* is also abundant.

Comments *Eucalyptus wandoo* Open Woodland is found amongst ironstone boulders below the lateritic plateau and in gravelly sands below a small lateritic ridge. This association is similar to areas of kwongan found in the southern section of the Mt Caroline vegetation system and in the Pikaring system which is mapped by Beard [1980] as "Thicket with scattered wandoo".

Photograph 9: *Eucalyptus wandoo* [white gum] with an understorey of *Allocasuarina campestris* at Site 46.



MALLEE

M Mallee

Diagnosis Shrub Mallee over variable understorey.

Site 19, 57.

Description

Stratum 1 Shrub Mallee usually to 5 m, occasionally to 8 m, form a mid dense stratum with scattered *Eucalyptus salmonophloia* emergent to 18 m at site 19. *Eucalyptus* species include *Eucalyptus erythronema*, *E. conglobata*, *E. pileata*, *E. transcontinentalis* and *E. subangusta* [ms].

Lower Stratum The understorey is patchy and in places shrubs are present only as scattered individuals. At site 19 a discontinuous shrub layer, 1 - 2 m, forms a sparse stratum. Commonly occurring species include *Acacia bidentata*, *Daviesia brachyphylla*, *Grevillea huegelii*, *Melaleuca* aff *undulata*, *M. adnata*, *M. uncinata* and *Westringia dampieri*.

Comments The Mallee association covers small areas in the Reserve and adjacent bushland. On the reserve the formation is found on clay soils on the slopes below the lateritic plateau and on land adjacent to the reserve on flatter terrain. The privately owned bushland is now fenced but grazing of the understorey probably occurred at some time in the past.

Photograph 10: Shrub Mallee at Site 19 including *Eucalyptus erythronema*, *E. pileata* and *E. subangusta*.



Mg Mallee over *Gastrolobium spinosum* Heath

Diagnosis Open Shrub Mallee over Heath B.

Site 61

Description

Stratum 1 Shrub Mallee to 6 m form a sparse stratum. *Eucalyptus leptophylla* and *E. albida* are usually present.

Stratum 2 Shrub 1 - 1.5 m, form a mid dense stratum with *Gastrolobium spinosum* abundant. Other species typical of this understorey include *Acacia leptospermoides*, *Baeckea crispiflora*, *Bossiaea eriocarpa*, *Calothamnus quadrifidus*, *Diplolaena microcephala*, *Dodonaea pinifolia*, *Guichenotia macrantha*, *Halgania preissiana*, *Hakea trifurcata*, *H. lissocarpa*, *Melaleuca pentagona*, *M. seriata*, *Podolepis canescens*, *Scholtzia drummondii*, *Thryptomene racemulosa*, *Verticordia acerosa* and *V. insignis*

Comments Mallee over *Gastrolobium spinosum* Heath is found on fairly flat terrain on sandy loam. Laterite is probably underlying the surface soils. this area has been burnt twice over the last 30 or so years, the last time in 1966.

Photograph 11: *Eucalyptus leptophylla* and *E. albida* with understorey of *Gastrolobium spinosum* at Site 61.



Mm Mallee over *Melaleuca uncinata* Heath

- Diagnosis Shrub Mallee/Open Shrub Mallee over Heath [Heath A/Dense Heath A]
A]
- Sites 54, 62
- Description
- Stratum 1 Shrub Mallee, 3 - 5 m, form a sparse to mid dense stratum. *Eucalyptus* species include *E. globata*, *E. flocktoniae* and *E. leptophylla*.
- Stratum 2 *Melaleuca uncinata* shrubs, 1.5 m - 2 m, form a dense to mid-dense understorey. Other *Melaleuca* species commonly occurring include *Melaleuca laxiflora*, *M. pentagona*, *M. platycalyx*, *M. seriata* and *M. spicigera*. *Santalum acuminatum* shrubs are sometimes present as scattered individuals emergent to 3 m.
- Comments Mallee over *Melaleuca uncinata* can be found on clay loam soils with gravel on slopes below the lateritic plateau extending onto low lying more level terrain.

Photograph 12: Shrub Mallee with an understorey of *Melaleuca uncinata* at Site 62. *Eucalyptus* species include *E. flocktoniae* and *E. globata*.



Mc Mallee over *Melaleuca* aff *undulata* Heath.

Diagnosis Open Shrub Mallee over Heath [Low Heath C/Dense Heath C/Dense Heath B].

Sites 20, 52.

Description

Stratum 1 Shrub Mallee form a sparse stratum, 4 - 6 m in height. *Eucalyptus* species include *E. conglobata*, *E. erythronema*, *E. transcontinentalis* and *E. subangusta* [ms].

Stratum 2 *Melaleuca* aff *undulata* shrubs from a dense to mid dense understorey, 0.5 to 1.5 m in height. Other species occur only occasionally as scattered individuals. These include *Dodonaea bursariifolia*, *Daviesia benthamii*, *Melaleuca adnata* and *Trymalium ledifolium*.

Comments On the reserve Mallee over *Melaleuca* aff *undulata* occurs immediately below the breakaway in small areas on gravelly soils on the scarp slopes. Areas of this association were also mapped on adjacent land interspersed with the Mallee [M] association on flatter terrain. *Melaleuca* aff *undulata* has been given a manuscript name by Barlow [*M. coronicarpa* sub sp *coronicarpa*] but this name has not been published.

Photograph 13: *Eucalyptus transcontinentalis* and *E. conglobata* with an understorey of *Melaleuca* aff *undulata* at Site 52.



Ma Open Mallee over *Allocasuarina campestris* Heath.

Diagnosis Very Open Shrub Mallee over Heath [Heath B to Dense Heath A].

Sites 50, 51, 53, 59, 69.

Description

Stratum 1 Shrub Mallee, 2 - 5 m, form a discontinuous very sparse stratum and are present in some areas only as scattered individuals. *Eucalyptus leptophylla* is usually present with *E. flocktoniae* also recorded.

Stratum 2 *Allocasuarina campestris* shrubs 1 - 2 m in height form a dense to mid dense understorey. Other commonly occurring species include *Allocasuarina acutivalvis*, *Melaleuca uncinata*, *Dryandra aff. cirsioides* and *Hakea scoparia*. Other characteristic species include *Grevillea hakeoides*, *Hakea multiligneata*, *Acacia ?fragilis*, *Gastrolobium spinosum*, *Melaleuca holosericea*, *Phebalium tuberosum* and *Santalum acuminatum*.

Comments Open Mallee over *Allocasuarina campestris* Heath occurs on gravelly soils adjacent to the *Eucalyptus falcata* woodlands on the lateritic plateau and peripheral areas. At site 50 scattered Mallee reach a height of 1.5 to 2 m only, this area was burnt in 1966.

Photograph 14 *Eucalyptus leptophylla* over *Allocasuarina campestris* Heath at Site 51.



KWONGAN

Kc/km *Allocasuarina campestris* Heath/Scrub Heath Mosaic.

Diagnosis Areas of Heath B and areas of Open Scrub [Open Low Scrub B to Open Scrub] over Low Heath C/Dwarf Scrub C over Dwarf Scrub D/Low Heath D.

Sites *Allocasuarina campestris* Heath - 2, 14, 44, 64.
Scrub Heath - 1, 3, 8, 10, 13, 26, 34, 38, 40, 43, 48, 60, 65, 66.

Description

Stratum 1 *Allocasuarina campestris* shrubs form a discontinuous and variable upper stratum and are present only as scattered individuals in some areas. The shrubs are usually 1 - 2 m in height and form a very sparse to mid dense stratum where they become dominant. In areas where this stratum is very sparse to sparse, *Allocasuarina campestris* is joined by other species forming part of the Scrub Heath association. These include *Actinostrobus arenarius* in the south eastern section of the reserve and also *Grevillea integrifolia*, *G. pritzelii*, *Hakea platysperma*, *Eremaea pauciflora* and *Leptospermum erubescens*.

Stratum 2 In the Scrub Heath areas shrubs to 1 m form a sparse to mid dense stratum in most areas except sites 26 and 34. Commonly occurring species include *Actinostrophus arenarius* [in the south east section only], *Petrophile seminuda* and *Petrophile ericifolia* which are prominent in some areas. Other characteristic species include *Allocasuarina microstachya*, *Conospermum stoechadis*, *Calothamnus quadrifidus*, *Eremaea pauciflora*, *Hakea strumosa*, *Hakea aff falcata*, *Isopogon scabriusculus*, *Melaleuca pentagona*, *Verticordia aff brownii*, *Verticordia chrysantha* and *Verticordia picta*.

Stratum 3

Shrubs, sedges and herbs to 0.5 m form a sparse to mid dense stratum in Scrub Heath areas. Commonly occurring species include *Borya sphaerocephala*, *Baeckea crispiflora*, *B. preissiana*, *Beaufortia bracteosa*, *Chamaexeros serra*, *Calytrix leschenaultii*, *Calothamnus brevifolius*, *Chorizema aciculare*, *Chamaescilla spiralis*, *Conostylis aculeata*, *Daviesia hamata*[ms], *D. cardiophylla*, *Dodonaea pinifolia*, *Dampiera oligophylla*, *D. lavandulacea*, *Dryandra aff cirsioides*, *D. speciosa*, *Grevillea uncinulata*, *Hakea circumalata*, *Hakea incrassata*, *Hibbertia hypericoides*, *H. uncinata*, *Jacksonia condensata*, *J. racemosa*, *Leucopogon cymbiformis*, *Lepidobolus chaetocephalus*, *Mesomelaena preissii*, *Mirbelia spinosa*, *Melaleuca leptospermoides*, *Opercularia vaginata*, *Petrophile brevifolia*, *Podolepis canescens*, *Platysace commutata*, *Stylidium dichotomum*, *S. repens*, *Waitzia acuminata* and *W. paniculata*.

Comments

Allocasuarina campestris Heath and Scrub Heath form an intricate mosaic covering extensive areas of the reserve. The associations are found on bleached sandy soils with gravel in places. *Allocasuarina campestris* may increase in density where laterite comes closer to the surface with Scrub-Heath occurring on deeper sands. In areas adjacent to the *Actinostrobus* Heath, *Actinostrobus arenarius* occurs frequently [sites 1, 3, 6, 8, 10, 38 and 48]. The delineation of these two associations was difficult because of the effect of past fires and clearing operations. At sites 26 and 34 stratum 2 was not present, here the soil had a greater clay content and is less well drained. These areas however were included in the Scrub-Heath association because of similar species composition, only *Verticordia acerosa* and *Gastrolobium obovatum* were not recorded elsewhere in the mosaic.

Photograph 15: Scrub Heath at Site 1. *Verticordia chrysantha* [yellow] and *Verticordia picta* [pink] are conspicuous in spring.



Photograph 16: *Allocasuarina campestris* Heath at Site 2.



Kh1 Open *Allocasuarina campestris* over *Melaleuca holosericea* Heath.

Diagnosis Variable *Allocasuarina campestris* [Open low Scrub B to Dwarf Scrub C] over Low Heath D.

Sites 4, 41, 42, 49.

Description

Stratum 1 *Allocasuarina campestris* shrubs to 1.5 m form a variable upper stratum usually very sparse to sparse. Scattered shrubs to 1.5m include *Banksia sphaerocarpa*, *Hakea* aff *falcata*, *Hakea strumosa* and *Leptospermum erubescens*.

Stratum 2 Shrubs usually to 0.5 m form a mid dense understorey. *Melaleuca holosericea* is abundant in this stratum. Other species typical of stratum 2 include *Acacia phaeocalyx*, *Beaufortia interstans*, *Dryandra speciosa*, *D. vestita*, *D. aff cirsioids*, *Daviesia rhombifolia*, *Leptospermum spinescens*, *Lysinema ciliatum*, *Leucopogon dielsiana*, *Petrophile circinata*, *Petrophile brevifolia*, *Verticordia brachypoda*, *V. chrysantha* and *V. picta*. The gazetted rare plant *Hemigenia visida* and *Allocasuarina fibrosa* also occur in this vegetation type.

Comments This association covers only small areas on higher ground on lateritic soils. Ironstone is exposed in some areas.

Photograph 18: Open *Allocasuarina campestris* over *Melaleuca holosericea* Heath at Site 4.



Kh2 *Allocasuarina campestris* Thicket/*Melaleuca holosericea* Heath.

- Diagnosis Thicket/Scrub over Low Heath D.
 Sites 67, 77.
 Description
- Stratum 1 *Allocasuarina campestris* shrubs to 2.5 m form a discontinuous stratum, mid dense to sparse in patches.
- Stratum 2 Shrubs to 0.5 m form a mid dense understorey, in some areas between patches of *Allocasuarina campestris* shrubs. *Melaleuca holosericea* is abundant with scattered shrubs of *Dryandra speciosa*, *Grevillea pitzelii*, *Hakea strumosa* and *Xanthorrhoea drummondii* to 1.5 m also occurring.
- Comments This vegetation type is closely related to the Open *Allocasuarina campestris* over *Melaleuca holosericea* Heath [Kh1] and has been mapped as Kh2. The species composition of the two map units differs with some of the species typical of the Kh1 areas absent from Kh2 including *Banksia sphaerocarpa* and *Dryandra vestita*. Similarities also exist with *Melaleuca holosericea* abundant in the understorey and the gazetted rare plant *Hemigenia visida* occurring in areas covered by both units. Although Kh2 areas occur on gravelly soils where laterite comes to the surface no exposed ironstone was seen in the area. The Kh2 areas have also remained unburnt for sometime, whereas areas of Kh1 were burnt in 1966.

Photograph 19: *Melaleuca holosericea* Heath with areas of *Allocasuarina campestris* Thicket in the background at Site 77.



Kt *Allocasuarina campestris* Thicket.

- Diagnosis** Thicket [Heath B to Dense Thicket].
- Sites** 11, 15, 16, 24, 30.
- Stratum 1** *Allocasuarina campestris* shrubs, from 1 to 2.5 m, form a dense to mid dense stratum. Other species are present only as scattered individuals and include *Melaleuca uncinata*, *Astroloma serratifolium*, *Borya sphaerocephala*, *Calytrix leschenaultii*, *Hakea incrassata*, *Stackhousia monogyne*, *Verticordia chysantha*, *V. picta* and *Waitzia acuminata*.
- Comments** *Allocasuarina campestris* Thicket occurs mainly in soils adjacent to Granite outcrops, interspersed with the woodland communities and on higher country on gravelly soils in the eastern section of the reserve. These areas have remained unburnt for sometime. The *Allocasuarina campestris* Heath component of the *Allocasuarina campestris* Heath/Scrub Heath Mosaic merges with this vegetation type in some areas usually where the *Allocasuarina campestris* Heath in the Mosaic has not been burnt for many years.

Ka1 *Actinostrobus arenarius* Heath.

Diagnosis Heath [Heath B-Thicket] over variable understorey.

Sites 5, 7a, 9, 37.

Description

Stratum 1

This stratum is very variable with shrubs usually to 1.5 m forming a mid dense stratum. *Actinostrobus arenarius* is dominant in some areas but may become a scattered individual amongst other plant species. *Actinostrobus* shrubs to 5 m occur in mid dense patches in places. Characteristic species include *Leptospermum erubescens* [prominent in some areas] and *Eremaea pauciflora*. Scattered *Grevillea eriostachya* shrubs to 3 m may also be present.

