Appendix H

Survey of Coomberdale TEC Regional Extent (Trudgen et al. 2012)

AN EXTENSION OF A

FLORA SURVEY,

FLORISTIC ANALYSIS

AND VEGETATION SURVEY

OF AREAS OF THE

COOMBERDALE CHERT TEC

TO INCLUDE A FURTHER AREA

prepared for

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1.0 INTRODUCTION

1.1 Background

This report extends the geographical coverage of vegetation and flora surveys of parts of the Coomberdale Chert Threatened Ecological Community documented in two earlier reports (Trudgen *et al.* 2006 & Trudgen *et al.* 2001) prepared for Simcoa Operations Pty. Ltd. ("Simcoa"). Simcoa operates a chert mine approximately fifteen kilometres north of Moora in the Midlands district of the Western Australian wheat belt that mines the chert the threatened ecological community occurs on. Trudgen *et al.* 2001 was prepared for environmental impact assessment processes related to an extension of the mine to a second pit (the Western Ridge or Western Ore Body), and the Trudgen *et al.* 2006 report was an update and extension of that report.

The geological unit (The Noondine Chert, formerly called the Coomberdale Chert, and still often referred to by the latter name) containing the quartzite mined north of Moora by Simcoa and material derived from it is the geological substrate of a group of vegetation types that the Department of Environment and Conservation (DEC) considers to be an "Endangered Ecological Community" (Hamilton-Brown 2000, p. 2). This vegetation is known as the *Coomberdale Chert Threatened Ecological Community* and has high conservation value for vegetation and flora. The definition of this threatened ecological community is currently under review (M. Hunter (DEC) pers. comm. January 2011).

The Coomberdale Chert Threatened Ecological Community is not a *community* in the sense of the word as used by botanists in the definition of *plant communities* in formal schemes of vegetation description. Plant community in formal vegetation description has a quite narrow definition, whereas the use of community in the term *The Coomberdale Chert Threatened Ecological Community* is a very broad sense not related to formal vegetation schemes. Rather, it is a catchall name for all the vegetation on the Coomberdale Chert and on geomorphology associated with it in the Moora area dominated by *Regelia megacephala* (a species restricted to the Coomberdale Chert) and *Allocasuarina campestris* (the common name of which is Tammar) a more widespread species associated with shallow soils. This includes vegetation on actual outcrop, on areas where there is a soil layer over the chert, or where the outcrop is broken up, and on areas of chert gravel on slopes associated with the chert ridges. While the *Regelia megacephala* and *Allocasuarina campestris* are the main dominants in this vegetation (and are the defining ones for the Threatened Ecological Community) there are a number of other species that are dominant or important in vegetation on the Coomberdale Chert and the vegetation they form should also be included in the concept of the Coomberdale Chert Threatened Ecological Community (and has been in this report). Some of the vegetation dominated by these other species is in fact less common than some of the vegetation dominated by *Regelia megacephala*.

1.2 Purpose of this survey

The purpose of the survey is to add further detail and knowledge to the Coomberdale Chert Threatened Ecological Community by incorporating vegetation and flora details of one property east of The Midland Road and north of Kiaka Road that was not visited as part of the survey for the 2006 report (Trudgen *et al.* 2006). Therefore, this report extends detailed knowledge of the Coomberdale Chert Threatened Ecological Community to an area previously not known in detail (although some work rare flora survey work had been done there), but other areas of the Coomberdale Chert are known that still have not been surveyed in detail.

The report covers a group of properties from north of Kiaka Road south to Dalaroo East Road. For the Coomberdale Chert Threatened Ecological Community areas on these properties it provides vegetation and flora surveys, especially surveys of flora of particular conservation significance, including Declared Rare Flora, Priority Flora, and other species of conservation significance.

1.3 Location of the survey area and details of locations or sub-areas

The survey area lies from about twelve to seventeen kilometres north of Moora on the eastern side of the Midlands Road (see Map 1). It extends (see Map 2) from the northern side of the Dalaroo East Road (parts of the Gardiner's and Morgan's properties) to north of Kiaka Road (parts of John Tonkin's and Stan Ridgway's properties and the new area surveyed). Between these properties, it includes parts of the farm "Goonderoo", formerly owned by Lance Doust and parts of several other properties.

The addition to the previous survey area is the vegetation of the Coomberdale Chert Threatened Ecological Community on Arthur and Rhonda Tonkin's property (see Map 2). This is all the remnant vegetation on this property.

The survey area has several sub-areas (see Map 2), which are discrete (or semi-discrete) blocks of vegetation. Some of the vegetation described (from the Western Ore Body) has now been cleared, but is included in this report so that the variation known for the Coomberdale Chert Threatened Ecological Community is fully described. The sub-areas are:

- Cairn Hill Westrail Reserve. Originally a gravel reserve for the railway system. Has significant areas of disturbance, but is mostly relatively undisturbed native vegetation. Now part of the Conservation estate;

- Cairn Hill North. An area of vegetation on the "Doust" property, contiguous with Cairn Hill, but which has had some grazing through it;

- The Eastern Ore Body. An area of vegetation at the southern end of the original mine pit, on the southern continuation of the ore body. Has now been partly mined;

- The Western Ridge (or Western Ore Body). An area of vegetation which lies to the west of the original mine pit on a low quartz ridge. Has now been partly mined;

- The Eastern Ridge. A large area of vegetation to the east of the original pit and Eastern Ore Body. Has had significant grazing pressure and has some degraded patches but in most parts retains good or better condition vegetation;

- The (formerly) Proposed Waste Dump. An area between the Western Ridge and the original mine pit that has been considered for expansion of the waste dump. Has been grazed, but retains native vegetation (although degraded to variable extent);

- 'Gardiner's Hill', a large remnant of bush on P. and J. Gardiner's property;

- John Tonkin's property north of Kiaka Road;

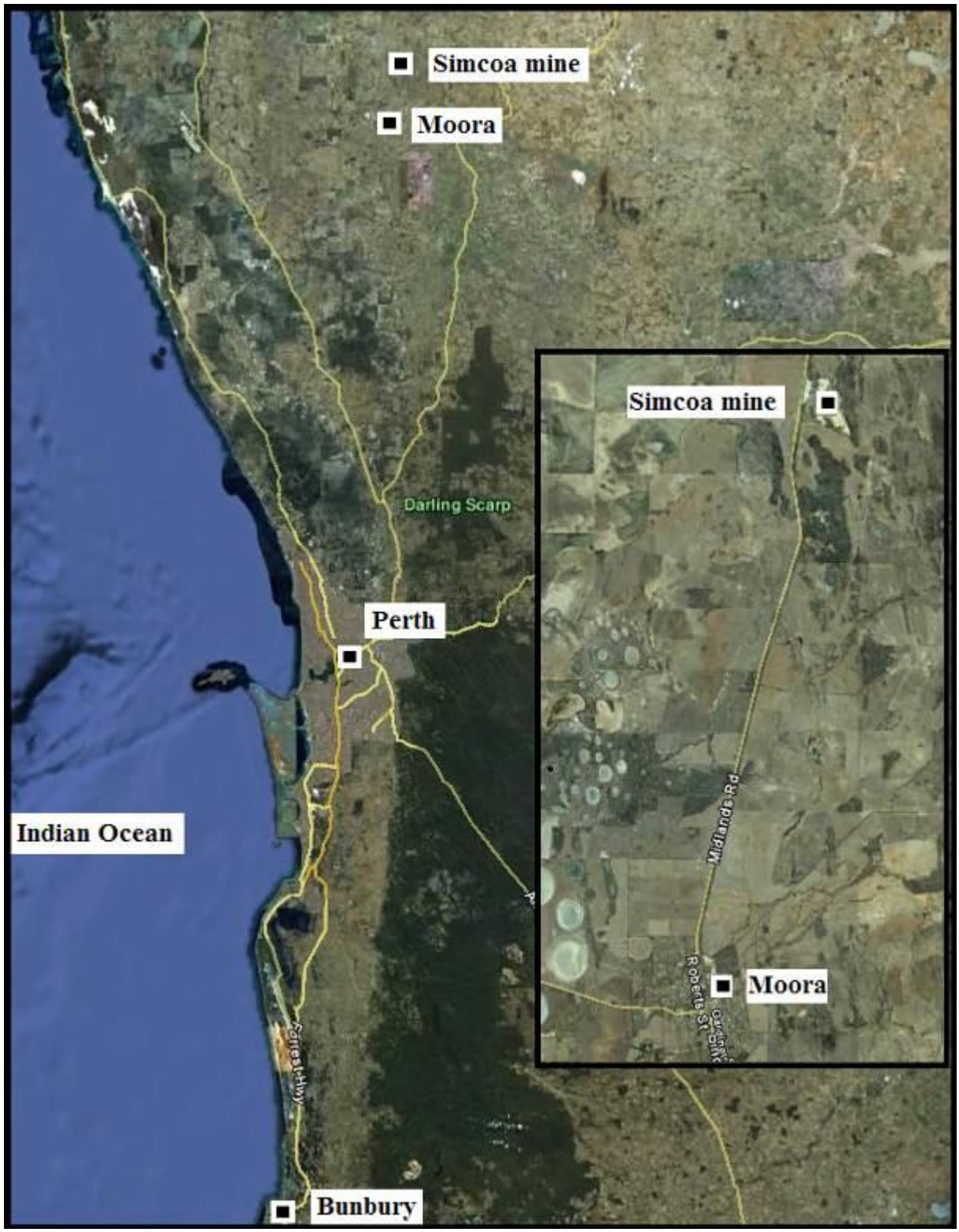
- Arthur and Rhonda Tonkin's property north of Kiaka Road and east of John Tonkin's property;

- Two areas of remnant vegetation on Stan Ridgway's property (Ridgway's East and Ridgway's West);

- Small areas of remnant vegetation on farm land south and south east of Cairn Hill (on Kim Chester's, Morgan's and Gardiner's properties (Small southern remnants);

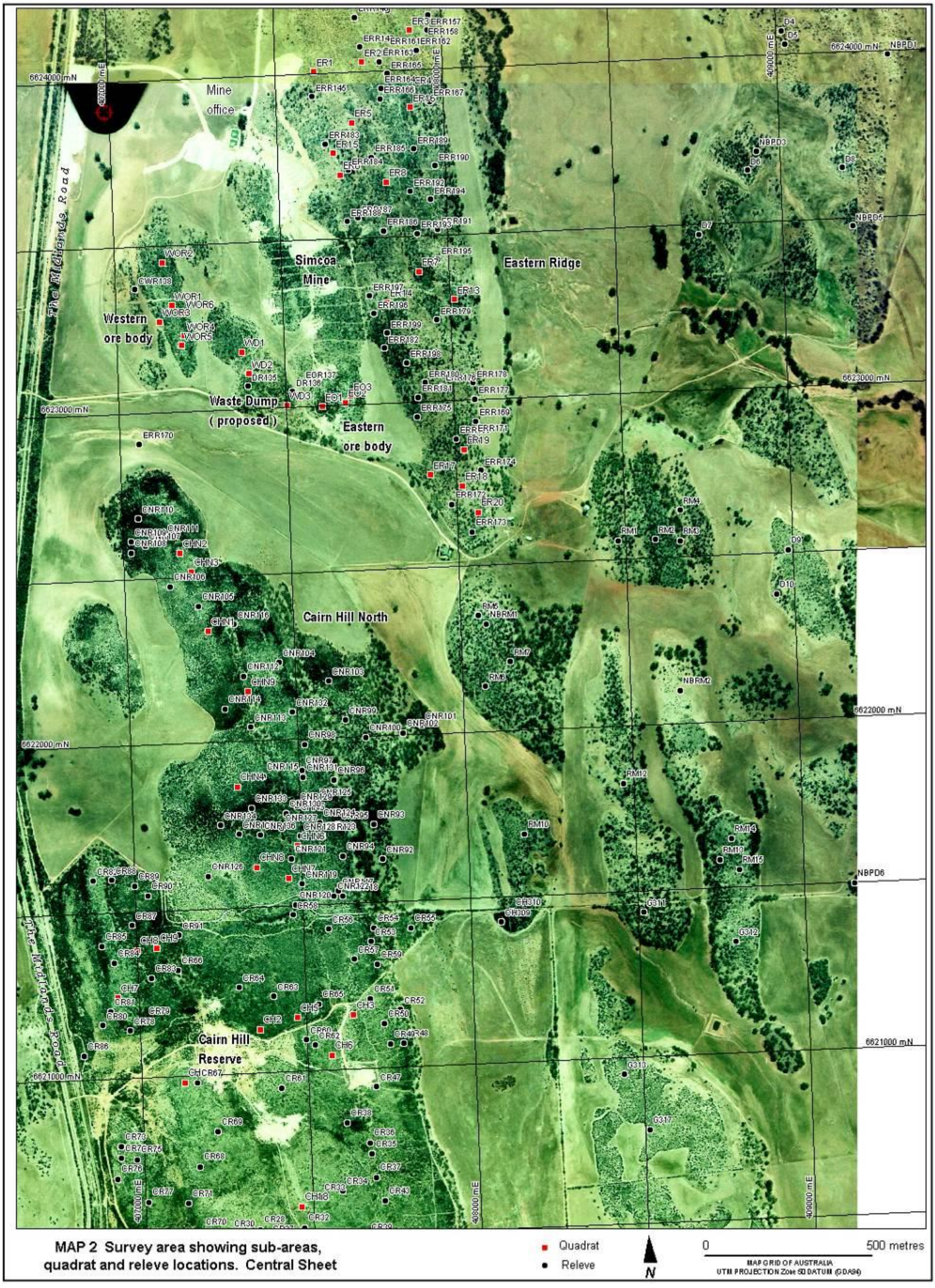
- Small areas of remnant vegetation on farmland east of the Eastern Ridge, Cairn Hill North and Cairn Hill Reserve (on Peter and Loretta Doblestein's, Ron Manning's and Phil and Jenny Gardiner's properties).

Vegetation recording quadrats were recorded in the larger areas of remnant bush, which all included chert ridges. However quadrats were not located in the smaller areas of remnant bushland as they were generally in poorer condition.



Map 1: Location of the Simcoa quartzite mine Australia
Note: Images from Google Earth.


Pipe Middlands Road
Arthur & Rhonda Tonkin's
John Tonkin's
Ridgeway's West
Ridgeway's East
Eastern Ridge
Kiaka Road
Quadrat
Releve
N
0
500 metres
MAP 2 Survey area showing sub-areas, quadrat and releve locations. North Sheet April 2011



MAP 2 Survey area showing sub-areas, quadrat and releve locations. Central Sheet

Note: Large parts of the Western Ridge and "Simcoa Mine Site" have been mined since the image was taken.

M.E. Trudgen & Associates, March 2012



MAP 2 Survey area showing sub-areas, quadrat and releve locations. South Sheet

Quadrat
Releve

N

0 500 metres

MAP GRID OF AUSTRALIA
UTM PROJECTION Zone 55 DATUM (GDA94)

1.4 Previous studies of the vegetation of, or including, the survey area

Several earlier reports or publications provide information on the vegetation considered in this report and are useful background reading.

They include:

- The original vegetation and flora survey for the current mine (Trudgen 1985), which was a survey of a relatively small area based on limited field work, but which identified the *Regelia* and *Kunzea* vegetation as having significant conservation value;

- A survey of the extent of the Priority flora species *Regelia megacephala* (Burgman 1983), which located five populations of this species in the area from Dalaroo to Coomberdale, in which the current survey area is located;

- A detailed study at a subregional level of the remnant vegetation in the Bindoon to Moora area (Griffin 1992) which defined regional vegetation units, one of which is the basis of the threatened ecological unit on the chert hills north of Moora. This study concluded that there were nodes of species richness in the region, and that landscape diversity, contributing to the species richness, was moderate to high in the context of Southwestern Western Australia.

- The draft Interim Recovery Plan (Hamilton-Brown 2000) published by the Department of Conservation and Environment (DEC, formerly Department of Conservation and Land Management CALM)) for the Threatened Ecological Community on the Coomberdale (= Noondine) Chert. This plan documented eight occurrences of the Communities and outlines a proposal for recovery and conservation of the remaining areas.

2.0 DEFINITION AND DISCUSSION TERMS USED

This section gives definitions of a number of the terms used in this report and discussion of them as appropriate. However, some of the terms and concepts relating to vegetation and use of the term *conservation value* will be discussed in more detail in later sections.

It should be noted that what is being done here is to present working, practical definitions. It should be understood that it is difficult to present definitions of some concepts, such as species, plant community and conservation value, that are unequivocal or for which exceptions cannot be found. However, as noted below, while the definition of species is notoriously difficult, this does not stop biologists and others from using the concept in a practical way. Thus the approach taken here is to try to impart the general use (or best use) of terms such as species, plant community and conservation value, rather than to present a legalistic definition.

Flora

The term flora has different meanings in different contexts. A flora species is a member of the plant kingdom, which includes the flowering plants, pines, cycads, ferns, mosses, liverworts, algae, lichens and other groups. Flora in this sense is generally taken to include the fungi, which used to be included in the plant kingdom, but which are now considered to form a separate kingdom. The flora of an area or region is all the plant species of that area or region. An example of the latter use is: an area may be said to have a diverse flora or a poor flora, depending on the number of species of flora present, its area, habitat diversity etc.

Declared rare flora

Declared rare flora species are flora species that are protected by the State through the Wildlife Conservation Act.

Without the consent of the Minister, it is illegal to "take" declared rare flora. The Department of Conservation and Environment (DEC) administers the Wildlife Conservation Act and makes recommendations to the Minister on which species should be gazetted.

Priority flora

The Priority flora list maintained by the Department of Environment and Conservation (DEC, previously the Department of Conservation and Land Management) is a list of species that the Department considers are rare, likely to be rare, or which are considered potentially under threat, but which have not yet been recommended for gazettal (usually because their status has not been sufficiently well defined). There are four priority ratings (Atkins 1995, 1998, 1999, etc), the definitions of which are reproduced in Appendix 1. A list of priority flora is maintained by DEC with the declared rare flora list and updated once or twice a year. The priority status of species is also indicated on the DEC website "Florabase" and the priority levels shown in this report were current when it was written.

Priority species are not protected directly by legislation. However, it is usual for them to be considered during assessment of the potential environmental impact of a proposal by the Environmental Protection Authority (EPA). If the EPA considers that the impact on a population of a priority species is environmentally unacceptable it can recommend to Government that the proposal is environmentally unacceptable, effectively protecting the particular population concerned of the priority species if the Government accepts the recommendation. Alternatively, the EPA may recommend amendment of the proposal to protect the population or part of it.

The Priority Flora List is a working document and species are added and removed, or declared as rare flora as better information becomes available. Due to the size of the flora of Western Australia, changes to the list will occur for some time to come.

Species of conservation significance

Declared rare and priority species are species of conservation significance. However, while declared rare flora are legally protected and priority flora have a level of de facto protection there are other categories of flora or specific populations of flora that botanists consider have special conservation value and would recommend they should be given some level of protection. These include:

- Previously unknown taxa (species or subspecies). The fact that a species or subspecies has not been previously found very often indicates that it is not common and may be rare. This is especially the case in the botanically better-known parts of the State, such as the Swan Coastal Plain and nearby areas;

- Disjunct populations. These are populations that are separated from the main area of distribution of the species they belong to by a significant distance. They are of conservation significance because they are likely to be genetically different from the main population, having the potential to evolve into a separate species over time because of this difference and the disjunction. They may also indicate the ability of the species to inhabit a different habitat;

- Populations at the ends of the range of a species. The populations at the ends of the range of a species may have genetic differences that enable the species to inhabit areas that are environmentally different from the main part of the distribution and also demonstrate the ability of the species to inhabit areas less favourable to it than the main part of the range;
- Un-common or rare species that have not been gazetted as rare or recognised as requiring priority species status. Due to the size of the flora of Western Australia and the small number of botanists working on this flora, it is not uncommon for species to

have not been recognised as requiring protection as declared rare flora or as priority species when one of these categories would be appropriate.

The discussion of species of conservation significance above relates to the general treatment of species in environmental assessments and surveys, that is it focuses on species and populations that are considered of particular importance. However, an equally, or arguably more, valid proposition is that all flora populations have conservation significance, but that to simplify the issue for practical considerations we talk of flora of conservation significance when we mean flora (species and populations) of special conservation significance. That is, flora species or populations that natural or human processes have made of more restricted occurrence or placed under threat.

Dominant

The *Oxford Dictionary of Plant Sciences* (Allaby 1998, p. 142) entry for dominant is "In ecology, the species having the most influence on community composition and form. Sometimes the term is also used to refer to the largest and/or most abundant species in the community." As generally used in relation to vegetation, it refers to either the species that contribute most of the mass of the vegetation, or those that are tallest.

Vegetation

Vegetation is the communities that flora species, including flowering plants, gymnosperms, ferns, mosses, fungi etc., form. The *Oxford Dictionary of Plant Sciences* (Allaby 1998, p. 466) definition, "A collection of plants of diverse or the same species", is not very satisfactory. Barbour *et al.* (p. 4) offer a different perspective, giving the following definition "Vegetation consists of all the plant species in a region (the flora) and the way those species are spatially or temporally distributed." The latter definition adds an aspect of variation through time, but is still not satisfactory, as the term is not solely used to describe the plant cover of a region. A definition such as: *The various forms of communities or structures developed by co-existing populations of plant species*; might be more useful.

A range of terms exists to describe various levels of different classifications of vegetation. The different ways that these terms have been used by different schools of plant ecologists has caused significant confusion in the classification and description of vegetation. There is no simple solution to this problem and the definitions of terms such as *plant community* and *vegetation association* are inherently difficult due to the range and types of variation that vegetation exhibits.

To some degree, in the absence of measurable agreed levels of similarity for defining plant communities and vegetation associations, the definition of such units will remain a matter of opinion for any given survey area. This is because significant causes of confusion relating to the practical description of plant communities and their grouping into vegetation associations

(not to mention assessment of their conservation value) are that before this work can be carried out well, sufficient experience with the species making up the vegetation is needed to enable the variation that exists to be actually observed (ie, if you can't recognise the species you can't properly observe the variation in the vegetation they form) and some familiarity with vegetation of the region being worked in is needed to be able to make judgements of the degree of significance of the variation observed. However, too much should not be made of this problem, as in practice experienced workers often produce fairly similar descriptions of the vegetation of the same or similar areas when they are working at the same level of description.

Vegetation structure

Vegetation structure is the arrangement of the different flora species present in a stand of vegetation into the physical form or physiognomy of the vegetation.

The major components of the description of the structure of vegetation are the height and cover (see below) of the different strata (see below) or layers of the vegetation and the life form of the dominant (see above) species. The cover combined with the form giving an indication of the spatial distribution and abundance of the dominant species.

Vegetation can have very simple structure, such as a grassland, consisting of one layer or stratum, or can have a complex structure with several layers. Sometimes the strata are well defined, and at other times they are poorly defined. An example of a complex structure is a stand with an open layer of Tuart (*Eucalyptus gomphocephala*) trees over a high shrub layer of Parrot bush (*Dryandra sessilis*) over scattered tall shrubs of Zamia Palm (*Macrozamia fraseri*) and Grasstree (*Xanthorrhoea preissii*) over an open low shrub layer of *Phyllanthus calycinus* over an annual herb and grass layer.

Vegetation description schemes such as that of Specht (as modified by Aplin 1979, see Appendix 2) often give arbitrary heights as cut-offs for layers (commonly 0.5 metres, 1 metre, 2 metres and 10 metres). In reality, plants of a species often straggle across one or more of these levels. In such cases it is usual in the description of a vegetation stand to notionally put all the individuals of a species into the upper layer that it reaches. This is done on the assumption that when the stand reaches a mature state that at least most of the individuals will reach this layer. However, where experience indicates that it is only exceptional individuals that are reaching a particular height then it is practical to assign the species to a lower layer.

Plant community

The best use of the term plant community is as a fairly narrow unit of vegetation that consists of one type. That is, it is best regarded as a basic unit that has a low level of synthesis and is not readily dividable into more than one distinct type, although it will have a range of variation. In this use of the term, a particular plant community can be characterised and

recognised by a fairly constant structure, species dominance and floristic composition. That is, there is variation but it is not great. We consider this the best use of the term as otherwise there is no basic unit to use as a base for the development of units of higher order of synthesis. We specify structure, species dominance and floristic composition as these are the major variables of vegetation and any unit that does not take account of all three is unlikely to be satisfactory as a basic unit.

However, plant community is a difficult concept to define, partly because it is different things to different people. Unfortunately, the term is used quite loosely. The various concepts that people hold for plant community are partly derived from the vegetation that they have worked with and partly from the methodology they have used or been taught.

Plant community as described above works well over small to medium sized areas. For larger areas it is more difficult to apply, as the influence of regional scale factors starts to alter the floristic composition of stands of vegetation, making the distinction of related communities necessary.

From this discussion it should be apparent that the definition of individual plant communities, particularly in the absence of a very detailed regional study, is a matter of professional opinion. However, in practice it is often possible to identify many of the plant communities present in a survey area quite readily, with the remainder being more problematical.

Vegetation association

There are different approaches to the definition of vegetation association. Most commonly, it is conceived of as a group of plant communities with similar structure and dominance (this is the approach taken in this report). For example, forests dominated by Jarrah might form one or more associations depending on how the concept is interpreted, how large an area is under consideration and how much variation there is in the understorey.

An alternative view (Barbour *et al.* 1987, p. 7) is that: "An association is the collection of all plant populations co-existing in a given habitat." Such a definition then becomes tied to how habitat is defined and does not actually classify variation in vegetation, rather variation in habitat (in essence, this usage is equivalent to "vegetation complex"). However, Barbour *et al.* also note that "As formally defined in an international botanical congress early this century, an association has the following attributes: (a) it has relatively fixed floristic composition, (b) it exhibits a relatively uniform physiognomy, and (c) it occurs in a relatively consistent type of habitat." These attributes are similar to those for a plant community and so an association really differs from plant community in how widely "relatively" is interpreted.

Vegetation associations can be grouped into broader units (vegetation formations) and may be grouped into vegetation 'sub-alliances' and 'vegetation alliances' as an intermediate step.

Vegetation Formation

A vegetation formation is a very broad unit of vegetation description that is defined by structure only, that is the particular species making up the vegetation are not taken into account, only its physiognomy. Examples of vegetation formations are tall forest, open forest, low woodland, heath and grassland.

Sometimes the term vegetation formation is used to denote a particular example (which would vary from other examples in details such as the dominant species) and the general sense as outlined above is referred to as a "formation type" which is then given as similar in meaning to biome (see Allaby 1998, p. 179).

Biome

"A biological subdivision of the Earth's surface that reflects the ecological and physiognomic character of the vegetation. Biomes are the largest geographical biotic communities that it is convenient to recognise. They broadly correspond with climatic regions, although other environmental controls are sometimes important. They are equivalent to the concept of major plant formations in plant ecology, but are defined in terms of all living organisms and of their interaction with the environment (and not only the dominant vegetation type). Typically, distinctive biomes are recognised for all the major climatic regions of the world ..... eg. tropical rain forest biome...." (Allaby 1998, p. 54)

There are varied concepts for biome, but generally there is an accent on a restriction in vegetation structure (physiognomy) and a geographic/climate aspect. Note that the use of formation as an ecological concept (formation type) is different from that of a vegetation structural classification unit (as it used in this report).

Cover

The cover of a plant species is the proportion of the area of a stand that a species occurs over.

There are two different measures of cover that are often used. The first is canopy cover, which uses the total of the areas within the perimeters of the canopies of all the individuals of the species being considered as the cover. The second is projected foliage cover, which defines the sum of the area covered by the individual leaves of the species when viewed vertically as the cover. (See the vegetation methods and limitations section for a discussion of estimation of cover relevant to this report.)

Stand of vegetation

A stand of vegetation is an area of vegetation with reasonably consistent structure and flora composition within one area of one type of habitat. This can include vegetation that grades

from one structural unit (eg open woodland) to another (woodland), but which maintains some overall consistency.
The change from one stand to another can be fairly abrupt or quite gradual, depending on the way that environmental factors, such as slope, aspect, soil and water availability etc. change (also see ecotone).

Stratum (strata)
A stratum in relation to vegetation is one recognisable layer of the structure or physiognomy of a stand or vegetation unit.

Vegetation classification and description schemes usually have several height intervals defined to facilitate description of vegetation structure (e.g. low forest is less than 10 metres tall, forest 10 to 20 m tall and tall forest more than 30 metres tall). Vegetation varies considerably in the arrangement of the plants present into such strata; sometimes there are well-defined strata, while at other times there are not.

Quadrat or plot
A quadrat or plot is a vegetation or flora sampling site of a defined size and shape that is usually recorded in a homogenous area of vegetation.

Quadrats or plots are usually marked out with pegs at the corners with tapes or cord strung between them at the time of recording. Quadrat size and shape is varied to suit the particular requirements of a survey or monitoring exercise. Quadrats or plots are used to give a higher level of consistency than is achievable from a releve (see below). However, use of (properly recorded) releves can have advantages over the use of plots or quadrats.

Releve
A releve is a sampling site that does not have a fixed size or shape that is marked out, although there is generally an approximate size for a given survey, or an intention to record data of a to a certain level (e.g. all the dominant species and most of the more common species in the area sampled, or all species in the area sampled).

Releves are often used rather than quadrats as well recorded releves can give good data, depending on the purpose for which it is required, and establishing quadrats is time consuming as well as requiring pegs. An advantage of the use of releves is that the area can be varied to record what is judged as a consistently good sample (eg., more than 80%) of the flora species of a stand rather than being constrained by a given area.

Floristic Community Type
A floristic community type is a group of flora recording quadrats (or releves, depending on the study) that represent a range of vegetation separated from other such groups of quadrats

on the presence or absence of flora species, so that quadrats with similar assemblages of flora species are grouped together (or have at least a core group or groups of species in common). It is a poor term, because of the confusing similarity to plant community. In this report "group" in relation to Floristic Community Type is used to refer to the group of quadrats shown to be related to each other in the analyses carried out.

The grouping of quadrats into floristic community types is carried out using appropriate computer programs. Floristic Community Types (groups) can be defined at a wide range of levels depending on the purpose of the study and the size of the data set. There is no standardised terminology to rank floristic community types in a similar hierarchy to plant community, vegetation association etc.

Habitat

For the purposes of this report the term habitat is used to refer to a physical position in the landscape when used to describe the place of occurrence of a vegetation type. For example, slope or crest. This is a fairly broad use of the term, and an individual flora species may have a much more restricted occurrence that would require definition of it's habitat in a more detailed manner that included soil type, rock type and possibly other factors such as aspect and rainfall.

While the various positions in the landscape provide habitats (in conjunction with other variables such as water tables) for vegetation types, the vegetation and landscape provide habitat for individual flora and fauna species. The habitat range of individual species of flora varies very widely, with some being very restricted in habitat while others are found in a wide range of habitats.

Conservation value

Conservation value is the value of an aspect or part of nature, such as a flora or animal species, a type of vegetation, the geomorphology of an area or the geology of a particular outcrop, that relates to, or is brought about by, its development or evolution, often over very long periods of time, as a part of natural systems. A simplified definition would be: Conservation value is the value of some part of nature that is inherent to it.

Conservation status

The conservation status of a species is an assessment of the population status of the species (large, small, rare, how distributed etc.) combined with what processes (eg., clearing of vegetation, dieback disease, grazing) are impacting the populations. That is, an attempt to assess what the outlook for the species is in terms of its longer-term survival. Sometimes conservation assessments are made without taking into account the processes affecting the species or vegetation type being considered.

So a species that is common and widespread with few processes deleteriously affecting its populations would have a good or excellent conservation status while a species that is rare and localised and under pressure could be endangered or under threat of extinction.

In a similar fashion, the conservation status of a vegetation type is an assessment of the future of the vegetation type taking into account the area of the vegetation type remaining, its original extent, how the remaining part of the original extent is distributed and what processes are deleteriously affecting it.

Reservation status

The reservation status of a species or vegetation type is an assessment of how well reserved, that is how well represented in secure conservation reserves, that species or vegetation type is. This will obviously be important for the conservation status of the species or vegetation type as areas or populations in secure reserves will have fewer deleterious processes affecting them.

Ecological community

The term "ecological community" is a catchall jargon of no particular rank or type that is defined as "A naturally occurring biological assemblage that occurs in a particular type of habitat" (English and Blyth 1997, Attachment 1; although I would exonerate them from blame for originating the term, which would appear to literally mean a community that studies its own interactions). Like floristic community type, it is a poor term because of the lack of specificity and the likelihood of confusion with plant community. It also has the deficiency that it defines biological groupings (biota) on the habitat they occur in rather than on their own attributes. Biota would have been a far better term.

Threatened ecological community; endangered ecological communities etc

"A threatened ecological community (TEC) is one which is found to fit into one of the following categories; 'presumed totally destroyed', 'critically endangered', 'endangered' or 'vulnerable'." (English and Blyth 1997, Attachment 1, p. 1.)

English and Blyth (1997, Attachment 1, p. 3) also give definitions for the various categories of threatened ecological communities listed above. For example, they define an endangered ecological community as "An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future".

3.0 CLIMATE OF THE REGION INCLUDING THE SURVEY AREA

The region including the survey area has a Mediterranean climate, with a cool wet winter and summer drought. The summers are warm to hot, with average maxima of approximately 30° Celsius and extremes of over 40° Celsius. The winters are cooler and milder with average maximum temperatures between 15° and 20° Celsius and minimums of around 5° Celsius.

The average annual rainfall is 463 mm, the majority of which falls from May to September.

Figure 1 of Griffin (1992) shows rainfall and temperature graphs for the survey area and compares them with other regional centres.

4.0 GEOLOGY, TOPOGRAPHY AND SOILS

4.1 Geology

The underlying rocks of the survey area belong to the Middle Proterozoic Moora Group. These are sedimentary rocks, which are separated from the Archaean rocks of the Darling Plateau by a series of poorly defined faults (Griffin, 1992).

The Noondine Chert Formation (originally called the Coomberdale Chert), which outcrops frequently in the survey area, is a part of the Coomberdale Subgroup of the Moora Group. "It consists of bedded chert, chert breccia, orthoquartzite, silicified limestone and dolomite and contains significant siliceous siltstone and sandstone beds, and minor claystone." (Carter and Lipple 1982).

The Noondine Chert lies on the western edge of the Darling Plateau, immediately east of and parallel to the Darling Fault. The survey area is located in the largest and most extensive area of outcrops of this formation, between Dalaroo and Coomberdale and includes Cairn Hill, a highpoint approximately fifteen kilometres north of Moora. Cairn Hill is in a nature reserve vested in the Department of Environment and Conservation and was formerly a Westrail reserve for gravel extraction.

The survey area has several faults present, perhaps most notably the Kiaka Fault, which runs NW-NE across the northern end of the Eastern Ridge before disappearing under the sand plain. Partly due to this dissection of the area by faults, acting as drainage channels, the quartzite in this group is relatively free of impurities.

4.2 Topography

The survey area contains part of a narrow and discontinuous series of low hills that are formed from the higher (and presumably more resistant to erosion) parts of the Noondine Chert Formation. These hills run north from Mt. Lamb, approximately ten kilometres south-south-east of Moora, to the Billeranga Hills some thirty kilometres north of Three Springs and occur along the western edge of the Darling Plateau.

Cairn Hill Nature Reserve contains the highest point in the survey area, the hill of the same name. This reserve has some steep, narrow chert ridges in its western part (close to the railway line) and then slopes upwards to the east, moderately and then steeply. Thus a large part of this reserve is westerly facing slopes, although the slopes are complex, so that there are also north-westerly and south-westerly facing areas. The eastern part of the reserve includes the crest above the slope. This has some flattish areas.

The vegetated area referred to in this report as 'Cairn Hill North' (see Map2, central sheet above) is a ridge running north from Cairn Hill Nature Reserve. The crest of this ridge slopes gently to the north, ending in a valley that separates Cairn Hill and Cairn Hill North from the

Western Ridge, the Eastern Ridge and the Eastern Ore Body. Cairn Hill North has a long western slope, while the wooded gullies along the top of the ridge have a variety of slopes, some of which have developed a reasonable soil cover.

The Western Ridge was a small ridge (in fact little more that a shoulder on a larger ridge) to the west of the original mine. Its southern part (about a quarter of its length) had blocky chert outcrop on a steeper southerly facing slope while the northern part had gentler slopes with chert at or just below the surface. The 'ridge' mainly sloped to the west, with a narrow area of gentle eastern facing slope on its eastern side (into a slight dip on the larger ridge the Western Ridge lies on). Since vegetation quadrats were recorded on the Western Ridge, much of it has been mined.

The area referred to as the 'Proposed Waste Dump' is a gently sloping area between the Western Ore Body and the current mine. It slopes to the south and south-west (it is now unlikely that waste will be dumped on this area).

The 'Eastern Ridge' is a long ridge that lies east of the current mine and stretches from south of the current mine path almost to Kiaka Rd, which runs west to east north of the mine site. The Eastern Ridge has a variety of slopes, mostly easterly or westerly facing, with some south and north sloping areas, generally in gullies. The central area of the Eastern Ridge is fairly flat, and slopes gently to the south, east, west and north-east from various parts of the crest. On part of the western side of the Eastern Ridge there is a breakaway, which is curved to form an amphitheatre with steep rocky sides providing a distinctive section of the western slope.

The original mine is based on the 'Eastern Ore Body', (what was) a ridge between the Western and Eastern Ridges. A small section of this ridge remains unmined, immediately south of the mine pit and in the path of the mine. This area has a steep boulder outcrop area facing south-west, below which are gentle colluvial slopes, while from the crest above the outcrop area moderate slopes with chert at the surface run to the south-east.

The areas north of Kiaka Road that were surveyed have a series of more or less parallel north-south trending ridges of chert, with small valleys between them. East of the easternmost of these there is a larger valley. There is an overall slope from east to west, with the western ridges lower than the eastern ones. The ridges vary considerably in cross section, some having gentle slopes on both sides and others (often narrower) having quite steep sides. There were some steep rocky areas, but the slopes are mainly gentle to moderate, with a few being quite steep.

South and southeast of Cairn Hill Reserve there are small, scattered remnants of vegetation on chert on three properties (Chester's, Gardiner's, Morgan's.). The southern part of this area had ridges with very low relief, while the area adjacent to the Cairn Hill Reserve has hills with

steeper slopes and rocky outcrops. The P. & J. Gardiner property had a series of north - south trending ridges and hills with relatively steep western slopes and flatter areas at the top leading to gentle slopes on the north and eastern sides. An area to the east of the south-east corner of Cairn Hill Reserve has more rounded, stony hills with sandy areas between them.

East of Cairn Hill and Cairn Hill North the ridges are generally oriented north-south and are low and rocky.

4.3 Soils

The soils on the chert ridges vary in depth from skeletal on the blocky outcropping chert, to gravelly, loamy sands lower down the slopes (Griffin, 1992). The surface soil was often pale grey, silty, fine sand.

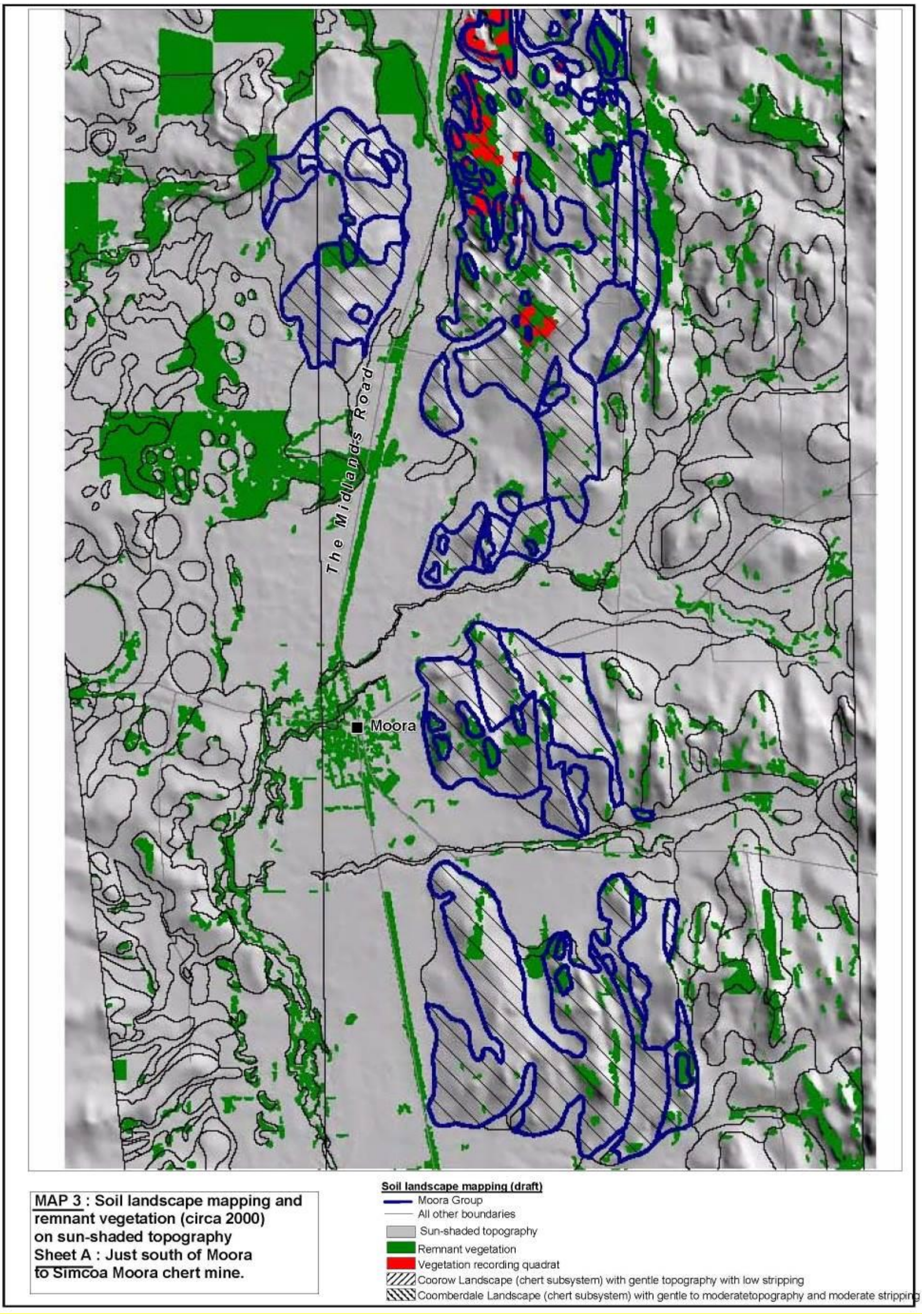
The soils in the valleys between the ridges are deeper over clay and broken rock (A. Tonkin *pers com*. and personal observation).

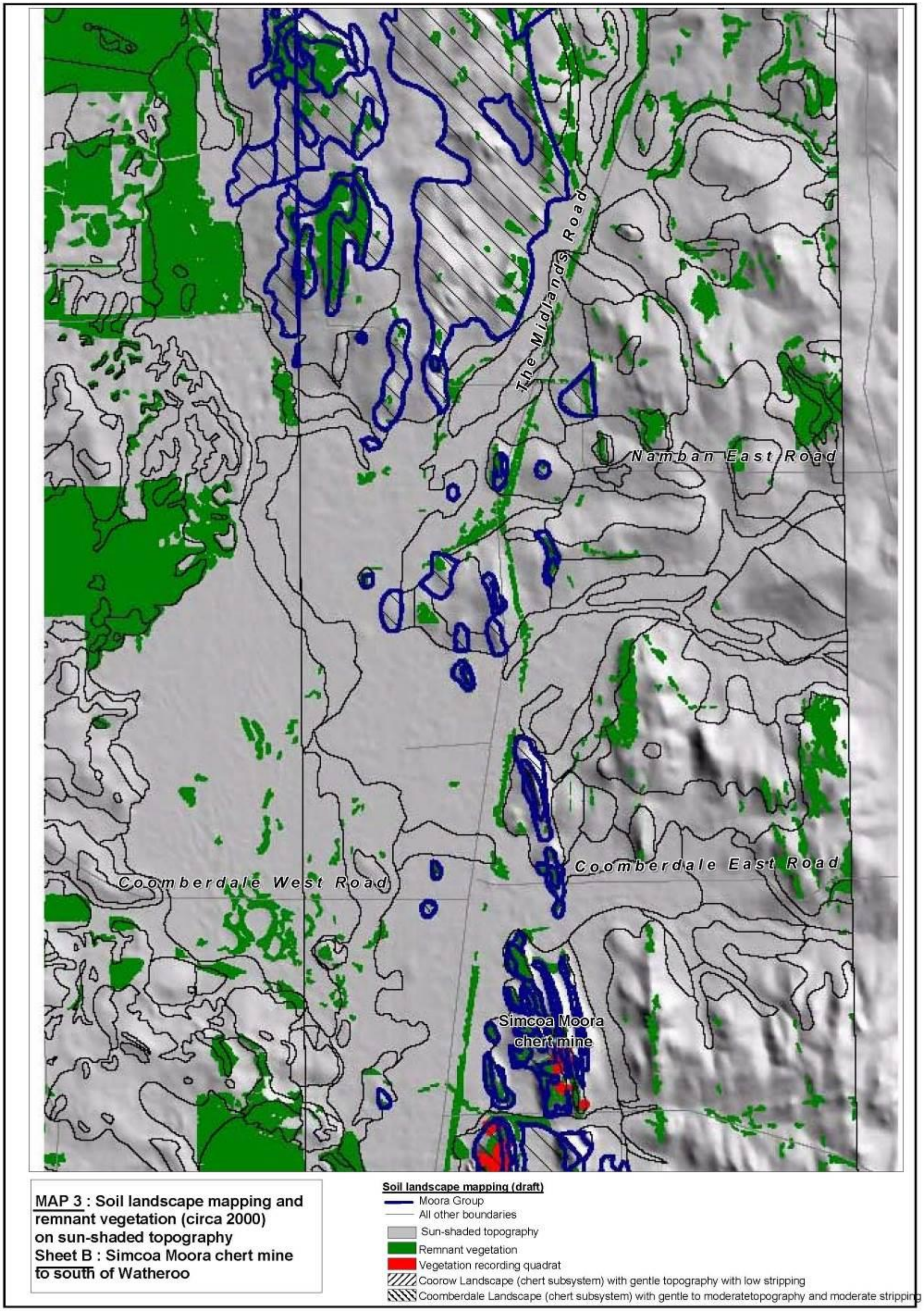
4.4 Mapping summary of landscape, soils and remnant vegetation

Map 3 (Sheets A-F) is a visual summary of the topography and the distribution of soils-landscape mapping units in an area containing the current survey area and the distribution of the Coomberdale Chert.

Of particular interest is the existence of two soil-landscape mapping units in the region that both occur on the Noondine Chert. These are two divisions of the Moora Group. The first is the Coorow Landscape (Chert subsystem) this has gentle topography with low stripping of the soils by erosion. It occurs to the north of the current survey area and does include some chert outcrop. The second is the Coomberdale Landscape (Chert subsystem). This has gentle to moderate topography with moderate stripping of the soils by erosion. The survey area lies within areas of the Coomberdale Landscape (Chert subsystem). The surface in the Coomberdale Landscape (Chert subsystem) generally has outcropping chert on the higher parts and colluvium with chert gravel on the slopes.

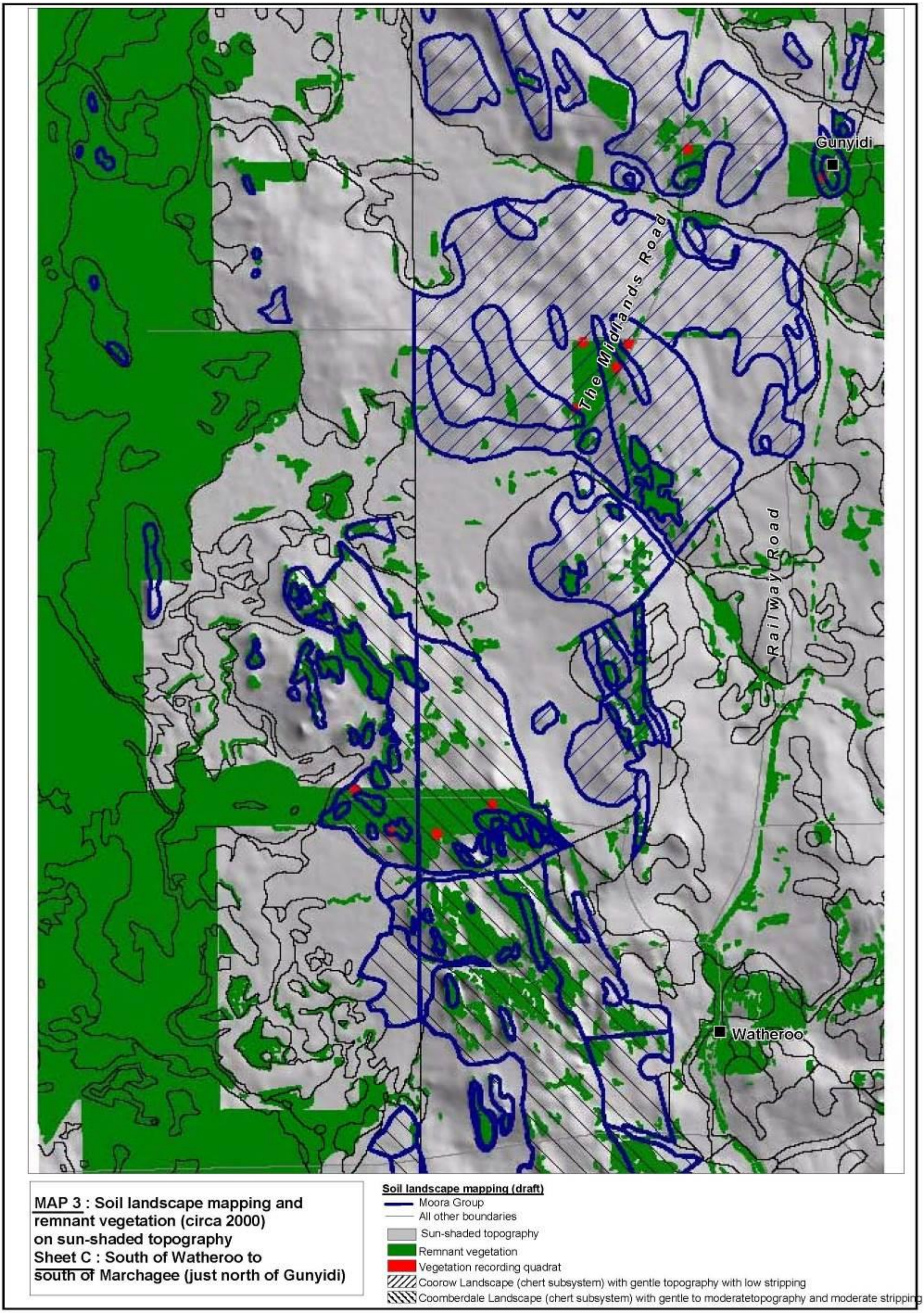
Within individual areas of the Coomberdale Landscape (Chert subsystem) there can be small areas (such as patches of laterite) that are minor occurrences of other subsystems of this soil-landscape unit.


The Midlands Road
Moora
MAP 3 : Soil landscape mapping and remnant vegetation (circa 2000) on sun-shaded topography
Sheet A : Just south of Moora to Simcoa Moora chert mine.
Soil landscape mapping (draft)
Moora Group
All other boundaries
Sun-shaded topography
Remnant vegetation
Vegetation recording quadrat
Coorow Landscape (chert subsystem) with gentle topography with low stripping
Coomberdale Landscape (chert subsystem) with gentle to moderatetopography and moderate stripping



MAP 3 : Soil landscape mapping and remnant vegetation (circa 2000) on sun-shaded topography
Sheet B : Simcoa Moora chert mine to south of Watheroo

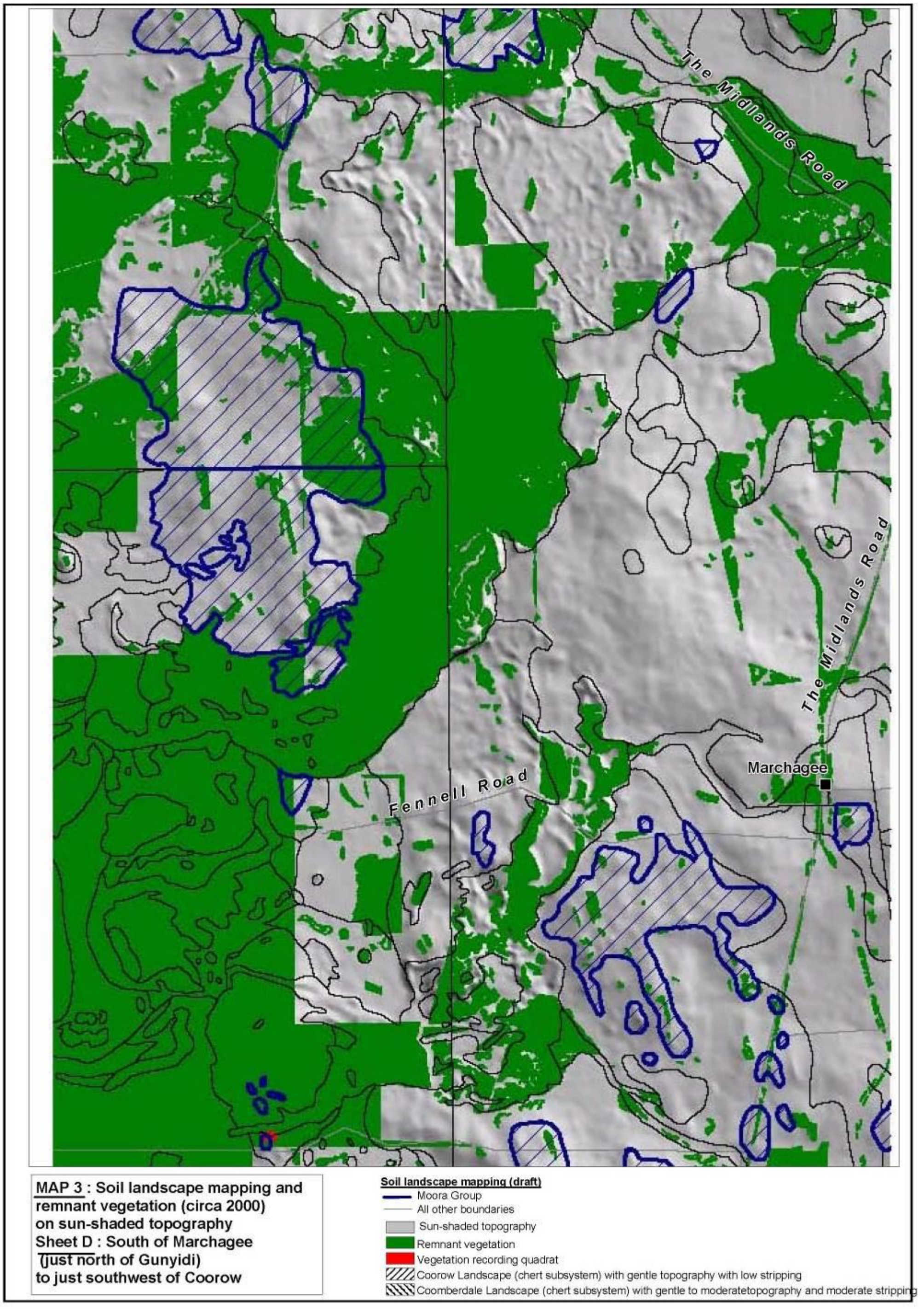
Soil landscape mapping (draft)
- Moora Group
- All other boundaries
- Sun-shaded topography
- Remnant vegetation
- Vegetation recording quadrat
- Coorow Landscape (chert subsystem) with gentle topography with low stripping
- Coomberdale Landscape (chert subsystem) with gentle to moderatetopography and moderate stripping

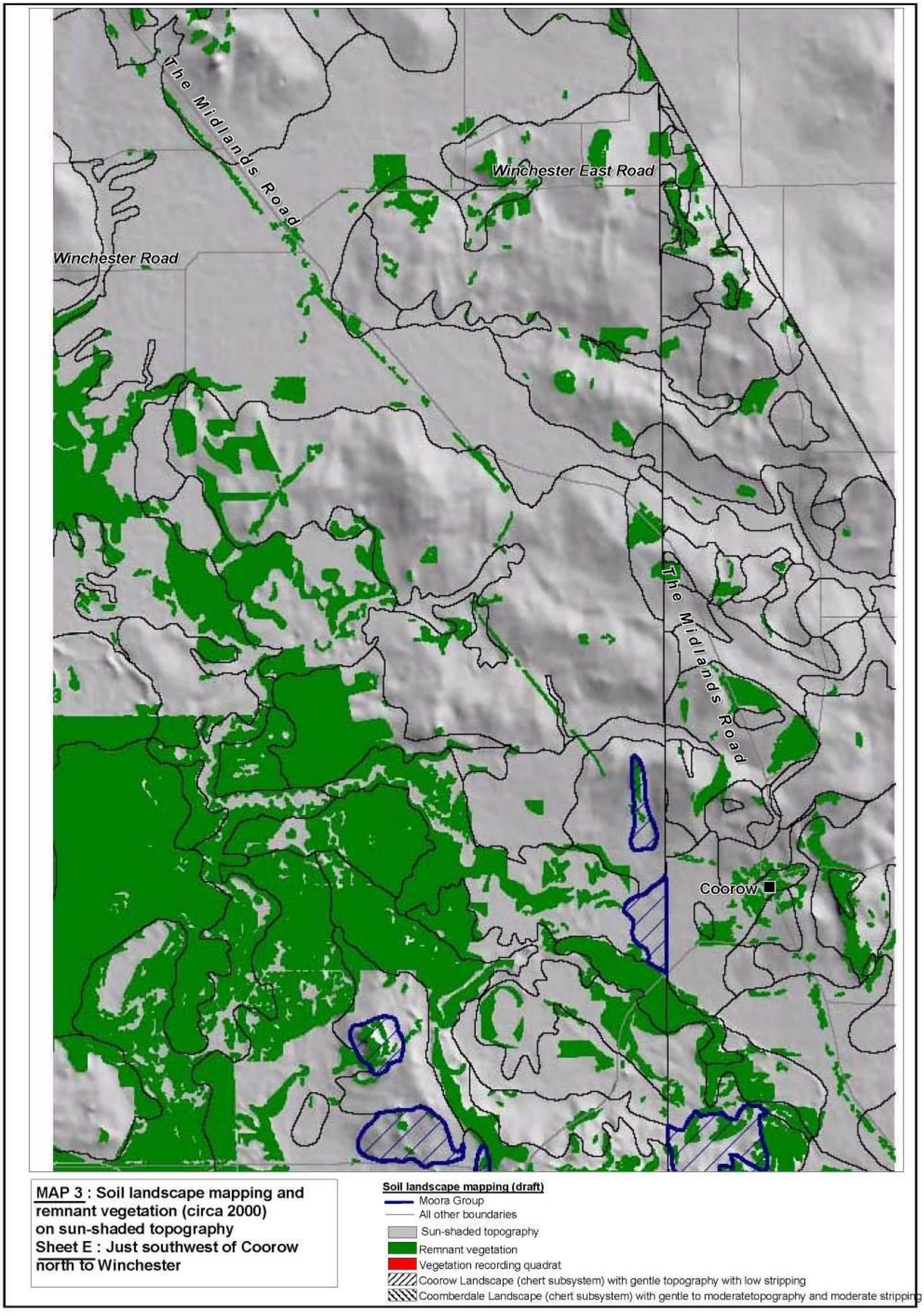


MAP 3 : Soil landscape mapping and remnant vegetation (circa 2000) on sun-shaded topography Sheet C : South of Watheroo to south of Marchagee (just north of Gunyidi)

Soil landscape mapping (draft)

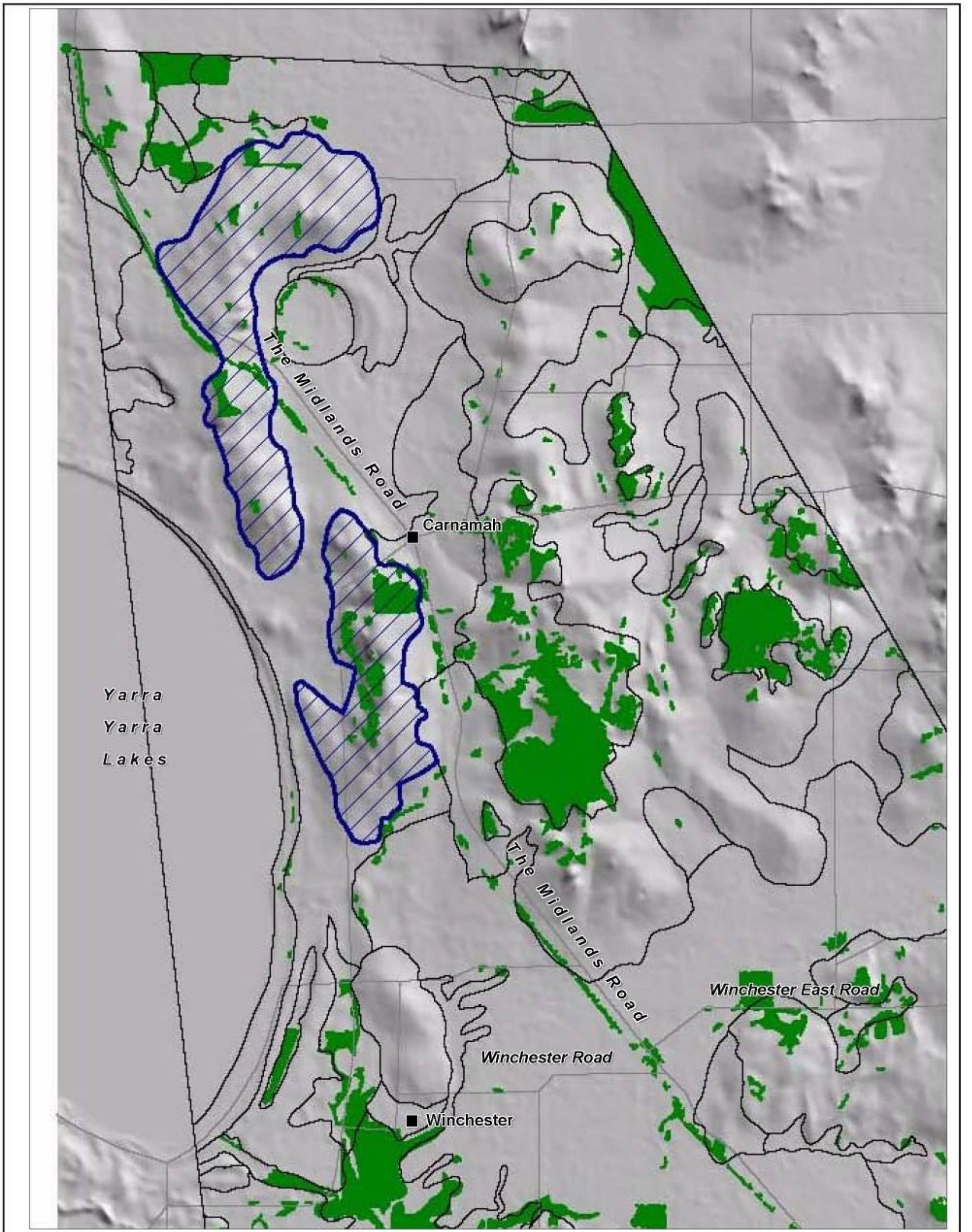
- Moora Group
- All other boundaries
- Sun-shaded topography
- Remnant vegetation
- Vegetation recording quadrat
- Coorow Landscape (chert subsystem) with gentle topography with low stripping
- Coomberdale Landscape (chert subsystem) with gentle to moderatetopography and moderate stripping


The Midlands Road
The Midlands Road
Fennell Road
Marchagee
MAP 3 : Soil landscape mapping and remnant vegetation (circa 2000) on sun-shaded topography
Sheet D : South of Marchagee (just north of Gunyidi) to just southwest of Coorow
Soil landscape mapping (draft)
Moora Group
All other boundaries
Sun-shaded topography
Remnant vegetation
Vegetation recording quadrat
Coorow Landscape (chert subsystem) with gentle topography with low stripping
Coomberdale Landscape (chert subsystem) with gentle to moderatetopography and moderate stripping



MAP 3 : Soil landscape mapping and remnant vegetation (circa 2000) on sun-shaded topography
Sheet E : Just southwest of Coorow north to Winchester

Soil landscape mapping (draft)
- Moora Group
- All other boundaries
- Sun-shaded topography
- Remnant vegetation
- Vegetation recording quadrat
- Coorow Landscape (chert subsystem) with gentle topography with low stripping
- Coomberdale Landscape (chert subsystem) with gentle to moderatetopography and moderate stripping



MAP 3 : Soil landscape mapping and remnant vegetation (circa 2000) on sun-shaded topography
Sheet F : Winchester north to Carnamah

Soil landscape mapping (draft)
- Moora Group
- All other boundaries
- Sun-shaded topography
- Remnant vegetation
- Vegetation recording quadrat
- Coorow Landscape (chert subsystem) with gentle topography with low stripping
- Coomberdale Landscape (chert subsystem) with gentle to moderatetopography and moderate stripping

5.0 SOME SPECIES COMMON IN THE SURVEY AREA

In order to understand the descriptions of the vegetation of the survey area provided in this report and the relationship of this vegetation to other vegetation it is necessary to have some familiarity with the species that form it. It is particularly important to have some familiarity with those species that are relatively important in the vegetation because they are major contributors to the vegetation, ie, are the dominants, providing the structure of the vegetation. Therefore, brief descriptions are provided for some of these species as well as other species of interest.

Two of the species considered in this section, *Regelia megacephala* and *Kunzea praestans*, are quite common in the survey area but are geographically restricted and either uncommon outside the Moora Chert Threatened Ecological Community (the *Kunzea*) or not found out of it (the *Regelia*). The other species discussed below are all quite common outside the Moora Chert Threatened Ecological Community.

***Acacia acuminata* subsp. *acuminata* (Jam)**

Jam is a small tree that usually grows to around five to seven metres tall in the survey area. It has long narrow "leaves" (strictly speaking, phyllodes) of a distinctive dusky green. This species occurs as scattered plants through much of the survey area, usually occurring with *Allocasuarina huegeliana*. Occasionally, it is the dominant in stands.

***Allocasuarina campestris* (Tammar)**

Tammar is a bushy, leafless shrub, usually two to three metres tall with insignificant red (female) or pale brown (male) flowers. The female inflorescence developing into small cone like aggregations of fruit. On the chert ridges in the survey area Tammar generally grows where there is deeper soil (ie. the chert is broken up below the surface). Often this is on mid-slopes, but Tammar also occurs on crests. In summer, Tammar suffers badly from drought stress and turns yellowish as the stems lose their green colouration. Heath dominated by this *Allocasuarina* is one of the main plant communities in the Coomberdale Chert Threatened Ecological Community.

***Allocasuarina huegeliana* (Rock Sheoak)**

The Rock Sheoak is a leafless tree four to ten metres tall that is often associated with granite or other rocky areas. The bark is dark with longitudinal fissures. This tree tends to avoid the exposed chert, preferring to grow on deeper soils on slopes, in gullies or in valleys, although it grows on crests if there is deeper soil. Rock Sheoak is the dominant in some communities.

***Dryandra sessilis* var. *sessilis* (Parrot Bush)**

Parrot bush is a shrub or small tree to five metres tall, with cream or yellow flowers. It is usually a fairly dense plant, and flat sclerophyllous leaves with spines on the margins. This

species is widespread in the survey area, but is not abundant there as it appears to favour the slopes below outcropping chert, and these have been largely cleared.

Hibbertia subvaginata

This species is generally an erect shrub with yellow flowers, although sometimes it is spreading and it is often rather straggly. Most individuals observed were about 0.5 to 1.2 metres tall, except under denser vegetation and in re-growth areas where it was lower. In the survey area, *Hibbertia subvaginata* was often found with *Kunzea praestans* and also often with the Declared Rare Flora species *Acacia aristulata*. While not abundant in most vegetation types in the survey area, it is occasionally dominant in the lower shrub layer.

***Eucalyptus loxophleba* ssp. *loxophleba* (York Gum)**

York Gum is a small to medium sized tree, with most individuals in the survey area being five to twelve metres tall. It has rough bark persisting on the lower part of the trunk, often with strips peeling on the upper parts. While not common on the ridges, York Gum did occur on the ridges where soils were deeper (for example, there were scattered individuals on upper parts of the Eastern Ridge and on the lower slopes of the Proposed Waste Dump). However, York Gum is commoner on lower slopes in the survey area.

***Eucalyptus wandoo* subsp. *wandoo* (Wandoo)**

Wandoo is a medium sized tree with slightly powdery, smooth white bark often with pink and/or grey tones (this varies through the year). There are usually brown patches of dead bark on the trunk and branches, giving a mottled appearance. This tree was found on the eastern side of the Eastern Ridge, in a small community on a fault line or dyke. It was also observed in Cairn Hill Westrail Reserve near the radio tower and on a lower slope on A. & R. Tonkin's property.

***Kunzea praestans* (a relative of the bottlebrushes)**

Kunzea praestans is an erect shrub with pink flowers and small leaves. It is usually one and a half to two metres tall, but was seen to three metres tall. In the survey area, *Kunzea praestans* was usually found with *Hibbertia subvaginata* and was sometimes found mixed with *Regelia megacephala*, although it tended to occur at the edge of *Regelia* stands rather than with the *Regelia*. It was observed at or near ridge crests and on slopes, usually in gravelly soil, but also in broken chert. Stands dominated by *Kunzea* are also from plant communities that belong to the Moora Chert Threatened Ecological Community as strictly defined.

***Regelia megacephala* (a relative of the bottlebrushes)**

Regelia megacephala is an erect shrub from two to five metres tall with purplish-red flowers and small, thick leaves in four rows. It grows mainly where the underlying chert is fairly massive, with relatively little infiltration of gravel and soil from the surface. In such situations, where other species appear to be unable to compete, it forms dense stands.

Vegetation dominated by *Regelia megacephala* forms several plant communities that are part of the Moora Chert Threatened Ecological Community.

***Xanthorrhoea drummondii* (a Grass Tree)**

This species is a Grass Tree or Blackboy; in the survey area it is usually from two to four metres tall, however it often occurs with shorter stems.

(This section from personal observation and from Paczkowska and Chapman, 2000.)

6.0 DISCUSSION OF DIFFERENT METHODOLOGIES FOR STUDYING VEGETATION RELEVANT TO DESCRIPTION AND ASSESSMENT OF THE VEGETATION OF THE SURVEY AREA

6.1 Scope of this section

This section will briefly describe and discuss some of the different methodologies that have been used for studying, describing and mapping the vegetation of the survey area and areas including it. Understanding of the different approaches is necessary to understand the bases of each and how they can properly be used, as well as understanding their relationship to each other and to vegetation, as it exists in the field.

It is also important to understand that the study of the vegetation of an area is an iterative process, refined over time as the theoretical limitations of studies and approaches are recognised or overcome, or different, often more specific, questions are asked that require more detailed study and understanding to be adequately answered.

It also needs to be recognised that studies of regional variation often cannot answer questions requiring answers based on more detailed knowledge, but provide a framework within which more detailed studies can be carried out. So (ideally) there is a progression from broader regional studies to detailed studies of smaller areas although, in practice, small areas often get studied before whole regions. There has also been a technological element involved in the progress of studies of vegetation in recent years. Until fairly recently, computers able to handle significant sized datasets were not readily available, this has changed, and has meant studies using larger data sets have become more practical.

The approaches discussed are the:

- More traditional structure and dominant species approach using the classification of Specht as modified by Aplin (1979) as an example (which has been used to describe the vegetation of the survey area);

- The floristic method, for example the floristic analyses carried out for this survey, and the survey of the Bindoon to Moora region by Griffin (1992);

- The approach of Beard (1980) in his regional mapping

These different methods are based on the use of either the structure and species dominance or the overall floristic composition of the vegetation, or a combination of these attributes. Before discussing them, it is worthwhile to consider why there are a number of different methods and not a single agreed resolution for classification of vegetation. The essence of the problem is that vegetation is very diverse as a result of:

- The number of species available within a region to form a stand;
- The number of species (few to many) that may form a stand of vegetation;
- The differing contribution to biomass that species can make in different stands (ie. one, a few, or more may be dominant or co-dominant);
- The number of different habitats vegetation occurs in, even in one region;
- The fact that habitats are often not discrete, ie. the change from one habitat to another may be gradual or abrupt;
- The range of structural types that vegetation can take, for example from herblands with one low stratum of herbs to forests or woodlands with two tree layers, three shrub layers and herb or sedge layers (although, this is driven by habitat); and
- The range of climate that vegetation occurs in, even within a single region.

Thus, the study of vegetation is difficult and is a particular case of the complexity of biological problems caused by the general problem that nature is extremely diverse.

6.2 Discussion of individual approaches used

6.2.1 The structure and dominant species approach

This approach places emphasis on the species present that are abundant or relatively so, and often largely on the tallest stratum of the vegetation. Therefore it generally emphasises those species that are more structurally important and/or often visually important from a human perspective.

The structure and dominance approach defines plant communities that are then grouped into vegetation associations and further into vegetation formations, with intermediate groupings sometimes used such as sub-formation or society. The left hand column of Table 1 shows this hierarchy. At the upper level of this approach (vegetation formation) only the structure is used. This provides a conceptual break between association and formation, because in the latter unit the identity of the species in the vegetation is ignored. This is a larger conceptual break than between association and community as here the difference is a matter of level. The definition of both the vegetation association and plant community levels is based on a combination of structure, dominant species and overall species composition.

Using the simplest format of the structure and dominant species approach (describing the tallest stratum of vegetation only) can be unsatisfactory in ecological studies or for conservation assessment as it can group together otherwise dissimilar vegetation on the basis

of a similar upper stratum even though the lower strata are different. Also, the upper stratum may not be a good indicator of habitat values for other flora and for fauna.

The modification by Aplin (1979) of Specht's classification uses description of all the different vegetation strata in a stand. At higher levels (eg. formation) it uses only the upper stratum, but at lower levels (eg. plant community) it uses all the strata. This vegetation classification system is used in this report to describe the vegetation stands recorded and the communities and associations defined from them.

6.2.2 The floristic approach, for example Griffin's (1992) survey of the Bindoon to Moora region

The floristic approach is based on defining units in the vegetation of an area on the basis of species presence and absence, ignoring their individual contribution to the biomass or structure of the vegetation. Generally, computer programs such the 'PATN' package (Belbin 1987 and later dates) are used to sort sites, on the basis of detailed flora lists, into groups or clusters of sites having more similar lists and providing a measure of that similarity. The resulting groups are then used to define units often referred to as "floristic community types". A step beyond the usual presence/absence sorting occurs when the site data includes information on the species cover. Then, the approach tends back towards the structure/dominance approach, but with the emphasis on floristics.

In general with the floristic approach it is found that, where it is desired to define regional units, a good result is obtained from the use of presence/absence data only (i.e., without cover). This would appear to be reasonable, as over large areas there is more scope for changes in climate, soil and habitat to cause differences in the presence or absence of species than over small areas. Correspondingly, when defining units of a lower order over smaller areas, abundance data is often found to be useful as the scope for changes in species composition is lower over smaller areas, but changes in habitat can influence abundance greatly. Lower order units will have similar floristics but different abundances.

The study of Griffin (1992) is of particular interest in the context of floristic studies of the region containing the survey area, as it is the only study of the region based on a large number of rigorously recorded sites. Griffin uses his floristic data (which includes cover values) to firstly define " vegetation types" and then secondly to describe seven floristic regions. Referring to Table 1 (see below), Griffin's " vegetation types" are equivalent to a unit at a level of synthesis between a vegetation association and a vegetation formation and his floristic regions are of a similar level of synthesis to the vegetation complex level of Heddle (1980), but are defined differently. Griffin (1992, p. 1) notes that the vegetation types were significantly "correlated with geological substrates". These units, while very useful in describing broad variation at the regional scale, are limited in that middle and lower order

units with conservation significance were not defined (to be fair such units were beyond the scope of the project) and consequently not available for conservation assessment.

6.2.3 The approach of Beard (1979) in his regional mapping

Beard used a variety of information, including soils and geology maps, to define broad map units for which he then described the vegetation using a physiognomic approach. This approach is similar to the vegetation complex approach. However, the amount of detail for each polygon is usually restricted to one generalised vegetation description rather than the description of a range of vegetation likely to occur in a polygon.

6.3 The relationship of the units used in different approaches to studying the vegetation of the survey area.

The relationship of the various units used in the studies commented on, and their appropriate use, may be better understood by tabulating them (see Table1) so that concepts of approximately the same level of synthesis are arranged more or less together, although there may be some overlap. This does not imply that the units are equivalent or interchangeable; they are products of very different concepts. What Table 1 shows, is the level at which the units should be interpreted. It also shows that most of the units in use in the region including the survey area are very broad units, a reflection of the fact that very little detailed description of vegetation has been carried out in this region.

6.4 Method of description of units used in this report

In this report, Aplin's (1979) modification of Specht's vegetation description system is used for describing and mapping the vegetation. While Specht's original scheme did not adequately deal with the variation found in vegetation because of a reliance on the upper stratum, Aplin included lower strata, eg shrub or herb layers, to allow differentiation between what may otherwise seem to be the same vegetation. This then gives a description that addresses two criteria that need to be considered when defining plant communities, the structure of the vegetation and the dominance of the species that make up the bulk of the structure. A third criterion, the overall floristic composition, is considered by comparison of the site species lists.

This approach allows the description of plant communities as basic units of the vegetation of the survey area. These are then grouped into vegetation associations and these again into vegetation alliances (see Table 1).

Table 1: Comparison of some units of vegetation description used for the survey area, or areas including it and some used in well known studies on the Swan Coastal Plain and the adjoining Darling Plateau to the commonly accepted structural/dominance classification of vegetation to indicate the approximate relationship of level of synthesis of these examples of various approaches used to study vegetation and the distribution of flora.

Hierarchy for vegetation divided on structure only at the two upper level(s) and on structure and dominant genera or species at the lower levels	Examples of vegetation divided on structure only at the two upper level(s) and on structure and dominant genera or species at the lower levels	Vegetation divided on geomorphological boundaries with subdivision on structure and dominant species	Vegetation divided only on the basis of the presence or absence of flora species (floristic analysis using pattern analysis).	Vegetation divided on the basis of the presence or absence of flora species and cover of species (floristic analysis using pattern analysis with cover).
Biome A concept that is partly distinguished on structure and partly on being a geographical entity. For example, the tropical rainforests of the Amazon Basin are a biome. Obviously, such as a large entity would not be entirely one formation but would have inclusions of others that would occur in a related fashion. This concept therefore straddles the conceptual boundary between the units in this column and the next.				Floristic Regions of Griffin (1992) defined in his Bindoon to Moora study area ☜? [See discussion in 8.0 below]
Vegetation formation A concept that covers vegetation of the same structure of the upper layer without reference to dominant species. While stands referred to a particular formation may have similar structure, they may have different dominant and associated species. For example a Banksia woodland with two shrub layers and a herb layer and a Casuarina woodland with virtually no understorey are both simply woodlands at the formation level. Aplin's (1979) modification of Specht provides a list of 29 formations		Vegetation complex on the Swan Coastal Plain A concept that covers a range of structural types that occur on a major geomorphological unit. (Heddle *et al.* 1980) Vegetation complex on the Darling Plateau (+/- land unit) A concept that covers a range of vegetation that occurs on one part of the range of geomorphology of the Plateau and the valleys incised into it and with subdivisions based on changes in vegetation related to broad climatic para meters. (Note: this reflects the fact that the Plateau/ Scarp complex has a higher range of topography and is older than the coastal plain, meaning that more diverse ecological situations have *developed. The result (with exceptions) is that there is less structural diversity in P/S vegetation complexes(Heddle *et al.* 1980 gives 30 vegetation complexes for the Northern Jarrah Forest) (? variable, possibly to sub-formation)	Gibson *et al.* (1994) level floristic community type Uses a concept that divides flora records for sites into a number of groups of sites on the basis of species presence and absence. The number of groups used being selected by the person doing the analysis. That is, varies from study to study. Gives 36 Floristic community types for the southern Swan CP [(? Variable, possibly to alliance)	Vegetation types of Griffin (1992) for his Bindoon to Moora study area Used both species composition and cover to define 45 "Vegetation types" [See discussion in 8.0 below] ☜?

Vegetation sub-formation At the sub-formation level, the genus of the dominant of the upper layer is included to group examples of the same formation with related species as the dominant(s). For example, *Eucalyptus* woodland.		Mapping by McArthur and Mattiske (1985) of the Bassendean Dunes of the Gnangara Mound		
Vegetation alliance This groups examples of associations that have the same dominant species. For example, *Eucalyptus marginata* (Jarrah) forest and may have the same or related species important in the understorey			Floristic "groups" (or "floristic community types") defined in the current study of the Moora chert hills. (Possibly higher than here)	
Vegetation association A concept that covers two or more plant communities with similar structure and dominant species. May vary significantly in associated species but all stands referred to it will have some visual similarity.	Vegetation associations described for the Moora Chert Hills study. Some possibly nearer alliance.			
Society A series of plant communities with the same structure and the same species dominant in the different strata				
Plant community The basic unit of vegetation description (although, sometimes sub-communities are defined). Standing at one place looking at a stand of vegetation one is looking at a physical example of a plant community. Extending this concept to several very similar stands introduces some variation and it becomes a concept.	Plant communities described for the Moora Chert Hills study			
Stand A particular example of a plant community				

Notes: Based on Table 3 of Trudgen (1999) and expanded to include relevant studies. Definitions of *alliance* and *society* follow Aplin (1979), the definition of *association* used is similar in meaning to that of Aplin. The definition of *biome* by various authors varies significantly, the concept used here is somewhat more restricted than used by some authors (see Allaby 1998, p 54 for example) who would equate it to all examples of a particular formation or a climatic type and arguably it could be above or below formation in the left hand column of this table (or in the column to the right at a higher level than land system (bioregion). Alliance and society are rarely used.

7.0 APPROPRIATE USE OF THE DIFFERENT VEGETATION UNITS IN THE ASSESSMENT OF THE VEGETATION

7.1 General comment on the use of regional units

The use of regional units in the assessment of conservation value for vegetation should take into account the variation within them. This variation may be regional or sub-regional variation in the flora composition or structure and dominance of stands. It may be caused by climatic or edaphic changes over distance or it may be related to the fact that broad units contain a range of finer units at a local or district level that are related to local or district changes in environmental factors; such as aspect, depth to water, or slope. Regional units should not be perceived as uniform, homogenous entities when they are mostly in fact quite variable. Therefore, regional units should be used to identify the need for conservation at a regional level (e.g. there should be reservation of such a unit over it's range), or the value of an area at the regional level, understanding that more detailed studies of the vegetation would be needed for a more detailed analysis.

7.2 The use of the floristic regions of Griffin (1992)

The floristic regions of Griffin (1992) are regional scale units that divide the landscape on a very broad scale and therefore it is appropriate to use them for assessing the value of areas at this scale. These floristic regions largely follow large-scale geomorphological/geological features presumably because the floristic variation they are based on is related to such features. It could not be expected that units defined at this scale will take into account significant variation in habitat that would support a wide range of vegetation types. An example of an appropriate use would be to assess the adequacy of reservation in the region at the level of these units.

7.3 The use of the units of Beard (1979) in conservation assessment

The units of Beard (1979) are conceived at quite a broad level and, like the vegetation types of Griffin (1992), divide the landscape at a broad scale. Therefore, these units can be used in a similar way to the floristic regions of Griffin, but are less well developed than those. As noted above, they are essentially broad level "vegetation complex" units (that is largely defined from geology or soils units), but with a low level of detail for what each unit covers.

7.4 The use of the "vegetation types" of Griffin

These units are generally sub-regional units, and as there are no maps of their distribution, it is not possible to use them in conservation assessment based on the area of their original extent and the proportion of that extent remaining. However, the number of occurrences known for each gives some indication of the abundance of them in remnant vegetation, and the number of them in particular floristic regions gives some idea of the diversity of vegetation in those regions. Ideally, these units would be used in conjunction with more detailed analysis and vegetation mapping to assess the part of the variation of them present in

an area and its importance. It might be possible to use them in conjunction with Beard's mapping.

7.5 The use of plant communities and vegetation associations in vegetation conservation assessment

Plant communities (as used in the description of vegetation in this report) are units of vegetation that closely reflect how vegetation occurs in the field. They are low-level units that discriminate the vegetation at a fairly fine level based on structure, dominance by different species and overall floristic composition. Thus, assessment at the plant community level allows either a real measure of the variation and diversity of the vegetation of an area, or a comparison of areas based on their relative values for vegetation at this level.

Two areas could be in the same floristic region (or other broad floristic unit), or have vegetation referrable to the same vegetation formation, but have quite different vegetation when assessed at a plant community level. To use the vegetation of the survey area as an example; it all falls within Griffin's (1992) Coomberdale Floristic Region and includes three of his "vegetation types". However the vegetation of the survey area is very rich at the plant community level, due to the significant variation in habitat and soils present. Thus the plant community level can be used to make comparisons between two (or more) areas of vegetation that are located in the same broader unit, such as the same "vegetation type" of Griffin or in one of the areas defined by Beard (1979).

The vegetation association level can be used in the same way, but because these units are somewhat broader, the comparison between areas will be less detailed and therefore the reliability of the comparison less robust.

8.0 BOTANICAL CONTEXT AND DEFINITION OF THE COOMBERDALE CHERT THREATENED ECOLOGICAL COMMUNITY

The survey area lies in the South West Botanical Province of Beard (1980), one of the three botanical provinces defined by Beard for Western Australia. Within this province, it is located in the Avon Botanical District, close to the border of the Darling Botanical District. Apart from Griffin (1992), and some very localised studies, there is relatively little published material dealing with the vegetation of the Avon Botanical District.

Griffin's (1992) Bindoon to Moora study area samples several of Beard's botanical districts, including part of the Avon Botanical District, and uses floristic and cover data to define "floristic regions" for the study area and within these what Griffin called "vegetation types".

Griffin's floristic regions are obviously lower level units than Beard's (1980) botanical districts, but are of a higher level of synthesis than the vegetation complexes defined for the Swan Coastal Plain by Heddle *et al.* (1980), and also therefore a higher level than formation (but of a different type to both). Griffin's floristic regions are part way between the level of vegetation formation and biome, just where depending on which definition of biome is used (biome is generally used in such a broad way that Griffin's units must be well below this category, but somewhat above vegetation formation).

Griffin's " vegetation types" are equivalent to a unit at a level of synthesis between a vegetation association and a vegetation formation (but closer to the latter) and may approximate the level of the vegetation complexes defined for the Swan Coastal Plain by Heddle *et al.* (1980). Griffin (1992, p. 1) noted that his vegetation types were significantly "correlated with geological substrates", which suggests a similar level to the Swan Coastal Plain vegetation complexes (see section 2.2.2 and Table 1 above).

Griffin placed the chert hills of the Noondine (Coomberdale) Chert in his Coomberdale Floristic Region. This floristic region occurs on the Noondine Chert Formation between Moora and Jingemia Hill, which is in the Watheroo National Park northwest of Watheroo. The largest and most extensive area of outcrops of this chert, and hence the largest representation of the vegetation of the Coomberdale Floristic Region occurs between Dalaroo and Coomberdale, where the current survey area is located. Three of Griffin's (1992, see pp. 134, 135, 136) "vegetation types" (numbers 23, 25 and 26) make up much of the vegetation of the survey area.

Hamilton-Brown (2000) has discussed the vegetation on the chert hills of the Coomberdale Floristic Region, recasting Griffin's three "vegetation types" as three "sub-units" of the threatened ecological community on the chert hills of the Coomberdale Floristic Region. She notes that "Three closely related vegetation sub-types occur on the exposed chert ridges and gravelly slopes of the Chert Hills in the Coomberdale Floristic Region that are recognisably

different from other vegetation types within this floristic region and other floristic regions." These sub-types (after Hamilton-Brown, 2000) are:

- Sub-type 1: a dense heath dominated by *Regelia megacephala* or *Allocasuarina campestris* on exposed chert ridges, with the *Regelia* being especially prominent on the ridges with little or no soil cover;

- Sub-type 2: a dense heath or open low woodland over dense to mid-dense heath dominated by *Kunzea praestans* on ridges or slopes; and

- Sub-type 3: *Allocasuarina campestris* on shallow loamy rocky soil on ridges or slopes.

It is presumed in this report that the circumscription of the Coomberdale Chert Threatened Ecological Community was restricted to these three sub-types because that was the level of information available, whereas the intent seems to have been to protect all the vegetation restricted to Noondine Chert outcrop and soils derived from it.

The vegetation described above has been listed as an "endangered" ecological community, under the title "Heath dominated by one or more of *Regelia megacephala*, *Kunzea praestans* and *Allocasuarina campestris* on ridges and slopes of the chert hills of the Coomberdale Floristic Region" (Hamilton-Brown, 2000). Part of the reason for perceived importance of the vegetation defined as this Threatened Ecological Community is that some stands are dominated by two species that have very restricted occurrence (*Regelia megacephala* and *Kunzea praestans*). Many of the "heath" stands are in fact high shrubland or high open scrub, not heath.

A preferable way to deal with the definition of the Coomberdale Chert Threatened Ecological Community would be to define it on a vegetation complex basis: as that vegetation on the outcrops and surrounding slopes of the Coomberdale Chert. To base the definition on the three sub-types listed above excludes not only much of the variation on the chert and slopes, but much of the less common vegetation. For example, the *Dryandra sessilis* vegetation on the slopes has been preferentially cleared (as the soil is better than upslope, though still gravelly and sometimes with some outcrop) and is a much smaller component of the remaining vegetation of the chert ridges and associated slope than the *Allocasuarina campestris* vegetation units.

9.0 A DISCUSSION OF RARITY IN RELATION TO VEGETATION

Any assessment of the rarity of an area of vegetation depends on the level of description used, the boundary the assessment is related to and a decision regarding what constitutes rarity in the sense of either a relative measure (for example an attribute such as the remaining percentage of the original extent), or an absolute measure (e.g. having an original extent that was small enough to be inherently rare, or being reduced to an area that is inherently rare).

The same area of vegetation may be thought of as common as part of a broadly defined unit or less common as part of a lower level unit. That is, when broader units are used to assess rarity then what is actually assessed is the rarity of that particular unit, not of any of its components.

Thus, if broad units alone are used to assess rarity then the real rarity of an area of vegetation (or of components of it) may not actually be assessed. Broad units often include unusual areas that have not been recognized as different. They may not have been discriminated to minimise the number of units mapped, or because their separation was not relevant to the aim of the mapping. The point here is that the real rarity of vegetation is a function of what exists in the field rather than in abstract units defined at broad levels, and it is important that the units used reflect this real variation as closely as possible (for example, plant communities), or that the limitations of using broader units are understood and taken into consideration. It is also the case that assessment based on different levels or types of information can, when they are combined, give the best overall understanding of the importance of an area of vegetation in the absence of critical mapping of regions at a level that identifies rarity in a meaningful manner. For example, using the detailed mapping of a small area to interpret the value of an area of a broad unit can give critical insight into how the values of the broad unit vary (eg. with topography or soil changes).

Turning to the boundary an assessment is made within, an area may appear to have common vegetation if a small surrounding area (context) is considered, but to have rare vegetation when a wider region is considered. Such a situation is described as locally common but regionally rare, with the latter more accurately describing the status of the vegetation. An extreme example of how the selection of boundaries affects the concept of rarity is that, from a world viewpoint *Banksia attenuata, Banksia menziesii* woodland is extremely rare, being found only in a small corner of Western Australia, while from a different viewpoint, perhaps only considering a small area surrounding Gingin, it appears very common. The point here is that a boundary has to be selected to have meaning in relation to the vegetation type being considered and the question being asked. To achieve a full understanding of the significance of an area of vegetation, it may be necessary to look at more than one boundary to reflect the relationship of different contexts to different levels of assessment. That is, if the area under consideration is heterogonous then it may be necessary to consider the rarity of different parts of it in relation to different boundaries or concepts.

To fully assess the rarity of an area of vegetation it makes sense to use boundaries that have been defined on biologically relevant bases rather than arbitrary ones. That is, the types of boundaries that are likely to be most useful are Botanical District or Sub-district boundaries and geomorphological boundaries (which may or may not co-incide).

The question of how much of an area of vegetation qualifies as rare, either in an absolute or relative sense, is a matter of opinion as there is no way of devising a standard from basic principles. Trudgen (1995) considered this question of a definition of rarity in relation to vegetation for the purpose of an assessment for the Australian Heritage Commission and made the following observation and suggestions in the Western Australian context:

"There are no accepted definitions of rare flora communities (vegetation) and ecosystems and no simple definition is practical. For the purposes of this analysis, the following definition is advanced: an ecosystem or vegetation type (whether plant community, association, vegetation complex or floristic community type) should be considered rare when:

- Its original extent was less than 2,000 hectares, irrespective of what proportion of its original extent survives; or

- Its original extent was 2,000 to 20,000 hectares and less than 2,000 hectares or less than 30% of its original extent survives; or

- Its original extent was 20,000 to 100,000 hectares or more and the portion of the original extent remaining is less than 30% for an original extent of 20,000 ha declining to less than 20% for an original extent of 50,000 ha to less than 10% for an original extent of 100,000 ha or more.

The thrust of this definition is to define vegetation as rare when its original extent was very small (2,000 ha or less) and as having become rare compared to an original extent when the original distribution has become reduced by clearing or other activities [to] below the areas suggested above. The end of this sliding scale has been taken as ten percent for areas of 100,000 ha or more, as ten percent is the minimum area recommended for protection of an ecosystem by the International Union for the Conservation of Nature (IUCN). However, this would obviously not be appropriate for vegetation types (or ecosystems) with very small original extents. Therefore, a sliding scale was chosen to link small areas through intermediate sized areas to the general standard. Obviously, this is somewhat arbitrary, but a vegetation type with an original extent of only 2,000 hectares is rare or at least unusual on a national scale and a vegetation type that originally had an extent of more than 100,000 hectares and has been reduced to 10,000 hectares or less is certainly uncommon (or rare) compared to its original extent. The scale attempts to provide a resolution of a problem that is

partly absolute (for small original extents) and partly relative (for large original extents) and should be taken as a guide." (Trudgen 1995, pp.7-9).

While this approach does not solve the problem (it is one person's opinion), it at least makes the issues clearer when considering the effect of the absolute and relative aspects of rarity of vegetation on the conservation value of the vegetation of an area of land.

Although there is no generally agreed approach to the assessment of rarity of vegetation in Western Australia, English and Blyth (1997) have developed "categories for assigning conservation status to ecological communities". The categories they selected "are based on the most recent World Conservation Union (IUCN) categories for threatened species or communities". Their categories are:

"a) presumably totally destroyed (PD)
b) critically endangered (CR)
c) endangered (EN)
d) vulnerable (VU)
e) data deficient (DD)
f) lower risk (LR)
g) not evaluated" (English and Blyth 1997, p 3 and Attachment 1)

The definition advanced by English and Blyth for their 'critically endangered' category is "an ecological community which has been adequately surveyed and found to have been subject to a major contraction in area and/or which was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated."

Later in their report (English and Blyth 1997, Attachment 6, p.4) they give criteria for the listing of critically endangered ecological communities:

"An ecological community will be listed as **Critically Endangered** when it is facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting **any one or more** of the following criteria (A, B or C);

A) The estimated geographic range, and/or the total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% **and either or both** of the following apply (i or ii);

i) geographic range, and /or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 5 years)

ii) modification throughout its range is continuing such that in the immediate future (within approximately 5 years) the community is unlikely to be capable of being substantially rehabilitated.

B) Current distribution is limited, and **one or more of** the following apply (i, ii or iii);

i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 5 years)

ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes

iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.

C) The ecological community exists only as highly modified occurrences which may be capable of being rehabilitated if such work begins in the immediate future (within approximately 5 years)."

While these criteria recognise the absolute and relative aspects of rarity, and in fact recognise the same level (10% remaining) as an indication of a critical reduction in original area that indicates relative rarity, they are aimed at identifying entities that are under immediate threat. That is, they are provided for use in identifying ecological communities in urgent need of management or protection due to threatening factors rather then simply to identify rarity.

As a result of their work, English and Blyth have identified sixteen critically endangered, seven endangered ten vulnerable and five deficient "ecological communities", which they list in their Table 1 (English and Blyth 1997, p.4). Examination of this list shows that what is being dealt with is the rarest of the rare, that part of the category that is under threat of loss in the near future. While this is extremely valuable and will result in the protection of areas of conservation and scientific value, it does not deal with the more general question of what constitutes rarity for the question of assessment for conservation value. Note that in the intervening period that the Department of Environment and Conservation have updated such lists and this later material is available on that departments website.

Table 1 of English and Blyth (1997, p. 4) lists communities already assessed at the time of publication of the report. The definition of an ecological community given by English and Blyth (1997, Attachment 1) is “A naturally occurring biological assemblage that occurs in a particular type of habitat”. This applies to the vegetation which is the subject of this study (ie., the vegetation of a series of low chert ridges), although it is not one "assemblage", but rather is an assemblage of assemblages (plant communities).

English and Blyth (1997, Attachment 5) include the Coomberdale Floristic Region of Griffin in their table of ‘Ecological Communities Proposed for Inclusion on the Threatened Ecological Community Database 7/5/97’. This "community" was assessed by the Department of Conservation and Land Management's (the precursor to DEC) Threatened Ecological Communities Scientific Advisory Committee as Endangered in October 1999, and an Interim Recovery Plan has been formulated (Hamilton-Brown, 2000).

10.0 METHODS AND LIMITATIONS OF THE VEGETATION AND FLORA SURVEYS

10.1 Methods of the flora survey

The flora survey of the overall survey area of this report is quite comprehensive, being based on a combination of fieldwork carried out for the precursors to this report (Trudgen *et al.* 2001 and Trudgen *et al.* 2006) and work carried out to complete the vegetation flora surveys on Arthur and Rhonda Tonkin's property in 2010. This included:

- Collection of flora specimens during the recording and re-visiting of the floristic survey/vegetation survey quadrats;
- Collection of flora specimens during recording of releves for the vegetation mapping;
- Opportunistic collections of flora specimens made between the quadrats and releves, especially of species not previously recorded;
- Collection of flora specimens during a systematic survey (see section 10.2) of the distribution of Declared Rare Flora for almost all parts of the survey area, especially of species not previously recorded.

During the work for the precursors to this report, three thousand seven hundred and fifteen (3,715) flora collections were made for the identification of species occurring in the quadrats, about another one thousand five hundred (1,500) collections were made during the vegetation mapping, on route between quadrats and releves and during the rare flora search. A further two hundred and sixty-six (266) collections were made while surveying Arthur and Rhonda Tonkin's property for this report. This gives a total of about five thousand four hundred and sixty collections made for the whole area covered by this report.

Thus, the flora survey was carried out in conjunction with the vegetation survey, the data collection (recording of quadrats) for the floristic analysis of the vegetation and the rare flora survey. The resulting flora list also incorporates data from the original survey of the mine site (Trudgen 1985) and data from Griffin (1992) from within the survey area.

The specimens collected were numbered to tie them to the quadrats, releves or locations (including a geocode) noted for them. Specimens were numbered and pressed on site, and dried later. Common species known to the authors were collected only a few times to ensure accurate identification, while species not well known (or taxonomically difficult, such as *Austrostipa* species) were collected at each quadrat to ensure identification was consistent. Once dried, specimens were sorted and identified. Identifications were made by keying specimens out in various papers and books, comparison to specimens in the research and reference collections of the Western Australian Herbarium, and by relevant experts on various

taxonomic groups (see acknowledgements section). The specimens collected at different times were comprehensively checked against each other to ensure consistency in naming.

Prior to and during the fieldwork, flora lists from previous studies (Trudgen 1985, Griffin, 1992) and the 1995 and 1998 DEC (formerly Department of Conservation and Land Management) Declared Rare and Priority Flora Lists (Atkins 1995, 1998) were consulted to ensure that species of conservation interest recorded from, or likely to occur in, the survey area were known and could be identified.

The Access database containing the vegetation data is structured so that it can provide a flora list, incidental records are typed into a "dummy" site so that they are included in the list. The list produced also indicates the number of records made for each species in the quadrats.

10.2 Methods for the searches for declared rare flora

There were two distinct methods used in the declared rare flora searches, which depended on the aim of the search.

Firstly, on the Western Ridge, Eastern Ridge, Cairn Hill North, the Proposed Waste Dump and the vegetation remaining on the Eastern Ore Body where the aim was to gain a quite accurate assessment of the populations of DRF present, searches were carried out in transects (note, that some of these areas have now been mined). Areas where the vegetation was relatively dense, restricting visibility, were searched at a 5-10 metre spacing depending on density. This covered all areas except for the southern end and northern half of the Eastern Ridge and the southern part of Cairn Hill North. The southern part of the Eastern Ridge, where the vegetation was not as dense, was searched at a spacing of about 20 metres (areas considered more likely to have declared rare flora, ie. *Kunzea* and *Regelia* stands were targeted for more intensive searching in these areas). When DRF or suspected DRF were found, the location was recorded using a GPS unit and the number of individuals present within a 5 to 10 metre radius noted. Where larger groups of individuals of DRF were encountered, a 20 to 30 metre radius was searched.

In the searches carried out on private property north of Kiaka Road and south of Cairn Hill, time did not allow as detailed a survey. In these areas, straight transects along a compass bearing were replaced with a zigzag pattern within set boundaries that was somewhat dictated by the density of the vegetation. When DRF were found, the location was recorded with a GPS unit and a count of individuals made within 50 metres of the GPS point. Note that when the vegetation of these areas was mapped, further observations were made for DRF.

10.3. Methods of the vegetation survey and floristic analysis

10.3.1 Methods for vegetation quadrat selection and recording

Prior to beginning of the original parts of the survey, aerial photographs of the survey area were studied to gain an impression of the variation of the vegetation in the survey area. It was decided to use quadrats measuring 10x10 m (ie. 100 m^2), as this size is commonly used in regional surveys in the south-west of Western Australia (eg., Griffin 1992, Gibson *et al.* 1994) and it would allow comparison of the data collected to previously collected data. However, it was also decided to record a 30x30 m (900 m^2) quadrat surrounding the smaller quadrat to provide data appropriate for more detailed study of the floristic analysis of the vegetation. This decision was partly taken on the basis that the vegetation of the survey area tends to be species poor, so that larger plots would provide samples less prone to stochastic variation.

Within the limits of the time available, quadrat sites were selected to represent the range of the vegetation types present in the survey sub-areas sampled. However, because of the high diversity of the vegetation, while the range was sampled, not all variation in that range could be sampled. The 10x10 m quadrats were pegged at all four corners with galvanised fence droppers and the location of the first peg recorded with a hand-held GPS unit. The 30x30 m areas were defined around the smaller area with tape measures but were not pegged or locations recorded with the GPS, as location of the pegs for the 10x10 m quadrat would adequately locate the 30x30 m quadrat. Where it was not possible to fit the 30x30 m quadrat in exactly because of stand size or disturbance, the boundaries were modified to include 900 m^2 where possible.

At each of the quadrats, the structure and dominance of the vegetation was recorded using Aplin's (1979) modification of Specht's table (Appendix 2). When a stratum was floristically diverse, only the more abundant species were included in the vegetation description. The quadrats were carefully searched to record as many of the species present as possible, all species observed were recorded for the site with an estimate of their height and cover. A "+" sign was used to indicate a cover assessment of significantly less than 1%.

At each site the condition of the native vegetation was assessed using the scale of Trudgen (1988, reproduced in Appendix 3). The scale has six categories as follows:

Excellent
Very Good
Good
Poor
Very Poor
Completely Degraded

Completely degraded was used to cover areas of post mining regrowth, severely disturbed areas and areas with only scattered trees remaining. Also recorded at each site were the levels of weed invasion and brief notes on the surface soil. The condition scale from Trudgen (1988) was modified so that 'Completely Degraded' areas included parkland cleared areas (areas with only scattered native plants in pasture) and areas where the vegetation had been removed when they were mined for gravel. Areas in Cairn Hill reserve, which had been mined for gravel and consequently had some apparently spontaneous regrowth, were also included in the 'Completely Degraded' category.

10.3.2 Data basing of the quadrat records

All data from the recording sheets used was entered into a Microsoft Access database with the interface mimicking the recording sheets. After specimens were identified the names were entered into the database at the appropriate collection number, to correct field identifications. Duplications were removed to avoid errors in analysis. The database has report functions to generate species lists and to export the vegetation data for inclusion in reports (for this report see Appendix 6) and forms suitable for floristic analysis.

10.3.3 Floristic analysis of the quadrat data

The quadrat data was analysed on a floristic basis (species presence and absence) with and without weeds and again including cover (without weeds) using the PATN computer package (Belbin 1987). One of us (E. A. Griffin) carried out the PATN analysis. The methodology used was generally similar to that used by Griffin (1999).

To provide a regional floristic context, a further analysis was carried out using relevant data from Griffin (1992) combined with data from the survey area.

10.3.4 Vegetation mapping methods

The vegetation of the survey area was mostly mapped at the plant community level, although some units may be either equivalent in level to the vegetation association level. The vegetation unit boundaries were drawn onto digitised images of 1:5000 ortho-corrected aerial photographs with a geocode (WGS84 datum) grid and the quadrat locations marked on them. The community boundaries were drawn on the photographs either using boundaries that were self-evident on the photographs, or by plotting boundaries on the aerial photographs by using a GPS unit and the grid marked on the photographs.

Where the vegetation was very similar or effectively the same as that recorded in one of the eighty-eight quadrats recorded in the survey area, the vegetation was considered to be equivalent to the vegetation of the relevant quadrat. Where a vegetation unit had not been previously recorded, the vegetation was described (using Aplin's (1979) modification of Specht's table) and the geocode, soil, habitat, some associated species and usually vegetation condition were recorded. These releve sites were numbered for the survey sub-area they were

located in. Using this methodology, all vegetation areas (polygons) drawn on the aerial photographs were labelled with a quadrat or releve number to indicate vegetation type.

Subsequently, the vegetation stands sampled in the quadrats and at the releves were classified into plant communities and these in turn into vegetation associations, based on a combination of structure, dominance and floristics. Stands were allocated to the same plant community if they had very similar structure, dominants and floristics. Plant communities were allocated to the same vegetation association if they had similar structure and dominant species, even if varying significantly in associated flora species (that is, the associations are sometimes fairly broad for the vegetation association level). The vegetation associations were then grouped into broader groups (called *Vegetation Alliances* in this report) that approximate vegetation alliances (see Table 1 above) in their level of synthesis, but not strictly in terms of their delimitation.

Each Vegetation Alliance contains vegetation associations with the same species forming the dominant cover, but not necessarily the tallest stratum. For example, the vegetation associations *Regelia megacephala* open scrub and *Allocasuarina huegeliana* low open woodland to low open forest over *Regelia megacephala* open scrub over scattered sedges and herbs were both included in Vegetation Alliance 15: *Regelia megacephala* high shrubland to open and closed scrub'.

The vegetation associations were given unique codes based on the first letters of the names of their dominant species, eg. Vegetation Association EsEl is *Eucalyptus salmonophloia* woodland over *Eucalyptus loxophleba* subsp. *loxophleba* low woodland over scattered *Acacia erinacea* and scattered herbs and grasses including *Ptilotus divaricatus* var. *divaricatus*, *Rhodanthe polycephala* and **Bromus diandrus*. Within each vegetation association, the plant communities have been were distinguished by adding numbers after the association code, eg EsEl.1.

The hand drawn map was scanned and the polygons digitised using a digital mapping program to produce a final map.

10.3.5 Vegetation condition mapping methods

Vegetation condition was estimated at many of the ninety-nine quadrats (see section 10.3.1 above) and several hundred releves recoded for the vegetation mapping. At these sites vegetation condition was assessed using the vegetation condition scale of Trudgen (1988). As well as this 'point' data, vegetation condition was noted in areas where vegetation condition was poorer, such as the smaller fragmented remnant vegetation blocks to the south and east of Cairn Hill and Cairn Hill North.

To produce a map of the condition of the vegetation of the survey area using this data, it was plotted onto a digital image of the vegetation. Areas of similar vegetation condition were then

defined by the occurrence of the point and other data, supplemented by the overall knowledge of the vegetation of the survey area.

10.4 Limitations of the flora survey

The major limitation of the flora survey reported is that any such survey is a sampling procedure in a variable environment that attempts to locate all species present when there is variation in population size, distribution, flowering time and distinctness (visibility or ease of discrimination in the field, which is related to size and morphology) of species. Some species are only available for collection for part of the year, for example annual species such as many daisies, which survive summer as seed, and cryptophyte species such as orchids, that survive the summer as tubers. If these have the opportunity to begin their growth cycle early, or if the year is a bad one, they may be missed, also, a few species of orchids only flower in some years. These factors mean that to locate all species from a survey area the size of the current one with a relatively small number of visits to each sub-area is an unrealistic expectation. The completeness of a survey is therefore dependent on the time available, when the work is carried out, the size and habitat diversity of the survey area, and the experience of the workers carrying out the search.

However, the flora survey presented in this document now reports quite detailed work for the area surveyed, as it includes records from ninety-nine (99) vegetation recording quadrats; records made during systematic rare flora searches; incidental records; records made at releves; and records made during the vegetation mapping. For much of the survey area this includes records from different times of the year, so that autumn, winter and spring sampling is represented. Most of the quadrats were visited twice, increasing the sampling for the overall flora survey. The exception is that, due to the drought year in 2010, sampling on the property of A. & R. Tonkin is somewhat less than other parts of survey area.

A significant limitation of the flora survey is that it is restricted to flowering plant species and other vascular flora groups (pines, cycads, and ferns). Fungi, mosses, liverworts, lichens and algae are generally not surveyed for environmental impact assessment and associated surveys in Western Australia, as surveying each of these groups is a specialist task, the level of information available to assess them against is poor and they comprise only a small part of the vegetation biomass.

Given the above limitations, it is likely that this work has recorded more than 95% of the flora of the overall survey area. However, a somewhat lower percentage is likely to be recorded for some of the individual sub-areas of the survey area.

While the survey has been as thorough as possible given the time constraints, it is possible that some species of conservation significance (Priority species, Declared Rare Flora, previously unknown species etc) occur in the survey area but have been missed.

10.5 Limitations of the rare flora searches

To locate all individuals of rare flora in areas as big as those surveyed would be a substantial task, however it is estimated that 90 to 95% of the populations on the Western Ridge, Eastern Ridge, Cairn Hill North (excluding an area adjacent to Cairn Hill not searched due to time constraints), the Proposed Waste Dump and the vegetation remaining on the Eastern Ore Body were located. For the areas north of Kiaka Road and south of Cairn Hill it is more difficult to estimate what percentage of populations were found however, it is likely to be more than 85% (with those missed being smaller populations or isolated individuals) as these areas have been re-visited since the rare flora survey for the vegetation mapping and to establish quadrats.

A significant limitation of the rare flora survey was that Cairn Hill was not specifically searched, however, The Department of Conservation and Environment (DEC) has kindly allowed use of data from a partial search of the reserve and a significant amount of data was available for this area from the quadrats recorded and observations made during the vegetation mapping carried out for this report.

10.6 Limitations of the vegetation mapping and classification

The vegetation of the survey area consists of a large number of small stands of a significant diversity of vegetation types, many of which are not discernable on the aerial photography available for the project. This has meant that there are limits to the accuracy of the individual polygons, although such limitations are within those usually accepted for vegetation mapping.

Many of the stands have the same dominants in varying amounts, or variations of combinations of them, and similar permutations in the understorey layers. However, at the same time they are significantly different in terms of vegetation classification. These aspects of the vegetation have made the classification of the vegetation very difficult, with the only way to express this diversity being a large number of units. While this reflects the diversity present, it makes "reading" the map more difficult due to its complexity.

In some places the stands were too small to map or were very variable, such areas have been mapped as mosaics.

10.7 Limitation of the vegetation condition mapping

The condition of the vegetation was not mapped in the field as a separate task, rather when it seemed desirable to include a vegetation condition map in the report, it was deemed practical to use the information collected at the quadrats and releves to define vegetation condition at those points and then combine this information with aerial photograph interpretation and the knowledge of the areas to produce a map of vegetation condition. Therefore, the vegetation condition map is limited by the amount of information available. However, the number of

points where condition was recorded is quite large and so the map should easily be of sufficient accuracy for environmental impact assessment or reserve planning uses.

10.8 Limitations of the floristic analyses

Any floristic analysis is limited to some degree by the number of sites recorded (or otherwise available) and the thoroughness with which they are recorded and whether or not the recording includes visits in different seasons. Other factors that can influence the results are the size of the quadrats and seasonal factors. In the present case the size of the quadrats is appropriate for the purpose of the analysis. The density of recording (number of quadrats related to the variation being sampled) is good, except it was found that in the update of the report to include A. & R. Tonkin's property that more quadrats in other parts of the northern end of the survey area would have been desirable to better understand the floristics of the vegetation on A. & R. Tonkin's property.

However, it is not clear if the problem was lack of such quadrats, or the effect of the drought on the data recorded from the quadrats on A. & R. Tonkin's property (see below).

11.0 RESULTS OF THE FLORA SURVEY AND RARE FLORA SEARCHES

11.1 Flora recorded

Three hundred and thirty-eight (338) species of native flowering plants, one native pine (*Actinostrobus arenarius*) and four species of native ferns (three *Cheilanthes* species and a *Pleurosorus*) were recorded for the survey area. In addition, fifty-four (54) introduced species of flowering plants (weed species) were also recorded.

Of the native species flowering plant species now recorded, ninety-three (93) are monocotyledons and two hundred and twenty (220) are dicotyledons (of these, four have two varieties in the survey area). For the native monocotyledons recorded, the Orchidaceae (Orchids) with twenty-seven species recorded was the family with the most species in the survey area. Following this were the Poaceae (grasses) with twenty-one (21) species recorded and Anthericaceae (part of the lilies) with fourteen (14) species and then a drop to the Cyperaceae (sedges) with twelve (12) species.

For the dicotyledon the families with the most species present were the Asteraceae (Daisy family) with thirty-two (32) species, the Myrtaceae (Gum tree and Bottlebrush family) with thirty-one (31) species present, the Mimosaceae (*Acacia* family) with seventeen (17) species (one of which had two subspecies in the survey area), Papilionaceae (Pea family) fourteen (14) species and Proteaceae (*Banksia* family) with thirteen (13) species, were also well represented.

A list of the flora recorded in this study is given in Appendix 5, with the flora from the earlier studies (there is some possible difference in naming between the studies, but it is quite small, affecting only about six species). Additional species may be known by DEC for Cairn Hill Westrail Reserve, but it has not been possible to collate these records for this study.

11.2 Declared Rare Flora (DRF) species recorded in the survey area

Five species that have been gazetted as Declared Rare Flora (Atkins 2004, Florabase 2011) under the Wildlife Act were recorded during the survey. They are *Acacia aristulata***,** *Synaphea quartzitica*, *Daviesia dielsii*, *Eucalyptus pruiniramis* and *Goodenia arthrotricha.* The distribution of these species in the survey area is shown on Map 4 and maps showing their overall distribution (from the DEC website "Florabase" are also given. Relevant information about them is summarised in Table 2 (see below) and discussed below. Details of the occurrences of the rare flora species (numbers of groups of individuals, numbers of individuals, AMG references of populations) are given in the tables in Appendix 4. One of these species, *Goodenia arthrotricha*, was a priority species at the time of the earlier reports, but has had it status changed to Declared Rare Flora since the last report (Trudgen *et al* 2006).

The lesser number of records of Declared Rare Flora (and Priority Flora) in the northern part of the survey area is due to a combination of factors. Firstly, the very northern part of A. & R

Tonkin's property has woodland of *Allocasuarina huegelii*, which has fewer shrub species and herbs in the understorey than other vegetation types in the survey area (and a different combination of species). Secondly, this area was surveyed in detail in a drought season, which meant that some species (cryptophytes) were not available for collection, as they did not produce above ground parts due to the poor conditions. Thirdly, some parts of the northern part of the survey area (e.g. the easternmost ridge on J. Tonkin's property) are more degraded than other parts of the survey area.

Acacia aristulata

This species is an erect or scrambling small shrub to one metre tall, although it is usually smaller. It has distinctive phyllodes ("leaves"), which have a single mucron (spine) at the apex. It appears to be most common in vegetation dominated by *Kunzea praestans,* but is also often found with *Regelia megacephala*. *Acacia aristulata* was fairly common in the survey area. However, it was less common in the areas on private property south of Cairn Hill Reserve, than in the rest of the survey area. Plants of this species were often grazed.

Table 2: Declared Rare Flora species recorded with occurrences in different sections of the survey area.

Notes: Columns 2 and 3 from Atkins (2004). MW = Midwest

Species	**DEC region**	**Distribution**	**Survey area**
Acacia aristulata	MW	Moora, Jingemia Hill (Watheroo NP)	Recorded in plots in: CHN, CAH, EOR, ERG, WDM, WOR. Also observed outside plots for these areas and during surveys of the Ridgway, J. Tonkin, A. & R. Tonkin, Chester and Gardiner properties
Daviesia dielsii	MW	Moora, Marchagee, Watheroo, Dalwallinu	Recorded in plots in: WDM, CAH, ERG, CHN. Also observed outside plots for these areas and during surveys of the Ridgway, both Tonkin, Chester and Gardiner properties
Eucalyptus pruiniramis	MW	Mogumber-Three Springs	Recorded in Cairn Hill Reserve (one small patch) and on Phil & Jenny Gardiner's property (two small patches).
Synaphea quartzitica	MW	Moora	In the survey area only known from Cairn Hill Reserve, where it was recorded once during vegetation (Geocode available on request).
Goodenia arthrotricha	SW	Wannamal	Recorded in plots in: ERG, CHN. Confused at one stage with Scaevola phlebopetala. Possibly also in some other sections of the survey area.

Daviesia dielsii

Daviesia dielsii is a many-branched shrub to one and a half metres tall. Like *Acacia aristulata,* this shrub has a distinctive leaf with a spine at the tip. It is most commonly found at the ecotone between *Kunzea* and *Allocasuarina campestris* communities. It is usually not as common as *Acacia aristulata,* although it was more common in Cairn Hill North than that *Acacia*. It was less common in the areas searched south of Cairn Hill Reserve, than in the reserve or the central parts of the survey area.



Distribution of *Acacia aristulata*.
(Map from the DEC site "Florabase").



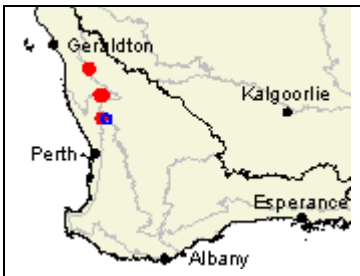
Distribution of *Daviesia dielsii*
(Map from the DEC site "Florabase").

Eucalyptus pruiniramis

This is a small mallee *Eucalyptus* species that grows to five metres tall. The population found in Cairn Hill Reserve was very small and the two populations found on the property of Phil and Jenny Gardiner are both also small (to 25 m across). The species occurs from the Watheroo National Park southwards, with all but one previous collection north of Cairn Hill and the one exception being from the Mogumber area. As each population in the survey area has few individuals in it, the new localities are unlikely to change the conservation status of the species.

Synaphea quartzitica

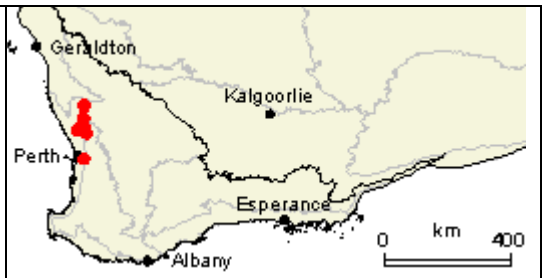
This species is a small shrub with yellow flowers that is found on rocky quartzite hills and flowers in July and August. It is known in the survey area from Cairn Hill Westrail Reserve, south of the current mine site (Hamilton-Brown *pers com*). It is possible that this species, while not recorded in the plots, may have escaped attention during the rare flora searches.



Distribution of *Eucalyptus pruiniramis*.
(Map from the DEC site "Florabase").



Distribution of *Synaphea quartzitica*.
(Map from the DEC site "Florabase").



Distribution of *Goodenia arthrotricha*.
(Map from the DEC site "Florabase").

Goodenia arthrotricha

Goodenia arthrotricha is an erect herb to 40 cm tall; it has blue flowers with a white throat. At the time of the previous version of this report (2006) it was a Priority 2 species, but is now

considered be threatened, and therefore to be Declared Rare Flora. This species was possibly confused in the field with *Scaevola phlebopetala* at times and may be more common in the survey area than the records for the survey indicate. It was recorded at six quadrats in the Eastern Ridge and Cairn Hill sub-areas.

11.3 Priority flora species recorded in the survey area

Seven Priority Flora species are currently recorded from the survey area. There have been several changes in the list of priority flora known for the survey area in the time that this series of reports (Trudgen *et al.* 2001, 2006 and the current report) covering it have been prepared. Changes have been partly due to enlargement of the survey area and increased survey intensity (resulting in a higher number in 2006 compared to 2001) and partly due to some species being removed from the Priority Flora List when more information about their occurrence became available (resulting in a lower number in 2011 compared to 2006). Most of the species in the latter category have been found to be more common, but one (*Goodenia arthrotricha*, see section above) has been found to be less common or under more threat and has been placed on the Declared Rare Flora List.

Of the seven priority flora species recorded, three are Priority 2, three are Priority 3 and the remaining one is Priority 4. They are all discussed individually below and their priority level, their known occurrence in DEC regions and their occurrence in the sub-areas of the survey area are given in Table 3. Their distribution in the survey area is shown on Map 4. For definitions of the priority levels, see Appendix 1. In a similar fashion to the occurrence of Declared Rare Flora, less Priority Flora are known or the northern part of the survey area. The same three reasons (see second paragraph of section 11.2 above) are relevant here.



Distribution of *Cryptandra glabriflora*.
(Map from the DEC site "Florabase").



Distribution of *Tricoryne* sp. Wongan Hills (B.H. Smith 794).
(Map from the DEC site "Florabase").

Cryptandra glabriflora

Cryptandra glabriflora is a small to medium sized shrub that grows to between a half and one metre tall. It is a Priority 2 species. This species is uncommon in the survey area (it was only recorded at eight of the quadrats) and has limited distribution in it.

Table 3: Priority flora recorded in the survey area.

Notes: Columns 2 and 3 from Atkins (2004). Survey sub-area Codes: CAH = Cairn Hill, CHN = Cairn Hill North, ERG = Eastern Ridge, WOR = Western Ridge, JT = John Tonkin's Property, WDM = Waste Dump, EOR = Eastern Ore body.

Species	**Priority level**	**DEC Regions**	**Distribution**	**Distribution in the survey area**
Cryptandra glabriflora	P2	MW	Kalbarri NP	Recorded in plots in: ERG, WOR, and WDM. Not observed in other sections of the survey area.
Tricoryne sp. Wongan Hills	P2	WB, MW	Yandanooka Hill, Wongan Hills, Depot Hill, Mingenew	Recorded in plots in: ERG, CHN.
Stylidium glabrifolium	P2	SW	Bindoon	Recorded from two quadrats on the Eastern Ridge and one from the Eastern Ore Body.
Grevillea amplexans ssp. *vestita*	P2	MW?	Small area SSE of Geraldton	Recorded from the south-east part of the survey area (see Map 4 south sheet).
Baeckea sp. Moora	P3	MW	North of Moora	Recorded in plots in: CAH, CHN. Also observed in EOR
Guichenotia tuberculata	P3	MW, SW	Mogumber, New Norcia, Gillingarra, Wannamal, Bullsbrook	Recorded on road verge of Dalaroo East Road (Voucher MET 21,790)
Melaleuca sclerophylla	P3	MW, WB, SW	Manmanning, Marchagee, Wongan Hills, New Norcia, Dalwallinu, Moora, Miling, Morawa, Caljie	Recorded in Gardiner's Hill at releve 227.
Austrostipa sp. Cairn Hill	P3		A few scattered but widespread localities.	Recorded from one site in C
Regelia megacephala	P4	GRE	Moora, Coomberdale, Dalaroo	Recorded in plots in: CAH, CHN, EOR, ERG, WDM, WOR. Also observed outside plots for these areas and during surveys of the Ridgway, J. Tonkin, A&R Tonkin, Chester and P. & J. Gardiner properties

Tricoryne sp. Wongan Hills (B.H. Smith 794)

Tricoryne sp. Wongan Hills is a rhizomatous perennial herb to 20 cm high. This Priority 2 species was recorded at three quadrats in the survey area and appears to be uncommon there. However, as it was not known to be in the survey area prior to one of the earlier reports in this series (Trudgen *et al* 2001), it was not searched for during the systematic rare flora surveys carried out for that report. In Trudgen et al (2006) this taxon was referred to as *Tricoryne arenicola* MS (the name available at that time).

Stylidium glabrifolium

Stylidium glabrifolium is a small herb and is a Priority 2 species. In the survey area, it was only recorded from three quadrats. Two were located on the Eastern Ridge, and the other in the remnant of native vegetation at the south end of the main mine (the Eastern Ore Body – note that some of this area has been mined since the collection was made).



Distribution of *Stylidium glabrifolium*.
(Map from the DEC site "Florabase").



Distribution of *Grevillea amplexans* ssp. *semivestita*.
(Map from the DEC site "Florabase").

Grevillea amplexans* ssp. *semivestita

This taxon has been placed on the Priority list since the earlier reports. In the survey area, *Grevillea amplexans* ssp. *semivestita* has only been recorded from two releves in the south-eastern part of the survey area (see Map 4, South Sheet).

***Baeckea* sp. Moora (R. Bone 1993/1)**

Baeckea sp. Moora is a low, spreading shrub to between 0.4 and 0.8 metres tall with small white flowers. This species was common in Cairn Hill Reserve and also present in the Cairn Hill North and the Eastern Ore Body sub-areas, but was not seen in the remainder of the survey area. It was recorded at thirteen quadrats. Although its distribution is limited in the survey area, *Baeckea* sp. Moora is quite abundant in some localised areas where it contributes significantly to the vegetation (see section 12 below). It is a Priority 3 taxon.

Guichenotia tuberculata

This small perennial shrub is a Priority 3 species. It was only recorded at one place in the survey area, on a road verge adjacent to the Dalaroo East Road.



Distribution of *Baeckea* sp. Moora (R. Bone 1993/1).
(Map from the DEC site "Florabase").



Distribution of *Guichenotia tuberculata*.
(Map from the DEC site "Florabase").

Melaleuca sclerophylla

Melaleuca sclerophylla is a low shrub. This Priority 3 species was only collected once during the survey, at Releve 227 on the property of Phil and Jenny Gardiner.



Distribution of *Melaleuca sclerophylla*.
(Map from the DEC site "Florabase").



Distribution of *Regelia megacephala*.
(Map from the DEC site "Florabase").

Regelia megacephala

Regelia megacephala is one of the defining species of some of the vegetation types of the Coomberdale Chert Threatened Ecological Community and is known to be quite restricted in overall distribution. However, where it does occur it is often the dominant in the vegetation, although sometimes there is a taller (but more open) stratum over it. There are forty-eight records for *Regelia megacephala* from the ninety-nine quadrats recorded in native vegetation, but as vegetation dominated by this species was a focus of the study this overestimates its distribution in the survey area. The proper assessment of this species is that it is very geographically restricted, locally common in vegetation it occurs in within its area of distribution, but not common in an absolute sense although it is usually dominant in the stands in which it occurs. The distribution and abundance of this Priority 4 species in the survey area is shown on Map 4, where stands of vegetation that have it as a significant component are shaded.

11.4 Other species of particular conservation interest

Several other species recorded in the survey area are of particular conservation interest. By this it is meant that while they do not fall into the categories of Declared Rare Flora or Priority Flora, their populations in the survey area have more than the general level of conservation of value those species that are not uncommon (which of course can range from just over the notional – and poorly defined - border from uncommon to common to extremely common). These species are discussed below and the distribution of some of them within the survey area is shown on Map 4. Further research may indicate that some of these species deserve to be Priority or Declared Rare Flora. Others are of interest because the population in the survey area is at the end of the species range or is an outlying (disjunct) population.

Cyrtostylis huegelii

The record of this species is an extension of the known range of the species (pers com. Andrew Brown 2006). The population is therefore of conservation significance as it is at one extreme of the known range.

Pterostylis* aff. *rufa

The record of this species extends the known range of the species a long way to the west (pers com. Andrew Brown 2006). The population is therefore of conservation significance as it is at one extreme of the known range.

***Hemigenia* sp.**

The two specimens of this species could not be matched at the Western Australian Herbarium. Specialist determination is needed to identify the species. Vouchers: MET 21,789 and Cairn Hill at 50J 0407772 UTM6620677

***Leptospermum* aff. *erubescens* (Moora Chert; B. Morgan 133).**

Two collections are known of this taxon, both are from the survey area. One was collected during the rare flora survey of the Gardiner Hill bush area (on the property of P & J. Gardiner) in 2001. The site was in a disturbed area on the edge of the vegetation remnant. The other (D.J.E. Whibley 4905) is from the gravel pit in Cairn Hill reserve; it was not collected as part of this survey. The two collections appear to represent a very uncommon undescribed taxon restricted to the Chert Hills at Moora (R. Davis pers comm. 2006). Until this taxon can be adequately surveyed, it should be treated as very rare. Accurate geocodes are not available for these two collections and the sites indicated on Map 4 are approximate.

***Calothamnus* aff. *quadrifidus* (Moora - Watheroo)**

This taxon was separated out from other variants of *Calothamnus quadrifidus* at the Western Australian Herbarium during preparation of the earlier versions of this report. It was recorded at fourteen quadrats during the survey, with three records from John Tonkin's property, two from P. and J. Gardiner's property one from Cairn Hill North, and the remainder from Cairn

Hill Reserve, but it is not common in the survey area. It is one of a number of variants of *Calothamnus quadrifidus* that are likely to be described as subspecies or separate species. It is probably restricted to the Coomberdale Floristic Region of Griffin (1992) and it should be treated as a geographically restricted taxon. There are about fifteen specimens in the collections at the Western Australian Herbarium, but this may over-estimate the abundance of the taxon as it is a large species (generally two to four metres tall) and thus more likely to be collected than smaller ones. This taxon needs surveying to provide sufficient information to decide if it should be placed on the DEC priority flora list.

Since this taxon was investigated for the 2006 precursor to the current report, material of this taxon has been included in *Calothamnus quadrifidus* ssp. *angustifolius* by George and Gibson (2010). It has not been possible to examine this assignment in detail for this report, and it has been decided to leave the reference to the entity as in the previous report. This has been done as one of us (MET, who has considerable experience in the taxonomy of the Myrtaceae) examined the material in the Western Australian Herbarium and came to the conclusion specimens from the geographic area including the Coomberdale Chert were a distinct entity (possibly a variety). This is not incompatible with the paper by George and Gibson.

***Bossiaea* sp. Cairn Hill (M. Henson CH2-28)**

Bossiaea sp. Cairn Hill is a distinct, geographically restricted species related to *Bossiaea eriocarpa* (which is a complex known to contain several taxa). There was one specimen of *Bossiaea* sp. Cairn Hill (M Henson CH2-28) under *Bossiaea eriocarpa* at the Western Australian Herbarium prior to the earlier survey (Trudgen *et al.* 2001). *Bossiaea* sp. Cairn Hill (M Henson CH2-28) is restricted to the chert hills of the Coomberdale Floristic Region and is only known from the survey area for this report. It was recorded at 23 of the quadrats recorded during the survey and an associated survey of rehabilitation areas. However, it was only recorded from the Cairn Hill Reserve, Cairn Hill North, Eastern Ridge, Western Ridge and Rehabilitation areas. This is a very restricted distribution, part of which (the Western Ridge) has been mined since the quadrats there were recorded. This species is certainly much less abundant than *Regelia megacephala* and *Kunzea praestans*. It should therefore be regarded as a very geographically restricted species that should be placed on the Department of Environment and Conservation (DEC) priority flora list. This species was often grazed (sometimes heavily), but it is not known if this was by domestic stock or kangaroos.

Hypoxis* aff. *glabella

One specimen (CH12-11A from Cairn Hill Reserve) was referred to the name *Hypoxis* aff. *glabella*, like *Hypoxis glabella* it has two bracteoles on the flower stalk. However, they are much larger than those of *Hypoxis glabella* and are alternate rather than opposite. It is not possible to give an authoritative view of the importance of the specimen, as *Hypoxis* is in need of revision, is a 'difficult' genus because of the reduced nature of the species it contains (simple, small herbs with a few leaves and little variation in the flowers) and the specimen is

poor. However, it can be said that it *may* represent a new species, and therefore needs further studies (especially field studies to find out if the form is consistent) to determine its significance.

***Caesia* sp. Moora**

A number of specimens collected during the survey appear to represent a new species of *Caesia*, a genus of the lily group of families. Specimens were collected from thirteen of the ninety nine quadrats recorded for the survey (from four in Cairn Hill, two in Cairn Hill North, one on the Eastern Ridge (area remaining vegetated in 2006 now partly mined), one on the Western Ridge (now mostly mined) and five on John Tonkin's property). While this species appears to be not uncommon in some parts of the survey area, it is probably restricted to the Coomberdale Chert and may be localised to the survey area and nearby. It is much less common than *Regelia megacephala* and should be placed on the DEC Priority Flora List.

Pityrodia dilatata

One sterile specimen collected at releve R168-5 in 2006 on the Eastern Ridge in one of the earlier surveys was identified as *Pityrodia*, but could not be determined as the specimen was sterile. Flowering material has now been collected and identified as *Pityrodia dilatata*, a species with a fairly restricted distribution and which is known from relatively few specimens.

***Trichocline* sp.**

A sterile specimen collected at site GH7-57 on the Gardiner's property is undoubtedly a *Trichocline* (this taxon was referred to *Amblysperma* in Trudgen *et al* 2006; these two genera having been in and out of favour in recently years – that is authorities differ on which is correct). However, it does not match either *Trichocline spathulata* or *Trichocline* sp. Treeton (= *Amblysperma minor*), the two *Trichocline* species known for Western Australia. It is closer to the latter taxon. The site needs to be re-visited to collect flowering material, so that the status of this taxon can be resolved. If the specimen should be found (when flowering material is available) to be *Amblysperma* sp. Treeton, then the locality is a massive range extension for that species.

***Eremaea* sp. Cairn Hill (B. Morgan BMor 531)**

One specimen of this taxon was collected on the property of Phil and Jenny Gardiner. Extensive checking against the research collections held at the Western Australian Herbarium failed to find any matching material. While further collections and study are needed to clarify the status of this collection, it is very likely to represent a new species allied to *Eremaea beaufortioides*, or possibly a new subspecies of that species.

***Petrophile brevifolia* (forma)**

A collection (G316-4) referred to *Petrophile brevifolia* (forma) is atypical for that species (ms Barbara Rye pers. comm. 2006), but flowering material and expert identification are necessary before the status of the collection can be fully assessed.

11.5 Other flora results of the survey

There are some other records of flora collected during the survey that are of interest, either because they have not been recognised as distinct previously (but are not rare), or because they were categorised as priority flora until recently (see Table 4) and while more common than previously believed are still not common species.

Gastrolobium acutum

This species (at one stage placed in *Nemcia*) has recently been removed from the DEC Priority Flora list after more information became available about its distribution and population status. It is an erect, or occasionally straggly shrub to one metre tall. While only recorded in thirteen of the eighty-nine quadrats recorded in native vegetation, this species was observed as scattered individuals, or small groups of individuals, in the survey area and north of Kiaka Road.

Table 4: Species categorised as priority flora at the time of the earlier reports (Trudgen *et al.* 2001, 2006), but subsequently removed from the priority flora list.

Notes: Columns 2 and 3 from Atkins (2004). Survey sub-area Codes: CAH = Cairn Hill, CHN = Cairn Hill North, ERG = Eastern Ridge, WOR = Western Ridge, JT = John Tonkin's Property, WDM = Waste Dump, EOR = Eastern Ore body,

Species	Former priority level	DEC Regions found in	Distribution	Distribution in the survey area
Kunzea praestans	Formerly P3	GRE	Watheroo, Coomberdale, Jam Hill	Recorded in plots in: CAH, CHN, ERG, WDM, WOR. Also observed outside plots for these areas and during surveys of the Ridgway, A&R Tonkin, J Tonkin, Chester and Gardiner properties
Gastrolobium acutum	Formerly P3	MW, SW	Armadale, Darlington, Bindoon, Regan's Ford, Lesmurdie	Recorded in plots in: CAH, CHN, EOR, WDM. Scattered plants observed in other sections of the survey area including North of Kiaka Road.
Stenanthemum tridentatum	Formerly P3	MW, WB, SC	West River, Tutanning, Kukerin, Wagin, Gunyidi, Boddington, Bulyee, S Kumminin, Beverley, Kellerberrin, Pingelly	Only recorded from one quadrat on Gardiner's Hill
Wurmbea drummondii	Formerly P4	MW, SW, WB	Moora, Narrogin, Toodyay	Recorded on John Tonkin's Property (Vouchers JT12-19, JT 6-55)

Austrostipa exilis	Formerly P2	SC	Cocklebiddy, Fitzgerald River, Wickepin, etc	Recorded in Cairn Hill (Voucher CR6-4)
Wurmbea drummondii	Formerly P4	MW, SW, WB	Moora, Narrogin, Toodyay	Recorded on John Tonkin's Property (Vouchers JT12-19, JT 6-55)

Kunzea praestans

This species has been removed from the Priority Flora list after more information became available about its distribution and population status. It is a tall shrub that in the survey area occurs mostly near the edges of chert outcrops.

Stenanthemum tridentatum

Stenanthemum tridentatum is a very small shrub and was a Priority 3 species, but has been removed from the Priority Flora List since 2006. In the survey area it was only collected from one quadrat in the Gardiner's Hill survey sub-area

Austrostipa exilis

Since the previous version of this report, *Austrostipa exilis* has been removed from the DEC Priority Flora list due to the collection of specimens that have extended its range to north of the survey area (its northern limit in 2006) and also increased the number of known locations.

Wurmbea drummondii

Wurmbea drummondii is a very small herb (ca. 5 cm tall with one or two leaves and one or two small flowers). It was only recorded at two places on John Tonkin's property during the survey and was a Priority 4 species. It is very uncommon in the survey area, but has also been removed from the DEC Priority Flora list.

Millotia* aff. *tenuifolia

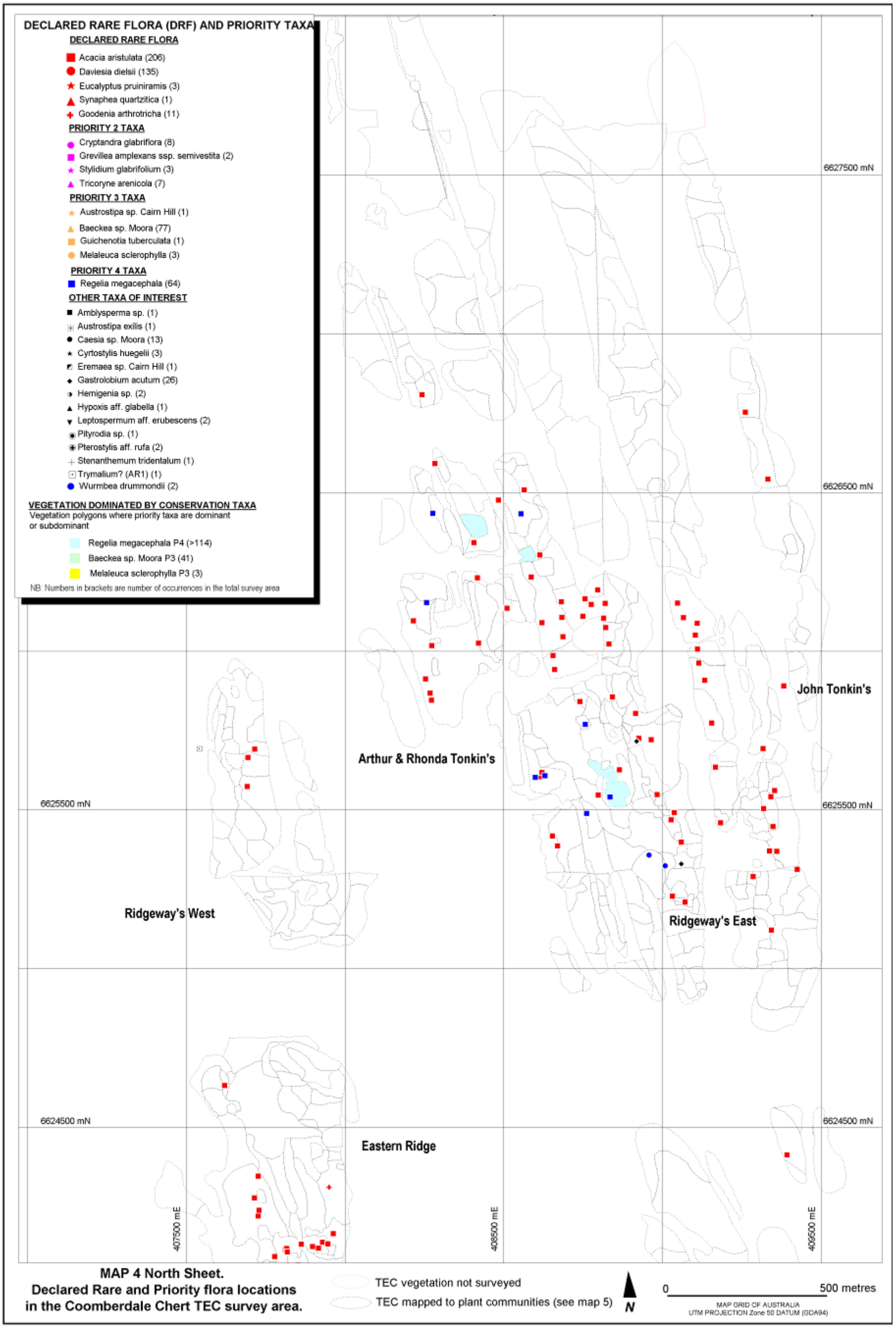
During identification of the *Millotia* specimens collected during the survey it was realised that the material under the name *Millotia tenuifolia* var. *tenuifolia* in the Western Australian Herbarium is mixed. One specimen (CH20-11) was collected that belongs to the (probably) undescribed form. This form can be easily distinguished by the spreading hairs on the leaves, it is not restricted in distribution and is does not appear to be uncommon.

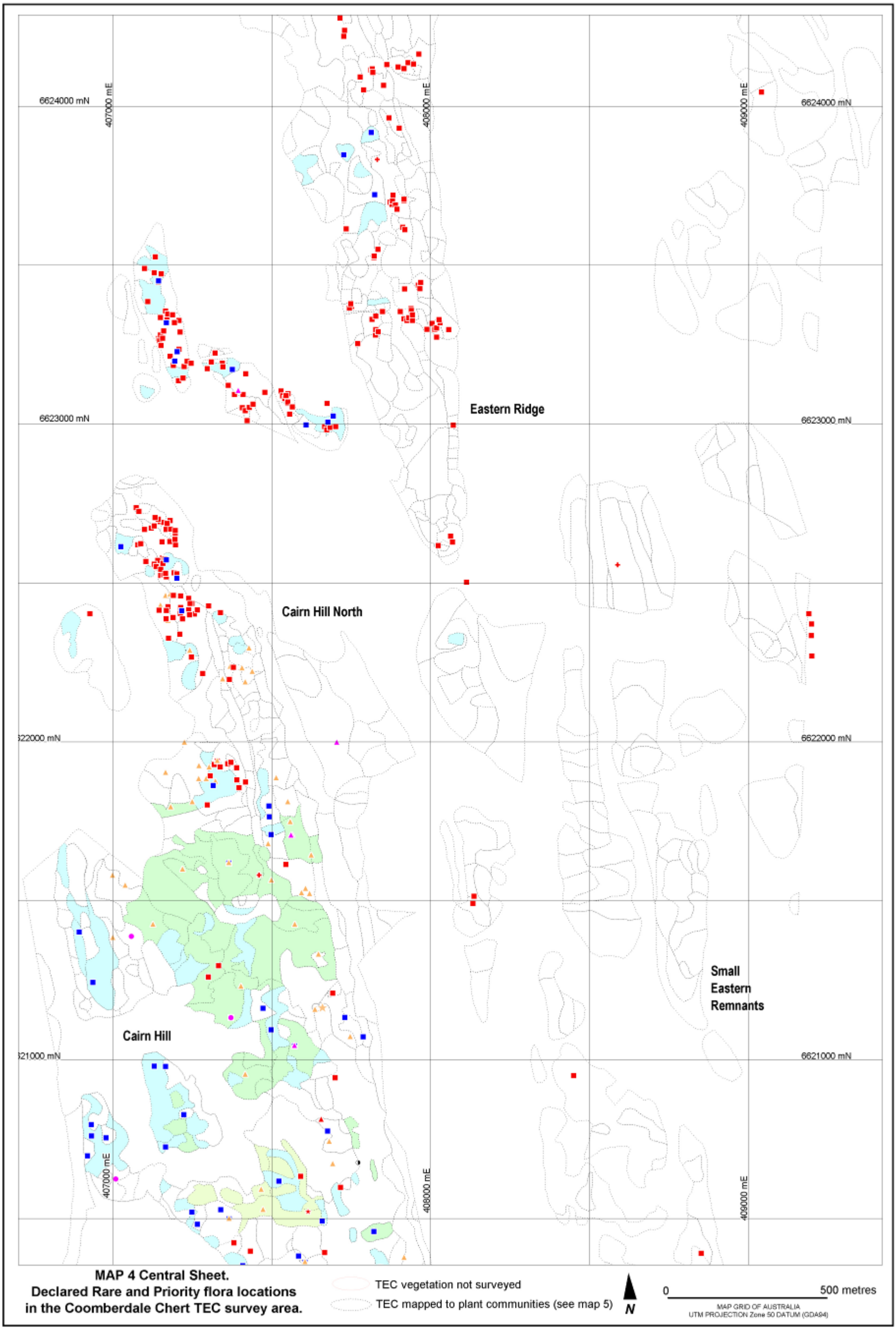
Podotheca gnaphalioides

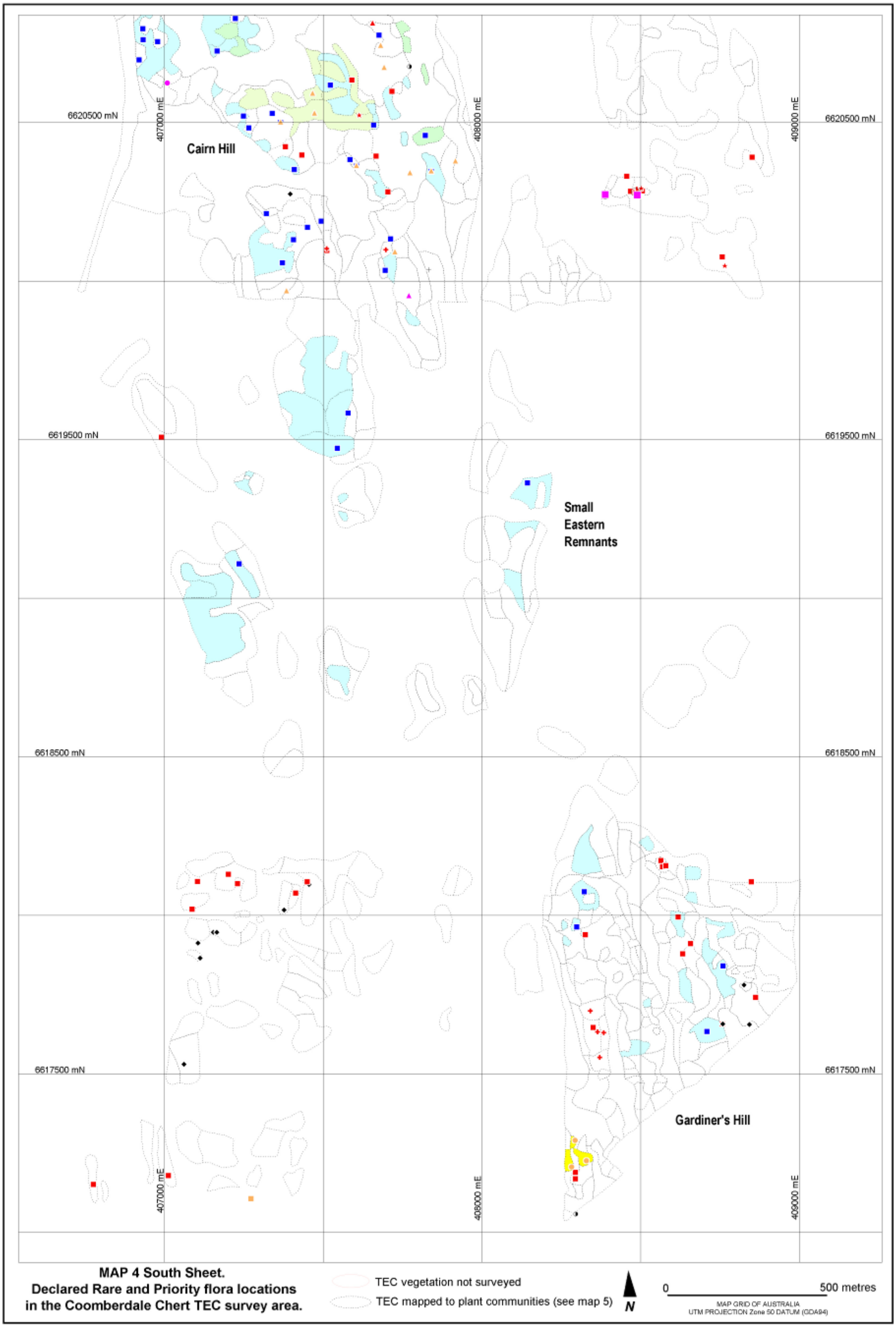
One specimen (WDM1-65) referred to *Podotheca gnaphalioides* differed from the others in the indumentum and the shape of the bracteoles forming the floral involucre. A (quick) review of the material determined as *Podotheca gnaphalioides* at the Western Australian Herbarium indicated that the specimen represents one of several "forms" currently referred to *Podotheca gnaphalioides*, but which probably deserve some level of taxonomic recognition.

Eucalyptus camaldulensis var.

Although *Eucalyptus camaldulensis* has been reviewed fairly recently, the study did not clarify the correct name for the subspecies (several subspecies are accepted) that occurs in the South West of Western Australia, or whether or not there is more than one taxon in that area. The range and conservation status of the form collected during the survey is therefore not known (although the form is probably fairly widespread in west coastal areas of the South West of Western Australia).


DECLARED RARE FLORA (DRF) AND PRIORITY TAXA
DECLARED RARE FLORA
Acacia aristulata (206)
Daviesia dielsii (135)
Eucalyptus pruiniramis (3)
Synaphea quartzitica (1)
Goodenia arthrotricha (11)
PRIORITY 2 TAXA
Cryptandra glabriflora (8)
Grevillea amplexans ssp. semivestita (2)
Stylidium glabrifolium (3)
Tricoryne arenicola (7)
PRIORITY 3 TAXA
Austrostipa sp. Cairn Hill (1)
Baeckea sp. Moora (77)
Guichenotia tuberculata (1)
Melaleuca sclerophylla (3)
PRIORITY 4 TAXA
Regelia megacephala (64)
OTHER TAXA OF INTEREST
Amblysperma sp. (1)
Austrostipa exilis (1)
Caesia sp. Moora (13)
Cyrtostylis huegelii (3)
Eremaea sp. Cairn Hill (1)
Gastrolobium acutum (26)
Hemigenia sp. (2)
Hypoxis aff. glabella (1)
Leptospermum aff. erubescens (2)
Pityrodia sp. (1)
Pterostylis aff. rufa (2)
Stenanthemum tridentalum (1)
Trymalium? (AR1) (1)
Wurmbea drummondii (2)
VEGETATION DOMINATED BY CONSERVATION TAXA
Vegetation polygons where priority taxa are dominant or subdominant
Regelia megacephala P4 (>114)
Baeckea sp. Moora P3 (41)
Melaleuca sclerophylla P3 (3)
NB. Numbers in brackets are number of occurrences in the total survey area
6627500 mN
6626500 mN
6625500 mN
6624500 mN
407500 mE
408500 mE
409500 mE
Arthur & Rhonda Tonkin's
John Tonkin's
Ridgeway's West
Ridgeway's East
Eastern Ridge
MAP 4 North Sheet.
Declared Rare and Priority flora locations
in the Coomberdale Chert TEC survey area.
TEC vegetation not surveyed
TEC mapped to plant communities (see map 5)
N
0
500 metres
MAP GRID OF AUSTRALIA
UTM PROJECTION Zone 50 DATUM (GDA94)


6624000 mN
407000 mE
408000 mE
409000 mE
6624000 mN
Eastern Ridge
6623000 mN
6623000 mN
Cairn Hill North
6622000 mN
6622000 mN
Small
Eastern
Remnants
Cairn Hill
6621000 mN
6621000 mN
407000 mE
408000 mE
409000 mE
MAP 4 Central Sheet.
Declared Rare and Priority flora locations
in the Coomberdale Chert TEC survey area.
TEC vegetation not surveyed
TEC mapped to plant communities (see map 5)
N
0
500 metres
MAP GRID OF AUSTRALIA
UTM PROJECTION Zone 50 DATUM (GDA94)


6620500 mN
407000 mE
Cairn Hill
408000 mE
409000 mE
6620500 mN
6619500 mN
6619500 mN
Small
Eastern
Remnants
6618500 mN
6618500 mN
6617500 mN
6617500 mN
Gardiner's Hill
407000 mE
408000 mE
409000 mE
MAP 4 South Sheet.
Declared Rare and Priority flora locations
in the Coomberdale Chert TEC survey area.
TEC vegetation not surveyed
TEC mapped to plant communities (see map 5)
N
0
500 metres
MAP GRID OF AUSTRALIA
UTM PROJECTION Zone 50 DATUM (GDA94)

12.0 VEGETATION OF THE SURVEY AREA

12.1 Introduction

This section describes and classifies the variation present in the vegetation of the survey area using "traditional" vegetation description and mapping techniques; the analysis of the floristic composition of the same vegetation using pattern analysis is described and discussed in Section 14.0 below. Here, the vegetation is described using the vegetation descriptions recorded at the ninety-nine quadrats recorded and at a further ca. three hundred releves recorded for the vegetation description and mapping. The full descriptions of the quadrats are given in Appendix 6 and the descriptions of the releves are incorporated in the vegetation classification in Appendix 7, which includes data from the quadrats as well.

Using these descriptions of the vegetation structure, dominance and the composition of the 506 different individual stands of vegetation recorded (99 quadrats and 407 releves – the latter in less detail), a series of lower order units were defined. These lower order units are mostly defined near the *plant community* level (see Table 1 and section 6.2.1 above) the sites in a unit having very similar structure, dominance and floristics, and will be referred to as at this level for the rest of this report. However, some of the units are broader and are part way in level of synthesis to the vegetation association level (that is, they include more variation than at the plant community level). To facilitate understanding of the very significant complexity of the vegetation of the survey area, the plant communities were grouped into one hundred and four *vegetation associations* if they had similar structure and dominant species and these then grouped again into thirty-one *vegetation* alliances as a third level of classification. Some of the vegetation alliances consisted of only one vegetation association; for example, vegetation association **Ec** is the only association in the vegetation alliance '*Eucalyptus camaldulensis* open forest to low mallee open forests'. Table 1 (see above) gives definitions of these levels of vegetation classification.

The alliance (third) level of the classification is a quite high order of synthesis and as noted above the units are being treated as *vegetation alliances*, however at this level of synthesis in vegetation classification there is necessarily an element of arbitrariness, because it attempts to impose order on a very complex phenomenon. However, the units defined are considered to mostly be fairly close to the *vegetation alliance* level, although in some cases the upper stratum is open and the vegetation has been grouped on the second stratum. That is, the arbitrary rules have been bent to make the result more meaningful.

The vegetation alliances are each vegetation units with one particular dominant species in their upper stratum. For example, Vegetation Alliance 1 is *Eucalyptus salmonophloia* woodland to open forests; Vegetation Alliance 2 is *Eucalyptus wandoo* subsp. *wandoo* woodlands and open forests and Vegetation Alliance 13 is *Allocasuarina campestris* high shrublands to open and closed scrubs. It should be noted that while *Regelia megacephala* scrub units have been included in Vegetation Association 15, *Regelia megacephala* high

shrubland to open and closed scrub, other vegetation units which had *Regelia megacephala* as a sub-dominant rather than the dominant, that is with lower cover may have been included in other vegetation alliances. For example, the vegetation association AhRm, *Allocasuarina huegeliana* low open forest over *Regelia megacephala* high open shrubland, was placed in Vegetation Alliance 9, *Allocasuarina huegeliana* low woodlands to low open forests.

Table 6: Abbreviations used for the species in the vegetation association/plant community codes.

Code for species	**Species**	**Code for species**	**Species**
Aa	*Acacia acuminata* subsp. *acuminata*	Ep	*Eucalyptus pruiniramis*
Ac	*Allocasuarina campestris*	Es	*Eucalyptus salmonophloia*
Ah	*Allocasuarina huegeliana*	Ew	*Eucalyptus wandoo* subsp. *wandoo*
Ahu	*Allocasuarina humilis*	Ha	*Hypocalymma angustifolium*
Am	*Allocasuarina microstachya*	Hr	*Hakea recurve* subsp. *recurva*
As	*Acacia scirpifolia*	Hs	*Hibbertia subvaginata*
B	*Baeckea* sp. Moora (R. Bone 1993/1)	Id	*Isopogon divergens*
Bp	*Banksia prionotes*	Kp	*Kunzea praestans*
Cd	*Calytrix depressa*	Lp	*Lepidosperma pubisquameum*
Cl	*Calytrix leschenaultii*	Mc	*Melaleuca calyptroides*
Cq	*Calothamnus* aff. *quadrifidus* (Moora-Watheroo)	Mco	*Melaleuca concreta*
Co	*Casuarina obesa*	Mcor	*Melaleuca coronicarpa*
Df	*Dryandra fraseri*	Mr	*Melaleuca radula*
Di	*Dodonaea inaequifolia*	Ms	*Melaleuca sclerophylla*
Dp	*Dodonaea pinifolia*	Pd	*Pityrodia dilatata*
Ds	*Dryandra sessilis* var. *sessilis*	Rv	*Ricinocarpus velutinus*
Ec	*Eucalyptus camaldulensis*	Rm	*Regelia megacephala*
Ee	*Eucalyptus eudesmioides*	Rmu	*Ricinocarpus muricatus*
Eh	*Eucalyptus horistes*	Td	*Trymalium daphnifolium*
El, Elo	*Eucalyptus loxophleba* subsp. *loxophleba*	Tl	*Trymalium ledifolium* subsp. *rosmarinifolium*
Eo	*Eucalyptus obtusiflora*	Xd	*Xanthorrhoea drummondii*

The vegetation alliances and the vegetation associations that they group together are listed and described in section 12.2 below. For the sake of brevity, the plant communities recorded in the survey area are described under their respective vegetation alliances and vegetation associations in Appendix 7, which is a complete classification of the vegetation.

The vegetation map (see Map 5 at end) shows the distribution of the plant communities, which are the individual polygons mapped. It also shows the distribution of the vegetation alliances, which are indicated on the map by different colours. Each map polygon is labelled

with an alpha-numeric code to indicate the plant community occupying that polygon. The letters at the beginning of the code indicate the vegetation association (see section 12.2 below) and the number at the end of the code identifies the particular plant community within the vegetation association. See Appendix 7 for descriptions of the plant communities.

12.2 The vegetation associations and vegetation alliances of the survey area

The vegetation associations recorded in the survey area are briefly described below, under the vegetation alliances that they have been placed in. The vegetation associations are each given a unique code based on abbreviations of the names of the dominant species. A capital letter indicates the genus and a lower case letter indicates species. Where two or more species of the same genus occur in the same structural layer, the genus is indicated only once in the code. Abbreviations for the species names used in the codes are given in Table 6.

Vegetation Alliance 1: *Eucalyptus salmonophloia* woodlands to open forests

Salmon gum open forest occurred in a few locations in the survey area, in small valleys between low ridges and in a few places in the remnant vegetation at the base of the chert ridges on the edge of broad valley floors now largely cleared for farming.

Vegetation Association Es: *Eucalyptus salmonophloia* (*Eucalyptus wandoo* subsp. *wandoo*) over *Dodonaea inaequifolia* high open shrubland.

This vegetation association included one plant community.

Vegetation Association EsEl: *Eucalyptus salmonophloia* woodland over *Eucalyptus loxophleba* subsp. *loxophleba* low woodland over scattered *Acacia erinacea* shrubs and scattered herbs and grasses including *Ptilotus divaricatus* var. *divaricatus, Rhodanthe polycephala* and **Bromus diandrus*.

This vegetation association included two plant communities. One plant community differed by having a number of Chenopod species present.

Vegetation Alliance 2: *Eucalyptus wandoo* subsp. *wandoo* woodlands and open forests

This vegetation alliance was not common among the chert ridges in the survey area. It occurred along some sections of narrow linear 'valleys' between some of the ridges (dykes) and sometimes in the remnant vegetation at the base of the chert ridges on the edge of broad valley floors now largely cleared for farming.

Vegetation Association Ew: Eucalyptus wandoo subsp. wandoo low woodland or open forest over open herb/grasslands that included Opercularia vaginata, Lomandra effusa, Crassula colorata var. colorata, Trachymene pilosa and Waitzia nitida herbs and Austrodanthonia setacea and Austrostipa exilis grasses.

Four plant communities were described in this vegetation association, one with wandoo woodland over scattered herbs (Ew1), one with wandoo woodland over Allocasuarina campestris high shrubland (Ew2 (probably an intermediate unit)), one with wandoo woodland over Acacia acuminata subsp. acuminata low woodland over herbland/sedgeland/grassland (Ew3) and one with wandoo woodland over Olearia dampieri subsp. eremicola and Hibbertia subvaginata open (low) shrubland (Ew4).

Vegetation Association EwDi: *Eucalyptus wandoo* subsp. *wandoo* low open forest over *Dodonaea inaequifolia* scattered tall shrubs to high shrubland.

This vegetation association was recorded in one salmon gum and wandoo valley in the south-east corner of Cairn Hill Reserve and included one plant community, EwDi1.

Vegetation Association EwTl: *Eucalyptus wandoo* subsp. *wandoo* open woodland over *Trymalium ledifolium* var. *rosmarinifolium* scattered shrubs to low open shrubland.

This vegetation association included two plant communities, which were recorded on rocky ridge slopes, one on Gardiner's Hill and one in Cairn Hill. In plant community EwTl.2 wandoo grew over *Allocasuarina huegeliana* scattered trees and *Allocasuarina campestris* scattered tall shrubs on a low ridge slope. Plant community EwTl.1, wandoo grew over an *Allocasuarina huegeliana* and *Acacia acuminata* subsp. *acuminata* low open woodland and *Xanthorrhoea drummondii* open shrubland and *Trymalium ledifolium* var. *rosmarinifolium* low open shrubland on the rocky upper slope at the end of a low ridge.

Vegetation Association EwAa: *Eucalyptus wandoo* subsp. *wandoo* open woodland over *Acacia acuminata* subsp. *acuminata* low open woodland over *Allocasuarina campestris* open scrub.

This vegetation association included only one plant community; EwAa.1. It was recorded on a gentle west-facing slope on A. & R. Tonkin's property. Although the stand is adjacent to cleared areas, it was in quite good condition.

Vegetation Alliance 3: *Eucalyptus loxophleba* subsp. *loxophleba* low woodlands to low open forests

Eucalyptus loxophleba subsp. *loxophleba* was mainly recorded in the survey area from lower slopes of ridges and the adjacent valley floor areas. It was also occasionally found growing on the crest of the low ridges and along some sections of narrow linear features between some of the ridges (dykes).

Vegetation Association El: *Eucalyptus loxophleba* subsp. *loxophleba* low woodland over scattered shrubs and very open herbland.

This vegetation association included five plant communities that differed in both the tree species occurring with the York Gum and the scattered shrub species.

Vegetation Association Elo: *Eucalyptus loxophleba* subsp. *loxophleba* low open to closed forest over scattered shrubs and very open herbland.

This vegetation association includes six plant communities that differed in the scattered shrub species present.

Vegetation Association ElEo: *Eucalyptus loxophleba* subsp. *loxophleba*, *Eucalyptus obtusiflora* low open woodland over scattered tall shrubs over *Dodonaea inaequifolia* low woodland over scattered shrubs over scattered sedges and very open herbland.

This unit included one plant community recorded in a deep gully along a shallow drainage line on the boundary of Cairn Hill and Cairn Hill North.

Vegetation Association ElXd: *Eucalyptus loxophleba* subsp. *loxophleba* low woodland to low open forest over *Xanthorrhoea drummondii* scattered shrubs to high open shrubland.

This vegetation association only included one plant community.