Stratum 2

In some areas shrubs and sedges to 1 m form a sparse stratum including *Mesomelaena preissii*, *Melaleuca leptospermoides*, *Petrophile ericifolia* and *Lepidobolus chaetocephalus*.

Comments

Actinostrobus arenarius Heath is found in deep yellow sand on higher country in the eastern section of the reserve. This association is very variable partly due to the effect of past fires and also past clearing operations.

Photograph 20: *Actinostrobus arenarius* at Site 5. This area was not burnt in the 1966 fire.



Photograph 21: *Actinostrobus arenarius* Heath at Site 37. *Eremaea pauciflora* and *Leptospermum erubescens* can be seen in the foreground.



Photograph 22: *Xylomelum angustifolium* [woody pear] with *Actinostrobus arenarius* at Site 7b.



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Ka2 *Xylomelum angustifolium*/*Actinostrobus arenarius* Heath.

Diagnosis Open Low Scrub A over Low Scrub B over Open Low Sedges.

Site 7.

Description

Stratum 1 Shrubs to 2 m form a very open stratum with scattered trees of *Xylomelum angustifolium* emergent to 5 m. *Xylomelum* may form a very sparse stratum in some areas. Stratum 1 species include *Leptospermum roei*, *Acacia merinthophora*, *Actinostrobus arenarius*, *Grevillea eriostachya*, *Calothamnus quadrifidus*, *Hakea platysperma* and *Allocasuarina campestris*

Stratum 2 Shrubs and sedges, 1 - 1.5 m, form a sparse stratum. Species commonly occurring include *Grevillea integrifolia*, *Eremaea pauciflora*, *Actinostrobus arenarius*, *Calothamnus quadrifidus*, *Ecdeiocolea monostachya* and *Petrophile ericifolia*.

Stratum 3 Shrubs and sedges to 0.5 m form a sparse understorey. Frequently occurring species include *Verticordia chrysantha*, *V. picta*, *V. aff brownii*, *Lepidobolus chaetocephalus*, *Melaleuca leptospermoides*, *Calytrix leschenaultii* and *Conospermum stoechadis*.

Comments This vegetation association is closely related to the *Actinostrobus arenarius* Heath association and also occurs on deep yellow sand on higher ground in the eastern section of the reserve, only covering a very small area. Ka1 and Ka2 have a similar species composition but Ka2 is mapped separately due to the presence of *Xylomelum* and differences in the structure of the vegetation within the two map units.

SEDGELANDS

S *Mesomelaena preissii* Low Sedges.

- Diagnosis** Low Sedges.
- Sites** 45, 47, 68, 76.
- Stratum 1** Shrubs and sedges to 0.5 m form a mid dense stratum with *Mesomelaena preissii* sedges dominant. *Melaleuca leptospermoides* shrubs are prominent in some areas. Other characteristic species include *Astroloma serratifolium*, *Boronia coerulescens*, *Boronia sphaerocephala*, *Baeckea crispiflora*, *Comesperma scoparia*, *Dampiera oligophylla*, *D. lavandulacea*, *Dodonaea pinifolia*, *Hakea incrassata*, *Hibbertia uncinata*, *Jacksonia condensata*, *Lepidobolus chaetocephalus* and *Opecularia vaginata*. Shrubs and sedges to 1 m are usually present as scattered individuals but may form a very sparse to sparse stratum in some areas, these include *Ecdelicolea monostachya*, *Verticordia* aff *brownii*, *V. chrysantha*, *V. brachypoda*, *Conospermum stoechadis*, *Eremaea pauciflora*, *Grevillea pritzelii* and *Calothamnus quadrifidus*. Scattered shrubs from 1.5 to 3 m also occur including *Leptospermum erubescens*, *Santalum spicatum*, *Acacia merinthophora* and *Grevillea eriostachya*. Scattered *Allocasuarina huegeliana* trees are also present in some areas.
- Comments** *Mesomelaena preissii* Low Sedges occur on yellow sand over laterite in low lying areas. At the gravel pit in the south-western section of the reserve the gravel is at a depth of approximately 1.0 m. Beard [1980] refers to large patches of Heath with *Cyperaceae* and *Restionaceae* dominant. Patches of *Allocasuarina campestris* thicket occur in places, usually peripheral to this association but sometimes interspersed.

Photograph 23: *Mesomelaena preissii* sedges at Site 76 with scattered shrubs of *Allocasuarina campestris*, *Santalum spicatum*, *Acacia merinthophora* and *Grevillea pitzelii* in the background.



LITHIC COMPLEX

G Granite Rock Surface, Herbs

Sites 12, 72, 74.

Description

Rock surface

Shallow soils *Borya sphaerocephala* Herbs to 10 cm form a mat on flat areas of the rock surface.

Shallow soil

and crevices Scattered shrubs, herbs, sedges and ferns are present including *Baeckea crispiflora*, *Calytrix leschenaultii*, *Dianella revoluta*, *Dodonaea viscosa*, *Glischrocaryon aureum*, *Lepidosperma ?pruinatum*, *L. costale*, *L. ?viscidum*, *Podolepis canescens*, *Stackhousia monogyna*, *Cheilanthes austrotenuifolia*, *Brunonia australis*, *Stypandra glauca*, *Verticordia chrysantha*, *V. picta* and *Waitzia acuminata*.

Deeper soil-

border of the

rock outcrop *Allocasuarina campestris* shrubs to 2.5 m form a mid dense association with scattered *Santalum acuminatum*, *Leptospermum roei* and *Acacia lasiocalyx* at sites 12 and 72.

Allocasuarina huegeliana trees form a mid dense stratum to 8 m at sites 72 and 74. *Acacia acuminata* and *A. lasiocalyx* may be abundant in some areas.

Comments

Areas of outcropping granite have a characteristic flora including mosses and liverworts. Large outcrops are found mainly in the south west section of the reserve.

Photograph 24: Granite outcrop at Site 12 with *Allocastraria campestris* growing in deeper soils at the border of the exposed rock.



Photograph 25: Granite outcrop at Site 74. *Allocastraria huegeliana* [sheoak] is found at the base of the rock with *Acacia acuminata* [jam] and *Acacia lasiocalyx* trees.



4.0 FLORA SURVEY

4.1 Flora of the Charles Gardner Reserve

A total of 443 plant species are recorded in Appendix 1 as occurring in the area of the Charles Gardner Reserve, including two species of fern, one gymnosperm and 440 angiosperms. Twenty one of the species recorded are exotic or introduced. Manuscript names [ms] have been included to help differentiate between undescribed species within a particular genus, however these names should not be used officially until after the date of their publication. Identifications with the Generic name followed by "sp" or ? are uncertain due to a lack of flowering or fruiting material or to confusion in the current taxonomy of the group concerned. The nomenclature follows that of Green [1985] and supplement 7 [unpublished] unless otherwise specified.

A species list compiled by Royce and Aplin from collecting trips to the reserve between 1967 and 1972 can be found in the WA Herbarium archives. Ninety five of the species on this list were not found in the present survey. Most of these plant species were ephemeral and herbaceous species and those which are inconspicuous or difficult to identify when not in flower. Members of the Orchidaceae, Poaceae, Anthericaceae, Droseraceae, Goodeniaceae and Asteraceae were mainly involved. The identification of some of these species is in doubt due to changes in the taxonomy of many groups since 1972. Unfortunately time restrictions did not allow for the checking of voucher specimens collected by Royce and Aplin and lodged in the collections at the WA Herbarium.

Appendix 1 does not represent a complete list of the flora present in the reserve and further collecting trips are still needed for a fully comprehensive record of the flora of the Charles Gardner Reserve

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

	Number of Species	Number of Genera	Number of Exotic species.
Myrtaceae [<i>Eucalyptus</i> , <i>Melaleuca</i> etc]	59	12	
Proteaceae [<i>Dryandra</i> , <i>Banksia</i> etc]	49	11	
Papilionaceae [pea flowers]	35	13	1
Asteraceae [daisies]	29	20	5
Mimosaceae [wattles]	28	1	
Goodeniaceae [<i>Dampiera</i> , <i>Lechenaultia</i> etc]	21	7	
Poaceae [grasses]	20	14	7
Cyperaceae [sedges]	15	6	
Anthericaceae [lilies]	14	8	

The families Myrtaceae, Proteaceae, Papilionaceae, Asteraceae and Mimosaceae were the most strongly represented in the flora of Charles Gardner Reserve. Of the monocotyledons, members of the families Poaceae, Cyperaceae and Anthericaceae are the most common.

Studies on family composition of kwongan reported by Brown [1989] state that Proteaceae, Myrtaceae and Papilionaceae are the most important families contributing over 40% of the species. The high number of species of Proteaceae and Myrtaceae is characteristic of laterite and sand heath vegetation.

Gazetted Rare Plants [continued]

Hemigenia viscida is known to occur on the Charles Gardner Reserve and also in the Wongan Hills area. During the present survey 4 populations were found on the reserve at sites 4, 42, 67 and 77. The plants were growing on gravelly soils in the Open *Allocasuarina campestris* over *Melaleuca holosericea* Heath and *Allocasuarina campestris* Heath/*Melaleuca holosericea* Heath formations. Another population was also discovered at site 21 on privately owned bushland adjacent to the reserve in a heath area containing *Melaleuca holosericea*. The plants were growing on gravelly soils over ironstone. Due to time limitations it was not possible to survey the populations in detail, however during the course of the fieldwork 6 plants were found at site 4, 7 plants at site 42, 3 plants at site 67 and 20 plants at site 77. Only 2 individuals were seen at site 21. In 1983 P. Roberts recorded 40 plants at site 42 and S. Van Leeuwen recorded 15 plants in the same population in 1988.

Photograph 26: *Hemigenia viscida* at Site 77 [December 1989].



Stylidium scabridum has been previously known from two populations in the Merredin District.

1. 3.3 kms South of the Calingiri road on Old Telegraph South Road, on Reserve 6779 [conservation of flora and fauna] and road verge;
2. 3.5 kms west of Tammin on the Great Eastern Highway on Shire Gravel Reserve 12425.

This species has not been found at either locality in recent years. The only known remaining population is situated west of Wyerning and consists of 14 plants. *Stylidium scabridum* was not found on the Charles Gardner Reserve during the present survey and another survey in 1987 was also unsuccessful in locating the species [D. Coates pers comm].

Geographically Restricted, Vulnerable and/or Poorly Known Plant Species.

Acacia campylophylla is a "priority 2" species and has been classified by Briggs and Leigh [1988] as "2KC-". This species has a restricted distribution with a geographic range from Wyalkatchem to York. *Acacia campylophylla* was recorded at sites 65, 67 and 77 growing in sandy or gravelly soils in the *Allocasuarina campestris* Heath/Scrub Heath Mosaic and *Allocasuarina campestris*/*Melaleuca holosericea* Heath associations. The species was found only occasionally in these areas.

Calothamnus brevifolius is presently known from a few localities in the W.A. wheatbelt ranging from Marchagee to Tammin. Hawkeswood [1984] reports that this species appears to have a limited distribution and extensive clearing has taken place in areas from which it has been previously collected. *Calothamnus brevifolius* is a "priority 3" species classified by Briggs and Leigh [1988] as "3k". The species was recorded at sites 1, 3, 13, 26, 38, 65 and 66 in the *Allocasuarina campestris* Heath/Scrub Heath Mosaic, at sites 9 and 37 in the *Acrotrichum arenarius* Heath and at site 68 in the *Mesomelaena preissii* Low Sedge association. *Calothamnus brevifolius* only occurs occasionally in these areas but may be more numerous locally.

Conospermum eatoniae has a restricted distribution with a geographic range from Goomalling to Quairading. Briggs and Leigh [1988] classify this species as "2k". *Conospermum eatoniae* was not found on the Charles Gardner Reserve during the present survey however it has been previously recorded for the reserve by Royce and Aplin [W.A. Herbarium archives].

Cryptandra leucopogon has been classified by Briggs and Leigh [1988] as "2kc-". Specimens lodged in the W.A. Herbarium show a geographic distribution from Wickiepin to Ravensthorpe with one specimen collected west of Zanthus. This species is poorly known and there appears to be some confusion within the current taxonomy of this group. During the present survey *Cryptandra leucopogon* was recorded at sites 1 and 2 [rarely seen] growing in sandy soils in the *Allocasuarina caespitris* Heath/Scrub Heath Mosaic.

Dampiera carinata has been classified by Briggs and Leigh [1988] as "3kc-". The geographic range of this species taken from herbarium specimens is Eneabba to east of Esperance. *Dampiera carinata* was not located during the present survey but has been recorded for the Charles Gardner Reserve by Royce and Aplin. A voucher specimen [Royce 9423] is present in the collections at the W.A. Herbarium.

Dampiera glabrescens is a "priority one" species classified by Briggs and Leigh [1988] as "2k". This species is known to occur in the Ballard - Wongan Hills area. *Dampiera glabrescens* was not found during the present survey but this species has been recorded for the Charles Gardner Reserve by Royce and Aplin. However a voucher specimen has not been located in the W.A. Herbarium collections and it is likely that the *Dampiera* collected by Royce was not *D. glabrescens* but a related species. Further investigation is required to confirm whether this species is growing on the Reserve.

Dryandra horrida has been classified by Briggs and Leigh [1988] as "2RC-". Griffin [1985] classified this species as "Vulnerable - not presently endangered but at risk over a longer period through continued depletion, or which largely occur on sites likely to experience changes in land use which would threaten the survival of the species in the wild". *Dryandra horrida* was only rarely found on the reserve during the present survey but was recorded in a range of vegetation associations including *Allocasuarina campestris* Heath/Scrub Heath Mosaic [site 43], *Actinostrobus arenarius* Heath [site 9], *Mesomelaena preissii* Low Sedges [sites 45, 76] and Open *Allocasuarina campestris* over *Melaleuca holosericea* Heath [sites 41, 42, 49]. The plants were found growing in gravelly or yellow sand.

Dryandra speciosa has also been classified as "vulnerable" by Griffin [1985]. According to the Department of Conservation and Land Management District records *Dryandra speciosa* from Tammin is endangered and probably differs from the *Dryandra speciosa* in the northern sandplains. This species was found at a number of sites and vegetation associations during the present survey. These include *Allocasuarina campestris* Heath/Scrub Heath mosaic [sites 1, 6, 10, 40, 43, 48], Open *Allocasuarina campestris* over *Melaleuca holosericea* Heath [sites 4, 41, 42], *Allocasuarina campestris*/*Melaleuca holosericea* Heath [sites 67, 77] and *Actinostrobus arenarius* Heath [site 9].

Lepidosperma ?leptophyllum has been classified by Briggs and Leigh [1988] as "3kCa". The geographical distribution of this species taken from herbarium specimens is Geraldton to Cape Arid. The genus *Lepidosperma* ?*leptophyllum* is poorly known. During the present survey this species was found in the *Eucalyptus loxophleba* woodland [sites 17, 63] and the *Eucalyptus salicophloia* woodland [site 18].

Mesomelaena preissii has been reported by Burgman [1985] as Vulnerable. According to Burgman "this species is widespread in the wheatbelt, from Jurien to the Esperance area. Most of the known locations are within existing agricultural land and it should be considered vulnerable". *Mesomelaena preissii* is abundant on the Charles Gardner Reserve and is dominant in some areas.

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Platysace commutata has been classified by Briggs and Leigh [1988] as "2k". Specimens lodged at the W.A. Herbarium are at present on loan, however Blackall and Greive [1980] report the geographic distribution of this species as Tammin to the Esperance area. *Platysace commutata* was recorded in a number of vegetation associations during the present survey including *Allocasuarina campestris* Heath/Scrub Heath mosaic, Open *Allocasuarina campestris* over *Melaleuca holosericea* heath, *Allocasuarina huegeliana* Woodland, Open Mallee over *Allocasuarina campestris* Heath/Scrub Heath mosaic, Open *Allocasuarina campestris* over *Melaleuca holosericea* heath, *Allocasuarina huegeliana* Woodland, Open Mallee over *Allocasuarina campestris* Heath, *Actinostrobus arenarius* Heath and *Mesomelaena preissii* Low Sedges.

Stirlingia simplex has been recorded for the Charles Gardner Reserve by Royce, a voucher specimen [Royce 8484] is present in the W.A. Herbarium collections. This species has been classified by Briggs and Leigh [1988] as "3k" and according to herbarium specimens it has a geographical range north to Jurien Bay, South to Busselton and east to Hyden. *Stirlingia simplex* was not recorded during the present survey.

Stylidium tenuicarpum is a "priority 5" species and was previously known only from the Tutanning Reserve near Pingelly. This species has also recently been found near Wickiepin [D. Coates pers. comm]. During the present survey *Stylidium tenuicarpum* was found at site 46 in an open area surrounded by *Allocasuarina campestris* Heath in the *Eucalyptus wandoo* over *Allocasuarina campestris* Heath vegetation association.

Taxonomic problems

Gnephosis tenuissima is at present classified as a priority 4 species "taxa presumed extinct". This classification is now misleading as plant species previously named *Chrysocoryne pusilla* have been reidentified as *Gnephosis tenuissima*. This name change is reported in Supplement 7 [unpublished] to Green [1985].

Herbarium specimens lodged at the W.A. Herbarium indicate some confusion in the collections of *Eremophila glabra* var *viridiflora* and *Eremophila subfloccosa*. A rare *Eremophila* with green flowers is also related to these two species. To clarify the situation in the Charles Gardner Reserve flowering material of these *Eremophila* species needs to be collected and sent to B. Chinnock at the Adelaide Botanic Gardens for confirmation.

Hakea tamminensis previously gazetted as rare is now recognised as *Hakea strumosa*. *H. tamminensis* is an invalid species name and is considered to be synonymous with *H. gibbous* which is confined to the Sydney area. *Hakea strumosa* is a common species throughout the wheatbelt.

5.0 MANAGEMENT CONSIDERATIONS

The kwongan vegetation associations on the Charles Gardner Reserve are rich in plant species. The overall floristic diversity of the reserve can be estimated at 75 species per km² making this reserve of outstanding value. The vegetation is also diverse with 17 associations covering the reserve area. However, Woodland and Mallee associations cover only small areas and are therefore only poorly represented within the 580ha.

The acquisition of the bushland adjoining the north east section of the reserve would be a valuable addition to the reserve area. This bushland includes *Eucalyptus salmonophloia* Woodland, *Acacia acuminata* Woodland, Mallee and Mallee over *Melaleuca* aff *undulata*. *Herigenia viscidula* a gazetted rare plant also occurs in a small area of kwongan [Heath B] at site 21, growing on gravelly soils over ironstone where *Dryandra* aff *cursioides* is prominent. *Melaleuca holosericea* also occurs in this heath and the association is probably related to the *Melaleuca holosericea* Heath areas on the reserve. A species list for site 21 is included in Appendix 3.

6.0 ACKNOWLEDGEMENTS

Thanks are given to the following people:

Mr B. Maslin for the identification of *Acacia* species, Dr A. Burbidge for species of *Stylidium* and Ms A. Kelly for species of *Eucalyptus*.

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

Cheryl Tonts for her wordprocessing.

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APPENDIX 1 - PLANT SPECIES LIST FOR THE
CHARLES GARDNER RESERVE [A20041]

- * Introduced species.
NS Not recorded during the present survey.
1243 Voucher number.
ms Manuscript name

PTERIDOPHYTA [ferns]

OPHTIOGLOSSACEAE

Ophioglossum lusitanicum NS

ADIANTACEAE

Cheilanthes austrotenuifolia 979

GYMNOSPERMAE

CUPRESSACEAE

Actinostrobus arenarius 1725

MONOCOTYLEDONAE

POACEAE

- * Aira caryophyllea
Amphipogon caricinus 2069
A. turbinatus NS
Aristida contorta NS
* Avena sativa
* Briza maxima
* Bromus ? diandrus 1966
* B. rubens 1890
Danthonia caespitosa NS
Eriachne ovata 2071
Lolium ? rigidum
Monachather paradoxo NS
Neurachne alopecuroides
* Pentaschistis aircides
Plectrachne dielsii 1880
Stipa compressa NC
S. elegantissima 1849
S. hemipogon NS
S. scabra NS
S. trichophylla NS
* Vulpia myuros

CYPERACEAE

Mesomelaena preissii	2013, 1724
Caustis dioica	
C. pentandra	NS
Isolepis congrua	NS
Lepidosperma ? angustatum	1832
L. ? costale	1967, 2070
L. ? leptophyllum	1909, 1957
L. ? pruinsum	1876, 1731
L. pubisquameum	1866
L. ? tenue	2040
L. viscidum	2012, 1893, ?1877
Schoenus globifera	2064, 2060
S. nanus	NS
S. trachycarpus	NS
Genus nov sp nov [aff Schoenus]	2015

RESTIONACEAE

Ecdeiocollea monostachya	1824
Lepidobolus chaetocephalus	1855, 1736
Loxocarya aspera [ms Briggs & Johnson]	1878, 2005
L. myrioclada [ms Briggs & Johnson]	1904
L. parthenica	1813
Lyginia barbata	1858, 1992
Restio megalotheca	NS

DASYPOGONACEAE

Acanthocarpus canaliculatus	1905
Calectasia cyanea	1710
Chamaexeros fimbriata	NS
C. serra	1847
Lomandra effusa	1953

XANTHORRHOEACEAE

Xanthorrhoea drummondii	
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PHORMIACEAE

Dianella revoluta

Stypandra glauca

1730

ANTHERICACEAE

Agrostocrinum scabrum

NS

Arthropodium ?preissii

NS

Borya sphaerocephala

1719, 1872, ?1766

Caesia micrantha

NS

Chamaescilla corymbosa

C. spiralis

1767

Laxmannia grandiflora

1794, 1769

L. squarrosa

1879

Thysanotus aspera

NS [Royce 9375
confirm Brittan]

T. dichotomus

2050

T. patersonii

1838, 1921

T. thyrsoides

NS

T. sparteus

2084

T. sp.

2054

Tricoryne elatior

NS

ASPHODELACEAE

* Asphodulus fistulosus

HAEMODORACEAE

Anigozanthos humilis

Conostylis aculeata ssp aculeata

2067

C. petrophiloides

1863, 1735

C. prolifera

1981

C. setigera

1734

Haemodorum laxus

1865

IRIDACEAE

Orthrosanthus laxus var graminea

2011

Patersonia juncea

2068

P. sp. nov

1947, 2014

ORCHIDACEAE

Caladenia deformis	NS
C. filamentosa	NS
C. flava	NS
Diuris longifolia	NS
Elythranthera brunonis	NS
Lyperanthus nigricans	NS
Pterostylis vittata	NS
Thelymitra spiralis	NS

DICOTYLEDONAECASUARINACEAE

Allocasuarina campestris	
A. fibrosa	2001
A. huegeliana	
A. humilis	1817
A. microstachya	1792, 1763

PROTEACEAE

Banksia sphaerocarpa	1806
Conospermum ephedroides	NS
C. eatoniae	NS
C. incurvum	NS
C. stoechadis	1722
Dryandra aff cirsioides	1937, 1780
D. fraseri	1989
D. horrida	1823
D. speciosa	1791
D. vestita	1802
Grevillea apiculoba	NS
G. eriostachya	
G. hakeoides	2025
G. huegelii	1928
G. insignis	2036
G. integrifolia ssp	
shuttleworthiana	1759
G. paniculata	1970
G. petrophiloides	
G. pilulifera var acerosa	NS
G. pritzelii	1726
G. teretifolia	2005b
G. tridentifera	1819
G. uncinulata	1720

Hakea circumalata	1848, 1795
H. corymbosa	1859
H. aff falcata	1790
H. gilbertii	1944, 2019
H. incrassata	1757
H. lissocarpha	1756
H. multilineata	2027, 2020
H. platysperma	
H. preissii	1962
H. scoparia	1892
H. strumosa	1786
H. trifurcata	
Isopogon divergens	1886
I. scabriusculus	1711
Persoonia coriacea	2083
P. striata	1723
P. trinervis	2021
Petrophile brevifolia	1798
P. circinata	1804
P. divaricata	NS
P. ericifolia	1799
P. ericifolia ssp scabriuscula	1715
P. media	NS
P. seminuda	1778
Stirlingia simplex	NS
Synapheae aff petiolaris	2059, 1852, 1995
S. aff polymorpha	2065
Xylomelum angustifolium	

SANTALACEAE

Leptomeria spinosa	2003, 1815
Santalum acuminatum	
S. murrayanum	NS
S. spicatum	1885

OLACACEAE

Olax benthamiana	2022
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POLYGONACEAE

Muehlenbeckia adpressa	1887
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CHENOPODIACEAE

Atriplex paludosa ssp baudinii	
Enchylaena lanata	1919
Rhagodia drummondii	1975
R. preissii	1010

AMARANTHACEAE

Ptilotus declinatus	NS
P. drummondii	1956
P. manglesii	NS
P. polystachyus	
P. spathulatus	1913

GYROSTEMONACEAE

Gyrostemon ramulosus	1874
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AIZOACEAE

Carpobrotus ?modestus	1843
* Mesembryanthemum nodiflorum	1961

MOLLUGINACEAE

Macarthuria australis	NS
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PORTULACACEAE

Calandrinia corrigioloides	NS
C. polyandra	NS

LAURACEAE

Cassytha flava	1801, 1941
C. glabella	1883

BRASSICACEAE

* Brassica tournefortii

DROSERACEAE

Drosera andersoniana	NS
D. bulbosa	NS
D. macrantha	
D. menziesii	1771
D. pycnoblata	1770, 1884
D. stolonifera	
D. subhirtella	1871
D. zonaria	NS

CRASSULACEAE

Crassula colorata

PITTOSPORACEAE

Billardiera bicolor	2082
Pittosporum phylliraeoides	1959
Sollya heterophylla	2009

SURIANACEAE

Stylobasium australe	2055
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PAPILIONACEAE

Bossiaea	erlocarpa	1939
B.	rufa var foliosa	NS
Chorizema	aciculare	1753
Daviesia	benthamii	1923
D.	brachyphylla ssp	
	brachyphylla [ms Crisp] 1920	
D.	cardiophylla	1761
D.	collettioides	NS
D.	hamata [ms Crisp]	1741
D.	?incrassata	2039
D.	incrassata ssp reversifolia	NS
D.	intricata ssp intricata [ms Crisp]	1862, 2000
D.	nudiflora	1796
D.	rhombifolia	1997, 1742
D.	uncinata [ms Crisp]	2004
Erichsenia	uncinata	NS
Gastrolobium	calycinum	2058
G.	hookeri	1778
G.	obovatum	1988, 2008
G.	parvifolium	1775, 1987
G.	spinosum	
G.	obcordatum var pachyphyllum	1789
G.	tomentosum	1854
Isotropis	cuneifolia	
I.	drummondii	2066
I.	junceae	1960b
Jacksonia	condensata	1754
J.	nematoclada	NS
J.	racenosa	1740
J.	restioides	NS
Mirbelia	spinosae	1828, 1749
Oxylobium	parviflorum	1894
Pultenaea	capitata	NS
Templetonia	aculeata	1747
T.	sulcata	1925

* Trifolium sp

GERANIACEAE* *Erodium botrys**Pelargonium havlasae*

1918

OXALIDACEAE* *Oxalis corniculata*RUTACEAE*Boronia coerulescens*

1764

Diplolaena microcephala

2045, 2046

Phebalium tuberculatum

1900

POLYGALACEAE*Comesperma scoparium*

1784

C. volubile

1833

EUPHORBIACEAE*Beyeria ?brevifolia*

1861

Monotaxis ?lurida

2035

Poranthera microphylla

NS

Stachystemon brachyphyllus

NS

CELASTRACEAE*Psammomoya choretroides*

1777

STACKHOUSIACEAE*Stackhousia monogyne*

1831, 1869

Tripterococcus brunonis

NS

SAPINDACEAE*Dodonaea bursariifolia*

1948

D. divaricata

2007

D. pinifolia

1982, 1721 /

D. viscosa

1898

RHAMNACEAE

Cryptandra glabriflora	1779
C. leucophracta	
C. leucopogon	1793
C. nutans	1917b
C. parvifolia	
C. pungens	1809, 1826, 1746
Spyridium ?complicatum	1850
Trymalium ledifolium	1963

MALVACEAE

Alyogyne hakeifolia	NS
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STERGULIACEAE

Guichenotia angustifolia	2010
G. macrantha	2044
G. micrantha	1940
Keraudrenia integrifolia	1842
Lasiopetalum molle	2034

DILLENIACEAE

Hibbertia acerosa	1816, 1857
H. exasperata	
H. hypericoides	1744, 1814
H. uncinata	1776, 1902

VIOLACEAE

Hybanthus floribundus	NS
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THYMELAEACEAE

Pimelia ? angustifolia	NS
P. argentea	1965
P. brevifolia subsp modesta	1797
P. imbricata var piligera	1745

MYRTACEAE

Baeckea crispiflora	1737, 1999
B. preissiana	1829, 2061
B. sp	2037
Beaufortia bracteosa	1712
B. interstans	2017
Calothamnus brevifolius	1732
C. quadrifidus	1844, 2023
Calytrix angulata	NS
C. leschenaultii	1752, 1891, 21312
C. sapphirina	1748
C. strigosa	1750, 1835
C. violacea	1991, 1751
Eremaea pauciflora	1758
Eucalyptus albida	
E. celastroides	1952
E. conglobata	2053
E. erythronema	1931 [on adjacent bushland only]
E. falcata	
E. flocktoniae	2029
E. leptophylla [ms Brooker]	2028
E. loxophleba	
E. pileata	1930
E. salmonophloia	
E. subangusta [ms Brooker]	1933
E. transcontinentalis	1929
E. wandoo	