Vegetation Alliance 4: *Eucalyptus eudesmioides* low mallee woodlands to low mallee open forests

Vegetation Association Ee: *Eucalyptus eudesmioides* low mallee woodland to low mallee open forest over annual grassland.

This vegetation association included one plant community, recorded at one site where the vegetation was in Poor to Very Poor condition.

Vegetation Association EeDs: *Eucalyptus eudesmioides* low mallee open forest over *Dryandra sessilis* var. *sessilis* high open shrubland and *Hibbertia subvaginata* low open shrubland.

Vegetation Association EeKp: *Eucalyptus eudesmioides* low mallee woodland over *Kunzea praestans* scattered tall shrubs to high shrubland.

This vegetation association included three plant communities, which differed in the shrub species.

Vegetation Association EeId: *Eucalyptus eudesmioides* low mallee woodland over Xanthorrhoea drummondii and Isopogon divergens scattered shrubs.

Vegetation Association EeRm: *Eucalyptus eudesmioides* low mallee open forest over *Calothamnus* aff. *quadrifidus* (Moora-Watheroo), *Regelia megacephala* high open shrubland.

Vegetation Alliance 5: *Eucalyptus camaldulensis* open forest

Vegetation Association Ec: Eucalyptus camaldulensis open forest.

This vegetation association was recorded on the valley flats on the south-east side of the survey area.

Vegetation Alliance 6: *Eucalyptus obtusiflora* low woodlands to low open forests

A small area of this unit occurred on a section of the floor of a linear depression (dyke) that occurred near the Cairn Hill North ridge crest and on a similar feature in the southern part of Cairn Hill.

Vegetation Association Eo: *Eucalyptus obtusiflora,* (*Eucalyptus loxophleba* subsp. *loxophleba*) low mallee open forest over *Acacia erinacea* scattered shrubs over a very open herbland.

Vegetation Association EoTd: *Eucalyptus obtusiflora* low mallee woodland to low open forest over *Trymalium daphnifolium, Acacia erinacea* shrubland.

Vegetation Alliance 7: *Eucalyptus horistes* low woodlands to low open forests

A small area of this eucalypt was found in Cairn Hill North, at the base of a low ridge near the southern boundary of Cairn Hill and at the base of the same ridge several hundred meters further south of Cairn Hill.

Vegetation Association EhAh: *Eucalyptus horistes* mallee woodland over *Allocasuarina huegeliana* low open woodland over scattered shrubs.

Vegetation Association EhEe: Eucalyptus horistes, (Eucalyptus eudesmioides) mallee woodland to low open forest.

This vegetation association included two plant communities. One was a low open forest over little understorey (Very Poor condition due to grazing) and the other was a woodland over a mixed high open shrubland and open shrubland.

Vegetation Alliance 8: *Eucalyptus pruiniramis* low woodland

A group of *Eucalyptus pruiniramis* mallees, described here as a small woodland, was found on the top of a rounded low hill east of Cairn Hill. A small clump of this mallee also occurred a few hundred meters to the south-east of the woodland and one small clump was found on the mid-slopes of a low ridge in Cairn Hill about 800 meters north of west of the small woodland.

Vegetation Association Ep: Eucalyptus pruiniramis low mallee woodland.

Vegetation Alliance 9: *Allocasuarina huegeliana* low woodlands to low open forests

Allocasuarina huegeliana grew as low woodland and low open forest on the sections of the ridge crests and slopes in the survey area.

Vegetation Association Ah: *Allocasuarina huegeliana* low woodland to low open forest over scattered shrubs.

Four plant communities were included in this vegetation association, differentiated by the composition of the tree layer and the shrub species.

Vegetation Association AhAc: *Allocasuarina huegeliana* low woodland to low open forest over *Allocasuarina campestris* scattered shrubs to high open shrubland.

Five plant communities were included in this vegetation association, differentiated by the composition of the tree layer and the shrub species growing under or with the *Allocasuarina campestris*.

Vegetation Association AhDf: Allocasuarina huegeliana low open forest over Stylobasium australe scattered shrubs and Dryandra fraseri, Calytrix depressa low open shrubland over Lepidosperma leptostachyum very open sedgeland.

One plant community was recorded in this vegetation association. It was recorded from the flat valley floor on the western boundary of Cairn Hill.

Vegetation Association AhDp: *Allocasuarina huegeliana* low woodland to low open forest over *Dodonaea pinifolia* scattered shrubs with *Xanthosia fruticulosa* very open herbland.

Two small plant communities were recorded in this vegetation association. Both units occurred along a breakaway on the side of a ridge. They differed in the associated tree and shrub species.

Vegetation Association AhDs: *Allocasuarina huegeliana* low woodland to low open forest over *Dryandra sessilis var. sessilis* scattered tall shrubs to high open shrubland.

Four plant communities were included in this vegetation association. They differed in the associated and sub-dominant species in the tree and shrub layers. One of these plant communities was distinguished by a low (open) shrubland of *Hibbertia subvaginata,* while another occurred on rocky ridge slopes in Gardiner's Hill and included *Trymalium ledifolium* ver. *rosmarinifolium low open shrubland*.

Vegetation Association AhDsKp: *Allocasuarina huegeliana* low woodland to low open forest over *Dryandra sessilis var. sessilis* scattered tall shrubs to high shrubland over *Kunzea praestans* scattered tall shrubs to high open shrubland.

This vegetation was recorded from John Tonkin's, Ridgway's, Cairn Hill North, Cairn Hill and Gardiner's Hill. Four plant communities were included in this vegetation association. They differed in the composition of the tree and shrub strata. One plant community was differentiated by having *Hibbertia subvaginata* scattered low shrubs to low open shrubland, while another plant community was a single stand at Gardiner's Hill where the *Dryandra*

sessilis var. sessilis formed an open scrub under an *Allocasuarina huegeliana* low open forest. A third plant community was distinguished by having a *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland to shrubland.

Vegetation Association AhHr: *Allocasuarina huegeliana* low open forest over *Hakea recurva* subsp. *recurva* scattered tall shrubs.
This vegetation association included one plant community that was recorded at Gardiner's Hill.

Vegetation Association AhHs: *Allocasuarina huegeliana* low open woodland to low woodland over *Hibbertia subvaginata* low open shrubland to low shrubland.

This vegetation association was only recorded on the Eastern Ridge. It included one plant community.

Vegetation Association AhKp: *Allocasuarina huegeliana* low woodland to low open forest over *Kunzea praestans* scattered tall shrubs to high open shrubland.

This vegetation association included three plant communities. One plant community was differentiated by having *Hibbertia subvaginata* scattered low shrubs to low open shrubland, while another plant community included a *Xanthorrhoea drummondii* high shrubland and a *Calytrix leschenaultia*, (*Hibbertia subvaginata*) low open shrubland. A third plant community included an *Allocasuarina campestris* high open shrubland.

Vegetation Association AhRm: *Allocasuarina huegeliana* low open forest over *Regelia megacephala, Allocasuarina campestris* high open shrubland.

This vegetation was recorded on the crest and slopes of two neighbouring ridges in the central western part of the Cairn Hill survey area. The vegetation association included two plant communities, with one occurring on the ridge slopes and including a *Kunzea praestans* high shrubland.

Vegetation Association AhRmAc: Allocasuarina huegeliana low open woodland over Regelia megacephala, Allocasuarina campestris open scrub over Ricinocarpos muricatus scattered shrubs to open shrubland

This vegetation was recorded on the low rocky chert ridges within the area north of Kiaka Road. One vegetation community was recorded with Ricinocarpos muricatus as a shrub layer.

Vegetation Association AhTl: *Allocasuarina huegeliana* low woodland to low open forest over *Trymalium ledifolium* ver. *rosmarinifolium, Hibbertia subvaginata* scattered shrubs to low open shrubland over scattered sedges and grasses, with *Xanthosia fruticulosa* very open herbland and *Cheilanthes adiantoides* scattered ferns.

This vegetation association consisted of two plant communities, which occurred on three breakaways at Cairn Hill and Eastern Ridge. The plant community at Cairn Hill was an *Allocasuarina huegeliana* low open forest over *Trymalium ledifolium* var. *rosmarinifolium* scattered shrubs.

Vegetation Association AhXd: *Allocasuarina huegeliana* low open woodland to low woodland over *Xanthorrhoea drummondii* scattered tall shrubs to high open shrubland over scattered low shrubs including *Trymalium ledifolium* ver. *rosmarinifolium* and *Hibbertia subvaginata* shrubs.

Five plant communities were included in this vegetation association. They varied in the shrub subdominants. One plant community was recorded from rocky slopes and included *Trymalium ledifolium* ver. *rosmarinifolium* scattered shrubs to low open shrubland. Another included a *Hibbertia subvaginata* low open shrubland. A third included an *Opercularia vaginata* open herbland.

Vegetation Alliance 10: *Casuarina obesa* open forest

Vegetation Association Co: Casuarina obesa open forest.

This vegetation association included one plant community that was described from one stand which occurred on the valley floor flats at the base of a low ridge.

Vegetation Alliance 11: *Acacia acuminata* low woodlands to low open forests

Acacia acuminata subsp. *acuminata* formed stands of low woodlands to low open forests in mainly small areas along the lower slopes of ridges. It commonly occurred with *Allocasuarina huegeliana* throughout the survey area.

Vegetation Association Aa: *Acacia acuminata* subsp. *acuminata* low open forest over scattered grasses sedges and very open herbland.

This vegetation association was made up of three plant communities. One plant community was distinguished by having *Allocasuarina huegeliana* present in the tree layer. Another plant community was distinguished by having a *Xanthorrhoea drummondii* high open shrubland.

Vegetation Association AaAc: *Acacia acuminata* subsp. *acuminata* low woodland over *Allocasuarina campestris* scattered tall shrubs to high open shrubland over very open herbland.

This vegetation association was made up of three plant communities. One plant community differed by having *Allocasuarina huegeliana* present in the tree layer. Another plant community was distinguished by having *Allocasuarina huegeliana* present in the tree layer and a *Xanthorrhoea drummondii* high open shrubland.

Vegetation Association AaDs: Acacia acuminata subsp. acuminata, Allocasuarina huegeliana low woodland over Dryandra sessilis var. sessilis (Xanthorrhoea drummondii) scattered tall shrubs over very open herbland.

Two plant communities were included in this vegetation association. One was distinguished by the presence of an Opercularia vaginata herbland.

Vegetation Association AaDsKp: *Acacia acuminata* subsp. *acuminata* low woodland over *Dryandra sessilis var. sessilis (Xanthorrhoea drummondii*) scattered tall shrubs over *Kunzea praestans* scattered tall shrubs to high open shrubland over very open herbland.

There were two plant communities in this vegetation association which differed in the shrub layer species. One plant community had *Hibbertia vaginata* scattered low shrubs while the other plant community had a *Melaleuca calyptroides* open shrubland.

Vegetation Association AaEl: *Acacia acuminata* subsp. *acuminata, Eucalyptus loxophleba* subsp. *loxophleba* low woodland to low open forest over very open grassland/herbland.

This vegetation association included three plant communities. One plant community was distinguished by the presence of *Allocasuarina campestris* scattered tall shrubs while another plant community had scattered *Xanthorrhea drummondii* and *Olearia dampieri* subsp. *eremicola* in the shrub layer.

Vegetation Association AaHr: *Acacia acuminata* subsp. *acuminata, (Eucalyptus loxophleba* subsp. *loxophleba*) scattered low trees over *Hakea recurva subsp. recurva* scattered tall shrubs to high open shrubland over very open herbland.

There were two plant communities in this vegetation association. One plant community differed by having an *Allocasuarina campestris* scattered tall shrubs component and a *Dodonaea pinifolia* low open shrubland over *Stenanthemum tridentatum* scattered low shrubs

Vegetation Association AaHs: Acacia acuminata subsp. acuminata, Allocasuarina huegeliana, (Eucalyptus loxophleba subsp. loxophleba) low woodland over Allocasuarina campestris scattered tall shrubs over Hibbertia subvaginata low open shrubland to low shrubland.

There was one plant community in this vegetation association. It was only recorded on the Eastern Ridge and is similar to the unit AhHs.

Vegetation Association AaKp: *Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana* low woodland to low open forest over *Kunzea praestans* scattered tall shrubs to high open shrubland over very open herbland.

There were two plant communities in this vegetation association. One plant community was differentiated by having *Allocasuarina campestris* and *Xanthorrhoea drummondii* in the high open shrubland layer.

Vegetation Association AaMcor: (*Eucalyptus wandoo* scattered trees) over *Acacia acuminata* subsp. *acuminata* scattered low trees over *Melaleuca coronicarpa* low open shrubland over very open herbland.

One plant community, recorded from a small stand at the southern corner of Gardiner's Hill, was included in this vegetation association.

Vegetation Association AaMr: *Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana* low woodland over *Melaleuca radula* scattered tall shrubs to high shrubland.

Two plant communities were included in this vegetation association, one distinguished by having an *Allocasuarina campestris* high shrubland.

Vegetation Association AaTl: Acacia acuminata subsp. acuminata scattered low trees over Trymalium ledifolium var. rosmarinifolium open shrubland.

One plant community was included in this vegetation association.

Vegetation Alliance 12: *Banksia prionotes* scattered low trees.

Vegetation Association Bp: *Banksia prionotes* scattered low trees over *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland.

Two plant communities were included in this vegetation association. One plant community was recorded near the head of a gully between low ridges, just east of Cairn Hill. The other plant community was quite different and recorded on the crest of a low rise a few hundred meters to the north-east.

Vegetation Alliance 13: *Allocasuarina campestris* high shrublands to open and closed scrub

Allocasuarina campestris formed high shrublands to open and closed scrubs extensively throughout the survey area. They were most common on lower slopes around and between the low chert ridges and on parts of the ridges where there was deeper soil over the underlying rock and probably where the underlying rock was more fractured and penetrable.

The *Allocasuarina campestris* scrub often grew with no tree layer in the survey area. Stands of *Allocasuarina campestris* scrub varied throughout the survey area with the presence and species composition of low woodlands and with associated plant species that varied in some part with sub-areas of the survey area and with habitat.

Vegetation Association Ac: *Allocasuarina campestris* open to closed scrub over scattered sedges/grasses/herbs.

There were eight plant communities in this vegetation association. They differed mainly in the presence and composition of a tree layer (scattered low trees to low open woodland) and the species of associated scattered low shrubs. One plant community differed by having an *Acacia acuminata* subsp. *acuminata* scattered low trees to low open woodland strata. Another had a *Eucalyptus loxophleba* subsp. *loxophleba*, (*Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana*) scattered low trees to low open woodland layer. Another differed by having an *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) scattered low trees to low open woodland layer. Different shrub and low shrub species that were present (scattered) in different plant communities were *Calytrix depressa*, *Dryandra fraseri*, *Hibbertia subvaginata* and *Melaleuca calyptroides*.

Vegetation Association AcAa: Acacia acuminata subsp. acuminata, Allocasuarina huegeliana low woodland over Allocasuarina campestris high open shrubland to high shrubland.

There was one plant community in this vegetation association.

Vegetation Association AcAh: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland to low open forest over *Allocasuarina campestris* high open shrubland to open to closed scrub.

There were two plant communities included in this vegetation association. They differed in the *Allocasuarina huegeliana* cover and *Allocasuarina campestris* cover.

Vegetation Association AcAhu: *Dryandra sessilis* var. sessilis scattered tall shrubs over *Allocasuarina campestris*, *Allocasuarina humilis* open scrub over *Hibbertia subvaginata* shrubland.

One plant community was included in this vegetation association. It occurred on a steep, lower to mid slope of a low chert ridge.

Vegetation Association AcAs: *Acacia scirpifolia*, *Acacia saligna* high open shrubland over *Allocasuarina campestris*, (*Calothamnus* aff. *quadrifidus* (Moora-Watheroo)) closed scrub over *Melaleuca calyptroides*, *Acacia congesta* subsp. *congesta* open shrubland.

There was one plant community included in this vegetation association. It was recorded in Cairn Hill from one stand on a broad valley floor, with no defined drainage line. The likelihood of recording other areas of this vegetation unit would have been much reduced by the clearing of much of that habitat in the survey area for gravel mining (in Cairn Hill Reserve) and for pasture and cropping.

Vegetation Association AcB: *Allocasuarina campestris* open scrub over *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland to open heath.

Four plant communities were included in this vegetation association. One plant community that was recorded on lower slopes, differed by having *Melaleuca radula*, *Baeckea* sp. Moora (R. Bone 1993/1) scattered shrubs to open shrubland under an *Allocasuarina campestris* open scrub. Another plant community was recorded at three sites on the broad top of a low ridge in Cairn Hill and Cairn Hill North and was differentiated by having a strata of scattered *Allocasuarina huegeliana* low trees over *Dryandra sessilis* var. *sessilis* scattered tall shrubs. Another differed by having a *Baeckea* sp. Moora (R. Bone 1993/1), *Melaleuca calyptroides* (open) shrubland to open heath under an *Allocasuarina campestris* closed scrub.

Vegetation Association AcCq: *Allocasuarina campestris*, *Calothamnus* aff. *quadrifidus* (Moora-Watheroo) open to closed scrub.

There were three plant communities assigned to this vegetation association. One was differentiated by having a *Melaleuca calyptroides* scattered shrubs to open shrubland layer. Another plant community differed by having a had scattered *Astroloma serratifolium* and *Hakea lissocarpha* low shrub layer.

Vegetation Association AcDs: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland scattered low trees to low open woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland over *Allocasuarina campestris* open to closed scrub.

Four plant communities were included in this vegetation association. One was distinguished by the presence of *Kunzea praestans* in the open scrub layer. Another plant community differed by having a high open shrubland of *Xanthorrhoea drummondii*. Another plant community differed by having a high open shrubland of *Melaleuca radula* and *Xanthorrhoea drummondii*.

Vegetation Association AcEe: *Eucalyptus eudesmioides* scattered low mallees to low mallee woodland over *Allocasuarina campestris* open scrub over *Baeckea* sp. Moora (R. Bone 1993/1) scattered low shrubs to low shrubland.

This vegetation association included two plant communities. One differed from the generic description above by having *Kunzea praestans*, *Regelia megacephala* high shrubland component and a *Melaleuca calyptroides* open shrubland to shrubland component.

Vegetation Association AcEl: *Eucalyptus loxophleba* subsp. *loxophleba* low open woodland to low open forest over *Allocasuarina campestris* open scrub.

There were two plant communities included in this vegetation association. They differed in their *Eucalyptus loxophleba* subsp. *loxophleba* low tree cover, one having a low open woodland to low woodland of *Eucalyptus loxophleba* subsp. *loxophleba*, while the other had a *Eucalyptus loxophleba* subsp. *loxophleba* low open forest.

Vegetation Association AcEw: *Eucalyptus wandoo* subsp. *wandoo* low open woodland over *Allocasuarina campestris* open to closed scrub.

There were four plant communities included in this vegetation association. They tended to be intermediate vegetation units on the lower slopes of rocky ridges, adjacent to *Eucalyptus wandoo* subsp. *wandoo* woodlands down slope and *Allocasuarina campestris* open to closed scrubs. One of the four plant communities differed by having a *Calothamnus* aff. *quadrifidus* (Moora-Watheroo) high shrubland component. Another plant community differed by having an *Acacia acuminata* subsp. *acuminata*, (*Allocasuarina huegeliana*) scattered low trees to low open woodland layer. Another plant community was described from a breakaway rocky slope of a low ridge with scattered *Kunzea praestans* and *Melaleuca calyptroides* present and typical breakaway slope species present (*Xanthosia fruticulosa*, *Stypandra glauca* and *Trymalium ledifolium* subsp. *rosmarinifolium*).

Vegetation Association AcHa: *Allocasuarina campestris* scattered tall shrubs over *Hypocalymma angustifolium* low open shrubland over *Pityrodia dilatata* low open shrubland.

Two plant communities were included in this vegetation association. Each plant community was recorded from one small stand each. The two stands were adjacent to each other and were both on top of a very small, very low rocky rise. One plant community differed by having *Dryandra fraseri* and *Hakea lissocarpha* in the low open shrubland over a low open shrubland of *Acacia aristulata* with only scattered *Pityrodia dilatata.*

The specimen identified as *Hypocalymma angustifolium* is a poor match for most of the material under this name in the Western Australian Herbarium, but matches some material there.

Vegetation Association AcHs: *Allocasuarina campestris* open to closed scrub over *Hibbertia subvaginata* scattered low shrubs to low open shrubland.

Two plant communities were included in this vegetation association. One plant community differed by having a *Eucalyptus loxophleba* subsp. *loxophleba*, *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland layer.

Vegetation Association AcId: Allocasuarina campestris open to closed scrub over Isopogon divergens open shrubland.

This vegetation association was mainly recorded on ridge tops or upper slopes in Cairn Hill. It included three plant communities. One differed by including a *Melaleuca calyptroides*, *Baeckea* sp. Moora (R. Bone 1993/1), (*Calothamnus sanguineus*) open shrubland to shrubland and *Calytrix leschenaultii*, *Dryandra fraseri* scattered low shrubs. Another plant community differed by having an *Allocasuarina huegeliana* scattered low tree layer along with a *Kunzea praestans* high open shrubland component and *Melaleuca calyptroides* shrubland over *Calytrix leschenaultii* scattered low shrubs.

Vegetation Association AcMr: *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low open woodland to low woodland over *Allocasuarina campestris*, (*Melaleuca radula*) open scrub.

Three plant communities were included in this vegetation association. One differed by having an *Acacia acuminata* subsp. *acuminata* scattered low trees to low open woodland tree layer. Another plant community differed by having no tree layer and an *Allocasuarina campestris*, (*Calothamnus* aff. *quadrifidus* (Moora-Watheroo), *Melaleuca radula*) closed scrub.

Vegetation Association AcMs: *Acacia acuminata* subsp. *acuminata* scattered low trees over *Allocasuarina campestris* open to closed scrub over *Melaleuca sclerophylla* open shrubland.

One plant community was included in this vegetation association. It was described from a small stand on the south-west boundary of Gardiner's Hill.

Vegetation Association AcRm: *Regelia megacephala* high open shrubland to shrubland over *Allocasuarina campestris* open to closed scrub.

Four plant communities were included in this vegetation association. They were probably intermediate vegetation to *Regelia megacephala* scrub and *Allocasuarina campestris* scrub units. One plant community, which occurred on a chert breakaway, differed by having *Santalum acuminatum* low open woodland and included a *Calothamnus* aff. *quadrifidus* (Moora-Watheroo) high open shrubland. Another plant community differed by having an *Allocasuarina huegeliana* scattered low trees layer, a *Calothamnus* aff. *quadrifidus* (Moora-Watheroo), *Kunzea praestans* high shrubland component and *Melaleuca calyptroides* scattered shrubs. One vegetation community was recorded with *Ricinocarpos muricatus* as a shrub layer.

Vegetation Alliance 14: *Allocasuarina microstachya* open scrub.

Allocasuarina microstachya was only recorded at Gardiner's Hill. It formed an open scrub in a small area of hill crest.

Vegetation Association Am: *Allocasuarina huegeliana* scattered low trees over *Allocasuarina microstachya*, *Kunzea praestans* open scrub over *Calytrix leschenaultii*, *Calytrix depressa* scattered low shrubs over scattered sedges/grasses and open herbland.

One plant community was included in this vegetation association.

Vegetation Alliance 15: *Regelia megacephala* high shrubland to open and closed scrub

Regelia megacephala high shrubland to open and closed scrub occurred on the exposed chert slopes and sometimes crests of the chert ridges in the survey area. In places *Regelia* scrub stands occurred in low open woodlands and occurred with different associated tree and shrub species which varied depending on the area within the survey area.

Vegetation Association Rm: Regelia megacephala open scrub.

One plant community was included in this vegetation association. The condition at the recording site was Very Poor and so this plant community may be a consequence of the vegetation deterioration.

Vegetation Association RmAh: *Allocasuarina huegeliana* low open woodland to low open forest over *Regelia megacephala* open scrub over scattered sedges and herbs.

This vegetation was recorded from sites in Cairn Hill, Cairn Hill North and Gardiner's Hill. Four plant communities were included in this vegetation association. In one plant community, *Allocasuarina huegeliana* formed a low open forest over a *Regelia megacephala* open scrub on the lower slopes of a chert ridge in the north-east corner of Cairn Hill. Another plant community was differentiated by having *Kunzea praestans* high open shrubland and *Hibbertia subvaginata* low open shrubland.

Vegetation Association RmB: *Regelia megacephala*, (*Kunzea praestans*) open scrub over *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland.

This vegetation association included one plant community.

Vegetation Association RmDs: Regelia megacephala, (Dryandra sessilis var. sessilis) open scrub.

One plant community was included in this vegetation association.
Vegetation Association RmEe: *Eucalyptus eudesmioides* scattered low trees to low woodland over *Regelia megacephala* open to closed scrub.

Two plant communities were included in this vegetation association. One was distinguished by having a *Kunzea praestans* high shrubland and *Melaleuca calyptroides* scattered shrubs to open shrubland.

Vegetation Association RmHs: *Regelia megacephala* open scrub over *Hibbertia subvaginata* low open shrubland to low shrubland.

This vegetation association included three plant communities. One plant community differed by the presence of a low tree layer (scattered *Allocasuarina huegeliana*). Another plant community was differentiated by having a low tree layer (scattered *Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana*), an *Allocasuarina campestris* high open shrubland and *Hibbertia subvaginata* scattered shrubs.

Vegetation Association RmKp: *Regelia megacephala* high shrubland to open scrub over *Kunzea praestans* high open shrubland to open scrub over *Hibbertia subvaginata* scattered shrubs to low open shrubland.

This vegetation association included three plant communities. One plant community was a *Regelia megacephala* high shrubland over *Kunzea praestans* open scrub over very open herbland. The second plant community differed by having a lower cover of *Kunzea praestans* (high open shrubland to high shrubland) over *Hibbertia subvaginata* scattered shrubs. The third plant community had a *Regelia megacephala*, *Kunzea praestans* open scrub over *Hibbertia subvaginata* with *Ricinocarpus muricatus* as an associated species.

Vegetation Association RmKpMc: *Regelia megacephala* open to closed scrub and *Kunzea praestans* high open shrubland to open scrub over *Melaleuca calyptroides* open shrubland to shrubland over *Hibbertia subvaginata* low open shrubland.

This vegetation association included three plant communities. One plant communities structure included a *Kunzea praestans* high shrubland to open scrub and a *Melaleuca calyptroides* open shrubland. Another plant community only had a lower *Kunzea praestans* cover (high open shrubland) and a higher cover of *Melaleuca calyptroides* (open shrubland to shrubland). The third plant community differed by having *Allocasuarina campestris* in the scrub layer.

Vegetation Alliance 16: *Kunzea Praestans* high shrubland to open and closed scrub

Kunzea praestans grew as high shrublands and open scrubs on parts of the slopes and crests of the chert ridges. It commonly grew over *Hibbertia subvaginata* (low) open shrublands to (low) open heaths.

Vegetation Association KpAh: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* low open woodland to low woodland over *Kunzea praestans* high shrubland to open scrub over *Hibbertia subvaginata* scattered shrubs to low open shrubland.

This vegetation association includes one plant community. One plant community is differentiated by having an open heath of *Hibbertia subvaginata*.

Vegetation Association KpAhB: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* scattered trees to low open woodland over *Kunzea praestans* high shrubland to open scrub over shrubland including *Melaleuca calyptroides* and *Baeckea* sp. Moora (R. Bone 1993/1) scattered shrubs to open shrubland.

This vegetation was recorded from numerous locations at Cairn hill and Cairn Hill North where *Melaleuca calyptroides* and *Baeckea* sp. Moora (R. Bone 1993/1) were widespread. Three plant communities were included in the vegetation association. One plant community differed by having a strata of *Dryandra sessilis* var. *sessilis* high open shrubland and no *Melaleuca calyptroides* open shrubland. Another plant community was distinguished by having *Allocasuarina humilis* in the open scrub on a rocky chert slope.

Vegetation Association KpAhDs: Allocasuarina huegeliana (Acacia acuminata subsp. acuminata) scattered trees to low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans, (Xanthorrhoea drummondii) high shrubland to open scrub over Hibbertia subvaginata low open shrubland.

Three plant communities were included in this vegetation association. While one plant community had a *Kunzea praestans*, (*Xanthorrhoea drummondii*) high shrubland over *Hibbertia subvaginata* low open shrubland, another plant community differed by having a *Kunzea praestans*, (*Xanthorrhoea drummondii*) high open shrubland over *Hibbertia subvaginata* low heath. The third plant community differed by not having *Hibbertia subvaginata* in the low shrub layer.

Vegetation Association KpAhMc: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* scattered trees to low open woodland over *Kunzea praestans* open scrub over *Melaleuca calyptroides* open shrubland to shrubland.

This vegetation association included one plant community.

Vegetation Association KpDs: *Dryandra sessilis* var. *sessilis* high open shrubland over *Kunzea praestans* (*Xanthorrhoea drummondii*) open scrub over *Hibbertia subvaginata* scattered low shrubs.

One plant community was included in this vegetation association.

Vegetation Association KpDsMc: *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland over *Kunzea praestans* high shrubland to open scrub over *Melaleuca calyptroides* scattered shrubs to shrubland over *Hibbertia subvaginata* scattered low shrubs to low open shrubland.

Three plant communities were recorded in this vegetation association. One plant community differed by having a tree strata (*Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* scattered low trees to low woodland). Another plant community differed by having a *Xanthorrhoea drummondii* high open shrubland strata.

Vegetation Association KpEe: *Eucalyptus eudesmioides* low woodland over *Kunzea praestans* open scrub over *Melaleuca calyptroides* and *Baeckea* sp. Moora (R. Bone 1993/1) open shrubland.

This unit was recorded at Cairn Hill.

Vegetation Association KpHs: *Kunzea praestans* high shrubland to open scrub over *Hibbertia subvaginata* (low) open shrubland to (low) open heaths over scattered to very open sedgeland/grassland/herbland.

Two plant communities were included in this vegetation association. One of these differed by having *Allocasuarina campestris* in the open scrub.

Vegetation Association KpXd: *Xanthorrhoea drummondii* high open shrubland over *Kunzea praestans* high open shrubland.

One plant community was included in this vegetation association.

Vegetation Alliance 17: *Melaleuca calyptroides* open to closed heath

Most of the units of this vegetation were recorded on John Tonkin's and the Ridgway's properties.

Vegetation Association Mc: *Kunzea praestans* high open shrubland over *Melaleuca calyptroides* open to closed heath over *Hibbertia subvaginata, Calytrix leschenaultii* scattered low shrubs to low open shrubland.

Four plant communities were included in this vegetation association. One plant community differed by having a scattered *Dryandra sessilis* var. *sessilis* upper strata. Another differed by having a scattered *Dryandra sessilis* var. *sessilis* upper strata and a *Baeckea* sp. Moora (R. Bone 1993/1) open shrubland. The fourth plant community differed by having a low tree layer (*Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) scattered low trees).

Vegetation Alliance 18: *Hibbertia subvaginata* low shrublands to low open heath

Hibbertia subvaginata commonly grew as scattered shrubs or low shrubland in association with *Regelia megacephala* and *Kunzea praestans* high shrublands and open scrubs. However, at a few site *Hibbertia subvaginata* grew as a low shrubland or open heath with no other dominants or under scattered trees. Most recordings of this unit were on the Eastern Ridge.

Vegetation Association Hs: Hibbertia subvaginata open heath.

This vegetation association included one plant community.

Vegetation Association HsAh: *Allocasuarina huegeliana* scattered trees over *Hibbertia subvaginata* (low open shrubland) open heath.

Three plant communities were included in this vegetation association. Two of these were recorded on rocky, south-facing slopes on the Eastern Ridge. One of these plant communities differed by having a *Pityrodia dilatata* low shrubland. The other was distinguished by its *Allocasuarina campestris* high open shrubland. The third plant community had *Kunzea praestans* scattered shrubs to open shrubland over *Hibbertia subvaginata* low open shrubland.

Vegetation Association HsDs: *Nuytsia floribunda* scattered low trees over *Dryandra sessilis* var. *sessilis* high open shrubland over *Hibbertia subvaginata* low shrubland.

One plant community was included in this vegetation association.

Vegetation Alliance 19: *Xanthorrhoea drummondii* high open shrubland

Vegetation Association Xd: *Xanthorrhoea drummondii* high open shrubland over grassland/herbland/sedgeland

One plant community was recorded in this vegetation association.

Vegetation Alliance 20: Miscellaneous heaths

Vegetation Alliance 20/1: *Dryandra sessilis* high shrubland to open scrub

Vegetation Association Ds: Dryandra sessilis var. sessilis, Xanthorrhoea drummondii high open shrubland over Allocasuarina campestris scattered tall shrubs.

There was one plant community in this vegetation association.

Vegetation Association DsHs: *Allocasuarina huegeliana*, (*Acacia acuminata*) scattered low trees to low open woodland over *Dryandra sessilis* var. *sessilis* high open shrubland to open scrub over *Hibbertia subvaginata* low shrubland.

There was one plant community in this vegetation association.

Vegetation Association DsKp: Dryandra sessilis var. sessilis high shrubland to open scrub over Kunzea praestans, Leptospermum erubescens high shrubland over Acacia pulchella, Baeckea aff. preissiana, Daviesia dielsii, Dryandra nivea ssp. nivea (narrow leaf, mound) Banksia sphaerocarpa low open shrubland.

There was one plant community in this vegetation association. This plant community was recorded on the gentle slopes of a broad low rise with some exposed chert.

Vegetation Alliance 20/2: *Melaleuca concreta* open scrub.

Vegetation Association Mco: *Eucalyptus loxophleba* subsp. *loxophleba, Acacia acuminata* subsp. *acuminata* scattered low trees over *Melaleuca concreta* open scrub over scattered low shrubs over scattered sedges.

Two plant communities were recorded in this vegetation association. One plant community occurred in a small area of a linear depression (?dyke) that occurred near the Cairn Hill North ridge crest. The other plant community occurred in a small area in the south-west corner of Gardiner's Hill and differed in not having a tree layer and having a *Melaleuca sclerophylla*, Olearia dampieri subsp. eremicola open shrubland.

Vegetation Alliance 20/3: *Melaleuca radula* high shrubland to open scrub

Vegetation Association Mr: Allocasuarina huegeliana, (Acacia acuminata subsp. acuminata) scattered low trees to low woodland over Melaleuca radula, (*Calothamnus* aff. *quadrifidus* (Moora-Watheroo), Xanthorrhoea drummondii) high shrubland to open scrub.

One plant community was included in this vegetation association, with all sites recorded at Gardiner's Hill.

Vegetation Alliance 20/4: *Melaleuca sclerophylla* open heath

Vegetation Association Ms: Melaleuca sclerophylla, (Grevillea sp. (GHR270-2)) open heath over Dodonaea pinifolia, Gastrolobium obovatum low open shrubland.

One plant community was included in this vegetation association. It was recorded from one small area in the south-west corner of Gardiner's Hill.

Vegetation Alliance 20/5: *Baeckea* sp. Moora (R. Bone 1993/1) low open heath

Vegetation Association B: *Allocasuarina huegeliana* scattered low trees to low open woodland over *Allocasuarina campestris*, (*Xanthorrhoea drummondii*) high open shrubland over *Baeckea* sp. Moora (R. Bone 1993/1), (*Calytrix leschenaultii*) low shrubland to low open heath.

One plant community was recorded in this vegetation association. It was recorded on the top of a low ridge in the Cairn Hill North area.

Vegetation Alliance 20/6: *Calytrix leschenaultii* open heath

Vegetation Association Cl: Allocasuarina campestris, Kunzea praestans scattered tall shrubs over Calytrix leschenaultii, (Hibbertia subvaginata) open heath.

One plant community was included in this vegetation association. One stand on a lower slope of a low chert ridge varied significantly by having a low open woodland of Eucalyptus wandoo subsp. wandoo, possibly indicating underlying doleritic soils.

Vegetation Association ClAh: Allocasuarina huegeliana, (Acacia acuminata subsp. acuminata) low open woodland to low woodland over Kunzea praestans, Xanthorrhoea drummondii high open shrubland over Calytrix leschenaultii open heath.

There were two plant communities in this vegetation association. One differed by having a Dryandra sessilis var. sessilis scattered tall shrub layer and a Hibbertia subvaginata low open shrubland component.

Vegetation Alliance 20/7: *Calytrix depressa* low open heath

Vegetation Association Cd: *Allocasuarina campestris* scattered tall shrubs over *Melaleuca radula, Grevillea* sp. (JTR270-2) open shrubland over *Calytrix depressa* low shrubland.

One plant community was recorded in this vegetation association. It was recorded on the slopes of a low ridge in Gardiner's Hill.

Vegetation Association CdAh: *Allocasuarina huegeliana* low woodland over *Allocasuarina campestris, Kunzea praestans, Xanthorrhoea drummondii* high open shrubland over *Baeckea* sp. Moora (R. Bone 1993/1) scattered shrubs over *Calytrix depressa* low open heath.

One plant community was recorded in this vegetation association. Very small areas of this plant community were recorded on the top of the low ridge at Cairn Hill North.

Vegetation Alliance 20/8: *Calothamnus* aff. *quadrifidus* (Moora-Watheroo) high shrubland

Vegetation Association CqMc (1): *Calothamnus* aff. *quadrifidus* (Moora-Watheroo) high shrubland over *Xanthorrhoea drummondii* scattered shrubs over *Melaleuca calyptroides* shrubland.

One plant community was included in this vegetation association.

Vegetation Association CqAh (1): *Allocasuarina huegeliana* scattered low trees over *Calothamnus* aff. *quadrifidus* (Moora-Watheroo), (*Kunzea praestans*, *Allocasuarina campestris*) high open shrubland to high shrubland over *Hibbertia subvaginata* scattered low shrubs to low open shrubland.

One plant community was included in this vegetation association.

Vegetation Alliance 20/9: *Ricinocarpus muricatus* shrubland to open heath

Vegetation Association Rmu: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low woodland to low open forest over Ricinocarpus muricatus shrubland to open heath.

One plant community was included in this vegetation association. It was described from the slopes of two low ridges in Ridgway's property, just north of Kiaka Rd.

Vegetation Alliance 20/10: *Ricinocarpus velutinus* open heath

Vegetation Association Rv: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low open woodland to low woodland over Allocasuarina campestris scattered tall shrubs over Xanthorrhoea drummondii scattered shrubs over Ricinocarpus velutinus open heath.

One plant community was included in this vegetation association. One stand of this plant community was recorded in a remnant vegetation block about 500 meters east of the southern end of the Eastern Ridge.

Vegetation Alliance 21: Other miscellaneous

Vegetation Alliance 21/1: *Lepidosperma pubisquameum* sedgeland

Vegetation Association Lp: *Xanthorrhoea drummondii* open shrubland over *Lepidosperma pubisquameum* sedgeland with an annual herbland and open annual grassland.

One plant community was included in this vegetation association. It occurred in one small area on the top of a low rocky ridge near the south end of Eastern Ridge.

Vegetation Alliance 22: *Casuarina obesa* (*Eucalyptus loxophleba* subsp. *loxophleba*) low open forest

Vegetation Association CoAl.1: *Casuarina obesa* (*Eucalyptus loxophleba* subsp. *loxophleba*) low open forest over *Acacia ligustrina* and *Hakea preissii* high open shrubland over **Cynosurus echinatus* and **Vulpia myuros* closed annual grassland.

This alliance differed from the previous *Casuarina obesa* alliance as it contains an additional structural unit. One community was recorded in this vegetation association.

12.3 Most abundant vegetation alliances

The most abundant of the thirty vegetation alliances in the survey area occurred on the upper parts of the ridges in the survey area. They are:

- Vegetation Alliance 9: *Allocasuarina huegeliana* low woodlands to low open forests;
- Vegetation Alliance 11: *Acacia acuminata* low woodlands to low open forests;
- Vegetation Alliance 13: *Allocasuarina campestris* high shrublands to open and closed scrub;
- Vegetation Alliance 15: *Regelia megacephala* high shrubland to open and closed scrub; and
- Vegetation Alliance 16: *Kunzea Praestans* high shrubland to open and closed scrub.

12.4 Less common vegetation alliances

Some vegetation alliances were less common in the survey area mainly because they occurred in habitat that is less common in the survey area. Examples of these are:

- The Wandoo (*Eucalyptus wandoo*) vegetation alliance (which occurred in small areas of the Eastern Ridge, Cairn Hill Reserve, A. & R. Tonkin's property and Gardiner's Hill);

- Many of the York Gum (*Eucalyptus loxophleba*) vegetation associations, which occurred both along dykes intruded into the chert ridges and along the edges of the broad valley floors (which are largely cleared) at the bases of the chert ridges; and

- The Salmon Gum (*Eucalyptus* vegetation association which was recorded along some narrow valley floors between chert ridges in Cairn Hill Reserve and Gardiner's Hill and within some of the adjacent remnants.

- There are a number of other vegetation alliances with limited distribution in the survey area including:

- Vegetation Alliance 5: *Eucalyptus camaldulensis* open forest, this alliance only occurred on a small area on the flat plains on the west side of remnant chert ridge vegetation on the Chester's property, south of Cairn Hill Reserve;

- Vegetation Alliance 6: *Eucalyptus obtusiflora* low woodlands to low open forests. This alliance is restricted to two small areas on dykes in Cairn Hill North and Cairn Hill Reserve;

- Vegetation Alliance 7: *Eucalyptus horistes* low woodlands to low open forests. This alliance is restricted to one location in Cairn Hill North, one location at the base of a low ridge near the southern boundary of Cairn Hill and at the base of the same ridge several hundred meters further south of Cairn Hill, on the Chester's property;

- Vegetation Alliance 20/2: *Melaleuca concreta* open scrub. This alliance is restricted to one small area in Cairn Hill North and another small area on Gardiner's Hill);

- Vegetation Alliance 20/4: *Melaleuca sclerophylla* open heath. This alliance is limited to one small area on Gardiner's Hill;

- Vegetation Alliance 20/9: *Ricinocarpus muricatus* shrubland to open heath. This alliance is restricted to two ridges on the Ridgway's property;

- Vegetation Alliance 20/10: *Ricinocarpus velutinus* open heath. This alliance is restricted to one small area of remnant vegetation east of the southern end of the Eastern Ridge.

- Vegetation Alliance 22: *Casuarina obesa* (*Eucalyptus loxophleba* subsp. *loxophleba*) low open forest

While vegetation dominated by the species that dominate these vegetation alliances will mostly be found elsewhere, it is likely to vary very significantly from the alliances described here and be referrable to different alliances. That is, with the possible exception of

Vegetation Alliance 5., the vegetation listed above is likely to be extremely rare as it is likely to be restricted to the (see Map 3 above) Coomberdale Landscape (Chert subsystem) where the gentle to moderate stripping of the landscape has exposed chert.

12.5 Vegetation associations dominated by the geographically restricted species *Kunzea praestans*

Kunzea praestans vegetation associations also occurred in all the main bushland areas in the survey area, but were most extensive north of Kiaka Rd. While *Kunzea praestans* was often a fairly minor component of vegetation associations, it was also prominent in a significant number of associations, including:

- Vegetation Association EeKp: *Eucalyptus eudesmioides* low mallee woodland over *Kunzea praestans* scattered tall shrubs to high shrubland.

- Vegetation Association AaDsKp: *Acacia acuminata* subsp. *acuminata* low woodland over *Dryandra sessilis var. sessilis (Xanthorrhoea drummondii*) scattered tall shrubs over *Kunzea praestans* scattered tall shrubs to high open shrubland over very open herbland.

- Vegetation Association Am: Allocasuarina huegeliana scattered low trees over *Allocasuarina microstachya*, *Kunzea praestans* open scrub over *Calytrix leschenaultii*, *Calytrix depressa* scattered low shrubs over scattered sedges/grasses and open herbland.

- Vegetation Association RmB: *Regelia megacephala*, (*Kunzea praestans*) open scrub over *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland.

- Vegetation Association RmKp: *Regelia megacephala* high shrubland to open scrub over *Kunzea praestans* high open shrubland to open scrub over *Hibbertia subvaginata* scattered shrubs to low open shrubland.

- Vegetation Association RmKpMc: *Regelia megacephala open to closed scrub and Kunzea praestans* high open shrubland to open scrub over *Melaleuca calyptroides* open shrubland to shrubland over *Hibbertia subvaginata* low open shrubland.

- Vegetation Association KpAh: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* low open woodland to low woodland over *Kunzea praestans* high shrubland to open scrub over *Hibbertia subvaginata* scattered shrubs to low open shrubland.

- Vegetation Association KpAhB: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* scattered trees to low open woodland over *Kunzea praestans* high shrubland to open scrub over shrubland including *Melaleuca calyptroides* and *Baeckea* sp. Moora (R. Bone 1993/1) scattered shrubs to open shrubland.
- Vegetation Association KpAhDs: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* scattered trees to low open woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Kunzea praestans*, (*Xanthorrhoea drummondii*) high shrubland to open scrub over *Hibbertia subvaginata* low open shrubland.

- Vegetation Association KpAhMc: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* scattered trees to low open woodland over *Kunzea praestans* open scrub over *Melaleuca calyptroides* open shrubland to shrubland.

- Vegetation Association KpDs: *Dryandra sessilis* var. *sessilis* high open shrubland over *Kunzea praestans* (*Xanthorrhoea drummondii*) open scrub over *Hibbertia subvaginata* scattered low shrubs.

- Vegetation Association KpDsMc: *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland over *Kunzea praestans* high shrubland to open scrub over *Hibbertia subvaginata* scattered low shrubs to low open shrubland.

- Vegetation Association KpEe: *Eucalyptus eudesmioides* low woodland over *Kunzea praestans* open scrub over *Melaleuca calyptroides* and *Baeckea* sp. Moora (R. Bone 1993/1) open shrubland.

- Vegetation Association KpHs: *Kunzea praestans* high shrubland to open scrub over *Hibbertia subvaginata* (low) open shrubland to (low) open heaths over scattered to very open sedgeland/grassland/herbland.

12.6 Vegetation associations with the geographically restricted species *Baeckea* sp. Moora common

Vegetation alliances in the survey area with the priority flora species *Baeckea* sp. Moora (R. Bone 1993/1) forming a significant part of the vegetation stands included in them occurred only in Cairn Hill North, the Eastern Ridge and Cairn Hill Reserve. The vegetation associations with *Baeckea* sp. Moora (R. Bone 1993/1) more abundant are:

- Vegetation Association AcB: *Allocasuarina campestris* open scrub over *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland to open heath.

- Vegetation Association RmB: *Regelia megacephala*, (*Kunzea praestans*) open scrub over *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland.

- Vegetation Association KpEe: *Eucalyptus eudesmioides* low woodland over *Kunzea praestans* open scrub over *Melaleuca calyptroides* and *Baeckea* sp. Moora (R. Bone 1993/1) open shrubland.

- Vegetation Association B: *Allocasuarina huegeliana* scattered low trees to low open woodland over *Allocasuarina campestris*, (*Xanthorrhoea drummondii*) high open shrubland over *Baeckea* sp. Moora (R. Bone 1993/1), (*Calytrix leschenaultii*) low shrubland to low open heath.

12.7 Vegetation associations dominated by the geographically restricted species *Regelia megacephala*

Vegetation alliances dominated by *Regelia megacephala* were recorded in all the main sub-areas of bushland in the survey area, however there are significant structural differences between *Regelia megacephala* units across the survey area, although a proportion of the stands are fairly similar. For example, in the southern part of the survey area, some *Regelia megacephala* open scrub stands occurred under an overstorey of *Allocasuarina huegeliana* low open woodland to low open forest (Cairn Hill, Cairn Hill North and Gardener's Hill) and *Regelia megacephala* open scrub occurred under *Eucalyptus eudesmioides* scattered low trees to low open woodland (Cairn Hill Reserve). This scale of this variation is self-evident from the list of vegetation associations from the survey area with *Regelia megacephala* dominant or sub-dominant given here:

- Vegetation Association AhRm: *Allocasuarina huegeliana* low open forest over *Regelia megacephala* high open shrubland.

- Vegetation Association AcRm: *Regelia megacephala* high open shrubland to shrubland over *Allocasuarina campestris* open to closed scrub.

- Vegetation Association Rm: *Regelia megacephala* open scrub.

- Vegetation Association RmAh: *Allocasuarina huegeliana* low open woodland to low open forest over *Regelia megacephala* open scrub over scattered sedges and herbs.

- Vegetation Association RmB: *Regelia megacephala*, (*Kunzea praestans*) open scrub over *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland.

- Vegetation Association RmDs: *Regelia megacephala,* (*Dryandra sessilis var. sessilis)* open scrub.

- Vegetation Association RmEe: *Eucalyptus eudesmioides* scattered low trees to low woodland over *Regelia megacephala* open to closed scrub.

- Vegetation Association RmHs: *Regelia megacephala* open scrub over *Hibbertia subvaginata* low open shrubland to low shrubland.

- Vegetation Association RmKp: *Regelia megacephala* high shrubland to open scrub over *Kunzea praestans* high open shrubland to open scrub over *Hibbertia subvaginata* scattered shrubs to low open shrubland.

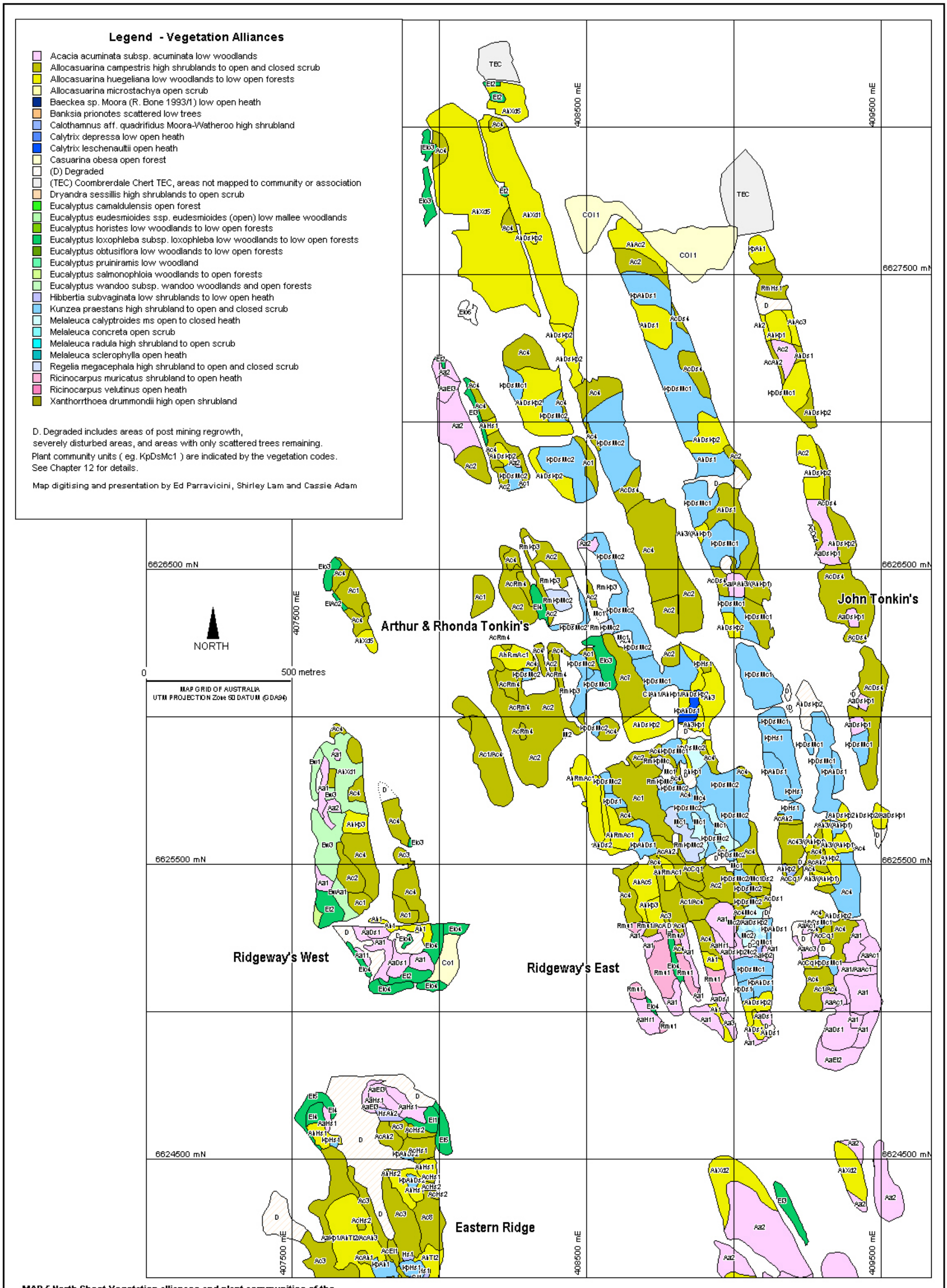
- Vegetation Association RmKpMc: *Regelia megacephala open to closed scrub and Kunzea praestans* high open shrubland to open scrub over *Melaleuca calyptroides* open shrubland to shrubland over *Hibbertia subvaginata* low open shrubland.

Floristic differences within the *Regelia megacephala* stands recorded are considered in section 14 below. The extent of vegetation dominated by *Regelia megacephala*, or with this species fairly significant in the vegetation, is shown on Map 4. The distribution of the different associations list above is shown by the alphabetic part of the community codes on Map 5.

Floristically, the *Regelia megacephala* stands were quite different across the different sub-areas, as indicated by their floristic groupings (groups 1,3,5 and 8 in the 10 group analysis) in the floristic analysis (see below).

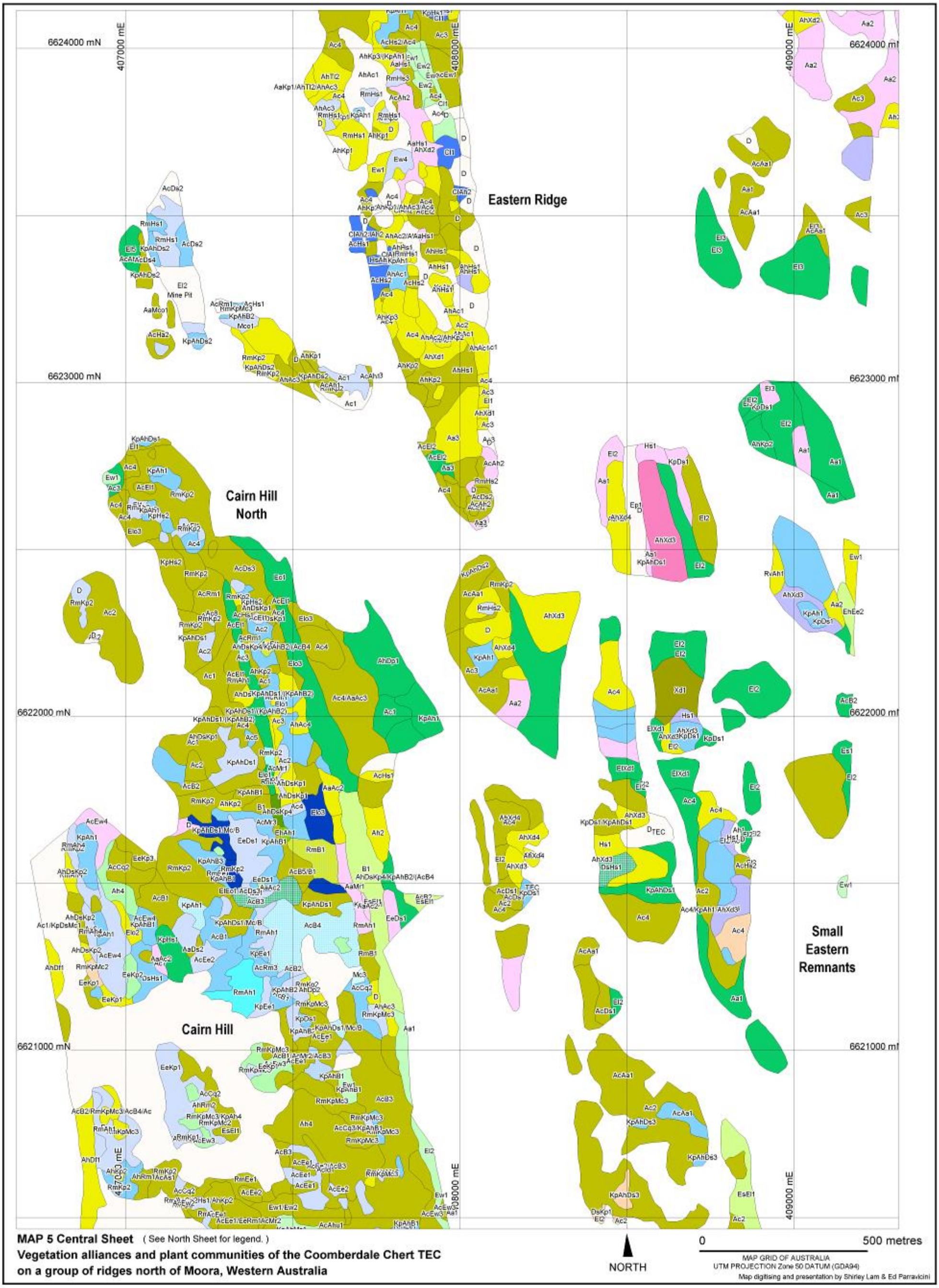
The condition of the *Regelia megacephala* stands varied from excellent in the Cairn Hill sub-area to good to very good in Cairn Hill North, the Western Ore Body, the Eastern Ore Body and the Eastern Ridge sub-areas. Some weed invasion and grazing were the cause of degradation of the *Regelia* stands. However, the very rocky chert outcrop habitat typical favoured by the *Regelia* stands generally limited the degradation. The *Regelia* stands in the Gardiner Hill and Kiaka Rd North sub-areas were also in good to very good condition. The Chester Property *Regelia* stands were in the poorest condition (+/-good), with more significant degradation from grazing and more severe weed invasion. The associated flora was also in the poorest condition in this area.

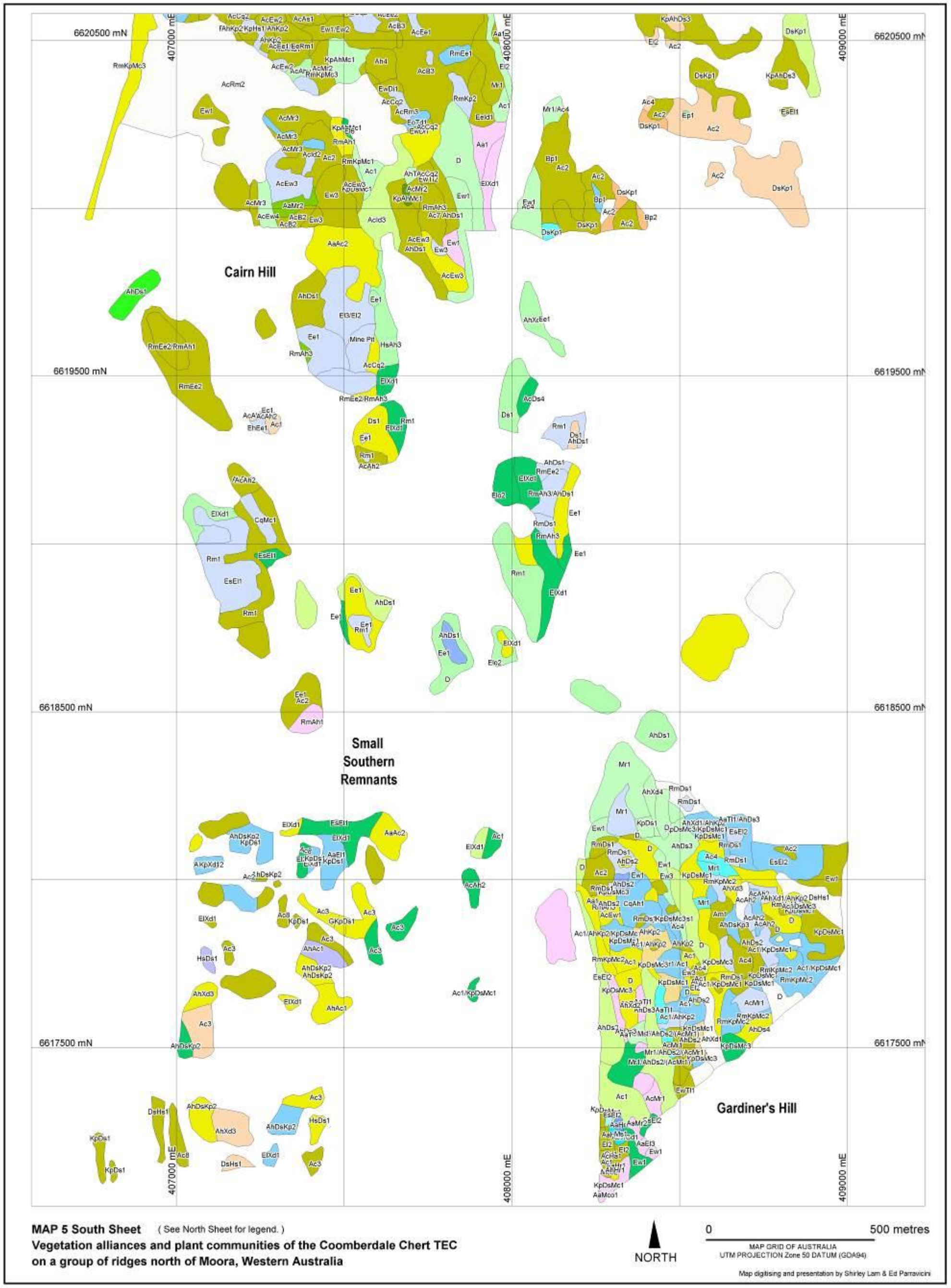
The *Regelia megacephala* stands in the Eastern Ridge sub-area were smaller stands than most other stands. The two quadrats located in these stands were recorded as in very good and good to very good condition respectively.



MAP 5 North Sheet Vegetation alliances and plant communities of the Coomberdale Chert TEC on a group of ridges north of Moora, Western Australia

Map 5. Vegetation alliances and plant communities of the Coomberdale Chert TEC


6624000 mN
6623000 mN
6622000 mN
6621000 mN
407000 mE
408000 mE
409000 mE
Eastern Ridge
Cairn Hill North
Cairn Hill
Small Eastern Remnants
MAP 5 Central Sheet (See North Sheet for legend.)
Vegetation alliances and plant communities of the Coomberdale Chert TEC on a group of ridges north of Moora, Western Australia
NORTH
0
500 metres
MAP GRID OF AUSTRALIA
UTM PROJECTION Zone 50 DATUM (GDA94)
Map digitising and presentation by Shirley Lam & Ed Parravicini


6620500 mN
6619500 mN
6618500 mN
6617500 mN
407000 mE
408000 mE
409000 mE
Cairn Hill
Small
Southern
Remnants
Gardiner's Hill
MAP 5 South Sheet (See North Sheet for legend.)
Vegetation alliances and plant communities of the Coomberdale Chert TEC
on a group of ridges north of Moora, Western Australia
NORTH
0
500 metres
MAP GRID OF AUSTRALIA
UTM PROJECTION Zone 50 DATUM (GDA94)
Map digitising and presentation by Shirley Lam & Ed Parravicini

13.0 THE CONDITION OF THE VEGETATION OF THE SURVEY AREA

13.1 Assessment of the condition of the vegetation

At each of the detailed recording sites (quadrats) and releves, the condition of the vegetation was assessed using the scale of Trudgen (1988, see Appendix 3). General impressions of the condition of the vegetation were also gained while walking between sites and while conducting rare flora searches. This information was used in conjunction with aerial photograph interpretation to produce a condition map of the remnant vegetation in the survey area (see Map 6). The condition of the vegetation of each location (Western Ridge, Cairn Hill North etc see section 1.3 above) in the survey area is discussed separately.

13.2 Condition of the vegetation in each of the survey sub-areas

13.2.1 Cairn Hill Reserve (CAH)

Until recently, Cairn Hill Reserve was a Westrail reserve used for the extraction of gravel (it is being transferred to the nature conservation reserve system). Significant areas have been heavily impacted (cleared, soil profile changed, and allowed to revegetate) by the gravel extraction (see Map 6). However, the level of disturbance in the areas not directly impacted by the gravel extraction appears to be very low. This is reflected in the condition scores given to the sites recorded in this area, which ranged from Very Good to Excellent (see Map 6). This means there is minimal disturbance and weed invasion at the sites recorded and the overall impression of the area was of vegetation in apparently near undisturbed condition. Noticeably, the vegetation in Cairn Hill Reserve had the best lower stratum (herbs, small shrubs) vegetation in the survey area. This is presumed to be due to no or very little grazing having taken place in the reserve.

13.2.2 Cairn Hill North (CHN)

This block of vegetation extends northwards from Cairn Hill Reserve into a paddock on the farm "Goonderoo" on which the Simcoa Chert Mine is located. This fairly large remnant of native vegetation has not been fenced off from the farm paddock it is located in and, except for it's southern edge, where it abuts the Cairn Hill reserve, is surrounded by pasture. Although this remnant has undoubtedly been subject to significant grazing pressure, the condition assessments of the sites recorded in it varied from Good to Very Good, with some Excellent areas (see Map 6). However, weeds were more abundant than in Cairn Hill Westrail Reserve and there was less of a herb or annual layer under the perennials - possibly partly due to grazing. Some areas have been impacted by grid lines, which have been bulldozed to facilitate access for drilling.

13.2.3 Western Ore Body (WOR)

Much of the Western Ore Body (or Western Ridge) has now been mined. The bulldozing of large gridlines has disturbed parts of the remaining area. Despite this, and the fact that this ridge had been part of a paddock before mining began, the remaining vegetation was graded as being Good to Very Good, although with an increasing level of weed invasion closer to the

edge. The relatively good condition was apparently partly due to the density of the stand (reducing grazing) and partly due to the hostility of the soil surface, which was very rocky, inhibiting weed invasion.

13.2.4 Proposed Waste Dump (WDM)

The vegetation was assessed as Good at two of the sites recorded in this sub-area, and to Very Good or to Excellent in the other. The quadrat with the higher assessment was further into the block and therefore was less affected by weed invasion from the surrounding vegetation. Observation of the general area around the plots indicated some degradation, with a heavy weed invasion and little understorey in parts of the sub-area.

13.2.5 Eastern Ore Body (EOR)

This small area at the south end of the main mine area also had some gridlines cleared for drilling, although there was more vegetation left between them than at the Western Ridge. The condition of the three sites was recorded as Good to Very Good, despite the area being part of a paddock at one stage. It seems likely the density of the vegetation, and the rockiness of the slopes, protected the vegetation from grazing to a significant degree.

13.2.6 Eastern Ridge (ERG)

Most of this area was outside the mine boundary fence, and therefore still subject to grazing. Fourteen quadrats were recorded from the south to north ends of this ridge and recorded a variety of values from Poor to Excellent. If the ridge is split into a northern section and a southern section, then the southern end has the poorer condition and the northern the better. Although, one plot on the northern end was recorded as in Poor to Good condition. It appears that grazing pressure may have been heavier at the southern end. Despite plot condition assessments mostly being Good to Very Good, there are large areas on the flatter part of the ridge top that are very degraded (these were avoided when selecting sites for the quadrats) and a lot of deaths of *Regelia megacephala* (possibly due to the dry winter). The northern end shows signs of degradation in the areas of *Allocasuarina campestris* scrub.

13.2.7 North of Kiaka Road

The survey area included parts of three properties north of Kiaka Road; those of: A & R Tonkin; J Tonkin; and G. Ridgway. The vegetation condition of this area was recorded at the quadrats and releves and during vegetation mapping and priority flora searches. The vegetation condition of the area ranges from Completely Degraded (cleared farm land) to Very Good (see Appendices 6 and 7 for quadrata and releve details).

It is not clear how much some areas, especially on the property of A. & R. Tonkin have been effected by grazing, as they appear to be in good or better condition but have lower species numbers than other areas. It is likely that some of these areas naturally have lower species numbers and that the recording of quadrats on A. & R. Tonkin's during the 2010 drought

accentuated this somewhat. With most in Poor to Good, Good or Good to Very Good condition. Vegetation condition was generally better in the vegetation types on rockier sites, steeper sites and where the *Regelia* or *Allocasuarina campestris* was denser.

13.2.8 South of Cairn Hill

The vegetation on the hill on the Gardiner Pastoral Company's (P. & J. Gardiner's) property on Dalaroo Rd. East that has been fenced to preserve the vegetation was rated as varying from Good to Very Good condition. However, it still shows signs of grazing. On K. & S. Chester's property (immediately south of Cairn Hill), much of the vegetation on the lower ridges in the south of the property was in Poor condition, as were many of the ridges on the east side. The vegetation on the two main ridges in the centre of the property was generally in Good to Very Good condition.

13.2.9 Small eastern remnants

Generally, the chert ridges in this area had very open remnant vegetation, with an overstorey of *Acacia acuminata* subsp. *acuminata* (especially on the south west ridges) and with *Eucalyptus loxophleba* subsp. *loxophleba* or *Allocasuarina huegeliana* low trees. A large part of these low ridges was partially cleared and there were very few understorey species remaining. Overall, the remnant vegetation was in poor to very poor condition due to clearing, intense grazing and weed invasion.

13.3 Processes affecting the condition of the vegetation of the survey area

A number of activities carried out in the areas around the 'islands' of remnant native vegetation that comprise the survey area affect the condition of the vegetation, as do several processes operating in the survey area vegetation due to the location of the vegetation in a 'sea' of (mainly) agricultural activity. These activities and processes are discussed individually below.

13.3.1 Agriculture, including grazing and cropping

Except for the Cairn Hill Westrail Reserve, the mine site (which is fenced off, although stock are let in at times) and an area set aside for conservation on the Gardiner Pastoral Company Property (which has been grazed in the past) the remnant native vegetation of the survey area is not fenced off from paddocks where stock (mainly sheep) graze. Consequently, particularly at the edges, where the surface is not rocky and where the plant communities are more open, livestock graze the lower shrubs and the herb, sedge layer of the vegetation. This has lead to a varying degree of impact on the vegetation by grazing that is difficult to assess, making assessment of the condition of some stands difficult.

Given the various factors involved in the impact of grazing, the observation in the field that stands dominated by *Allocasuarina campestris* were more heavily affected by grazing than stands dominated by *Kunzea praestans* and these more heavily than those dominated by

Regelia megacephala would seem to be reasonably likely to be correct. The impact of grazing on the stands dominated by *Allocasuarina campestris* was often difficult to assess because of the variation in these stands, but it seems likely that there has been significant loss of ground flora species (mainly herbs, but also small shrubs) from a number of stands with less impact on others. Stands dominated by *Regelia megacephala* were generally fairly dense and had very rocky soil surfaces. Both these factors would reduce grazing impacts by discouraging stock from entering them and lessening the invasion of weeds. Stands dominated by *Kunzea praestans* are generally more open, and usually had a less rocky soil surface than *Regelia* stands. The apparent extent of grazing impact on *Kunzea* stands varied significantly, with position (at the edge of a remnant or not, steep or gentle slope) and soil surface affecting the degree of degradation. Certainly, stands with smooth surfaces at the edges of remnants were more impacted than stands with rockier surfaces well into remnants.

The impact of stock is not limited to actual grazing, with use of the vegetation for grazing or shelter involving trampling of the soil surface and of smaller plants. Obviously, these uses also interact with weed invasion and with re-establishment of native species after fire or other disturbance.

The impact of agricultural use of land adjoining remnants of native vegetation is not limited to impacts caused by stock, cropping involves the use of herbicides and artificial fertilisers, which impact on native vegetation through drift of these chemicals into the vegetation. The effect of such chemicals can be direct death or weakening of species susceptible to herbicides or changes of relative strength due to fertilisers. Fertilisers or herbicides may also affect native soil fungi and this may lead to death of flowering plants dependant on symbiotic relationships with such fungi.

13.3.2 Weed invasion

Weed invasion impacts native vegetation in a number of ways, weeds directly compete for resources (water, nutrients) and for space and can increase flammability or release toxic chemicals that effect other species. They enter remnants as seeds carried by livestock (on their coats, or in faeces) or through distribution by other agents such as the wind. Weed invasion is to some degree "resisted" or made more difficult by stands that are healthy and dense, as such stands provide more competition. Conversely, stands that are heavily grazed (or recently burnt) will be more open and have the soil surface more disturbed, increasing the ability of weeds to establish. Vegetation on harsh sites, such as the more rocky sites on which *Regelia megacephala* grows, are more resistant to weed invasion, and this appears to be a major factor in the relatively low weed invasion of much of the native vegetation in the survey area.

Fifty-two species of weeds were recorded in the survey area. The cover of some of these species was quite high in some plots and a number of them (ten or eleven of the more

common ones) may occur in one 10 x 10 m quadrat with total cover of 10% or more. Fortunately, most of the weeds recorded are not highly aggressive species with some (eg. *Aira caryophyllea*) being very small species. In most of the areas surveyed small annual native species such as *Trachymene pilosa* and *Trachymene ornata* were still present, so the impact has probably been loss of population size for such species, rather than total loss. However, at the edges of stands and in the stands in Poor or worse condition it is likely that species have been lost due to higher cover of more aggressive species of weeds.

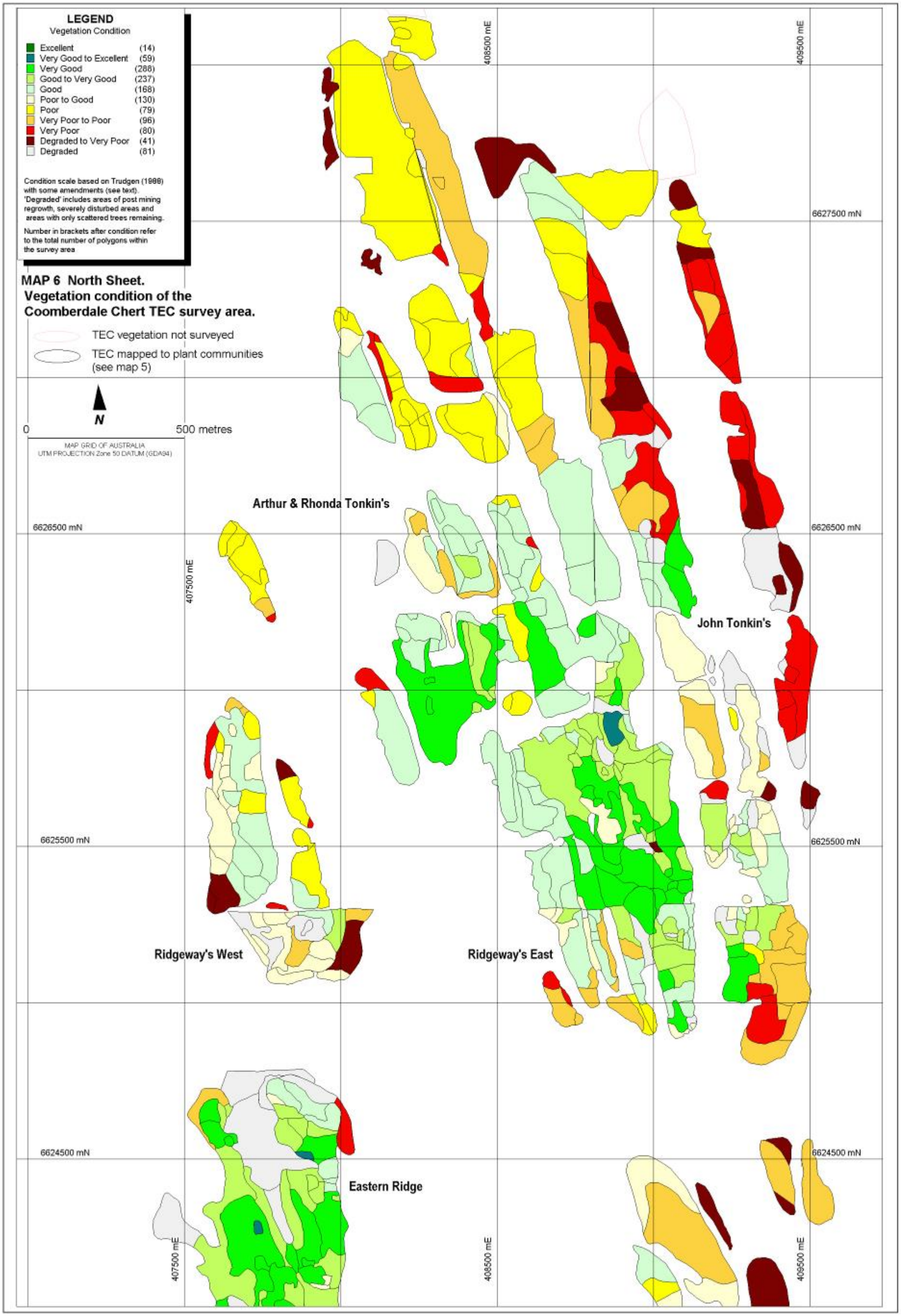
13.3.3 Mining operations

The small scale of the mining of chert by Simcoa means that large areas are not directly impacted by it, however, those areas impacted suffer total loss of the vegetation which cannot be regenerated on the sites mined (or on waste dumps) because of the change to the soil profile (Trudgen *et al.* 2001). However, rehabilitation of waste dump areas appears to be able to develop vegetation of native species local to the area, which should help maintain population sizes of some species locally.

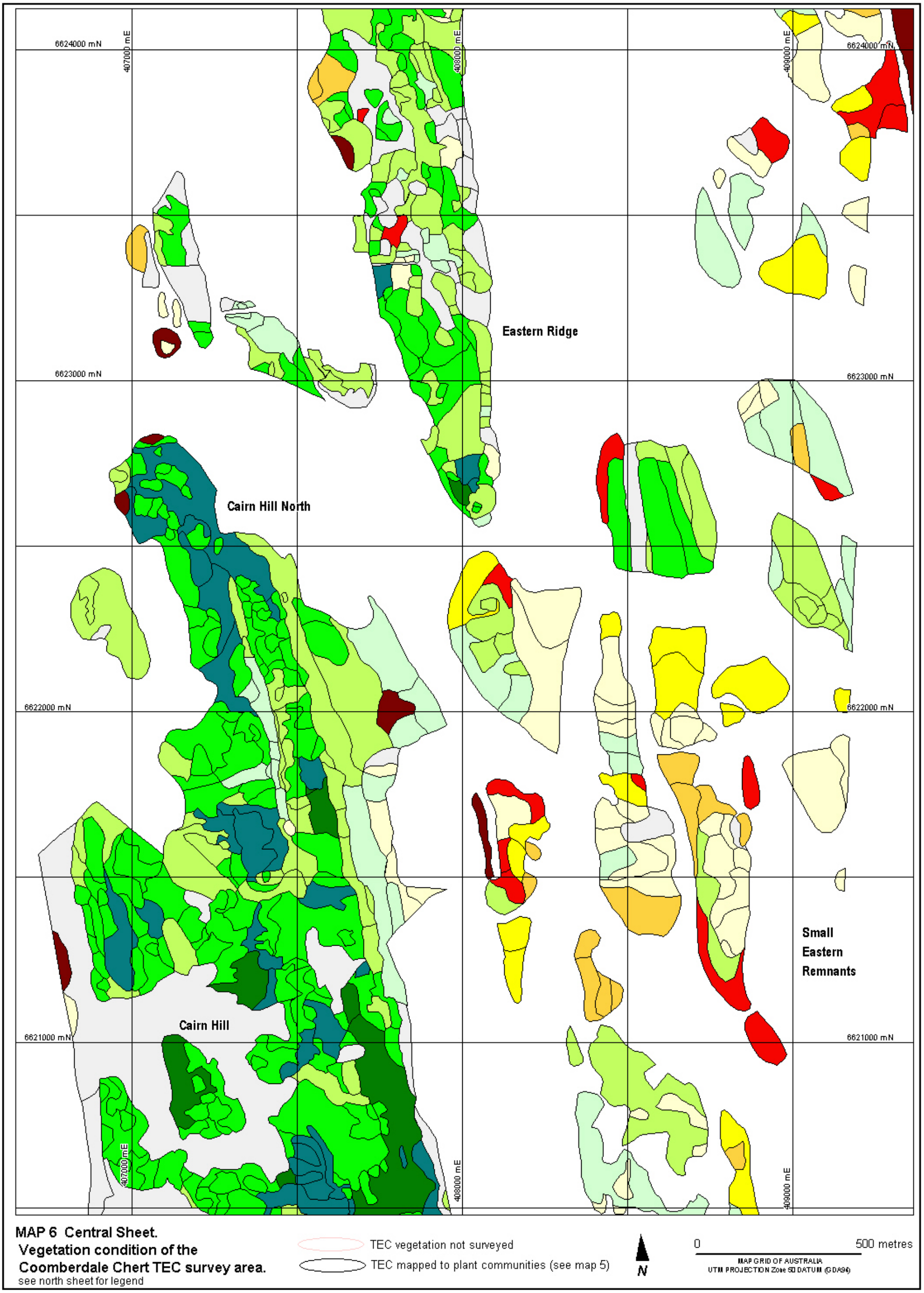
Other impacts (than actual mining) of mining operations include clearing of grid lines for drilling work and vehicle and personnel movements that can affect vegetation by carrying weed seed into vegetation or by physical impact on the vegetation. Due to the small scale of the Simcoa operations, these impacts have been small, except for the original mine, and the mine on the Western Ore Body. A *Regelia* stand in Cairn Hill North has also been impacted, by the bulldozing of grid lines at some time in the past.