<i>Leptospermum erubescens</i>	1822, 1762
L. <i>roei</i>	1821
L. <i>spinescens</i>	
<i>Melaleuca acuminata</i>	1916
M. <i>adnata</i>	1906
M. <i>?cuneata</i>	2081
M. <i>holosericea</i>	1801
M. <i>lateriflora</i>	
M. <i>laxiflora</i>	1917
M. <i>leptospermoides</i>	1739
M. <i>pentagona</i>	1972, 1743, 1971
M. <i>platycalyx</i>	2031
M. <i>radula</i>	1888
M. <i>scabra</i>	NS
M. <i>seriata</i>	2041, 1853, 2041, 1818
M. <i>spicigera</i>	1934
M. <i>trichophylla</i>	NS
M. <i>uncinata</i>	
M. <i>aff undulata</i> [<i>coronicarpa</i> <i>ssp coronicarpa</i> , [ms Barlow]	1907
<i>Pileanthus peduncularis</i>	NS
<i>Sholtzia drummondii</i>	2033
<i>Thryptomene racemulosa</i>	2047
<i>Verticordia acerosa ssp preissii</i>	1968
V. <i>brachypoda</i>	1807, 1969
V. <i>aff brownii</i> [<i>V. eriocephala</i> , ms George]	1807, 1969
V. <i>chrysantha</i>	1713
V. <i>aff drummondii</i> [<i>V. tumida</i> <i>subsp tumida</i> , ms George]	2079
V. <i>densiflora</i> var <i>densiflora</i>	1714, 2080
V. <i>insignis</i>	2042
V. <i>pennigera</i>	1716
V. <i>piota</i>	
V. <i>serrata</i> var <i>ciliata</i>	2002

HALORAGACEAE

Glischrocaryon aureum	1936
G. flavescens	

APIACEAE

Platysace commutata	1738
P. juncea	NS
Trachymene cyanopetala	1783
T. pilosa	
T. ornata	

EPACRIDACEAE

Andersonia brevifolia	NS
A. lehmanniana	2065a
Astroloma serratifolium	1728
Leucopogon cymbiformis	1727
L. dielsianus	1781
L. sp 1	2052, 2024
L. sp 2	1729
Lysinema ciliatum	

PRIMULACEAE

* Anagallis arvensis

LOGANIACEAE

Logania flaviflora	2063
L. tortuosa	1807

BORAGINACEAE

Halgania cyanea	NS
H. integerrima	1996
H. preissiana	2043

CHLOANTHACEAE

Cyanostegia angustifolia	1938
Mallophora globiflora	2048
Pityrodia terminalis	1950

LAMIACEAE

Hemiandra coccinea	NS
H. incana	NS
Hemigenia viscida	1803, 1943
Microcorys barbata	NS
Westringia dampieri	1935

SOLANACEAE

Solanum oldfieldii	NS
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MYOPORACEAE

Eremophila drummondii	1922
E. ?glabra var viridiflora	1976
E. ?subfloccosa	2051

RUBIACEAE

Opercularia vaginata	1718
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CAMPANULACEAE

* Wahlenbergia capensis	1882
W. gracilis	NS

LOBELIACEAE

Lobelia heterophylla	NS
L. rarifolia	NS
L. winfridae	2072

GOODENIACEAE

Anthotium rubriflorum	
Brunonia australis	2073
Cooperhooikia strophiolata	1958
Dampiera carinata	NS
D. eriocephala	NS
D. glabrescens	NS
D. lavandulacea	1765
D. lindleyi	1846
D. oligophylla ssp juncea	1998, 1755
D. spicigera	1993, 1825, 1864
D. triloba	NS
D. wellsiana	1951
Goodenia berardiana	NS
G. brevisepala [ms Carolin]	NS
G. helmsii [ms Carolin]	NS
G. pinifolia	1946
G. watsonii	NS
Lechenaultia tubiflora	1860
Scaevola arenaria	1980
S. paludosa	NS
S. spinescens	NS

STYLIDIACEAE

Levenhookia leptantha	1908
Stylidium ?breviscapum	1949
S. caricifolium	1942
S. dichotomum	1834, 1782
S. leptophyllum	1983, 1837
S. piliferum	1870
S. repens	1787
S. sacculatum	1841
S. squamellosum	2074
S. tenuicarpum	2075

ASTERACEAE

Actinobole uliginosum	NS
* Arctotheca calendula	
Asteridea nivea	NS
Blennospora drummondii	NS
Brachycome ? iberidifolia	1977
Ceratogyne obionoides	NS
Erymophyllum tenellum	1954
Gnephosis tenuissima	2076
G. tomentosus	1960
Helichrysum lindleyi	
Helipterum demissum	NS
H. laeve	NS
H. manglesi	
* Hypochaeris glabra	NS

Millotia tenuifolia	NS
Oleari muelleri	1932
O. ?revoluta	1899
* Osteospermum clandestinum	NS
Podolepis canescens	1881, 1768
P. capillaris	1912
P. lessonii	2077
Podotrocha angustifolia	1793
P. gnaphalioides	1978
* Sonchus oleraceus	
* Ursinia anthemoides	
Waitzia acuminata	1827
W. citrina	1984
W. paniculata	2006, 1773

APPENDIX 2 - MUIR VEGETATION DESCRIPTIONS.

Acacia acuminata Low Woodland [Wa]

- Site 23 Low Forest B over *Borya sphaerocephala* Herbs in places
Scattered *Eucalyptus loxophleba* and *Allocasuarina huegeliana*.
- Site 25 Low Forest B/Low Woodland B over *Borya sphaerocephala* Herbs
in places. Scattered *Eucalyptus loxophleba*.
- Site 29 Low Woodland B over *Borya sphaerocephala* Open Herbs.
- Site 35 Low Forest B/Low Woodland B over *Borya sphaerocephala* Herbs.
Scattered *Eucalyptus loxophleba*.

Allocasuarina huegeliana Low Woodland [Wh]

- Site 39 Low Forest A/Low Woodland A over Open Low Sedges in places.
- Site 70 Low Forest A/Low Woodland A over Open Low Scrub A. Scattered
Eucalyptus loxophleba and *Acacia acuminata*.
- Site 75 Low Forest A over Low Heath D/Low Sedges [small area of
Verticordia aff *brownii* Dwarf Scrub C]. Scattered *Acacia lasiocalyx* and *Acacia acuminata*.

Eucalyptus falcata Woodland [Wf1]

- Site 55 Low Woodland A over Low Scrub B.

Regeneration *Eucalyptus falcata* Woodland [Wf2]

- Site 56 Low Forest A over Heath A.

Eucalyptus loxophleba Woodland [W1]

- Site 17 Low Forest A/Low Woodland A over Heath B/Low Scrub B.
Scattered *Eucalyptus salmonophloia* and *Acacia acuminata*.
[Area of *Acacia acuminata* Low Woodland B].
- Site 27 Low Forest A/Low Woodland A over *Acacia acuminata* Open Low
Woodland B [area of Low Heath C].
- Site 31 Low Woodland A over *Borya sphaerocephala* Herbs in places.
Scattered *Eucalyptus wandoo*, *Acacia acuminata* and *E.*
salmonophloia.
- Site 32 Low Woodland A over *Acacia acuminata* Low Woodland B over
Borya sphaerocephala Herbs. Scattered *Eucalyptus*
salmonophloia emergent.
- Site 36 Low Forest A [over *Melaleuca* Thicket in one area].
- Site 63 Low Woodland A over *Melaleuca* Heath A in places. Scattered
Acacia acuminata trees..
- Site 71 Low Woodland A over *Acacia acuminata* Low Woodland B
- Site 73 Low Woodland A/Open Low Woodland A over *Acacia acuminata* Low
Woodland B.

Eucalyptus salmonophloia Woodland [Ws]

- Site 18 Woodland over *Eucalyptus loxophleba* Low Woodland A over Low
Heath C.
- Site 22 Open Woodland over Shrub Mallee/Open Shrub Mallee over Low
Scrub A in places.
- Site 28 Woodland
- Site 33 Woodland over Open Low Scrub B. Scattered *Eucalyptus*
loxophleba.

Eucalyptus wandoo Open Woodland over
Allocasuarina campestris Heath [Ww]

Site 46 Open Low Woodland A over *Allocasuarina campestris* Heath B/Dense Heath B. *Loxocarya* Open Low Sedges in places.

Site 58 Woodland over *Allocasuarina campestris* Heath.

Mallee [M]

Site 19 Shrub Mallee over Low Scrub A/Low Scrub B/scattered shrubs.

Site 57 Shrub Mallee.

Mallee over *Gastrolobium spinosum* Heath [Mg]

Site 61 Open Shrub Mallee over *Gastrolobium spinosum* Heath B.

Mallee over *Melaleuca uncinata* Heath [Mm]

Site 54 Shrub Mallee/Open Shrub Mallee over *Melaleuca uncinata* Heath A/Dense Heath A.

Site 62 Shrub Mallee/Open Shrub Mallee over *Melaleuca uncinata* Heath A. Scattered *Santalum acuminatum* scattered 3 m.

Mallee over *Melaleuca aff undulata* Heath [Mc]

Site 20 Open Shrub Mallee over *Melaleuca aff undulata* Dense Heath B.

Site 52 Open Shrub Mallee over Low Heath C/Dense Low Heath C.

Open Mallee over *Allocasuarina campestris* [Ma].

Site 50 *Allocasuarina campestris* Heath B. Scattered *Eucalyptus ? leptophylla*, *Santalum acuminatum* and *Leptospermum roei*.

Site 51 Very Open Shrub Mallee over *Allocasuarina campestris* Dense Heath B/Heath B.

- Site 53 *Allocasuarina campestris* Heath B/Dense Heath B. Scattered Mallee.
- Site 59 Very Open Shrub Mallee over *Allocasuarina campestris* Heath A.
- Site 69 Very Open Shrub Mallee over *Allocasuarina campestris* Heath A/Dense Heath A

Allocasuarina campestris Heath/Scrub Heath Mosaic [Kc/Km]

- Site 1 Open Low Scrub B [*Allocasuarina campestris*, *Grevillea integrifolia*, *G. pritzelii*] over Dwarf Scrub C [*Actinostrobus arenarius*, *Petrophile seminuda*, *Verticordia* aff *brownii*, *V. chrysantha*, *V. picta*, *Isopogon scabriusculus*, *Eremaea pauciflora*] over Low Heath D.
Borya sphaerocephala Very Open Herbs in places.
- Site 2 *Allocasuarina campestris* Heath B.
- Site 3 Open Low Scrub B/Low Scrub B [*Allocasuarina campestris*, *Grevillea integrifolia*, *Hakea* aff *falcata*, *Leptospermum erubescens*] over Dwarf Scrub C [*Actinostrobus arenarius*, *Verticordia* aff *brownii*, *Isopogon scabriusculus*, *Petrophile ericifolia*, *Allocasuarina microstachya*] over Low Heath D over
Borya sphaerocephala Open Herbs in places.
- Site 6 Scattered shrubs/Open Low Scrub A in places [*Allocasuarina campestris*, *Leptospermum erubescens*, *Grevillea integrifolia*, *Hakea platysperma*, *H. strumosa*, *Grevillea eriostachya*] over Low Heath C [*Actinostrobus arenarius*, *Verticordia* aff *brownii*, *V. picta*, *V. chrysantha*] over
Borya sphaerocephala Open Herbs.

- Site 8 Open Scrub [*Actinostrobus arenarius*, *Allocasuarina campestris*, *Calothamnus quadrifidus*, *Eremaea pauciflora*] over
Dwarf Scrub C [*Eremaea pauciflora*] over
Low Heath D
- Site 10 Low Scrub B/Open Low Scrub B [*Allocasuarina campestris*, *Actinostrobus arenarius*, *Eremaea pauciflora*] over
Dwarf Scrub C [in places] over
Low Heath D
- Site 13 Open Low Scrub A [*Allocasuarina campestris*, *Grevillea integrifolia*, *Hakea platysperma*, *Santalum spicatum*] over
Low Scrub B [*Allocasuarina campestris*, *Isopogon scabriusculus*, *Hakea strumosa*, *Petrophile ericifolia*, *Verticordia picta*, *Eremaea pauciflora*] over
Low Heath D
- Site 14 *Allocasuarina campestris* Heath B [area *Acacia merinthophora* Scrub]
- Site 26 Open Low Scrub B [*Allocasuarina campestris*, *Acacia acuminata*, *Santalum acuminatum*, *Santalum spicatum* over
Low Heath D over
Borya sphaerocephala Herbs
- Site 34 Open Low Scrub B [*Allocasuarina campestris*, *Eremaea pauciflora*, *Acacia acuminata*] over
Low Heath D over
Borya sphaerocephala Open Herbs
- Site 38 Open Dwarf Scrub C/Dwarf Scrub C [*Actinostrobus arenarius*, *Allocasuarina campestris*, *Calytix leschenaultii*, *Verticordia chrysantha*, *V. picta*] over
Low Heath D
Scattered shrubs of *Allocasuarina campestris* and *Actinostrobus arenarius*.

Site 40

Low Scrub A [*Allocasuarina campestris*, *Grevillea integrifolia*] over
Dwarf Scrub C [*Conospermum stoechadis*, *Grevillea pritzelii*,
Isopogon scabrusculus, *Petrophile seminuda*, *Verticordia aff brownii*, *V. chrysantha*, *V. picta*] over
Low Heath D over
Borya sphaerocephala Open Herbs/Very Open Herbs.
[Area *Acacia merinthopora* Scrub]

Site 43

Open Low Scrub A [*Allocasuarina campestris*, *Grevillea integrifolia*, *G. pritzelii*] over
Open Dwarf Scrub C/Dwarf Scrub C [*Baeckea crispiflora*,
Petrophile ericifolia, *Verticordia chrysantha*, *Hakea platysperma*, *Melaleuca leptospermoides*, *Conospermum stoechadis*, *Verticordia aff brownii*] over
Low Heath D/Dwarf Scrub D

Site 44

Allocasuarina campestris Low Heath C over
Borya sphaerocephala Very Open Herbs

Site 48

Low Heath C/Dwarf Scrub C [*Actinostrobus arenarius*, *Isopogon scabrusculus*, *Verticordia aff brownii*, *Verticordia picta*, *V. chrysantha*] over
Open Dwarf Scrub D. Scattered *Allocasuarina campestris*,
Grevillea integrifolia and *Leptospermum roei*

Site 60

Low Scrub B/Open Low Scrub B [*Allocasuarina campestris*] over
Dwarf Scrub C/Low Heath C [*Verticordia aff brownii*,
Petrophile ericifolia, *P. seminuda*] over
Dwarf Scrub D. *Hakea platysperma* in areas
Open Low Scrub A

Site 64

Allocasuarina campestris Heath E

Site 65

Open Low Scrub B [*Allocasuarina campestris*] over
Low Heath C/Dwarf Scrub C [*Eremaea pauciflora*, *Calotranum quadrifidus*, *Petrophile seminuda*, *Melaleuca pertusgens*,
Verticordia chrysantha, *V. aff brownii*, *Conospermum stoechadis*] over
Dwarf Scrub D
Areas of *Acacia merinthopora* Scrub and *Allocasuarina campestris* Heath A.

Site 66

Open Low Scrub B [*Allocasuarina campestris*], over
Low Heath C/Dwarf Scrub [*Petrophile seminuda*, *Eremaea*
pauciflora, *Hakea strumosa*, *Verticordia chrysantha*, *V.*
piota, *Grevillea pritzelii*, *Petrophile ericifolia*] over
Low Heath D/Dwarf Scrub D.

Open *Allocasuarina campestris* over *Melaleuca holosericea* Heath Kh1

Site 4

Open Low Scrub B over Low Heath D

Site 41

Low Scrub B over Low Heath D

Site 42

Open Dwarf Scrub C/Dwarf Scrub C over Low Heath D

Site 49

Low Scrub B over Low Heath C

Allocasuarina campestris/*Melaleuca holosericea* Heath Kh2

Site 67

Thicket/Scrub over Low Heath D.

Site 77

Thicket/Scrub over Low Heath D
Scattered shrubs including *Dryandra speciosa*, *Grevillea*
pritzelii, *Xanthorrhoea drummondii* and *Hakea strumosa*.

Allocasuarina campestris Thicket Kt

- Site 11 Dense Thicket.
- Site 15 Heath A/Dense Heath A
Burnt area - Dense Low Heath C/Low Heath C.
- Site 16 Heath B/Dense Heath B.
- Site 24 Dense Heath A.
- Site 30 Thicket/Dense Thicket.

Actinostrobus arenarius Heath Ka1

- Site 5 *Actinostrobus arenarius* Thicket.
- Site 7a Heath B [*Actinostrobus arenarius*, *Grevillea integrifolia*, *G. eriostachya*] over
Dwarf Scrub C [*Mesomelaena preissi*, *Melaleuca leptospermoides*, *Petrophile ericifolia*, *Lepidobolus chaetocephalus*]
- Site 9 Open Scrub [*Actinostrobus arenarius*, *Leptospermum roei*] over
Heath B [*Leptospermum erubescens*, *Eremaea pauciflora*, *Actinostrobus arenarius*]
Areas of *Actinostrobus arenarius* Thicket, *Actinostrobus arenarius* Heath [burnt] and *Leptospermum erubescens* Heath 4
- Site 37 Heath B [*Actinostrobus arenarius*, *Leptospermum erubescens*, *Eremaea pauciflora*]

Xylomelum angustifolium/*Actinostrobus arenarius* Heath Ka2

- Site 7 Open Low Scrub A over Low Scrub B over Open Low Sedges.
[*Xylomelum* Open Low Woodland B in places].

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Mesomelaena preissii Low Sedges S

- Site 45 Low Sedges over Very Open Herbs in places
Areas of [*Ecdiocolea monostachya* Very Open Tall Sedges and
Allocasuarina campestris Thicket.
- Site 47 Low Sedges
Areas of Open Dwarf Scrub C with *Melaleuca leptospermoides*,
Verticordia chrysantha, *V. picta* and *V. brachypoda*.
- Site 68 Low Sedges
Scattered shrubs becoming Dwarf Scrub C in places with
scattered *Allocasuarina huegeliana* and *Leptospermum*
erubescens. Patches of *Allocasuarina campestris* Thicket.
- Site 76 Low Sedges
Scattered *Santalum spicatum*, *Acacia merinthopora*, *Grevillea*
pritzellii, *Allocasuarina campestris*, *Allocasuarina*
huegeliana, *Grevillea eriostachya*. Patches of *Allocasuarina*
campestris Thicket.

LITHIC COMPLEX

Granite rock surface, Herbs

Site 12

Borya sphaerocephala Herbs

Border - *Allocasuarina campestris* Thicket with; scattered *Leptospermum roei*, *Acacia lasiocalyx* and *Santalum acuminatum*.

Site 72

Borya sphaerocephala Herbs

Boarder - *Allocasuarina huegeliana* Low Forest A and *Allocasuarina campestris* Thicket.

Site 74

Borya sphaerocephala Herbs

Border - Low Forest A of *Allocasuarina huegeliana*, *Acacia acuminata* and *Acacia lasiocalyx*. *Allocasuarina campestris* Thicket.

APPENDIX 3 - PLANT SPECIES LIST FOR VEGETATION ASSOCIATIONS OF THE CHARLES
GARDNER RESERVE

Abundance

A - Abundant

F - Frequent

O - Occasional

No of sites = The number of sites at which each species was recorded.

Acacia acuminata [jam] Low Woodland

[Sites 23, 25, 29, 35]

	<u>Abundance</u>	<u>No of sites</u>
<i>Acacia acuminata</i>	A [Dominant]	4
<i>A. erinacea</i>	O	1
* <i>Aira caryophyllea</i>	F-O	4
<i>Allocasuarina campestris</i>	F-O	4
<i>A. huegeliana</i>	O	3
* <i>Arctotheca calendula</i>	O	1
<i>Astroloma serratifolium</i>	O	1
* <i>Avena fatua</i>	F [edge]	1
<i>Baeckea crispiflora</i>	O	1
<i>Borya sphaerocephala</i>	A-F	4
<i>Brachycome iberidifolia</i>	O	3
* <i>Briza maxima</i>	O	2
* <i>Bromus ?diandrus</i>	F [edge]	1
<i>Brunonia australis</i>	O	3
<i>Calytrix leschenaultii</i>	F-O	2
<i>Dampiera lavandulacea</i>	F	4
<i>Dianella revoluta</i>	O	2
<i>Dodonaea pinifolia</i>	O	2
<i>Drosera macrantha</i>	O	1
<i>Dryandra frazeri</i>	O	1

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	<u>Abundance</u>	<u>No of sites</u>
Enchylaena lanata	0	1
Eucalyptus loxophleba	F-0	3
E. salmonophloia	0	1
Glischrocaryon flavescens	0	2
G. aureum	0	1
Gnephosis tenuissima	F	4
Grevillea paniculata	0	2
Helipterum manglesii	0	1
Lepidobolus chaetocephalus	F	1
Lepidosperma ?angustatum	0	1
L. ?costale	0	3
L. ?pruinsum	0	1
Levenhookia leptantha	0	1
Lobelia ?winfridae	0	1
Loxocarya ?aspera [ms]	F	3
Neurachne alopecuroidea	0	3
Opercularia vaginata	0	2
Podolepis lessonii	F-0	3
Podotheca gnaphalioides	0	1
Santalum spicatum	0	2
Stackhousia monogyna	0	1
Stylidium leptophyllum	0	3
S. tenuicarpum	0	1
S. squamellosum	0	1
Stipa sp	0	1
Thysanotus sp	0	1
Trachymene cyanopetala	0	2
T. ornata	0	4
* Ursinia anthemoides	0	3
Waitzia acuminata	F	4
W. citrina	F-0	3

Allocasuarina huegeliana [sheoak] Woodland

[Sites 39, 70, 75]

	<u>Abundance</u>	<u>No of sites</u>
<i>Acacia acuminata</i>	0	2
A. <i>?ephedroides</i>	0	1
A. <i>lasiocalyx</i>	0	1
A. <i>merinthophora</i>	0	3
A. <i>saligna</i>	0	1
<i>Allocasuarina campestris</i>	F-0	2
A. <i>huegeliana</i>	A [Dominant]	3
* <i>Anagalis arvensis</i>	0	1
* <i>Asphodelus fistulosus</i>	0	1
<i>Astroloma serratifolium</i>	0	1
* <i>Arena fatua</i>	0	1
<i>Baeckea crispiflora</i>	0	2
<i>Borya sphaerocephala</i>	F	2
<i>Brunonia australis</i>	0	1
* <i>Briza maxima</i>	0	1
<i>Calothamnus brevifolius</i>	0	2
C. <i>quadrifidus</i>	0	1
<i>Calytrix leschenaultii</i>	F-0	3
C. <i>strigosa</i>	0	1
<i>Comesperma scoparia</i>	0	1
<i>Conospermum stoechadis</i>	0	1
<i>Conostylis aculeata</i> ssp <i>aculeata</i>	0	1
<i>Dampiera lavandulacea</i>	F-0	2
D. <i>spicigera</i>	0	1
<i>Dianella revoluta</i>	0	2
<i>Dodonaea pinifolia</i>	F-0	3
<i>Eremaea pauciflora</i>	0	2
<i>Erymophyllum tenellum</i>	0	1
<i>Eucalyptus loxophleba</i>	0	1
<i>Grevillea integrifolia</i>	0	1
<i>pritzelii</i>	0	1
<i>Hakea incrassata</i>	0	1
<i>lissocarpa</i>	0	1

	<u>Abundance</u>	<u>No of sites</u>
Halgania preissiana	0	1
Isopogon scabriusculus	0	1
Lepidobolus chaetocephalus	A-0	2
Lepidosperma ?angustatum	0	1
Leptospermum erubescens	F-0	1
L. roei	0	1
Loxocarya ?aspera [ms]	0	1
Melaleuca leptospermoides	F	1
M. pentagona.	0	1
M. seriata	0	1
Mesomelaena preissii	F-0	2
Neurachne alopecuroides	0	1
Platysace commutata	0	2
Podolepis canescens	F-0	2
P. lessonii	0	1
Stylidium dichotomum	0	1
Trachymene ornata	0	
* Ursinia anthemoides	0	1
Verticordia acerosa ssp preissii	0	1
V. chrysantha	F-0	2
V. aff brownii	F	1
V. picta	0	1
Waitzia acuminata	F-0	2
W. citrina.	F-0	3

Eucalyptus falcata [silver mallet] Woodland [1]
[Site 55]

	<u>Abundance</u>
Acacia leptospermoides	0
A. ligulata	0
Allocasuarina acutivalvis	F
A. campestris	A
Dodonaea bursariifolia	F-0
Eucalyptus falcata	A [Dominant]
Gastrolobium spinosum	F

	<u>Abundance</u>
Goodenia pinifolia	0
Hakea multileneata	0
Labichea lanceolata	0
Melaleuca uncinata	F
Phebalium tuberculatum	0
Scholtzia drummondii	0
Trymalium ledifolium	0

Regenerating *Eucalyptus falcata* [silver mallet] Woodland
[Site 56]

	<u>Abundance</u>
Acacia spinosissima	0
A. leptospermoides	0
Allocasuarina acutivalvis	F
A. campestris	A
Bossiaea eriocarpa	0
Beyeria ?brevifolia	0
Dodonaea bursariifolia	0
Eucalyptus falcata	A [Dominant]
Gastrolobium spinosum	F
Goodenia pinifolia	0
Grevillea ?huegelii	0
Grevillea insignis	0
G. petrophiloides	0
Hakea multileneata	0
H. scoparia	0
Labichea lanceolata	0
Lasiopetalum molle	0
Melaleuca uncinata	A
M. ?spicigera	0
Phebalium tuberculatum	0
Scholtzia drummondii	0
Trymalium ledifolium	F-0
Westringia dampieri	0

Eucalyptus laxophleba [york gum] Woodland

[Sites 17, 27, 31, 32, 36, 63, 71, 73]

	<u>Abundance</u>	<u>No of sites</u>
<i>Acacia acutaria</i>	0	3
<i>Acacia acuminata</i>	F-0	7
A. <i>bidentata</i>	0	1
A. <i>erinacea</i>	0	1
A. <i>hemiteles</i>	0	1
A. <i>lasiocarpa</i> var <i>sedifolia</i>	0	1
A. <i>microbotrya</i>	0	2
A. <i>saligna</i>	0	1
A. <i>undosa</i> [ms]	0	1
<i>Acanthocarpus canaliculatus</i>	0	2
* <i>Aira caryophyllea</i>	0	2
<i>Allocasuarina acutivalvis</i>	0	1
A. <i>campestris</i>	0	5
A. <i>huegeliana</i>	0	1
* <i>Anagalis arvensis</i>	0	2
<i>Angianthus tomentosus</i>	0	1
* <i>Arctotheca calendula</i>	0	1
* <i>Asphodelus fistulosus</i>	0	1
* <i>Avena fatua</i>	F [edge] - 0	1
<i>Baeckea crispiflora</i>	0	2
<i>Borya sphaerocephala</i>	A-0	6
<i>Brachycome ?iberidifolia</i>	0	1
* <i>Briza maxima</i>	A - C	1
* <i>Brassica tournefortii</i>	0	1
<i>Brunonia australis</i>	0	2
* <i>Bromus ?diandrus</i>	F - 0 [edge]	2
<i>Calothamnus quadrifidus</i>	0	1
<i>Calytrix leschenaultii</i>	0	2
<i>Cooperhooikia strophiolata</i>	0	1
<i>Comesperma voluibile</i>	0	3

	<u>Abundance</u>	<u>No of sites</u>
Conostylis prolifera	0	1
Cryptandra nutans	0	1
Dampiera lavandulacea	F - 0	5
D. oligophylla	0	1
Daviesia brachyphylla ssp brachyphylla [ms]	0	1
Daviesia benthamii	0	1
Dianella revoluta	0	3
Dodonaea bursariifolia	F - 0	4
D. pinifolia	0	2
D. viscosa	F	1
Eremophila ?glabra var viridiflora	0	1
E. ?subfloccosa	0	2
E. drummondii	0	1
Enchylaena lanata	0	3
Erymophyllum tenellum	0	2
Eucalyptus loxophleba	A [Dominant]	8
Eucalyptus salmonophloia	0	4
E. wandoo	0	1
Glischrocaryon aureum	0	2
G. flavescens	0	1
Gnephosis tenuissima	0	3
Grevillea paniculata	0	3
G. pritzellii	0	1
Hakea preissii	0	1
H. circumalata	0	1
Helichrysum lindleyi	0	1
Isotropis juncea	0	1
Laxmannia squarrosa	0	3
Lepidosperma ?leptophyllum	0	2
* Lolium ?rigidum	F [edge]	1
Lomandra effusa	0	5
Loxocarya aspera [ms]	F-0	6

	<u>Abundance</u>	<u>No of sites</u>
Melaleuca acuminata	F-0	2
M. adnata	F-0	2
M. laxiflora	F-0	2
M. pentagona	0	1
M. seriata	F-0	1
M. spicigera	0	2
M. uncinata	A - 0	3
M. aff undulata	F - 0	2
* Mesembrythemum nodiflorum	0	1
Neurachne alopecuroides	0	5
Oleania muelleri	F	1
O. revoluta	F	5
Operculania vaginata	0	2
Pelagonium havlasae	0	1
Pimelea argentea	0	1
Pittosporum phylliraeoides		1
Podolepis capillaris	0	3
P. canescens	F-0	4
P. lessonii	F-0	4
Ptilotus drummondii	0	1
P. polystachyus	0	1
P. spathulatus	0	1
Rhagodia preissii	F-0	3
Santalum acuminatum	0	3
S. spicatum	0	2
Scaevola arenaria	0	3
Stackhousia monogyne	0	1
Stipa sp	0	2
Stylobasium australe	0	1
Stylidium leptophyllum	0	1
Templetonia sulcata	0	1
Thysanotus patersonii	0	4
Trachymene cyanopetala	0	2
T. ornata	0	3