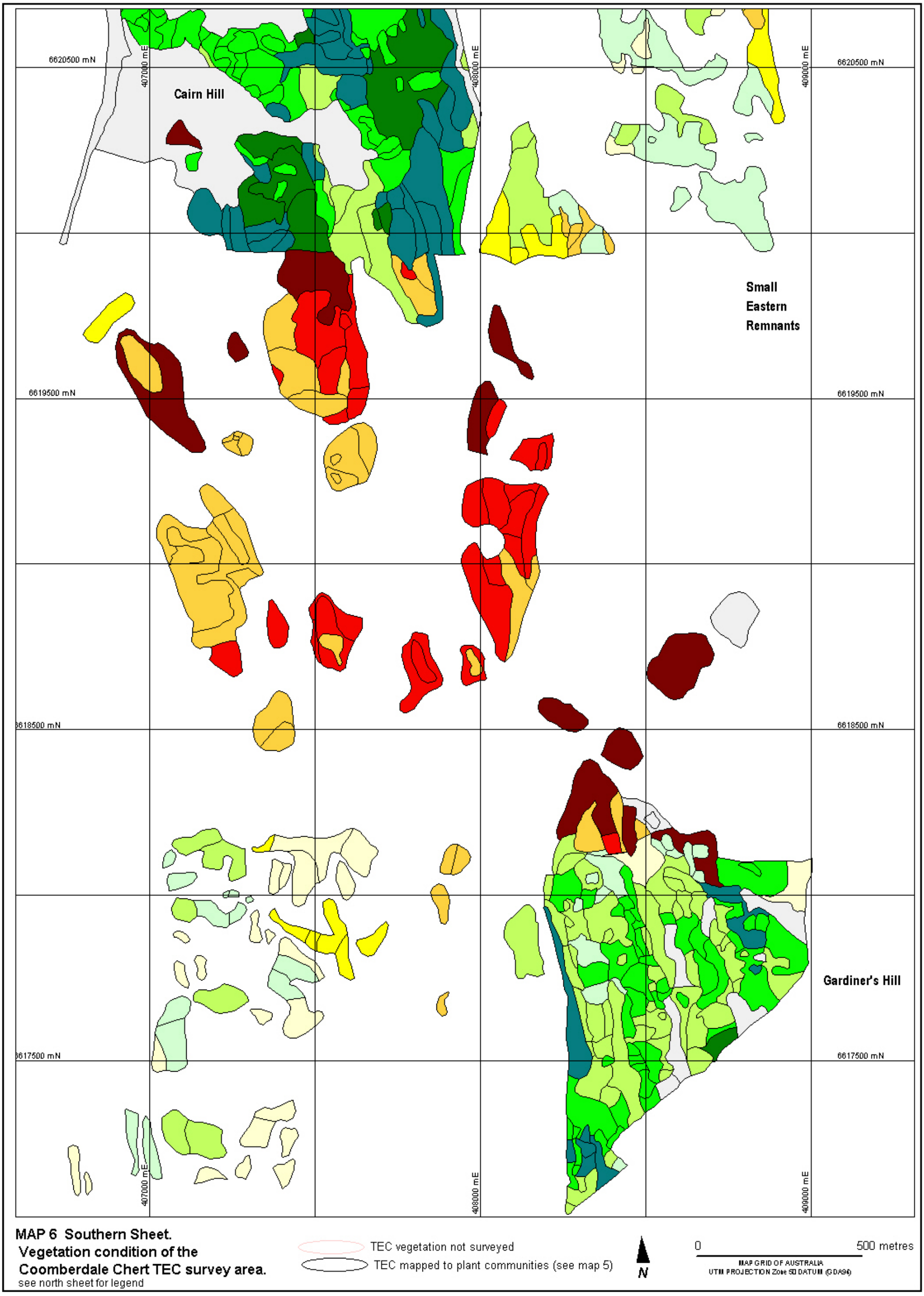
13.3.4 Rubbish Dumping

Rubbish dumps are often foci for the introduction of weeds into native vegetation and can also be a localised source of pollutants. A number of small, disused rubbish dumps were found in various parts of the survey area, mostly associated with farming activity. The rubbish included household refuse, motor vehicles, old farm machinery, timber, galvanised iron and an occasional drill rod.



M.E. Trudgen & Associates, March 2012


6624000 mN
407000 mE
408000 mE
409000 mE
6624000 mN
Eastern Ridge
6623000 mN
6623000 mN
Cairn Hill North
6622000 mN
6622000 mN
Small
Eastern
Remnants
Cairn Hill
6621000 mN
6621000 mN
407000 mE
408000 mE
409000 mE
MAP 6 Central Sheet.
Vegetation condition of the
Coomberdale Chert TEC survey area.
see north sheet for legend
TEC vegetation not surveyed
TEC mapped to plant communities (see map 5)
N
0
500 metres
MAP GRID OF AUSTRALIA
UTM PROJECTION Zone 50 DATUM (GDA94)



MAP 6 Southern Sheet.
Vegetation condition of the Coomberdale Chert TEC survey area.
see north sheet for legend

14.0 FLORISTIC ANALYSIS OF THE QUADRAT DATA

14.1 Introduction to the floristic analysis

The use of floristic analysis, that is the comparison of the flora present in quadrats recorded in different stands of vegetation using computer programmes written specifically to identify patterns of variation in such data, is a methodology that can be employed to assist in investigating the nature of variation in vegetation in a comparatively objective way. In the current survey, such techniques have been used to examine several significant issues relating to the floristic composition of the vegetation of the survey area. However, it should be noted, that vegetation is a complex phenomenon and floristic composition is one aspect of its variation - with structural/dominance aspects described in section 12.0 (see above).

The objectives of the analysis were to:

- Determine what floristically based vegetation units are present in the study area;
- Evaluate the geographical extent of the floristic units identified within the study area;
- Evaluate the likely geographical extent of the floristic units identified outside the study area.

To evaluate the floristic variation in the survey area, data from ninety-nine quadrats (10 by 10 metre quadrats nested inside 30 by 30 metre quadrats) recorded in the main areas of remnant native vegetation in the survey area (from the A. & R. Tonkin and J. Tonkin properties north of Kiaka Road south to Dalaroo Road) was analysed. These quadrats (see Map 2 above for their locations) sampled the range of vegetation types based on structure and dominance by different species (ie. the vegetation types that look fairly different because they are dominated by different species and/or have different form) in the different sub-areas (the Western Ore-body, Cairn Hill, Cairn Hill North, the Eastern Ridge, the Proposed Waste Dump, the Eastern Ore-body, John Tonkin's Property, A. & R. Tonkin's property, Gardiner's Hill and Stan Ridgway's property) of the survey area. Sampling occurred over a period of time (2000 to 2010) and the dates are given in Appendix 6 for each quadrat.

To examine the regional floristic variation in the area with similar geology to the current survey area (and including it), data from 29 releves recorded by one of us (E.A. Griffin) from an earlier regional survey was analysed. This data includes examples of the known areas on the Noondine (Coomberdale) chert (exposed or weathered). In a precursor report (Trudgen *et al* 2001) to this report, the data from these sites was analysed together with the quadrat data collected from the then survey area (a portion of the current survey area). This is no longer considered appropriate, because the significant difference in the sampling effort for the two

data sets makes interpretation of the classification difficult. However, the 29 releves were considered suitable for examining the regional variation in the floristics of the Coomberdale Chert.

Both data sets were analysed using various modules of the PATN computer package (Belbin 1987). These analyses were performed to assist in evaluating the nature of the variation present in the floristic dataset. The principal results were classifications of the sites to identify the nature of the floristic variation at both scales. To assist in this evaluation, the species were also classified. This enabled the presentation of the occurrences of species at sites in a table in which the site order reflected the classification of sites and the species order reflected the classification of species (Figure 9). In addition, the sites were subjected to an ordination analysis. This attempts to represent the variation between the sites in multi-dimension space.

As noted above, this report extends an earlier report (Trudgen et al 2006) by the inclusion of the property of A. & R. Tonkin (which is now the north-western part of the area surveyed). As the quadrats on this property were recorded during 2010, the second driest year on record, it was not considered reliable to run an entirely new analysis. Therefore, this section contains the 2006 floristic analysis and separate analyses to relate the new data to that analysis.

14.2 Floristic analysis of the quadrat data from the 2006 report survey area

This report has two precursor reports that look at smaller parts of the chert hills surveyed. As indicated in the methods, the data from the quadrats recorded in the 2006 survey area were analysed in three ways:

- Presence/absence data, all species;
- Presence/absence data, weeds omitted; and
- Cover data, weeds omitted.

It was hoped that consistency between the results of these sets would increase confidence in the interpretation of the results.

The dendrogram reproduced in Figure 1 represents the classification from presence/absence data using all the species recorded in the quadrats (ie., including weed species). From this classification a somewhat arbitrary number of 20 groups ("floristic community types") was set. That is, the analysis was set to give 20 groups.

Figure 1: Dendrogram from the floristic analysis of the 88 quadrats from the 2006 report survey area

Notes: Based on all species (native and introduced). Gp10 and Gp20 are site classification numbers at the ten and twenty group classification levels respectively. The Gp 20 groups are coloured to allow them to be easily distinguished in the dendrogram.

Site	Gp10	Gp20	Dendrogram
			0.1920 0.2724 0.3529 0.4333 0.5138 0.5942 0.6747 0.7551 0.8356 0.9160
CAH001	1	1	
CAH006	1	1	
CAH018	1	2	
CAH002	2	3	
CAH005	2	3	
CAH011	2	3	
CHN002	2	3	
CHN003	2	3	
CHN006	2	3	
CHN004	2	3	
CHN008	2	3	
CHN007	2	3	
ERG014	2	3	
WDM001	2	3	
WOR002	2	3	
CAH007	2	4	
CAH015	2	4	
CAH008	2	4	
CAH013	2	4	
CAH004	2	5	
CAH017	2	5	
CAH019	2	5	
EOR002	3	6	
EOR003	3	6	
WOR001	3	6	
WOR004	3	6	
WOR005	3	6	
WOR003	3	6	
WOR006	3	6	
GH001	4	7	
GH003	4	7	
GH002	4	7	

JT001	5	8	_____ | | |
JT008	5	8	_____|_____ | | |
JT003	5	8	_____ | | | |
JT007	5	8	_____ | | | |
JT011	5	8	_____|_____|____|_____ | | |
JT010	5	8	_____|_____ | | |
JT002	5	8	_____ | | | |
JT005	5	8	_____ | | | |
JT009	5	8	_____|_____|_____ | | |
JT004	5	8	_____ | | | |
JT006	5	8	_____|_____|_____|_____|___|_____ |
CAH003	6	9	_____ | |
CAH009	6	9	_____|_____ | |
CHN010	6	10	_____|_____|__ |
CAH010	7	11	_____ | |
GH005	7	11	_____ | | |
GH009	7	11	_____|_____|_____ | |
GH004	7	11	_____ | | |
GH008	7	11	_____|_____ | | |
GH010	7	11	_____|_____|_____ | |
ERG004	7	11	_____ | | |
ERG016	7	11	_____|_____ | | |
GH007	7	11	_____|_____|___ | |
CAH012	7	12	_____ | | |
GH006	7	12	_____|_____|___ | |
CHN001	7	13	_____ | | |
WDM002	7	13	_____ | | | |
WDM003	7	13	_____|_____|_____|_ | |
ERG017	7	14	_____ | | |
ERG019	7	14	_____|_____ | | |
ERG018	7	14	_____ | | | |
ERG020	7	14	_____|_____|_____ | | |
ERG022	7	14	_____|_____|_ | |
CHN005	7	15	_____ | | |
EOR001	7	15	_____|_____ | | |
ERG002	7	15	_ | | | |
ERG021	7	15	|_____ | | | |
ERG009	7	15	_____|____ | | | |

ERG011	7	15	
ERG003	7	15	
ERG010	7	15	
ERG012	7	15	
ERG001	7	16	
ERG005	7	16	
ERG007	7	16	
ERG013	7	16	
ERG008	7	16	
ERG006	7	16	
ERG015	7	16	
ERG023	7	16	
CAH014	8	17	
CAH016	8	17	
CHN009	8	18	
CAH020	9	19	
JT012	10	20	
SW1	10	20	
			0.1920 0.2724 0.3529 0.4333 0.5138 0.5942 0.6747 0.7551 0.8356 0.9160

However, this arbitrary number was actually found to be quite reasonable, in that it represented a maximum fusion of a dissimilarity co-efficient of about 0.5, which is roughly equivalent to that separating the Floristic Community Types of Gibson *et al* (1994) for the Swan Coastal Plain. However, the 0.5 dissimilarity level suggests that there is significant variation within these twenty groups. Examination of the dendrogram in Figure 1, clearly show this variation within the groups, with the larger ones having several sub-groups.

The dendrogram in Figure 1 also shows that most of the sites (quadrats) tended to group with sites from the same sub-area (vegetation remnant) from the survey area. Thus, the classification suggests that much of the variation between sub-areas is determined by geographically related factors, probably soil/geology and topographic differences.

As can be seen in the dendrogram (Figure 1), and more graphically in Figures 2 to 5, all three of the site classifications (all species, without weeds, and using cover) showed strong localization of the variation in community composition. The initial impression from the classification with weeds included was that the control of these patterns might have been differential grazing pressure, which would be (partly) consistent with the land use history of the different sub-areas. This is because grazing pressure, to the level observed in the survey area, causes an increase in the abundance of weeds, and in the number of weed species.

To investigate this issue, analysis of the dataset with weeds removed was carried out. However, the reasonable accord of the three classifications suggested other fundamental factors were influencing the composition.

The challenge is defining the controlling factors and, thereby, building a model of the response of species and communities to the Coomberdale chert landscapes. Clearly, there are strong relationships between plant species and vegetation to soil and geology. *Regelia megacephala* vegetation is an obvious example of vegetation from which many species are absent, because of its harsh habitat. However, absences are also a product of differentially applied modifying agents such as man, stock and rabbits and it is difficult to interpret such absences of species from communities in a similar manner.

Are, the geographic variations clearly present in these data a product of habitat variation, or is it differential disturbance? Clearly, there is some of both, with the marked habitat differences between some of the sub-areas suggesting that the role of such variation is fairly strong. The shaded relief map (Map 3 sheets A-F above) indicates clearly that the landscape of the sub-areas vary considerably. Cairn Hill and to some degree Cairn Hill North have the greatest

relief while Gardiner's Hill for example is mostly gently undulating (although it includes one moderate sized valley). The Eastern Ridge and John Tonkin's property have intermediate relief. These landscape differences are accompanied by soil type differences that would undoubtedly support different plant communities.

Thus, it is inferred that the significant variation in the composition of the floristic community groups defined in the analysis is probably present because of the landscape and geologically controlled soil parent material. Grazing pressures has also fairly obviously been a factor in contributing to the current differences in composition in the floristic community types from different areas. However, what the specific effects of grazing have been are far from clear. It is obvious that some weed species have been introduced. But, just what native species may have been lost from different quadrats (and the vegetation they sample) is more problematical.

Most classification formulae are based on a combination of what species are present and what species are absent in the vegetation being analysed. These methods are thus very sensitive to absences as well as to presences. This needs to be appreciated in the interpretation of the significance of the floristic community types identified using such analyses.

Figure 11 is a representation of the results of the classifications of species and of sites. It shows both species and sites ordered in their respective classification order. The species are shown grouped at the 80, 40 and 20 group levels and the sites grouped at the 10 and 20 group levels. The values shown are the cover-coded values for the species at the particular site, however cover was not used in these classifications.

The most obvious point to be seen from Figure 11 is that some species appear to be largely ubiquitous (ie, frequently present, although not abundant in all the types they occur in – dominant or abundant in some uncommon in others) in the vegetation of the survey area, these include *Hibbertia subvaginata, Allocasuarina huegeliana* and *A. campestris* and form species group 80 at the end of the figure. However, many of these more or less ubiquitous species are absent from the quite distinct communities of site groups 17 to 20. Due to their size, life span and ability to cope with disturbance, a number of these species are unlikely to be missing from site groups 17 to 20 as a result of grazing.

Figure 2: Schematic representation of the location of the quadrats in the survey area sub-areas.

Notes: To provide better separation of the quadrats, the E-W scale is about 2x that of the N-S. CAH = Cairn Hill; CHN = Cairn Hill North; EOR = Eastern Ore body; ERG = Eastern Ridge; GH = Gardiner's Hill; JT = John Tonkin's; SW = Stan Ridgway's property; WDM = proposed Waste Dump; WOR = Western Ore body; ART = A. & R. Tonkin's.

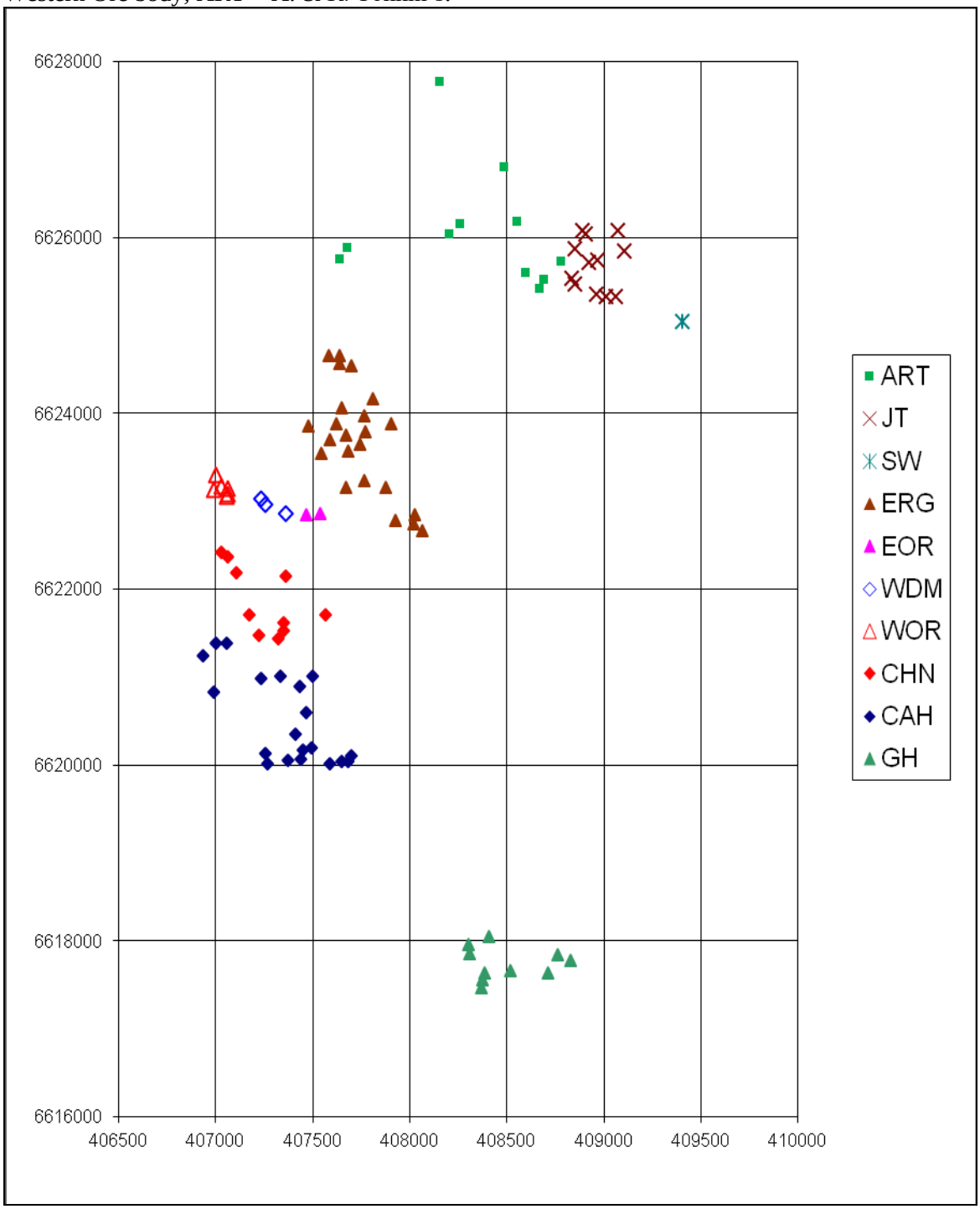


Figure 3: Distribution in the survey area of the groups defined at the 20-group level in the classification using all (native and introduced) species, including A. & R. Tonkin property sites.

Notes: The same symbol shape indicates quadrats in a group at the 10-group level. To provide better separation of the quadrats, the E-W scale is about 2x that of the N-S scale. Especially note that this is the 2006 classification, with the A. & R. Tonkin's property sites (ART) assigned to it by a separate process. Particularly important is that Group 0 (green squares) is those ART sites that do not fit the 2006 analysis; these sites probably represent several units at this level new to the survey area.

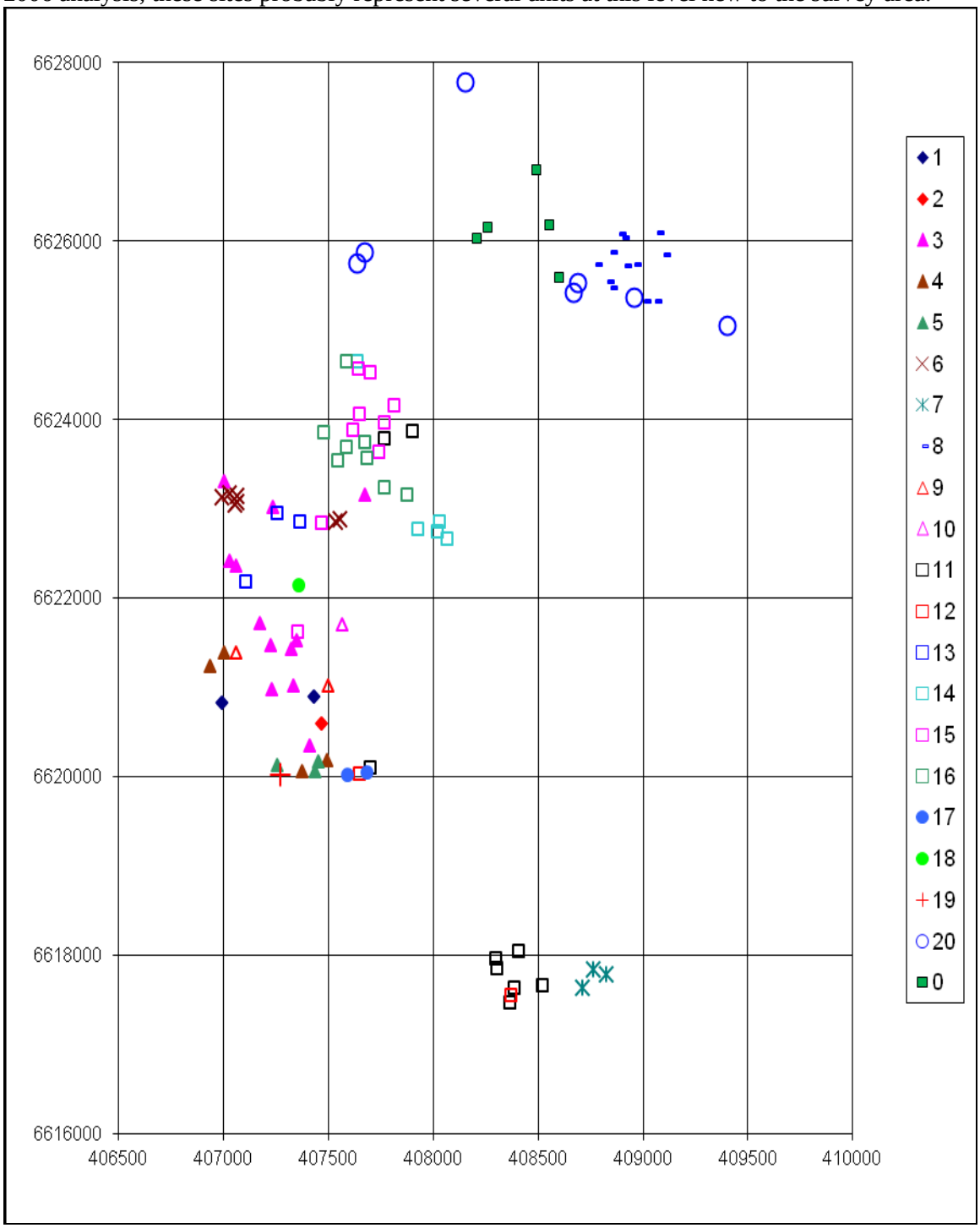


Figure 4: Distribution in the survey area of the groups defined at the 20-group level in the classification using native species only (ie. introduced species excluded), 2006 data only.

Notes: The same symbol shape indicates quadrats in a group at the 10-group level. To provide better separation of the quadrats, the E-W scale is about 2x that of the N-S scale.

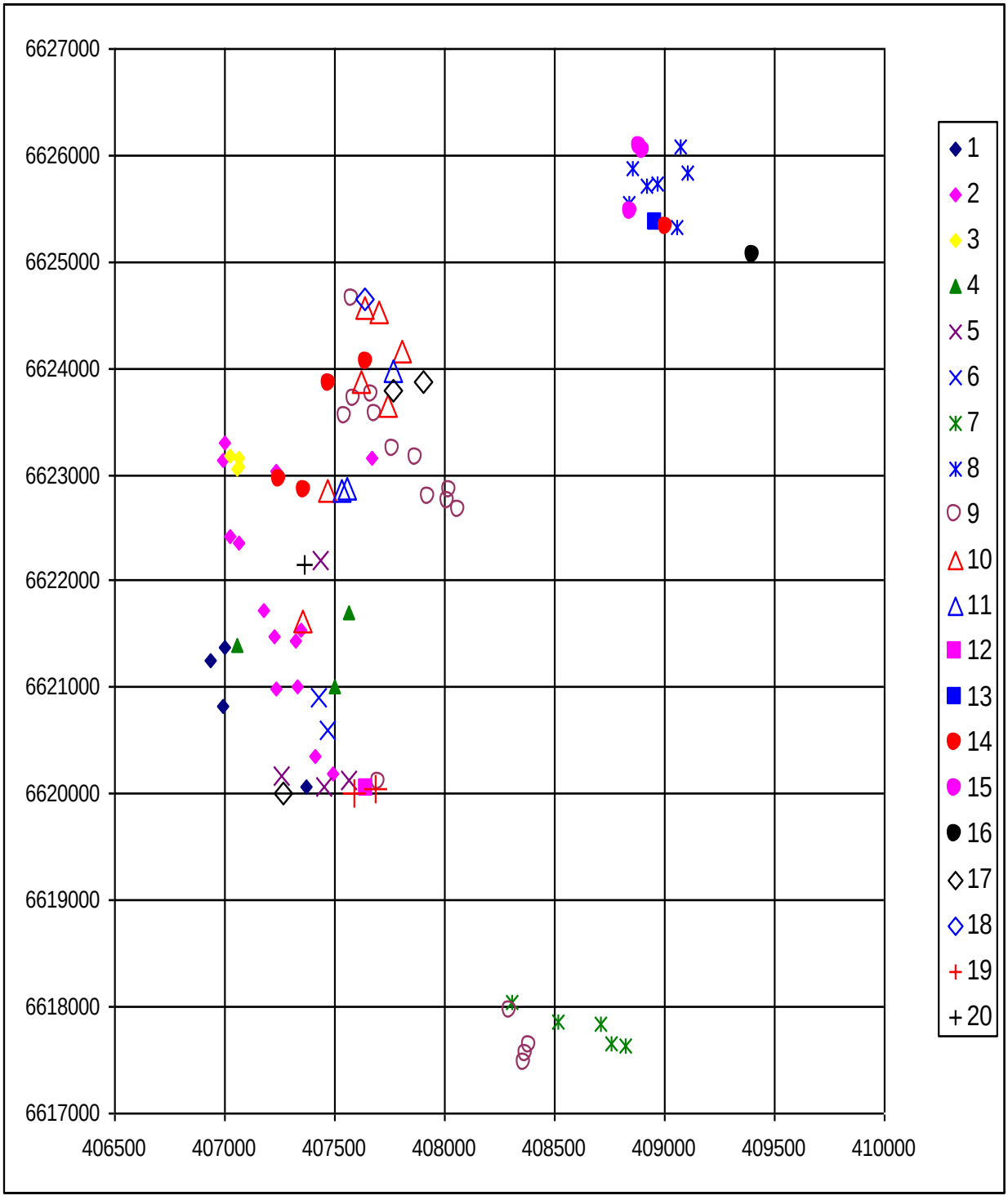
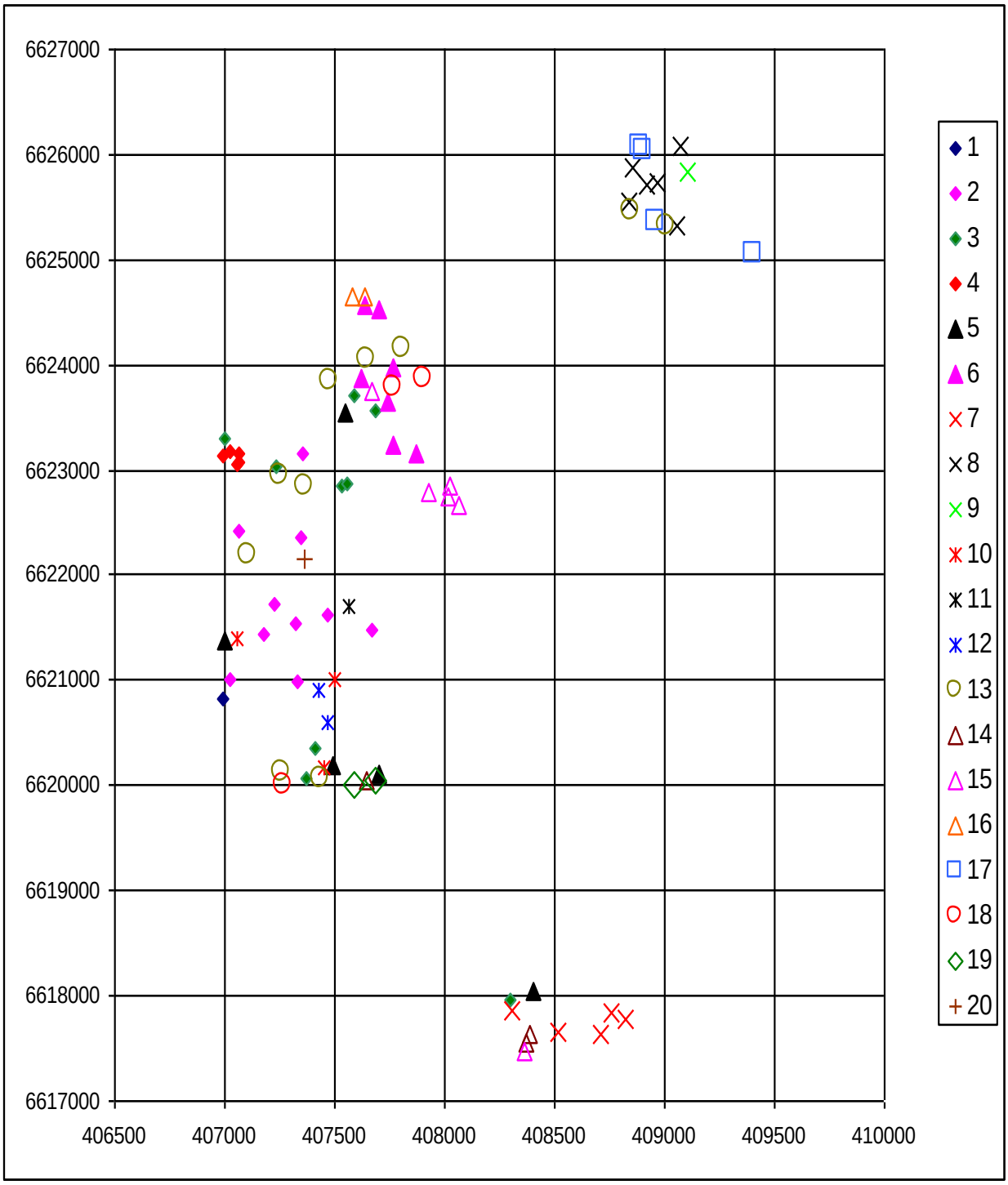


Figure 5: Distribution in the survey area of the groups defined at the 20-group level in the classification using cover of native species only (ie. introduced species excluded), 2006 data only.

Notes: The same symbol shape indicates quadrats at the 10-group level. To provide better separation of the quadrats, the E-W scale is about 2x that of the N-S scale.



While species group 79 has species that are common in many communities, many species in this species group have low frequency in the quadrats located in the vegetation of the Eastern Ridge. This group include the species *Melaleuca calyptroides, Dryandra sessilis* and *Drosera erythrorhiza*. Most of the species are, however, infrequently present, either across communities or confined to one or two communities. Of the latter group of species, the presence of such species as *Eucalyptus wandoo* or *Dodonaea inaequifolia* is definitive of communities 12 and 17 respectively.

The overall conclusion then is that, some of the floristic groups on the chert hills form a suite with floristic changes apparently defined as much by "absences" of species as by presence of species. Standing out from these floristic groups there are a number of floristic groups with distinct *presences* of species that are *absent* from the other floristic groups.

For the purpose of discussion and interpretation of floristic patterns, the classification using all native and introduced species was used.

14.3 Addition of 2010 sites to classification.

The number of native species in the 11 quadrats on the A. & R. Tonkin property was relatively low (Table 7), but the number of weeds was similar to other sub-areas. Typically, low species richness of new sites (when adding them to a pre-existing classification) has a major influence on the results of classifications. As the low richness might be because of the 2010 drought, it was possible that the analysis of the combined data might be drought affected. Also, were weeds to be included in the data for analysis, they are likely to have a major influence on the classification of the ART sites. This is because weeds were a much higher proportion of the species in ART than in other areas.

It was concluded that a more reliable inference of the floristic patterns would be obtained from techniques to match to the existing 2006 classification with the weed species omitted.

14.3.1 Matching methods

To match the new data from A. & R. Tonkin's property to the 2006 classification, both classification and nearest neighbour analysis techniques were employed, and each with two data sets: firstly all natives and secondly perennial natives. From the classifications (dendrograms showing relationships), the most likely group for a new site is inferred from the group of the previously classified sites to which it is joined. From the nearest neighbours, the

most likely group for a new site is inferred from the group of the previously classified sites to which it is most similar.

Table 7. Average richness of the survey sub-area per site by species group

Note.: weeds* dark shading indicates weeds are >30% of All. pale 20-30%. else <20% . CAH = Cairn Hill; CHN = Cairn Hill North; EOR = Eastern Ore body; ERG = Eastern Ridge; GH = Gardiner's Hill; JT = John Tonkin's; SW = Stan Ridgway's property; WDM = proposed Waste Dump; WOR = Western Ore body; ART = A. & R. Tonkin's.

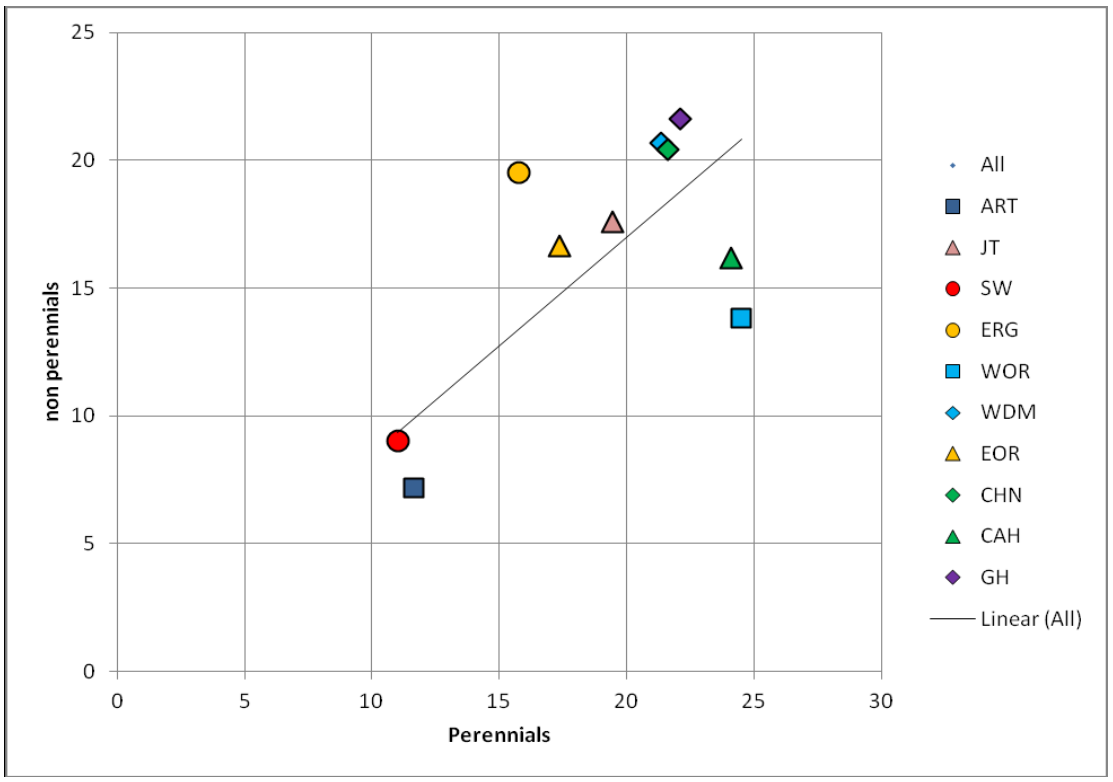
Sub-area	Number of sites	Average number of species per quadrat				
		All	Weeds*	Native	Perennial	Non perennial
ART	11	31	12	19	12	7
CAH	20	46	7	40	24	16
CHN	10	51	9	42	22	20
EOR	3	47	13	34	17	17
ERG	23	48	12	35	16	20
GH	10	53	10	44	22	22
JT	12	50	13	37	19	18
SW	1	32	12	20	11	9
WDM	3	54	12	42	21	21
WOR	6	50	11	38	25	14

The classification using all native species produced a strong clustering of the ART sites to their cohorts rather than those from other areas (Figure 9 – see six pages below). Such results make it difficult to infer a group for new sites as it suggests data inconsistencies. In this case, it suggests that the ART dataset may have a systematic bias (possibly due to the drought period they were recorded in, but possibly due to other factors). This problem was largely overcome through a technique known as single-site-insertion, where one new site is added and classified separately.

The possibility of a systematic difference was evaluated at a gross level by reviewing some aggregate statistics. Clearly the ART sites had fewer native species (Table 7), including perennial and non-perennial lower to a similar degree (Figure 6).

It is conceivable that there are relatively fewer non-perennial natives, consistent with the drought. But the values are not so low to be unequivocal about this inference; it depends on should the number of non-perennial be related to the number of perennial, or should the number of non-perennial be similar to the number in other areas.

Figure 6. Average number of non-perennial natives against average number of perennial natives



14.3.2 Matching results

The floristic group suggested for the sites from A. & R. Tonkin's property (ART sites) varied somewhat between the method (classification or nearest neighbours) or the datasets. The latter was to be expected to some degree and more notice was taken of that from the all natives rather than perennials only. Predominantly, the closest groups for the ART sites (existing floristic groups 20, 8, 16 and 6 at the 20-group level) were from areas nearby, particularly sub-areas JT, SW and to a lesser degree ERG and WOR. The nearest sites come from these nearby areas.

The inferred groups are shown in Figure 9 in which it can be seen that they appear consistent with the classification where all sites were included, but from which it was difficult to make reasonable inferences. Of particular note is that several sites have no group assigned. This is because the evidence is such that these sites appear to be significantly different from the 2006 (Trudgen et al 2006) sites (and therefore groups) and therefore represent new groups at the same level as the 2006 classification. The data suggests there are several new groups but the uncertainty about the impacts of the drought on the data means that it is not possible to be definitive in clarifying this.

Table 8. List of quadrats recorded on A. & R. Tonkin's property with assignment to the groups from the 2006 classification and their vegetation descriptions

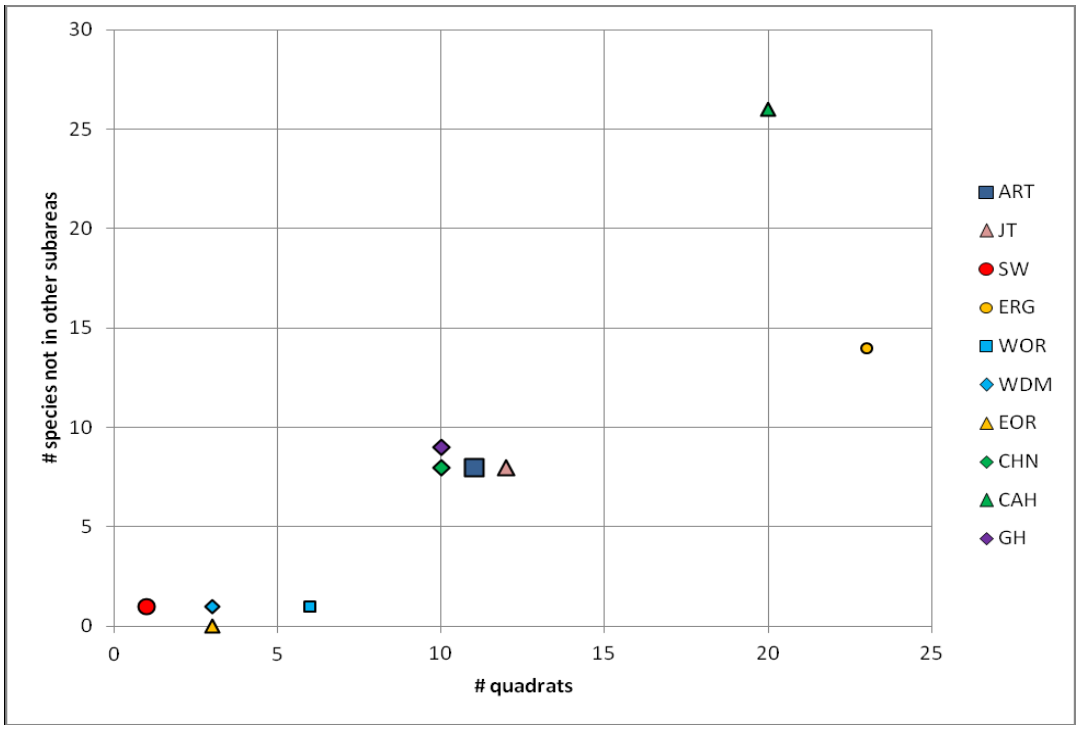
Notes. An "N" in column two indicates a probable new group.

Site	Assigned to group	Vegetation Description
ART01	N	Regelia megacephala open scrub over Ricinocarpos muricatus scattered shrubs over Dichopogon capillipes, Lepidosperma sp. (ART01-07), scattered herbs and sedges and *Ursinia anthemoides, Hypochaeris glabra, Ehrharta longiflora, *Vulpia myuros annual herb/g
ART02	N	Allocasuarina humilis open heath over Stylidium septentrionale, Borya laciniata, Cheilanthes adiantoides open herbland/fernland.
ART03	N	York gum low woodland to low open forrest over Melaleuca concreta over Austrostipa sp. (perennial) scattered low tussocks (with scattered introduced herbs and grasses)
ART04	8	Acacia acuminata scattered low trees overs Kunzea praestans (Dryandra sessilis) open scrub over Hibbertia racemosa low shrubland over Desmocladus flexuosus low open shrubland and Cheilanthes adiantoides, Cheilanthes distans low open fernland.
ART05	N	Allocasuarina huegeliana scattered low trees over Regelia megacephala high shrubland over Cheilanthes adiantoides Low open herbland.
ART06	20	Allocasuarina huegeliana, Acacia acuminata low open woodland over Allocasuarina campestris high shrubland over Cheilanthes adiantoides open fernland and Asteraceae/Poaceae (native/weedy) annual herb/grassland.
ART07	20	Allocasuarina huegeliana low woodland over Xanthorrhoea preissii scattered shrubs over Hibbertia racemosa, Trymalium sp. low open shrubland over Cheilanthes austrotenuifolia low open fernland with Ursinia anthemoides, Dioscorea hastifolia
ART08	20	Allocasuarina huegeliana, Acacia acuminata low open forest over Xanthorrhoea preissii open shrubland over Lomandra sp. (ART08-02), Neurachne alopecuroidea, Austrostipa sp. (ART08-05) scattered low grasses and *Ehrharta longiflora, *Avena fatua annual grassland
ART09	N	Kunzea praestans, Dryandra sessilis high shrubland to open scrub over Xanthorrhoea preissii open shrubland over Hibbertia racemosa low open shrubland over *Avena, *Bromus diandrus, Hypochaeris glabra annual grass/herbland.
ART10	20	Allocasuarina huegeliana low open forest over Allocasuarina campestris, Xanthorrhoea preissii shrubland/high shrubland over Hibbertia racemosa low open shrubland over Austrostipa sp. (ART10-14?, ART10-06) scattered grasses.
ART11	20	Eucalyptus accedens scattered trees over Acacia acuminata, Allocasuarina huegeliana low woodland over Xanthorrhoea preissii scattered shrubs/tall shrubs over annual grassland and herbland.

The assigned groups are included in Figure 3.

The quadrats on A. & R. Tonkin's property have eight native species not in other areas. However, this degree of difference in flora composition appears consistent with other sub-areas (Figure 7), which also have species not found on A. & R. Tonkin's property or variously in other sub-areas. This supports a conclusion that A. & R. Tonkin's property has genuine differences in its floristics to the other sub-areas of the survey area.

Figure 7. Number of species only in each area related to the number of sites in the area



14.3.3 Discussion of inferences made

The data shows that A. & R. Tonkin's property largely has vegetation floristically related to the adjacent sub-areas. However, it appears likely that the vegetation on this property includes some that appears to be unique to it in the survey area. However, more evidence is needed to confirm that this property contains vegetation of significance, as given the present data it is not possible to differentiate with certainty what is an artefact of the disturbance history from real floristic differences.

14.4 Regional Variation

The Proterozoic Moora Group of rocks extend for over a hundred kilometres from Moora to Three Springs. This group of rocks is highly variable, having occurrences of the Coomberdale chert and a range of other altered sedimentary rocks. Folding, faulting and intrusions have imprinted features on these rocks that have further influenced the range of landscapes developed on the Moora Group. As a result of the combination of these factors and further differences caused by variation in the degree of weathering, and the presence or absence of covering material, a wide range of substrate as habitats for plant communities has been developed.

Outside the current survey area, a limited number of chert areas have been examined and their plant community composition recorded. This is partly due to the limited amount of native

vegetation that remains on chert areas and partly due to the limited botanical survey work that has been carried out in the region. In apparent contradiction to the current survey area, where it is often massive and outcropping, some areas of chert soils are preferred farming land.

Figure 8 is a dendrogram representing the floristic classification of the 29 releves recorded on chert areas by Griffin (1992). (Note these data were captured less efficiently than the current data and could not readily be incorporated for the regional analysis.) The distribution of these sites is from Cairn Hill to the southern end of Pinjarrega Nature Reserve is shown in Figure 7. This classification suggests that the vegetation of Cairn Hill, as a representative of that of the Coomberdale area, is quite different from even the Jingemia area of Watheroo National Park, which has some moderately dissected landscape with exposed chert.

The data also tend to suggest that these small islands of chert within a sea of sandplain have a mixture of species. There are some typical plants (eg *Kunzea praestans*), but also locally common species that do not occur in the Coomberdale area. Thus the indications from the available data are that the chert between Watheroo and Three Springs appears to have plant communities of significantly different floristic composition from those in the Coomberdale area and that therefore chert areas in Watheroo National Park are not similar to those in the Coomberdale area

Figure 8: Dendrogram showing the classification of the sites recorded by E.A. Griffin from Cairn Hill to the southern end of Pinjarrega Nature Reserve

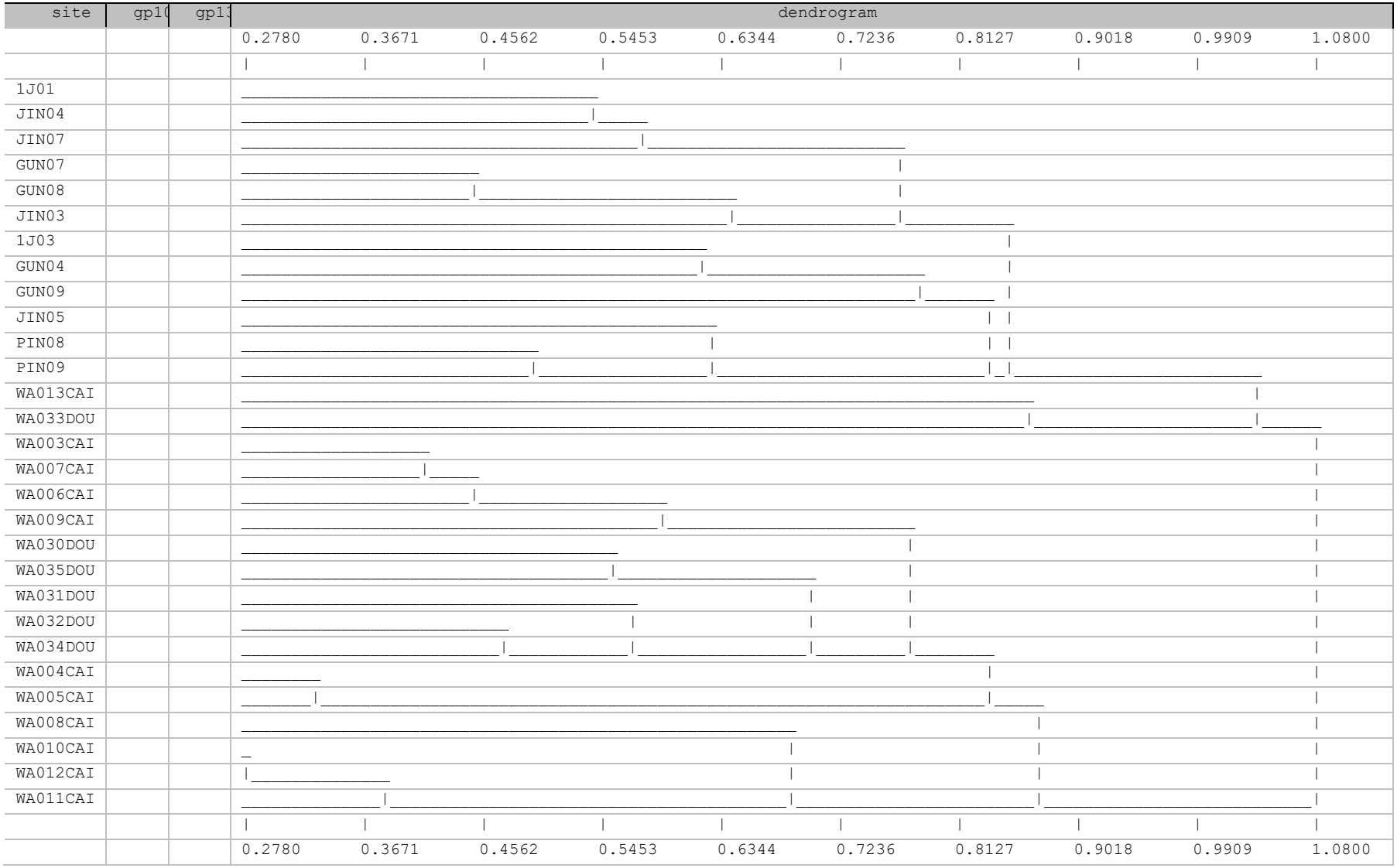


Figure 9. Dendrogram of Classification 2010 and 2006 sites using all native Species.

Notes. A. & R. Tonkin's property (ART) quadrats highlighted. The group-20 classification in the second column is based on the 2006 data (all species), while the group-10, second group-20 and group-40 are from the new classification

site	g20	gp10	gp20	gp40	data
					0.2380 0.3404 0.4429 0.5453 0.6478 0.7502 0.8527 0.9551 1.0576 1.16
ART001	-	1	1	1	
ART005	-	1	2	2	
ART004	8	2	3	3	
ART009	-	2	3	3	
JT010	8	2	3	4	
ART006	20	3	4	5	
SW1	20	3	4	5	
ART011	20	3	4	6	
ART007	20	3	4	7	
ART010	20	3	4	7	
ART008	20	3	4	8	
CAH001	1	4	5	9	
CAH015	4	4	5	9	
CAH007	4	4	5	9	
CAH002	3	4	5	10	
CAH011	3	4	5	10	
CAH006	1	4	5	10	
CAH005	3	4	5	11	
CHN006	3	4	5	11	
CHN002	3	4	5	11	
CHN003	3	4	5	11	
CHN004	3	4	5	11	
CHN008	3	4	5	11	
CHN007	3	4	5	11	
ERG014	3	4	5	11	
WDM001	3	4	5	12	
WOR002	3	4	5	12	
CAH004	5	4	5	13	
CAH017	5	4	5	13	
CAH019	5	4	5	13	

site	g20	gp10	gp20	gp40	data									
					0.2380	0.3404	0.4429	0.5453	0.6478	0.7502	0.8527	0.9551	1.0576	1.16
CAH008	4	4	6	14										
GH010	11	4	6	14										
WOR001	6	4	7	15										
WOR004	6	4	7	15										
WOR005	6	4	7	15										
WOR003	6	4	7	15										
WOR006	6	4	7	15										
CAH013	4	4	8	16										
EOR002	6	4	8	17										
EOR003	6	4	8	17										
ERG003	15	4	8	17										
CHN005	15	4	8	18										
ERG011	15	4	8	18										
ERG002	15	4	8	18										
ERG009	15	4	8	18										
ERG021	15	4	8	18										
EOR001	15	4	8	18										
ERG010	15	4	8	18										
CAH003	9	4	9	19										
CHN010	10	4	9	19										
CAH009	9	4	9	20										
CHN001	13	4	10	21										
JT002	8	4	10	22										
JT005	8	4	10	22										
JT006	8	4	10	22										
JT009	8	4	10	22										
JT004	8	4	10	23										
GH001	7	4	11	24										
GH003	7	4	11	24										
GH002	7	4	11	24										
GH004	11	4	11	25										
GH008	11	4	11	25										
JT001	8	4	11	25										
JT007	8	4	11	25										
JT008	8	4	11	25										

site	g20	gp10	gp20	gp40	data
					0.2380 0.3404 0.4429 0.5453 0.6478 0.7502 0.8527 0.9551 1.0576 1.16
JT003	8	4	11	25	
JT011	8	4	11	25	
CAH018	2	5	12	26	
CAH010	11	6	13	27	
ERG006	16	6	13	27	
GH005	11	6	13	27	
GH009	11	6	13	27	
ERG005	16	6	13	28	
ERG013	16	6	13	28	
ERG008	16	6	13	28	
ERG015	16	6	13	29	
ERG023	16	6	13	29	
ERG001	16	6	14	30	
ERG007	16	6	14	30	
ERG012	15	6	14	30	
ERG018	14	6	14	30	
ERG020	14	6	14	30	
WDM002	13	6	14	30	
WDM003	13	6	14	30	
ERG004	11	6	14	31	
ERG016	11	6	14	31	
ERG022	14	6	14	32	
ERG017	14	6	14	33	
ERG019	14	6	14	33	
GH007	11	6	14	33	
CAH012	12	6	15	34	
GH006	12	6	15	34	
ART002	-	7	16	35	
ART003	-	8	17	36	
CAH014	17	9	18	37	
CAH016	17	9	18	37	
CHN009	18	9	18	38	
CAH020	19	10	19	39	
JT012	20	10	20	40	

Figure 10: Distribution of the floristic groups in the sites recorded by E.A. Griffin.

Notes: The lowest cluster are in the Cairn Hill area (see Figure 8 for an expanded representation). The top left group are in the Pinjarrega Nature Reserve. The centre left group are in the Jingemia Hill area in Watheroo National Park. The others are in or near Gunyidi Nature Reserve.

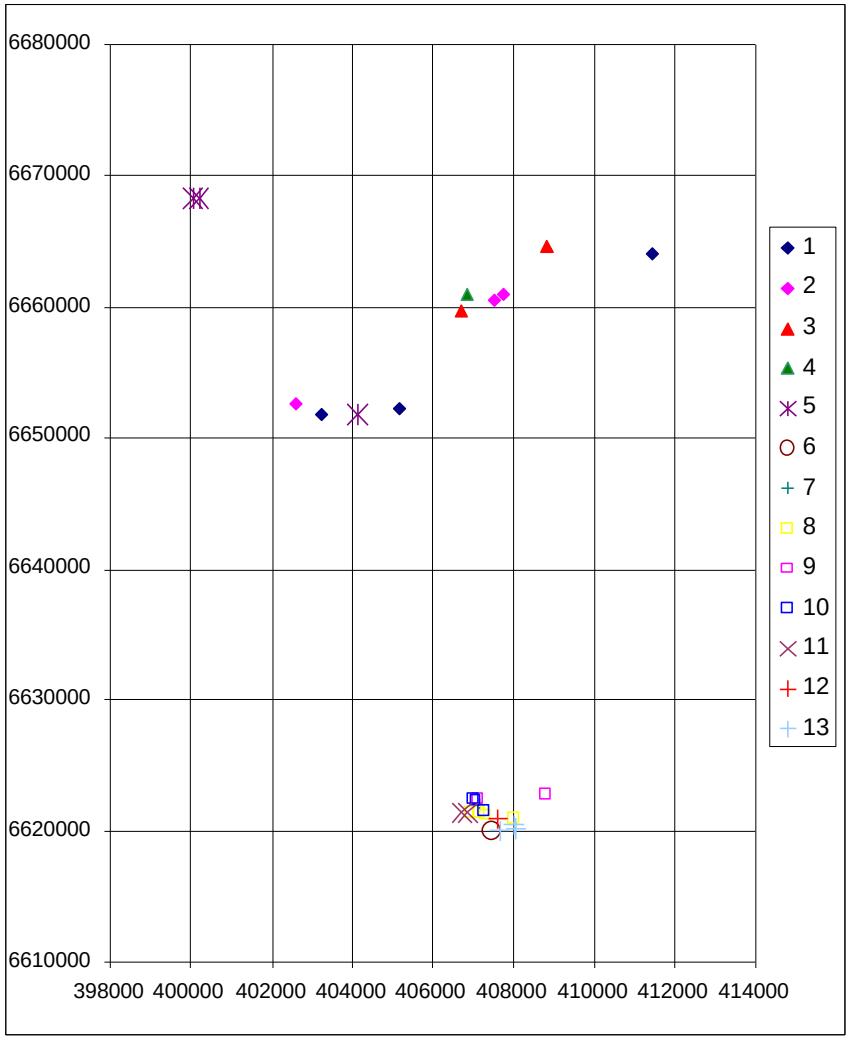
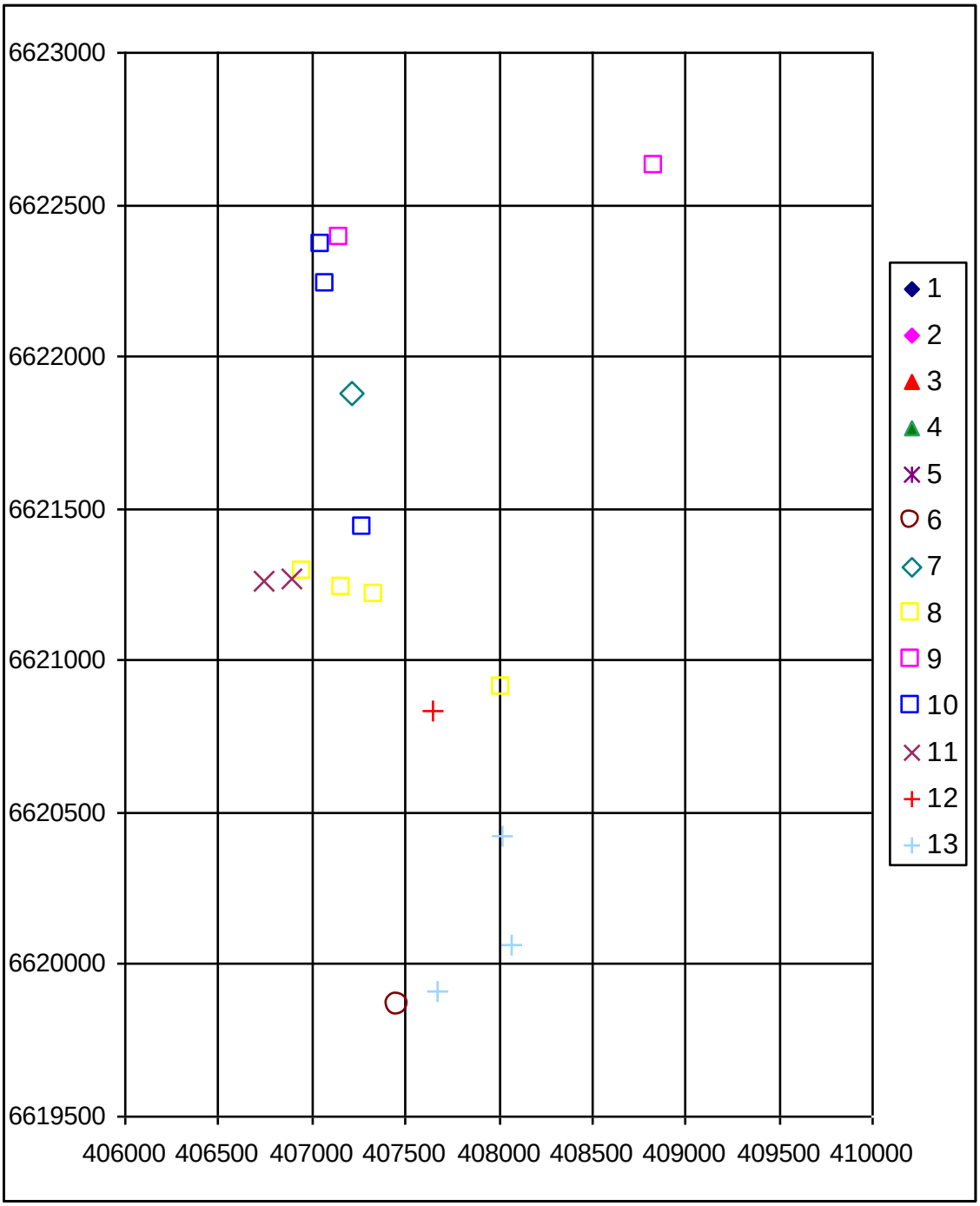


Figure 11: The distribution of the floristic groups in the sites recorded by Griffin in the Cairn Hill and Cairn Hill North survey sub areas and nearby.

Note: This is an expansion of the southern most group from Figure 7.



Sites ordered by Site Classification

Species ordered by Species classification

ID	name	gp20	gp40	gp80
5	Pentaschistis sp. Moora (doubtful ID)	1	1	1
6	Gallum murale	1	1	1
7	Santalum acuminatum	1	1	2
8	Velleia cycnopotamica	1	1	2
9	Amyema miraculosa subsp. miraculosa	1	1	2
10	Poranthera microphylla	1	1	2
11	Tricoryne elatior	1	1	3
12	Linum trigynum	1	1	3
13	Waitzia acuminata	1	1	3
14	Lomandra (Moora twisty)	1	2	4
15	Sowerbaea laxiflora	1	2	4
16	Erodium botrys	1	2	4
17	Romulea rosea	1	2	4
18	Gilberta tenuifolia	1	2	4
19	Brunonia australis	1	2	5
20	Eucalyptus loxophleba subsp. loxophleba	1	2	5
21	Lupinus angustifolius	1	2	6
22	Boronia coerulescens subsp. spinescens	1	2	7
23	Austrostipa hemipogon	1	2	7
24	Thysanotus dichotomus	1	3	8
25	Linum marginale	1	3	8
26	Caladenia vulgata	1	3	8
27	Wurmbea drummondii	1	4	9
28	Rhodanthe manglesii	1	4	9
29	Hyalosperma glutinosum subsp. glutinosum	1	4	9
30	Gonocarpus nodulosus	1	4	9
31	Wahlenbergia capensis	1	4	9
32	Amyema preissii	1	5	10
33	Lysiana casuarinae	1	5	10
34	Prasophyllum gracile	1	5	10
35	Ptilotus spathulatus	1	6	11
36	Rhyncharrhena linearis	1	6	11
37	Hedypnois rhagadioloides	1	6	11
38	Lobelia (Moora small)	1	7	12
39	Trymalium ledifolium var. rosmarinifolium	1	7	12
40	Lolium perenne	1	7	12
41	Goodenia arthrotricha	1	7	12
42	Lepidosperma (Moora winged stem)	1	7	13
43	Caesia micrantha	1	7	13
44	Austrodanthonia caespitosa	1	7	13
45	Daucus glochidiatus	1	7	13
46	Lomandra aff. micrantha subsp. micrantha	1	7	14
47	Eucalyptus wandoo subsp. wandoo	1	7	14
48	Austrostipa scabra	1	7	14
49	Lomandra effusa	1	7	14
50	Lagenifera huegelii	1	7	14
51	Orthrosanthus laxus var. laxus	1	7	14
52	Conostylis androstemma	1	8	15
53	Pterostylis rufa	1	8	15
54	Sollya heterophylla	1	8	16
55	Glischrocaryon flavescens	1	8	16
56	Stenanthemum tridentatum	1	8	16
57	Crassula sp. Moora	2	9	17
58	Austrostipa nitida	2	9	17
59	Stackhousia monogyna	2	9	18
60	Podolepis canescens	2	9	18
61	Astroloma serratifolium	2	9	18
62	Stylidium repens	2	9	18
63	Calandrinia sp. Blackberry (XXXX)	2	9	19
64	Acacia hemiteles	2	9	19
65	Cheilanthes distans	2	9	19
66	Millotia myosotidifolia	2	9	19
67	Dryandra fraseri var. fraseri	2	9	19
68	Acacia restiacea	2	9	20
69	Diplopeltis huegelii subsp. lehmannii	2	9	20
70	Cristonia biloba	2	9	20
71	Stylidium cordifolium	2	9	20
72	Homalosciadium homalocarpum	3	10	21
73	Paracaleana carinata	3	10	21
74	Laxmannia ramosa subsp. ramosa	3	10	21
75	Pterostylis exserta (ms)	4	11	22
76	Actinostrobus arenarius	4	11	22
77	Podotheca gnaphalioides	4	11	22
78	Muehlenbeckia adpressa	4	11	22
79	Schoenus nanus	4	12	23
80	Guichenotia micrantha	4	12	23
81	Nuytsia floribunda	4	12	23
82	Eriachne sp Moora	5	13	24
83	Dodonaea pinifolia	5	14	25
84	Guichenotia sarotes	5	15	26
85	Pterostylis spathulata	5	16	27
86	Austrostipa compressa	5	17	28
87	Austrostipa exilis	5	18	29
88	Pterostylis aff nana	5	19	30
89	Levenhookia stipitata	5	19	30
90	Daviesia hakeoides subsp. subnuda	5	19	31
91	Habenaria elongata	5	20	32
92	Stylidium glabrifolium	5	20	32
93	Solanum nigrum	5	21	33
94	Austrostipa macalpinei	5	21	33
95	Elythranthera brunonis	5	22	34
96	Stylidium caricifolium	5	22	34
97	Centaurium tenuiflorum	5	22	34

Figure 12. Two way table of sites by species

Notes. The ART sites and species were added manually.

98	Pterostylis vittata	5	22	35
99	Orobanche minor	5	22	35
100	Wahlenbergia preissii	5	22	35
101	Solanum oldfieldii	5	23	36
102	Ptilotus gaudichaudii var. parviflorus	5	23	36
103	Leucopogon sp. Yanchep (M. Hislop 19,861)	5	24	37
104	Agrostocrinum scabrum	5	24	37
105	Schoenus subflavus	5	25	38
106	Allocasuarina humilis	5	25	38
107	Centrolepis drummondiana	5	25	38
108	eudesmioides	5	25	38
109	Cryptandra glabriflora	5	25	39
110	Boronia ramosa subsp. anethifolia	5	25	39
111	Thysanotus multiflorus	5	25	40
112	Scaevola glandulifera	5	25	40
113	Lechenaultia (Moora blue)	5	26	41
114	Stylidium miniatum	5	26	41
115	Pterostylis sargentii	5	26	41
116	Goodenia hassallii	5	26	41
117	Acacia microbotrya	5	26	42
118	Isotoma hypocrateriformis	5	26	42
119	Schoenus brevisetis	5	27	43
120	Cassytha pomiformis	5	27	44
121	Calothamnus sanguineus	5	27	44
122	Acacia lasiocarpa var. bracteolata	5	27	45
123	Caesia (Moora hairy stem)	5	28	46
124	Calandrinia eremaea	5	28	46
125	Aira caryophyllea	5	28	47
126	Wahlenbergia gracilenta	5	28	47
127	Tripteris clandestina	5	28	47
128	Crassula peduncularis	5	28	48
129	Acacia pulchella	5	28	48
130	Rhodanthe laevis	5	28	49
131	Drosera macrophylla subsp. macrophylla	5	28	49
132	Cyanicula gemmata	5	28	49
133	Schoenus clandestinus	5	29	50
134	Haemodorum simulans	5	29	50
135	Lepidobolus chaetocephalus	5	29	51
136	Melaleuca radula	5	29	51
137	Haemodorum paniculatum	5	29	51
138	Leporella fimbriata	5	29	52
139	Tricoryne arenicola	5	29	52
140	Stylidium calcaratum	5	29	52
141	Exocarpos sparteus	5	29	52
142	Borya laciniata	5	30	53
143	Scaevola anchusifolia	5	30	53
144	Dampiera juncea	5	30	53
145	Calytrix depressa	5	30	54
146	Pimelea imbricata var. piligera	5	30	54
147	Quinetia urvillei	5	30	54
148	Platysace (Moora common)	6	31	55
149	Blennospora drummondii	6	31	55
150	Diuris aff. recurva	6	31	55
151	Anagallis arvensis	6	31	55
152	Eriochilus helonomos	6	31	55
153	Calandrinia calyptrata	6	31	56
154	Podotheca angustifolia	6	31	56
155	Opercularia vaginata	6	31	56
156	Austrostipa trichophylla	6	31	56
157	Bromus diandrus	6	31	57
158	Austrodanthonia acerosa	6	31	57
159	Comesperma integerrimum	6	31	57
160	Lepidosperma leptostachyum	6	31	57
161	Dianella revoluta var. divaricata	6	31	57
162	Austrostipa elegantissima	6	31	57
163	Austrostipa variabilis	6	31	57
164	Austrodanthonia setacea	6	31	57
165	Petrorhagia dubia	6	31	58
166	Silene gallica var. gallica	6	31	58
167	Goodenia berardiana	6	31	58
168	Waitzia nitida	6	31	58
169	Erodium cygnorum	6	31	58
170	Hyalosperma cotula	6	31	59
171	Olearia dampieri subsp. eremicola	6	31	59
172	Pterostylis setulosa	6	32	60
173	Drosera pallida	6	32	60
174	Acacia congesta subsp. congesta	6	32	60
175	Bossiaea sp. Cairn Hill (M Henson CH2-28)	6	32	61
176	Regelia megacephala	6	32	61
177	Acacia aristulata	6	32	61
178	Pityrodia dilatata	6	32	61
179	Tripterococcus brunonis	6	32	61
180	Scaevola phlebopetala	6	32	61
181	Pterostylis recurva	6	32	62
182	Xanthosia fruticulosa	6	32	62
183	Baeckea sp.Moora(R.Bone 1993/1)	6	32	62
184	Lawrencella rosea	6	32	62
185	Lepidosperma tenue	6	32	63
186	Millotia tenuifolia var. tenuifolia	6	32	63
187	Amphipogon caricinus var. caricinus	6	32	64
188	Apium annuum	6	32	65
189	Hakea incrassata	6	32	66
190	Thomasia grandiflora	6	32	66
191	Isopogon divergens	6	32	67
192	Nemcia acuta	6	32	67
193	Daviesia dielsii	6	32	67
194	Calothamnus quadrifidus	6	32	67
195	Pleurosorus rutifolius	6	33	68
196	Trifolium repens var. repens	6	33	68
197	Urospermum picroides	6	33	69

198	Eriochilus dilatatus	6	33	70
199	Sonchus oleraceus	6	33	70
200	Trifolium arvense var. arvense	6	33	70
201	Kennedia prostrata	6	33	70
202	Caladenia denticulata	6	33	70
203	Grevillea biternata	6	34	71
204	Cyrtostylis huegelii	6	34	71
205	Aristida contorta	6	35	72
206	Schoenia cassiniana	6	35	72
207	Acacia stenoptera	6	35	72
208	Austrostipa mollis	6	35	72
209	Acacia lasiocarpa var. sedifolia	6	35	73
210	Austrostipa tenuifolia	6	35	73
211	Podolepis gracilis	6	36	74
212	Ptilotus polystachyus var. polystachyus	6	36	74
213	Centrolepis pilosa	7	37	75
214	Laxmannia omnifertilis	7	37	75
215	Hemiandra incana	7	37	75
216	Verticordia acerosa var. preissii	7	37	75
217	Pterochaeta paniculata	7	37	75
218	Caladenia flaccida	7	37	75
219	Eremophila (Moora small leaf)	8	38	76
220	Acacia (Moora falcate)	8	38	76
221	Eucalyptus salmonophloia	8	38	76
222	Daviesia benthamii subsp. benthamii	8	38	76
223	Parietaria debilis	8	38	76
224	Rhagodia drummondii	8	38	76
225	Pterostylis scabra	8	38	77
226	Maireana marginata	8	38	77
227	Ptilotus divaricatus var. divaricatus	8	38	77
228	Rhagodia preissii	8	38	77
229	Acacia erinacea	8	38	77
230	Trymalium daphnifolium	8	38	77
231	Plantago debilis	8	38	77
232	Calotis hispidula	8	38	77
233	Dodonaea inaequifolia	8	38	77
234	Rhodanthe polycephala	8	38	77
235	Eucalyptus obtusiflora	8	38	77
236	Melaleuca uncinata	9	39	78
237	Brachyscome perpusilla	9	39	78
238	Rhodanthe pygmaea	9	39	78
239	Caladenia remota	9	39	78
240	Drosera aff macrantha	10	40	79
241	Xanthorrhoea drummondii	10	40	79
242	Calytrix leschenaultii	10	40	79
243	Desmocladus flexuosus	10	40	79
244	Kunzea praestans	10	40	79
245	Stylidium septentrionale	10	40	79
246	Melaleuca calyptroides	10	40	79
247	Pterostylis sanguinea	10	40	79
248	Trachymene pilosa	10	40	79
249	Dryandra sessilis var. sessilis	10	40	79
250	Borya sphaerocephala	10	40	79
251	Drosera erythrorhiza subsp. erythrorhiza	10	40	79
252	Vulpia myuros var. hirsuta	10	40	80
253	Neurachne alopecuroidea	10	40	80
254	Chamaescilla corymbosa var. corymbosa	10	40	80
255	Dichopogon capillipes	10	40	80
256	Cheilanthes adiantoides	10	40	80
257	Hypochaeris glabra	10	40	80
258	Ursinia anthemoides	10	40	80
259	Thysanotus manglesianus	10	40	80
260	Dioscorea hastifolia	10	40	80
261	Avena barbata	10	40	80
262	Briza maxima	10	40	80
263	Ehrharta longiflora	10	40	80
264	Trachymene ornata	10	40	80
265	Pentaschistis airoides	10	40	80
266	Burchardia umbellata	10	40	80
267	Hibbertia subvaginata	10	40	80
268	Caladenia flava subsp. flava	10	40	80
269	Allocasuarina huegeliana	10	40	80
270	Allocasuarina campestris	10	40	80
271	Stypandra glauca	10	40	80
272	Hypoxis sp.	10	40	80
273	Drosera macrantha subsp. macrantha	10	40	80
274	Acacia acuminata subsp. acuminata	10	40	80
275	Parentucellia latifolia	10	40	80
276	Podolepis lessonii	10	40	80
277	Crassula colorata	10	40	80
278	Cyanicula deformis	10	40	80
279	Trachymene cyanopetala	10	40	80
280	Arctotheca calendula	10	40	80
	Acacia ligustrina			
	Atriplex suberecta			
	Brachypodium distachyon			
	Cheilanthes austrotenuifolia			
	angustissimus			
	Cotula turbinata			
	Crassula exserta			
	Cynosurus echinatus			
	Dysphania melanocarpa forma melanocarpa			
	Ehrharta brevifolia var. cuspidata			
	Emex australis			
	Enchylaena tomentosa var. tomentosa			
	Euphorbia drummondii			
	Hordeum leporinum			
	Hypoxis glabella var. leptantha			
	Lamarckia aurea			
	Melaleuca concreta			
	Moraea setifolia			
	Petrorhagia prolifera			
	Polycarpon tetraphyllum			
	Ptilotus drummondii var. drummondii			
	Ricinocarpos muricatus			
	Schismus barbatus			
	Senecio glossanthus			
	Sonchus asper			
	Trifolium campestre var. campestre			
	Trifolium hirtum			

14.5 Overview of the floristic analyses

The results of the floristic analysis of the data collected in the 2001, 2006 and 2010 surveys indicate that there is significant variation in the composition of the vegetation in the different survey area sub-areas. While some of this difference reflects the effects of differential grazing pressure, the variation in landscape development and hence soil development is considered to be likely to be the major controlling factor.

While some ambiguity must remain around the issue of how much of the variation is a result of grazing, it is clear that the survey area sub-areas are largely not interchangeable in regard to the floristic variation in their vegetation and that this is not due to grazing. There is significant overlap in floristic composition between Cairn Hill and Cairn Hill North at the 10-group level (which is a very broad level). This would be expected, as they are contiguous, however, there is much less overlap between the other sub-areas at this level.

Table 9 is a summary of the distribution of the floristic groups (at the 10- and 20-group levels) in the different sub-areas of the survey. This table shows that a significant proportion of the variation sampled in the survey area is within Cairn Hill, which contains half of the groups defined at the 20-group level. Given that Cairn Hill has the largest topographic variation of the survey sub-areas, this indicates the importance of habitat range and type as an underlying cause of the development of the floristic groups found in the survey area.

Table 9 also shows that Cairn Hill North (CHN) has significant overlap with Cairn Hill, as six of the quadrats recorded in it are from the same floristic group at the 20-group level as three from Cairn Hill. The similarity is greater at the 10-group level, although at this level the groups defined are very broad. At the 20-group level the other four quadrats recorded in Cairn Hill North are from different floristic groups, so while there is overlap, there is also significant difference between these two survey sub-areas.

In contrast, most of the quadrats recorded on the Eastern Ridge (ERG) are from floristic groups (at the 20-group level) that are not present in Cairn Hill. The Eastern Ridge survey sub-area has overlap with both Cairn Hill and Cairn Hill North, but is significantly different from both. Like Cairn Hill North, it has less variation than Cairn Hill.

Table 9: Summary of Site classification (all species) by sub-area

Notes. The cell values are the number of quadrats in each combination. The values in bold indicate floristic groups restricted to one survey sub-area. CAH = Cairn Hill; CHN = Cairn Hill North; EOR = Eastern Orebody; ERG = Eastern Ridge; GH = Gardiner's Hill; JT = John Tonkin's; SW = Stan Ridgway's property; WDM = Proposed Waste Dump; WOR = Western Ridge, ART = A. & R. Tonkin's.

Groups at the 10 & 20 group level		**Sub areas**									
gp10	**gp20**	**CAH**	**CHN**	**ERG**	**WDM**	**WOR**	**EOR**	**GH**	**JT**	**SW**	**ART**
1	1	**2**									
1	2	**1**									
2	3	3	6	1	1	1					
2	4	**4**									
2	5	**3**									
3	6					5	2				
4	7							**3**			
5	8								**11**		1
6	9	**2**									
6	10		**1**								
7	11	1		2				6			
7	12	1						1			
7	13		1		2						
7	14			**5**							
7	15		1	7			1				
7	16			**8**							
8	17	**2**									
8	18		**1**								
9	19	**1**									
10	20								1	1	5
Other											5

The Western Orebody (WOR) mostly has (or had, it has now largely been mined) communities which it shared only with the Eastern Ore body. However, one quadrat was from a floristic community type that was shared with several other survey sub-areas.

Gardiner's Hill (GH) has a mixture of floristic variation that is restricted to it (at the 20 and 10-group level) and variation shared with Cairn Hill and the Eastern Ridge. The overlap with Cairn Hill is low, as it is in floristic community types that are represented in Cairn Hill by one quadrat each, although one of these types included six of the quadrats from Gardiner's Hill.

The twelve quadrats on John Tonkin's property were referred to only two floristic community types, although the significant structural and dominance variation would have appeared to suggest more would be present. These were shared with A. & R. Tonkin's property (ART sites)

and Ridgway's property (SW site).

Five of the sites on A. & R. Tonkin's property appear to have floristically different vegetation from the other sub-areas. The data suggest these are from two different floristic types.

The colour coding on Figure 11 shows the distribution of the quadrats from the different sub-areas in the floristic groups (the heavier vertical lines group the quadrats into the floristic groups defined at the 10-group level). This figure shows the very wide distribution through the analysis of quadrats from Cairn Hill and Cairn Hill North, reflecting the diversity of habitats and vegetation types sampled in those areas. It also shows the somewhat lesser spread of sites from the Eastern Ridge, which had less diversity of vegetation and the small spread of the sites from the Western Orebody and the other survey sub-areas. The Western Orebody sites were in two floristic groups in this analysis, but only in one in the first analysis.

14.6 Comparison of the floristic analysis to the structural/dominance classification

It was not possible to compare all the different levels of floristic community types defined in the floristic analysis to all of the units of the three layers of the structural dominance classification of the vegetation given in section 12 above. Such a complete comparison would require having at least one quadrat in each of the many plant communities defined (if not most of the polygons mapped) and is outside the scope of this report. However, it was possible to compare the floristic groups the 88 quadrats were placed in with the plant community and vegetation alliance they were placed in (see Table 10)

Bearing in mind that for the diversity of the vegetation sampled the number of quadrats is not very large, some points can be made. Firstly, ten plant communities that had more than one quadrat recorded in them had quadrats placed in two or more floristic groups and of these, for six plant communities, quadrats were placed in different floristic groups at the 20-group level. This shows that these plant communities, while having similar structure and dominance are significantly variable floristically. Secondly, in the nine other cases were more than one quadrat was recorded for a plant community the two quadrats sampled were placed in the same floristic group at the 40-group level. This suggests that these communities are more tightly defined. Together, these points suggest that the ranking of the plant communities defined as mostly at that level, but with some varying to near the vegetation association level is likely to be correct.

One plant community (RmKp1, one of those dominated by *Regelia megacephala*) had three quadrats allocated to group 23 and two to group 25 at the 40-group level (both of which are in

group15 at the 20-group level). Two other *Regelia* plant communities had two and three quadrats respectively placed in the same floristic group at the 40-group level, while another had one quadrat in one group and two in another. This suggests that a more detailed classification of the *Regelia* vegetation would define more plant communities, but that a proportion of those defined are close to the plant community level, while others are broader.

Table 10. Comparison of floristic analysis to structural/dominance classification
Notes: See section 12 for descriptions of vegetation alliances and Appendix 7 for descriptions of the plant communities. The numbers in cells are numbers of quadrats (only from 2006 survey).