	<u>Abundance</u>	<u>No of sites</u>
* Trifolium sp	0	1
Trymalium ledifolium	0	2
* Ursinia anthemoides	0	5
Waitzia acuminata	F-0	7
W. citrina	0	1

Eucalyptus salmonophloia [salmon gum] Woodland

[Site 18, 22, 28, 33]

	<u>Abundance</u>	<u>No of sites</u>
Acacia acuminata	0	2
A. acutaria	0	1
A. erinacea	F-0	4
A. hemiteles	F-0	2
A. bidentata	0	1
* Aira caryophyllaea	0	1
Atriplex paludosa ssp baudinii	0	1
* Bromus ?diandrus	0-F [edge]	1
Carpobrotus ?modestus	0	1
Crassula coronata	0 [locally F]	1
Daviesia benthamii	0	2
D. brachyphylla [ms]	F-0	1
Dianella revoluta	0	2
Dodonaea visosa	0	2
D. bursariifolia	F-0	3
Enchylaena lanata	0	2
Eremophila drummondii	F-0	3
Erymophylla tenellum	0	1
Eucalyptus erythronema	A	1
E. celestinoides	F	1
E. loxocleba	A - 0	3
E. salmonophloia	A [Dominant]	4
E. transcontinentalis	A	1
Gnephosis tenuissima	0	1
Grevillea huegelii	0	2
G. paniculata	0	1

	<u>Abundance</u>	<u>No of sites</u>
Lepidosperma ?leptophylla	0	1
L. ?viscidum	0	1
Loxocarya ?aspera [ms]	0	3
Melaleuca aff undulata	0	1
M. adnata	0	1
M. acuminata	0	1
Olearia muelleri	F-0	1
O. ?revoluta	0-F	2
Oxylobium parviflorum	0	1
Podolepis capillaris	0	1
Ptilotus spathulata	0	1
Ragodia drummondii	0	1
R. preissii	0	4
Santalum acuminatum	0	2
Scaevola arenaria	0	1
Templetonia sulcata	0	1
Thysanotus patersonii	0	1
Trachymene ornata	0	1
* Ursinia anthemoides	0	2
Waitzia acuminata	0	2

Eucalyptus wandoo Open Woodland over

Allocasuarina campestris Heath Ww

[Sites 46, 58]

	<u>Abundance</u>	<u>No of sites</u>
Acacia acuminata	0	1
A. ?fragilis	0	1
A. lasiocalyx	0	2
* Aiza caryochyllea	0	1
Allocasuarina campestris	A	2
A. acutivalvis	F	1
Astroloma serratifolium	0	1
Baeckea crispiflora	0	1
Borja schaeerocephala	F	1
Calytrix leschenaultii	0	1
Chamaexeros serra	0	1

	<u>Abundance</u>	<u>No of sites</u>
Dampiera oligophylla	0	1
Dianella revoluta	0	1
Dodonaea ciliaricata	0	1
D. bursariifolia	0	1
Dianella revoluta	0	1
Dryandra aff. cirsiioides	0	1
Eucalyptus flocktoniae	0	1
E. wandoo	F [Dominant]	2
Gastrolobium obovatum	0	1
Grevillea petrophiloides	0	1
G. insignis	0	1
Guichenotia angustifolia	0	1
Hakea incrassata	0	1
H. multilineata	0	1
H. scoparia	0	1
Helipterum lindleyi	F	1
Hibbertia uncinata	0	1
Laxmannia squarrosa	0	1
Lepidosperma viscidum	0	1
Loxocarya aspera [ms]	F	1
Melaleuca strictigera	0	1
M. uncinata	0	2
Mesomelaena breissii	0	1
Neurachne alopecuroides	0	1
Oleana ?revoluta	0	1
Opercularia vaginata	0	1
Orthrosanthus laxus	0	1
Oxylobium parviflorum	F	1
Phebalium tuberculosum	0	1
Podolepis canescens	0	1
P. lessonii	0	1
Santalum acuminatum	0	1
Sollya heterophylla	0	1
Stylidium brevicaepum	0	1
S. squamellosum	0	1
S. tenuicarpum	0	1

	<u>Abundance</u>	<u>No of sites</u>
<i>Stypandra glauca</i>	0	1
<i>Thysanotus patersonii</i>	0	1
<i>Trachymene cyanopetala</i>	0	1
<i>Trymalium ledifolium</i>	0	1
* <i>Ursinia anthemoides</i>	0	1
<i>Verticordia chrysantha</i>	0	1

Mallee
[sites 19, 57]

	<u>Abundance</u>	<u>No of sites</u>
<i>Acacia acuminata</i>	F	1
A. <i>bidentata</i>	0	1
A. <i>hemiteles</i>	0	2
* <i>Aira caryophyllea</i>	0	1
* <i>Bromus ?diandrus</i>	0	1
<i>Daviesia brachyphylla</i> [ms]	0	1
<i>Diplolaena microcephala</i>	0	1
<i>Dodonaea bursariifolia</i>	0	1
D. <i>viscosa</i>	0	1
<i>Enchylaena lanata</i>	0	1
<i>Eremophila drummondii</i>	0	1
<i>Eucalyptus conglobata</i>	F [Dominant]	1
E. <i>flocktoniae</i>	F [Dominant]	1
E. <i>erythronema</i>	F [Dominant]	1
E. <i>loxophleba</i>	0	1
E. <i>pileata</i>	F [Dominant]	1
E. <i>subangusta</i> [ms]	F [Dominant]	1
E. <i>salmonophloia</i>	0	1
E. <i>transcontinentalis</i>	F [Dominant]	1
<i>Grevillea huegelii</i>	F	2
<i>Lepidosperma ?angustatum</i>	0	1
* <i>Lolium ?rigidum</i>	0	1
<i>Melaleuca adnata</i>	F-0	0
M. <i>spicigera</i>	0	1
M. <i>uncinata</i>	F	2
M. <i>aff undulata</i>	F	1

	<u>Abundance</u>	<u>No of sites</u>
Olearia muelleri	0	1
Oxylobium parviflorum	0	1
Pelagonium havlasae	0	1
Podolepis capillaris	0	1
P. lessonii	0	1
Rhagodia sp	0	1
Trachymene cyanopetala	0	1
* Ursinia anthemoides	0	1
Waitzia acuminata	0	1
Westringia dampieri	0	1

Mallee over *Gastrolobium spinosum* Heath

[Site 61]

	<u>Abundance</u>
Acacia lasiocalyx	0
A. leptospermoides	
var leptospermoides	0
A. merinthophora	0
A. saligna	0
A. spinissima	0
Allocosuarina campestris	0
Baeckea crispiflora	0
Bossiaea eriocarpa	0
Calothamnus quadrifidus	0
Calytrix leschenaultii	0
Diplolaena microcephala	0
Dodonaea pinifolia	0
Eucalyptus albidula	F [Dominant]
E. leptophylla	F [Dominant]
Gastrolobium spinosum	A
Grevillea pritzellii	0
Guichenotia macrantha	0
Halgania preissiana	0
Hakea lissocarpa	0
H. scoparia	0
H. trifurcata	F-0
Lepidobolus chaetocephalus	0
Lepidosperma ?tenue	0
Loxocarya ?aspera	0
Mallophora globifera	0

	<u>Abundance</u>
Melaleuca pentagona	0
M. seriata	F
Petrophile brevifolia	0
Podolepis canescens	0
Scholtzia drummondii	F
Tryptomene racemulosa	0
Verticordia acerosa	0
V. insignis	0

Mallee over *Melaleuca uncinata* Heath
[Sites 54, 62]

	<u>Abundance</u>	<u>No of sites</u>
Acacia bidentata	0	2
A. lasiocarpa	0	2
Allocasuarina campestris	0	2
Baeckea sp	0	1
Bossiaea eriocarpa	F	2
Calytrix leschenaultii	0	2
Cryptandra sp	0	1
Daviesia benthamii	0	1
Dodonaea bursariifolia	F-0	2
Diplolaena microcephala	0	1
Eucalyptus conglobata	F [Dominant]	1
E. flocktoniae	F [Dominant]	1
E. leptophylla	F [Dominant]	2
Gastrolobium spinosum	0	2
Grevillea pritzelii	0	1
G. hakeoides	0	1
Halgania preissiana	0	1
Hakea lissocarpa	0	1
H. multilineata	0	2
H. scoparia	0	2
H. trifurcata	0	1
Hibbertia uncinata	0	2
Lasiopetalum molle	0	2
Lepidosperma ?angustatum	0	1
Leptospermum erubescens	0	1
Leucopogon sp [1]	0	1

	<u>Abundance</u>	<u>No of sites</u>
Melaleuca laxiflora	0	2
M. pentagona	0	1
M. platycalyx	0	1
M. seriata	0	2
M. spicigera	0	2
M. uncinata	A	2
Phebalium tuberculatum	F-0	2
Santalum acuminatum	F-0	2
Trymalium ledifolium	F-0	1
Westringia dampieri	0	1

Mallee over *Melaleuca aff undulata* Heath
[Sites 20, 52]

	<u>Abundance</u>	<u>No of sites</u>
Acacia ?hemiteles	0	1
Daviesia benthamii	0	2
Eucalyptus conglobata	F [Dominant]	1
E. erythronema	F [Dominant]	1
E. subangusta [ms]	F [Dominant]	1
E. transcontinentalis	F. [Dominant]	2
Melaleuca adnata	0	1
M. aff undulata	A	2
Santalum acuminatum	0	1
Trachymene ornata	0	1
Trymalium ledifolium	0	1

Open Mallee over *Allocasuarina campestris* Heath
[Sites 50, 51, 53, 59, 69]

	<u>Abundance</u>	<u>No of sites</u>
Acacia ?fragilis	0	4
A. leptospermoides	0	1
A. spinosissima	0	3
Allocasuarina acutivalvis	F-0	1
A. campestris	A	4
Baeckea crispiflora	F-0	4
B. sp nov	0	1
Calothamnus quadrifidus	F-0	4
Calytrix leschenaultii	0	2

	<u>Abundance</u>	<u>No of sites</u>
Dodonaea bursariifolia	0	2
Dryandra aff cirsioides	F-0	4
D. vestita	0	1
Ecdeiocolea monostachya	0	3
Eucalyptus flocktoniae	F-0 [Dominant]	1
E. leptophylla	F-0 [Dominant]	5
Gastrolobium spinosum	F-0	5
Goodenia pinifolia	0	1
Grevillea hakeoides	F	1
G. pritzelii	0	3
Hakea circumalata	0	1
H. gilbertii	0	2
H. incrassata	0	3
H. multilineata	0	5
H. platysperma	F-0	3
H. scoparia	F-0	3
Halgania integerrima	0	1
Isopogon divergens	0	1
I. scabriusculus	0	2
Labichea lanceolata	0	2
Leucopogon sp	0	1
Leptospermum erubescens	0	2
L. roei	F-0	4
Melaleuca holosericea	F-0	3
M. leptospermoides	0	1
M. pentagona	F-0	3
M. platycalyx	0	1
M. uncinata	F-0	4
Phebalium tuberculosum	F-0	4
Platysace commutata	0	1
Santalum acuminatum	F-0	5
Thysanotus dichotomus	0	2
Verticordia aff brownii	0	2
V. chrysantha	F - 0	5
V. picta	0	1

Scrub Heath Sites in *Allocasuarina campestris*

Heath/Scrub Heath Mosaic Kc/Km

[Sites 1, 3, 6, 8, 10, 13, 38, 40, 43, 48, 60, 65, 66]

	<u>Abundance</u>	<u>No of sites</u>
<i>Acacia acuaria</i>	0	2
<i>A. acuminata</i>	0	1
<i>A. campylophylla</i>	0	1
<i>A. ephedroides</i>	F-0	3
<i>A. ligulata</i>	0	1
<i>A. merinthophora</i>	F-0	6
<i>A. saligna</i>	0	1
<i>A. sphacelata</i> ssp <i>sphacelata</i>	0	1
<i>Actinostrobus arenarius</i>	A-F	7
* <i>Actotheca calendula</i>	0	1
* <i>Aira caryophyllaea</i>	0	1
<i>Allocasuarina acutivalvis</i>	0	1
<i>A. campestris</i>	A-0	12
<i>A. humilis</i>	0	2
<i>A. microstachya</i>	F-0	12
<i>Andersonia lehmanniana</i>	0	1
<i>Anigozanthos humilis</i>	0	2
<i>Astroloma serratifolium</i>	0	4
<i>Baeckea crispiflora</i>	0	3
<i>B. preissiana</i>	F-0	6
<i>Beaufortia bracteosa</i>	F-0	6
<i>Boronia coerulescens</i>	0	4
<i>Borya sphaerocephala</i>	A-0	12
* <i>Brassica tournefortii</i>	0	1
<i>Calcectasia cyanea</i>	0	5
<i>Calothamnus brevifolia</i>	F-0	6
<i>C. quadrifidus</i>	F-0	3
<i>Calytrix leschenaultii</i>	F-0	8
<i>C. sappharina</i>	0	1
<i>C. strigosa</i>	0	2
<i>C. violacea</i>	0	1
<i>Carpobrotus ?modestus</i>	0	2
<i>Cassytha glabella</i>	0	1

	<u>Abundance</u>	<u>No of sites</u>
Caustis ?dioica	0	4
Chamaescilla spiralis	F-0	8
Chamaexeros serra	0	5
Chorizema aciculare	0	7
Comesperma scoparium	0	4
Conospermum stoechadis	F-0	9
Conostylis aculeata	0	6
C. petrophiloides	0	4
C. setigera	0	4
Cryptandra glabriflora	0	1
C. leucopogon	0	1
C. pungens	0	2
Dampiera lavandulacea	F-0	8
D. lindleyi	0	2
D. oligophylla ssp juncea	F - 0	9
Daviesia cardiophylla	0	7
D. hamata [ms]	0	8
D. ?incrassata	0	1
D. nudiflora	0	1
D. rhombifolia	0	2
Dianella revoluta	0	1
Dodonaea pinifolia	F-0	9
Drosera menziesii	0	1
D. pycnoblata	0	3
D. ?stolonifera	0	3
Dryandra aff cirsioides	0	7
D. horrida	0	1
D. speciosa	0	6
Ecdelocolea monostachya	F-0	9
Eremaea pauciflora	F-0	11
Gastrolobium parvifolium	0	1
G. hookeri	0	1
G. calycinum	0	1
Glischrocaryon roei	0	1
Gompholobium oboordatum var pachyphyllum	0	2

	<u>Abundance</u>	<u>No of sites</u>
Grevillea integrifolia ssp		
shuttleworthiana	F-O	10
G. pritzelii	F-O	9
G. teretifolia	O	1
G. uncinulata	O	6
Haemodorum laxus	O	2
Hakea circumalata	O	8
H. aff falcata	F-O	6
H. lissocarpha	O	2
H. incrassata	F-O	13
H. platysperma	F-O	7
H. strumosa	F-O	8
Hibbertia hypericoides	O	6
H. uncinata	F-O	7
Isopogon divergens	O	2
I. scabriusculus	F-O	11
Isotropis drummondii	O	1
Jacksonia condensata	F-O	11
?racemosa	F-O	6
Laxmannia grandiflora	O	4
L. squarrosa	O	1
Lepidobolus chaetocephalus	F-O	10
Lepidosperma ?angustatum	O	1
Lepidosperma pruinatum	O	2
L. pubisquamum	O	1
Leptomeria spinosa	O	1
Leptospermum erubescens	O	10
L. roei	F-O	2
Leucopogon cymatiformis	F-O	2
L. dielsianus	O	3
L. sp [2]	O	3
Loxocarya ?aspera [ms]	O	1
Lysinema ciliatum	O	7
Melaleuca leptospermoides	F-O	10
M. pentagona	F-O	6
M. seriata	O	1
Mesomelaena preissii	F	13

	<u>Abundance</u>	<u>No of sites</u>
Mirbelia spinosa	0	8
Monotaxis ?lurida	0	1
Neurachne alopecuroides	0	4
Operculana vaginata	F-0	6
Persoonia striata	F-0	11
Petrophile brevifolia	0	7
P. cincinnata	0	1
P. ericifolia	F-0	10
P. seminuda	F-0	10
Pimelia brevifolia	0	2
P. imbricata	0	1
Platysace commutata	0	11
Plectrachne dielsii	0	1
Podolepis canescens	F-0	5
Podotheca angustifolium	0	1
Psammomoya choretroides	F-0	6
Ptilotus polystachyus	0	1
Santalum spicatum	0	1
Stipa elegantissima	0	1
Stylidium breviscapum	0	2
S. dichotomum	0	5
S. leptocoryllum	0	2
S. repens	0	11
Stackhousia monogyne	0	1
Stypandra glauca	0	2
Synaphea aff petiolaris	0	4
S. aff polymorpha	0	2
Templetonia aculeata	0	3
Trachymene cyanocetala	0	3
* Ursinia anthemoides	0	-
Verticordia aff brownii	A-0	11
V. chrysantha	A-0	13
V. bracteolata	0	5
V. densiflora	F-0	3
V. pennigera	0	3
V. picta	F-0	13

	<u>Abundance</u>	<u>No of sites</u>
* <i>Wahlenbergia capensis</i>	0	1
<i>Waitzia acuminata</i>	F-0	7
W. <i>citrina</i>	0	1
W. <i>paniculata</i>	0	5

[Sites 26 and 34]

	<u>Abundance</u>	<u>No of sites</u>
<i>Acacia acuminata</i>	F-0	2
A. <i>saligna</i>	0	1
<i>Allocasuarina campestris</i>	F-0	2
A. <i>microstachya</i>	F	2
<i>Astroloma serratifolium</i>	0	1
<i>Baeckea crispiflora</i>	0	2
<i>Borya sphaerocephala</i>	A-F	2
<i>Calothamnus brevifolia</i>	0	1
<i>Caustris ?dioica</i>	0	1
<i>Calytrix leschenaultii</i>	F-0	2
<i>Calytrix sappharina</i>	0	1
C. <i>strigosa</i>	0	1
C. <i>violacea</i>	0	1
<i>Chamaescilla spiralis</i>	0	1
<i>Chamaexeros serra</i>	0	2
<i>Chorizema aciculare</i>	0	1
<i>Comesperma scoparia</i>	0	1
<i>Conospermum stoechadis</i>	0	1
<i>Conostylis aculeata</i>	0	2
C. <i>prolifera</i>	0	1
<i>Cryptandra pungens</i>	0	1
<i>Dampiera lavandulacea</i>	F	2
D. <i>lindleyi</i>	0	1
<i>Daviesia nanata</i> [ms]	0	2
<i>Dianella revoluta</i>	0	1
<i>Dodonaea pinifolia</i>	0	2
<i>Eremaea pauciflora</i>	F-0	2
<i>Gastrolobium obovatum</i>	0	1
G. <i>parvifolium</i>	0	1
<i>Glischrocaryon flavescens</i>	0	2

	<u>Abundance</u>	<u>No of sites</u>
Grevillea paniculata	0	2
G. uncinulata	0	1
Haemodorum ?laxus	0	1
Hakea aff falcata	0	1
H. lissocarpa	0	2
H. incrassata	0	2
Hibbertia uncinata	F-C	1
Isopogon divergens	0	1
Jacksonia condensata	0	2
Lepidobolus chaetocephalus	F	2
Lepidosperma ?angustatum	0	1
Leucopogon cymbiformis	0	1
Melaleuca leptospermoides	0	2
M. pentagona	F-C	2
M. radula	0	1
Mesomelaena preissii	F	2
Mirbelia spinosa	0	1
Neurachne alopecuroides	0	1
Opercularia vaginata	F-C	2
Persoonia striata	F-C	2
Petrophile seminuda	0	2
Platysace commutata	0	2
Podolepis canescens	F	2
Santalum acuminatum	F	1
S. spicatum	0	2
Stipa elegantissima	0	1
Stylidium dichotomum	0	1
S. leptophylla	0	1
Thysanotus patersonii	0	1
* Ursinia anthemoides	0	2
Verticordia acerosa ssp preissii	F	2
V. brachypoda	0	2
V. aff brownii	0	1
V. chrysantha	0	2
V. picta	0	
Waitzia acuminata	F-C	2
W. paniculata	F-C	1

Allocasuarina campestris Heath in Heath/Scrub Heath Mosaic
[Sites 2, 14, 44, 64]

	<u>Abundance</u>	<u>No of sites</u>
<i>Acacia merinthophora</i>	F-0	3
<i>Actinostrobus arenarius</i>	F	1
<i>Allocasuarina campestris</i>	A [Dominant]	4
A. <i>microstachya</i>	0	1
<i>Astroloma serratifolium</i>	0	3
<i>Baeckea crispiflora</i>	0	2
<i>Boronia coerulescens</i>	0	2
<i>Borya sphaerocephala</i>	F	4
<i>Calothamnus brevifolius</i>	0	1
<i>Calytrix leschenaultii</i>	0	3
<i>Calytrix setigera</i>	0	1
<i>Chamaescilla spiralis</i>	F-0	1
<i>Conospermum stoechadis</i>	0	1
<i>Conostylis setigera</i>	0	1
C. <i>aculeata</i>	0	1
<i>Cryptandra leucopogon</i>	0	1
<i>Dampiera lavandulacea</i>	0	2
D. <i>oligophylla</i>	0	3
<i>Daviesia cardiophylla</i>	0	1
<i>Dodonaea pinifolia</i>	0	3
<i>Drosera menziesii</i>	0	1
<i>Eremaea pauciflora</i>	0	2
<i>Ecdiocollea monostachya</i>	0	2
<i>Grevillea integrifolia</i>	0	2
G. <i>pritzelii</i>	0	3
<i>Hakea circumalata</i>	0	1
H. <i>incrassata</i>	0	2
H. <i>platysperma</i>	0	2
H. <i>strumosa</i>	0	1
<i>Hibbertia hypericoides</i>	0	1
H. <i>uncinata</i>	0	1
<i>Isopogon scabriusculus</i>	0	1
<i>Jacksonia condensata</i>	0	2

	<u>Abundance</u>	<u>No of sites</u>
Laxmannia grandiflora	0	1
Lepidobolus chaetocephalus	F	3
Leptospermum erubescens	0	1
L. roei	0	1
Leucopogon cymbiformis	0	0
L. dielsiana	0	1
Melaleuca leptospermoides	0	2
M. pentagona	0	1
Mesomelaena preissii	F	4
Mirbelia spinosa	0	3
Muehlenbeckia adpressa	0	1
Pimelea imbricata	0	1
Platysace commutata	0	3
Santalum acuminatum	0	2
Stylidium dichotomum	0	1
S. leptophyllum	0	1
S. repens	0	1
Stypandra glauca	0	1
Trachymene cyanopetala	0	1
* Ursinia anthemoides	0	2
Verticordia brachypoda	0	1
V. aff brownii	F-0	2
V. chrysantha	F-0	4
V. picta	0	3
V. serrata	0	1
Waitzia acuminata	0	1

Open *Allocasuarina campestris* over *Melaleuca holosericea* Heath

[Sites 4, 41, 42, 49]

	<u>Abundance</u>	<u>No of sites</u>
Acacia mollis ssp recurvistipula	0	1
A. phaeocalyx	0	4
Actinostrobos arenarius	0	3
Allocasuarina campestris	- [Dominant]	4
A. fibrosa	0	3
A. humilis	0	3
A. microstachya	0	3

	<u>Abundance</u>	<u>No of sites</u>
<i>Astroloma serratifolium</i>	0	4
<i>Baeckea crispiflora</i>	0	3
B. <i>preissiana</i>	F	4
<i>Banksia sphaerocarpa</i>	F	4
<i>Beaufortia interstans</i>	F-0	4
B. <i>bracteosa</i>	0	2
<i>Boronia coerulescens</i>	0	1
<i>Borya sphaerocephala</i>	F-0	2
<i>Calectasia cyanea</i>	0	2
<i>Calothamnus quadrifidus</i>	0	3
<i>Calytrix leschenaultii</i>	0	4
C. <i>?sapparrina</i>	0	3
<i>Cassytha ?flava</i>	0	1
<i>Chorizema aciculare</i>	0	2
<i>Comesperma scoparia</i>	0	4
<i>Cryptandra pungens</i>	0	1
<i>Dampiera oligophylla</i>	F-0	4
<i>Daviesia cardiophylla</i>	0	4
D. <i>rhombifolia</i>	F-0	4
D. <i>uncinata</i> [ms]	0	3
<i>Dryandra aff cirsioides</i>	F-0	4
D. <i>horrida</i>	0	3
D. <i>speciosa</i>	F-0	3
D. <i>vestita</i>	F	4
<i>Eremaea pauciflora</i>	F-0	3
<i>Gastrolobium parvifolium</i>	0	2
Genus nov sp nov	0	1
<i>Glischrocaryon aureum</i>	0	3
<i>Grevillea integrifolia</i>	0	4
G. <i>pritzelii</i>	F-0	4
G. <i>? paniculata</i>	0	2
<i>Hakea aff falcata</i>	F-0	4
H. <i>gilbertii</i>	0	1
H. <i>incrassata</i>	F	4
H. <i>platysperma</i>	0	4
H. <i>scoparia</i>	0	3
H. <i>strumosa</i>	F-0	4

	<u>Abundance</u>	<u>No of sites</u>
Halgania integerrima	0	3
Hemigenia viscida	0	3
Hibbertia uncinata	0	1
Isopogon divergens	0	1
I. scabriusculus	F	4
Jacksonia condensata	0	3
J. ?racemosa	0	3
Laxmannia grandiflora	0	1
Leptospermum erubescens	F-O	3
L. spinescens	0	4
Leptomeria spinosa	0	2
Leptobolus chaetochephalus	0	1
Leucopogon cymbiformis	0	1
L. dielsiana	0	3
Logania tortuosa	0	3
Loxocarya aspera [ms]	0	2
Lysinema ciliatum	F-O	4
Melaleuca leptospermoides	F-O	3
M. holoserica	A-F	4
Mirbelia spinosa	0	3
Persoonia striata	0	3
Petrophile brevifolia	F-O	4
P. circinata	F-O	4
P. ericifolia	0	2
Platyscoe commutata	0	2
Psammomoya choretroides	0	1
Stylidium repens	0	2
Synaphea aff petiolaris	0	2
Trachypene ornata	0	1
Verticordia brachypoda	F-O	3
V. aff brownii	F-O	4
V. chrysantha	F	4
V. picta	0	4
V. serra	0	3

Allocasuarina campestris/ *Melaleuca holosericea* Heath

[Sites 67, 78]

	<u>Abundance</u>	<u>No of sites</u>
<i>Acacia campylophylla</i>	0	2
A. <i>lasiocarpa</i> var <i>bracteolata</i>	0	1
A. <i>merinthophora</i>	0	1
<i>Allocasuarina campestris</i>	A [Dominant in some areas	2
A. <i>humilis</i>	0	1
A. <i>microstachya</i>	0	2
<i>Anthotium rubriflorum</i>	0	2
<i>Astroloma serratifolium</i>	0	1
<i>Baeckea crispiflora</i>	0	2
B. <i>preissiana</i>	0	1
<i>Beaufortia interstans</i>	0	2
<i>Borya sphaerocephala</i>	F-0	2
<i>Calectasia cyanea</i>	0	1
<i>Calothamnus quadrifidus</i>	0	2
<i>Calytrix leschenaultii</i>	0	1
C. <i>sappharrina</i>	0	1
<i>Chorizema aciculare</i>	0	1
<i>Comesperma scoparia</i>	0	1
<i>Conostylis petrophilloides</i>	0	1
<i>Cryptandra leucopogon</i>	0	1
C. <i>pungens</i>	0	2
<i>Dampiera lindleyi</i>	0	1
D. <i>oligophylla</i>	F-0	2
<i>Daviesia cardiophylla</i>	0	1
D. <i>hamata</i> [ms]	0	2
<i>Dodonaea pinifolia</i>	F-0	2
<i>Dryandra aff cirsioides</i>	0	2
D. <i>speciosa</i>	F-0	2
<i>Ecdiocollea monostachya</i>	F-0	1
<i>Eremaea pauciflora</i>	F-0	2
<i>Gastrolobium calycinum</i>	0	2
G. <i>parvifolium</i>	0	1
<i>Glischrocaryon aureum</i>	0	2

	<u>Abundance</u>	<u>No of sites</u>
Grevillea pritzelii	F-0	2
G. uncinulata	0	2
Hakea circumalata	0	1
H. aff falcata	0	1
H. incrassata	0	2
H. strumosa	0	2
H. scoparia	0	2
Hibbertia exasperata	0	2
Hemigenia viscida	0	2
Isopogon divergens	F-0	1
I. scabrisculus	0	2
Jacksonia condensata	0	2
Laxmannia squarrosa	0	1
Leptobolus chaetocephalus	F	1
Leptospermum erubescens	0	1
Leucopogon cymbiformis	0	1
L. dielsiana	0	1
Logania flaviflora	0	2
Lysinema ciliatum	0	2
Melaleuca leptospermoides	F-0	2
M. holosericea	A	2
M. pentagona	0	1
M. radula	0	1
Mesomelaena preissii	F	2
Mirbelia spinosa	0	1
Opercularia vaginata	0	2
Persoonia striata	F	2
Petrophile brevifolia	0	1
P. ericifolia	0	1
P. seminuda	0	2
Pimelea ?brevifolia	0	1
Podolepis canescens	F-0	1
Platysace commutata	0	1
Psammomoya choretroides	0	2
Schoenus globifera	0	1

	<u>Abundance</u>	<u>No of sites</u>
Stylidium breviscapum	F-0	2
S. dichotomum	0	1
S. leptophyllum	0	1
S. repens	F-0	1
Synaphea aff petiolaris	0	1
Verticordia brachypoda	0	2
V. aff brownii	0	1
V. chysantha	=	2
V. picta	0	2
Waitzia acuminata	0	1
Xanthorrhoea drummondii	0	1

Allocasuarina campestris Thicket

[Sites 11, 15, 16, 24, 30]