	Floristic analysis GP20	8	8	15	15	15	15	15	16	16	17	17	17	17	17	17	18	18	19	19
	Floristic analysis GP40	12	13	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Vegetation Alliance	Plant community code																			
1	Es1																1			
2	EwAc2											1								
2	Ew1										1								1	
2	Ew2										1									
2	EwDi1										1									
2	EwTl1											1								
3	El(of)1																	1		
3	El1													1						
3	El2													1						
3	El3															1				
3	El4										1									
4	EeRm1			1																
4	EeAc2	1																		
4	EeAc3		1																	
6	EoTd1																1			
9	AhHs1															1				
9	AhHs2														1					
9	AhAc1												1		1					
9	AhAc2													1						
9	Ah4							2												
9	AhKp1						1													
9	AhTl1			2																
9	AhTl2										1					1				
11	Aa2																			1
11	Aa3																			1
11	AaTl1										1									
11	AaTl2															1				
13	Ac3												1	1	1					
13	Ac4							1								1				
13	AcAs1												1							
13	AcAs2														1	1				
13	AcBsM4								1											
13	AcCq1							1												
13	AcId2				1															
13	AcId3				1															

13	AcMr2				1														
15	RmAh1			1										1					
15	RmAh3						1												
15	RmB1	1		2															
15	RmDs1									1									
15	RmHs1													1					
15	RmHs2					2								1					
15	RmKp1			2		3													
15	RmKp2			3															
15	RmMc1						1												
15	RmMc2							1											
16	Kp1												2						
16	Kp2			1															
16	KpAh1			1															
16	KpAh2							1					1						
16	KpAhB1			2															
16	KpAhB2								1										
16	KpAhB3			1															
16	KpAhDs2					2							1						
16	KpDs3							2											
16	KpDsMc1							1											
16	KpDsMc4										2								
17	Mc4							2											
20/5	BsM1									1									
21/1	Lp												1						

15.0 CONSERVATION VALUE FOR FLORA

15.1 Context for assessing the conservation value for flora of the survey area

The appropriate context for assessing the overall conservation value of the survey area for flora is that it lies in the South West Botanical Province of Beard (1980), that within this Province it is located in the Avon Botanical District, close to the border of the Darling Botanical District. And, that within the Avon Botanical District it lies in the Coomberdale Floristic Region of Griffin (1992).

Within this context it is appropriate to consider various aspects of the flora of the survey area, such as the overall population of plant species, the presence of declared rare species, the presence of priority flora and other species of particular conservation interest species, and species whose populations on the subject land are of biogeographical interest.

15.2 The conservation value of the overall flora population of the subject land

The overall flora population of native vascular species of the various sub-areas of the survey area is consists of the populations of the three hundred and thirty-two (332) native species (four ferns, one gymnosperm and three hundred and twenty-seven angiosperms or flowering plants) recorded for it. This was an increase by one fern and nineteen flowering plants by the addition of the A. & R. Tonkin property to the survey area. There are also significant sized populations of lichens (often abundant on the chert boulders and outcrop), probably of fungi (impossible to estimate without specialist surveys) and smaller populations of mosses and liverworts.

In the context of the highly cleared nature of the Avon Botanical District, these populations persist in a very large area with a rich flora that has comparatively little native vegetation in secure conservation reserves (see section 16.0). For many of the native species recorded in the survey area, this means that their populations have already been greatly reduced compared to their size before European settlement. Thus, the conservation value of these remaining populations is that the flora populations of the survey area persist in a context where the original extent of plant populations has been greatly reduced by clearing of native vegetation, largely for agriculture, and the proportion of the original vegetation (and thus of flora populations) of the botanical district in secure conservation reserves is well below international and national objectives for secure reservation.

At the broad level of the Avon Botanical District, the conservation value for flora of the survey area is therefore very high. The long-term value is to some degree increased by the fact that the vegetation occurs on well-drained low hills, as many of the lower-lying existing conservation reserves in the Avon Botanical District are threatened by rising water tables and increased salination. The fact that the survey area is very close to the border of the Drummond Botanical District would not significantly change this assessment (although that

District has a higher proportion of its original vegetation remaining), as there are significant differences between the floras of the two Botanical Districts.

If the context is reduced from the Avon Botanical District to the Shire of Moora, the outcome is much the same, as some 85% of the Shire has been cleared for agriculture (Hamilton-Brown, 2000) and therefore any substantial areas of native vegetation would have very high conservation value for flora. The figure of 15% is also likely to underestimate the level of clearing, as it probably would not include roads and towns. The Shire of Moora also includes areas of the Drummond Botanical District, which has a much higher proportion of its original vegetation remaining so that the percentage of the Shire remaining vegetated underestimates the clearing of those areas in the Shire that are in the Avon Botanical District.

Similarly, if the context of the assessment is reduced to the Coomberdale Floristic Region of Griffin (1992), the regional floristic unit to which the vegetation of the survey area belongs, the outcome is similar. The Department of Environment and Conservation (DEC) considers the three major variants of the vegetation of the Coomberdale Floristic Region to be an Endangered Ecological Community (Hamilton-Brown 2000, p. 2) and the overall survey area (from north of Kiaka road to Dalaroo East Road) contains the largest remaining occurrence of this vegetation; and therefore of the plant populations it contains. As a large proportion of the Endangered Ecological Community (especially the types that grew on slopes, see section 16 below) has already been cleared and the unit had a fairly small original extent, the conservation value of it for flora is high.

It is suggested here, that the definition of the TEC would be improved if it were based on a vegetation complex concept. This would mean defining the areas mapped as native vegetation on chert or chert derived soils in this report as a Coomberdale Chert Vegetation Complex and basing the TEC (for the areas mapped) on those borders. This would remove the arbitrary nature of basing the definition on a few vegetation types and include the full range of vegetation types that actually occur on the chert. As is demonstrated in this report, many of these other vegetation types actually have much smaller extents than the types the TEC was originally based on and have very high conservation value.

15.3 Distribution of flora conservation values in the sub-areas

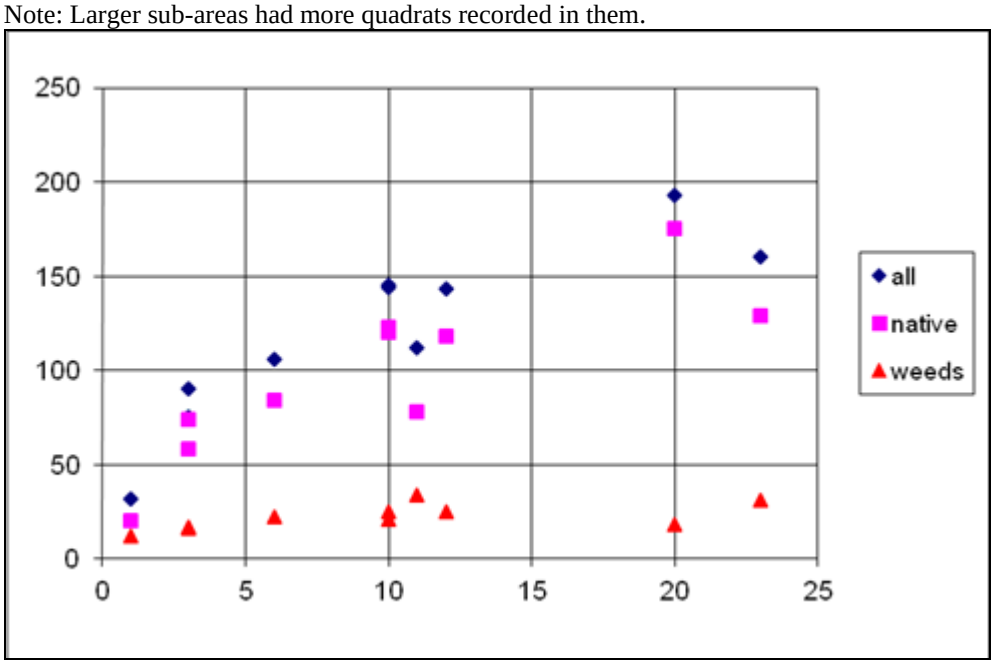
The distribution of this overall conservation value for flora in the various sub-areas of the survey area is shown (at the somewhat superficial level of species occurrence rather than populations) in Table 11. Predictably, this table shows that the sub areas with more variation in habitat (geomorphology/topography) and consequently of vegetation, have a larger number of species. Interestingly, Cairn Hill has the most native species recorded (168) in spite of the fact that more quadrats were recorded in the Eastern Ridge. This undoubtedly reflects the wide range of habitat sampled in Cairn Hill. However, it may also partly reflect the exclusion of grazing from Cairn Hill in contrast to the fairly regular grazing of the Eastern Ridge..

Table 11: Number of native flora species, number of weed flora species, total number of flora species recorded for the different sub-areas of the main survey are, and numbers of quadrats recorded in them.

Project sub-area	Number of quadrats	Total number of species	Number of native species	Number of weed species
Cairn Hill	20	186	168	18
Cairn Hill North	10	135	119	16
Eastern Ore Body	3	74	58	16
Eastern Ridge	23	150	123	27
Gardiner Hill	10	137	114	23
John Tonkin	12	133	111	22
Stan Ridgway	1	26	17	9
"Waste" Dump	3	87	71	16
Western Ridge	6	100	81	19
A. & R. Tonkin	11	155	121	34

The data in Table 11 can be shown diagrammatically (Figure 10), this shows the importance of the size of the individual sub-areas for flora conservation value. Larger sub areas had more quadrats in them and there is a generally steady increase in the number of native species with size in the sub-areas. This greater size also implies larger populations, which are likely to be more sustainable.

Figure 10: A plot of number of species recorded for individual survey sub-areas against the number of quadrats in the sub-area.
Note: Larger sub-areas had more quadrats recorded in them.



The Eastern Ore Body and the Proposed Waste Dump had fifty-eight (58) and seventy-one (71) native species respectively, reflecting their small size and low diversity of vegetation types. The Western Ore Body (now largely cleared) on the other hand compared very well in

terms of species diversity with sixty-nine (69) species recorded, although it also had a small range of habitat and vegetation types and most was cleared before the quadrats there could be re-visited. However, it should be noted that the Western Ore Body had more quadrats recorded in it than the Eastern Ore Body and the Proposed Waste Dump, and this would have increased the flora recorded.

15.4 Conservation value of the survey area for declared rare flora species

Four declared rare flora species have been recorded for the survey area. Two of these species, *Acacia aristulata* and *Daviesia dielsii* are widely distributed in it, occurring in all of the sub-areas. The total populations of these two species in the survey area are of very high conservation value for them. In fact, the population of *Acacia aristulata* in the survey area probably represents the major part of its known population. *Daviesia dielsii* has a larger range than *Acacia aristulata* (see Table 3 in section 11.2), however, the population of this species in the survey area is still probably a significant part of its total population as the vegetation over much of its range has been cleared.

The third and fourth declared rare flora species known for the overall survey area are *Synaphea quartzitica* and *Eucalyptus pruiniramis*. The only known population of *Synaphea quartzitica* in the survey area is in Cairn Hill Westrail Reserve, and it is very much less common locally than the other two declared rare flora species. *Eucalyptus pruiniramis* is also very uncommon in the survey area with one small patch in Cairn Hill and two small patches on Phil and Jenny Gardiner's property.

The value of the population of *Synaphea quartzitica* in Cairn Hill is quite high, as this is a very rare species with few known populations. The value of the populations of *Eucalyptus pruiniramis* in the survey is also high, as this species has a scattered distribution and these populations occur in a large gap in this distribution.

15.5 Conservation value of the survey area for priority flora species

Several species of priority flora are known from the survey area, these are: *Cryptandra glabriflora*, *Goodenia arthrotricha*, *Regelia megacephala*, *Baeckea* sp. Moora; *Guichenotia tuberculata*, *Wurmbea drummondii*, *Austrostipa exilis*, *Tricoryne sp. Wongan Hills* , *Stylidium glabrifolium*, *Stenanthemum tridentatum* and *Melaleuca sclerophylla*. Details of the priority level of these species and their occurrence in the various sub-areas of the survey area are provided in Table 4 (see section 11.3 above).

The overall conservation value of the survey area for these priority flora species is very high, although it varies for the individual species depending on factors such as the sizes of the population of them in the survey area and the proportion of their overall populations that the populations in the survey area represent.

Table 12: Occurrence of priority flora species in survey sub-areas

Sub-area → **Species**	**A.&R. Tonkin**	**Cairn Hill**	**Cairn Hill North**	**Eastern Ridge**	**John Tonkin**	**Eastern OB**	**Waste Dump**	**Western Ore Body**	**Other**
Austrostipa sp. Cairn Hill		Yes							
Baeckea sp. Moora		Yes	Yes			Yes			
Cryptandra glabriflora		Yes		Yes			Yes	Yes	
Goodenia arthrotricha		Yes	Yes	Yes					Gardiner's Hill
Grevillea amplexicans ssp. *vestita*									Gardiner's Hill
Guichenotia tuberculata									Dalaroo East Rd
Melaleuca sclerophylla									Gardiner's Hill
Regelia megacephala	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Gardiner's Hill
Stenanthemum tridentatum									Gardiner's Hill
Stylidium glabrifolium				Yes		Yes			
Tricoryne sp. Wongan Hills		Yes	Yes				Yes		

For *Regelia megacephala*, the value is extremely high as the populations in the survey area represents a major proportion of the known population and this species is very geographically restricted. The same applies to *Baeckea* sp. *Moora*, which is even more geographically restricted and has a higher proportion of its total population in the survey area. Similarly, the survey area has significant value for *Grevillea amplexicans* ssp. *semivestita*, which is known from relatively few populations.

On the other hand the value for *Cryptandra glabriflora* would be much less, as the species is considerably more widespread and has smaller populations in the survey area. The value for *Goodenia arthrotricha* would be intermediate as this species has a larger range than the *Regelia* or *Baeckea* and a smaller range than the other species and apparently has a small population in the survey area, the population of Tricoryne sp. Wongan Hills has similar value. The value for *Guichenotia tuberculata* would be low, as the only specimen came from a road verge. The value for *Austrostipa* sp. Cairn Hill would also be low as only one collection from

Cairn Hill was definitely this species (another may be). However, the species has a very sporadic distribution and the population is in a reserve and therefore has particular value.

The populations of *Stylidium glabrifolium* is a range extension and this species has very few records, therefore the population is of high value. On the other hand the population of *Stenanthemum tridentatum* is one of a relatively larger number and while it is at the northern limit of the species is not a great range extension, it therefore has lower value.

The value of the different sub-areas of the project area (see Table 12) for the priority flora species known from the survey area vary markedly. For example, Cairn Hill Westrail Reserve had populations of the *Baeckea* and *Regelia* while the Western Ridge had populations of the *Regelia* and the *Cryptandra*. Interestingly, the Eastern Ridge had only one less priority species than Cairn Hill Reserve, even though it has a smaller topographic range and les habitat range. The Gardiner property and the verge of the nearby Dalaroo East Road obviously have a different suite of species than further north. This reflects the significant differences between different parts of the survey area in their topography and minor differences in geology.

The fewer priority species recorded from the A. & R. Tonkin property probably partly reflects the drought year this property was surveyed in.

15.6 Conservation value of the survey area for other species of conservation interest

Several other species (see section 11.4 above) that occur in the survey area are of particular interest for conservation. They include *Calothamnus* aff. *quadrifidus* (Moora - Watheroo), *Bossiaea* sp. Cairn Hill (M. Henson CH2-28) and a *Hemigenia*

The value for the *Bossiaea* is very high as on current knowledge, as it is restricted to the Coomberdale Chert threatened ecological community in the survey area. However, it is likely that this species does extend a short distance outside the survey area.

The *Calothamnus* has a larger range and the conservation value of the survey area for this taxon is lower, although it needs to be noted that the population status of this taxon is only known from herbarium specimens, except for the survey area, where it is not common.

Hemigenia sp. The two specimens of this species could not be matched at the Western Australian Herbarium. The survey area has high value for this species.
Amblysperma sp. If this is a distinct species, then the population in the survey area is the only known population. If it is *Amblysperma* sp. Treeton, then the population is an extremely large range extension and has high value for that species.

Caesia sp. Moora, the material referred to this name appears to be a new species only known from the survey area. Obviously, the survey area has very high value for this species.

Leptospermum aff. *erubescens*, the material referred to this name is almost certainly a new species. As this taxon is only known form the two collections from the survey area, the survey are has very high value for this species.

As well as species that are of conservation significance because they are poorly known, the survey area has value for populations that are extensions of the range of the species. Two Orchid species fall into this category. The populations of *Cyrtostylis huegelii* and *Pterostylis* aff *rufa* in the survey area extend the known ranges of these species (A. Brown pers com) and are of significant conservation value.

Eremaea sp. Cairn Hill (B. Morgan BMor 531)
One specimen of this taxon was collected on the property of Phil and Jenny Gardiner. As this seems to be the only record for this species the survey area has very high value for it.

Other taxa of interest for conservation in the survey area are discussed in section 11 above.

16.0 CONSERVATION VALUE FOR VEGETATION OF THE SURVEY AREA

16.1 Context for assessing the conservation value for vegetation of the survey area

The appropriate context for assessing the overall conservation value of the survey area for vegetation is that it lies in the Avon Botanical District of the South West Botanical Province of Beard (1980), near the border of the Darling Botanical District, and that within the Avon Botanical District it is located in the Coomberdale Landscape (Chert subsystem). Also relevant is that it lies in the Coomberdale Floristic Region of Griffin (1992).

The botanical province and district that the survey area lies in are relevant because these are broad scale areas defined on vegetation that the survey area vegetation lies in. However, they are probably too broad in scale for very meaningful comparisons to be made, except that they are known to have very high proportions of their areas cleared. The Coomberdale Floristic Region of Griffin (1992) is also a fairly large area and is possibly too broad to make meaningful comparisons to, except, again, to say that it a large proportion of its is cleared.

The Coomberdale Landscape (Chert subsystem) is a the best concept for making more detailed assessments within, as it is the original area that the native vegetation types still extant in the survey area would have been restricted to before clearing for agriculture. This is because the Coomberdale Landscape (Chert subsystem) is a geomorphology/soil unit and geomorphology and soils are a major control on the development of different vegetation types within areas of similar climate.

16.2 Conservation value of the vegetation of the survey area in the context of the Avon Botanical District

The Avon Botanical District is the basis of the IBRA (Interim Biogeographic Regionalisation For Australia) Avon Wheatbelt Bioregion (Thackway *et al.* 1995), that is, they are the same area with somewhat different names in different systems of mapping. Thackway *et al.* (1995, Table 14, p. 43) gives the reservation status of the Avon Wheatbelt Region as < 1%. The same authors (Table 15, p 51) give the "Dominant Condition i.e. context" as category "A", which is defined by them (p. 55) as "Modified ecosystems dominant i.e. very little indigenous ecosystem remains".

It is therefore quite obvious that any remnant of native vegetation in the Avon Botanical District (whether referred to as an IBRA region or a botanical district), except for those of trivial size, have high or very high conservation value for vegetation depending on their size, and to a lesser degree on their condition, the diversity of vegetation types present and the particular vegetation types present.

Leading on from this, the significant size of the vegetation remnants that comprise some of the sub-areas of the survey area must mean that they have very high conservation value for vegetation. The sub-areas that would be large enough to cross this threshold would seem to

be Cairn Hill, Cairn Hill North, the Eastern Ridge, Gardiner's Hill adjacent to the Dalaroo East Road (on the Gardiner property) and the areas north of Kiaka Road (John Tonkin's property and adjoining properties), although the latter might need to be considered as one or two such areas and some smaller areas. The position of the survey area at the border of the Drummond Botanical District (which has more native vegetation remaining) would not have any impact on these assessments, as that botanical district has vegetation quite different to that of the survey area.

This leaves smaller areas such as the Western Ridge, the Proposed Waste Dump, the small remainder of the Eastern Ore Body (the currently mined ridge) and small areas south of Cairn Hill and north of Kiaka Road. Some of these areas would still rate as having high conservation value (at least for their size, see note below), particularly those in better condition. This would include the Proposed Waste Dump, the Eastern Ore Body and any part of the Western Ridge that has not been mined, although the clearing of grid lines has impacted the latter area.

Note: There is an issue in this section concerning the use of "very high" conservation value for areas that are much smaller than some areas that might also be assessed at this level. However, the alternative seems to be to underrate the value of the areas being assessed. A non-linear scale is needed to solve this problem and is not available. Addition of "for its size" might help, but would tend to reduce weighting of the significance being assessed as present.

16.3 Conservation value of the vegetation of the survey area in the context of the Coomberdale Floristic Region

The conservation value of the remnant vegetation in the survey area can also be assessed in the context of the Coomberdale Floristic Region of Griffin (1992).

"The Coomberdale Floristic Region corresponds to the discontinuous, narrow (Å 2-10 km wide) outcrop of Noondine Chert from Jingemia to Moora with the largest most extensive outcrop between Coomberdale and Watheroo" (Hamilton-Brown 2000, citing Griffin 1992 and Carter and Lipple 1982). However, Griffin (1992, p. 160) actually gives the distribution of his Coomberdale Region as follows "This region was mapped as discontinuous. It was essentially areas where the Moora Group of Proterozoic rocks, especially Noondine Chert, was outcropping. Small areas just east of Moora marked the southern limit. The main portion extended from Dalaroo East Road to Coomberdale, north of the survey area, and discontinuously beyond." That is, he does not give a northern limit at Jingemia Hill (although that may be his most northerly releve site).

Examination of the Moora 1:250,000 Geology map (Carter and Lipple 1982) shows that the area of outcrop of the Noondine Chert in the current overall survey area is about one quarter of that mapped between Moora and Marchagee. Hamilton-Brown also gives a series of areas for the known occurrences of the threatened community, which total 551 hectares. It seems

from these points and examination of aerial photographs (including limited stereo-coverage) that the vegetation of the Noondine Chert has suffered significant clearing, apparently of greater than 60% in the Marchagee to Moora area, with the types on the lower slopes (mostly dominated by *Allocasuarina campestris*) being preferentially cleared.

Therefore, it seems firstly that the Coomberdale Floristic Region, of which the Moora Chert Threatened Ecological Community is a major component, was never abundant, and possibly was (before partial clearing) intrinsically rare although there may have been more than 2000 hectares, if that is taken as the (arbitrary) cut-off point (see section 9.0 above) for intrinsically rare. Certainly it seems that subsequent to clearing, with the known area of the threatened community totalling 551 hectares that this unit is either intrinsically rare (and has become rare due to clearing) or has become rare due to the amount of it that has been cleared. Whichever applies, it is obvious that all areas of it (except those of trivial size or very degraded) have high or very high conservation value for vegetation. It needs to be noted here that "Threatened Ecological Community" is not a standard term used for vegetation classification, and as used in this case by The Department of Conservation and Land Management includes a range of vegetation alliances, vegetation associations and plant communities (see section 12 above). Obviously, these each have much smaller areas than the overall Threatened Ecological Community, and are therefore individually very rare.

16.4 Conservation value of the vegetation of the survey area in the context of the Coomberdale Landscape (Chert subsystem)

Examination of Map 3, sheets A, Band C show that the Coomberdale Landscape (Chert subsystem) is fairly highly cleared, with about 80 to 85% (by visual estimation) of its original extent cleared. This means that the level of clearing is quite high and that any significant sized remnants have high conservation value for vegetation.

The *very high diversity* of the vegetation of the remnants of the Coomberdale Landscape (Chert subsystem) surveyed suggests that the conservation value for vegetation of these areas is higher than would frequently be the case for similar sized areas in the Avon Botanical District.

16.5 Contribution to conservation value of the remnants from their diversity

In the preceding section, the high diversity of the vegetation of the remnants surveyed was commented on. This deserves some more detailed comment.

Table 13 shows that the areas of remnant vegetation surveyed have high diversity of vegetation at the vegetation alliance (upper level of classification for the survey) and at the plant community level (lower level of classification for the survey). It also shows that the number of individual areas of vegetation (stands; map polygons) is high. This table confirms that the vegetation of the survey area is diverse and supports (because of the small polygon

size) the observation that the high diversity is driven by the development of numerous discrete plant habitats in the rocky landscape.

Table 13: Vegetation diversity attributes of the survey sub-areas

Survey sub-area	Number of vegetation polygons	Number of alliances	Number of communities
Cairn Hill	**176**	**14**	**79**
Cairn Hill North	**126**	**13**	**49**
Doblestein	**15**	**4**	**5**
Eastern Ore Body	**2**	**1**	**1**
Eastern Ridge	**172**	**9**	**48**
Gardiner's Hill	**145**	**14**	**40**
John Tonkin's	**127**	**8**	**25**
Ridgeway's East	**68**	**8**	**23**
Ridgeway's West	**17**	**4**	**6**
Small Eastern Remnants	**137**	**15**	**32**
Small Southern Remnants	**116**	**13**	**30**
Waste Dump	**4**	**2**	**3**
Western Ore Body	**9**	**2**	**3**
A. & R. Tonkin's	**142**	**7**	**33**

16.6 Different values of the sub-areas for conservation of vegetation

Examination of Table 13 and Table 14 (see below) shows that even at the Vegetation Alliance level, the highest level of the classification of the vegetation of the survey area used in this survey, the survey sub-areas have significantly different values. For example, eight out of the thirteen sub-areas in Table 13 have representation of the *Regelia megacephala* vegetation alliance. Further, for these eight, the area of the alliance varies from 0.2 hectares to 21.3 hectares.

Similarly, only three of the survey sub-areas had representation of the *Melaleuca calyptroides* vegetation alliance. For four of the vegetation alliances, only one-survey sub-areas had representation of the alliance.

The number of vegetation alliances in a remnant also varies very significantly, with Cairn Hill having fourteen (14) vegetation alliances recorded, while the Waste Dump site had only two, as did the Western Ore Body while the Eastern Ore Body only had one. Similar information for vegetation associations and plant communities (see Appendices) shows that at lower levels of treatment of the vegetation, that the differences between remnants become more pronounced.

Table 14: Occurrence of the vegetation alliances in the survey sub-areas.

Notes. The numbers in the cells are the areas of the alliances in hectares. Does not include A. & R. Tonkin property.

Veg Alliance no	Vegetation Alliance	Cairn Hill	Cairn Hill North	Dobel-stein	Eastern Ore Body	Eastern Ridge	Gard-iner's Hill	John Tonkins	Ridge-ways East	Ridge-ways West	Small Eastern Remnants	Small Southern Remnants	Waste dump	Western Ore Body
1	Eucalyptus salmonophloia woodlands to open forests	2.6	4.0				6.9				2.7	1.7		
2	Eucalyptus wandoo subsp. wandoo woodlands and open forests	9.3	0.2			1.8	6.4				1.7			
3	Eucalyptus loxophleba subsp. loxophleba low woodlands to low open forests	1.6	13.2	0.7		3.4	2.0		0.4	2.5	32.0	9.2		
4	Eucalyptus eudesmioides low mallee woodlands to low mallee open forests	3.3	1.0									10.8		
5	Eucalyptus camaldulensis open forest											0.9		
6	Eucalyptus obtusiflora low woodlands to low open forests	0.1	0.3											
7	Eucalyptus horistes low woodlands to low open forests	0.6	0.1									0.1		
8	Eucalyptus pruiniramis low woodland										0.0			
9	Allocasuarina huegeliana low woodlands to low open forests	11.9	5.2	4.4		18.8	9.9	10.5	1.5	0.4	14.0	14.0	0.7	
10	Casuarina obesa open forest									1.1				
11	Acacia acuminata subsp. acuminata low woodlands	2.5	4.7	15.5		5.6	2.7	4.2	12.2	2.2	5.6	2.3		
12	Banksia prionotes scattered low trees										0.8			
13	Allocasuarina campestris high shrublands to open and closed scrub	47.5	38.7	0.6	0.6	27.5	8.6	21.8	3.8		44.9	17.9	0.6	

14	Allocasuarina microstachya open scrub						0.0							
15	Regelia megacephala high shrubland to open and closed scrub	21.3	5.9			2.8	4.7	0.7			0.2	12.7		1.6
16	Kunzea praestans high shrubland to open and closed scrub	9.6	9.0			2.4	12.6	24.3	2.0		9.3	4.0		1.3
17	Melaleuca calyptroides open to closed heath	1.6						2.3	0.6					
18	Hibbertia subvaginata low shrublands to low open heath					0.7					3.5	0.9		
19	Xanthorrhoea drummondii high open shrubland										2.1			
20-1	Dryandra sessilis high shrublands to open scrub	0.2									7.7	2.9		
20-2	Melaleuca concreta open scrub		0.3				0.1							
20-3	Melaleuca radula high shrubland to open scrub						1.0				0.3			
20-4	Melaleuca sclerophylla open heath						0.2							
20-5	Baeckea sp. Moora (R. Bone 1993/1) low open heath	1.4	2.1											
20-6	Calytrix leschenaultii open heath					2.0		0.5						
20-7	Calytrix depressa low open heath						0.2							
20-8	Calothamnus aff. quadrifidus (Moora-Watheroo) high shrubland						0.2	0.1	0.1			0.5		
20-9	Ricinocarpus muricatus shrubland to open heath								2.9					
20-10	Ricinocarpus velutinus open heath										3.1			

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AN EXTENSION OF A

FLORA SURVEY,

FLORISTIC ANALYSIS

AND VEGETATION SURVEY

OF AREAS OF THE

COOMBERDALE CHERT TEC

TO INCLUDE A FURTHER AREA

prepared for

SIMCOA OPERATIONS Pty Ltd

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APPENDIX 1. The Department of Conservation and Land Management Priority Flora Categories

Definition of CALM Declared Rare and Priority Flora categories (from Atkins 1998).

Declared Rare Flora - Extant Taxa

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

Declared Rare Flora - Presumed Extinct Flora

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

Priority One - Poorly Known Taxa.

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

Priority Two - Poorly Known Taxa.

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

Priority Three - Poorly Known Taxa.

Taxa which are known from several populations, and the taxa are not believed to under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally > 5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further study.

Priority Four - Rare Taxa.

Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

APPENDIX 2. Vegetation structural table of Specht as modified by Aplin (1979)

Life form and height of tallest stratum	Projective foliage cover of tallest stratum as %	Description
Trees over 30 metres	70 -100	High closed forest
30 -70	High open forest	
10 - 30	high woodland	
2 -10	high open woodland	
under 2	Scattered tall trees	
Trees 10 - 30 metres	70 -100	Closed forest
30 -70	Open forest	
10 - 30	Woodland	
2 -10	Open woodland	
under 2	Scattered trees	
Trees under 10 metres	70 -100	Low closed forest
30 - 70	Low open forest	
10 - 30	Low woodland	
2 -10	Low open woodland	
under 2	Scattered low trees	
Shrubs over 2 metres	70 - 100	Closed scrub
30 - 70	Open scrub	
10 - 30	High shrubland	
2 -10	High open shrubland	
under 2	Scattered tall shrubs	
Shrubs 1 - 2 metres	70 - 100	Closed heath
30 - 70	Open heath	
10 - 30	Shrubland	
2 -10	Open shrubland	
under 2	Scattered shrubs	
Shrubs under 1 metre	70 - 100	low closed heath
30 - 70	low open heath	
10 - 30	low shrubland	
2 -10	Low open shrubland	
under 2	Low scattered shrubs	
Herbs/Sedges/Grasses	70 - 100	Closed herb, sedge, grassland
30 - 70	Herb, sedge, grassland	
10 - 30	Open herb, sedge, grassland	
2 -10	Very open herb, sedge, g'land	
under 2	Scattered herbs sedges, grasses	

Grasslands then divided into:
Tussock grasslands (perennial tussock species, e.g. Eragrostis species);
Hummock grasslands (Triodia and Plectrachne species that form hummocks)
Curly spinifex grassland (Plectrachne pungens, which does not form hummocks)
Annual tussock grassland (e.g. annual Sorghum species).
The "curly spinifex grassland " division follows J.S. Beard.

APPENDIX 3. Condition scale of Trudgen (1988)

E = Excellent. Pristine or nearly so, no obvious signs of damage caused by the activities of European man.

VG = Very good. Some relatively slight signs of damage caused by the activities of European man. E.g. some signs of damage to tree trunks caused by repeated fire and the presence of some relatively non-agressive weeds such as Ursinia anthemoides or Briza spp., or occasional vehicle tracks.

G = Good. More obvious signs of damage caused by the activities of European man, including some obvious impact on the vegetation structure such as caused by low levels of grazing or by selective logging. Weeds as above, possibly plus some more aggressive ones.

P = Poor. Still retains basic vegetation structure or ability to regenerate to it after very obvious impacts of activities of European man such as grazing or partial clearing (chaining) or very frequent fires. Weeds as above, probably plus some more aggressive ones such as *Ehrharta* spp.

VP = Very poor. Severely impacted by grazing, fire, clearing or a combination of these activities. Scope for some regeneration but, not to a state approaching good condition without intensive management. Usually with a number of weed species including aggressive species.

D = Completely degraded. Areas that are completely or almost completely without native species in the structure of their vegetation. I.e. areas that are cleared or "parkland cleared" with their flora comprising weed or crop species with isolated native trees or shrubs.

APPENDIX 4: Location of declared rare flora, priority flora and flora of special interest in the survey area

This appendix lists the locations recorded Declared Rare Flora (DRF), Priority flora and flora of special interest found in the study area. Recordings from the rare flora searches included plant numbers. In this case the numbers of plants were recorded for discrete groups of plants (within a 10 m radius of the GPS reading). However, in areas where rare plants occurred dispersed over a larger area, plant numbers were recorded within approximately 30 m of the GPS reading (the latter generally indicated by larger numbers of plants at a location).

The rare flora searches in the Eastern Ore Body, Waste Dump and Western Ore Body sub-areas were searches along grid lines about 15 metres apart. The northern two-thirds of Cairn Hill North and the central section of Eastern Ridge (adjacent to the current mine, waste dumps and rehabilitated dump areas) was similarly grid searched. Time did not permit completion of a search in the southern end of Cairn Hill North. Rare flora searches in the remaining parts of the Eastern Ridge and the sub-areas Kiaka Rd North, Gardiner property and Chester property were selectively but less intensively walked, focusing on habitats most likely to contain known DRF taxa.

Table 1 App4 below also includes locations of DRF, Priority flora and species of special interest recorded in quadrats, releves, and general collections or observations while mapping the vegetation.

Table 1 App.4: Locations for DRF, Priority flora and flora of special interest.

Taxon	Area	MGA_EAST	MGA_NORTH	Status	Number of Plants	Data source
Acacia aristulata		408134	6621493	DRF	3	Mpg GC
Acacia aristulata		408137	6621516	DRF	4	Mpg GC
Acacia aristulata		406776	6617153	DRF	12	Mpg GC
Acacia aristulata		407013	6617181	DRF	80	Mpg GC
Acacia aristulata	Cairn Hill North	407073.71	6622739.14	DRF	3	RFS
Acacia aristulata	Cairn Hill North	407078.72	6622622.15	DRF	2	RFS
Acacia aristulata	Cairn Hill North	407081.72	6622727.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407087.71	6622625.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407099.72	6623491.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407103.72	6622569.15	DRF	1	RFS
Acacia aristulata	Western Ore Body	407109.71	6623387.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407130.72	6623478.14	DRF	2	RFS
Acacia aristulata	Cairn Hill North	407130.72	6622681.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407130.72	6622561.15	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407132.72	6622707.15	DRF	1	RFS
Acacia aristulata	Western Ore Body	407133.72	6623528.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407136.72	6622553.15	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407141.72	6622573.15	DRF	1	RFS
Acacia aristulata	Western Ore Body	407142.71	6623449.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407142.71	6622702.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407143.72	6623451.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407143.72	6623271.14	DRF	1	RFS

Acacia aristulata	Cairn Hill North	407145.72	6622416.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407147.72	6623264.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407149.72	6623337.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407149.72	6623282.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407150.71	6622545.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407151.72	6623249.14	DRF	4	RFS
Acacia aristulata	Western Ore Body	407152.72	6623474.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407156.72	6623272.14	DRF	3	RFS
Acacia aristulata	Cairn Hill North	407157.71	6622563.15	DRF	1	RFS
Acacia aristulata	Western Ore Body	407159.72	6623295.14	DRF	3	RFS
Acacia aristulata	Cairn Hill North	407163.72	6622578.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407165.72	6623357.15	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407165.72	6622532.13	DRF	2	RFS
Acacia aristulata	Cairn Hill North	407168.71	6622415.14	DRF	2	RFS
Acacia aristulata	Western Ore Body	407170.72	6623339.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407170.72	6622689.14	DRF	3	RFS
Acacia aristulata	Western Ore Body	407172.71	6623348.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407175.71	6622328.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407179.71	6622632.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407180.72	6623215.14	DRF	3	RFS
Acacia aristulata	Western Ore Body	407187.72	6623345.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407190.71	6623186.14	DRF	2	RFS
Acacia aristulata	Cairn Hill North	407190.71	6622462.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407192.72	6622534.13	DRF	2	RFS
Acacia aristulata	Western Ore Body	407193.72	6623321.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407196.72	6622667.15	DRF	3	RFS
Acacia aristulata	Cairn Hill North	407196.72	6622658.15	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407197.71	6622622.15	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407201.71	6622530.13	DRF	1	RFS
Acacia aristulata	Chester's Hills	407201.71	6618131.11	DRF	9	RFS
Acacia aristulata	Western Ore Body	407206.72	6623138.14	DRF	11	RFS
Acacia aristulata	Western Ore Body	407208.71	6623328.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407208.71	6623237.14	DRF	3	RFS
Acacia aristulata	Western Ore Body	407211.72	6623291.14	DRF	1	RFS
Acacia aristulata	Western Ore Body	407220.72	6623146.14	DRF	3	RFS
Acacia aristulata	Western Ore Body	407224.72	6623183.14	DRF	16	RFS
Acacia aristulata	Western Ore Body	407233.72	6623199.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407242.72	6622437.13	DRF	3	RFS
Acacia aristulata	Cairn Hill North	407282.71	6622217.14	DRF	3	RFS
Acacia aristulata	Waste Dump	407297.72	6623176.14	DRF	1	RFS
Acacia aristulata		407301	6621262	DRF		Releves
Acacia aristulata	Waste Dump	407309.72	6623197.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407319.72	6621930.14	DRF	1	RFS
Acacia aristulata	Waste Dump	407321.72	6623225.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407328.72	6621941.13	DRF	1	RFS
Acacia aristulata	Waste Dump	407344.71	6623193.14	DRF	1	RFS
Acacia aristulata	Waste Dump	407363.72	6623123.14	DRF	1	RFS
Acacia aristulata	Waste Dump	407382.72	6623095.14	DRF	1	RFS
Acacia aristulata	Cairn Hill North	407397.72	6621857.14	DRF	4	RFS
Acacia aristulata	Waste Dump	407407.72	6623053.15	DRF	3	RFS
Acacia aristulata	Waste Dump	407416.72	6623044.14	DRF	2	RFS
Acacia aristulata	Waste Dump	407422.72	6623012.15	DRF	10	RFS
Acacia aristulata	Waste Dump	407429.72	6623054.15	DRF	1	RFS
Acacia aristulata	Waste Dump	407441.72	6623064.15	DRF	2	RFS
Acacia aristulata		407450	6618107	DRF	1	Mpg GC
Acacia aristulata		407498	6621096	DRF		Releves
Acacia aristulata		407621	6624633	DRF		Releves
Acacia aristulata	Eastern Ore Body	407666.71	6622994.14	DRF	1	RFS

Acacia aristulata		407667	6620395	DRF		Releves
Acacia aristulata	Eastern Ore Body	407673.71	6622984.14	DRF	5	RFS
Acacia aristulata	Waste Dump	407674.71	6623067.14	DRF	1	RFS
Acacia aristulata		407676	6620777	DRF		Releves
Acacia aristulata	Eastern Ore Body	407683.72	6622991.14	DRF	2	RFS
Acacia aristulata	Kiaka Rd North	407691.72	6625575.15	DRF	7	RFS
Acacia aristulata	Kiaka Rd North	407694.72	6625667.16	DRF	6	RFS
Acacia aristulata	Eastern Ore Body	407701.72	6622994.14	DRF	3	RFS
Acacia aristulata		407704	6620283	DRF		Releves
Acacia aristulata	Kiaka Rd North	407715.73	6625693.15	DRF	1	RFS
Acacia aristulata		407717	6620600	DRF		Releves
Acacia aristulata	Eastern Ridge	407726.73	6624347.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407734.72	6623616.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407744.72	6623367.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407751.72	6623372.14	DRF	6	RFS
Acacia aristulata	Eastern Ridge	407778.72	6624094.15	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407789.72	6624053.15	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407812.72	6624116.15	DRF	2	RFS
Acacia aristulata	Eastern Ridge	407815.72	6623331.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407816.72	6624119.15	DRF	2	RFS
Acacia aristulata	Eastern Ridge	407818.73	6624108.15	DRF	1	RFS
Acacia aristulata		407822	6620461	DRF		Releves
Acacia aristulata	Eastern Ridge	407827.72	6623341.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407834.72	6623551.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407852.72	6624067.15	DRF	3	RFS
Acacia aristulata	Eastern Ridge	407862.73	6624133.15	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407869.73	6623965.15	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407872.72	6623700.15	DRF	9	RFS
Acacia aristulata	Eastern Ridge	407878.72	6623693.15	DRF	2	RFS
Acacia aristulata	Eastern Ridge	407880.73	6623704.16	DRF	2	RFS
Acacia aristulata	Eastern Ridge	407881.72	6623722.15	DRF	6	RFS
Acacia aristulata	Eastern Ridge	407889.72	6623691.15	DRF	7	RFS
Acacia aristulata	Eastern Ridge	407894.72	6623678.15	DRF	8	RFS
Acacia aristulata	Eastern Ridge	407897.72	6624125.15	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407901.72	6623933.15	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407904.72	6623356.15	DRF	2	RFS
Acacia aristulata	Eastern Ridge	407912.72	6623621.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407916.72	6624120.15	DRF	2	RFS
Acacia aristulata	Eastern Ridge	407916.72	6623705.16	DRF	3	RFS
Acacia aristulata	Eastern Ridge	407916.72	6623333.14	DRF	3	RFS
Acacia aristulata	Eastern Ridge	407918.72	6623427.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407925.72	6623328.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407929.72	6624139.15	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407931.72	6623336.14	DRF	3	RFS
Acacia aristulata	Eastern Ridge	407938.72	6623365.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407939.72	6623359.15	DRF	2	RFS
Acacia aristulata	Eastern Ridge	407942.72	6623342.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407942.72	6623345.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407942.72	6623328.14	DRF	3	RFS
Acacia aristulata	Eastern Ridge	407946.73	6624134.15	DRF	1	RFS
Acacia aristulata	Eastern Ridge	407961.72	6623439.14	DRF	1	RFS
Acacia aristulata		407963	6624166	DRF		Releves
Acacia aristulata		407967	6623428	DRF		Releves
Acacia aristulata	Eastern Ridge	407969.72	6623447.14	DRF	2	RFS
Acacia aristulata	Eastern Ridge	407988.72	6623300.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	408004.72	6623318.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	408013.72	6623300.14	DRF	10	RFS
Acacia aristulata	Eastern Ridge	408019.72	6623275.14	DRF	2	RFS

Acacia aristulata	Eastern Ridge	408019.72	6623304.15	DRF	5	RFS
Acacia aristulata	Eastern Ridge	408024.72	6622619.15	DRF	1	RFS
Acacia aristulata	Eastern Ridge	408026.72	6623330.14	DRF	10	RFS
Acacia aristulata	Eastern Ridge	408030.72	6623321.14	DRF	6	RFS
Acacia aristulata	Eastern Ridge	408057.72	6623299.14	DRF	2	RFS
Acacia aristulata	Eastern Ridge	408063.72	6622649.14	DRF	1	RFS
Acacia aristulata	Eastern Ridge	408069.72	6622630.14	DRF	2	RFS
Acacia aristulata	Eastern Ridge	408071.72	6622998.14	DRF	1	RFS
Acacia aristulata	Kiaka Rd North	408242.72	6626810.16	DRF	1	RFS
Acacia aristulata		408295	6617191	DRF		Releves
Acacia aristulata		408295	6617171	DRF		Releves
Acacia aristulata	Kiaka Rd North	408406.72	6626344.16	DRF	2	RFS
Acacia aristulata	Kiaka Rd North	408417.72	6626233.16	DRF	1	RFS
Acacia aristulata	Kiaka Rd North	408420.72	6626027.16	DRF	1	RFS
Acacia aristulata	Gardiner's Hills	408564.72	6618174.11	DRF	2	RFS
Acacia aristulata	Gardiner's Hills	408579.72	6618158.11	DRF	6	RFS
Acacia aristulata	Kiaka Rd North	408586.73	6626235.16	DRF	1	RFS
Acacia aristulata	Kiaka Rd North	408613.72	6626305.17	DRF	1	RFS
Acacia aristulata	Kiaka Rd North	408614.73	6625606.16	DRF	4	RFS
Acacia aristulata	Gardiner's Hills	408618.72	6617996.11	DRF	1	RFS
Acacia aristulata	Kiaka Rd North	408620.72	6626091.16	DRF	1	RFS
Acacia aristulata	Kiaka Rd North	408620.72	6625619.16	DRF	2	RFS
Acacia aristulata	Kiaka Rd North	408660.73	6625944.16	DRF	1	RFS
Acacia aristulata	Kiaka Rd North	408681.73	6626157.17	DRF	1	RFS
Acacia aristulata	Kiaka Rd North	408686.72	6626047.16	DRF	10	RFS
Acacia aristulata	Kiaka Rd North	408749.73	6626112.17	DRF	2	RFS
Acacia aristulata	Kiaka Rd North	408756.72	6626167.16	DRF	7	RFS
Acacia aristulata	Kiaka Rd North	408775.73	6626149.16	DRF	4	RFS
Acacia aristulata	Kiaka Rd North	408796.72	6626195.16	DRF	13	RFS
Acacia aristulata		408815	6626106	DRF		Releves
Acacia aristulata	Kiaka Rd North	408819.73	6626152.16	DRF	6	RFS
Acacia aristulata	Kiaka Rd North	408821.73	6626076.16	DRF	32	RFS
Acacia aristulata	Kiaka Rd North	408831.73	6626024.16	DRF	5	RFS
Acacia aristulata	Kiaka Rd North	408842.73	6625857.16	DRF	6	RFS
Acacia aristulata	Kiaka Rd North	408915.73	6625806.16	DRF	1	RFS
Acacia aristulata	Kiaka Rd North	408925.73	6625727.15	DRF	5	RFS
Acacia aristulata	Kiaka Rd North	408964.72	6625723.15	DRF	2	RFS
Acacia aristulata	Kiaka Rd North	408983.72	6625550.15	DRF	2	RFS
Acacia aristulata	Kiaka Rd North	409027.72	6625470.16	DRF	1	RFS
Acacia aristulata	Kiaka Rd North	409047.73	6626153.17	DRF	>10	RFS
Acacia aristulata	Kiaka Rd North	409066.73	6626107.17	DRF	3	RFS
Acacia aristulata	Kiaka Rd North	409103.72	6626052.16	DRF	16	RFS
Acacia aristulata	Kiaka Rd North	409109.73	6626090.16	DRF	8	RFS
Acacia aristulata	Kiaka Rd North	409110.73	6626008.17	DRF	14	RFS
Acacia aristulata	Kiaka Rd North	409114.72	6625964.17	DRF	6	RFS
Acacia aristulata	Kiaka Rd North	409133.72	6625910.17	DRF	45	RFS
Acacia aristulata	Kiaka Rd North	409155.72	6625775.15	DRF	81	RFS
Acacia aristulata	Kiaka Rd North	409167.73	6625636.15	DRF	34	RFS
Acacia aristulata	Kiaka Rd North	409183.73	6625461.16	DRF	>10	RFS
Acacia aristulata	Kiaka Rd North	409261.72	6626755.16	DRF	2	RFS
Acacia aristulata	Kiaka Rd North	409317.73	6625695.15	DRF	2	RFS
Acacia aristulata		409319	6625506	DRF		Releves
Acacia aristulata	Kiaka Rd North	409332.73	6626544.16	DRF	3	RFS
Acacia aristulata	Kiaka Rd North	409341.72	6625543.15	DRF	8	RFS
Acacia aristulata	Kiaka Rd North	409348.73	6625449.15	DRF	20	RFS
Acacia aristulata		409354	6625563	DRF		Releves
Acacia aristulata		409361	6625371	DRF		Releves
Acacia aristulata	Kiaka Rd North	409382.72	6625892.15	DRF	13	RFS

Acacia aristulata		409393	6624414	DRF	12	Mpg GC
Acacia aristulata	Kiaka Rd North	409424.74	6625314.16	DRF	>50	RFS
Acacia aristulata		406991	6619509	DRF	25	Mpg GC
Acacia aristulata		407730	6621135	DRF		Releves
Acacia aristulata		408506	6620286	DRF	1	Mpg GC
Acacia aristulata		409191	6622405	DRF	3	Mpg GC
Acacia aristulata		409199	6622336	DRF	6	Mpg GC
Acacia aristulata		409200	6622373	DRF	13	Mpg GC
Acacia aristulata		409201	6622272	DRF	1	Mpg GC
Acacia aristulata		407512	6620098	DRF		Releves
Austrostipa exilis	Cairn Hill	407832	6620037	P2		Miscellaneous
Baeckea sp. Moora	Cairn Hill North	407150	6622430	P1	1	RFS
Baeckea sp. Moora	Cairn Hill North	407166	6622461	P1	3	RFS
Baeckea sp. Moora	Cairn Hill North	407166	6621904	P1	1	RFS
Baeckea sp. Moora	Cairn Hill North	407174	6622382	P1	1	RFS
Baeckea sp. Moora	Cairn Hill North	407180	6622465	P1	3	RFS
Baeckea sp. Moora	Cairn Hill North	407182	6621796	P1	20+	RFS
Baeckea sp. Moora	Cairn Hill North	407190	6622393	P1	1	RFS
Baeckea sp. Moora	Cairn Hill North	407220	6622389	P1	32	RFS
Baeckea sp. Moora	Cairn Hill North	407224	6622418	P1	1	RFS
Baeckea sp. Moora	Cairn Hill North	407225	6621999	P1	2	RFS
Baeckea sp. Moora	Cairn Hill North	407239	6622453	P1	1	RFS
Baeckea sp. Moora	Cairn Hill North	407242	6622288	P1	5	RFS
Baeckea sp. Moora	Cairn Hill North	407246	6622402	P1	1	RFS
Baeckea sp. Moora	Cairn Hill North	407250	6621812	P1	30+	RFS
Baeckea sp. Moora	Cairn Hill North	407270	6621885	P1	50+	RFS
Baeckea sp. Moora	Cairn Hill North	407271	6621925	P1	1	RFS
Baeckea sp. Moora	Cairn Hill North	407294	6621885	P1	>10	RFS
Baeckea sp. Moora	Cairn Hill North	407303	6621921	P1	1	RFS
Baeckea sp. Moora	Cairn Hill North	407323	6621876	P1	6	RFS
Baeckea sp. Moora	Cairn Hill North	407329	6621941	P1	2	RFS
Baeckea sp. Moora	Cairn Hill North	407369	6622238	P1	2+	RFS
Baeckea sp. Moora	Cairn Hill North	407407	6622233	P1	1+	RFS
Baeckea sp. Moora	Cairn Hill North	407417	6622189	P1	>20	RFS
Baeckea sp. Moora	Cairn Hill North	407429	6622296	P1	1	RFS
Baeckea sp. Moora	Cairn Hill North	407439	6622222	P1	50+	RFS
Baeckea sp. Moora		407607	6621539	P1		Releves
Baeckea sp. Moora		407730	6621135	P1		Releves
Baeckea sp. Moora		406999	6621580	P1		Releves
Baeckea sp. Moora		407039	6621549	P1		Releves
Baeckea sp. Moora		407126	6621426	P1		Releves
Baeckea sp. Moora		407219	6621600	P1		Releves
Baeckea sp. Moora		407249	6620522	P1		Releves
Baeckea sp. Moora		407266	6620484	P1		Releves
Baeckea sp. Moora		407301	6621262	P1		Releves
Baeckea sp. Moora		407346	6622198	P1		Releves
Baeckea sp. Moora		407366	6620501	P1		Releves
Baeckea sp. Moora		407417	6620954	P1		Releves
Baeckea sp. Moora		407473	6620529	P1		Releves
Baeckea sp. Moora		407499	6621565	P1		Releves
Baeckea sp. Moora		407514	6621887	P1		Releves
Baeckea sp. Moora		407551	6621812	P1		Releves
Baeckea sp. Moora		407558	6621749	P1		Releves
Baeckea sp. Moora		407591	6620635	P1		Releves
Baeckea sp. Moora		407594	6621525	P1		Releves
Baeckea sp. Moora		407605	6620364	P1		Releves
Baeckea sp. Moora		407619	6621523	P1		Releves
Baeckea sp. Moora		407624	6621644	P1		Releves

Baeckea sp. Moora		407647	6621332	P1		Releves
Baeckea sp. Moora		407667	6620395	P1		Releves
Baeckea sp. Moora		407676	6620777	P1		Releves
Baeckea sp. Moora		407681	6620743	P1		Releves
Baeckea sp. Moora		407692	6620673	P1		Releves
Baeckea sp. Moora		407692	6621211	P1		Releves
Baeckea sp. Moora		407700	6620945	P1		Releves
Baeckea sp. Moora		407705	6621999	P1		Releves
Baeckea sp. Moora		407747	6621073	P1		Releves
Baeckea sp. Moora		407822	6620461	P1		Releves
Baeckea sp. Moora		407841	6620347	P1		Releves
Baeckea sp. Moora		407917	6620378	P1		Releves
Baeckea sp. Moora		407385	6619969	P1		Releves
Baeckea sp. Moora		407403	6621231	P1		Releves
Baeckea sp. Moora		407573	6621426	P1		Releves
Baeckea sp. Moora		407726	6620092	P1		Releves
Baeckea sp. Moora		407774	6620341	P1		Releves
Baeckea sp. Moora		407638.72	6621163.13	P1		Quadrat
Baeckea sp. Moora		407000	6621385	P1		Quadrat
Baeckea sp. Moora		407058	6621390	P1		Quadrat
Baeckea sp. Moora		407130.72	6620981.13	P1		Quadrat
Baeckea sp. Moora		407315.71	6621864.14	P1		Quadrat
Baeckea sp. Moora		407364.72	6621620.14	P1		Quadrat
Baeckea sp. Moora		407371.72	6621134.13	P1		Quadrat
Baeckea sp. Moora		407460.72	6621582.14	P1		Quadrat
Baeckea sp. Moora		407467	6620592	P1		Quadrat
Baeckea sp. Moora		407472.71	6621163.13	P1		Quadrat
Baeckea sp. Moora		407488.72	6621679.14	P1		Quadrat
Baeckea sp. Moora		407565	6621707	P1		Quadrat
Baeckea sp. Moora		407571.71	6621045.13	P1		Quadrat
Cryptandra glabriflora		407009	6620626	P2		Releves
Cryptandra glabriflora		407058	6621390	P2		Quadrat
Cryptandra glabriflora		407143.72	6623452.14	P2		Quadrat
Cryptandra glabriflora		407202.72	6623229.14	P2		Quadrat
Cryptandra glabriflora		407371.72	6621134.13	P2		Quadrat
Cryptandra glabriflora		407375.72	6623173.14	P2		Quadrat
Cryptandra glabriflora		407571.71	6621045.13	P2		Quadrat
Cryptandra glabriflora		407824.72	6623723.15	P2		Quadrat
Daviesia dielsii	Cairn Hill North	406927.72	6622405.14	DRF	4	RFS
Daviesia dielsii		407087	6618021	DRF	10 +	Mpg GC
Daviesia dielsii	Cairn Hill North	407099.72	6622670.15	DRF	1	RFS
Daviesia dielsii		407104	6618108	DRF	3	Mpg GC
Daviesia dielsii	Cairn Hill North	407120.71	6622674.14	DRF	4	RFS
Daviesia dielsii	Cairn Hill North	407147.72	6622695.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407150.71	6622545.14	DRF	2	RFS
Daviesia dielsii	Cairn Hill North	407150.71	6622525.14	DRF	9	RFS
Daviesia dielsii	Cairn Hill North	407154.72	6622631.14	DRF	3	RFS
Daviesia dielsii	Cairn Hill North	407156.72	6622580.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407159.72	6622692.14	DRF	2	RFS
Daviesia dielsii	Cairn Hill North	407159.72	6622528.13	DRF	2	RFS
Daviesia dielsii	Cairn Hill North	407167.72	6622670.15	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407167.72	6622389.13	DRF	3	RFS
Daviesia dielsii	Cairn Hill North	407168.71	6622521.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407170.72	6622689.14	DRF	3	RFS
Daviesia dielsii	Cairn Hill North	407173.72	6622427.14	DRF	3	RFS
Daviesia dielsii	Cairn Hill North	407180.72	6622698.14	DRF	3	RFS
Daviesia dielsii	Cairn Hill North	407181.72	6622671.15	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407189.72	6622393.13	DRF	5	RFS

Daviesia dielsii	Cairn Hill North	407195.72	6622639.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407197.71	6622622.15	DRF	1	RFS
Daviesia dielsii	Chester Hills	407201.71	6618131.11	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407210.72	6622340.13	DRF	3	RFS
Daviesia dielsii	Cairn Hill North	407211.72	6622407.14	DRF	2	RFS
Daviesia dielsii	Cairn Hill North	407212.71	6622406.14	DRF	2	RFS
Daviesia dielsii	Cairn Hill North	407213.72	6622461.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407213.72	6622424.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407219.71	6622389.13	DRF	20	RFS
Daviesia dielsii	Chester Hills	407230.71	6618101.11	DRF	>20	RFS
Daviesia dielsii	Cairn Hill North	407238.71	6622453.14	DRF	2	RFS
Daviesia dielsii	Cairn Hill North	407238.71	6622417.14	DRF	2	RFS
Daviesia dielsii	Cairn Hill North	407241.71	6622401.13	DRF	4	RFS
Daviesia dielsii	Waste Dump	407246.72	6623193.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407247.72	6622268.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407248.71	6622437.13	DRF	20	RFS
Daviesia dielsii	Cairn Hill North	407256.71	6622404.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407265.72	6622417.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407297.72	6621803.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407301.72	6622429.13	DRF	3	RFS
Daviesia dielsii	Cairn Hill North	407306.72	6621895.13	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407332.72	6621297.13	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407337.71	6621923.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407338.72	6622408.14	DRF	1	RFS
Daviesia dielsii	Waste Dump	407346.72	6623182.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407361.72	6621933.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407366.71	6622198.13	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407371.72	6621937.13	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407379.72	6622236.13	DRF	1	RFS
Daviesia dielsii		407381	6620425	DRF		Releves
Daviesia dielsii	Cairn Hill North	407389.72	6621920.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407390.72	6621882.14	DRF	1	RFS
Daviesia dielsii	Waste Dump	407409.71	6623095.14	DRF	1	RFS
Daviesia dielsii	Chester Hills	407413.71	6618072.11	DRF	2	RFS
Daviesia dielsii	Cairn Hill North	407417.71	6621875.14	DRF	1	RFS
Daviesia dielsii	Waste Dump	407418.72	6623160.15	DRF	1	RFS
Daviesia dielsii	Waste Dump	407478.72	6623101.14	DRF	1	RFS
Daviesia dielsii	Eastern Ore Body	407529.72	6623106.15	DRF	2	RFS
Daviesia dielsii	Eastern Ore Body	407534.71	6623090.14	DRF	1	RFS
Daviesia dielsii	Eastern Ore Body	407541.71	6623082.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	407544.72	6621616.14	DRF	1	RFS
Daviesia dielsii	Eastern Ore Body	407545.71	6623091.14	DRF	3	RFS
Daviesia dielsii	Eastern Ore Body	407550.72	6623067.14	DRF	1	RFS
Daviesia dielsii		407551	6623071	DRF		Releves
Daviesia dielsii	Eastern Ore Body	407551.72	6623097.14	DRF	2	RFS
Daviesia dielsii	Eastern Ore Body	407556.71	6623033.14	DRF	1	RFS
Daviesia dielsii	Eastern Ore Body	407564.71	6623056.15	DRF	1	RFS
Daviesia dielsii		407591	6620635	DRF		Releves
Daviesia dielsii		407667	6620395	DRF		Releves
Daviesia dielsii		407692	6621211	DRF		Releves
Daviesia dielsii	Eastern Ridge	407714.72	6624279.15	DRF	3	RFS
Daviesia dielsii	Eastern Ridge	407726.73	6624222.15	DRF	2	RFS
Daviesia dielsii	Eastern Ridge	407729.72	6624240.15	DRF	6	RFS
Daviesia dielsii	Eastern Ridge	407744.72	6623367.14	DRF	4	RFS
Daviesia dielsii	Eastern Ridge	407748.73	6623380.14	DRF	1	RFS
Daviesia dielsii	Eastern Ridge	407770.73	6623255.15	DRF	1	RFS
Daviesia dielsii	Eastern Ridge	407815.72	6623331.14	DRF	1	RFS
Daviesia dielsii	Eastern Ridge	407821.72	6623526.14	DRF	1	RFS

Daviesia dielsii	Eastern Ridge	407822.72	6623530.14	DRF	1	RFS
Daviesia dielsii	Eastern Ridge	407826.72	6623282.14	DRF	1	RFS
Daviesia dielsii	Eastern Ridge	407827.72	6623299.14	DRF	1	RFS
Daviesia dielsii	Eastern Ridge	407827.72	6623341.14	DRF	2	RFS
Daviesia dielsii	Eastern Ridge	407835.72	6623292.14	DRF	2	RFS
Daviesia dielsii	Eastern Ridge	407848.72	6623356.15	DRF	1	RFS
Daviesia dielsii	Eastern Ridge	407916.72	6623709.15	DRF	1	RFS
Daviesia dielsii	Eastern Ridge	407919.72	6623613.14	DRF	1	RFS
Daviesia dielsii	Cairn Hill North	408113.72	6622504.14	DRF	1	RFS
Daviesia dielsii	Kiaka Rd North	408215.72	6626097.16	DRF	1	RFS
Daviesia dielsii	Kiaka Rd North	408253.72	6625914.17	DRF	>10	RFS
Daviesia dielsii	Kiaka Rd North	408268.72	6625869.16	DRF	4	RFS
Daviesia dielsii	Kiaka Rd North	408272.72	6625847.15	DRF	>5	RFS
Daviesia dielsii	Kiaka Rd North	408273.72	6626019.16	DRF	9	RFS
Daviesia dielsii	Kiaka Rd North	408283.72	6626593.16	DRF	1	RFS
Daviesia dielsii		408295	6617191	DRF		Releves
Daviesia dielsii		408295	6617171	DRF		Releves
Daviesia dielsii		408326	6617940	DRF		Releves
Daviesia dielsii	Gardiner's Hill	408350.72	6617648.11	DRF	1	RFS
Daviesia dielsii		408451	6620952	DRF	1	Mpg GC
Daviesia dielsii		408457	6620332	DRF	4	Mpg GC
Daviesia dielsii		408469	6620284	DRF	1	Mpg GC
Daviesia dielsii		408483	6620280	DRF		Releves
Daviesia dielsii	Kiaka Rd North	408483.72	6626478.16	DRF	4	RFS
Daviesia dielsii		408493	6620290	DRF		Mpg GC
Daviesia dielsii		408506	6620286	DRF		Mpg GC
Daviesia dielsii	Kiaka Rd North	408510.72	6626137.16	DRF	2	RFS
Daviesia dielsii	Kiaka Rd North	408564.73	6626510.16	DRF	1	RFS
Daviesia dielsii	Gardiner Hills	408569.72	6618155.11	DRF	2	RFS
Daviesia dielsii	Gardiner Hills	408632.72	6617880.11	DRF	1	RFS
Daviesia dielsii	Kiaka Rd North	408653.72	6625419.16	DRF	2	RFS
Daviesia dielsii	Kiaka Rd North	408655.73	6625988.16	DRF	15	RFS
Daviesia dielsii	Gardiner Hills	408657.72	6617912.11	DRF	2	RFS
Daviesia dielsii	Kiaka Rd North	408669.73	6625388.15	DRF	4	RFS
Daviesia dielsii	Kiaka Rd North	408683.73	6626108.17	DRF	8	RFS
Daviesia dielsii	Kiaka Rd North	408686.72	6626047.16	DRF	15	RFS
Daviesia dielsii	Kiaka Rd North	408740.73	6625843.15	DRF	2	RFS
Daviesia dielsii		408758	6620078	DRF		Mpg GC
Daviesia dielsii	Gardiner Hill	408758.73	6617659.12	DRF	14	RFS
Daviesia dielsii	Kiaka Rd North	408796.72	6626195.16	DRF	4	RFS
Daviesia dielsii	Kiaka Rd North	408797.73	6625548.15	DRF	8	RFS
Daviesia dielsii	Gardiner Hill	408848.73	6618107.11	DRF	1	RFS
Daviesia dielsii		408852	6620392	DRF	5	Mpg GC
Daviesia dielsii	Gardiner Hill	408862.72	6617743.11	DRF	3	RFS
Daviesia dielsii		408865	6625628	DRF		Releves
Daviesia dielsii	Kiaka Rd North	408983.72	6625550.15	DRF	4	RFS
Daviesia dielsii		409032	6625230	DRF		Releves
Daviesia dielsii	Kiaka Rd North	409037.73	6625493.15	DRF	1	RFS
Daviesia dielsii		409042	6624046	DRF	>4%	Mpg GC
Daviesia dielsii	Kiaka Rd North	409059.72	6625400.15	DRF	2	RFS
Daviesia dielsii		409072	6625211	DRF		Releves
Daviesia dielsii	Kiaka Rd North	409167.73	6625636.15	DRF	1	RFS
Daviesia dielsii	Kiaka Rd North	409285.73	6625291.15	DRF	1	RFS
Daviesia dielsii	Kiaka Rd North	409337.73	6625372.16	DRF	2	RFS
Daviesia dielsii	Kiaka Rd North	409343.73	6625123.16	DRF	1	RFS
Daviesia dielsii		407700	6620945	DRF		Releves
Daviesia dielsii		407433	6620399	DRF		Releves
Eucalyptus pruiniramis		407614	6620524	DRF	>1	Mpg GC

Eucalyptus pruiniramis		408502	6620294	DRF		Mpg GC
Eucalyptus pruiniramis		408765	6620050	DRF	2	Mpg GC
Goodenia arthrotricha		407460.72	6621582.14	P1		Quadrat
Goodenia arthrotricha		407512	6620103	P1		Mpg GC
Goodenia arthrotricha		407698	6620100	P1		Quadrat
Goodenia arthrotricha		407833	6623834	P1		Mpg GC
Goodenia arthrotricha		407950.72	6624312.15	P1		Quadrat
Goodenia arthrotricha		408299	6617965	P1		Quadrat
Goodenia arthrotricha		408342	6617700	P1		Releves
Goodenia arthrotricha		408365	6617634	P1		Releves
Goodenia arthrotricha		408372	6617553	P1		Quadrat
Goodenia arthrotricha		408385	6617631	P1		Quadrat
Goodenia arthrotricha		408590	6622558	P1		Releves
Guichenotia tuberculata	Gardiner's Hill	407273	6617108	P3		Miscellaneous
Hemigenia sp.	Cairn Hill	407772	6620677	Of Interest		Miscellaneous
Hemigenia sp.	Gardiner's Hill	408296	6617059	Of Interest		Miscellaneous
Melaleuca sclerophylla	Gardiner Hill	408330	6617228	P3		Releves
Melaleuca sclerophylla	Gardiner Hill	408283	6617208	P3		Releves
Melaleuca sclerophylla	Gardiner Hill	408294	6617292	P3		Releves
Gastrolobium acutum		407062	6617532	Of Interest	1	Mpg GC
Gastrolobium acutum		407106	6617914	Of Interest	9	Mpg GC
Gastrolobium acutum		407113	6617867	Of Interest	1	Mpg GC
Gastrolobium acutum		407154	6617948	Of Interest	3	Releves
Gastrolobium acutum		407165	6617948	Of Interest	3	Mpg GC
Gastrolobium acutum		407364.72	6621620.14	Of Interest		Quadrat
Gastrolobium acutum		407371.72	6621134.13	Of Interest		Quadrat
Gastrolobium acutum		407375.72	6623173.14	Of Interest		Quadrat
Gastrolobium acutum		407396.72	6620276.12	Of Interest		Quadrat
Gastrolobium acutum		407409	6620353	Of Interest		Quadrat
Gastrolobium acutum		407451	6620171	Of Interest		Quadrat
Gastrolobium acutum		407472.71	6621163.13	Of Interest		Quadrat
Gastrolobium acutum		407571.71	6621045.13	Of Interest		Quadrat
Gastrolobium acutum		407693.72	6623027.14	Of Interest		Quadrat
Gastrolobium acutum		407841	6620347	Of Interest		Releves
Gastrolobium acutum		408299	6617965	Of Interest		Quadrat
Gastrolobium acutum		408760	6617842	Of Interest		Quadrat
Gastrolobium acutum		408815	6626106	Of Interest		Releves
Gastrolobium acutum		408826	6617782	Of Interest		Quadrat
Gastrolobium acutum	John Tonkin's	408835	6625542	Of Interest		Specimens
Gastrolobium acutum	John Tonkin's	408919	6625718	Of Interest		Specimens
Gastrolobium acutum		409060	6625331	Of Interest		Quadrat
Gastrolobium acutum	Chester's	407377	6618018	Of Interest	2	RFS
Gastrolobium acutum	Chester's	407456	6618099	Of Interest	4	RFS
Gastrolobium acutum	Chester's	408759	6617659	Of Interest	1	RFS
Gastrolobium acutum	Chester's	408843	6617657	Of Interest	2	RFS
Regelia megacephala		406894	6621403	P4		Releves
Regelia megacephala		406920	6620699	P4		Releves
Regelia megacephala		406932	6620797	P4		Releves
Regelia megacephala		406933	6620762	P4		Releves
Regelia megacephala		406937	6621245	P4		Quadrat
Regelia megacephala		407025	6622616	P4		Releves
Regelia megacephala		407130.72	6620981.13	P4		Quadrat
Regelia megacephala		407143.72	6623452.14	P4		Quadrat
Regelia megacephala		407166	6620980	P4		Releves
Regelia megacephala		407166	6620727	P4		Releves
Regelia megacephala		407168.71	6622574.15	P4		Quadrat
Regelia megacephala		407168.71	6623321.14	P4		Quadrat
Regelia megacephala		407194.71	6623200.14	P4		Quadrat

Regelia megacephala		407201.71	6622517.14	P4		Quadrat
Regelia megacephala		407202.72	6623229.14	P4		Quadrat
Regelia megacephala		407217	6622414	P4		Releves
Regelia megacephala		407224	6620829	P4		Releves
Regelia megacephala		407236	6619110	P4		Releves
Regelia megacephala		407249	6620522	P4		Releves
Regelia megacephala		407266	6620484	P4		Releves
Regelia megacephala		407315.71	6621864.14	P4		Quadrat
Regelia megacephala		407340	6620530	P4		Releves
Regelia megacephala		407364.72	6621620.14	P4		Quadrat
Regelia megacephala		407366	6620501	P4		Releves
Regelia megacephala		407371.72	6621134.13	P4		Quadrat
Regelia megacephala		407372	6620059	P4		Quadrat
Regelia megacephala		407375.72	6623173.14	P4		Quadrat
Regelia megacephala		407409	6620353	P4		Quadrat
Regelia megacephala		407451	6620171	P4		Quadrat
Regelia megacephala		407472.71	6621163.13	P4		Quadrat
Regelia megacephala		407491	6621800	P4		Releves
Regelia megacephala		407492.72	6621766.14	P4		Quadrat
Regelia megacephala		407494	6620190	P4		Quadrat
Regelia megacephala		407498	6621096	P4		Releves
Regelia megacephala		407498	6621710	P4		Releves
Regelia megacephala		407523	6620619	P4		Releves
Regelia megacephala		407545	6619474	P4		Releves
Regelia megacephala		407571.71	6621045.13	P4		Quadrat
Regelia megacephala		407579	6619585	P4		Releves
Regelia megacephala		407605	6620364	P4		Releves
Regelia megacephala		407608.71	6622999.14	P4		Quadrat
Regelia megacephala		407676	6620777	P4		Releves
Regelia megacephala		407676.72	6623007.15	P4		Quadrat
Regelia megacephala		407693.72	6623027.14	P4		Quadrat
Regelia megacephala		407696	6620035	P4		Releves
Regelia megacephala		407726.73	6623849.15	P4		Quadrat
Regelia megacephala		407730	6621135	P4		Releves
Regelia megacephala		407788	6621074	P4		Releves
Regelia megacephala		407813	6623919	P4		Releves
Regelia megacephala		407822	6620461	P4		Releves
Regelia megacephala		407824.72	6623723.15	P4		Quadrat
Regelia megacephala		408144	6619365	P4		Releves
Regelia megacephala		408299	6617965	P4		Quadrat
Regelia megacephala		408323	6618076	P4		Releves
Regelia megacephala		408709	6617635	P4		Quadrat
Regelia megacephala		408760	6617842	P4		Quadrat
Regelia megacephala		408835	6625542	P4		Quadrat
Regelia megacephala		406979	6620756	P4		Releves
Regelia megacephala		407321	6620214	P4		Releves
Regelia megacephala		407407	6620132	P4		Releves
Regelia megacephala		407585	6620384	P4		Releves
Regelia megacephala		407659	6620494	P4		Releves
Regelia megacephala		407713	6620134	P4		Releves
Regelia megacephala		407841	6620347	P4		Releves
Synaphea quartzitica	Cairn Hill	407656	6620813	DRF		GC
Tricoryne arenicola		407394.72	6623106.15	P2		Quadrat
Tricoryne arenicola		407565	6621707	P2		Quadrat
Tricoryne arenicola		407571.71	6621045.13	P2		Quadrat
Tricoryne arenicola		407705	6621999	P2		Releves
Tricoryne arenicola		407551	6621812	P2		Releves
Tricoryne arenicola		407561	6621707	P2		Releves

Tricoryne arenicola	Cairn Hill	407770	6619954	P2		Specimens
Wurmbea drummondii	John Tonkin's	408958	6625359	P4		Miscellaneous
Wurmbea drummondii	John Tonkin's	409009	6625325	P4		Miscellaneous
Cyrtostylis huegelii	Eastern Ridge	407822	6623667	Of Interest		Quadrat
Cyrtostylis huegelii	Eastern Orebody	407677	6623008	Of Interest		Quadrat
Cyrtostylis huegelii	Cairn Hill	407409	6620353	Of Interest		Quadrat
Caesia sp. Moora	Eastern Ridge	407813	6623304	Of Interest		Quadrat
Caesia sp. Moora	Cairn Hill	407646	6620040	Of Interest		Quadrat
Caesia sp. Moora	Cairn Hill	407683	6620043	Of Interest		Quadrat
Caesia sp. Moora	Cairn Hill	407590	6620015	Of Interest		Quadrat
Caesia sp. Moora	Cairn Hill	407275	6620019	Of Interest		Quadrat
Caesia sp. Moora	Cairn Hill North	407058	6621390	Of Interest		Quadrat
Caesia sp. Moora	Western Orebody	407204	6623297	Of Interest		Quadrat
Caesia sp. Moora	John Tonkin's	408881	6626068	Of Interest		Quadrat
Caesia sp. Moora	John Tonkin's	408852	6625867	Of Interest		Quadrat
Caesia sp. Moora	John Tonkin's	408906	6626039	Of Interest		Quadrat
Caesia sp. Moora	John Tonkin's	408835	6625542	Of Interest		Quadrat
Caesia sp. Moora	John Tonkin's	408958	6625359	Of Interest		Quadrat
Caesia sp. Moora	Cairn Hill North	407316	6621865	Of Interest		Quadrat
Amblysperma sp.	Gardiner's	408366	6617473	Of Interest		Quadrat
Pterostylis aff. rufa	Gardiner's	408372	6617553	Of Interest		Quadrat
Pterostylis aff. rufa	Cairn Hill	407058	6621390	Of Interest		Quadrat
Hypoxis aff. glabella	Cairn Hill	407646	6620000	Of Interest		Quadrat
Pityrodia sp.	Eastern Ridge	408004	6622885	Of Interest		Releve
Leptospermum aff. erubescens	Gardiner's	408800	6617640	Of Interest		RFS
Leptospermum aff. erubescens	Gravel Pit	407140	6621150	Of Interest		Collector
Eremaea sp. Cairn Hill	Cairn Hill	408308	6620008	Of Interest		Specimen
Stylidium glabrifolium	Eastern Ridge	407950	6624313	P2		Quadrat
Stylidium glabrifolium	Eastern Ridge	407820	6624653	P2		Quadrat
Stylidium glabrifolium	Eastern Orebody	407694	6623028	P2		Quadrat
Stenanthemum tridentatum	Gardiner's	408370	6617600	P3		Quadrat

APPENDIX 5: Flora list for the study area

Notes: The abbreviations in the top of the top row are those used in the report, they are followed by the number of quadrats recorded in the relevant sub-area. The right hand column has records from areas of vegetation that were mapped, but did not have quadrats located in them (usually because they are small areas, or are degraded). An asterix in the third column indicates an introduced or alien (weed) species. Specimens not identifiable due to poor material or recorded as "sp." have been included in the list, but not counted for the number of species recorded, these records are shown in grey text (ie. grey). records at quadrats are indicated by a q"" and at releves by an "r". Specimens collected opportunistically (rather than at a quadrat or releve) are indicated by an "o".

Family	Family number	Weed *	NAME	ART (11) A&R Tonkin	CAH (20) Cairn Hill Reserve	CHN (10) Cairn Hill North	EOR (3) Eastern Ore Body	ERG (23) Eastern Ridge	GH (10) Gardiner's Hill	JT (12) John Tonkin	WDM (3) Waste Dump Area	WOR (6) Western Ridge	Records from other areas of vegetation surveyed
FERNS													
Adiantaceae	007		Cheilanthes adiantoides	4q	17q, 37r	9q, 21r	3q	23q, 40r	8q, 21r	11q, 15r	3q, 1r	6q, 1r	32r
Adiantaceae	007		Cheilanthes austrotenuifolia	5q, 1o									
Adiantaceae	007		Cheilanthes distans	3q, 3r	1q		1q			1q			
Aspleniaceae	011E		Pleurosorus rutifolius				1q	2q	1q	1q			
PINES													
Cupressaceae	018		Actinostrobus arenarius							1q			
ANGIOSPERMS Monocotyledons													
Poaceae	031	*	Aira caryophyllea		10q			5q	1q	5q			
Poaceae	031		Amphipogon caricinus		5q, 2r	1r		4q	1q, 3r			2q	
Poaceae	031		Aristida contorta		1q						1q	1q	
Poaceae	031		Austrodanthonia acerosa	2q	4q,2r			2q, 4r	4q, 1r	3q	2q	4q	1r
Poaceae	031		Austrodanthonia caespitosa	1q, 1o	5q	1q		8q, 7r	3q, 3r			1q	4r
Poaceae	031		Austrodanthonia setacea		7q, 3r	7q	3q	10q, 4r	3q, 1r	2q, 1r	1q	4q	2r
Poaceae	031		Austrodanthonia sp.	1r,	1q				2q	1q			7r
Poaceae	031		Austrostipa compressa			8q							
Poaceae	031		Austrostipa elegantissima	1q, 1r,	8q, 5r	2q	1q	8q	6q, 5r	2q	2q	2q	2r
Poaceae	031		Austrostipa eremophila		1r								
Poaceae	031		Austrostipa exilis		2r								
Poaceae	031		Austrostipa hemipogon	1q				1q	2q	1q	1q	3q	

Poaceae	031		Austrostipa macalpinei						2q			
Poaceae	031		Austrostipa mollis					1r				1r
Poaceae	031		Austrostipa nitida		2q			4q, 3r	2q	5q		3r
Poaceae	031		Austrostipa scabra		3q				4q	1q		1r
Poaceae	031		Austrostipa sp.		1q	1q		1q		1q, 2r		
Poaceae	031		Austrostipa sp. Cairn Hill (M.E. Trudgen 21176)		1q							
Poaceae	031		Austrostipa tenuifolia				1q	1q			1q	
Poaceae	031		Austrostipa trichophylla	8q, 1r	8q	5q	1q	12q	3q, 2r	1q	2q	5q
Poaceae	031		Austrostipa variabilis		4q		1q	3q	6q	3q, 2r		1q
Poaceae	031	*	Avena barbata	9q, 7r	8q	5q	3q	23q, 17r	9q, 10r	11q, 20r	2q	6q
Poaceae	031	*	Brachypodium distachyon	3q								
Poaceae	031	*	Briza maxima	7q	10q	8q	3q	23q, 8r	8q, 35r	12q, 6r	3q	6q
Poaceae	031	*	Bromus diandrus	5q, 1o	3q	2q	3q	12q, 5r	4q, 1r	9q, 2r	1q	5q
Poaceae	031	*	Cynosurus echinatus	1q, 1r								
Poaceae	031	*	Ehrharta brevifolia var. cuspidata	1q								
Poaceae	031	*	Ehrharta longiflora	10q, 3r	12q	6q	3q	19q,6r	7q, 5r	9q, 5r	1q	6q
Poaceae	031		Eriachne ovata		1q							
Poaceae	031	*	Hordeum leporinum	1q								
Poaceae	031	*	Lamarckia aurea	1q								
Poaceae	031	*	Lolium perenne	2q	1q				1q	1q		1r
Poaceae	031		Neurachne alopecuroidea	7q, 4r	16q, 55r	10q, 34r	2q, 1r	20q, 38r	10q, 33r	12q, 10r	3q, 2r	6q, 1r
Poaceae	031	*	Pentaschistis airoides	8q, 1r	3q	7q	3q	15q			3q	5q
Poaceae	031	*	Pentaschistis pallida		1q			3q	7q, 6r	7q, 6r		1q
Poaceae	031	*	Pentaschistis sp.	2q				1q	1q			
Poaceae	031	*	Pentaschistis sp. Moora (doubtful ID)		1q			2q		3q		
Poaceae	031	*	Schismus barbatus	1q 1o								
Poaceae	031	*	Vulpia myuros	11q, 3r	17q, 1r	8q	2q	5q	9q, 3r	11q, 7r	3q	5q
Cyperaceae	032		Gahnia drummondii									1r
Cyperaceae	032		Lepidosperma pubisquameum	1o		1r		1q	1r			
Cyperaceae	032		Lepidosperma aff. leptostachyum (Moora: ERG18-7)		5q	1q		4q	5q	1q		1q
Cyperaceae	032		Lepidosperma costale		4q, 1r			2q	1q, 2r			
Cyperaceae	032		Lepidosperma leptostachyum		4q, 14r	4r	2q	13q, 3r	2q, 1r		1q	4q
Cyperaceae	032		Lepidosperma sp.		1q	1q, 1r		1q	1r	2r	1q	

Cyperaceae	032		Lepidosperma sp. P1 small head (M.D. Tindale 166A)		2r							
Cyperaceae	032		Lepidosperma tenue	1q, 1r	8q, 10r	1q, 4r		5q, 35r	8r	3r	1r	2q, 1r	7r
Cyperaceae	032		Schoenus brevisetis		1q, 4r	1q							
Cyperaceae	032		Schoenus clandestinus	1o	4q, 13r	1q, 9r		3q, 7r	28r	5q, 8r	2q, 1r	1q, 1r	
Cyperaceae	032		Schoenus nanus		1r	1q							
Cyperaceae	032		Schoenus pleiostemoneus		1q							1q	
Restionaceae	039		Desmocladus flexuosus	8q, 2r, 1o	14q, 39r	7q, 15r	1q, 1r	5q, 10r	9q, 19r	11q, 24r	2q, 1r	4q, 1r	17r
Restionaceae	039		Lepidobolus chaetocephalus		4q, 8r	1q, 1r			4r	2r	1q		
Centrolepidaceae	040		Centrolepis drummondiana		2q	1q							
Centrolepidaceae	040		Centrolepis pilosa		1q		1q				1q		
Centrolepidaceae	040		Centrolepis sp.			1q							
Dasypogonaceae	054C		Lomandra (Moora twisty)	2q	1q			4q	1q	2q			
Dasypogonaceae	054C		Lomandra aff. micrantha subsp. micrantha	1q	3q			3q	1q		1q		
Dasypogonaceae	054C		Lomandra effusa		1q, 5r	1q			3q, 5r				1r
Dasypogonaceae	054C		Lomandra sp.		1q								1r
Xanthorrhoeaceae	054D		Xanthorrhoea drummondii	7q, 4r	16q, 39r	9q, 22r	2q, 1r	10q, 27r	8q, 20r	10q, 15r	3q	6q, 1r	1q
Phormiaceae	054E		Dianella revoluta var. divaricata	1o	6q, 2r	3q, 1r		2r	3q, 2r		2q	3q	
Phormiaceae	054E		Stypandra glauca	5q, 2r	12q, 39r	5q, 15r	3q	17q, 19r	3q, 5r	4q, 2r	2q, 1r	5q	
Anthericaceae	054F		Agrostocrinum scabrum	1q	1q				2q				
Anthericaceae	054F		Caesia (Moora hairy stem)		4q	1q		1q		5q		1q	
Anthericaceae	054F		Caesia alfordii		1q, 1r			5q	2q	1q			
Anthericaceae	054F		Chamaescilla corymbosa var. corymbosa		15q, 13r	9q, 10r	1q, 1r	22q, 15r	10q, 4r	11q, 4r	3q	6q	7r
Anthericaceae	054F		Dichopogon capillipes	7q, 1r	17q, 42r	7q, 16r	3q	22q, 28r	10q, 10r	9q, 2r	3q, 1r	6q	1q,22r
Anthericaceae	054F		Laxmannia omnifertilis		1q								
Anthericaceae	054F		Laxmannia ramosa subsp. ramosa	1q						2q			
Anthericaceae	054F		Sowerbaea laxiflora			1q		5q, 1r	5q				
Anthericaceae	054F		Thysanotus dichotomus	1o	1q			2q, 3r	1q, 1r				1o
Anthericaceae	054F		Thysanotus manglesianus	3q, 1r	18q, 5r	9q, 9r	3q	20q, 2r	8q, 1r	11q	3q	4q	
Anthericaceae	054F		Thysanotus multiflorus		1q					1q			
Anthericaceae	054F		Thysanotus patersonii					1q					
Anthericaceae	054F		Thysanotus sp.		1q			1q					
Anthericaceae	054F		Tricoryne arenicola		1q	1q, 3r					1q		

Anthericaceae	054F		Tricoryne elatior	2o		3q, 2r		3q, 2r	1q			
Colchicaceae	054J		Burchardia bairdiae					1q				
Colchicaceae	054J		Burchardia umbellata	2q	15q, 21r	9q, 8r	3q, 1r	18q, 16r	8q, 6r	7q, 1r	1q	6q	3r
Colchicaceae	054J		Wurmbea drummondii							2q			
Boryaceae	054L		Borya laciniata	3q, 1o	1q	1q							
Boryaceae	054L		Borya sphaerocephala	1r,	10q, 29r	5q, 15r	1r	7q, 19r	76q, 35r	7q, 1r	3q, 1r	1q	15r
Haemodoraceae	055		Conostylis androstemma		1q								
Haemodoraceae	055		Haemodorum paniculatum		2q	1q				1q	1q		
Haemodoraceae	055		Haemodorum simulans	1o	4q	2q				2q	1q	1q	1r
Hypoxidaceae	056A		Hypoxis aff. glabella		1q								
Hypoxidaceae	056A		Hypoxis glabella var. leptantha	1q	3q	1q			3q		1q		
Hypoxidaceae	056A		Hypoxis occidentalis var. occidentalis		1q	4q	1q	20q	6q	4q	3q	1q	
Hypoxidaceae	056A		Hypoxis sp.							1q			1q
Dioscoreaceae	059		Dioscorea hastifolia	9q, 4r	15q 19r	7q, 5r	3q	23q, 24r	7q, 4r	4q, 3r	2q	6q	1q, 8r
Iridaceae	060	*	Moraea setifolia	1q, 1o									
Iridaceae	060		Orthrosanthus laxus var. gramineus		1r,1q				4q, 2r			2q	
Iridaceae	060	*	Romulea rosea			1q	2q	7q		1q	3q	2q	
Orchidaceae	066		Caladenia denticulata				1q	9q		6q	2q	1q	
Orchidaceae	066		Caladenia flaccida subsp. flaccida		1q						1q		
Orchidaceae	066		Caladenia flava subsp. flava	3q	9q	9q	3q	17q	9q	9q	1q	4q	
Orchidaceae	066		Caladenia sp.			3r							
Orchidaceae	066		Caladenia vulgata	1q				1q	1q				
Orchidaceae	066		Cyanicula deformis		3q	9q	3q	17q	8q	10q	3q	1q	
Orchidaceae	066		Cyanicula gemmata			1q		1q		4q			
Orchidaceae	066		Cyrtostylis huegelii		1q		1q	1q					
Orchidaceae	066		Diuris aff. recurva		5q	6q		6q	5q	3q	1q	1q	
Orchidaceae	066		Elythranthera brunonis			1q				1q		2q	
Orchidaceae	066		Eriochilus dilatatus		1q		1q	2q			3q	1q	
Orchidaceae	066		Eriochilus helonomos		7q	4q		1q	4q				
Orchidaceae	066		Habenaria elongata					1q					
Orchidaceae	066		Leporella fimbriata		1q	1q			2q		1q		
Orchidaceae	066		Paracaleana carinata							1q			
Orchidaceae	066		Prasophyllum gracile					1q	1q				
Orchidaceae	066		Pterostylis aff. nana			2q		1q					

Orchidaceae	066		Pterostylis aff. rufa		1q				1q				
Orchidaceae	066		Pterostylis exserta (ms)							1q			
Orchidaceae	066		Pterostylis recurva		6q	2q	1q			1q		1q	
Orchidaceae	066		Pterostylis sanguinea		12q		2q	9q	8q	4q	2q	1q	
Orchidaceae	066		Pterostylis sargentii						1q				
Orchidaceae	066		Pterostylis scabra		3q		1q	1q					
Orchidaceae	066		Pterostylis setulosa		5q	8q	3q	7q	1q	2q	2q		
Orchidaceae	066		Pterostylis sp.		1q, 2r	1q		1q		2q			
Orchidaceae	066		Pterostylis spathulata	1o	1q								
Orchidaceae	066		Pterostylis vittata			1q						2q	
ANGIOSPERMS Dicotyledons													
Casuarinaceae	070		Allocasuarina campestris	3q, 6r	15q, 62r	9q, 33r	2q, 1r	17q, 40r	1q, 22r	8q, 18r	3q, 1r	4q, 1r	40r
Casuarinaceae	070		Allocasuarina huegeliana	6q, 6r	10q, 51r	7q, 29r	3q, 1r	19q, 48r	9q, 26r	8q, 25r	2q, 1r	3q, 1r	59r
Casuarinaceae	070		Allocasuarina humilis	2q	1q, 5r								
Casuarinaceae	070		Allocasuarina microstachya						1r				
Casuarinaceae	070		Casuarina obesa	3r									3r
Urticaceae	088		Parietaria debilis		2q								
Proteaceae	090		Banksia prionotes										2r
Proteaceae	090		Banksia sphaerocarpa var. sphaerocarpa	1r, 1o									1r
Proteaceae	090		Dryandra fraseri	1o	1q, 5r				1q, 3r	1q			1o
Proteaceae	090		Dryandra nivea ssp. nivea										1r
Proteaceae	090		Dryandra sessilis var. sessilis	2q, 1r	5q, 17r	3q, 14r	1r	4q, 2r	6q, 9r	6q, 19r	1q	5q, 1r	33r
Proteaceae	090		Grevillea amplexans subsp. semivestita										2r
Proteaceae	090		Grevillea biternata					1q					1o
Proteaceae	090		Hakea incrassata		4q, 6r								
Proteaceae	090		Hakea lissocarpha		5r	1r		4r	3r				1r
Proteaceae	090		Hakea preissii	1r									
Proteaceae	090		Hakea recurva subsp. recurva	1o		1r			7r				1r, 1o
Proteaceae	090		Isopogon divergens		7q, 7r	1q			2q, 3r	1r			1o
Proteaceae	090		Petrophile brevifolia										1r
Santalaceae	092		Leptomeria preissiana		1r								
Santalaceae	092		Santalum acuminatum	4o	1q, 2r	1r							1o

Santalaceae	092		Santalum spicatum	1o				1q					
Loranthaceae	097		Amyema miraculosa subsp. miraculosa	1r, 1o				1q					
Loranthaceae	097		Amyema preissii	2q, 1r, 1o				2q, 1o					1o
Loranthaceae	097		Lysiana casuarinae					1q					
Loranthaceae	097		Nuytsia floribunda	2q, 1r	5r	2q			2r	1q, 1r		1q	6r
Polygonaceae	103	*	Emex australis	1q									
Polygonaceae	103		Muehlenbeckia adpressa				1q	1q		1q			
Chenopodiaceae	105		Atriplex suberecta	1q, 1r					1r				
Chenopodiaceae	105		Dysphania melanocarpa forma melanocarpa	1q									
Chenopodiaceae	105		Enchylaena tomentosa var. tomentosa	2q	1r								
Chenopodiaceae	105		Maireana brevifolia	1r					1r				
Chenopodiaceae	105		Maireana enchylaenoides						2r				
Chenopodiaceae	105		Maireana marginata	1q	2q				2r				
Chenopodiaceae	105		Rhagodia drummondii		3q, 1r								
Chenopodiaceae	105		Rhagodia preissii subsp. preissii		2q, 1r	1q							
Amaranthaceae	106		Ptilotus declinatus	1o	2r								
Amaranthaceae	106		Ptilotus divaricatus var. divaricatus		2q, 1r	2r			2r				1o
Amaranthaceae	106		Ptilotus drummondii var. drummondii	1q, 2o	2r	1r			1r				
Amaranthaceae	106		Ptilotus gaudichaudii var. parviflorus	1q				1q					
Amaranthaceae	106		Ptilotus holosericeus			1q							
Amaranthaceae	106		Ptilotus manglesii		1r								
Amaranthaceae	106		Ptilotus polystachyus var. polystachyus	1q, 1r	1r			1q, 2r		1q		1q	
Amaranthaceae	106		Ptilotus spathulatus forma spathulatus	1q, 1r		1q			1q				
Nyctaginaceae	107		Boerhavia coccinea	1o									
Gyrostemonaceae	108		Gyrostemon ramulosus										1o
Portulacaceae	111		Calandrinia calyptrata	5q, 1o	4q			5q	5q	3q			
Portulacaceae	111		Calandrinia eremaea		1q	1q				1q			
Portulacaceae	111		Calandrinia remota	1q		1q							
Portulacaceae	111		Calandrinia sp. (inadequate material or not collected)		5q, 1r	4q	1q	8q	2q, 3r		1q	1q	1r

Portulacaceae	111		Calandrinia sp. Blackberry (D.M. Porter 171)							1q			
Caryophyllaceae	113	*	Petrorhagia dubia	3q, 1r,		1q		10q	1q	8q	1q	1q	
Caryophyllaceae	113	*	Petrorhagia prolifera	6q									
Caryophyllaceae	113	*	Polycarpon tetraphyllum	1q									
Caryophyllaceae	113	*	Silene gallica var. gallica	5q		3q		5q	4q	9q		1q	1q
Caryophyllaceae	113	*	Spergula arvensis									1q	
Lauraceae	131		Cassytha pomiformis	1o	3q	1q			1q, 1r				
Brassicaceae	138	*	Brassica barrelieri subsp. oxyrrhina					1q		1q			
Brassicaceae	138		Lepidium rotundum		1r								
Droseraceae	143		Drosera aff. macrantha	4q	13q	5q	2q	3q	6q	6q	2q	6q	
Droseraceae	143		Drosera erythrorhiza subsp. erythrorhiza	1q	7q	4q		+	6q	3q	2q		
Droseraceae	143		Drosera macrantha subsp. macrantha		10q	4q	1q	20q	9q	7q	2q	2q	1q
Droseraceae	143		Drosera macrophylla subsp. macrophylla		1q			1q		3q			
Droseraceae	143		Drosera pallida		1q	5q	1q	3q					
Crassulaceae	149		Crassula colorata	1q	1r					2r			6r
Crassulaceae	149		Crassula colorata var. acuminata	3q, 1r									
Crassulaceae	149		Crassula colorata var. colorata	2q	7q, 4r	4q	3q	9q	5q, 3r	11q		1q	2r
Crassulaceae	149		Crassula decumbens var. decumbens		1q					1q			
Crassulaceae	149		Crassula exserta	3q	3q	3q	1q	7q	2q	5q	2q	2q	
Pittosporaceae	152		Sollya heterophylla		2r				1q, 1r				1o
Surianaceae	160		Stylobasium australe		3r								1o
Mimosaceae	163		Acacia acuminata subsp. acuminata	6q, 5r, 3o	5q, 33r	3q, 31r		20q, 40r	7q, 22r	10q, 20r	1q	2q	72r
Mimosaceae	163		Acacia aestivalis			1q							
Mimosaceae	163		Acacia aristulata	1o	9q, 9r	4q	2q	6q, 3r	4q, 2r	5q, 3r	1q	5q	
Mimosaceae	163		Acacia congesta subsp. congesta	1o	5q, 10r	1q, 1r	3q, 1r	5q, 8r		1q	1q	2q	1r
Mimosaceae	163		Acacia ericksoniae						1r				
Mimosaceae	163		Acacia erinacea	1r,	2q, 2r	1q, 1r			1r				2o
Mimosaceae	163		Acacia hemiteles							2q			1o
Mimosaceae	163		Acacia lasiocarpa var. sedifolia		1q	1q, 1r	1q, 1r	2q, 2r	1q, 1r		1q	2q	1r
Mimosaceae	163		Acacia ligustrina	1q, 1r	1q								
Mimosaceae	163		Acacia microbotrya	1o	1q, 2r			1o	1r				1r
Mimosaceae	163		Acacia pulchella		1q, 1r								

Mimosaceae	163		Acacia pulchella var. glaberrima									1r
Mimosaceae	163		Acacia pulchella var. goadbyi		1q, 1r							
Mimosaceae	163		Acacia restiacea	1o	3r					2q, 3r	1q		1r
Mimosaceae	163		Acacia saligna		1r							
Mimosaceae	163		Acacia scirpifolia		1r							1o
Mimosaceae	163		Acacia stenoptera				2q	1q				5q	
Papilionaceae	165		Bossiaea sp. Cairn Hill (M Henson CH2-28)		6q, 13r	4q, 2r		2q				6q	1r
Papilionaceae	165		Cristonia biloba							3q			
Papilionaceae	165		Daviesia benthamii subsp. benthamii		1q								
Papilionaceae	165		Daviesia dielsii	1o	7q, 6r	1q	1r	1q	3r	2q, 1r	1q		5r
Papilionaceae	165		Daviesia hakeoides subsp. subnuda		1r					1q			1o
Papilionaceae	165		Gastrolobium acutum										1r
Papilionaceae	165		Gastrolobium obovatum						4r				
Papilionaceae	165		Gompholobium glutinosum MS		2r								1o
Papilionaceae	165		Isotropis drummondii										1o
Papilionaceae	165		Jacksonia floribunda										1r
Papilionaceae	165		Jacksonia foliosa										1r
Papilionaceae	165		Kennedia prostrata	1q			1q	7q	1q				2r
Papilionaceae	165	*	Lupinus angustifolius			3q		2q					
Papilionaceae	165		Nemcia acuta		6q, 1r	1q	1q		3q	2q, 1r	1q		
Papilionaceae	165		Templetonia smithiana						1r				
Papilionaceae	165	*	Trifolium arvense var. arvense	2q		2q	2q	3q		1q	3q	3q	
Papilionaceae	165	*	Trifolium campestre var. campestre	1q									
Papilionaceae	165	*	Trifolium hirtum	1q		1q		1q	1q	8q			
Papilionaceae	165	*	Trifolium repens var. repens				1q	6q				1q	
Papilionaceae	165	*	Trifolium subterraneum			2q		11q		2q		1q	1q
Geraniaceae	167	*	Erodium botrys	4q, 1r				5q	3q	5q			3r
Geraniaceae	167		Erodium cygnorum		4q	2q	1q	4q	1q	1q		1q	1q
Geraniaceae	167		Pelargonium littorale subsp. littorale					1o					
Oxalidaceae	168	*	Oxalis corniculata		1q	1q			1q				
Linaceae	170	*	Linum trigynum	1q				4q	1q				1r
Rutaceae	175		Boronia coerulescens subsp. spinescens			2r		2q					1o
Rutaceae	175		Boronia ramosa subsp. anethifolia		1q	3q						3q	

Polygalaceae	183		Comesperma integerrimum	1q, 1o	4q, 1q	1q, 1r	2q	8q	2q	3q	3q	6q	1r
Polygalaceae	183		Comesperma virgatum						1q				
Polygalaceae	183		Comesperma volubile		2q					2q			
Euphorbiaceae	185		Beyeria lechenaultii										1o
Euphorbiaceae	185		Euphorbia drummondii subsp. drummondii	1q						1q			
Euphorbiaceae	185		Phyllanthus calycinus					4r					1o
Euphorbiaceae	185		Poranthera microphylla		1q			2q		1q			
Euphorbiaceae	185		Ricinocarpos muricatus	1q, 5r, 1o									
Stackhousiaceae	202		Stackhousia monogyna		2q				3q, 1r	3q			
Stackhousiaceae	202		Tripterococcus brunonis		5q	4q		1q	3q	1q		2q	
Sapindaceae	207		Diplopeltis huegelii subsp. lehmannii	4q, 1r, 1o						4q, 1r			
Sapindaceae	207		Dodonaea inaequifolia	1o	4q, 19r								1o
Sapindaceae	207		Dodonaea pinifolia		1q,7r	1r			2r				
Rhamnaceae	215		Cryptandra glabriflora		3q, 1r			1q			1q	2q	
Rhamnaceae	215		Stenanthemum tridentatum						1q, 5r				
Rhamnaceae	215		Trymalium daphnifolium		2q	1q, 1r							
Rhamnaceae	215		Trymalium ledifolium var. rosmarinifolium	1q, 1r, 1o	3q, 6r			4q, 4r	3q, 6r	2r			
Malvaceae	221		Alyogyne hakeifolia	1o		1o							1o
Malvaceae	221		Alyogyne huegelii var. grossulariifolia		1r								
Sterculiaceae	223		Guichenotia micrantha			1q		1o					
Sterculiaceae	223		Guichenotia sarotes					1q					
Sterculiaceae	223		Guichenotia tuberculata										1o
Sterculiaceae	223		Thomasia grandiflora		2q, 3r		1q	1r				2q	
Dilleniaceae	226		Hibbertia acerosa		1q								
Dilleniaceae	226		Hibbertia subvaginata	6q, 6r	14q, 33r	8q, 13r	3q, 1r	19q, 6r	7q, 8r	8q, 18r	2q, 1r	6q	24r
Thymelaeaceae	263		Pimelea imbricata var. piligera		1q, 1r	3q							
Myrtaceae	273		Baeckea crispiflora (smaller leaf form)		2r								1r
Myrtaceae	273		Baeckea crispiflora var. tenuior		3r			2r	2r				2r
Myrtaceae	273		Baeckea preissiana										1r
Myrtaceae	273		Baeckea sp. Moora (R. Bone 1993/1)		8q, 28r	5q, 12r							
Myrtaceae	273		Calothamnus aff. quadrifidus Moora-	1o	8q, 23r	1q		1r	4q, 7r	3q, 4r			3r

			Watheroo									
Myrtaceae	273		Calothamnus sanguineus	1o	3q, 6r	2q			2q, 2r	1q		
Myrtaceae	273		Calytrix depressa		2r	1q, 2r		1q	3r			
Myrtaceae	273		Calytrix leschenaultii	2q, 2r,	14q, 34r	9q, 22r	1q, 1r	7q, 22r	9q, 23r	10q, 15r	2q, 1r	4q	17r
Myrtaceae	273		Calytrix strigosa										1r
Myrtaceae	273		Eremaea beaufortioides var. lachnosanthe										1r
Myrtaceae	273		Eremaea sp. Cairn Hill (B. Morgan BMor 351)										1o
Myrtaceae	273		Eucalyptus camaldulensis (forma)										1r
Myrtaceae	273		Eucalyptus camaldulensis var. obtusa		1o								
Myrtaceae	273		Eucalyptus eudesmioides		3q, 16r								3r
Myrtaceae	273		Eucalyptus horistes		1r	1r,2o							1r
Myrtaceae	273		Eucalyptus loxophleba subsp. loxophleba	1q, 2r,	6r	1q, 12r	1q	7q, 16r	1q, 8r	1r	1q		21r
Myrtaceae	273		Eucalyptus obtusiflora		1q, 1r	1r							1o
Myrtaceae	273		Eucalyptus pruiniramis										1r, 4o
Myrtaceae	273		Eucalyptus salmonophloia	1o	1r				3r				1r
Myrtaceae	273		Eucalyptus wandoo subsp. wandoo	1q, 1r	5q, 12r			2q, 3r	2q, 3r				3r
Myrtaceae	273		Hypocalymma angustifolium						4r				
Myrtaceae	273		Kunzea praestans	4q, 3r	13q, 42r	8q, 16r	1r	7q, 15r	5q, 10r	11q, 21r	1q, 1r	6q	25r
Myrtaceae	273		Leptospermum aff. erubescens (Moora Chert; B. Morgan 133)						1o				1o
Myrtaceae	273		Leptospermum erubescens										3r. 1o
Myrtaceae	273		Melaleuca calyptroides	2q, 3r,	10q, 31r	5q			5q, 7r	9q, 8r	1q		5r
Myrtaceae	273		Melaleuca concreta	1q	1r	1q, 1r			1r				1o
Myrtaceae	273		Melaleuca coronicarpa						1r				1r
Myrtaceae	273		Melaleuca lateriflora subsp. lateriflora			1o							
Myrtaceae	273		Melaleuca radula	1o	6q, 16r	1q, 7r		1r	1q, 11r				1r
Myrtaceae	273		Melaleuca sclerophylla						3r				
Myrtaceae	273		Melaleuca sp.							1q			
Myrtaceae	273		Regelia megacephala	2q, 5r	9q, 26r	5q, 5r	3q	2q, 1r	3q, 1r	1q	1q	4q	
Myrtaceae	273		Verticordia acerosa var. preissii		1q								
Myrtaceae	273		Verticordia densiflora var. densiflora		1r				1r				1o

Myrtaceae	273		Verticordia huegelii var. stylosa		1r							
Myrtaceae	273		Verticordia pennigera									1o
Haloragaceae	276		Glischrocaryon flavescens		1r				1q			1o
Haloragaceae	276		Gonocarpus nodulosus			1q		1q		1q		
Apiaceae	281		Apium annuum		3q		2q	2q		1q		
Apiaceae	281		Daucus glochidiatus	3q	2q			7q	3q			1q
Apiaceae	281		Homalosciadium homalocarpum							1q		
Apiaceae	281		Platysace cirrosa		10q	6q	1q	14q	2q	2q	1q	1q
Apiaceae	281		Trachymene cyanopetala	5q	5q, 14r	7q, 5r		10q, 1r	5q, 1r	9q	2q	2q
Apiaceae	281		Trachymene ornata	6q	14q, 6r	6q, 2r	3q	19q, 1r		7q, 1r	3q	4q	1q
Apiaceae	281		Trachymene pilosa		12q, 21r	1q, 7r		7q, 4r	7q, 6r	5q, 1r		3q
Apiaceae	281		Trachymene sp.		2q			1q	1q			
Apiaceae	281		Xanthosia fruticulosa		14q, 33r	7q, 7r						
Epacridaceae	288		Astroloma serratifolium		4q, 8r	1r			3q, 2r	2q, 1r	1q	
Epacridaceae	288		Leucopogon sp. Yanchep (M. Hislop 19,861)						1q			1o
Primulaceae	293	*	Anagallis arvensis	1q	5q	4q	3q	4q	5q		1q	3q
Loganiaceae	302		Phyllangium sulcatum		2q	3q		13q	2q	4q		
Gentianaceae	303	*	Centaurium tenuiflorum									1q
Asclepiadaceae	305		Rhyncharrhena linearis						1q			
Convolvulaceae	307		Convolvulus angustissimus subsp. angustissimus	1q								
Poaceae	31	*	Ehrharta calycina									2r
Chloanthaceae	311A		Pityrodia dilatata	2q, 1r	6q, 4r	4q, 1r	1q, 1r	9q, 7r	3r	5q, 2r	1q	5q
Lamiaceae	313		Hemiandra incana		1q							1o
Lamiaceae	313		Hemigenia sp. (needs further study)	1o								
Solanaceae	315		Lycium australe			1o						
Solanaceae	315	*	Solanum nigrum	1q					1q			
Solanaceae	315		Solanum oldfieldii	1o				1q, 2r				
Scrophulariaceae	316	*	Dischisma capitatum					1o				
Scrophulariaceae	316	*	Parentucellia latifolia	2q	3q	4q	1q	17q	4q	6q	3q	4q	1r
Scrophulariaceae	316	*	Zaluzianskya divaricata					1q				
Orobanchaceae	320	*	Orobanche minor									1q
Myoporaceae	326		Eremophila lehmanniana		1q							
Plantaginaceae	329		Plantago debilis		2q	1q					1q	

Rubiaceae	331	*	Galium murale					2q	1q	1q			1q
Rubiaceae	331		Opercularia vaginata	1q	5q, 7r	6q, 1r		4q, 1r	5q, 14r	6q, 2r		2q	7r
Campanulaceae	339	*	Wahlenbergia capensis		1q			1q		1q			
Campanulaceae	339		Wahlenbergia gracilenta	1r	6q		1q	1q		1q		1q	
Lobeliaceae	340		Isotoma hypocrateriformis		1q								
Lobeliaceae	340		Lobelia sp. small flowers (K.F. Kenneally 7705)		3q			1q	3q				
Goodeniaceae	341		Brunonia australis					4q					1r
Goodeniaceae	341		Dampiera lavandulacea		2q, 3r	1q			1q, 3r				
Goodeniaceae	341		Goodenia arthrotricha		1q	1q		1q	3q, 2r				1r
Goodeniaceae	341		Goodenia berardiana	1q	4q	5q, 1r		13q, 3r	3q	2q	1q	1q	
Goodeniaceae	341		Goodenia glareicola		1r								
Goodeniaceae	341		Goodenia hassallii		1q, 1r	1q, 3r			1q, 3r				
Goodeniaceae	341		Goodenia sp.						2q		1q		
Goodeniaceae	341		Lechenaultia biloba		2q				1q				
Goodeniaceae	341		Scaevola anchusifolia			1q							
Goodeniaceae	341		Scaevola glandulifera		1q			1r					
Goodeniaceae	341		Scaevola phlebopetala		3q	4q				1q		1q	
Goodeniaceae	341		Velleia cycnopotamica		1r			1q					
Stylidiaceae	343		Levenhookia stipitata		2q	1q				1q			
Stylidiaceae	343		Stylidium calcaratum		1q	1q					1q		
Stylidiaceae	343		Stylidium caricifolium						1q	1q		3q	
Stylidiaceae	343		Stylidium cordifolium		1q, 1r				1q	2q			
Stylidiaceae	343		Stylidium glabrifolium				1q	2q					
Stylidiaceae	343		Stylidium miniatum		2q				1q				
Stylidiaceae	343		Stylidium repens	1r					3q	6q			
Stylidiaceae	343		Stylidium septentrionale	2q	13q, 28r	9q, 7r		1q, 2r	6r	9q, 1r		1q	
Asteraceae	345		Actinobole uliginosum	1o									
Asteraceae	345		Amblysperma sp. Moora (GH7-57)						1q				
Asteraceae	345	*	Arctotheca calendula	6q	6q	8q	1q	15q	3q	11q	3q+	1q	
Asteraceae	345		Blennospora drummondii		7q, 11r	9q, 2r	2q	8q, 2r	2q, 4r	1q. 1r		1q	
Asteraceae	345		Brachyscome perpusilla	1q		1q							
Asteraceae	345		Calotis hispidula			1q		1q					
Asteraceae	345	*	Cotula turbinata	1q									

Asteraceae	345		Erymophyllum tenellum			1r						
Asteraceae	345		Gilberta tenuifolia	1q, 1o	2q	1q, 5r		9q, 20r	4q, 3r	1q, 1r	3q	13r
Asteraceae	345	*	Hedypnois rhagadioloides					3q	1q			
Asteraceae	345		Hyalosperma cotula	1o		2q		2q	9q, 2r	1q	2q	1q	4r
Asteraceae	345		Hyalosperma glutinosum subsp. glutinosum			1r		1q		1q			2r
Asteraceae	345	*	Hypochaeris glabra	10q, 1r	17q	9q	3q	22q, 2r	7q, 4r	12q, 13r	3q	4q	1q,10r
Asteraceae	345	*	Hypochaeris radicata		3q								
Asteraceae	345		Lagenophora huegelii		1q				3q				
Asteraceae	345		Lawrencella rosea	1r	8q, 19r	8q, 10r		9q, 5r	1q, 4r			1q	1r
Asteraceae	345		Millotia aff. tenuifolia (Moora: CH20-11)		1q								
Asteraceae	345		Millotia myosotidifolia	2q					1q	2q			
Asteraceae	345		Millotia tenuifolia var. tenuifolia	1q, 1r	4q, 5r		1q	4q	1q	2q, 1r		1q	2r
Asteraceae	345		Olearia dampieri subsp. eremicola	1o				9q, 9r	6q, 11r	1q, 1r			4r
Asteraceae	345		Podolepis canescens	1q, 1r, 2o	3q, 5r	2q		2q	5q, 20r	1q			
Asteraceae	345		Podolepis gracilis									1q	
Asteraceae	345		Podolepis lessonii	2q, 1r	5q, 9r	8q, 11r		19q, 31r	8q, 15r	10q, 14r	3q, 2r	6q	1q
Asteraceae	345		Podotheca aff. gnaphalioides (Moora WDM1-65)								3q		
Asteraceae	345		Podotheca angustifolia		3q, 6r	6q, 3r		11q, 1r	7q, 5r	4q, 3r	3q	1q	
Asteraceae	345		Podotheca gnaphalioides	1q						2q			
Asteraceae	345		Pterochaeta paniculata		1q								
Asteraceae	345		Quinetia urvillei			2q		4q					
Asteraceae	345		Rhodanthe laevis					3q		4q	1q		
Asteraceae	345		Rhodanthe manglesii			1q				1q			
Asteraceae	345		Rhodanthe polycephala	2q	5q, 3r	1q, 3r		1r	1r				
Asteraceae	345		Rhodanthe pygmaea			1q							
Asteraceae	345		Schoenia cassiniana	4q	3q			3q	3q	1q		1q	
Asteraceae	345		Senecio glossanthus	1q									
Asteraceae	345		Siloxerus humifusus					1q					
Asteraceae	345	*	Sonchus asper	1q									
Asteraceae	345	*	Sonchus oleraceus		1		1q	2q	1q	1q, 1r	2q		
Asteraceae	345	*	Tripteris clandestina	1q	5q	2q	2q	7q	2q	8q	1q	1q	1q
Asteraceae	345	*	Urospermum picroides	8q, 1r	2q		2q	5q	4q	3q		2q	1q

Asteraceae	345	*	Ursinia anthemoides	10q, 6r	18q, 1r	9q	3q	23q, 2r	10q, 4r	12q, 2r	3q	6q	1q
Asteraceae	345		Waitzia acuminata						1q				
Asteraceae	345		Waitzia nitida	1q	1q, 7r	1q, 4r		13q, 8r	4q, 9r	5q			

APPENDIX 6: Quadrat site descriptions and species lists for the study area

Notes: All coordinates are given in the WGS 84 datum. The item Type: "QUADRAT 10x10 m, 30x 30" means a ten by ten metre quadrat nested within a thirty by thirty metre quadrat.

CAIRN HILL RESERVE

Moora **Site** CAH001
Described by BRM **Date** 22/10/00 **Type:** QUADRAT 10x10 m, 30x 30
Location: Cairn Hill Westrail Reserve, approximately 11 km north of Moora on the Midlands Road. The quadrat is on the south side of the track to the radio tower, approximately 250 m east of the Midlands Road.
MGA Zone 50 407129 **m E** 6620970 **m N** -30.539955 **S lat** 116.031824 **E long**
Habitat: Mid-slope, North facing.
Soil: Grey loamy sand amongst outcropping chert.
Rock Type: Chert outcrop, 80-90% surface cover.
Vegetation: Regelia megacephala open to closed scrub over Kunzea praestans, Melaleuca calyptroides, Calothamnus aff. quadrifidus Moora-Watheroo, Dodonaea pinifolia scattered shrubs over Stypandra glauca very open herbland.
Vegetation condition: Excellent.
Fire age: < 5 years
Notes: 30x30m area restricted on east side (vegetation changes to a n Allocasuarina campestris community)
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	30 cm	CH1-3	
Acacia congesta subsp. congesta	+	<1 %	1.8 m	CH1-7	=EO1-1
Allocasuarina campestris	+	<1 %	1 m	CH1-11	
Amphipogon caricinus	+	<1 %		=WO1-4	
Baeckea sp. Moora (R. Bone 1993/1)	+	<1 %		CH1-10	
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	30 cm		
Burchardia umbellata	+	<1 %	15cm	CH1-23	Revisit ?Thysanotus
Calothamnus aff. quadrifidus Moora-Watheroo	1-2	1-5%	1 m	CH1-4	No flowers
Calytrix leschenaultii	+	<1 %	1 m	CH1-6	
Cheilanthes adiantoides	+	<1 %	10 cm		
Desmocladus flexuosus	+	<1 %	40 cm	CH1-8	
Dichopogon capillipes	+	<1 %	40 cm dead base		Lilly, purple flower,
Dioscorea hastifolia	+	<1 %		=EO1-11	
Dodonaea pinifolia	2	1-5%	1.2m	CH1-2&18	Revisit
Drosera aff. macrantha	+	<1 %	20, 40 cm	CH1-21,22	=WO1-23, Climbing & #Revisit, Drosera #1&#2
Hibbertia subvaginata	+	<1 %	90cm		Revisit
Hypochaeris radicata	+	<1 %	2cm	CH1-19	Revisit
Kunzea praestans	2	1-5%	1 m	CH1-1	
Melaleuca calyptroides	3	1-5%	1.3m		Revisit
Pterostylis recurva	+	<1 %	15cm	CH1-20	Revisit
Regelia megacephala	4	1-5%	2-3 m		
Stypandra glauca	3-4	1-5%	60 cm	=EO1-13	
Tripterococcus brunonis	+	<1 %		CH1-9	
Ursinia anthemoides	+	<1 %			
Xanthorrhoea drummondii	1	<1 %	1 m		2 only
Xanthosia fruticulosa				CH1-5	
Borya sphaerocephala	+	<1 %		CH1-16	
Lawrencella rosea	+	<1 %		CH1-14	Daisy
Pityrodia dilatata	+	<1 %		CH1-13	
Scaevola phlebopetala	+	<1 %		CH1-15	
Stackhousia monogyna	+	<1 %		CH1-12	
Thysanotus manglesianus	+	<1 %		CH1-17	

Moora **Site** CAH002
Described by MJH **Date** 22/10/00 **Type:** QUADRAT 10x10 m, 30x 30
Location: Cairn Hill Westrail Reserve, approximately 11 km north of Moora on the Midlands Road. The plot is on the slope to the N side of the track from the gravel pits to the radio tower, approx. 500 m east of the Midlands Road.
MGA Zone 50 407370 **m E** 6621123 **m N** -30.538594 **S lat** 116.03435 **E long**
Habitat: SW-facing moderate mid- slope.
Soil: Dark grey silty loam amongst outcropping chert. Good litter layer.
Rock Type: Chert outcrop, 60% cover.
Vegetation: Eucalyptus eudesmioides subsp. eudesmioides low open woodland to low woodland over Regelia megacephala, Kunzea praestans open scrub over Melaleuca calyptroides open shrubland over Calytrix leschenaultii, Baeckea sp. Moora (R. Bone 1993/1), Hibbertia subvaginata, Bossiaea sp. Cairn Hill (M Henson CH2-28) low open shrubland over Desmocladus flexuosus very open sedgeland.
Vegetation condition: Excellent.
Notes: First coord is for NE peg; 2nd coordinate is for SW peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	30 cm	CH2-30	
Allocasuarina humilis	+	<1 %	1.2 m	CH2-43	1 of
Austrostipa variabilis	+	<1 %	70 cm		
Baeckea sp. Moora (R. Bone 1993/1)	2-3	1-5%	30-50 cm	CH2-18	
Boronia ramosa subsp. anethifolia	+	<1 %	30 cm	CH2-2	
Briza maxima	+	<1 %	10-15 cm		
Burchardia umbellata	+	<1 %	15 cm		
Caladenia flava subsp. flava	+	<1 %	15 cm	CH2-11a	
Calytrix leschenaultii	1-2	1-5%	60 cm	CH2-12	
Chamaescilla corymbosa var. corymbosa				CH2-11,40	Also 30x30.
Cheilanthes adiantoides	+	<1 %			
Desmocladus flexuosus	1-2	1-5%	15-20 cm	CH2-3	
Dichopogon capillipes	+	<1 %	20 cm		
Dioscorea hastifolia	1	<1 %	1m		
Drosera aff. macrantha	+	<1 %	0.2-1.5 m	CH2-13a&	Tall one (2x2-13)
Drosera macrantha subsp. macrantha	+	<1 %	45 cm	CH2-5	
Eucalyptus eudesmioides subsp. eudesmioides	20-30	10-25%	6 m	CH2-16	Mallee
Hibbertia subvaginata	1	<1 %	90cm		
Isopogon divergens	+	<1 %	1.6m		Revisit.
Kunzea praestans	10	5-10%	1-2.5 m		
Lawrencella rosea	+	<1 %	5 cm	CH2-6,2-1	White daisy
Melaleuca calyptroides	1-2	1-5%	1.75 m	CH2-10	
Nemcia acuta	+	<1 %	10cm		Revisit. Elliptic leaves,
Neurachne alopecuroidea	+	<1 %	10 cm	CH2-4	
Pentaschistis airoides	+	<1 %	5 cm	CH2-8	Grass
Pterostylis recurva	+	<1 %	2cm	CH2-36	Revisit. Pterostylis #2
Pterostylis sanguinea	+	<1 %	12cm	CH2-35,38	Revisit.
Regelia megacephala	30	25-33.3%	2-3 m		
Stylidium septentrionale	+	<1 %	5 cm	CH2-19	
Thysanotus manglesianus	+	<1 %	2 m	CH2-9	
Trachymene ornata	+	<1 %	5 cm	CH2-7	
Ursinia anthemoides	+	<1 %	10 cm		
Xanthorrhoea drummondii	2-3%	1-5%	2-3 m		
Xanthosia fruticulosa	+	<1 %	20-30 cm	CH2-1	
Agrostocrinum scabrum	+	<1 %	30cm	CH2-44	Lilly (glaucous, tussock)
Allocasuarina huegeliana	+	<1 %	3 m		
Amphipogon caricinus	+	<1 %	35cm	CH2-39	Revisit.
Austrodanthonia setacea	+	<1 %	20 cm		Grass-
Austrostipa elegantissima	+	<1 %	45 cm	CH2-26	
Blennospora drummondii	+	<1 %		CH2-24	Daisy
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	80cm	CH2-28	
Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %	50 cm	CH2-20	
Centrolepis drummondiana	+	<1 %		CH2-22	
Comesperma integerrimum	+	<1 %	2m, 30 cm	CH2-21,42	
Cryptandra glabriflora	+	<1 %		=CH9-46	Rhamnaceae
Dianella revoluta var. divaricata	+	<1 %	80 cm	CH2-13b	(2x2-13)
Hypochaeris glabra	+	<1 %	2cm		Revisit.
Lepidosperma tenue	+	<1 %	40cm	CH2-27	

Levenhookia stipitata	+	<1 %		CH2-23	
Pityrodia dilatata	+	<1 %			
Schoenus pleiostemoneus	+	<1 %	10cm	CH2-41	Revisit.
Stypandra glauca	+	<1 %	60 cm	CH2-14	Blue lilly
Trachymene pilosa	+	<1 %		CH2-15,31	Specimen poor.
Vulpia myuros var. hirsuta	+	<1 %		CH2-25	Grass

Moora Site CAH003

Described by MET **Date:** 22/10/00 **Type:** QUADRAT 10x10 m, 30x 30

Location: Cairn Hill Westrail Reserve, approximately 11 km north of Moora on the Midlands Road. The plot is on the E side of track to the radio tower towards the top of the hill, approximately 700 m along the track from the Midlands Road.

MGA Zone 50 407637 **m E** 6621152 **m N** -30.538353 **S lat** 116.037135 **E long**

Habitat: Gentle upper slope facing northwest.

Soil: Whitish grey, gravelly siliceous silty fine sand. Litter under Allocasuarina campestris.

Vegetation: Allocasuarina huegeliana scattered low trees over Dryandra sessilis var. sessilis, Xanthorrhoea drummondii scattered tall shrubs over Allocasuarina campestris shrubland to open heath over Melaleuca calyptroides open shrubland over Desmocladus flexuosa, Borya sphaerocephala, Stylidium septentrionale, Neurachne alopecuroidea open herb/grass/sedgeland.

Vegetation condition: Excellent. Weed invasion minimal.

Fire Age: >10 (>15?) years since burnt.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	20-25%	10-25%	2-2.5m		
Allocasuarina huegeliana	2	1-5%	6 m		
Amphipogon caricinus	+	<1 %	10cm	CH3-12,50	
Austrostipa sp 2 hairy sheath	+	<1 %	50 cm	CH3-20	
Austrostipa tenuifolia	+	<1 %	15 cm	CH3-8	
Baeckea sp. Moora (R. Bone 1993/1)	+	<1 %	50 cm	CH3-15	
Blennospora drummondii	+	<1 %	4-5 cm	CH3-11	
Borya sphaerocephala	+	<1 %	4 cm	CH3-5	
Briza maxima	+	<1 %	20cm		
Burchardia umbellata	+	<1 %	40 cm		
Caladenia flaccida subsp. flaccida	+	<1 %			
Calytrix leschenaultii	+	<1 %	65 cm	CH3-14	
Centrolepis pilosa	+	<1 %	1.5 cm	CH3-21	
Chamaescilla corymbosa var. corymbosa	+	<1 %		CH3-53	
Comesperma integerrimum	+	<1 %	25 cm	CH3-3	
Desmocladus flexuosus	1-2%	1-5%	20cm		
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	2cm	CH3-55	
Drosera macrantha subsp. macrantha	+	<1 %	50 cm	CH3-4,52	
Dryandra sessilis var. sessilis	+	<1 %	2.6(4) m		
Goodenia berardiana	+	<1 %	7-10 cm	CH3-13	
Haemodorum simulans	+	<1 %	15 cm	CH3-18	
Hemiandra incana	+	<1 %	30 cm	CH3-10	
Hypochaeris glabra	+	<1 %	5 cm		
Kunzea praestans	+	<1 %	20-70 cm		juv
Lawrencella rosea	+	<1 %	20 cm	CH3-9	Daisy
Laxmannia omnifertilis	+	<1 %	15 cm	CH3-6	
Lepidobolus chaetocephalus	+	<1 %	25 cm	CH3-7,51	
Melaleuca calyptroides	5	5-10%	1-1.5 m	CH3-1	
Millotia tenuifolia var. tenuifolia	+	<1 %	4 cm		=EO3
Opercularia vaginata	+	<1 %	25 cm		
Parentucellia latifolia	+	<1 %	5 cm		
Podolepis lessonii	+	<1 %	10 cm	CH3-22	
Pterochaeta paniculata	+	<1 %	4cm	CH3-24	Daisy
Schoenus clandestinus	+	<1 %	6 cm	CH3-23	
Stylidium miniatum	+	<1 %	2 cm	CH3-17	Rosette
Stylidium septentrionale	2	1-5%	10 cm	CH3-2	
Thysanotus manglesianus	+	<1 %		CH3-54	Fleshy leaf (Probably juv. T. Mang-MET8/05)
Trachymene cyanopetala	+	<1 %	10 cm	CH3-19	
Trachymene ornata	+	<1 %	6 cm	=WD3-9	
Ursinia anthemoides	+	<1 %	5-12 cm		

Vulpia myuros var. hirsuta	+	<1 %	10-15 cm	CH3-16	
Xanthorrhoea drummondii	5	5-10%	1.5-3.7 m		
Acacia acuminata subsp. acuminata	+	<1 %	6.5 m		
Austrodanthonia caespitosa	+	<1 %	6 cm	CH3-27	
Calytrix depressa	+	<1 %	40-70 cm	CH3-30	
Goodenia hassallii	+	<1 %	70 cm	CH3-26	Near NW corner
Hibbertia subvaginata	+	<1 %	40 cm		
Isopogon divergens	+	<1 %	1.6m		
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	50 cm	CH3-29	
Leporella fimbriata	+	<1 %	4cm	CH3-56	Orchid
Pimelea imbricata var. piligera	+	<1 %	60 cm	CH3-31	
Verticordia acerosa var. preissii	+	<1 %	50 cm	CH3-25	

Moora **Site** CAH004

Described by BRM **Date** 23/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill Westrail Reserve, approximately 11 km north of Moora on the Midlands Road. The plot is approximately 400 m south and then east along the track from the entry to the Reserve from the Midlands Road
MGA Zone 50 407395 **m E** 6620265 **m N** -30.546337 **S lat** 116.034534 **E long**
Habitat: East facing mid-slope.
Soil: Quartz gravel grey sand.
Rock Type: Chert, 40-50% cover.
Vegetation: Allocasuarina campestris closed scrub over Xanthorrhoea drummondii scattered shrubs over Calytrix leschenaultii, Daviesia hakeoides subsp. subnuda scattered low shrubs over Desmocladus flexuosus, Stypandra glauca scattered sedges and herbs.
Vegetation condition: Excellent, no signs of disturbance.
Notes: Earthworks in 30x30 area about 5m downslope (north side) of 10x10 - only searched to this.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Allocasuarina campestris	80	>75%	2-3 m		
Aristida contorta				CH4-27	
Borya sphaerocephala	+	<1 %	2 cm	CH4-1	
Burchardia umbellata	+	<1 %	15cm	CH4-56	fleshy leaf
Caladenia flava subsp. flava	+	<1 %		CH4-10	Orchid
Calytrix leschenaultii	+	<1 %	1 m	CH4-2	
Chamaescilla corymbosa var. corymbosa	+	<1 %	4cm	CH4-3,54	
Cheilanthes adiantoides	+	<1 %	10cm		=WO1-19
Daviesia hakeoides subsp. subnuda	1-2	1-5%		CH4-6	
Desmocladus flexuosus	+	<1 %		CH4-7	
Dichopogon capillipes	+	<1 %	20cm	CH4-51	
Dioscorea hastifolia	+	<1 %			=EO1-11
Drosera aff. macrantha	+	<1 %		CH4-58	
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	2cm	CH4-53	
Drosera macrantha subsp. macrantha	+	<1 %			2=EO1-18
Dryandra fraseri	+	<1 %	60 cm	CH4-9	prostrate
Hypochaeris glabra				CH4-13	
Lepidosperma leptostachyum	+	<1 %	30cm	CH4-19,57	Also 30x30.
Lepidosperma tenue	+	<1 %		CH4-18	Sedge
Melaleuca radula	+	<1 %	1-1.5 m	CH4-11,52	
Nemcia acuta				CH4-14	
Neurachne alopecuroidea	+	<1 %			=WO1-17, grazed
Platysace cirrosa	+	<1 %	40cm	CH4-50	
Schoenus clandestinus	+	<1 %		CH4-15	
Stylidium calcaratum	+	<1 %		CH4-4	leaf at base
Stylidium septentrionale	+	<1 %		CH4-5	
Stypandra glauca	1-2	1-5%		=EO1-13	
Thysanotus manglesianus	+	<1 %	40cm	CH4-55	Climber
Trachymene ornata				CH4-25	
Tripterococcus brunonis	+	<1 %		CH4-8	
Ursinia anthemoides	+	<1 %			
Xanthorrhoea drummondii	+	<1 %	1 m		
Xanthosia fruticulosa				CH4-12	
Austrodanthonia setacea				CH4-20	
Austrostipa tenuifolia	+	<1 %		CH4-23	

Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %		CH4-16	
Crassula exserta	+	<1 %		CH4-22	
Daviesia dielsii	+	<1 %		CH4-24	
Eriochilus helonomos	+	<1 %	20cm	CH4-59	Orchid
Genus sp.	+	<1 %	2cm	CH4-61	Daisy.
Hakea incrassata	+	<1 %		CH4-17	
Hibbertia subvaginata	+	<1 %			
Kunzea praestans	+	<1 %			
Pentaschistis airoides	+	<1 %			
Pterostylis sanguinea	+	<1 %	2cm	CH4-60	Pterostylis flat
Vulpia myuros var. hirsuta	+	<1 %		CH4-21	

Moora **Site** CAH005

Described by MJH **Date** 23/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill Westrail Reserve, approximately 11 km north of Moora on the Midlands Road. The plot is on the slope to the N side of the track from the gravel pits to the radio tower, approx. 600 m east of the Midlands Road.
MGA Zone 50 407471 **m E** 6621152 **m N** -30.53834 **S lat** 116.035405 **E long**
Habitat: Gentle midslope.
Soil: Brown fine sand/silt. Good litter cover.
Rock Type: Chert cobbles-large gravel. Cover 20-70% variable.
Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Dryandra sessilis var. sessilis high open shrubland over Kunzea praestans closed heath to closed scrub over Melaleuca calyptroides, Calothamnus sanguineus scattered shrubs over Hibbertia subvaginata, Calytrix leschenaultii low open shrubland over Desmocladus flexuosus open sedgeland.
Veg Condition: Excellent
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	(20) 50cm	CH5-29	
Austrodanthonia caespitosa	+	<1 %	5-10 cm	CH5-21	
Austrodanthonia setacea	+	<1 %	25 cm	CH5-7	Grass-Amphipogon/ Austrodanthonia
Austrostipa elegantissima	+	<1 %	80cm	CH9-5B	
Blennospora drummondii	+	<1 %	5 cm	CH5-18,20	
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	25 cm	CH5-23	
Briza maxima	+	<1 %	5 cm		
Burchardia umbellata	+	<1 %	10-40cm	=CH1-23	Fleshy leaf
Calothamnus sanguineus	2	1-5%	1m	CH5-5, 57	
Calytrix leschenaultii	2	1-5%	1 m+	CH5-4	
Cassytha pomiformis	+	<1 %	50 cm	CH5-11	
Chamaescilla corymbosa var. corymbosa	+	<1 %	5cm	CH5-24, 50	
Cheilanthes adiantoides	2	1-5%	2cm		
Desmocladus flexuosus	10-12	10-25%	15-20 cm	CH5-3	
Dichopogon capillipes	+	<1 %	10cm		
Drosera aff. macrantha	+	<1 %	40cm	CH5-52,56	
Drosera macrantha subsp. macrantha	+	<1 %	1 m	CH5-8	Large
Dryandra sessilis var. sessilis	5	5-10%	3-4 m		
Hibbertia subvaginata	3-4	1-5%	90 cm		
Kunzea praestans	80	>75%	1.5-2.5 m		
Lawrencella rosea	+	<1 %	5 cm	CH5-13	
Melaleuca calyptroides	2-4	1-5%	1 m	CH5-6	
Neurachne alopecuroidea	+	<1 %	10 cm	CH5-9A	
Platysace cirrosa	+	<1 %		CH5-54	
Pterostylis recurva	+	<1 %	2cm	=CH2-36	Pterostylis flat base
Pterostylis sanguinea	+	<1 %	15cm	CH5-55	
Stylidium septentrionale	+	<1 %	10 cm	CH5-2	=ch2
Trachymene ornata	+	<1 %	5 cm	CH5-15	
Trachymene pilosa	+	<1 %	5 cm	CH5-17	Grass
Tripterococcus brunonis	+	<1 %	25 cm	CH5-10	Also CH5-12,16
Ursinia anthemoides	+	<1 %	15 cm		
Vulpia myuros var. hirsuta	+	<1 %	5 cm	CH5-19	
Xanthorrhoea drummondii	+	<1 %	2.5 m		
Xanthosia fruticulosa	+	<1 %	20 cm	CH5-1	
Acacia acuminata subsp. acuminata	+	<1 %	8 m		On edge
Acacia pulchella var. goadbyi	+	<1 %	70cm	CH5-53	Det BRM, but atypical.

Allocasuarina huegeliana	+	<1 %	6-7 m		On edge
Allocasuarina sp.	+	<1 %	1.5m		
Austrostipa variabilis	+	<1 %	20 cm	CH5-30	
Avena barbata	+	<1 %	30 cm		
Baeckea sp. Moora (R. Bone 1993/1)	+	<1 %	1.5 m	CH5-27	
Dioscorea hastifolia	+	<1 %	30 cm		
Ehrharta longiflora	+	<1 %	15 cm		Open patch upslope
Haemodorum simulans	+	<1 %	30 cm	CH5-28	
Hypochaeris glabra	+	<1 %			
Nemcia acuta	+	<1 %	50 cm	CH5-31	
Pityrodia dilatata	+	<1 %	5-10 cm		Juvenile
Regelia megacephala	+	<1 %	3 m		
Scaevola phlebopetala	+	<1 %	25 cm	CH5-26	
Thysanotus manglesianus	+	<1 %		CH5-51	

Moora **Site** CAH006

Described by MET **Date** **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill Westrail Reserve, approximately 11 km north of Moora on the Midlands Road. The plot is ~200 m NNW of the radio tower.
MGA Zone 50 407570 **m E** 6621034 **m N** -30.539412 **S lat** 116.036426 **E long**
Habitat: Gently sloping upper hillslope.
Soil: Gravelly, pebbly siliceous silt/fine sand. Some litter.
Rock Type: Some outcrop.
Vegetation: Eucalyptus eudesmioides subsp. eudesmioides mallee low open woodland to woodland over Regelia megacephala, Kunzea praestans, Xanthorrhoea drummondii open shrubland over Allocasuarina campestris open heath over Melaleuca calyptroides, Baeckea sp. Moora (R. Bone 1993/1), Calytrix leschenaultii shrubland.
Vegetation condition: Very good to excellent. Would be excellent except burnt 5/10 years ago. Low weed invasion.
Fire age: 5-10 years ago.
Notes: Less Regelia megacephala outside plot.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	40	33.3-50%	1.2m	CH6-56	
Amphipogon caricinus	+	<1 %	40 cm	CH6-18	
Apium annuum	+	<1 %	2 cm	CH6-13	
Baeckea sp. Moora (R. Bone 1993/1)	15-20	10-25%	50-70 cm	CH6-15	
Blennospora drummondii	+	<1 %	2-4 cm	CH6-14	
Borya sphaerocephala	+	<1 %	4 cm		
Briza maxima	+	<1 %	5 cm		
Burchardia umbellata	+	<1 %	20cm	CH6-50	
Calytrix leschenaultii	+/-5	1-5%	60-80 cm	CH6-4	
Centrolepis drummondiana	+	<1 %	2 cm	CH6-11	
Chamaescilla corymbosa var. corymbosa	+	<1 %	4cm	CH6-58	
Cryptandra glabriflora	+	<1 %	40cm	CH6-54	Rhamnaceae
Daviesia dielsii	+	<1 %	50 cm		
Desmocladus flexuosus	+	<1 %	25 cm	CH6-6	
Drosera aff. macrantha	+	<1 %	20 cm	CH6-24	Climber
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1 cm		ssp.??
Drosera macrantha subsp. macrantha	+	<1 %	25cm	CH6-52	
Eucalyptus eudesmioides subsp. eudesmioides	<10	5-10%	3-5 m	CH6-1 brown bark	Smooth grey-light
Hakea incrassata	+	<1 %	1 m	CH6-22	
Hibbertia subvaginata	+	<1 %	60 cm		
Kunzea praestans	+/-1	<1 %	1-1.4 m		
Lawrencella rosea	+	<1 %	15-25 cm	CH6-16	
Lepidosperma sp.	+	<1 %	35 cm	CH6-8	
Melaleuca calyptroides	5	5-10%	90cm		
Millotia tenuifolia var. tenuifolia	+	<1 %	4 cm	CH6-7	
Neurachne alopecuroidea	+	<1 %	5 cm		
Pentaschistis airoides	+	<1 %	10-15 cm		
Pityrodia dilatata	+	<1 %	(2) 55cm	CH6-9,53	
Platysace cirrosa	+	<1 %	15cm	CH6-51	
Pterostylis sanguinea	+	<1 %	2cm	CH6-55, 57	Pterostylis sp.
Regelia megacephala	2-3	1-5%	1.5 m		
Scaevola phlebopetala	+	<1 %	20 cm	CH6-17	

Stylidium septentrionale	+	<1 %	10 cm	CH6-10	
Stypandra glauca	+	<1 %	25-75 cm	CH6-5	
Trachymene ornata	+	<1 %	5 cm		
Trachymene pilosa	+	<1 %	5 cm		
Tricoryne arenicola	+	<1 %	15 cm	CH6-3	PRIORITY 2
Tripterococcus brunonis	+	<1 %	50 cm	CH6-2	
Ursinia anthemoides	+	<1 %	10 cm		
Wahlenbergia gracilenta	+	<1 %	7 cm	CH6-12	
Xanthorrhoea drummondii	<5	1-5%	1.5-2 m		
Xanthosia fruticulosa	+	<1 %	30 cm		
Acacia aristulata	+	<1 %	50 cm	CH6-20	
Acacia congesta subsp. congesta	+	<1 %	1.8 m	CH6-27	
Astroloma serratifolium	+	<1 %	25 cm	CH6-19	
Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %	1.9 m	CH6-29	
Dianella revoluta var. divaricata	+	<1 %	70 cm		
Nemcia acuta	+	<1 %	20 cm	CH6-25	juv
Scaevola glandulifera	+	<1 %	50 cm	CH6-21	NW corner
Stackhousia monogyna	+	<1 %	45 cm	CH6-28	
Thysanotus multiflorus	+	<1 %	20 cm	CH6-23	
Vulpia myuros var. hirsuta				CH6-26	

Moora **Site** CAH007

Described by BRM **Date** 9/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Chert ridge in NW corner of Cairn Hill Reserve (railway 100m to west))
MGA Zone 50 406937 **m E** 6621245 **m N** -30.537462 **S lat** 116.029846 **E long**
Habitat: Steep mid-slope of chert ridge, west-facing
Soil: Grey sand in matrix of exposed sheet rock with boulders, rocks and cobbles. Surface has 80-90% rock cover.
Rock Type: Chert
Vegetation: Regelia megacephala, Kunzea praestans high shrubland over Xanthosia fruticulosa low open shrubland over Borya sphaerocephala open herbland
Vegetation condition: Excellent to very good. Only a few weeds.
Fire age: Fire >10 years since burnt.
Notes: Coordinate datum: WGS'84.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Aira caryophyllea	+	<1 %	15cm	CH7-7	Pentaschistis
Borya sphaerocephala	10-12	10-25%	10cm	CH7-2,12	
Briza maxima	+	<1 %	40cm	CH7-13	
Burchardia umbellata	+	<1 %	15cm	CH7-3	Burchardia
Chamaescilla corymbosa var. corymbosa	+	<1 %	4cm	CH7-6,27	
Cheilanthes adiantoides	3-5%	1-5%	15cm	CH7-4	Cheilanthes
Dichopogon capillipes	+	<1 %	40cm	CH7-5,14	
Dioscorea hastifolia	+	<1 %	10cm		
Diuris aff. recurva	+	<1 %	15cm	CH7-29	Lilly
Drosera aff. macrantha	+	<1 %	20cm	CH7-8	Also CH7-24,25.
Ehrharta longiflora	+	<1 %	20cm		
Hibbertia subvaginata	+	<1 %	20cm		
Hypochaeris glabra	+	<1 %	20cm	CH7-10	Sonchus
Kunzea praestans	5-10%	5-10%	2.2m		
Platysace cirrosa	+	<1 %	25cm	CH7-11,28	
Pterostylis recurva	+	<1 %	10cm	CH7-26	Greenhood orchid
Regelia megacephala	15-20%	10-25%	2.5-3.0m		
Stypandra glauca	+	<1 %	45cm		
Trachymene ornata	+	<1 %	20cm	CH7-9	Trachymene white top
Ursinia anthemoides	+	<1 %	20cm		
Xanthosia fruticulosa	1-2%	1-5%	35cm	CH7-1	Xanthosia
Acacia aristulata	+	<1 %	35cm	CH7-21	Acacia (shrub)
Allocasuarina huegeliana	+	<1 %	8m		
Avena barbata	+	<1 %	40cm		
Crassula exserta	+	<1 %	4cm	=ER15-5A	Crassula colorata
Eriachne ovata	+	<1 %	10cm	CH7-22,30	
Lawrencella rosea	+	<1 %	15cm	CH7-19	Asteraceae
Podolepis canescens	+	<1 %	25cm	CH7-17	?Podolepis
Podolepis lessonii	+	<1 %	15cm	CH7-18	Podolepis lessonii

Thysanotus manglesianus	+	<1 %	60cm	CH7-16	Thysanotus
Trachymene pilosa	+	<1 %	10cm	CH7-15	Trachymene
Urospermum picroides	+	<1 %	20cm	CH7-23	Asteraceae
Vulpia myuros var. hirsuta	+	<1 %	15cm	CH7-20	Poaceae (cyl head)

Moora Site CAH008

Described by MET **Date** 9/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: NW corner of the Cairn Hill Reserve on the east side of the first low ridge.
MGA Zone 50 407000 **m E** 6621385 **m N** -30.536204 **S lat** 116.030515 **E long**
Habitat: East-facing moderately sloping upper slope of a low chert ridge. Below areas of outcrop.
Soil: Gravelly, cobbly (chert) light grey silty sand with scattered boulders and thin litter layer (mostly Allocasuarina needles).
Vegetation: Allocasuarina huegeliana low woodland to low open forest over Kunzea praestans, Xanthorrhoea drummondii scattered tall shrubs over Xanthosia fruticulosa low open shrubland to low shrubland over Opercularia vaginata, Cheilanthes adiantoides, Neurachne alopecuroidea low
Vegetation condition: Area seems to be generally in very good condition. However there are some vehicle tracks (bulldozer?) in places possibly from an old drilling program (there were chips of chert in a pile that could only be from drilling).
Fire age: Not burnt for more than 15 years, possibly 25 year
Notes: Coordinate datum: WGS'84. In places has Hibbertia subvaginata open shrubland understorey.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia congesta subsp. congesta	+	<1 %	70cm	CH8-26	Acacia ?aristulata (1 plant)
Allocasuarina huegeliana	25-35%	25-33.3%	(4)6-7m		
Austrodanthonia acerosa	+	<1 %	10cm	CH8-9	Austrodanthonia
Austrostipa variabilis	+	<1 %	10cm	CH8-2	Austrostipa
Baeckea sp. Moora (R. Bone 1993/1)	+	<1 %	60cm		
Briza maxima	+	<1 %	5cm		
Burchardia umbellata	+	<1 %	30cm	CH8-12	Poaceae
Calandrinia sp.	+	<1 %	5cm	CH8-17	Calandrinia
Calytrix leschenaultii	+	<1 %	1.4m	CH8-11	Calytrix
Cheilanthes adiantoides	2-3%	1-5%	5-15cm		Cheilanthes
Desmocladus flexuosus	+	<1 %	10-15cm	CH8-4	"Loxocarya"
Dichopogon capillipes	+	<1 %	25cm	CH8-23	Dichopogon
Dioscorea hastifolia	5-10%	5-10%	10-50cm		
Drosera aff. macrantha	+	<1 %	0.4-1 m	CH8-25	Also CH8-21, 28 (30x30).
Ehrharta longiflora	+	<1 %	10-30cm		
Genus sp.				CH8-10	Lilly
Gilberta tenuifolia	+	<1 %	6cm	CH8-19	"Myriocephalus"
Goodenia berardiana	+	<1 %	15cm	CH8-6	Goodenia
Hypochaeris glabra	+	<1 %	5cm		
Kunzea praestans	2	1-5%	1.5m		
Lobelia sp. small flowers (K.F. Kenneally 7705)	+	<1 %	5-8cm	CH8-14	Lobelia
Neurachne alopecuroidea	+	<1 %	10cm	CH8-3	Neurachne
Opercularia vaginata	3-5%	1-5%	10-15cm	CH8-13, 24	Opercularia
Pentaschistis sp. Moora (doubtful ID)	+	<1 %	12cm	CH8-18	Poaceae
Platysace cirrosa	+	<1 %	15cm	=ER16-9	Unknown
Podolepis canescens	1	<1 %	15-45	CH8-5	Podolepis "ray"
Podolepis lessonii	+	<1 %	10cm	CH8-7	Podolepis "button"
Podotheca angustifolia	+	<1 %	5-10cm	CH8-16	Podotheca
Pterostylis sp.	+	<1 %	15cm		Pterostylis sp (dead)
Schoenia cassiniana	+	<1 %	8-15cm	CH8-8	Daisy pink/white
Stypandra glauca	+	<1 %	60cm		
Trachymene pilosa	+	<1 %	5-10cm		
Ursinia anthemoides	+	<1 %	10-25cm		
Wahlenbergia gracilenta	+	<1 %	10-15cm	CH8-15	Wahlenbergia
Xanthorrhoea drummondii	2	1-5%	1.7m		
Xanthosia fruticulosa	8-10	5-10%	30-55cm	CH8-1	Xanthosia
Aira caryophyllea	+	<1 %	5-10cm		*Aira
Hibbertia subvaginata	+	<1 %	0.5-1.4m		
Lepidosperma tenue	fern/herb/grassland.			+	<1 %55cm CH8-22 Lepidosperma
Stylidium septentrionale	+	<1 %	15cm	CH8-20	Stylidium

Thysanotus manglesianus	+	<1 %		CH8-27	Thysanotus Climber
Vulpia myuros var. hirsuta	+	<1 %	10cm		Vulpia

Moora Site CAH009

Described by BRM **Date** 9/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Eastern side of chert ridge in the NW corner of Cairn Hill Reserve.
MGA Zone 50 407058 **m E** 6621390 **m N** -30.536163 **S lat** 116.03112 **E long**
Habitat: Lower to mid-slope, colluvial gentle east-facing slope.
Soil: Cobbly, pebbly brown sand.
Rock Type: Chert.
Vegetation: Allocasuarina huegeliana scattered low trees over Kunzea praestans, Allocasuarina campestris high shrubland over Melaleuca calyptroides open shrubland to shrubland over Baeckea sp. Moora (R. Bone 1993/1), Calytrix leschenaultii low open shrubland over Neurachne alopecuroidea, sedge (CAH9-5) scattered grassland/sedgeland with Borya sphaerocephala, Stylidium septentrionale scattered herbs.
Vegetation condition: Very good to excellent (few weeds).
Fire age: Not burnt for more than 10 years.
Notes: Datum: WGS84. 1st coord is SE peg; 2nd peg is NW peg. Only the SE and NW corners were pegged. There was higher percentage cover of Baekia sp. Moora (R. Bone 1993/1) outside plot than in it.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Lepidobolus chaetocephalus	+	<1 %	30cm	CH9-41,42	Restionaceae
Acacia microbotrya	+	<1 %	10cm	CH9-18	Acacia (juvenile)
Aira caryophyllea	+	<1 %	10cm	=CH7-7	Pentaschistis
Allocasuarina campestris	3-5%	1-5%	2.5m		
Allocasuarina huegeliana	+	<1 %	4-6m		
Amphipogon caricinus	+	<1 %	25cm	CH9-10A	BIS, Borya removed
Austrodanthonia setacea	+	<1 %	4cm	CH9-38	Grass
Austrostipa elegantissima	+	<1 %	30cm	CH9-9	Austrostipa ?elegantissima
Austrostipa trichophylla	+	<1 %	30cm	CH9-7	Austrostipa
Avena barbata	+	<1 %	30cm		
Baeckea sp. Moora (R. Bone 1993/1)	1	<1 %	60cm	CH9-2	More % cover outside
Borya sphaerocephala	1-2	1-5%	10cm	CH9-10B	
Burchardia umbellata	+	<1 %	30cm	=CH7-3	Burchardia
Calytrix leschenaultii	1-2	1-5%	80cm	CH9-3	Calytrix
Chamaescilla corymbosa var. corymbosa	+	<1 %	15cm	CH9-13,36	Chamaescilla
Cheilanthes adiantoides	+/-1	<1 %	15cm	=CH7-4	Cheilanthes
Daviesia dielsii	+	<1 %	40cm	CH9-19	Daviesia dielsii
Desmocladus flexuosus	+	<1 %	20cm	CH9-8,40	Desmocladus ?flexuosus
Dianella revoluta var. divaricata	+	<1 %	50cm	CH9-26	Also 30x30. Dianella
Drosera aff. macrantha	+	<1 %	35cm	CH9-17,32	Also CH9-32,33. Drosera (lge Yellow cup)
Genus sp.	+/-1	<1 %	30cm	CH9-5	Sedge
Hypochaeris glabra	+	<1 %	20cm	=CH7-10	*Sonchus
Hypochaeris radicata	+	<1 %	2cm	CH9-37	Hypochaeris glabra
Isopogon divergens	+	<1 %	1.1-2.5m	CH9-6	Isopogon ?divergens
Isotoma hypocrateriformis	+	<1 %	10cm	CH9-20	juvenile
Kunzea praestans	5%	5-10%	2.3m		
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	20cm	CH9-12	Lepidosperma
Levenhookia stipitata	+	<1 %	2cm	CH9-16	Stylidiaceae
Melaleuca calyptroides	10%	10-25%	1.8m	CH9-1	Melaleuca
Melaleuca radula	+	<1 %	1.5m	CH9-14	Melaleuca
Neurachne alopecuroidea	+	<1 %	4cm	CH9-39	Neurachne
Parentucellia latifolia	+	<1 %	6cm		Parentucellia
Podolepis canescens	+	<1 %	20cm	=CH7-17	Podolepis
Podolepis lessonii	+	<1 %	10cm	=CH7-18	Podolepis
Podotheca angustifolia	+	<1 %	2cm	CH9-15	Entry correct.
Stylidium septentrionale	2-3	1-5%	10cm	CH9-4	Stylidium
Thysanotus manglesianus	+	<1 %	20cm	CH9-34,35	?Thysanotus upright
Thysanotus sp.	+	<1 %	10cm		Thysanotus
Trachymene ornata	+	<1 %	5cm	=CH7-9	Trachymene (white heads)
Trachymene pilosa	+	<1 %	5cm	CH9-11	Trachymene
Ursinia anthemoides	+	<1 %	15cm		
Vulpia myuros var. hirsuta	+	<1 %	15cm	=CH7-20	Grass 'cyl head'

Xanthorrhoea drummondii	+	<1 %	1.8m		
Acacia acuminata subsp. acuminata	+	<1 %	1m		
Acacia congesta subsp. congesta	+	<1 %	50cm	CH9-44	Acacia
Astroloma serratifolium	+	<1 %	15cm	CH9-21	Astroloma
Austrostipa nitida	+	<1 %	30cm	CH9-27	Austrostipa
Borya laciniata	+	<1 %	10cm	CH9-43	Laxmannia
Cryptandra glabriflora	+	<1 %	20cm	CH9-45, 46	Rhamnaceae (white flr)
Daviesia hakeoides subsp. subnuda	+	<1 %	40cm	CH9-47	Pea/Acacia
Dichopogon capillipes	+	<1 %	20cm	CH9-28	Dichopogon
Dioscorea hastifolia	+	<1 %	40cm		
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %		CH9-23	Drosera
Dryandra sessilis var. sessilis	+	<1 %	5m	CH9-25	Dryandra sessilis
Haemodorum paniculatum	+	<1 %	30cm	CH9-30B	Haemodorum ID?
Haemodorum simulans	+		50 cm	CH9-30A	
Lechenaultia biloba	+	<1 %	40cm	CH9-24	Lechenaultia
Opercularia vaginata	+	<1 %	20cm	CH9-31	Opercularia
Schoenus clandestinus	+	<1 %	3cm	CH9-22	Schoenus
Stylidium miniatum	+	<1 %	15cm	CH9-29	Stylidium

Moora Site CAH010

Described by MET **Date** 23/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Southern part of Cairn Hill Reserve near SE corner.
MGA Zone 50 407698 **m E** 6620100 **m N** -30.547852 **S lat** 116.037676 **E long**
Habitat: Moderate to steep slope with more than 10% outcrop (chert).
Soil: Grey (brownish) silty sand with thin litter layer. Very gravelly (chert) - pebbly amongst boulders and outcrop.
Vegetation: Eucalyptus wandoo subsp. wandoo scattered low trees/trees over Allocasuarina huegeliana low woodland over Dodonaea inaequifolia, Santalum acuminatum scattered tall shrubs to high open shrubland over Trymalium ledifolium var. rosmarinifolium, Xanthosia fruticulosa low open shrubland over Desmocladus flexuosus low open sedgeland.
Vegetation condition: Very good to excellent. Not excellent because a bit too weedy and Xanthorrhoea dying out.
Fire age: Not burnt for more than 10 (>20?) years.
Notes: Coordinate datum: WGS'84. 1st coord is for NE peg; 2nd coord is for SW peg. Seedling Dryandra sessilis 4cm in plot (south side) and juvenile Calothamnus - mature plants of each nearby. Tall shrub layer patchy from <2% to > 10% (in 10x10m areas). A large wandoo in the plot but overall cover <5% (ie more in the plot, but stand cover is <5%). Nearby, CALM? plot. Fence droppers with tag 'CH01'. 50J0407613; UTM6620080. 2nd peg 10 to south. Samples a west-facing boulder scree slope, lower; Eucalyptus sp. (not wandoo or loxophleba - has smooth bark, pale grey to tan, not powdery) woodland over Acacia sp. low shrubland (patches) and Dodonaea high shrubland. Species poor.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Aira caryophyllea	+	<1 %	5-10cm	CH10-11	
Allocasuarina huegeliana	>10	10-25%	4-5m		
Anagallis arvensis	+	<1 %	5-8cm		
Apium annuum	+	<1 %	5-10cm	CH10-17	Apium ID?
Austrodanthonia acerosa	+	<1 %	5cm	CH10-10	
Austrodanthonia setacea	+	<1 %	10cm	CH10-24	
Austrostipa elegantissima	+	<1 %	30cm	CH10-8	
Austrostipa variabilis	+	<1 %	10cm	CH10-25,2	Also 30x30.
Avena barbata	<=1	<1 %	40cm		Avena fatua
Briza maxima	+	<1 %	10cm		
Caladenia flava subsp. flava	+	<1 %	12cm	CH10-56	
Calandrinia calyptrata	+	<1 %	5cm	CH10-18	
Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %	15cm(juv)		Calothamnus quadrifidus
Calytrix leschenaultii	+	<1 %	40cm	CH10-21	Calytrix
Cheilanthes adiantoides	1-2	1-5%	10cm		Cheilanthes austro?
Comesperma integerrimum	+	<1 %	35cm	CH10-54,6	Also 30x30.
Comesperma volubile	+	<1 %	30cm		
Crassula colorata var. colorata	+	<1 %	2-3cm		Crassula colorata
Crassula exserta	+	<1 %	5cm		
Desmocladus flexuosus	1-2	1-5%	10-25cm	CH10-5	Desmocladus
Dianella revoluta var. divaricata	+	<1 %	10cm(juv)		Dianella revoluta
Dichopogon capillipes	+/-1	<1 %	5-30cm	CH10-9	Also CH10-52,53.
Dioscorea hastifolia	1-2	1-5%	10-25cm		
Dodonaea inaequifolia	3-4	1-5%	(0.8)3-4m	CH10-1	Erect to spreading open

					shrubs. 3-4m+ tall.
Drosera macrantha subsp. macrantha	+	<1 %	50cm	CH10-55,6	Also 30x30. Climber
Dryandra sessilis var. sessilis	+	<1 %	4cm (juv)		Dryandra sessilis var. sessilis
Ehrharta longiflora	2-3	1-5%	15-45cm		
Eucalyptus wandoo subsp. wandoo	<5%	1-5%	8-11m		Eucalyptus wandoo
Genus sp.	1-2	1-5%	10-40cm	CH10-6	Lilly
Goodenia berardiana	+	<1 %	15cm	CH10-14	
Hypochaeris glabra	+	<1 %	5cm		
Lepidosperma costale	+	<1 %	20-50cm	CH10-15	
Lepidosperma leptostachyum	1	<1 %	40cm	CH10-7	
Lepidosperma tenue	+	<1 %		CH10-7 #2	
Lobelia sp. small flowers (K.F. Kenneally 7705)	+	<1 %	15cm	CH10-20	
Lolium perenne	+	<1 %		CH10-23,5	
Neurachne alopecuroidea	+	<1 %	10cm		
Phyllangium sulcatum	+	<1 %	5-10cm	CH10-12	"Mitrasacme"
Podotheca angustifolia	+	<1 %	5cm	CH10-19	Podotheca
Pterostylis sanguinea	+	<1 %	2cm	CH10-51,6	Also 30x30. Orchid flat
Rhodanthe polycephala	+	<1 %	8-15cm	CH10-13	Asteraceae
Santalum acuminatum	2-3	1-5%	2-3m	CH10-2	
Schoenia cassiniana	+	<1 %	10cm	CH10-28	Also 30x30 and CH10-58, 61. Daisy white/pink. Abundant
Stypandra glauca	1	<1 %	20-40cm		
Thysanotus manglesianus	+	<1 %	25cm	CH10-22	Also CH10-50,57. Thysanotus
Trachymene pilosa	+	<1 %	8cm		
Trymalium ledifolium var. rosmarinifolium	2-3	1-5%	10-80cm	CH10-3	
Ursinia anthemoides	2	1-5%	8-15cm		
Vulpia myuros var. hirsuta	+	<1 %	5-6cm		Vulpia myuros
Wahlenbergia gracilenta	+	<1 %	25cm	CH10-16	
Xanthorrhoea drummondii	+	<1 %	30cm		Dead
Xanthosia fruticulosa	5-6	5-10%	10-35cm	CH10-4	Xanthosia
Acacia acuminata subsp. acuminata	+	<1 %	1-5.5m		Acacia acuminata
Allocasuarina campestris	+	<1 %	3m		Allocasuarina campestris
Cyanicula deformis	+	<1 %	12cm	CH10-65	Blue orchid
Goodenia arthrotricha	+	<1 %	40cm	CH10-27	Unknown, dead. Goodeniaceae? 3m SW of SW peg. multi stemmed. Stems and leaves slightly glandular/sticky. Perennial with short lived stems.
Hibbertia subvaginata	+	<1 %	1m		
Lawrencella rosea	+	<1 %	12cm	CH10-63	Daisy
Podolepis lessonii	+	<1 %	20cm	CH10-59	Daisy
Thysanotus dichotomus	+	<1 %	30cm	CH10-67	
Trachymene ornata	+	<1 %	10cm		
Tripteris clandestina	+	<1 %	20cm	CH10-62	Daisy
Waitzia nitida	+	<1 %		CH10-29	

Moora Site CAH011

Described by BRM **Date** 23/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill near southern end of reserve.
MGA Zone 50 407409 **m E** 6620353 **m N** -30.545547 **S lat** 116.034686 **E long**
Habitat: Lower to mid-slope of steep, south-facing slope of medium height ridge.
Soil: Gravelly, pebbly, cobbly brown sandy loam amongst exposed sheet rock and boulders.
Rock Type: Chert. Rock cover of surface about 70%.
Vegetation: Regelia megacephala (Kunzea praestans) open scrub over Allocasuarina campestris scattered shrubs over Hibbertia subvaginata, Xanthosia fruticulosa low open shrubland over Stypandra glauca very open herbland with Dioscorea hastifolia very open lianes.
Vegetation condition: Very good to excellent.
Fire age: Not burnt for more than 10 years.
Notes: Datum: WGS84. 1st coord is for SW peg; 2nd coord is for NE coord. 30x30 search area limited on southern side by Allocasuarina campestris scrub community.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	30cm		
Aira caryophyllea	+	<1 %	10cm	CH11-4	Pentaschistis
Allocasuarina campestris	2	1-5%	1.7m		
Anagallis arvensis	+	<1 %	10cm	CH11-12	