	<u>Abundance</u>	<u>No of sites</u>
Acacia acuminata	0	2
A. aff bidentata [ericksonii ms]	0	1
A. fragilis	0	2
A. lasiocalyx	0	1
A. lasiocarpa var sedifolia	0	1
A. stereophylla	0	1
Acanthocarpus canaliculatus [ms]	0	1
* Aira canyophyllea	0	3
Allocasuarina campestris	A [Dominant]	5
* Asphodelus fistulosus	0	1
Astroloma serratifolium	0	2
Baeckea crispiflora	F-0	2
Borya sphaerocephala	F-0	5
* Bromus rufus	0	2
Calothamnus quadrifidus	0	1
Calytrix laschenaultii	0	3
Chamaescilla spiralis	0	1
Cheilanthes austrotenuifolia	0	1
Dianella revoluta	0	2
Diploloma microcephala	0	1
Dodonaea viscosa	0	1
Dryandra speciosa	0	1

	<u>Abundance</u>	<u>No of sites</u>
Gastrolobium spinosum	0	1
Grevillea pritzelii	0	1
Hakea incrassata	0	3
H. scoparia	0	2
Helichrysum lindleyi	0	1
Hibbertia exasperata	0	1
H. uncinata	0	1
Isopogon scabriusculus	0	1
Jacksonia condensata	0	1
Lepidobolus chaetocephalus	0	1
Lepidosperma viscidum	0	1
Levenhookia leptantha	0	1
Loxocarya aspera [ms]	0	1
L. myrioclada [ms]	0	1
Melaleuca uncinata	F-0	
Melaleuca radula	0	1
Mesomelaena preissii	0	
Oxylobium parviflorum	0	1
Olearia ?revoluta	0	1
* Pentaschistis airoides	0	1
Phebalium tuberculosum	0	1
Podolepis lessonii	F-0	3
Santalum acuminatum	0	1
Stackhousia monogyne	0	2
Stylidium dichotomum	0	1
S. leptophyllum	0	1
Trachymene ornata	0	3
* Ursinia anthemoides	0	1
Verticordia chrysantha	0	4
V. picta	0	3
Waitzia acuminata	F-0	5
W. citrina	F-0	4

Actinostrobos arenarius Heath

[Sites 5, 7a, 9, 37]

	<u>Abundance</u>	<u>No of sites</u>
<i>Acacia merinthophora</i>	0	1
<i>Actinostrobos arenarius</i>	A	4
<i>Allocastrum acutivalvis</i>	0	1
A. <i>campestris</i>	F-0	4
A. <i>huegeliana</i>	F-0	2
A. <i>humilis</i>	0	1
A. <i>microstachya</i>	0	2
<i>Anigozanthos humilis</i>	0	2
* <i>Actotheca calendula</i>	0	1
<i>Astroloma serratifolium</i>	0	1
<i>Baeckea crispiflora</i>	F	3
B. <i>preissiana</i>	F-0	2
<i>Banksia sphaerocarpa</i>	0	1
<i>Boronia coerulescens</i>	0	1
<i>Borya sphaerocephala</i>	F-0	2
<i>Calothamnus quadrifidus</i>	F-0	2
C. <i>brevifolius</i>	0	2
<i>Calytrix leschenaultii</i>	0	3
C. <i>strigosa</i>	0	1
<i>Carpobrotus ?modestus</i>	0	1
<i>Caustis ?dioica</i>	F-0	3
<i>Comesperma volubile</i>	0	1
<i>Conospermum stoechadis</i>	0	3
<i>Conostylis aculeata</i>	0	1
C. <i>setigera</i>	0	1
C. <i>stylidioides</i>	0	1
<i>Cryptandra pungens</i>	0	2
<i>Dampiera lavandulacea</i>	0	3
D. <i>oligophylla</i>	0	3
D. <i>spicigera</i>	0	2
<i>Daviesia cardiophylla</i>	0	3
D. <i>intricata</i> ssp <i>intricata</i> [ms]	0	3
<i>Dianella revoluta</i>	0	1
<i>Dryandra horrida</i>	0	1

	<u>Abundance</u>	<u>No of sites</u>
Dryandra speciosa	0	1
Ecdeiocolea monostachya	0	1
Eremaea pauciflora	A-0	4
Glischrocaryon laeureum	0	1
Grevillea ericostachya	F-0	2
G. integrifolia	0	2
G. prittellii	0	2
G. tripartita	0	3
G. undulata	0	1
Hakea corymbosa	0	1
H. incrassata	0	2
H. platysperma	F-0	1
H. strumosa	0	1
Isopogon scalarisculus	0	1
Jacksonia condensata	0	2
Laxmannia grandiflora	0	1
Lechenaultia tubiflora	0	1
Lepidosperma angustatum	0	1
Lepidobolus chaetocephalus	A-0	3
Leptomeria spinea	0	1
Leptospermum erubescens	F-0	4
L. roei	F-0	2
Leucopogon cymbiformis	0	3
Loxocarya aspera [ms]	0	2
Lyginia barbata	0	2
Lysinema ciliatum	0	1
Melaleuca leptospermoides	0	3
M. seriata	0	2
Mesomelaena preissii	A-0	3
Mitabelia spinosa	0	1
Petrophile brevifolia	0	1
P. ericifolia	F-0	3
Pimelea brevifolia	0	1
Platysace commutata	0	2
Psammomoya chonetroides	0	1
Stackhousia monogyna	0	2
Stylidium repens	0	1
Trachymene cyanocephala	0	1
T. ornata	0	1
* Ursinia athenolobes	0	2

	<u>Abundance</u>	<u>No of sites</u>
Verticordia aff brownii	F-0	1
V. chrysantha	F-0	3
V. densiflora	0	2
V. pennigera	0	1
V. picta	0	2
Waitzia acuminata	F-0	2
Xylomelum angustifolium	0	1

Xylomelum angustifolium/Actinostrobus arenarius Heath Ka2

[Site 7b]

	<u>Abundance</u>	<u>No of sites</u>
Acacia merinthophora	0	
A. stereophylla	0	
Actinostrobus arenarius	A	
Allocasuarina campestris	F	
A. huegeliana	F-0	
A. microstachya	0	
Astroloma serratifolium	0	
Baeckea crispiflora	0	
B. preissiana	0	
Boronia coerulescens	0	
Calothamnus quadrifidus	F	
Calytrix leschenaultii	0	
Carpobrotus ?modestus	0	
Conesperma scoparium	0	
C. volubile	0	
Conospermum stoechadis	F-0	
Conostylis setigera	0	
Crotonandra pungens	0	
Dampiera lavandulacea	0	
D. oligophylla	0	
D. spicigera	0	
Daviesia cardiophylla	0	
Doonaea pinifolia	0	
Ecdelocolea monostachya	0	
Eremaea pauciflora	F-0	
Glischrocaryon flavescens	0	
Grevillea eriostachya	F-0	
G. integrifolia	0	
Hakea platysperma	0	
Jacksonia condensata	0	

	<u>Abundance</u>	<u>No of sites</u>
Keraundrenia integrifolia	0	
Laxmannia grandiflora	0	
Lepidobolus chaetocephalus	F	
Lepidosperma sp	0	
Leptospermum erubescens	F-0	
L. roei	F-0	
Melaleuca leptospermoides	F	
M. holosericea	0	
Mesomelaena preissii	A-F	
Mirbelia spinosa	0	
Persoonia striata	0	
Petrophile brevifolia	0	
P. ericifolia	0	
Platysace commutata	0	
Psammomoya choretroides	0	
Spyridium complicatum	0	
Stylidium dichotomum	0	
S. leptophyllum	0	
S. sacculatum	0	
Thysanotus patersonii	0	
Trachymene cyanopetala	0	
* Ursinia anthemoides	0	
Verticordia aff brownii	0	
V. chrysantha	0	
V. picta	0	
Waitzia acuminata	F-0	
Xylomelum angustifolium	F	

Mesomelaena preissii Low Sedges

[Sites 45, 47, 68, 76]

	<u>Abundance</u>	<u>No of sites</u>
Acacia acuminata	0	1
A. fragilis	0	1
A. merinthophora	1	2
Acanthocarpus canaliculatus [ms]	0	1
Allocasuarina campestris	A-0	4
A. huegeliana	F-0	2
A. microstachya	0	1
Astroloma serratifolium	0	3

	<u>Abundance</u>	<u>No of sites</u>
Baeckea crispiflora	F-0	3
Boronia coerulescens	0	3
Borya sphaerocephala	A-F	4
Calothamnus brevifolium	F-0	1
C. quadrifidus	0	1
Calytrix leschenaultii	0	1
Caustis dioica	0	1
Chamaescilla spiralis	0	1
Chorizema aciculare	0	1
Comesperma scoparia	0	3
Conospermum stoechadis	F-0	4
Conostylis petrophiloides	0	1
C. setigera	0	1
Dampiera lavendulacea	0	3
D. oligophylla	F-0	4
Daviesia cardiophylla	0	1
D. hamata [ms]	0	2
Dianella revoluta	0	2
Dodonaea pinifolia	0	4
Drosera macrantha	0	1
Dryandra horrida	0	2
Ecdiocollea monostachya	F	2
Eremaea pauciflora	0	1
Genus nova [aff Shoenus]	0	1
Glischrocaryon flavescens	F-0	1
Gompholobium obcordatum var pachyphyllum	0	1
Grevillea eriostachya	F-0	3
G. integrifolia	0	2
G. pritzelii	F-0	4
G uncinulata	0	1
Hakea aff falcata	0	1
H. incrassata	F-0	4
H. platysperma	0	1
H. scoparia	0	1
Halgania integerrima	0	2
Hibbertia uncinata	0	4
Jacksonia condensata	0	3
Laxmannia grandiflora	0	1
Lepidobolus chaetocephalus	F	4
Leptospermum erubescens	0	1

	<u>Abundance</u>	<u>No of sites</u>
Leucopogon dielsianus	0	2
Logania flavescens	0	1
Loxocanya ?aspera [ms]	0	1
Melaleuca leptospermoides	A-F	4
M. pentagona	0	1
Mesomelaena preissii	A. [Dominant]	4
Mirbelia spinosa	0	2
Neurochne alopecuroidea	0	1
Opercularia vaginata	F-0	3
Patersonia sp nov	0	1
Persoonia striata	0	1
Petrophile brevifolia	0	1
P. ericifolia	0	1
Platysace commutata	0	2
Podolepis canescens	A	1
Psammomoya choretroides	0	2
Santalum spicatum	0	2
Stylidium breviscopum	0	1
S. dichotomum	0	1
S. leptophyllum	0	2
S. repens	0	2
Stypandra glauca	0	2
Synaphea aff polymorpha	0	1
Thysanotus patersonii	0	2
Trachymene cyanopetala	0	2
T. ornata	0	2
Verticordia brachypoda	0	4
V. aff brownii	0	2
V. chrysantha	F-0	4
V. densiflora	0	1
V. picta	F-0	2
Waitzia acuminata	F-0	2

LITHIC COMPLEX
[Sites 12, 72, 74]

	<u>Abundance</u>	<u>No of sites</u>
Acacia acuminata	F-0	2
A. lasiocalyx	F-0	2
* Aira caryophyllea	0	1

	<u>Abundance</u>	<u>No of sites</u>
<i>Allocasuarina campestris</i>	A [Dominant on border]	3
A. <i>huegeliana</i>	A [Dominant on border]	3
* <i>Asphodelus fistulosus</i>	0	1
<i>Astroloma serratifolium</i>	0	1
* <i>Avena fatua</i>	0	1
<i>Baeckea crispiflora</i>	0	2
<i>Borya sphaerocephalus</i>	A	3
* <i>Briza maxima</i>	0	1
* <i>Bromus ?rubens</i>	0	1
<i>Brunonia australis</i>	0	1
<i>Calytrix leschenaultii</i>	F-0	3
<i>Cheilanthes austrotenuifolia</i>	0	1
<i>Comesperma scoparium</i>	0	2
<i>Conospermum stoechadis</i>	0	2
<i>Dampiera lavandulacea</i>	0	1
<i>Dianella revoluta</i>	0	2
<i>Dodonaea viscosa</i>	F	1
<i>Drosera subhirtella</i>	0	1
<i>Eremaea pauciflora</i>	0	1
<i>Eriachne ovata</i>	F	1
<i>Erymophyllum tenellum</i>	F-0	1
<i>Eucalyptus loxophleba</i>	0	1
<i>Glischrocaryon aureum</i>	F-0	3
G. <i>flavescens</i>	F	1
<i>Gnephosis tenuissima</i>	F	1
<i>Gyrostemon ramulosus</i>	0	1
<i>Halgania ?integerrima</i>	0	1
<i>Laxmannia squarrosa</i>	0	1
<i>Lepidobolus chaetocephalus</i>	F	1
<i>Lepidosperma ?costale</i>	F	1
L. <i>?pruinsum</i>	F-0	2
L. <i>?viscidum</i>	F-0	1
<i>Leptospermum erubescens</i>	F-0	2
L. <i>roei</i>	0	2
<i>Leucopogon</i> sp	0	1
<i>Loxacarya ?aspera</i> [ms]	0	1
<i>Mesomelaena preissii</i>	0	1

	<u>Abundance</u>	<u>No of sites</u>
Muehlenbeckia adpressa	0	1
Neurachne alopecuroides	0	2
Opercularia vaginata	0	1
Platysace commutata	0	1
Podolepis canescens	F	2
Podotheca angustifolia	0	1
P. gnaphalioides	0	1
Ptilotus polystachyus	0	2
Santalum acuminatum	0	1
Stackhousia monogyna	F	3
Stylidium piliiferum	0	1
Stypandra glauca	0	1
* Ursinia anthemoides	0	2
Verticordia chrysantha	0	1
V. picta	0	1
Waitzia acuminata	F-0	2
W. citrina	0	1

PRIVATE LAND

Heath 8

[Site 21]

	<u>Abundance</u>	<u>No of sites</u>
Acacia acuminata	0	
A. ataxiphylla ssp magna	0	
* Aira caryophyllea	0	
Allocasuarina campestris	0	
A. humilis	0	
Astroloma serratifolium	0	
Baeckea crispiflora	F	
Beaufortia ?interstans	0	
Bossiaea eriocarpa	F	
* Briza maxima	0	
Calytrix sapphirina	0	
- Cassytha ?flava	0	
Dampiera oligophylla	0	
D. wellsiiana	0	
Daviesia cardiophylla	0	
D. rhombifolia	0	
Dodonaea bursariifolia	0	
Dryandra aff cirsioides	A	
D. speciosa	F	
Gastrolobium spinosum	F	
Glischrocaryon aureum	0	
Goodenia pinifolia	0	
Grevillea integrifolia	0	
G. pritzelii	0	
Guichenotia micrantha	0	
Hakea circumalata	0	
H. gilbertii	0	
H. incrassata	0	
H. scoparia	F	
Hemigenia viscida	0	
Hibbertia uncinata	0	
Isopogon divergens	0	
Leptospermum erubescens	0	
Lysinema ciliatum	0	
Melaleuca holosericea	F	

[illegible]