Arctotheca calendula	+	<1 %	10cm	CH11-57	
Austrodanthonia acerosa	+	<1 %	15cm	CH11-18	Native glass
Austrodanthonia caespitosa	+	<1 %	35cm	CH11-23	Austrostipa #2
Austrostipa elegantissima	+	<1 %	1m	CH11-15	
Avena barbata	+	<1 %	35cm		
Blennospora drummondii	+	<1 %	10cm	CH11-14	Blennospora
Briza maxima	+	<1 %	20cm		
Bromus diandrus	+	<1 %	15cm		Bromus
Burchardia umbellata	+	<1 %	40cm	CH11-63	Also 30x30.
Caladenia flava subsp. flava	+	<1 %	20cm	CH11-24	Orchid
Calandrinia sp.	+	<1 %	2cm	CH11-53	
Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %	1.2m	CH11-22	Calothamnus ?quadrifidus
Cheilanthes adiantoides	+	<1 %	15cm	CH11-9	Cheilanthes
Cyanicula deformis	+	<1 %	12cm	=CH12-57	Blue orchid
Cyrtostylis huegelii	+	<1 %	1cm	CH11-54	Round base-leaf orchid
Dichopogon capillipes	+	<1 %	35cm	CH11-5	Dichopogon
Dioscorea hastifolia	2-4	1-5%	1.5m		Dioscorea
Drosera aff. macrantha	+	<1 %	30cm	CH11-50,5	Yellow stem
Drosera macrantha subsp. macrantha	+	<1 %	20cm	CH11-6	
Ehrharta longiflora	+	<1 %	30cm		
Eriochilus helonomos	+	<1 %	20cm	=CH14-61	Orchid
Hibbertia subvaginata	5	5-10%	60cm		Hibbertia
Hypochaeris glabra	+	<1 %	2cm		cats tongue leaf
Kunzea praestans	+	<1 %	2-2.5m		
Lepidosperma tenue	+	<1 %	35cm	CH11-7,65	Also 30x30.
Millotia tenuifolia var. tenuifolia	+	<1 %	10cm	CH11-13	Millotia
Parentucellia latifolia	+	<1 %	10cm		Parentucellia
Pityrodia dilatata	+	<1 %	35cm		Pityrodia
Pterostylis sanguinea	+	<1 %	20cm	CH11-21,5	Orchid
Regelia megacephala	50-60%	50-75%	3-4m		
Stypandra glauca	3-5	1-5%	80cm		
Thysanotus manglesianus	+	<1 %	1.2m	CH11-8	Thysanotus
Trachymene ornata	+	<1 %	10cm		Trachymene white heads
Tripteris clandestina	+	<1 %	20cm	CH11-11	Also CH11-17,19,56
Trymalium ledifolium var. rosmarinifolium	+	<1 %	40cm	CH11-20	Rhamnaceae
Urospermum picroides	+	<1 %	25cm	CH11-10	Sonchus
Ursinia anthemoides	+	<1 %	30cm		Ursinia
Vulpia myuros var. hirsuta	+	<1 %	20cm	CH11-2,3	Grass (cylinder head)
Wahlenbergia gracilenta	+	<1 %	10cm	CH11-16	
Xanthorrhoea drummondii	+	<1 %	1.5m		
Xanthosia fruticulosa	5	5-10%	40cm	CH11-1	Xanthosia
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	3cm(juv)		
Calytrix leschenaultii	+	<1 %	90cm		Calytrix (purple)
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	=CH12-52	Orchid
Dampiera lavandulacea	+	<1 %	25cm	CH11-28,6	
Daviesia dielsii	+	<1 %	1.1m		coordinates collected
Desmocladus flexuosus	+	<1 %	25cm	CH11-62	
Dianella revoluta var. divaricata	+	<1 %	70cm	CH11-26	Dianella
Diuris aff. recurva	+	<1 %	15cm	CH11-58	
Dryandra sessilis var. sessilis	+	<1 %	2.5m		Dryandra sessilis
Hakea incrassata	+	<1 %	1.2m	CH11-27	Hakea ?incrassata
Isopogon divergens	+	<1 %	1.6m	CH11-29	Isopogon
Melaleuca calyptroides	+	<1 %	1.4m	CH11-32	
Nemcia acuta	+	<1 %	35cm	CH11-31	Nemcia
Neurachne alopecuroidea	+	<1 %	30cm	CH11-25	Neurachne
Stylidium cordifolium	+	<1 %	30cm	CH11-34	
Stylidium septentrionale	+	<1 %	10cm	CH11-60	
Thomasia grandiflora	+	<1 %	80cm	CH11-30	Thomasia ?grandiflora

Moora **Site** CAH012
Described by MET **Date** 23/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: South section of Cairn Hill Reserve, towards SE corner
MGA Zone 50 407646 **m E** 6620040 **m N** -30.548389 **S lat** 116.037129 **E long**

Habitat: West-facing midslope of a low ridge.
Soil: Slightly pinkish-grey silty gravelly to cobbly sand. No outcrop but some small boulders (of chert).
Vegetation: Eucalyptus wandoo subsp. wandoo scattered low trees to trees over Allocasuarina campestris open scrub to scrub over Lepidosperma tenue scattered sedges over Cheilanthes adiantoides, Borya sphaerocephala low open fern/herbland.
Vegetation condition: Very good to Excellent. (Again, Xanthorrhoea seems to be dying out).
Fire age: Not burnt for more than 20 years.
Notes: Coordinate datum: WGS'84. 1st coord is for NW peg; 2nd coord is for NE peg; 3rd coord is for SW peg. Wandoo cover given as 5% as for stand - more actually in plot. In 30x30 search, only went 5m downslope of the 10x10 as beyond this it changed. Did not go into the outcrop area upslope from the quadrat (plot 14 type veg; excluded Trymalium). Large individual of the blue-green (larger) Lomandra about 7m NE of NE peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	>=5%	5-10%	5-6m		Acacia acuminata
Acacia pulchella	+	<1 %	10cm(juv)		Acacia cf pulchella
Aira caryophyllea	+	<1 %	5-8cm	CH12-9	
Allocasuarina campestris	>60%	50-75%	3.5m		Allocasuarina campestris
Austrodanthonia caespitosa	+	<1 %	10cm	CH12-3	
Austrostipa elegantissima	+	<1 %	20cm	CH12-16	
Austrostipa scabra	+	<1 %	15cm	CH12-5	
Borya sphaerocephala	2%	1-5%	5cm		Borya
Briza maxima	+	<1 %	15cm		
Caesia (Moora hairy stem)	+	<1 %		CH12-6,50	
Caesia alfordii	+	<1 %		CH12-8B	
Chamaescilla corymbosa var. corymbosa	+	<1 %	15cm	CH12-52	
Cheilanthes adiantoides	5-8%	5-10%	5-10cm		Cheilanthes austro?
Crassula decumbens var. decumbens	+	<1 %	6cm	CH12-18	long pedicels
Dichopogon capillipes	+	<1 %	25cm	=CH10-52	
Dodonaea inaequifolia	+	<1 %	1m	=CH10-1	
Drosera macrantha subsp. macrantha	+	<1 %	15cm	CH12-7	Also CH12-53,59.
Eriochilus helonomos	+	<1 %	25cm	=CH14-61	Orchid
Erodium cygnorum	+	<1 %	3cm	=CH14-53	
Eucalyptus wandoo subsp. wandoo	<5%	1-5%	11m		Euc wandoo
Hypochaeris glabra	+	<1 %	2cm		
Hypoxis aff. glabella	+	<1 %		CH12-11A	Det. As aff. glabella 23/8/05
MET. 2 alternate bracts.					
Hypoxis glabella var. leptantha	+	<1 %	20cm	=CH14-59	Lilly
Hypoxis occidentalis var. occidentalis	+	<1 %	10cm	CH12-14	Hypoxis. Spec missing, presumed = other record.
Lagenifera huegelii	+	<1 %	10cm	CH12-51	
Lawrencella rosea	+	<1 %	30cm	=CH10-6	Lilly
Lepidobolus chaetocephalus	+	<1 %	10cm	=CH10	
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	20cm	CH12-12	
Lepidosperma tenue	3%	1-5%	40-70cm	CH12-1	Lepidosperma
Lomandra aff. micrantha subsp. micrantha	+	<1 %	10cm	CH12-13,1	
Lomandra effusa	+	<1 %	10-15cm	CH12-15	Blue green
Neurachne alopecuroidea	+	<1 %	10cm		
Orthrosanthus laxus var. gramineus	+	<1 %	30cm	CH12-2	Orthrosanthus
Platysace cirrosa	+	<1 %	20cm	CH12-11B	Also 30x30 and CH12-26,54. Linear leaves dried black.
Pterostylis sanguinea	+	<1 %	1cm	=CH10-51	Pterostylis flat
Schoenia cassiniana	+	<1 %	10cm	=CH10	Daisy white/pink
Schoenus clandestinus	+	<1 %	4cm	CH12-10	
Stylidium septentrionale	+	<1 %	7cm	CH12-20	common one
Thysanotus manglesianus	+	<1 %	30cm	CH12-4	Thysanotus
Trachymene ornata	+	<1 %	8cm		
Ursinia anthemoides	+	<1 %	10cm		
Vulpia myuros var. hirsuta	+	<1 %	7cm		
Wahlenbergia gracilenta	+	<1 %	10-15cm	CH12-19	
Xanthorrhoea drummondii	+	<1 %			dead
Austrostipa sp.	+	<1 %	15cm	CH12-23	
Calandrinia calyptrata	+	<1 %	8-12cm	CH12-21	
Crassula colorata var. colorata	+	<1 %	3-5cm		
Cyanicula deformis	+	<1 %	12cm	CH12-57	Blue orchid

Daucus glochidiatus	+	<1 %	10cm	CH12-24	
Dioscorea hastifolia	+	<1 %	10cm		
Drosera macrophylla subsp. macrophylla	+	<1 %	3cm	CH12-58	
Ehrharta longiflora	+	<1 %	15-30cm		
Lepidosperma costale	+	<1 %	55cm	CH12-27	
Melaleuca radula	+	<1 %	2m	CH12-22	straggly
Rhodanthe polycephala	+	<1 %	8cm	CH12-25,5	Daisy (juv)
Trachymene pilosa	+	<1 %	10cm	CH12-56	juv
Tripteris clandestina	+	<1 %	12cm	CH12-60	Asteraceae

Moora Site CAH013

Described by BRM **Date** 23/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Ridge at south end of Cairn Hill Reserve.
MGA Zone 50 407494 **m E** 6620190 **m N** -30.547024 **S lat** 116.035557 **E long**
Habitat: East facing slope of low ridge, mid-slope.
Soil: Pebbly, cobbly grey-brown loamy sand, skeletal amongst boulders and exposed sheet rock.
Rock Type: Chert. Covers 70% of surface.
Vegetation: Acacia huegeliana low open forest over Trymalium ledifolium var. rosmarinifolium, Xanthosia fruticulosa low open shrubland over Neurachne alopecuroidea, Desmocladus flexuosa very open grass/sedgeland with Dioscorea hastifolia very open lianes.
Vegetation condition: Very good to excellent (very few weeds).
Fire age: More than 10 years since burnt.
Notes: Coordinate datum: WGS'84. 1st coord is for NE peg; 2nd coord is for SW peg. Allocasuarina campestris just upslope of plot is different community.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina huegeliana	55-65%	50-75%	6-8m		
Austrodanthonia acerosa	+	<1 %	35cm	CH13-5	
Austrodanthonia caespitosa	+	<1 %	30cm	CH13-4	hairy
Austrostipa scabra	+	<1 %	20cm	CH13-29	
Austrostipa trichophylla	+	<1 %	30cm	CH13-3	
Burchardia umbellata	+	<1 %	35cm	CH13-53	
Caladenia flava subsp. flava	+	<1 %	6cm	CH13-18,5	Orchid
Calandrinia calyptrata	+	<1 %	4cm	CH13-12	
Calytrix leschenaultii	+	<1 %	40cm	CH13-30	
Chamaescilla corymbosa var. corymbosa	+	<1 %	20cm	CH13-19	Chamaescilla
Cheilanthes adiantoides	1-2	1-5%	15cm	=CH11-9 winter 2003	Cover recorded
Comesperma integerrimum	+	<1 %	3m	CH13-8	Climber; woody
Crassula colorata var. colorata	+	<1 %	2cm	CH13-20	Crassula
Daviesia dielsii	+	<1 %	20cm	CH13-21	Juvenile
Desmocladus flexuosus	1	<1 %	20cm		
Dichopogon capillipes	+	<1 %	30cm	CH13-22	Dichopogon
Dioscorea hastifolia	3-4	1-5%	30cm	Cover recorded winter 2003	
Drosera aff. macrantha	+	<1 %	30cm	CH13-11,5	
Ehrharta longiflora	+	<1 %	20cm		Ehrharta
Genus sp.	+	<1 %	3cm	CH13-23	
Goodenia berardiana	+	<1 %	20cm	CH13-15	open mouths
Hibbertia subvaginata	+	<1 %	80cm		
Hypochaeris glabra	+	<1 %	20cm	CH13-24,5	
Lepidosperma costale	+	<1 %	20cm	CH13-27	
Lobelia sp. small flowers (K.F. Kenneally 7705)	+	<1 %	3cm	CH13-7,28	
Lomandra aff. micrantha subsp. micrantha	+	<1 %	30cm	CH13-10	
Neurachne alopecuroidea	1	<1 %	15cm	CH13-2	
Pentaschistis pallida	+	<1 %	15cm	CH13-13	
Phyllangium sulcatum	+	<1 %	10cm	CH13-26A	Number split.
Pityrodia dilatata	+	<1 %	20cm		
Poranthera microphylla	+	<1 %	2cm	CH13-22b	
Pterostylis setulosa	+	<1 %	20cm	CH13-9	Orchid
Stylidium septentrionale	+	<1 %	20cm	CH13-14	
Stypandra glauca	+	<1 %	60cm		
Thysanotus manglesianus	+	<1 %	60cm	CH13-50,5	Thysanotus Climber
Trachymene ornata	+	<1 %	10cm		White heads
Trachymene pilosa	+	<1 %	15cm	CH13-6	short hairs

Trachymene sp.	+	<1 %	10cm		hairy
Trymalium ledifolium var. rosmarinifolium	1	<1 %	40cm	CH13-1	Rhamnaceae
Ursinia anthemoides	+	<1 %	30cm		
Vulpia myuros var. hirsuta	+	<1 %	10cm	CH13-17	Vulpia
Wahlenbergia capensis	+	<1 %	15cm	CH13-25	
Xanthorrhoea drummondii	+	<1 %	1.3m		
Xanthosia fruticulosa	+	<1 %	30cm	=CH11-1	Xanthosia
Acacia aristulata	+	<1 %	30cm		
Allocasuarina campestris	+	<1 %	3m		
Anagallis arvensis	+	<1 %	4cm	=CH11-12	
Arctotheca calendula	+	<1 %	15cm		
Cheilanthes distans	+	<1 %	4cm	CH13-56	hairy Cheilanthes
Eucalyptus wandoo subsp. wandoo	+	<1 %	12cm		Eucalyptus wandoo
Isopogon divergens	+	<1 %	50cm	=CH17-2	
Kunzea praestans	+	<1 %	2.5m		
Regelia megacephala	+	<1 %	80cm		

Moora Site CAH014

Described by MET **Date** 24/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Southern part of Cairn Hill Reserve.
MGA Zone 50 407683 **m E** 6620043 **m N** -30.548365 **S lat** 116.037515 **E long**
Habitat: Flat to gently sloping small "bench" near top of west-facing side of ridge.
Soil: Very gravelly, pebbly, cobbly light grey silty sand. Small cobbles strewn on surface. Thin litter layer over most of the quadrat, some areas within lichen crust.
Vegetation: Eucalyptus obtusiflora mallee scrub to closed mallee scrub over Trymalium daphnifolium, Acacia erinacea shrubland over Austrodanthonia setacea, Austrostipa elegantissima scattered low grasses.
Vegetation condition: Excellent.
Fire age: More than 10 years (?15 years) since burnt.
Notes: Coordinate datum: WGS'84. 1st coords is for NE peg; 2nd coords for NW peg; 3rd coords for SE peg; 4th peg is for SW peg. Eucalyptus wandoo overhanging the quadrat but is excluded from the list because it is rooted in a different habitat. Quadrat dimensions were about 8x12m to fit the stand. Only north and south side of quadrat surveyed for 30x30 as different habitats east and west. Stand only about 20x90m. Stand varies to have almost no shrubs in the understorey (Sth of quadrant).
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia erinacea	5-10%	5-10%		CH14-3	straggly shrub
Aira caryophyllea	+	<1 %	10cm	CH14-13	
Apium annuum	+	<1 %	5cm	CH14-8	ID?
Arctotheca calendula	+	<1 %	3cm		Cape weed
Austrodanthonia setacea	+	<1 %	5cm	CH14-10	
Austrostipa elegantissima	+	<1 %	40cm	CH14-12,5	Grass
Blennospora drummondii	+	<1 %	5cm	CH14-14	Daisy
Bromus diandrus	+	<1 %	10cm	CH14-11	
Caesia (Moora hairy stem)	+	<1 %	20cm	CH14-9,58	
Calandrinia sp.	+	<1 %	2cm	CH14-64	
Cheilanthes adiantoides	+	<1 %	5cm		Cheilanthes austro?
Crassula colorata var. colorata	+	<1 %	3cm		
Daucus glochidiatus	+	<1 %	10cm	CH14-62	
Dichopogon capillipes	+	<1 %	25cm	=CH10-52	?Dichopogon
Dioscorea hastifolia	+	<1 %	4cm		
Dodonaea inaequifolia	1-2%	1-5%	2.2m	CH14-4	
Ehrharta longiflora	+	<1 %	10-20cm		
Eriochilus helonomos	+	<1 %	20cm	CH14-61	1 leaf-stem orchid
Erodium cygnorum	+	<1 %	10cm	CH14-53	
Eucalyptus obtusiflora	>75%	>75%	6cm	CH14-1	Mallee, bark smooth, grey or tan.
Hypochaeris glabra	+	<1 %	3cm		
Hypoxis glabella var. leptantha	+	<1 %	15cm	CH14-59	Lilly
Lomandra sp.	+	<1 %	20cm	CH14-50	
Maireana marginata	+	<1 %	2cm	CH14-6	Maireana ?
Oxalis corniculata	+	<1 %	4cm	CH14-54	Yellow flowered Clover-leaf
Plantago debilis	+	<1 %	10cm	CH14-7,56	
Pterostylis sanguinea	+	<1 %	1cm	=CH10-51	flat leaf-base orchid

Pterostylis scabra	+	<1 %	20cm	CH14-57	
Ptilotus divaricatus var. divaricatus	+	<1 %	90cm	CH14-5	tangled perennial shrub
Rhagodia preissii subsp. preissii	+	<1 %	15cm	CH14-51	
Rhodanthe polycephala	+	<1 %	10cm	CH14-55	?Daisy
Thysanotus manglesianus	+	<1 %	45cm	CH14-15	Thysanotus patersonii
Trachymene cyanopetala	+	<1 %	10cm	CH14-63	
Trachymene ornata	+	<1 %	12cm		
Trymalium daphnifolium	>=10%	10-25%	0.8-1.4m	CH14-2	shrub
Vulpia myuros var. hirsuta	+	<1 %	10cm		
Austrostipa variabilis	+	<1 %	8cm	CH14-16	
Avena barbata	+	<1 %	40cm		Avena fatua
Calotis hispidula	+	<1 %	3cm	CH14-66	herb
Lepidosperma tenue	+	<1 %	35cm	=CH12-1	On sloping edge.
Trachymene sp.	+	<1 %	10cm		not ornata or pilosa

Moora Site CAH015

Described by BRM **Date** 24/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: South end of a ridge on the southern boundary of Cairn Hill Reserve.
MGA Zone 50 407372 **m E** 6620059 **m N** -30.548196 **S lat** 116.034274 **E long**
Habitat: Steep, south-facing slope on medium sized ridge.
Soil: Gravelly, pebbly, cobbly brown sand, skeletal amongst exposed sheet rock and boulders.
Rock Type: Chert. About 70% of surface covered by rock.
Vegetation: Allocasuarina huegeliana low open woodland over Regelia megacephala open scrub over Xanthosia fruticulosa, Hibbertia subvaginata low open shrubland over Stypandra glauca, Dichopogon capillipes very open herbland.
Vegetation condition: Excellent. A few weeds.
Fire age: Not burnt for more than 7-10 years.
Notes: Coordinate datum: WGS'84. 1st coord is for SW peg; 2nd coord is for NE peg. Four dead, four live Xanthorrhoea observed point on southern boundary of plot. Very low recruitment. Note area with Regelia also dead.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	30cm		
Aira caryophyllea	+	<1 %		CH15-10	
Allocasuarina huegeliana	5%	5-10%	3.5-5.5m		
Anagallis arvensis	+	<1 %	10cm	=CH11-12	
Austrostipa trichophylla	+	<1 %	30cm	CH15-5	
Avena barbata	+	<1 %	30cm		
Briza maxima	+	<1 %	20cm		
Burchardia umbellata	+	<1 %	30cm	CH15-1	Burchardia
Caladenia flava subsp. flava	+	<1 %	15cm	CH15-4	Orchid
Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %	1.8m	=CH11-22	Calothamnus ?quadrifidus
Chamaescilla corymbosa var. corymbosa	+	<1 %	30cm	CH15-7	
Cheilanthes adiantoides	+	<1 %	15cm	=CH11-9	Cheilanthes
Desmocladus flexuosus	+	<1 %	20cm		
Dichopogon capillipes	+/-1	<1 %	30cm	=CH13-22	Dichopogon
Dioscorea hastifolia	+	<1 %	1.8m		Dioscorea
Diuris aff. recurva	+	<1 %	30cm	CH15-57	Donkey orchid
Drosera aff. macrantha	+	<1 %	45cm	CH15-6,54	Drosera Climber
Ehrharta longiflora	+	<1 %	20cm		
Eriochilus dilatatus	+	<1 %	15cm	CH15-52	Orchid (side leaf)
Hibbertia subvaginata	1-2	1-5%	1m		
Hypochaeris glabra	+	<1 %	15cm	=CH13-24	
Lepidosperma leptostachyum	+	<1 %	35cm	CH15-58	
Lepidosperma tenue	+	<1 %	35cm	CH15-3	
Melaleuca calyptroides	+	<1 %	1.6m	=CH11-32	
Pterostylis recurva	+	<1 %	30cm	CH15-2	Orchid
Pterostylis sanguinea	+	<1 %	25cm	CH15-50	Orchid green hood
Pterostylis scabra	+	<1 %	15cm	CH15-59	Orchid green hood
Pterostylis spathulata	+	<1 %	25cm	CH15-9	Orchid
Regelia megacephala	60-70%	50-75%	2.5-5m		
Stypandra glauca	3-5	1-5%	40cm		Stypandra glauca
Thysanotus manglesianus	+	<1 %	35cm	CH15-55,5	Thysanotus Climber

Trachymene pilosa	+	<1 %	5cm	CH15-11	short hairs
Ursinia anthemoides	+	<1 %	15cm		
Vulpia myuros var. hirsuta	+	<1 %	10cm	CH15-8	Grass
Xanthorrhoea drummondii	+	<1 %	60cm		juvenile
Xanthosia fruticulosa	2-3	1-5%	30cm	=CH11-1	Xanthosia
Allocasuarina campestris	+	<1 %	2.5m		
Borya sphaerocephala	+	<1 %	10cm		Borya
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	35cm		
Kunzea praestans	+	<1 %	2.2m		
Neurachne alopecuroidea	+	<1 %	15cm	=CH13-2	Neurachne

Moora Site CAH016

Described by MET **Date** 24/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: South side of Cairn Hill Nature Reserve.
MGA Zone 50 407590 **m E** 6620015 **m N** -30.54861 **S lat** 116.036543 **E long**
Habitat: Lower slope in valley between two ridges, adjacent to but not including a small poorly defined drainage line and below a stabilized scree slope.
Soil: Gravelly, pebbly light brown silty sand/loam.
Vegetation: Eucalyptus salmonophloia, (Eucalyptus wandoo subsp. wandoo) woodland over Dodonaea inaequifolia high shrubland over Acacia erinacea open shrubland over Austrostipa scabra, Austrostipa elegantissima, Austrostipa trichophylla, Austrodanthonia setacea scattered grasses.
Vegetation condition: Very good to excellent.
Fire age: Not burnet for more than 10 years.
Notes: Coordinate datum: WGS'84. 1st coord is NE peg; 2nd coord is SW peg; very few annuals where the ground is a bit more gravelly/pebbly. 30x30 only to the north and south to fit the vegetation community type. <10% of CAH(16-1) in plot but 10-15% over the stand. Pair of white cockies. Pink and greys roost here and possibly nest in hollow 14m up.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia erinacea	5%	5-10%	1-1.6m	=CH14-3	
Aira caryophyllea	+	<1 %	5cm	CH16-5	WRONG specimen #
Allocasuarina campestris	+	<1 %	3.5m		
Austrodanthonia setacea	+	<1 %	8cm	CH16-12	
Austrostipa elegantissima	+	<1 %	45cm	CH16-6	
Austrostipa scabra	+	<1 %	5cm	CH16-8	
Austrostipa trichophylla	+	<1 %	10cm	CH16-13	
Avena barbata	+	<1 %	30cm		
Caesia (Moora hairy stem)	+	<1 %	10cm	CH16-7	
Calandrinia eremaea	+	<1 %		CH16-16	Det provisional
Calandrinia sp.	5%	5-10%	3-7cm	=CH12	
Calotis hispidula	+	<1 %	2cm	CH16-15	
Cheilanthes adiantoides	1	<1 %	10-15cm		Cheilanthes austro?
Comesperma volubile	+	<1 %	1.7m		Overhanging
Crassula colorata var. colorata	+	<1 %	3-8cm		
Daviesia benthamii subsp. benthamii	2	1-5%	80cm	CH16-2	
Dichopogon capillipes	+	<1 %	20cm	=CH10-52	?Dichopogon
Dioscorea hastifolia	1	<1 %	1.6m		
Dodonaea inaequifolia	25-35%	25-33.3%	3-4m	=CH10-1	
Ehrharta longiflora	2-3	1-5%	15-60cm		
Eremophila lehmanniana	+	<1 %	60cm(2.5	CH16-3,54	?Eremophila
Erodium cygnorum	+	<1 %	3cm	=CH14-53	
Eucalyptus salmonophloia	10-15%	10-25%	12-20m	CH16-1	
Hypochaeris glabra	+	<1 %	2cm		Cats tongue-leaf
Hypoxis glabella var. leptantha	+	<1 %	12cm	=CH14-59	Lilly
Neurachne alopecuroidea	+	<1 %	8cm		Neurachne
Pterostylis setulosa	+	<1 %	1cm	CH16-51	Flat leaf-base Pterostylis
Ptilotus divaricatus var. divaricatus	2	1-5%	1m	=CH14-5	
Rhagodia drummondii	+	<1 %	25cm	CH16-11	
Rhagodia preissii subsp. preissii	1	<1 %	90cm	CH16-4	Also 30x30 and CH16-52, 57.
Rhodanthe polycephala	+	<1 %	5-8cm	CH16-14,5	Asteraceae
Thysanotus manglesianus	+	<1 %		CH16-10	Thysanotus patersonii
Trachymene cyanopetala	+	<1 %	8cm		Trachymene: not pilosa,
Trachymene ornata	+	<1 %	10cm		

Trachymene pilosa	+	<1 %	10cm		
Tripteris clandestina	+	<1 %	15cm	CH16-9,53	Asteraceae
Trymalium daphnifolium	+	<1 %	1.6m	=CH14-2	
Ursinia anthemoides	+	<1 %	10cm		
Vulpia myuros var. hirsuta	+	<1 %	12cm		
Wahlenbergia gracilenta	+	<1 %	15cm		usual
Acacia ligustrina	+	<1 %	2.5m	CH16-56	
Arctotheca calendula	+	<1 %	12cm		
Bromus diandrus	+	<1 %	10cm	=CH14	
Eucalyptus wandoo subsp. wandoo	+	<1 %			
Maireana marginata	+	<1 %	2cm	CH16-55	hairy
Parietaria debilis	+	<1 %	30cm	CH16-58	herb (?Solanum ?Nicotiana)
Plantago debilis	+	<1 %	2cm	=CH14	
Pterostylis scabra	+	<1 %	20cm	=CH14-57	
Sonchus oleraceus	+	<1 %	8cm		

Moora **Site** CAH017

Described by BRM **Date** 24/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Ridge near southern end of Cairn Hill Reserve (CAH13 on east-facing slope and CAH15 on south-facing slope of this ridge).
MGA Zone 50 407451 **m E** 6620171 **m N** -30.547192 **S lat** 116.035107 **E long**
Habitat: Flat crest of low ridge.
Soil: Gravelly, pebbly, cobbly brown sandy loam with some exposed sheet rock.
Rock Type: Chert. Rock cover of surface is 40-50%.
Vegetation: Allocasuarina huegeliana scattered low trees over Allocasuarina campestris, Kunzea praestans high shrubland to open scrub over Melaleuca calyptroides, Isopogon divergens shrubland over Calytrix leschenaultii low open shrubland over Borya sphaerocephala, Stylidium septentrionale very open herbland.
Vegetation condition: Excellent (few weeds).
Fire age: Not burnt for more than 7 to 10 years.
Notes: Coordinate datum: WGS'84. 1st coord is for NW peg; 2nd coord is for SE peg. Allocasuarina huegeliana trees at northern end of quadrat.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	2cm		
Allocasuarina campestris	20-25%	10-25%	2.5m		
Allocasuarina huegeliana	2%	1-5%	4m		
Arctotheca calendula	+	<1 %	2cm	CH17-58	Daisy (germinated in kangaroo dung)
Austrostipa nitida	+	<1 %	5cm	CH17-12	no flower spike
Borya sphaerocephala	3-5	1-5%	6cm		Borya
Burchardia umbellata	+	<1 %	20cm	CH17-53	Burchardia
Calandrinia calyptrata	+	<1 %	6cm	CH17-11	
Calytrix leschenaultii	2	1-5%	35cm	CH17-3	Calytrix purple
Cassytha pomiformis	2-3	1-5%	1.5m	CH17-5	Cassytha
Chamaescilla corymbosa var. corymbosa	+	<1 %	5cm	CH17-55	1xleaf - underside red
Crassula colorata var. colorata	+	<1 %	2cm	CH17-9	Crassula
Daviesia dielsii	+	<1 %	50cm		
Desmocladus flexuosus	+	<1 %	20cm		
Dichopogon capillipes	+	<1 %	10cm	CH17-59	
Drosera aff. macrantha	+	<1 %	30cm	CH17-57	
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1cm	CH17-50,5	red rosette leaf
Drosera macrantha subsp. macrantha	+	<1 %	1cm	CH17-7	rosette
Eriochilus helonomos	+	<1 %	15cm	CH17-60	Orchid
Hibbertia subvaginata	+	<1 %	35cm		
Hypochaeris glabra	+	<1 %	10cm	=CH13-24	
Hypochaeris radicata	+	<1 %	1cm	CH17-52	
Isopogon divergens	10-15	10-25%	1.2m	CH17-2	Isopogon
Kunzea praestans	2	<1 %	2m	CH17-64	
Melaleuca calyptroides	10-15	10-25%	1.8m	CH17-1	
Neurachne alopecuroidea	+	<1 %	15cm	CH17-8	
Opercularia vaginata	+	<1 %	25cm	CH17-10	Opercularia
Platysace cirrosa	+	<1 %	15cm	CH17-54	
Pterostylis sanguinea	+	<1 %	15cm	CH17-61,6	green hood orchid

Stylidium septentrionale	1-2	1-5%	10cm	CH17-4	
Stypandra glauca	+	<1 %	35cm		Stypandra
Thysanotus manglesianus	+	<1 %	15cm	CH17-56	Climber
Trachymene cyanopetala	+	<1 %	6cm		Trachymene hairy
Trachymene pilosa	+	<1 %	6cm	CH17-13A	short hairs
Ursinia anthemoides	+	<1 %	20cm		
Vulpia myuros var. hirsuta	+	<1 %	10cm	CH17-6	Grass
Xanthorrhoea drummondii	2	1-5%	2m		
Xanthosia fruticulosa	+	<1 %	15cm	=CH11-1	Xanthosia
Austrodanthonia sp.	+	<1 %	30cm	CH17-63	WRONG specimen #
Calothamnus sanguineus	+	<1 %	90cm	CH17-18	Calothamnus ? sanguineus
Cheilanthes adiantoides	+	<1 %	10cm		Cheilanthes
Diuris aff. recurva	+	<1 %	25cm	CH17-65	?Donkey orchid
Lechenaultia biloba	+	<1 %	35cm	CH17-14	small upright shrub
Melaleuca radula	+	<1 %	1.0m	CH17-13B	Melaleuca radula
Nemcia acuta	+	<1 %	35cm	CH17-15	
Regelia megacephala	+	<1 %	2.5m		
Schoenus brevisetis	+	<1 %	20cm	CH17-16	
Tripterococcus brunonis	+	<1 %	30cm	CH17-17	Tripterococcus

Moora **Site** CAH018

Described by BRM **Date** 25/08/03 **Type:** QUADRAT 10x10 m, 30x30

Location: Mid part of Cairn Hill Reserve, just east (upslope) of track across middle of Cairn Hill Reserve between northern and southern gravel pits.

MGA Zone 50 407467 **m E** 6620592 **m N** -30.543395 **S lat** 116.035312 **E long**

Habitat: Moderate, north-west facing lower to mid-slope of low ridge.

Soil: Gravelly, pebbly pale yellow-brown loamy sand. (NB Uncertain if soil surface is undisturbed - there is a lot of disturbance too.)

Rock Type: ?Chert.

Vegetation: Eucalyptus eudesmioides subsp. eudesmioides low woodland to low open forest (distribution very patchy) over Allocasuarina campestris closed scrub over Baeckea sp. Moora (R. Bone 1993/1), Calytrix leschenaultii low open shrubland over Lomandra (CH18-3), Neurachne alopecuroidea scattered herbs and grasses.

Vegetation condition: Uncertain as to whether very good regeneration following a hot fire or clearing or whether in very good condition with a natural paucity of herbs, grasses and sedges.

Notes: Coordinate datum: WGS84. Datum of coordinates was WGS'84. 1st coordinate is for NW peg; 2nd coord is for SE peg. Appears to be regeneration from a hot fire (even aged young Allocasuarina campestris about 80cm to 1.3m tall) or some other disturbance. Old revegetated excavated area (excavated to about 1m depth) to north of plot. Uncertain as to whether some broad clearing many years ago for gravel mining or perhaps a hot fire. Paucity of herbs indicates there may have been soil surface disturbance in past. 30x30 area search limited to 5m to north of 10x10 on north side (old excavations) and also avoided large areas without the Eucalyptus eudesmioides subsp. eudesmioides.

Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Allocasuarina campestris	50-60%	50-75%	0.80-1.3m		
Baeckea sp. Moora (R. Bone 1993/1)	5-6%	5-10%	40-70cm	=CHN10-1	
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	10cm		
Burchardia umbellata	+	<1 %	12cm	CH18-4	
Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %	1.2m	CH18-7	
Calytrix leschenaultii	1-2	1-5%	35cm		
Desmocladus flexuosus	+	<1 %	10cm		
Dianella revoluta var. divaricata	+	<1 %	15cm		
Dichopogon capillipes	+	<1 %	3cm	=CH10-53	Dichopogon flat top
Eucalyptus eudesmioides subsp. eudesmioides	35-45%	33.3-50%	4-5m	CH18-1	
Hibbertia subvaginata	+	<1 %	20cm	CH18-6	
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	30cm	CH18-5	
Lepidosperma costale	+	<1 %	12cm	CH18-3	Sedge, not Lomandra.
Lomandra aff. micrantha subsp. micrantha	+	<1 %	35cm	CH18-18	
Neurachne alopecuroidea	+	<1 %	4cm	CH18-2	
Pterostylis setulosa	+	<1 %	1cm	=CHN3-56	Flat base
Xanthorrhoea drummondii	+	<1 %	30cm		Leaves chewed of at bases - 28 parrot damage
Acacia congesta subsp. congesta	+	<1 %	1.1m		
Acacia lasiocarpa var. sedifolia	+	<1 %	60cm	CH18-16	DET BRM

Astroloma serratifolium	+	<1 %	15cm	CH18-17	
Borya sphaerocephala	+	<1 %	3cm		
Caladenia flava subsp. flava	+	<1 %	4cm		
Dampiera lavandulacea	+	<1 %	50 cm	CH1811(B)	Number used twice?
Daviesia dielsii	+	<1 %	35cm	CH18-12	
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1cm	CH18-9	
Drosera pallida	+	<1 %	45cm	CH18-10	
Hakea incrassata	+	<1 %	50cm	CH18-8	WRONG specimen #
Lepidosperma leptostachyum	+	<1 %	30cm	CH18-13	
Melaleuca radula	+	<1 %	30cm	CH18-15	
Platysace cirrosa	+	<1 %	12cm	=ER2-53	
Pterostylis sanguinea	+	<1 %	15cm	=CHN6-55	Pterostylis 'bottom lip'
Rhagodia drummondii	+	<1 %	20cm	CH18-11	Specimen No. wrong.
Stylidium septentrionale	+	<1 %	5cm	=CHN8-59	
Stypandra glauca	+	<1 %	30cm		
Thomasia grandiflora	+	<1 %	30cm	CH18-14	
Xanthosia fruticulosa	+	<1 %	12cm		

Moora **Site** CAH019

Described by BRM **Date** 24/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: South end of ridge near the southern boundary of Cairn Hill Reserve.
MGA Zone 50 407436 **m E** 6620064 **m N** -30.548156 **S lat** 116.034942 **E long**
Habitat: South-west-facing, steep mid-slope on southern end of medium height ridge.
Soil: Gravelly brown sand.
Rock Type: Chert. Some outcropping near surface.
Vegetation: Allocasuarina campestris closed scrub over Isopogon divergens open shrubland over Daviesia (19-1) scattered low shrubs over Neurachne alopecuroidea scattered grasses.
Vegetation condition: Excellent (very few weeds).
Fire age: Not burnt for 7-10 years.
Notes: Coordinate datum: WGS'84. 1st coord is for NW peg; 2nd coord is for SE peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Aira caryophyllea	+	<1 %	6cm	CH19-2	
Allocasuarina campestris	80-90%	>75%	2.5-3m		
Astroloma serratifolium	+	<1 %	20cm	CH19-12,5	
Blennospora drummondii	+	<1 %	4cm		Blennospora
Burchardia umbellata	+	<1 %	20cm	CH19-55	succulent leaf
Caladenia flava subsp. flava	+	<1 %	15cm	CH19-4	Orchid
Calytrix leschenaultii	+	<1 %	50cm	=CH17-3	Calytrix
Chamaescilla corymbosa var. corymbosa	+	<1 %	4cm	CH19-52	Orchid 1-leaf red u/nth
Cheilanthes adiantoides	+	<1 %	15cm	=CH11-9	Cheilanthes
Conostylis androstemma	+	<1 %	15cm	CH19-56,6	
Daviesia hakeoides subsp. subnuda	1-2%	1-5%	50cm	CH19-1	
Desmocladus flexuosus	+	<1 %	20cm		
Dichopogon capillipes	+	<1 %	5cm	=CH13-22	
Diuris aff. recurva	+	<1 %	30cm	CH19-15,5	Also 30x30. Orchid
Drosera aff. macrantha	+	<1 %	40cm	CH19-53	Climber
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	2cm	CH19-51	rosette base
Drosera macrantha subsp. macrantha	+	<1 %	35cm	CH19-5	
Ehrharta longiflora	+	<1 %	30cm		
Eriochilus helonomos	+	<1 %	20cm	CH19-50	Orchid side leaf
Genus sp.	+	<1 %	3cm	CH19-7	
Hypochaeris glabra	+	<1 %	15cm	=CH13-24	
Isopogon divergens	2-3%	1-5%	1.3m	=CH17-2	Isopogon
Lepidobolus chaetocephalus	+	<1 %	20cm	CH19-16,6	Also 30x30. Restionaceae
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	20cm	CH19-8	
Millotia tenuifolia var. tenuifolia	+	<1 %	5cm	CH19-6	Millotia
Neurachne alopecuroidea	+/-1%	<1 %	15cm	CH19-9	
Platysace cirrosa	+	<1 %	25cm	CH19-11,5	
Pterostylis aff. rufa	+	<1 %	20cm	CH19-13	Orchid
Pterostylis recurva	+	<1 %	15cm	CH19-57	
Pterostylis sanguinea	+	<1 %	25cm	CH19-14,6	Orchid
Pterostylis setulosa	+	<1 %	15cm	CH19-10	Orchid

Stylidium septentrionale	+	<1 %	10cm	=CH17-4	
Thysanotus manglesianus	+	<1 %	25cm	CH19-66	
Trachymene ornata	+	<1 %	4cm		White top
Vulpia myuros var. hirsuta	+	<1 %	10cm	CH19-3	Grass
Xanthosia fruticulosa	+	<1 %	20cm	=CH11-1	Xanthosia
Calothamnus sanguineus	+	<1 %	40cm	CH19-63	
Cassytha pomiformis	+	<1 %	1m	=CH17-5	
Haemodorum paniculatum	+	<1 %	30cm	CH19-64	
Haemodorum simulans	+	<1 %	35cm	CH19-17	Lilly
Melaleuca calyptroides	+	<1 %	1m	=CH17-1	
Melaleuca radula	+	<1 %	70cm	CH19-60	
Rhodanthe polycephala	+	<1 %	3cm	CH19-61	Daisy? Seedling det. provisional.
Ursinia anthemoides	+	<1 %	20cm		
Xanthorrhoea drummondii	+	<1 %	2m		

Moora **Site** CAH020

Described by BRM **Date** 25/04/03 **Type:** QUADRAT 10x10 m, 30x30
Location: About 100m north of the southern boundary of Cairn Hill Reserve and on the west side of of the Reserve. About 100m west of CH15.
MGA Zone 50 407269 **m E** 6620015 **m N** -30.548585 **S lat** 116.033196 **E long**
Habitat: Lower, west-facing, gentle slope of a low rocky ridge. On a fault (or dyke) trending north-south along the slope.
Soil: Gravelly, pebbly, cobbly bouldery brown sand.
Rock Type: ?Chert
Vegetation: Eucalyptus wandoo ssp. wandoo open forest over Dichopogon capillipes, Cheilanthes adiantoides scattered herbs and ferns and Calandrinia sp. scattered annual herbs.
Vegetation condition: Very good to excellent. Considerable soil disturbance in surrounding areas.
Notes: WGS'84 datum. 1st coord for NW peg; 2nd coord for SE peg. Considerable leaf and stick litter. 30x30 search area only about 1-2m wide on east side (up to Allocasuarina campestris scrub).
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Caesia (Moora hairy stem)	+	<1 %	10cm	CH20-3	
Calandrinia sp.	+	<1 %	2cm	CH20-4	
Chamaescilla corymbosa var. corymbosa ?corymbosa	+	<1 %	5cm	=CHN2-57	Chamaescilla
Cheilanthes adiantoides	+	<1 %	10-15cm		
Crassula colorata var. colorata	+	<1 %	3cm	CH20-9	
Dioscorea hastifolia	+	<1 %	5cm		
Ehrharta longiflora	+	<1 %	25cm		
Eriochilus helonomos	+	<1 %	4cm	=CH14-61	leaf-stem orchid
Eucalyptus wandoo subsp. wandoo	50-60%	50-75%	8-12m	CH20-1	
Genus sp.	+	<1 %	5cm	CH20-8	Grass
Hypochaeris glabra	+	<1 %	2cm		
Lomandra (Moora twisty)	+	<1 %	20cm	CH20-10	
Platysace cirrosa	+	<1 %	25cm	=ER2-53	Climbing
Pterostylis setulosa	+	<1 %	1cm	=CHN3-56	Pterostylis flat base
Rhagodia drummondii	+	<1 %	15cm	CH20-6	Chenopodiaceae
Thysanotus manglesianus	+	<1 %	20cm	CH20-2,5	Climber
Trachymene cyanopetala	+	<1 %	3cm	CH20-7	
Ursinia anthemoides	+	<1 %	10cm		
Allocasuarina campestris	+	<1 %	3m		
Anagallis arvensis	+	<1 %	4cm	=CHN3-62	
Arctotheca calendula	+	<1 %	4cm		Capeweed
Austrostipa trichophylla	+	<1 %	4cm	CH20-12	hairy ?Austrodanthonia
Caladenia flava subsp. flava	+	<1 %	3cm		
Erodium cygnorum	+	<1 %	4cm	=ER17-52	?Erodium
Gilberta tenuifolia	+	<1 %	3cm	=ER17-59	Daisy
Hypoxis sp.	+	<1 %	15cm		common Hypoxis
Millotia aff. tenuifolia (Moora: CH20-11)	+	<1 %	3cm	CH20-11	Aff. tenuifolia. Hairy grey daisy
Neurachne alopecuroidea	+	<1 %	3cm		
Opercularia vaginata	+	<1 %	12-15cm	=JT12-4	O. ?vaginata
Parietaria debilis	+	<1 %	3-15cm	CH20-13	soft green leaf
Tripteris clandestina	+	<1 %	15cm	=JT3-50	stink daisy

CAIRN HILL NORTH

Moora **Site** CHN001
Described by MJH **Date** 26/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill North is the ridge of Cairn Hill extending north on to 'Goonderoo'. The plot is on the west side of the ridge, approximately 1 km SSE of the entry to 'Goonderoo' from the Midlands Road.
MGA Zone 50 407243 **m E** 6622325 **m N** -30.527739 **S lat** 116.033133 **E long**
Habitat: Gentle west facing slope.
Soil: Skeletal, fine grey-brown silty loam.
Rock Type: Chert gravel and cobbles.
Vegetation: Allocasuarina campestris open heath to low open heath over Borya sphaerocephala, Hypoxis occidentalis var. occidentalis, Austrodanthonia setacea, *Vulpia myuros var. hirsuta very open herbland/grassland.
Vegetation condition: Very good to excellent.
Fire age: Old.
Notes: Wide clear track about 8m to north of 10x10 (regen on track <2 years old).
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	70	50-75%	0.75-2 m		
Austrodanthonia setacea	+	<1 %	15 cm		Grass
Avena barbata	+	<1 %	6cm		
Borya sphaerocephala	10-15	10-25%	5 cm	CHN1-1	
Briza maxima	+	<1 %	20 cm		
Burchardia umbellata	+	<1 %	30cm	CHN1-55	
Chamaescilla corymbosa var. corymbosa	+	<1 %	10-15 cm	CHN1-2	
Cheilanthes adiantoides	1	<1 %	10 cm	Cover re-assessed in winter 2003	
Cyanicula deformis	+	<1 %	12cm	CHN1-50	
Diuris aff. recurva	+	<1 %	20cm	CHN1-54	Orchid
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1 cm	CHN1-7	Rosette. ssp.??
Drosera macrantha subsp. macrantha	+	<1 %	40cm	CHN1-15,51	
Dryandra sessilis var. sessilis	1	<1 %	3 m		1 only
Ehrharta longiflora	+	<1 %	12cm		
Elythranthera brunonis	+	<1 %	15 cm	CHN1-8	
Genus sp.	+	<1 %	20 cm	CHN1-9	Herb
Haemodorum paniculatum	+	<1 %	35cm	CHN1-14, 58	
Hypoxis occidentalis var. occidentalis	1-2%	1-5%	15cm	CHN1-52 winter 2003	Cover assessed in
Neurachne alopecuroidea	+	<1 %	10 cm		
Parentucellia latifolia	+	<1 %	10 cm	CHN1-12	herb
Pentaschistis airoides	+	<1 %	5-8 cm	CHN1-3	Grass
Platysace cirrosa	+	<1 %	12cm	=ER2-53	Climber
Pterostylis aff. nana	+	<1 %	12cm	CHN1-59	Flat base
Schoenus clandestinus	10-12%	10-25%	3cm	CHN1-6, 53	
Stylidium calcaratum	+	<1 %	7 cm	CHN1-10	
Stylidium septentrionale	+	<1 %	10 cm	CHN1-13	
Thysanotus manglesianus	+	<1 %	30cm	CHN1-57	Climber
Trachymene ornata	+	<1 %	5 cm	CHN1-5, 56	
Vulpia myuros var. hirsuta	+	<1 %	10 cm	CHN1-4	Grass
Acacia aristulata	+	<1 %	15 cm		juv
Blennospora drummondii	+	<1 %	5 cm	CHN1-206 Grey daisy	Also CHN1-62, 63.
Caladenia flava subsp. flava	+	<1 %	6cm		
Calytrix leschenaultii	+	<1 %	20-30 cm		
Eriochilus helonomos	+	<1 %	10cm	=CH14-61	side leaf orchid
Goodenia hassallii	+	<1 %	30 cm	CHN1-21	??
Haemodorum simulans	+	<1 %	15 cm	CHN1-17	
Hibbertia subvaginata	+	<1 %	50 cm		
Hyalosperma cotula	+	<1 %	5 cm	CHN1-22	White daisy
Lupinus angustifolius	+	<1 %	20 cm		Blue lupin
Podolepis lessonii	+	<1 %	10-15 cm	CHN1-18,6	Daisy
Trachymene cyanopetala	+	<1 %	5 cm	CHN1-19	
Trifolium subterraneum	+	<1 %	2cm	CHN1-60	Clover
Xanthorrhoea drummondii	+	<1 %	1 m		

Moora **Site** CHN002
Described by BRM **Date** 26/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill North is the ridge of Cairn Hill extending north on to 'Goonderoo'. The plot is at the northern end of Cairn Hill North, approximately 1 km SE of the entry to 'Goonderoo' from the Midlands Road.
MGA Zone 50 407167 **m E** 6622563 **m N** -30.525585 **S lat** 116.032362 **E long**
Habitat: Gentle northwest-facing upper slope, just below crest of low ridge.
Soil: Pebbly, cobbly, gravelly grey loamy sand.
Rock Type: Chert outcrop and boulders, 90%+ cover.
Vegetation: Regelia megacephala, (Kunzea praestans, Allocasuarina campestris) open to closed scrub over Hibbertia subvaginata scattered low shrubs over Xanthosia fruticulosa scattered low shrubs over Stypandra glauca, Dichopogon capillipes very open herbland.
Vegetation condition: Very good to excellent. Not much evidence of grazing. Very few weeds: some non-aggressive weed invasion.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	4-5	1-5%	2 m		
Arctotheca calendula	+	<1 %	6cm		
Austrodanthonia setacea	+	<1 %		CHN2-12	
Avena barbata	+	<1 %	4cm		
Blennospora drummondii	+	<1 %	3cm	=CHN1-62	Daisy
Boronia ramosa subsp. anethifolia	+	<1 %	40cm	CHN2-14,5	Boronia
Bossiaea sp. Cairn Hill (M Henson CH2-28)				CHN2-19	
Burchardia umbellata				CHN2-21	
Caladenia flava subsp. flava	+	<1 %		CHN2-9	Orchid
Calytrix leschenaultii	+	<1 %	1 m	CHN2-13	
Chamaescilla corymbosa var. corymbosa				CHN2-20	
Cheilanthes adiantoides	+	<1 %		CHN2-6	
Desmocladus flexuosus				CHN2-22	
Dichopogon capillipes	1	<1 %		CHN2-3,50	Mauve lilly, dead base
Dioscorea hastifolia	+	<1 %			
Diuris aff. recurva	+	<1 %	40cm	=CHN1-54	
Drosera aff. macrantha	+	<1 %		CHN2-8	=WO1-23
Ehrharta longiflora	+	<1 %	8cm		
Hibbertia subvaginata	1-2%	<1 %	<1m	CHN2-53	
Hypochaeris glabra				CHN2-17	
Kunzea praestans	2	1-5%	2-2.5 m		
Neurachne alopecuroidea	+	<1 %		CHN2-11	
Pentaschistis airoides	+	<1 %		CHN2-5	
Pityrodia dilatata	+	<1 %		CHN2-18	
Platysace cirrosa	+	<1 %	15cm	=ER2-53	Climber
Podotheca angustifolia	+	<1 %	4cm	=CHN3-52	Daisy
Pterostylis sanguinea	+	<1 %	25cm	=CHN6-55	Pterostylis 'bottom lip'
Pterostylis setulosa	+	<1 %	10cm	=CHN3-56	flat base
Regelia megacephala	70-75	50-75%	2-3 m		
Scaevola phlebopetala	+	<1 %		CHN2-10	
Stypandra glauca	2-3	1-5%	60 cm	CHN2-1	
Trachymene cyanopetala	+	<1 %	3cm	CHN2-51B	
Trachymene ornata	+	<1 %		CHN2-51A	Also CHN2-25
Tricoryne elatior	+	<1 %	30 cm	CHN2-15	
Tripterococcus brunonis	+	<1 %	30 cm	CHN2-16,2	Redet 05/05
Ursinia anthemoides	+	<1 %			
Vulpia myuros var. hirsuta	+	<1 %		CHN2-4	grass
Xanthosia fruticulosa	1-2	1-5%	30 cm	CHN2-2	
Acacia aristulata	+	<1 %		CHN2-24	
Allocasuarina huegeliana	+	<1 %	3.5-4m		
Briza maxima	+	<1 %	35cm		
Calandrinia sp.	+	<1 %	2cm	CHN2-54	
Crassula colorata var. colorata	+	<1 %	1cm	CHN2-55	
Cyanicula deformis	+	<1 %	12cm	=CHN1-50	
Lawrencella rosea				CHN2-30	Daisy
Lepidosperma tenue				CHN2-29	sedge
Pterostylis sp.	+	<1 %	35cm	CHN2-56	
Stylidium septentrionale	+	<1 %		CHN2-27	
Xanthorrhoea drummondii	+	<1 %			

Moora **Site** CHN003

Described by MJH **Date** 26/10/00 **Type:** QUADRAT 10x10 m, 30x30

Location: Cairn Hill North is the ridge of Cairn Hill extending north on to 'Goonderoo'. The plot is on the crest of the ridge approximately 100 m to the NNE of CHN001.

MGA Zone 50 407200 **m E** 6622506 **m N** -30.526102 **S lat** 116.032701 **E long**

Habitat: Gentle west-facing upper slope, slightly below crest of low ridge.

Soil: Pebbly, cobbly, bouldery grey brown silty loam.

Rock Type: Chert outcrops and cobbles, cover 70-90%.

Vegetation: Kunzea praestans, (Allocasuarina campestris) open scrub to high shrubland over Hibbertia subvaginata scattered shrubs over Dichopogon capillipes, Chamaescilla corymbosa var. corymbosa scattered herbs.

Vegetation condition: Generally very good, weed invasion in parts stop it being excellent (very little Avena barbata and Ehrharta longiflora in the 10x10).

Notes: Daviesia dielsii: group of 7 plants @ 50J 0406999, UTM 6622354, and others downslope. Several dead Hibbertia subvaginata plants. 30x30 search area didn't include Regelia scrub to east.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	5 cm		juv
Allocasuarina campestris	10-12	10-25%	2 m		
Austrostipa tenuifolia	+	<1 %	20-30 cm	CHN3-17	
Avena barbata	+	<1 %	15 cm		
Blennospora drummondii	+	<1 %	3cm	=CHN1-62	Daisy
Bossiaea sp. Cairn Hill (M Henson CH2-28)	1-2	1-5%	70 cm		juv
Briza maxima	+	<1 %	15 cm		
Burchardia umbellata	+	<1 %	35cm	=CHN1-55	
Caladenia flava subsp. flava	+	<1 %	15 cm	CHN3-16	
Calandrinia sp.	+	<1 %	2cm	CHN3-59	
Calytrix leschenaultii	+	<1 %	20 cm		
Chamaescilla corymbosa var. corymbosa	+	<1 %	15-20 cm	CHN3-7	
Cheilanthes adiantoides	+	<1 %	5-8 cm		
Crassula exserta	+	<1 %	1cm	CHN3-60	
Cyanicula deformis	+	<1 %	15cm	=CHN1-50	Blue Beard orchid
Desmocladus flexuosus	+	<1 %	15 cm	CHN3-3	
Dichopogon capillipes	1-2	1-5%	30 cm		
Dioscorea hastifolia	+	<1 %	1 m		
Diuris aff. recurva	+	<1 %	20cm	=CHN1-54	Donkey orchid
Drosera aff. macrantha	+	<1 %	15-20 cm	CHN3-13	Also CHN3-50,51.
Drosera pallida	+	<1 %	15 cm	CHN3-8	
Ehrharta longiflora	+	<1 %	20-30 cm		
Goodenia berardiana	+	<1 %	20cm	=ER8-52	
Hibbertia subvaginata	2%	1-5%	<1 m		
Hypochaeris glabra	+	<1 %	5 cm		
Kunzea praestans	40-60	33.3-50%	2-3 m		
Melaleuca calyptroides	+	<1 %	1 m		
Neurachne alopecuroidea	+	<1 %	30 cm		
Opercularia vaginata	+	<1 %	5 cm	CHN3-4a	???herb Not sure of number
Pentaschistis airoides	+	<1 %	5 cm	CHN3-12	
Phyllangium sulcatum	+	<1 %	5 cm	CHN3-4	
Platysace cirrosa	+	<1 %	6cm	=ER2-53	Climber
Podolepis lessonii	+	<1 %	10-20 cm	CHN3-9	
Podotheca angustifolia	+	<1 %	45cm	CHN3-52,5	Climber 4
Pterostylis setulosa	+	<1 %	30cm	CHN3-56,5	Goodeniaceae 7
Scaevola phlebopetala	+	<1 %	50-90cm	CHN3-14,58	
Schoenus nanus	+	<1 %	5 cm	CHN3-5	
Stylidium septentrionale	+	<1 %	5 cm	CHN3-15	
Stypandra glauca	+	<1 %	20 cm	CHN3-10	
Thysanotus manglesianus	+	<1 %	12cm	CHN3-55	Pterostylis 'bottom lip'
Trachymene ornata	+	<1 %	5 cm		
Tricoryne elatior	+	<1 %	30 cm	CHN3-2	
Trifolium sp.				CHN3-18	Not T. arvense
Tripterococcus brunonis	+	<1 %	30 cm	CHN3-1	
Ursinia anthemoides	+	<1 %	15 cm		
Vulpia myuros var. hirsuta	+	<1 %	5 cm	CHN3-6	Grass

Xanthosia fruticulosa	+	<1 %	15 cm		
Anagallis arvensis	+	<1 %	5cm	CHN3-62	
Arctotheca calendula	+	<1 %	15cm		Around base of Nuytsia
Erodium cygnorum	+	<1 %	4cm	=ER17-52	
Guichenotia micrantha	+	<1 %	35cm	CHN3-61	
Lawrencella rosea	+	<1 %	25cm	=CHN4-60	Pink daisy
Nuytsia floribunda	1	<1 %	5 m		
Pityrodia dilatata	+	<1 %	20cm		
Regelia megacephala	+	<1 %	3 m		
Trifolium hirtum	+	<1 %	10cm	CHN3-64	
Trifolium subterraneum	+	<1 %	10cm	CHN3-63	Clover #2
Tripteris clandestina	+	<1 %	25cm	=JT3-50	Stink daisy
Xanthorrhoea drummondii	+	<1 %	1.8m		

Moora Site CHN004

Described by BRM **Date** 26/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill North is the ridge of Cairn Hill extending north on to 'Goonderoo'. The plot is approximately 1.1 km SSE of the entry to 'Goonderoo' from the Midlands Road on a NW facing slope.
MGA Zone 50 407314 **m E** 6621853 **m N** -30.532003 **S lat** 116.033831 **E long**
Habitat: Northwest-facing, moderate sloping mid-slope of low ridge.
Soil: Gravelly, grey sandy loam.
Rock Type: Chert outcrop ~30% cover.
Vegetation: Regelia megacephala open scrub over Allocasuarina campestris open shrubland over Melaleuca alyptroides scattered shrubs over Hibbertia subvaginata scattered low shrubs over Borya sphaerocephala scattered herbs and Lawrencella rosea scattered annual herbs
Vegetation condition: Very good. Evidence of some grazing?
Fire age: Long time unburnt.
Notes: Very rocky. Gridlines to north (2m) and south (4m) of 10x10 plot.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	5-8	5-10%	2 m		
Anagallis arvensis	+	<1 %	1cm	CHN4-50	
Austrodanthonia setacea	+	<1 %		CHN4-13	grass
Austrostipa variabilis				CHN4-12b	
Blennospora drummondii	+	<1 %	20cm	CHN4-57	big leaf daisy
Borya sphaerocephala	1-2	1-5%			=WD2-4
Briza maxima	+	<1 %			
Burchardia umbellata	+	<1 %		CHN4-11	
Caladenia flava subsp. flava	+	<1 %		CHN4-5	Orchid
Calandrinia eremaea	+	<1 %	1cm	CHN4-54	Det provisional
Calytrix leschenaultii	+	<1 %		CHN4-8	
Cassytha pomiformis	+	<1 %		CHN4-10	Climber
Chamaescilla corymbosa var. corymbosa	+	<1 %		CHN4-29	
Crassula colorata var. colorata	+	<1 %	2cm	CHN4-55	
Cyanicula deformis	+	<1 %	10cm	=ER17-51	Blue Beard orchid
Desmocladus flexuosus	+	<1 %	3cm	CHN4-56	Daisy
Dioscorea hastifolia	+	<1 %			Climber
Drosera aff. macrantha	+	<1 %		CHN4-14	Climbing, =WO1-23
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	30cm	CHN4-51	Climber (no fleshy leaves)
Drosera pallida	+	<1 %		=EO1-18	Short fat leaf
Goodenia berardiana	+	<1 %	25cm	=ER8-52	
Hibbertia subvaginata	+	<1 %	1 m		
Hypochaeris glabra	+	<1 %	1cm		
Kunzea praestans	+	<1 %	1-2 m		
Lawrencella rosea	+	<1 %	15cm	CHN4-60,6	Also CHN4-2b; pink daisy, linear leaves
Melaleuca calyptroides	1-2%	1-5%	1.1-1.9m		
Neurachne alopecuroidea	+	<1 %		=WO1-4	
Parentucellia latifolia	+	<1 %		CHN4-12a	
Pentaschistis airoides	+	<1 %		CHN4-3	
Pityrodia dilatata	+	<1 %	10cm		
Podolepis canescens	+	<1 %	35cm	CHN4-58	Pterostylis tall
Podolepis lessonii	+	<1 %	4cm	=ER1-58	Daisy

Pterostylis setulosa	+	<1 %	10cm	=CHN7-58	Flat leaf base
Regelia megacephala	50	50-75%	3 m		
Romulea rosea	+	<1 %	25cm		
Scaevola phlebopetala	+	<1 %		CHN4-4	
Stylidium septentrionale	+	<1 %		CHN4-6	
Stypandra glauca	+	<1 %		=EO1-13	
Thysanotus manglesianus	+	<1 %	12cm	CHN4-52,5	
3					
Trachymene ornata	+	<1 %		CHN4-1	
Trifolium sp.	+	<1 %	2cm	CHN4-59	Clover
Ursinia anthemoides	+	<1 %			
Vulpia myuros var. hirsuta	+	<1 %		CHN4-7	
Allocasuarina huegeliana	+	<1 %			
Arctotheca calendula	+	<1 %	10cm		Capeweed
Austrostipa elegantissima	+	<1 %	40cm	CHN4-63	
Baeckea sp. Moora (R. Bone 1993/1)	+	<1 %	15cm	CHN4-62	
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	15cm	CHN4-64	
Bromus diandrus	+	<1 %	25cm	=ER10-58	
Caesia (Moora hairy stem)	+	<1 %	30cm	CHN4-65	
Calothamnus sanguineus	+	<1 %		CHN4-30	
Cheilanthes adiantoides	+	<1 %		=WO1-19	
Dianella revoluta var. divaricata	+	<1 %	60cm		
Dichopogon capillipes	+	<1 %			Mauve lilly, dead base
Diuris aff. recurva	+	<1 %		CHN4-17	
Eriochilus helonomos	+	<1 %	20cm	=CH14-61	Leaf-stem orchid
Hyalosperma cotula	+	<1 %		CHN4-20	Daisy
Opercularia vaginata				CHN4-22	
Pimelea imbricata var. piligera	+	<1 %		CHN4-26	
Trifolium arvense var. arvense	+	<1 %		CHN4-19	
Xanthorrhoea drummondii	+	<1 %			
Xanthosia fruticulosa	+	<1 %		CHN4-24	

Moora **Site** CHN005

Described by MJH **Date** 23/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill North is the ridge of Cairn Hill extending north on to 'Goonderoo'. The plot is approximately 50 m on the east side of the "York Gum Gully" which runs through the hilltop 150 m east of CHN004.
MGA Zone 50 407491 **m E** 6621755 **m N** -30.532901 **S lat** 116.035667 **E long**
Habitat: Flat to gently sloping, north-facing slope on crest of low ridge.
Soil: Well mulched grey fine loam, skeletal.
Rock Type: Chert outcrop, cobbles, 80-90% cover.
Vegetation: Allocasuarina huegeliana low open woodland over Regelia megacephala, Kunzea praestans high open scrub over Xanthosia fruticulosa low open shrubland with Hypoxis occidentalis var. occidentalis, Cheilanthes adiantoides scattered herbs and ferns.
Veg Condition
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Acacia aristulata	+	<1 %	12 cm		juv
Acacia congesta subsp. congesta	1	<1 %	1 m	CHN5-10	
Allocasuarina huegeliana	15-20	10-25%	5-7 m		
Arctotheca calendula	+	<1 %	10cm		Capeweed
Austrodanthonia setacea	+	<1 %	25 cm	CHN5-5	Grass
Austrostipa tenuifolia	+	<1 %	20 cm	CHN5-7	
Austrostipa variabilis	+	<1 %	30 cm	CHN5-8	Grass
Briza maxima	+	<1 %	5-10 cm		
Burchardia umbellata	+	<1 %	40cm	=GH9-52	
Caladenia flava subsp. flava	+	<1 %	15 cm	CHN5-4	
Calytrix leschenaultii	+	<1 %	20 cm		
Chamaescilla corymbosa var. corymbosa	+	<1 %	4cm	=ER19-50	
Cheilanthes adiantoides	1-2	1-5%	5 cm		
Cyanicula deformis	+	<1 %	12cm	=ER17-51	Blue Beard orchid
Desmocladus flexuosus	+	<1 %	10 cm		
Dichopogon capillipes	+	<1 %	20cm		
Dioscorea hastifolia	+	<1 %	2 m		
Drosera macrantha subsp. macrantha	+	<1 %	30 cm		

Drosera pallida	+	<1 %	20 cm		
Hibbertia subvaginata	+	<1 %	30-50 cm		
Hypochaeris glabra	+	<1 %	1cm		
Hypoxis occidentalis var. occidentalis	1	<1 %	15cm	=ER17-58	
Kunzea praestans	5-6%	5-10%	2-2.5 m		
Neurachne alopecuroidea	+	<1 %	30 cm		
Opercularia vaginata	+	<1 %	10-20 cm	CHN5-3,55	Also recorded in 30x30.
Pterostylis sanguinea	+	<1 %	15cm	CHN5-53	?Opercularia
Pterostylis setulosa	+	<1 %	6cm	=CHN7-58	Pterostylis flat base
Regelia megacephala	20-25	10-25%	3 m		
Silene gallica var. gallica	+	<1 %	35cm	CHN5-50	Climber
Stylidium septentrionale	+	<1 %	5 cm	CHN5-2	
Thysanotus manglesianus	+	<1 %	25cm	CHN5-54	fleshy leaf Thysanotus
Trachymene cyanopetala	+	<1 %	10cm	CHN5-52	
Tripterococcus brunonis	+	<1 %	20 cm	CHN5-9	
Ursinia anthemoides	+	<1 %	5-10 cm		
Xanthorrhoea drummondii	1-2%	1-5%	1.5 m		
Xanthosia fruticulosa	5-10	5-10%	20-30 cm		
Acacia acuminata subsp. acuminata	+	<1 %	6-7 m		
Allocasuarina campestris	2	1-5%	2 m		
Austrostipa compressa	+	<1 %	30 cm		
Dianella revoluta var. divaricata	+	<1 %	80 cm		
Goodenia berardiana	+	<1 %	8cm	=ER8-52	
Lawrencella rosea	+	<1 %	15cm	=CHN4-60	pink daisy linear leaf
Trachymene ornata	+	<1 %	5 cm		

Moora **Site** CHN006

Described by BRM **Date** 26/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill North is the ridge of Cairn Hill extending north on to 'Goonderoo'. The plot is on top of the ridge, approximately 100 m south of CHN005.
MGA Zone 50 407487 **m E** 6621668 **m N** -30.533685 **S lat** 116.035618 **E long**
Habitat: Ridge-top.
Soil: Pebbly, cobbly, bouldery grey loamy sand amongst exposed sheet rock.
Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Kunzea praestans open heath over Hibbertia subvaginata low open shrubland over Xanthosia fruticulosa low open shrubland over Neurachne alopecuroidea, Austrostipa variabilis, Austrodanthonia setacea, Dichopogon capillipes very open grass/herbland.
Vegetation condition: Good to very good. Considerable weed cover on the north side of the plot.
Notes: Numerous Kunzea praestans and Hibbertia subvaginata deaths (deaths not included in cover estimates). Old dead Xanthorrhoea drummondii in plot. Regelia scrub 8-10m north of 10x10 not included in the 30x30 search area - search only included Kunzea dominated areas.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Acacia acuminata subsp. acuminata	+	<1 %	5 m		
Allocasuarina huegeliana	5-8	5-10%	5 m		Tree fallen in plot - estimated cover assuming tree standing.
Arctotheca calendula	+	<1 %	10cm		
Austrodanthonia setacea	+	<1 %		CHN6-11	Grass
Austrostipa variabilis				CHN6-17	
Avena barbata	+	<1 %	10cm		
Baeckea sp. Moora (R. Bone 1993/1)	1-2	1-5%		CHN6-10	??
Blennospora drummondii	+	<1 %		CHN6-8	grey Daisy
Boronia ramosa subsp. anethifolia	+	<1 %	20cm	CHN6-15,5	Also recorded in 30x30.
6					
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %			=WO1-20
Briza maxima	+	<1 %			
Burchardia umbellata	+	<1 %	20cm	CHN6-52	
Caladenia flava subsp. flava	+	<1 %		CHN6-3	Orchid
Calandrinia sp.	+	<1 %	2cm	CHN6-53	
Calytrix leschenaultii	+	<1 %	35cm	CHN6-20	Also recorded in 30x30.
Chamaescilla corymbosa var. corymbosa	+	<1 %		CHN6-12	
Cheilanthes adiantoides	1-2%	1-5%			
Crassula exserta	+	<1 %		CHN6-5	
Cyanicula deformis	+	<1 %	15cm	=ER17-51	

Desmocladus flexuosus	1%	1-5%			= CHN4-15
Dianella revoluta var. divaricata	+	<1 %		CHN6-14	
Dichopogon capillipes	2-3	1-5%			Mauve lilly, dead base
Dioscorea hastifolia	1	<1 %			
Drosera macrantha subsp. macrantha	+	<1 %	40cm	CHN6-51	Climber
Dryandra sessilis var. sessilis	+	<1 %			overhanging 10x10 plot
Ehrharta longiflora	+	<1 %	5cm		
Eriochilus helonomos	+	<1 %	20cm	=ER8-56	side leaf orchid
Hibbertia subvaginata	8-10	5-10%	1.4m		
Hypochaeris glabra	3-4%	1-5%	2cm		
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=ER17-58	
Kunzea praestans	33-40	33.3-50%	1.8-3m		
Lawrencella rosea	+	<1 %	20cm	CHN6-2	pink daisy linear leaves
Levenhookia stipitata	+	<1 %		CHN6-16	not sure of no.
Opercularia vaginata	+	<1 %		CHN6-9	
Parentucellia latifolia	+	<1 %		CHN6-6	
Pentaschistis airoides	+	<1 %		CHN6-1	
Platysace cirrosa	+	<1 %	4cm	=ER2-53	Climber
Podotheca angustifolia	+	<1 %	4cm	=GH10-52	?Daisy
Pterostylis recurva	+	<1 %	15cm	CHN6-50	
Stylidium septentrionale	+	<1 %		CHN6-23	
Thysanotus manglesianus	+	<1 %	1cm	CHN6-54	Pterostylis flat base
Trachymene pilosa	+	<1 %			
Tripterococcus brunonis	+	<1 %		CHN6-13	
Ursinia anthemoides	+	<1 %			
Vulpia myuros var. hirsuta	+	<1 %		CHN6-4	Grass
Xanthosia fruticulosa	2-3%	1-5%			
Acacia aestivalis	+	<1 %	3m	CHN6-59	Needs further study.
Allocasuarina campestris	+	<1 %	2.5m		
Calothamnus sanguineus	+	<1 %		CHN6-19	
Lepidosperma sp.	+	<1 %		CHN6-24	Specimen missing 9/2005.
Melaleuca calyptroides	+	<1 %		CHN6-25	
Neurachne alopecuroidea				CHN6-27	
Nuytsia floribunda	+	<1 %	60cm	CHN6-57	juvenile
Podolepis lessonii	+	<1 %	10cm	=ER1-58	Daisy
Pterostylis aff. nana	+	<1 %		CHN6-21	
Pterostylis sanguinea	+	<1 %	30cm	CHN6-55	Pterostylis 'bottom lip'
Pterostylis vittata				CHN6-26	
Scaevola phlebopetala	+	<1 %	15cm	CHN6-22,5	Goodeniaceae
Xanthorrhoea drummondii	+	<1 %			

Moora **Site** CHN007

Described by BRM **Date** 4/12/00 **Type:** QUADRAT 10x10 m, 30x30

Location: Cairn Hill North is the ridge of Cairn Hill extending north on to 'Goonderoo'. The plot is on the western side of the ridge, approximately 1.6 km SSE of the entry to 'Goonderoo' from the Midlands Road and only 200m N of the Cairn Hill boundary fence.

MGA Zone 50 407459 **m E** 6621571 **m N** -30.534558 **S lat** 116.035317 **E long**

Habitat: Western end of chert ridge at the south end of Cairn Hill North. Very gentle southerly slope.

Soil: Grey, silty loamy sand

Rock Type: Quartz cobbles/gravel. Exposed outcrop 5%. Cover 30-40%.

Vegetation: Allocasuarina huegeliana and Acacia acuminata subsp. acuminata scattered low trees over Kunzea praestans, (Allocasuarina campestris) open scrub over Hibbertia subvaginata open shrubland over Neurachne alopecuroidea, Austrodanthonia setacea, Stylidium septentrionale, Opercularia vaginata , Chamaescilla corymbosa var. corymbosa very open grass/herbland.

Vegetation condition: Very good to excellent (a few weeds).

Notes: 1st coord is for NE peg; 2nd coord is for SW coordinate. Considerable Kunzea 'dieback', but most have new shoots.

Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Allocasuarina campestris	3-4%	1-5%	1.8-2.5 m		
Allocasuarina huegeliana	+	<1 %	1.6m		juvenile
Austrodanthonia setacea	+	<1 %	30 cm	CHN7-8	Grass
Baeckea sp. Moora (R. Bone 1993/1)	3	1-5%	70 cm		

Blennospora drummondii	+	<1 %	4 cm	CHN7-5	grey daisy
Briza maxima	+	<1 %			
Burchardia umbellata	+	<1 %	25cm	CHN7-51,5	Thysanotus fleshy leaf
7					
Caladenia flava subsp. flava	+	<1 %	8 cm	CHN7-3,50	Orchid
Calandrinia sp.	+	<1 %	1m	CHN7-56	
Calytrix leschenaultii	+	<1 %			
Chamaescilla corymbosa var. corymbosa	+	<1 %	5cm	=ER19-50	
Cheilanthes adiantoides	+	<1 %			
Daviesia dielsii	+	<1 %	70 cm		3 (+9 in 30x30)
Desmocladus flexuosus	+	<1 %	15cm	CHN7-55	
Dichopogon capillipes	+	<1 %	40 cm		
Dioscorea hastifolia	+	<1 %			
Diuris aff. recurva	+	<1 %	25cm	=ER3-52	common
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1cm	CHN7-60	
Drosera macrantha subsp. macrantha	+	<1 %			
Drosera pallida	+	<1 %			
Dryandra sessilis var. sessilis	+	<1 %	10 cm		gully
Goodenia arthrotricha	+	<1 %	30 cm		1 plant
Hibbertia subvaginata	6	5-10%	0.7-1 m		
Hypochaeris glabra	+	<1 %	1cm		
Kunzea praestans	33-40	33.3-50%	1.8-3 m		
Lawrencella rosea	+/-1%	<1 %	10-30 cm	CHN7-1,53	
Melaleuca calyptroides	4	1-5%	1-2 m		
Neurachne alopecuroidea	+	<1 %			
Opercularia vaginata	+	<1 %	20cm	CHN7-9,52	
Pentaschistis airoides	+	<1 %			Tall
Phyllangium sulcatum	+	<1 %	4 cm	CHN7-4	Small daisy
Platysace cirrosa	+	<1 %	20cm	=ER2-53	Climber
Podolepis canescens	+	<1 %	12cm	CHN7-62	Daisy
Podolepis lessonii	+	<1 %	10 cm	CHN7-6	
Podotheca angustifolia	+	<1 %	3cm	CHN7-63	Daisy
Pterostylis sanguinea	+	<1 %	6cm	CHN7-59	Pterostylis tall
Pterostylis setulosa	+	<1 %	10cm	CHN7-58	Pterostylis flat leaf base
Stylidium septentrionale	+	<1 %			Short, pink
Stypandra glauca	+	<1 %	20cm		
Thysanotus manglesianus	+	<1 %	20cm	CHN7-61	Climber
Trachymene cyanopetala	+	<1 %	3cm	CHN7-54	
Tricoryne elatior	+	<1 %	40 cm	CHN7-2	
Ursinia anthemoides	+	<1 %	15 cm		
Vulpia myuros var. hirsuta	+	<1 %		CHN7-12	
Xanthorrhoea drummondii	1	<1 %	2-3 m		
Xanthosia fruticulosa	+	<1 %			
Acacia lasiocarpa var. sedifolia	+	<1 %			
Borya sphaerocephala	+	<1 %			
Crassula exserta	+	<1 %	2cm	CHN7-64	
Gilberta tenuifolia	+	<1 %	10cm	=ER17-59	Small yellow daisy
Trachymene ornata	+	<1 %		CHN7-10	

Moora **Site** CHN008

Described by MJH **Date** 4/12/00 **Type:** QUADRAT 10x10 m, 30x30

Location: Cairn Hill North is the ridge of Cairn Hill extending north on to 'Goonderoo'. The plot is at the southern end of the Cairn Hill North area, 90 m N of the Cairn Hill boundary and 100 m west of CHN007.

MGA Zone 50 407363 **m E** 6621609 **m N** -30.534208 **S lat** 116.03432 **E long**

Habitat: Moderate to steep west facing slope, mid-slope on low ridge.

Soil: Gravelly, pebbly, cobly dark grey loamy fine sand, with some exposed sheet rock..

Rock Type: Quartz outcrop and cobbles. 60-70% cover.

Vegetation: Allocasuarina huegeliana scattered low trees over Regelia megacephala, (Calothamnus aff. quadrifidus, Kunzea praestans) open scrub over Baeckea sp. Moora (R. Bone 1993/1) open shrubland over Hibbertia subvaginata low open shrubland over Borya sphaerocephala, Chamaescilla corymbosa var. corymbosa very open herbland

Vegetation condition: Very good to excellent. Some senescence, but lots of Regelia volunteering. Some weed invasion.

Fire age: >10-15 years.

Notes: 1st coord is for north peg; 2nd coord is for south peg.Quadrat placed diagonally across slope. Regelia cover a little patchy - higher cover in surrounding areas.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina huegeliana	1-2%	1-5%	4-4.5m		
Anagallis arvensis	+	<1 %	2-3cm	CHN8-52	
Arctotheca calendula	+	<1 %	4cm		
Austrostipa trichophylla	+	<1 %	15cm	CHN8-54,5	Also recorded in 30x30 and CHN8-9. Grass
Avena barbata	+	<1 %	15 cm		
Baeckea sp. Moora (R. Bone 1993/1)	5-7	5-10%	1.4 m		
Blennospora drummondii	+	<1 %	4 cm	CHN8-1	
Boronia ramosa subsp. anethifolia	+	<1 %	15cm	CHN8-56	
Borya sphaerocephala	4-5%	1-5%	5 cm		
Briza maxima	+	<1 %	10-15 cm		
Burchardia umbellata	+	<1 %	30cm	=GH9-52	
Caladenia flava subsp. flava	+	<1 %	4cm	=ER16-54	
Calothamnus aff. quadrifidus Moora-Watheroo	2-3	1-5%	0.2-2.4m		
Calytrix leschenaultii	+	<1 %	50 cm		
Centrolepis drummondiana	+	<1 %	5 cm	CHN8-8	
Chamaescilla corymbosa var. corymbosa	+	<1 %	15-40cm	=ER19-50	
Cheilanthes adiantoides	+	<1 %	10 cm		
Crassula colorata var. colorata	+	<1 %	2cm	CHN8-55	
Cyanicula gemmata	+	<1 %	1cm	=JT6-54	hairy spade-leaf orchid
Dioscorea hastifolia	+	<1 %	1 m		
Diuris aff. recurva	+	<1 %	30cm	CHN8-61	?=ER3-52
Drosera aff. macrantha	+	<1 %	30cm	CHN8-50	Also CHN8-53A,B.
Drosera pallida	+	<1 %		CHN8-5	
Eriochilus helonomos	+	<1 %	20cm	=ER8-56	side-leaf orchid
Hibbertia subvaginata	3-4	1-5%	1m		
Hypochaeris glabra	+	<1 %	1-2cm		
Isopogon divergens	+	<1 %	1.1m	CHN8-10,6,5	
Kunzea praestans	2-4%	1-5%	1.2-2.1m		
Lawrencella rosea	+	<1 %	20cm	=CHN4-60	pink daisy linear leaf
Melaleuca calyptroides	+	<1 %	1.5 m		
Neurachne alopecuroidea	+	<1 %	30 cm		
Pentaschistis airoides	+	<1 %		CHN8-3	Grass
Phyllangium sulcatum	+	<1 %	8 cm		
Pityrodia dilatata	+	<1 %	10 cm		juv
Platysace cirrosa	+	<1 %	20cm	=ER2-53	
Podolepis lessonii	+	<1 %	10 cm	CHN8-6	Daisy
Pterostylis sanguinea	+	<1 %	12cm	CHN8-51	Pterostylis 'bottom lip'
Pterostylis setulosa	+	<1 %	1cm	=CHN7-58	flat base
Quinetia urvillei	+	<1 %	2cm	=ER13-61	Daisy
Regelia megacephala	40-50	33.3-50%	(0.2-0.5) 3-4m		
Sowerbaea laxiflora	+	<1 %		CHN8-60	
Stylidium septentrionale	+	<1 %	12cm	CHN8-59	
Stypandra glauca	+	<1 %	50 cm		
Thysanotus manglesianus	+	<1 %	20cm	CHN8-57	Climber
Trachymene cyanopetala	+	<1 %	1-3cm	CHN8-62	
Ursinia anthemoides	+	<1 %	10 cm		
Vulpia myuros var. hirsuta	+	<1 %	8 cm	CHN8-4	Grass
Xanthorrhoea drummondii	1-2	1-5%	2 m		
Allocasuarina campestris	+	<1 %	3 m		
Borya laciniata	+	<1 %	2cm	CHN8-68	
Cyanicula deformis	+	<1 %	15cm	CHN8-67	Blue Beard orchid
Dampiera lavandulacea	+	<1 %	40cm	CHN8-66	Goodeniaceae
Desmocladus flexuosus	+	<1 %	20cm	CHN8-63	
Dichopogon capillipes	+	<1 %	30cm	CHN8-69	
Nemcia acuta	+	<1 %	20 cm		
Parentucellia latifolia	+	<1 %	20 cm		
Pimelea imbricata var. piligera	+	<1 %		CHN8-12	
Pterostylis recurva	+	<1 %	30cm	CHN8-64	Pterostylis tall
Scaevola anchusifolia	+	<1 %		CHN8-70	

Schoenus brevisetis	+	<1 %	20 cm	CHN8-11	sedge
Xanthosia fruticulosa	+	<1 %	20cm		

Moora Site CHN009

Described by BRM **Date** 24/08/03 **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill North, about 390m south of site CHN3.
MGA Zone 50 407359 **m E** 6622151 **m N** -30.52932 **S lat** 116.034325 **E long**
Habitat: Gentle south-west facing slope at head of a narrow gully, starting near mid crest of low ridge. Appears to follow a fault line.
Soil: Pebbly, cobbly brown loam.
Rock Type: ?
Vegetation: Eucalyptus loxophleba subsp. loxophleba low woodland over Trymalium daphnifolium scattered shrubs over Brachyscome perpusilla, Rhodanthe polycephala, Calandrinia remota very open annual herbland.
Vegetation condition: Good. Considerable weed cover (high weed invasion typical of the York Gum stands in these remnants).
Notes: Coordinate datum: WGS84. 1st coord is for NW peg; 2nd coord is for SE peg. Moss covers 10-15% of surface. 30x30 search area limited to a few meters to the north and west by Allocasuarina campestris scrub vegetation community and limited to a few meters to east by Eucalyptus loxophleba subsp. loxophleba over Melaleuca uncinatum scrub vegetation community.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia erinacea	+	<1 %	20cm	CHN9-10	
Anagallis arvensis	+	<1 %	3cm	=CHN3-62	
Arctotheca calendula	1-2	1-5%	12cm		
Austrodanthonia setacea	+	<1 %	6cm	CHN9-16,2	Grass
Austrostipa elegantissima	+	<1 %	30cm	CHN9-13	Tall grass
Blennospora drummondii	+	<1 %	6cm	=CHN1-62	Daisy
Brachyscome perpusilla	2-3%	1-5%	6cm	CHN9-2	Daisy
Bromus diandrus	1-2	1-5%	20cm	CHN9-12	
Caesia (Moora hairy stem)	1	<1 %	15cm	CHN9-5	
Calandrinia remota	3-4%	1-5%	3cm	CHN9-3	Det provisional
Calotis hispidula	+	<1 %	2cm	CHN9-23	
Centrolepis sp.	+	<1 %	3cm	CHN9-25	
Comesperma integerrimum	+	<1 %	12cm	CHN9-14	
Crassula colorata var. colorata	+	<1 %	3cm	CHN9-8	
Cyanicula deformis	+	<1 %	12cm	=CHN1-50	Blue Beard orchid
Ehrharta longiflora	1%	1-5%	15cm		
Erodium cygnorum	+	<1 %	3cm	=ER17-52	?Erodium sp.
Eucalyptus loxophleba subsp. loxophleba	40%	33.3-50%	7-8m	CHN9-9	
Goodenia berardiana	+	<1 %	20cm	=ER8-52	
Hypochaeris glabra	+	<1 %	2cm		
Hypoxis glabella var. leptantha	+	<1 %	12cm	CHN9-6	
Neurachne alopecuroidea	+	<1 %	4cm		
Opercularia vaginata	+	<1 %	10cm	CHN9-17	
Oxalis corniculata	+	<1 %	6cm	CHN9-7	Clover
Petrorhagia prolifera	+	<1 %	(3) 30cm	CHN9-24	
Plantago debilis	+	<1 %	5cm	CHN9-22	
Podolepis lessonii	+	<1 %	5cm	=CHN1-61	Daisy
Podotheca angustifolia	+	<1 %	3cm	=CHN3-52	Daisy
Ptilotus holosericeus	+	<1 %	5 cm	CHN9-15A	Cryptophyte
Ptilotus spathulatus forma spathulatus	+	<1 %	5cm	CHN9-15B	
Rhagodia preissii subsp. preissii	+	<1 %	5cm	CHN9-18	heavily grazed
Rhodanthe manglesii	+	<1 %	25cm	CHN9-11	amplexicaul-leaf daisy
Rhodanthe polycephala	1-2%	1-5%	25cm	CHN9-4	?Daisy
Rhodanthe pygmaea	+	<1 %	3cm	CHN9-21	
Silene gallica var. gallica	+	<1 %	20cm	CHN9-26	
Trachymene cyanopetala	+	<1 %	6cm	CHN9-19	
Tripteris clandestina	+	<1 %	5cm	JT3-50	Stink daisy
Trymalium daphnifolium	1-2%	1-5%	2.0m	CHN9-1	Rhamnaceae shrub
Ursinia anthemoides	+	<1 %	6cm		
Acacia acuminata subsp. acuminata	+	<1 %	3m		
Lomandra effusa	+	<1 %	20cm	CHN9-28	
Lupinus angustifolius	+	<1 %	12cm	CHN9-27	
Melaleuca concreta	+	<1 %	2m	CHN9-30	

Pterostylis setulosa	+	<1 %	10cm	=CHN3-56	Pterostylis flat leaf base
Thysanotus manglesianus	+	<1 %	30cm	CHN9-29	Thysanotus fleshy leaves
Vulpia myuros var. hirsuta	+	<1 %	15cm	CHN9-31,32	

Moora Site CHN010

Described by BRM **Date** 24/03/03 **Type:** QUADRAT 10x10 m, 30x30
Location: Cairn Hill North, about 100 to 150m from south boundary (with Cairn Hill) and about 80m east of CHN6.
MGA Zone 50 407565 **m E** 6621707 **m N** -30.533342 **S lat** 116.036433 **E long**
Habitat: Mid-slope of gently sloping, east-facing slope on low ridge.
Soil: Gravelly, pebbly pale brown sand.
Vegetation: Allocasuarina huegeliana scattered trees to low open woodland over Allocasuarina campestris open high shrubland over Baeckea sp. Moora (R. Bone 1993/1), Calytrix leschenaultii low open shrubland to low heath over Borya sphaerocephala very open herbland.
Vegetation condition: Excellent
Notes: Coordinate datum: WGS84. 1st coord is for NW peg; 2nd coord is for SE peg. Note: Baeckea sp. Moora (R. Bone 1993/1) and Calytrix leschenaultii grow mainly around Allocasuarina campestris shrubs (not underneath) and form heath in some very open areas where there are none or very few A. campestris shrubs.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	12-15%	10-25%	2.5m		
Allocasuarina huegeliana	7-10%	5-10%	4-8m		
Arctotheca calendula	+	<1 %	4cm		Capeweed
Austrodanthonia caespitosa	+	<1 %	3cm	CHN10-14	very hairy grass
Baeckea sp. Moora (R. Bone 1993/1)	15-20%	10-25%	30-90cm	CHN10-1	
Blennospora drummondii	+	<1 %	2cm	=CHN1-62	Daisy
Borya sphaerocephala	5-6%	5-10%	2cm		
Burchardia umbellata	+	<1 %	20cm	=CHN1-55	
Caladenia flava subsp. flava	+	<1 %	3cm		
Calytrix depressa	+	<1 %	35-70cm	CHN10-7	
Calytrix leschenaultii	5-10%	5-10%	0.3-1.0m		
Cheilanthes adiantoides	+	<1 %	15cm		
Cyanicula deformis	+	<1 %	5cm	=CHN1-50	'Blue Beard' Caladenia
Drosera aff. macrantha	+	<1 %	20cm	CHN10-8,1	Climber
1					
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1m	CHN10-6	
Ehrharta longiflora	+	<1 %	4cm		
Gonocarpus nodulosus	+	<1 %	5cm	CHN10-13	
Goodenia berardiana	+	<1 %	10cm	=ER8-52	
Hypochaeris glabra	+	<1 %	2cm		
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=CHN1-52	
Kunzea praestans	+	<1 %	20cm		juvenile
Lawrencella rosea	+	<1 %	10-20cm	=CHN4-60	pink linear leaf daisy
Lepidobolus chaetocephalus	+	<1 %	20cm	CHN10-5	Restionaceae ?Lepido
Leporella fimbriata	+	<1 %	1cm	CHN10-10	
Melaleuca radula	1	<1 %	(30cm)1.9	CHN10-2	
m					
Neurachne alopecuroidea	+	<1 %	3cm		
Podolepis lessonii	+	<1 %	3cm	=CHN1-61	Daisy
Podotheca angustifolia	+	<1 %	3cm	=CHN3-52	Daisy
Quinetia urvillei	+	<1 %	2cm	=ER13-61	Daisy
Thysanotus manglesianus	+	<1 %	30cm	CHN10-9	Climber
Trachymene cyanopetala	+	<1 %	2cm	CHN10-3	
Tricoryne arenicola	+	<1 %	10cm	CHN10-4	soft leaf
Ursinia anthemoides	+	<1 %	5cm		
Waitzia nitida	+	<1 %	10cm	CHN10-12	
Xanthorrhoea drummondii	+	<1 %	1.8m		
Chamaescilla corymbosa var. corymbosa	+	<1 %	4cm	=CHN2-57	
Haemodorum simulans	+	<1 %	15cm	CHN10-19	ID ?
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	30cm	CHN10-16	
Lupinus angustifolius	+	<1 %		=CHN9-27	
Pimelea imbricata var. piligera	+	<1 %	30cm	CHN10-17	?Pimelea
Pterostylis sanguinea	+	<1 %	12cm	CHN10-15	Also CHN10-18. Pterostylis 'bottom lip'
Pterostylis setulosa	+	<1 %	10cm	=CHN3-56	Pterostylis flat base

					(flowering)
Stylidium septentrionale	+	<1 %	12cm	=CHN8-59	

EASTERN ORE BODY

Moora Site EOR001

Described by BRM **Date** 22/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: At the eastern end of the current mine path. The site is on the south side of a slope overlooking the 'Goonderoo' farm road, approximately 750 m east of the entry to 'Goonderoo' from the Midlands Road (13 km north of Moora) and 80 m west of EOR002.
MGA Zone 50 407607 **m E** 6622988 **m N** -30.521785 **S lat** 116.036986 **E long**
Habitat: South facing midslope of a hill.
Soil: Grey sandy loam **Rock Type:** Chert.
Vegetation: Allocasuarina huegeliana low woodland over Allocasuarina campestris, Acacia congesta subsp. congesta open scrub over Dichopogon capillipes very open herbland.
Vegetation condition: Good to very good between gridlines.
Notes: 1st coordinate is for NE peg; 2nd coordinate is for SW peg. 30x30 search area limited by drilling grid lines (cleared) 2m to north and south of plot and 1 to 2m to west.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia congesta subsp. congesta (numerous dead)	5	5-10%	1.5-2.5 m	EO1-1	~20% Only 1 shrub alive
Allocasuarina campestris	35-40	33.3-50%	2-2.5	EO1-2	
Allocasuarina huegeliana	40	33.3-50%	6 m		
Anagallis arvensis	+	<1 %		EO1-22	
Apium annuum	+	<1 %		EO1-59B	ID?
Austrodanthonia setacea	+	<1 %		EO1-10	
Austrostipa elegantissima	+	<1 %		EO1-9	
Austrostipa tenuifolia				EO1-4B	
Austrostipa variabilis	+	<1 %		EO1-4	
Avena barbata	+	<1 %			
Blennospora drummondii	+	<1 %		EO1-21	
Briza maxima	+	<1 %			
Bromus diandrus				EO1-7a	
Burchardia umbellata	+	<1 %		EO1-5	
Caladenia flava subsp. flava	+	<1 %	12cm	EO1-6,54	Caladenia ?flava
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	EO1-16	
Cheilanthes adiantoides	+	<1 %			Fern (=WO1-19)
Crassula colorata var. colorata	+	<1 %	3cm	EO1-58	
Desmocladus flexuosus	+	<1 %		EO1-3	
Dichopogon capillipes	3-5%	1-5%	30cm	EO1-50	
Dioscorea hastifolia	1	<1 %		EO1-11	
Drosera macrantha subsp. macrantha	+	<1 %	30cm	EO1-18,51	
Ehrharta longiflora	+	<1 %	12cm	EO1-57	Det OK
Eucalyptus loxophleba subsp. loxophleba	+	<1 %	4-5m	EO1-60	very slender trunk, grey stringy bark; very small crown (<0.5mSQ)
Hibbertia subvaginata	+	<1 %			
Hypochaeris glabra	+	<1 %		EO1-20	
Muehlenbeckia adpressa	+	<1 %		EO1-19	Climber
Pentaschistis airoides	+	<1 %		EO1-7	Grass
Platysace cirrosa	+	<1 %	20cm	=ER2-53	
Pterostylis recurva	+	<1 %	20cm	EO1-52	Pterostylis tall + extensions
Pterostylis sanguinea	+	<1 %	15cm	EO1-53	Pterostylis tall
Pterostylis setulosa	+	<1 %	10cm	EO1-56	Pterostylis flat leaf base
Regelia megacephala	2-3	1-5%	2-3 m		2 shrubs alive plus 1dead
Romulea rosea	+	<1 %	35cm		
Stypandra glauca	+	<1 %		EO1-13	Lilly, blue flower
Thysanotus manglesianus	+	<1 %	25cm	EO1-14,55	Thysanotus fleshy leaf. (Prob Juv. T. mang. MET 8/05)
Trachymene ornata	+	<1 %	2-4cm	EO1-12,59	White head
Ursinia anthemoides	+	<1 %			
Acacia lasiocarpa var. sedifolia	+	<1 %		EO1-25	
Calytrix leschenaultii	+	<1 %		EO1-26	
Cyanicula deformis	+	<1 %	10cm	=ER17-51	

Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=ER17-58
Neurachne alopecuroidea	+	<1 %		EO1-24

Moora Site EOR002

Described by MJH **Date** 22/10/00 **Type:** QUADRAT 10x10 m, 30x30

Location: At the eastern end of the current mine path. The site is on the south side of a chert hill overlooking the 'Goonderoo' farm road, approximately 800 m east of the entry to 'Goonderoo' from the Midlands Road (13 km north of Moora).

MGA Zone 50 407675 **m E** 6622996 **m N** -30.521718 **S lat** 116.037695 **E long**

Habitat: South facing, steep rocky slope of ridge, just below crest.

Soil: Skeletal where present, grey brown silty loam.

Rock Type: Chert outcrop and boulders, ~ 95% cover.

Vegetation: Allocasuarina huegeliana scattered low trees over Regelia megacephala high shrubland over Hibbertia subvaginata scattered shrubs over Dichopogon capillipes, Stypandra glauca scattered herbs to very open herbland with *Ehrharta longiflora, *Avena barbata very open annual grassland.

Vegetation condition: Good (high weed cover).

Notes: Revisit: Edge of cleared mine area now 2 to 3m north of 10x10. Little or no effect on 10x10 area to date. Limited 30x30 search area on north side.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia stenoptera	+	<1 %	20-30cm	EO2-8,66	
Allocasuarina huegeliana	3	1-5%	6 m		
Anagallis arvensis	+	<1 %	3cm	=WOR2-67	
Avena barbata	+	<1 %	30-40 cm		
Briza maxima	+	<1 %	20 cm		
Bromus diandrus	+	<1 %	15 cm	EO2-1	
Caladenia flava subsp. flava	+	<1 %		=EO1-54	Caladenia flava
Calandrinia sp.	+	<1 %	3cm	EO2-52	
Cheilanthes adiantoides	+	<1 %	15cm	EO2-56,57	in deep crevices in rocks
Cheilanthes distans	+	<1 %	5cm	EO2-14,51	hairy fern
A					
Crassula colorata var. colorata	+	<1 %	2cm	EO2-64	
Cyanicula deformis	+	<1 %	12cm	EO2-59	Blue Beard orchid
Cyrtostylis huegelii	+	<1 %	1cm	EO2-58	round leaf orchid
Dichopogon capillipes	1-2	1-5%		EO2-9	=WO4
Dioscorea hastifolia	+	<1 %			
Drosera aff. macrantha	+	<1 %	1.0m	EO2-53	Drosera ?pallida
Ehrharta longiflora	5-7%	5-10%	20-25 cm		
Hibbertia subvaginata	1-2	1-5%	1-2 m		
Hypochaeris glabra	+	<1 %	15 cm		
Pentaschistis airoides	+	<1 %	5 cm	EO2-7	
Pleurosorus rutifolius	+	<1 %		EO2-51B	
Pterostylis setulosa	+	<1 %	12cm	EO2-65	?=EO1-56: Pterostylis flat leaf
Regelia megacephala	30	25-33.3%	2-3 m		
Sonchus oleraceus	+	<1 %			=WO3
Stypandra glauca	1-2	1-5%	<1 m	EO2-4	
Thysanotus manglesianus	+	<1 %	30cm	=EO1	Thysanotus Climber
Trachymene ornata	+	<1 %	5-10 cm	EO2-3	
Trifolium repens var. repens	+	<1 %	5-10 cm	EO2-5	
Trifolium sp.	+	<1 %	2cm	EO2-55	Clover
Tripteris clandestina	+	<1 %	40cm	=JT3-50	stink daisy
Urospermum picroides	+	<1 %	15cm	EO2-54	
Ursinia anthemoides	+	<1 %	10 cm		
Vulpia myuros var. hirsuta	+	<1 %	20 cm	EO2-2	Grass
Acacia aristulata	+	<1 %	50 cm	EO2-12	
Acacia congesta subsp. congesta	+	<1 %	2 m	EO2-11	
Austrodanthonia setacea	+	<1 %	45 cm	EO2-10	Grass-Amphipogon\ Austrodanthon
Burchardia umbellata	+	<1 %	30cm	=GH9-52	
Comesperma integerrimum	+	<1 %			
Drosera sp.	+	<1 %	20cm	EO2-60	Climbing drosera
Eriochilus dilatatus	+	<1 %	30cm	EO2-63	leaf stem orchid
Kennedia prostrata	+	<1 %	5cm	EO2-50	
Lepidosperma leptostachyum	+	<1 %	50cm	EO2-62	
Pityrodia dilatata	+	<1 %	30cm		

Pterostylis sanguinea	+	<1 %	12cm	EO2-61	Pterostylis tall
Romulea rosea	+	<1 %	45cm		
Thomasia grandiflora	+	<1 %			
Xanthorrhoea drummondii	+	<1 %	1.8m		

Moora Site EOR003

Described by MET **Date** **Type:** QUADRAT 10x10 m, 30x30

Location: At the eastern end of the current mine path. Site on the eastern slope of a ridge, looking towards the 'Goonderoo' farmhouse, approximately 900 m east of the entry to 'Goonderoo' from the Midlands Road (13 km north of Moora) and 20 m east of EOR002.

MGA Zone 50 407692 **m E** 6623016 **m N** -30.521539 **S lat** 116.037874 **E long**

Habitat: Moderate southeast facing slope.

Soil: Gravelly and pebbley, grey silt to fine sand, some clayey material.

Rock Type: Quartz cobbles, boulders and outcrop ~ 50% of surface.

Vegetation: Allocasuarina huegeliana scattered low trees over Regelia megacephala open scrub over Hibbertia subvaginata scattered shrubs over Stypandra glauca scattered perennial herbs and *Ehrharta longiflora, *Pentaschistis airoides, *Ursinia anthemoides very open annual grass/herbland.

Vegetation condition: Good to very good. Some dead (apparently fire killed) Allocasuarina huegeliana otherwise would be VG. The condition of the overall stand is also reduced by the gridlines on the north and south side.

Notes: Outcrop just upslope from plot and 30x30 is ~30% outcrop.At the time of the revisit (18/8/03) the edge of the mine was 5m from the west side of the 10x10 quadrat. The quadrat is irregularly shaped to avoid disturbance.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata				EO3-2b	
Acacia congesta subsp. congesta	+	<1 %	(0.3)1.4 m	EO3-2a	
Allocasuarina campestris	2%	1-5%	2 m	EO3-5	
Anagallis arvensis	+	<1 %	2-7cm	=WOR2-67	
Apium annuum	+	<1 %	3 cm	EO3-12,52	
Arctotheca calendula	+	<1 %	10cm		Capeweed
Austrodanthonia setacea	+	<1 %	20 cm	EO3-7	
Avena barbata	+	<1 %	10-15 cm		
Blennospora drummondii	+	<1 %	2-5cm	EO3-9,55	Daisy
Briza maxima	+	<1 %	10 cm		
Bromus diandrus	+	<1 %	30 cm	EO3-1	poaceae
Burchardia umbellata	+	<1 %	40cm	=GH9-52	
Caladenia denticulata	+	<1 %	12cm	=JT6-56	Spider orchid
Caladenia flava subsp. flava	+	<1 %	5cm	=EO1-54	
Centrolepis pilosa	+	<1 %	3 cm	EO3-10	
Cheilanthes adiantoides	+	<1 %	5-15 cm		
Comesperma integerrimum	+	<1 %	2 m		large, =WO3
Crassula colorata var. colorata	+	<1 %	2 cm		=WO3
Crassula exserta	+	<1 %			=WD3
Cyanicula deformis	+	<1 %	10cm	=ER17-51	Blue Beard orchid
Dichopogon capillipes	1-2%	1-5%	5 cm		Lilly=WD3-14
Dioscorea hastifolia	1-2%	1-5%	1-1.5 m		
Drosera aff. macrantha	+	<1 %	(1cm)	EO3-53,54	
Drosera pallida	+	<1 %	25 cm		=WD3
Ehrharta longiflora	+	<1 %	10-15 cm		
Erodium cygnorum	+	<1 %	3cm	=ER17-52	
Hibbertia subvaginata	+	<1 %	25 cm		
Hypochaeris glabra	+	<1 %	4 cm		
Lepidosperma leptostachyum	+	<1 %	75 cm	EO3-6	
Millotia tenuifolia var. tenuifolia	+	<1 %	3 cm	EO3-16	
Nemcia acuta	+	<1 %	40 cm	EO3-3	
Neurachne alopecuroidea	+	<1 %	3cm		
Parentucellia latifolia	+	<1 %	5 cm		
Pentaschistis airoides	+	<1 %	5-10 cm		
Pterostylis setulosa	+	<1 %	15cm	EO3-59	Also recorded in 30x30.
Pterostylus flat base					
Regelia megacephala	50-60%	50-75%	(1.3)2-4		
Stylidium glabrifolium	1-2	1-5%	40-70 cm		
Stypandra glauca	1-2	1-5%			
Thysanotus manglesianus	+	<1 %	30cm	EO3-50	Climber
Trachymene ornata	+	<1 %	10cm	EO3-51	

Urospermum picroides	+	<1 %	5-10 cm	EO3-4	Also EO3-57,58.
Ursinia anthemoides	+	<1 %	15 cm		
Vulpia myuros var. hirsuta	+	<1 %	15 cm	EO3-8	
Wahlenbergia gracilenta	+	<1 %	4 cm	EO3-11	
Acacia stenoptera	+	<1 %	60 cm	EO3-17	
Allocasuarina huegeliana	+	<1 %	2.4-4 m		
Pterostylis scabra	+	<1 %	15cm	EO3-56	Pterostylis tall
Trifolium arvense var. arvense	+	<1 %	4 cm		=WO6
Tripteris clandestina	+	<1 %	30cm	=JT3-50	stink daisy
Xanthorrhoea drummondii	+	<1 %	2 m		

EASTERN RIDGE

Moora Site ERG001

Described by MJH **Date** **Type:** QUADRAT 10x10 m, 30x30
Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is on the western slope of the ridge, approximately 1 km SE of the Kiaka Rd/Midlands Rd junction.
MGA Zone 50 407614 **m E** 6623996 **m N** -30.51269 **S lat** 116.037149 **E long**
Habitat: Gentle west facing slope.
Soil: Dark grey silt/fine sand.
Rock Type: Chert outcrops and cobbles ~50% cover.
Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminatus scattered low trees over Allocasuarina campestris open heath to open scrub over Cheilanthes adiantoides, Hypoxis occidentalis var. occidentalis, Borya sphaerocephala, Caesia alfordii very open fern/herbland.
Vegetation condition: Very good (some grazing evident).
Notes: 30x30 search area limited on west side (about 5m to track). Vegetation description revised during winter 2003 visit.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	70	50-75%	1.5-2.3 m		
Amphipogon caricinus	+	<1 %	20-30 cm		
Apium annuum	+	<1 %	5cm	ER1-59	ID?
Arctotheca calendula	+	<1 %	6cm		Capeweed
Avena barbata	+	<1 %	20 cm		
Borya sphaerocephala	1%	1-5%	5-10 cm		
Briza maxima	+	<1 %	10-20 cm		
Bromus diandrus	+	<1 %	10 cm	ER1-6	Grass
Caesia alfordii	+	<1 %	30cm	ER1-10,54	
Caladenia denticulata	+	<1 %	12cm	=JT6-56	Spider orchid
Caladenia flava subsp. flava	+	<1 %	15 cm	ER1-1	
Cheilanthes adiantoides	4-5%	<1 %	10-15 cm		
Cyanicula deformis	+	<1 %	15cm	=ER17-51	Blue beard orchid
Cyanicula gemmata	+	<1 %	1cm	=JT6-54	hairy spade-leaf orchid
Dioscorea hastifolia	+	<1 %	25 cm		
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1cm	=ER12-54	flat leaf Drosera
Drosera macrantha subsp. macrantha	+	<1 %	1m	ER1-51	Climbing
Eriochilus dilatatus	+	<1 %	15cm	ER1-56	leaf stem orchid
Gilberta tenuifolia	+	<1 %	12cm	=ER17-59	yellow daisy
Goodenia berardiana	+	<1 %	15cm	ER1-3,60	?Daisy
Hypochaeris glabra	+	<1 %	15 cm	ER1-11	
Hypoxis occidentalis var. occidentalis	1-2%	1-5%	15cm	=ER12-50	
Lepidosperma leptostachyum	+	<1 %	30 cm		usual
Neurachne alopecuroidea	+	<1 %	30 cm		
Parentucellia latifolia	+	<1 %	5-10 cm	ER1-7	
Pentaschistis airoides	+	<1 %	10-15 cm	ER1-5	Grass
Phyllangium sulcatum	+	<1 %	10-15 cm	ER1-13	
Platysace cirrosa	+	<1 %	25cm	=GH9-54	Trachymene Climber
Podolepis lessonii	+	<1 %	(3)	ER1-2,58	Daisy
10-20cm					
Pterostylis sanguinea	+	<1 %	10cm	=CH10-51	Pterostylis flat leaf base
Rhodanthe laevis	+	<1 %	3cm	ER1-55	Daisy fine grey leaf
Siloxerus humifusus	+	<1 %	1cm	ER1-57	Redet 05/05
Stypandra glauca	+	<1 %	20cm		
Thysanotus manglesianus	+	<1 %	(30cm)	ER1-50,53	Climbing

1.3m					
Trachymene cyanopetala	+	<1 %	5 cm	ER1-9	
Trachymene ornata	+	<1 %	10 cm		
Trifolium subterraneum	+	<1 %	2cm	ER1-52	
Ursinia anthemoides	+	<1 %	10 cm		
Vulpia myuros var. hirsuta	+	<1 %	20-30 cm	ER1-4	Grass
Waitzia nitida	+	<1 %	10-15 cm	ER1-8	
Acacia acuminata subsp. acuminata	+	<1 %	2.5 m		1 plant.
Allocasuarina huegeliana	+	<1 %	6 m		
Austrostipa trichophylla	+	<1 %	25 cm	ER1-14	
Chamaescilla corymbosa var. corymbosa	+	<1 %	15cm	=ER19-50	
Drosera macrophylla subsp. macrophylla	+	<1 %	4cm	ER1-62	
Ehrharta longiflora	+	<1 %	25-30 cm		
Hibbertia subvaginata	+	<1 %	40 cm		at edge of firebreak
Kennedia prostrata	+	<1 %	50 cm		at edge of firebreak
Lawrencella rosea	+	<1 %	12cm	ER1-61	pink daisy
Trifolium arvense var. arvense	+	<1 %	10 cm	ER1-15	
Urospermum picroides	+	<1 %	25 cm	ER1-16	

Moora Site ERG002

Described by BRM **Date** 5/11/00 **Type:** QUADRAT 10x10 m, 30x30
Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is towards the top of the ridge, approximately 100 m east of ERG001.
MGA Zone 50 407758 **m E** 6624019 **m N** -30.512494 **S lat** 116.038651 **E long**
Habitat: East side of broad, flat crest of ridge.
Soil: Gravelly, pebbly cobbly grey sand.
Rock Type: Chert cobbles-pebbles, ~70% cover.
Vegetation: Allocasuarina huegeliana and Acacia acuminata subsp. acuminata low open woodland over Kunzea praestans open scrub over Hibbertia subvaginata shrubland over Lepidosperma leptostachyum, Austrodanthonia setacea, Dichopogon capillipes very open sedge/grass/herbland
Vegetation condition: Very good, but some weed invasion.
Notes: 30x30 search area limited on western and eastern sides of quadrat by change in vegetation community. Areas of significant Hibbertia subvaginata deaths along ridge. Many macropods present.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Acacia acuminata subsp. acuminata	1	<1 %	(2)4-5 m		
Allocasuarina huegeliana	8-10%	5-10%	(2)5 m		
Austrodanthonia setacea				ER2-6A	
Austrostipa trichophylla	+		30 cm	ER2-6B	Split from ER2-6A
Avena barbata	+	<1 %	20 cm		
Briza maxima	+	<1 %	5 cm		
Burchardia umbellata	+	<1 %	40 cm	ER2-17	
Caladenia flava subsp. flava	+	<1 %	15 cm	ER2-21	Orchid
Calytrix leschenaultii	+	<1 %	70 cm	ER2-9	
Chamaescilla corymbosa var. corymbosa	+/-1%		30 cm	ER2-16A	
Cheilanthes adiantoides	1-2	1-5%	4 cm	ER2-2	
Crassula colorata var. colorata	+	<1 %	1cm	ER2-55A&	
64					
Crassula exserta	+	<1 %		ER2-55(B)	ER2-55 split.
Cyanicula deformis	+	<1 %	12cm	=ER17-51	Blue Beard orchid
Dichopogon capillipes	1	<1 %	30 cm	ER2-5	
Dioscorea hastifolia	6-8	5-10%		ER2-4	
Drosera macrantha subsp. macrantha	+	<1 %	60 cm	ER2-7,50	
Hibbertia subvaginata	15-20	10-25%	0.8-1.2 m		
Kunzea praestans	40	33.3-50%	2-2.5 m		
Lepidosperma leptostachyum	+	<1 %	4 cm	ER2-3	sedge
Lepidosperma tenue				ER2-27	
Millotia tenuifolia var. tenuifolia	+	<1 %	2 cm	ER2-13	
Neurachne alopecuroidea	+	<1 %	40 cm	ER2-8	
Parentucellia latifolia	+	<1 %	4 cm	ER2-12	
Pentaschistis airoides	+	<1 %	5 cm	ER2-1	
Phyllangium sulcatum	+	<1 %	10 cm	ER2-16B	
Pityrodia dilatata	+	<1 %	20cm	Also recorded in 30x30. Also ER2-23	

Platysace cirrosa	+	<1 %	30cm	ER2-53	Trachymene Climbing
Podotheca angustifolia	+	<1 %	3cm	ER2-14,54	Daisy
Pterostylis sanguinea	+	<1 %	15cm	ER2-52	Pterostylis tall
Pterostylis setulosa	+	<1 %	1cm	ER2-51	Pterostylis flat leaf
Trachymene ornata	+	<1 %	3 cm	ER2-10	
Trachymene pilosa	+	<1 %	3 cm	ER2-11	
Ursinia anthemoides	+	<1 %	10 cm		
Vulpia myuros var. hirsuta	+	<1 %	10 cm	ER2-15	Grass
Acacia aristulata	+	<1 %	80 cm	ER2-19	
Allocasuarina campestris					
Comesperma integerrimum				ER2-28	
Ehrharta longiflora	+	<1 %	30 cm	ER2-25	light shade grass
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=ER12-50	
Opercularia vaginata	+	<1 %	15cm	ER2-56	?Daisy
Tricoryne elatior	+	<1 %	15 cm	ER2-24	Redet 14/3/05 MET
Trymalium ledifolium var. rosmarinifolium	+	<1 %	30 cm	ER2-22	

Moora Site ERG003

Described by MJH **Date** **Type:** QUADRAT 10x10 m, 30x30

Location: The Eastern Ridge parallels the current mine path to its east. This site is to the eastern side of the ridge on a south facing slope on the northern side of shallow, broad valley approximately 200 m north of the Eucalyptus wandoo stand (ERG004).

MGA Zone 50 407904 **m E** 6624109 **m N** -30.511693 **S lat** 116.040181 **E long**

Habitat: Moderate to steep midslope, south facing in open valley.

Soil: Skeletal. Dark silt/fine sand.

Rock Type: Chert outcrop, boulders, cobbles, ~90% cover.

Vegetation: Kunzea praestans high shrubland over Hibbertia subvaginata open heath over Dichopogon capillipes, Chamaescilla corymbosa var. corymbosa, Cheilanthes adiantoides very open herb/fernland.

Vegetation condition: Very good. Some evidence of grazing, and minor weed invasion.

Fire age: <10 years?

Notes: Vegetation description revised during winter 2003 visit.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	30 cm		1, +1 just outside
Acacia congesta subsp. congesta	1	<1 %	2 m		
Arctotheca calendula	+	<1 %	6cm		
Avena barbata	+	<1 %	10-30 cm		
Briza maxima	+	<1 %	25 cm	ER3-11	
Burchardia umbellata	+	<1 %	20cm	=GH9-52	
Caladenia flava subsp. flava	+	<1 %	20 cm	ER3-2	
Chamaescilla corymbosa var. corymbosa	+/-1	<1 %	10-20 cm	ER3-1	
Cheilanthes adiantoides	2-3	1-5%	10 cm		
Dichopogon capillipes	1	<1 %	30 cm		
Diuris aff. recurva	+	<1 %	35cm	ER3-52	Diuris orchid
Drosera aff. macrantha	+	<1 %	30cm	ER3-54	Drosera Climber
Drosera pallida	+	<1 %	25 cm	ER3-5	
Ehrharta longiflora			+		
Hibbertia subvaginata	35-40	33.3-50%	1-1.5 m		
Hypochaeris glabra	+	<1 %	10 cm	ER3-9	Daisy
Kunzea praestans	30-40	25-33.3%	2-3 m		
Parentucellia latifolia	+	<1 %	10 cm	ER3-10	Grass
Pentaschistis airoides	+	<1 %	15-0 cm	ER3-3	Grass
Pleurosorus rutifolius	+	<1 %	15cm	ER3-55	hairy fern (growing from crevice in chert rock)
Pterostylis aff. nana	+	<1 %		ER3-6	
Pterostylis sanguinea	+	<1 %	12cm	ER3-50,51	Pterostylis flat base leaf
Pterostylis setulosa	+	<1 %	12cm	ER3-51A	Pterostylis flat base leaf
Stypandra glauca	+	<1 %	15 cm	ER3-7	juv
Trachymene pilosa	+	<1 %	4cm	ER3-53	
Ursinia anthemoides	+	<1 %	10-15 cm		
Vulpia myuros var. hirsuta	+	<1 %	10-15 cm	ER3-8	Grass
Xanthorrhoea drummondii	+	<1 %	1.5 m		
Allocasuarina campestris	+	<1 %	1.5 m		

Allocasuarina huegeliana	+	<1 %	5-8 m		
Amphipogon caricinus	+	<1 %			
Austrostipa elegantissima	+	<1 %	40cm	ER3-59	
Crassula colorata var. colorata	+	<1 %	3cm	ER3-56	
Cyanicula deformis	+	<1 %	12cm	=ER17-51	Blue Beard orchid
Dioscorea hastifolia	+	<1 %	5cm		
Dryandra sessilis var. sessilis	+	<1 %	7-8 m	ER3	
Lawrencella rosea	+	<1 %	15cm	=ER20-54	pink daisy
Lepidosperma leptostachyum	+	<1 %	45cm	ER3-58	
Lomandra aff. micrantha subsp. micrantha				ER3-13	
Pityrodia dilatata	+	<1 %	20 cm		
Thysanotus manglesianus	+	<1 %	30cm	=ER17-55	Thysanotus fleshy leaves
Trachymene ornata	+	<1 %	5-10 cm		
Trifolium subterraneum	+	<1 %	3cm	ER3-57	Clover
Trymalium ledifolium var. rosmarinifolium	+	<1 %	1 m	ER3-12	shrub

Moora Site ERG004

Described by BRM **Date** 5/11/00 **Type:** QUADRAT 10x10 m, 30x30
Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is on the eastern side of the ridge, approximately 1.1 km SE of the Kiaka Rd/Midlands Rd junction.
MGA Zone 50 407907 **m E** 6623930 **m N** -30.513308 **S lat** 116.040196 **E long**
Habitat: East facing gentle mid-slope. 15-20 m wide belt of Eucalyptus wandoo subsp. wandoo running N-S along contour.
Soil: Well mulched, fine gravelly brown sand with scattered quartz rocks.
Vegetation: Eucalyptus wandoo subsp. wandoo low open forest to open forest over Austrostipa variabilis, Dichopogon capillipes very open grass/herbland.
Vegetation condition: Good - very good. Some weed invasion.
Notes: Regeneration apparent from burnt trunks, and several dead trunks present. 30X30 search area limited to west (upslope) and east (downslope) by different vegetation units. Search about 30 m to N and S in Eucalyptus wandoo vegetation.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Anagallis arvensis	+	<1 %	4 cm	ER4-17	
Arctotheca calendula	+	<1 %	5cm		Capeweed
Austrodanthonia setacea	+	<1 %	20 cm	ER4-16	
Austrostipa elegantissima	+	<1 %	40cm	ER4-56	
Austrostipa tenuifolia	+	<1 %	3 cm	ER4-22	Grass
Austrostipa variabilis	+	<1 %		ER4-7	
Avena barbata					
Blennospora drummondii	+	<1 %	4 cm	ER4-18	
Burchardia umbellata	+	<1 %	20cm	=GH9-52	?Burchardia
Calandrinia sp.	+	<1 %	3 cm	ER4-21	
Cheilanthes adiantoides	+	<1 %	15cm		Cheilanthes (usual)
Desmocladus flexuosus				ER4-10	
Dichopogon capillipes	+	<1 %			
Dioscorea hastifolia	+	<1 %	4cm		
Ehrharta longiflora	+	<1 %	15 cm	ER4-1	
Eucalyptus wandoo subsp. wandoo	60-70	50-75%	3-8 m	ER4-27	
Genus sp.	+	<1 %	6cm	ER4-53	Daisy
Hibbertia subvaginata	+	<1 %	70 cm		
Hypochaeris glabra				ER4-3	star head
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=ER17-58	Hypoxis
Lomandra aff. micrantha subsp. micrantha				ER4-11	sedge
Millotia tenuifolia var. tenuifolia				ER4-4	umbrella grass
Neurachne alopecuroidea	+	<1 %	5cm		Neurachne
Olearia dampieri subsp. eremicola	+	<1 %		ER4-8	
Parentucellia latifolia	+	<1 %	4 cm	ER4-23	
Pentaschistis airoides				ER4-9	
Petrorhagia prolifera	+	<1 %	2-15cm	ER4-12,55	
Phyllangium sulcatum	+	<1 %		ER4-5	
Platysace cirrosa	+	<1 %	25cm	=ER2-53	Trachymene Climber
Podolepis lessonii	+	<1 %	15 cm	ER4-14	Daisy
Podotheca angustifolia	+	<1 %	5 cm	ER4-25	

Ptilotus gaudichaudii var. parviflorus	+	<1 %	40 cm	ER4-15	
Rhodanthe laevis	+	<1 %	5cm	=ER1-55	Daisy
Schoenus clandestinus	+	<1 %	3cm	ER4-52	
Thysanotus manglesianus	+	<1 %	30cm	ER4-50	Thysanotus Climber
Trachymene cyanopetala				ER4-2(A)	
Trachymene pilosa	+	<1 %	7 cm	ER4-2(B)	Specimen split.
Trifolium repens var. repens	+	<1 %	4 cm	ER4-20	red cylinder head
Trifolium subterraneum	+	<1 %	3cm	ER4-51	Clover
Ursinia anthemoides	+	<1 %	10 cm		
Vulpia myuros var. hirsuta	+	<1 %	4 cm	ER4-19	slim cylinder head grass
Zaluzianskya divaricata	+	<1 %	6 cm	ER4-24	
Allocasuarina campestris					
Briza maxima					
Chamaescilla corymbosa var. corymbosa		<1 %	10cm	=ER19-50	about 20m south of plot
Solanum oldfieldii		<1 %	30cm	ER4-57	about 20m N of plot
Waitzia nitida				ER4-26	yellow daisy

Moora Site ERG005

Described by MJH **Date** **Type:** QUADRAT 10x10 m, 30x30

Location: The Eastern Ridge parallels the current mine path to its east,and extends north to Kiaka Rd. This site is on top of the ridge, approximately 100 m NE of the 'Breakaway' area and 1.2 km SSE of the Kiaka Rd/Midlands Rd. junction.

MGA Zone 50 407725 **m E** 6623838 **m N** -30.514124 **S lat** 116.038291 **E long**

Habitat: Flat-gentle slope on ridge-top just below crest.

Soil: Dark silty loam.

Rock Type: Chert outcrop and cobbles, ~50% cover.

Vegetation: Regelia megacephala open scrub over Hibbertia subvaginata shrubland over Neurachne alopecuroidea very open grassland with scattered annual herbs and grasses including Podolepis lessonii and *Avena barbata,

Vegetation condition: Very good. Some senescence (and lack of understorey through grazing?).

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	2%		1.8 m		
Amphipogon caricinus	+	<1 %			
Arctotheca calendula	+	<1 %	10cm		Revisit. Capeweed
Avena barbata	+	<1 %	25 cm		
Blennospora drummondii	+	<1 %	5 cm	ER5-4	Grey daisy
Briza maxima	+	<1 %	10 cm		
Caladenia flava subsp. flava	+	<1 %	6 cm	=ER16-?	Revisit. ? Flava; hairy leaf.
Calandrinia sp.	+	<1 %	20cm	ER5-53	Revisit.
Chamaescilla corymbosa var. corymbosa	+	<1 %	15cm	ER05-10	Also =ER19-50.
Cheilanthes adiantoides	1%	1-5%	+?		
Crassula colorata var. colorata				ER5-51	Revisit.
Crassula exserta	+	<1 %	2 cm	ER5-8	
Dianella revoluta var. divaricata	+	<1 %	30cm		Revisit.
Dichopogon capillipes	+	<1 %	25 cm		
Dioscorea hastifolia	+	<1 %	2 m		
Drosera macrantha subsp. macrantha	+	<1 %	40cm	ER5-55	Revisit. Climber
Ehrharta longiflora	+	<1 %	10-20 cm		
Goodenia berardiana	1%	1-5%	2 cm	ER5-50	Revisit.
Hibbertia subvaginata	5-10%	10-25%	1-1.5 m	ER8	
Hypochaeris glabra	+	<1 %	5 cm	ER5-6	
Lawrencella rosea	+	<1 %	15cm	=ER8-51	Revisit. Pink daisy
Neurachne alopecuroidea	+	<1 %	30 cm		
Pentaschistis airoides	+	<1 %	5-10 cm	ER5-3	Grass
Petrorhagia prolifera	+	<1 %	6cm	ER5-57	Revisit. Daisy
Petrorhagia velutina	+	<1 %	5-10 cm		
Platysace cirrosa	+	<1 %	15 cm	=ER2-53	"Trachymene Climber"
Podolepis lessonii	+	<1 %	15 cm	ER5-7	
Podotheca angustifolia	+	<1 %	3cm	=ER2-54	Daisy
Quinetia urvillei	+	<1 %	5 cm	ER5-5	
Regelia megacephala	60%	50-75%	2-4 m		
Silene gallica var. gallica	+	<1 %	25cm	ER5-58,60	Also recorded in 30x30. Revisit. ?
Thysanotus manglesianus	+	<1 %	1.3m	ER5-54	Revisit. Climber
Trachymene cyanopetala	+	<1 %	20cm	ER5-52B	Revisit.

Trachymene ornata	+	<1 %	20cm	ER5-52A	Revisit.
Trifolium subterraneum	+	<1 %	5cm	ER5-56	Revisit. Clover
Ursinia anthemoides	+	<1 %	10-15 cm		
Vulpia myuros var. hirsuta	+	<1 %	15 cm	ER5-1	Grass
Burchardia umbellata	+	<1 %	30 cm		
Caladenia denticulata	+	<1 %	15cm	JT6-56	Revisit. Orchid
Calytrix leschenaultii	+	<1 %	30-50 cm		
Hypoxis occidentalis var. occidentalis	+	<1 %	12cm	ER5-59	Revisit.
Lepidosperma leptostachyum	+	<1 %	40CM	ER5-61,62	Revisit.
Olearia dampieri subsp. eremicola	+	<1 %	80cm	=ER8/16	Revisit.
Pityrodia dilatata	+	<1 %	30cm		
Stypandra glauca	+	<1 %	40cm		
Waitzia nitida	+	<1 %	10-15 cm	ER5-11	Yellow Daisy

Moora **Site** ERG006

Described by BRM **Date** 5/11/00 **Type:** QUADRAT 10x10 m, 30x30

Location: The Eastern Ridge parallels the current mine path to its east. This site is in the "Breakaway" area near the current mining area, on the western side of the ridge, approximately 1.3 km SSE of the Kiaka Rd/Midlands Rd junction.

MGA Zone 50 407685 **m E** 6623682 **m N** -30.515529 **S lat** 116.037861 **E long**

Habitat: West facing slope of ridge, in quartz 'breakaway'.

Vegetation: Allocasuarina huegeliana (Acacia acuminata subsp. acuminata) low open woodland over Hibbertia subvaginata low open shrubland to open shrubland over Podolepis lessonii/*Avena barbata, *Briza maxima very open annual herb/grassland.

Vegetation condition: Good? Very open understorey, a lot of weeds.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	+	<1 %	4 cm		
Acacia stenoptera	+	<1 %	80 cm	ER6-12	
Allocasuarina huegeliana	15	10-25%	12-15 m		
Amyema preissii	+	<1 %	1.2m	=ER15	Revisit. On Acacia acum
Apium annuum	+	<1 %	2cm	ER6-60	Revisit. #3 ID?
Austrostipa trichophylla	+	<1 %	40 cm	ER6-9	
Avena barbata	+	<1 %	30 cm		
Briza maxima	+	<1 %	15 cm		
Burchardia umbellata	+	<1 %	30cm	GH9-52	Revisit. ?
Caladenia denticulata	+	<1 %	15cm	ER6-50	Revisit. Spider orchid
Caladenia flava subsp. flava	+	<1 %	10cm	=ER16-54	Revisit.
Calandrinia sp.	+	<1 %	2cm	ER6-62A	Revisit
Cheilanthes adiantoides	+	<1 %	10 cm		
Crassula exserta	+	<1 %	2cm	ER6-56	Revisit.
Cyanicula deformis	+	<1 %	12cm	=ER17-51	Revisit. Blue beard.
Daucus glochidiatus	+	<1 %	10cm	ER6-51,25	Also recorded in 30x30.
Dichopogon capillipes	+	<1 %			
Dioscorea hastifolia	4-5%				Revisit.
Drosera macrantha subsp. macrantha	+	<1 %	40cm	=ER6-54	Revisit. Climber ?pallida
Ehrharta longiflora	+	<1 %			
Goodenia berardiana	+	<1 %		ER6-19,52	
Hibbertia subvaginata	3-4	1-5%	0.7-1.2 m		
Hypochaeris glabra	+	<1 %	10 cm	ER6-15	
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=ER17-58	Revisit.
Kennedia prostrata	+	<1 %	10 cm	ER6-14	
Lawrencella rosea	+	<1 %	15cm	=ER20-54	Revisit. Pink daisy
Lepidosperma tenue	+	<1 %	6 cm	ER6-20,65	sedge
Linum trigynum	+	<1 %		ER6-18	
Neurachne alopecuroidea	+	<1 %	30 cm	ER6-6	cylinder head
Parentucellia latifolia	+	<1 %		ER6-10	
Pentaschistis airoides	+	<1 %	10 cm		
Phyllangium sulcatum	+	<1 %		ER6-11	
Podolepis lessonii	+	<1 %	15 cm	ER6-3	Daisy
Podotheca angustifolia	+	<1 %	4cm	GH10-52	Revisit. Daisy
Ptilotus polystachyus var. polystachyus	+	<1 %		ER6-13	
Schoenia cassiniana	+	<1 %	10 cm	ER6-2,62B	
Stypandra glauca	+	<1 %	30 cm	ER6-7	

Thysanotus manglesianus	+	<1 %	30 cm	ER6-5,53	
Trachymene ornata	+	<1 %	5 cm	ER6-17,59	
Tripteris clandestina	+	<1 %	10cm	=JT3-50	Revisit. Stink daisy
Trymalium ledifolium var. rosmarinifolium	+	<1 %	1 m	ER6-4	
Urospermum picroides	+	<1 %	30 cm	ER6-8,61	
Ursinia anthemoides	+	<1 %	15 cm		
Waitzia nitida	+	<1 %	10 cm	ER6-1,57	Also recorded in 30x30.
Austrostipa elegantissima	+	<1 %	60cm	ER6-58	Revisit. Tall
Comesperma integerrimum	+	<1 %		ER6-24	creeper (?Comesperma)
Dryandra sessilis var. sessilis					
Lepidosperma leptostachyum	+	<1 %		ER6-66	Revisit. In rock shelves
Olearia dampieri subsp. eremicola	+	<1 %		ER6-21	
Pityrodia dilatata	+	<1 %		ER6-22	
Pleurosorus rutifolius	+	<1 %	15cm	ER6-64	Revisit. Hairy fern
Trifolium repens var. repens	+	<1 %		ER6-23	
Xanthorrhoea drummondii	+	<1 %			

Moora Site ERG007

Described by MJH **Date** **Type:** QUADRAT 10x10 m, 30x30

Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is south and east of the 'Breakaway', on the ridge top, an is approximately 1.4 km SSE of the Kiaka Rd/Midlands Rd junction.

MGA Zone 50 407904 **m E** 6623376 **m N** -30.518307 **S lat** 116.040116 **E long**

Habitat: Gentle south facing slope just below crest.

Soil: Well mulched, dark and loamy.

Rock Type: Well weathered quartz?-not as hard as chert. Some outcrop, cobbles.

Vegetation: Allocasuarina huegeliana and Acacia acuminata scattered low trees to open low woodland over Allocasuarina campestris open scrub over scattered low shrubs of Hibbertia subvaginata.

Vegetation condition: Good

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	40	33.3-50%	(0.5)2-2.5		
Allocasuarina huegeliana	5	5-10%	8 m		
Amphipogon caricinus	+	<1 %	30 cm		
Arctotheca calendula	+	<1 %	12cm		Revisit.
Austrodanthonia caespitosa	+	<1 %	20-30 cm	ER7-3,56	
Austrostipa tenuifolia	+	<1 %	25 cm	ER7-2	
Avena barbata	1	<1 %	20-30 cm		
Briza maxima	+	<1 %	10-15 cm		
Bromus diandrus	+	<1 %	10 cm	ER7-4	Grass
Caladenia flava subsp. flava	+	<1 %	10cm	=ER11-53	Revisit.
Calandrinia sp.	+	<1 %	10cm	ER7-60	Revisit.
Chamaescilla corymbosa var. corymbosa	+	<1 %	20 cm	ER7-8	
Cheilanthes adiantoides	+	<1 %	10 cm		
Cyanicula deformis	+	<1 %	10cm	=ER17-51	Revisit. Blue beard
Dichopogon capillipes	1%	1-5%	30cm	ER7-50	Revisit.
Dioscorea hastifolia	3-4%		50cm		Revisit.
Drosera macrantha subsp. macrantha	+	<1 %	30cm	ER7-53	Revisit.
Ehrharta longiflora	+	<1 %	5-10 cm		
Gilberta tenuifolia	+	<1 %	15cm	=ER17-59	Also recorded in 30x30. Also ER7-16 (Revisit). Small yellow
Goodenia berardiana	+	<1 %	12cm	=ER8-52	Revisit.
Hibbertia subvaginata	3-5	1-5%	30-50 cm		
Hyalosperma cotula	+	<1 %	10 cm	ER7-10	White daisy
Hypochaeris glabra	+	<1 %	10 cm	ER7-11	
Hypoxis occidentalis var. occidentalis	1-2%	1-5%	15cm	=ER17-58	Revisit.
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	3cm	ER7-58	Revisit.
Lepidosperma leptostachyum	+	<1 %	45cm	ER7-59	Revisit.
Lomandra (Moora twisty)	+	<1 %	30cm	ER7-51	Revisit.
Neurachne alopecuroidea	+	<1 %	10cm		Revisit. Flowering
Olearia dampieri subsp. eremicola	+	<1 %	10 cm	ER7-1	
Parentucellia latifolia	+	<1 %	10 cm	ER7-9	Grass
Pentaschistis airoides	+	<1 %		ER7-7	Grass
Petrorhagia prolifera	+	<1 %	15cm	=ER8-65	Revisit.

Phyllangium sulcatum				ER7-5,63	
Platysace cirrosa	+	<1 %	15cm	=ER2-53	Revisit. Climber
Podolepis lessonii	+	<1 %	10 cm	ER7-6	Daisy
Romulea rosea	+	<1 %	30cm		Revisit.
Stypandra glauca	+	<1 %	20cm		Revisit.
Thysanotus manglesianus	+	<1 %	60 cm	ER7-55,62	
Trachymene sp.	+	<1 %	30cm	ER7-54	Revisit.
Trifolium arvense var. arvense	+	<1 %	5 cm	ER7-12	
Trifolium subterraneum	+	<1 %	2cm	ER7-52	Revisit. Clover
Ursinia anthemoides	+	<1 %	5-10 cm		
Waitzia nitida	+	<1 %	10 cm	ER7-65	Also recorded in 30x30. Yellow Daisy=ER5
Xanthorrhoea drummondii	+	<1 %	1.8m		Revisit.
Acacia acuminata subsp. acuminata	+	<1 %	10 m		
Borya sphaerocephala	+	<1 %	4.5 cm		
Burchardia bairdiae	+	<1 %	30cm	=GH9-52	Revisit.
Caladenia denticulata	+	<1 %	20cm	=JT6-56	Revisit. Spider orchid
Calytrix leschenaultii	+	<1 %	50 cm		
Erodium cygnorum	+	<1 %	5cm	=ER17-52	Revisit. ?
Kennedia prostrata	+	<1 %	5 cm		
Lawrencella rosea	+	<1 %	15cm	=ER20-54 linear leaf	Revisit. Pink daisy
Petrorhagia velutina	+	<1 %	15 cm	ER7-15	
Silene gallica var. gallica	+	<1 %	30cm	ER7-64	Revisit. ?
Sowerbaea laxiflora	+	<1 %	30 cm	ER7-13	
Thysanotus dichotomus	+	<1 %		ER7-61	
Trachymene ornata	+	<1 %	5 cm		
Trifolium repens var. repens				ER7-17	
Tripteris clandestina	+	<1 %	30cm	=JT3-50	Revisit. Stink daisy

Moora Site ERG008

Described by BRM **Date** 5/11/00 **Type:** QUADRAT 10x10 m, 30x30

Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is approximately 300 m north of ERG007.

MGA Zone 50 407823 **m E** 6623712 **m N** -30.515269 **S lat** 116.039301 **E long**

Habitat: Ridge top.

Soil: Grey sand.

Rock Type: Cobbles, rocks, outcrop, ~90% cover - 50% sheet rock.

Vegetation: Regelia megacephala open scrub over Hibbertia subvaginata low open shrubland over Lepidosperma leptostachyum, Lepidosperma tenue, Austrostipa tenuifolia, Neurachne alopecuroidea very open sedge/grassland with *Pentaschistis airoides, Podolepis lessonii, Lawrencella rosea scattered annual grasses and herbs

Vegetation condition: Good-very good. Some grazing.

Notes: There have been many Regelia deaths, but there are lots of volunteers to replace them and many mature plants are sprouting from their bases.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Austrostipa tenuifolia				ER8-30	
Acacia acuminata subsp. acuminata	+	<1 %	30 cm		juv
Allocasuarina huegeliana	+	<1 %		ER8-15	
Anagallis arvensis	+	<1 %	4cm	ER8-60	Revisit.
Austrostipa sp.	+	<1 %	40 cm	ER8-18	
Avena barbata				ER8-14a	
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	25cm	ER8-19	Also recorded in 30x30.
Briza maxima	+	<1 %			
Bromus diandrus	+	<1 %	15cm	ER8-63,28	Also recorded in 30x30.
Burchardia umbellata	+	<1 %			
Caladenia denticulata	+	<1 %	15cm	=JT6-56	Revisit. ?Orchid
Caladenia flava subsp. flava	+	<1 %		ER8-1	Orchid
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	ER8-59	Revisit.
Cheilanthes adiantoides	+	<1 %			
Cryptandra glabriflora	+	<1 %	5 cm	ER8-16	
Cyanicula deformis	+	<1 %	12cm	=ER17-51	Revisit. Blue beard
Dichopogon capillipes					
Dioscorea hastifolia	+	<1 %			

Diuris aff. recurva	+	<1 %	35cm	=ER3-52	Revisit.
Drosera macrantha subsp. macrantha	+	<1 %	70cm	ER8-12,53	Climber,
Ehrharta longiflora	+	<1 %			
Eriochilus helonomos	+	<1 %	25cm	ER8-56	Revisit. Orchid
Goodenia berardiana				ER8-8a,52	
Grevillea biternata	+	<1 %	10cm	=ER	Revisit.
Hibbertia subvaginata	4-5	1-5%	0.6-1 m		
Hypochaeris glabra	+	<1 %		ER8-10	
Kennedia prostrata	+	<1 %	3cm	ER8-62	Revisit.
Lawrencella rosea	+	<1 %	15cm	ER8-2,51	Daisy
Lepidosperma leptostachyum	+	<1 %		ER8-14	sedge
Lepidosperma tenue	+	<1 %		ER8-13	sedge
Neurachne alopecuroidea	+	<1 %		ER8-7	
Olearia dampieri subsp. eremicola	+	<1 %	10 cm	ER8-17	
Parentucellia latifolia	+	<1 %	4cm	ER8-64	Revisit.
Pentaschistis airoides	+	<1 %		ER8-26	
Petrorhagia velutina	+	<1 %		ER8-2B	
Phyllangium sulcatum	+	<1 %		ER8-9	
Platysace cirrosa	+	<1 %	20cm	=ER2-53	Revisit.
Podolepis lessonii	+	<1 %	6cm	ER8-6	Daisy
Podotheca angustifolia	+	<1 %	4cm	=ER2-54	Revisit. Daisy
Pterostylis sanguinea	+	<1 %	1cm	ER8-58	Revisit. Flat base
Pterostylis scabra	+	<1 %	15cm	ER8-57	Revisit. Tall
Regelia megacephala	30-40	25-33.3%	1-2.5 m		
Sonchus oleraceus	+	<1 %			star head = ER6-15
Stypandra glauca	+	<1 %			=ER6-7
Thysanotus manglesianus	+	<1 %	30cm	ER8-54,55	Also recorded in 30x30. Also ER8-32. Revisit. Fleshy leaf
Trachymene pilosa	+	<1 %		ER8-8	
Trifolium arvense var. arvense	+	<1 %		ER8-3	fluffy head
Urospermum picroides	+	<1 %	15 cm	ER8-25	
Ursinia anthemoides	+	<1 %			
Vulpia myuros var. hirsuta	+	<1 %		ER8-11	Grass
Waitzia nitida	+	<1 %		ER8-4	
Austrodanthonia caespitosa	+	<1 %		ER8-21	hairy base grass
Austrodanthonia setacea				ER8-29	
Cyrtostylis huegelii	+	<1 %	1cm	ER8-66	Revisit. Orchid (round leaf) (200m west of NW peg)
Millotia tenuifolia var. tenuifolia	+	<1 %		ER8-23	
Pentaschistis pallida				ER8-27	Grass
Tripteris clandestina	+	<1 %	30cm	ER8-61	Revisit. Stink daisy
Tripterococcus brunonis	+	<1 %		ER8-33	

Moora Site ERG009

Described by MJH **Date** 3/12/00 **Type:** QUADRAT 10x10 m, 30x30

Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is near the north end of the ridge, just S and upslope from some costeans, and approximately 900 m ESE from the Kiaka Rd/Midlands Rd junction.

MGA Zone 50 407881 **m E** 6623783 **m N** -30.514633 **S lat** 116.039912 **E long**

Habitat: Ridge top with gentle slope to north.

Soil: Where present, a shallow fine brown sand/silt.

Rock Type: Chert outcrop -> boulders -> cobbles -> gravel. Cover 85%+ of surface.

Vegetation: Allocasuarina huegeliana, Dryandra sessilis var. sessilis scattered low trees over Kunzea praestans, Acacia congesta subsp. congesta shrubland to high shrubland over Hibbertia subvaginata open heath to shrubland over *Pentaschistis airoides, *Vulpia myuros var. hirsuta, *Ehrarta longiflora very open annual grassland.

Vegetation condition: Very Good - Excellent. Some weed invasion and senescence but overall high quality.

Fire age: >10 Years.

Notes: Is near cleared area (to S). With the amount of chert on this site it may be expected to find the Regelia here, but there is none present.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia congesta subsp. congesta	5	5-10%	1-2 m		dead and dying
Allocasuarina campestris	1	<1 %	1-2 m		
Allocasuarina huegeliana	2	1-5%	4 m		

Austrodanthonia setacea	+	<1 %	40 cm	ER9-4,51	
Avena barbata	+	<1 %	20 cm	ER9-3	
Briza maxima	+	<1 %	10 cm	ER9-6	
Burchardia umbellata	+	<1 %	12-20cm	ER9-54	Revisit. Fleshy leaves
Caladenia flava subsp. flava	+	<1 %	10cm	=ER11-53	Revisit.
Calandrinia sp.	+	<1 %	2cm	ER9-53	Revisit.
Calytrix leschenaultii	+	<1 %	1 m		
Chamaescilla corymbosa var. corymbosa	+	<1 %	15cm	=ER19-50	Revisit.
Cheilanthes adiantoides	+	<1 %	10 cm		
Crassula exserta	+	<1 %	8 cm	ER9-1	
Cyanicula deformis	+	<1 %	10cm	=ER17-51	Revisit. Blue beard
Dichopogon capillipes	+	<1 %	15cm	ER9-50	Revisit.
Dioscorea hastifolia	+	<1 %			
Diuris aff. recurva	+	<1 %	30cm	ER9-61	Revisit.
Drosera macrantha subsp. macrantha	+	<1 %	15cm	ER9-55	Revisit. Erect
Drosera pallida	+	<1 %		ER9-5	
Dryandra sessilis var. sessilis	2	1-5%	5 m		
Ehrharta longiflora	+	<1 %	20 cm		
Goodenia berardiana	+	<1 %	30cm	ER9-59	Revisit.
Guichenotia sarotes	+	<1 %	60cm	ER9-58	Revisit.
Hibbertia subvaginata	40	33.3-50%	1 (1.2) m		
Hypochaeris glabra	1-2%	1-5%	(2) 15cm		Revisit.
Kunzea praestans	5	5-10%	(0.5)1.8-3m		
Lepidosperma leptostachyum	+	<1 %	30cm	ER9-57	Revisit.
Neurachne alopecuroidea	+	<1 %	20 cm		
Pentaschistis airoides	+	<1 %	10 cm		
Platysace cirrosa	+	<1 %	15cm	=ER2-53	Revisit.
Podotheca angustifolia	+	<1 %	3cm	GH10-52	Revisit. Daisy
Pterostylis setulosa	+	<1 %	15cm	=ER10-60	Revisit. Flat base
Quinetia urvillei	+	<1 %	10 cm	ER9-7	
Romulea rosea	+	<1 %	35cm	ER9-56	Revisit.
Trachymene ornata	+	<1 %	30cm	ER9-52	Revisit.
Ursinia anthemoides	+	<1 %	10-15 cm		
Vulpia myuros var. hirsuta	+	<1 %	10 cm	ER9-2	
Acacia acuminata subsp. acuminata	+	<1 %	1 m		juv
Bromus diandrus	+	<1 %	20cm	=ER10-58	Revisit.
Hypoxis occidentalis var. occidentalis	+	<1 %	12cm	=ER17-58	Revisit.
Podolepis lessonii	+	<1 %	25cm	=ER1-58	Revisit. Daisy
Trifolium subterraneum	+	<1 %	1cm	ER9-60	Revisit. Clover
Tripteris clandestina	+	<1 %	40cm	=JT3-50	Revisit. Stink daisy

Moora **Site** ERG010

Described by BRM **Date** 3/12/00 **Type:** QUADRAT 10x10 m, 30x30

Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is on the south slope of the northern-most hill of the ridge, approx 850 m ESE of the Kiaka Rd/Midlands Rd junction and 100 m east of Kiaka Road.

MGA Zone 50 407838 **m E** 6624673 **m N** -30.506599 **S lat** 116.039543 **E long**

Habitat: South facing mid-slope on a fairly low chert hill.

Soil: Gravelly, grey silty sand.

Rock Type: Quartz outcrop/boulders/cobbles. Cover ~80-90% of surface.

Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata, Eucalyptus loxophleba subsp. loxophleba scattered low trees over Allocasuarina campestris high open shrubland, over Hibbertia subvaginata open heath over Dichopogon capillipes, Lepidosperma tenue, Austrodanthonia acerosa very open herb/sedge/grassland.

Vegetation condition: Good - very good. Evidence of grazing nearby, *Ursinia and *Briza present.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	4	1-5%	3-4 m		
Allocasuarina campestris	10	5-10%	1.8-2.5 m		
Austrodanthonia acerosa	+	<1 %		ER10-10	Grass
Austrodanthonia caespitosa	+	<1 %	4cm	ER10-53	Revisit. (hairy)
Austrostipa elegantissima	+	<1 %	35cm	=ER4-56	Revisit. Grass
Avena barbata				ER10-59	Also recorded in 30x30.
Briza maxima	2-3	1-5%	15 cm		
Burchardia umbellata	+	<1 %	30cm	=GH9-52	Revisit.

Caladenia flava subsp. flava	+	<1 %	12cm	=ER16-54	Revisit.
Calandrinia sp.	+	<1 %	3cm	ER10-54	Revisit.
Chamaescilla corymbosa var. corymbosa	+	<1 %		ER10-4	
Cheilanthes adiantoides	+	<1 %		ER10-7	
Dichopogon capillipes					
Dioscorea hastifolia	+	<1 %			
Drosera macrantha subsp. macrantha					
Drosera sp.	+	<1 %	50cm	ER10-50	Revisit.
Eucalyptus loxophleba subsp. loxophleba	8	5-10%	5 m		
Hibbertia subvaginata	30-40	25-33.3%	1-1.5 m		
Hypochaeris glabra	+	<1 %	1cm		Revisit.
Hypoxis occidentalis var. occidentalis	+	<1 %	20cm	=ER12-50	Revisit.
Lepidosperma leptostachyum	+	<1 %	60 cm	ER10-2	sedge
Olearia dampieri subsp. eremicola	+	<1 %	0.4-1.5 m	ER10-1	
Pentaschistis airoides	+	<1 %		ER10-8	
Pterostylis sp.	+	<1 %	12cm	=ER18-57	Revisit. Tall
Stylidium glabrifolium	+	<1 %			
Stypandra glauca	+	<1 %	30cm		Revisit.
Thysanotus manglesianus	+	<1 %	30cm	=ER17-55	Revisit. Fleshy leaf
Trifolium repens var. repens	+	<1 %	20 cm	ER10-6	cylinder head
Trifolium subterraneum	+	<1 %	3cm	ER10-55	Revisit. Clover
Trymalium ledifolium var. rosmarinifolium				ER10-3	
Urospermum picroides	+	<1 %	6cm	ER10-57	Revisit. ?
Ursinia anthemoides	+	<1 %	30 cm		
Vulpia myuros var. hirsuta	+	<1 %		ER10-9	
Acacia aristulata	+	<1 %			6 of
Allocasuarina huegeliana	+	<1 %			
Bromus diandrus	+	<1 %	20cm	ER10-58	Revisit.
Pterostylis setulosa	+	<1 %	10cm	ER10-60	Revisit. Flat base leaf
Trachymene ornata	+	<1 %	10cm	ER10-61	Revisit.

Moora Site ERG011

Described by BRM **Date** 3/12/00 **Type:** QUADRAT 10x10 m, 30x30

Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is on a NE facing slope of a gully that empties to the NNW and is approximately 800m SE of the Kiaka Rd/Midlands Rd junction.

MGA Zone 50 407949 **m E** 6624301 **m N** -30.509964 **S lat** 116.040667 **E long**

Habitat: East facing upper slope.

Soil: Gravelly grey silty sand.

Rock Type: Quartz gravel/cobbles/boulders.

Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris open to closed scrub.

Vegetation condition: Very good. Little sign of grazing and weeds.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Habenaria elongata					
Allocasuarina campestris	80--85	>75%	2-2.4 m		
Avena barbata	+	<1 %			
Blennospora drummondii	+	<1 %		ER11-7	Daisy
Briza maxima	+	<1 %			
Bromus diandrus	+	<1 %		ER11-6	Grass
Burchardia umbellata	+	<1 %	20cm	=GH9-52	Revisit.
Caladenia flava subsp. flava	+	<1 %	3cm	ER11-53,5	Revisit. Orchid (hairy spade leaf)
(x3 2-3m from NE peg)					
Chamaescilla corymbosa var. corymbosa	+/-1%		4cm	=ER19-50	Revisit.
Cheilanthes adiantoides	+	<1 %			
Cyanicula deformis	+	<1 %	15cm	=ER17-51	Revisit. Blue beard orchid
Dichopogon capillipes	+	<1 %			
Dioscorea hastifolia	+	<1 %			
Drosera macrantha subsp. macrantha	+	<1 %	45cm	ER11-52	Revisit. Climbing
Drosera pallida	+	<1 %		ER11-1	
Hibbertia subvaginata					At edge of 10x10.
Hypochaeris glabra	+	<1 %	1cm		Revisit.

Hypoxis occidentalis var. occidentalis	+	<1 %	10cm	=ER17-58	Revisit.
Lepidosperma tenue	+	<1 %			Sedge = ER10-2
Millotia tenuifolia var. tenuifolia	+	<1 %	2cm	ER11-54	Revisit. Daisy #1
Neurachne alopecuroidea	+	<1 %	5cm		Revisit.
Pentaschistis airoides	+	<1 %		ER11-2	
Petrorhagia prolifera	+	<1 %		ER11-9	
Phyllangium sulcatum	+	<1 %		ER11-8	Daisy
Platysace cirrosa	+	<1 %	10cm	=GH9-54	Revisit. Climber
Podolepis lessonii	+	<1 %		ER11-3,55	Daisy, small
Pterostylis sanguinea	+	<1 %	10cm	ER11-58	Revisit. Orchid
Trachymene cyanopetala	+	<1 %	2cm	ER11-50	Revisit.
Trifolium subterraneum	+	<1 %	2cm	ER11-51	Revisit. Clover
Ursinia anthemoides	+	<1 %			
Vulpia myuros var. hirsuta	+	<1 %		ER11-5	Grass
Acacia acuminata subsp. acuminata					
Acacia aristulata					4
Acacia congesta subsp. congesta					
Allocasuarina huegeliana					
Austrodanthonia setacea	+	<1 %	10cm	ER11-63	Revisit. (top slope edge of 30x30)
Brassica barrelieri subsp. oxyrrhina	+	<1 %	10cm	ER11-62	Revisit. Small gallow flr
Calytrix leschenaultii					
Goodenia arthrotricha					
Kunzea praestans					
Lepidosperma leptostachyum	+	<1 %	50cm	ER11-61	Revisit.
Stylidium glabrifolium					
Stypandra glauca	+	<1 %	20cm		Revisit.
Thysanotus manglesianus	+	<1 %	25cm	ER11-60	Revisit. Climber
Xanthorrhoea drummondii					

Moora **Site** ERG012

Described by MJH **Date** 3/09/00 **Type:** QUADRAT 10x10 m, 30x30

Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is on a SW facing slope (facing ERG011) of a gully that empties to the NNW and is approximately 800m SE of the Kiaka Rd/Midlands Rd junction.

MGA Zone 50 407788 **m E** 6624200 **m N** -30.510863 **S lat** 116.03898 **E long**

Habitat: Rocky, gentle west facing slope.

Soil: Where present, a shallow black fine sand - well mulched under Allocasuarina campestris.

Rock Type: Quartz/laterite outcrop and cobbles. Cover 85%+.

Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata, Eucalyptus loxophleba subsp. loxophleba scattered low trees over Allocasuarina campestris closed scrub over Austrostipa variabilis, Hypoxis occidentalis var. occidentalis scattered grasses and herbs

Vegetation condition: Very good - moderate weed invasion.

Fire age: >10 years?

Notes: High degree of outcrop, but quartz not of same quality as supports Regelia - mixed with laterite.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	90%	>75%	2.5 m		
Austrostipa variabilis	+	<1 %	20 cm	ER12-3	Grass
Avena barbata	+	<1 %	15-20 cm		
Borya sphaerocephala	+	<1 %	20cm		Revisit.
Briza maxima	+	<1 %	10-15		
Bromus diandrus	+	<1 %	10 cm	ER12-4	
Burchardia umbellata	+	<1 %	30cm	=GH9-52	Revisit.
Caladenia denticulata	+	<1 %	12cm	=JT6-56	Revisit. ?Orchid
Caladenia flava subsp. flava	+	<1 %	5cm	=ER11-53	Revisit. Orchid
Chamaescilla corymbosa var. corymbosa	+	<1 %	20 cm		
Cheilanthes adiantoides	+	<1 %	10-15		
Cyanicula deformis	+	<1 %	12cm	=ER17-51	Revisit. Blue beard orchid
Dichopogon capillipes	+	<1 %	30 cm		
Dioscorea hastifolia	+	<1 %	10cm-1.3		Revisit.
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	10cm	ER12-54	Revisit. Flat base
Drosera macrantha subsp. macrantha	+	<1 %	30cm	ER12-59,5	Also recorded in 30x30.

					Climber
Hypochaeris glabra	+	<1 %	10 cm		
Hypoxis occidentalis var. occidentalis	<1%	<1 %	15cm	ER12-50	Revisit.
Parentucellia latifolia	+	<1 %	10 cm		
Pentaschistis airoides	+	<1 %	10 cm		
Phyllangium sulcatum	+	<1 %	10 cm		
Podolepis lessonii	+	<1 %	10 cm	ER12-1	Daisy
Podotheca angustifolia	+	<1 %	5 cm	ER12-6,60	
Thysanotus manglesianus	+	<1 %	1.1m	ER12-55	Revisit. Climber
Trachymene ornata	+	<1 %	5cm	ER12-53	Revisit.
Trifolium subterraneum	+	<1 %	3cm	ER12-51	Revisit. Clover
Ursinia anthemoides	+	<1 %	10 cm		
Acacia acuminata subsp. acuminata	+	<1 %	4 m		
Allocasuarina huegeliana	+	<1 %	4-5 m		
Eucalyptus loxophleba subsp. loxophleba	+	<1 %	6 m	ER12-7	
Muehlenbeckia adpressa	+	<1 %	2cm	ER12-56	Revisit.
Olearia dampieri subsp. eremicola	+	<1 %	90cm	ER12-57	Revisit.
Platysace cirrosa	+	<1 %	1.3m	=GH9-54	Revisit. Climbing
Pterostylis sanguinea	+	<1 %	2cm	=ER11-57	Revisit. Flat leaf

Moora Site ERG013

Described by MJH **Date** 3/12/00 **Type:** QUADRAT 10x10 m, 30x30

Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is on a south facing slope on the eastern arm of a gully emptying east of the ridge, approx. 2 km SE of Kiaka Rd/Midlands Rd junction.

MGA Zone 50 408012 **m E** 6623294 **m N** -30.519055 **S lat** 116.041234 **E long**

Habitat: Gentle - moderate southerly facing slope.

Soil: Black, gravelly silty sand.

Rock Type: Quartz outcrop, boulders and cobbles. ~70% cover (from memory, no notes)

Vegetation: Allocasuarina huegeliana low open woodland over Hibbertia subvaginata open heath over Pityrodia dilatata low shrubland over Neurachne alopecuroidea scattered grasses and *Ehrharta longiflora scattered annual grasses.

Vegetation condition: Good - very good. Lots of weed invasion from paddock below, and weeds almost only herb layer.

Notes: A lot of Acacia aristulata around here - should be recorded separately, but there were 11 individuals in the 10x10 m plot, and others outside.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	1%	<1 %	20 cm		
Allocasuarina huegeliana	5%	5-10%	(3)10 m		
Arctotheca calendula	+	<1 %	12cm		Revisit. Capeweed
Austrodanthonia caespitosa	+	<1 %	15cm	ER13-56	Revisit. Hairy godas
Austrodanthonia setacea	+	<1 %	15 cm	ER13-4	Grass
Avena barbata	+	<1 %	15 cm		
Briza maxima	+	<1 %	10-15 cm		
Bromus diandrus	+	<1 %	15cm	=ER10-58	Revisit.
Burchardia umbellata	+	<1 %	20cm	=GH9-52	Revisit.
Caladenia flava subsp. flava	+	<1 %	15 cm	ER13-1	Orchid
Calandrinia calyptrata	+	<1 %	2cm	ER13-55	Revisit.
Chamaescilla corymbosa var. corymbosa	+	<1 %	15 cm		
Cheilanthes adiantoides	+	<1 %	10 cm		
Comesperma integerrimum	+	<1 %	1m	ER13-59,5	Also recorded in 30x30. Revisit. Daisy ID?
Crassula colorata var. colorata	+	<1 %	2cm	Er13-54	Revisit.
Cyanicula deformis	+	<1 %	12cm	=ER17-51	Revisit. Blue beard
Dichopogon capillipes	+	<1 %	15-30 cm		
Dioscorea hastifolia	+	<1 %	1 m		
Drosera macrantha subsp. macrantha	+	<1 %	30cm	ER13-52	Revisit. Climber
Ehrharta longiflora	+	<1 %	15 cm	ER13-62	
Goodenia berardiana	+	<1 %	25cm	=ER19	Revisit.
Hibbertia subvaginata	65	50-75%	1-2 m		
Hypochaeris glabra	+	<1 %	15-20 cm		
Lepidosperma leptostachyum	+	<1 %	40cm	ER13-50	Revisit.
Neurachne alopecuroidea	+	<1 %	30 cm		

Parentucellia latifolia	+	<1 %	10-15 cm		
Pentaschistis airoides	+	<1 %	10-12 cm		
Petrorhagia velutina	+	<1 %	20 cm		
Phyllangium sulcatum	+	<1 %	10 cm		
Pityrodia dilatata	10%	<1 %	45cm	ER13-51	Revisit.
Podolepis lessonii	+	<1 %	20cm	=ER1-58	Revisit. Daisy
Quinetia urvillei	+	<1 %	2cm	ER13-61	Revisit. ?Daisy
Stypandra glauca	+	<1 %	30 cm		
Thysanotus manglesianus	+	<1 %	8cm	ER13-58	Revisit. Fleshy leaf
Trachymene cyanopetala	+	<1 %	12 cm		
Trifolium subterraneum	+	<1 %	3cm	ER13-57A	Revisit. Clover
Ursinia anthemoides	+	<1 %	15 cm		
Vulpia myuros var. hirsuta	+	<1 %	15 cm	ER13-2	Grass
Xanthorrhoea drummondii	+	<1 %	2 m		
Acacia congesta subsp. congesta	+	<1 %	1.5 m		
Caladenia denticulata	+	<1 %	25cm	ER13-60	Revisit. Spider orchid
Calytrix leschenaultii	+	<1 %	0.5-1 m		
Kennedia prostrata	+	<1 %	5cm		Revisit.
Petrorhagia prolifera	+	<1 %	20cm	=ER8-65	Revisit.
Pterostylis setulosa	+	<1 %	8cm	=EO2-65	Revisit. Flat base
Waitzia nitida	+	<1 %	10-20 cm	ER13-6	Yellow daisy

Moora Site ERG014

Described by BRM **Date** 3/12/00 **Type:** QUADRAT 10x10 m, 30x30
Location: The Eastern Ridge parallels the current mine path to its east, and extends north to Kiaka Rd. This site is adjacent to the current pit on the western side of the ridge, approx. 200 m west of ERG013.
MGA Zone 50 407812 **m E** 6623292 **m N** -30.519058 **S lat** 116.039149 **E long**
Habitat: Upper slope, west facing. Chert outcropping.
Soil: Grey, silty/loamy sand.
Rock Type: Quartz outcrop, gravel/cobbles.
Vegetation: Allocasuarina huegeliana (Acacia acuminata subsp. acuminata) low open woodland over Kunzea praestans, Xanthorrhoea drummondii, Allocasuarina campestris open scrub over Hibbertia subvaginata, Acacia lasiocarpa var. sedifolia open shrubland over Borya sphaerocephala herbland.
Vegetation condition: Poor to good. Very heavily grazed, some weeds. Would regenerate well.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	+	<1 %	4 cm		REGROWTH
Acacia lasiocarpa var. sedifolia	+	<1 %		ER14-5	
Allocasuarina campestris	+	<1 %	2 m		
Allocasuarina huegeliana	4	1-5%	7 m		
Arctotheca calendula	+	<1 %	15cm		Revisit. Capeweed
Austrostipa tenuifolia	+	<1 %		ER14-10	
Avena barbata	+	<1 %			
Borya sphaerocephala	40	33.3-50%	3 cm	ER14-4	
Briza maxima	+	<1 %			
Caesia (Moora hairy stem)	+	<1 %	20cm	ER14-51,5	Also recorded in 30x30. Revisit.
Caladenia flava subsp. flava	+	<1 %		ER14-3	Orchid
Calytrix leschenaultii	+	<1 %			
Chamaescilla corymbosa var. corymbosa	+	<1 %			
Cheilanthes adiantoides	+	<1 %			
Crassula colorata var. colorata	+	<1 %	3cm	ER14-53	Revisit.
Cyanicula deformis	+	<1 %	10cm	=ER17-51	Revisit. Blue beard orchid
Desmocladus flexuosus	+	<1 %			
Dioscorea hastifolia	+	<1 %	5cm		Revisit.
Drosera macrantha subsp. macrantha	+	<1 %	30cm	ER14-50	Revisit.
Erodium cygnorum	+	<1 %	1cm	=ER17-52	Revisit. ?
Genus sp.	+	<1 %	10cm		Revisit.
Gilberta tenuifolia	+	<1 %		ER14-8	Daisy
Hibbertia subvaginata	1	<1 %	0.8-1 m		
Hypochaeris glabra				ER14-14,6	
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=ER17-58	Revisit.
Kunzea praestans	30	25-33.3%	2-2.5 m		

Lawrencella rosea	+	<1 %	15cm	=ER20-54	Revisit. Pink daisy
Lepidosperma tenue				ER14-1	Sedge
Lomandra (Moora twisty)	+	<1 %	30cm	ER14-52	Revisit.
Neurachne alopecuroidea					
Parentucellia latifolia	+	<1 %		ER14-9	
Pentaschistis airoides	+	<1 %			Tall
Phyllangium sulcatum	+	<1 %		ER14-11	
Platysace cirrosa	+	<1 %	12cm	=ER2-53	Revisit. Climber
Podolepis lessonii	+	<1 %		ER14-6	Daisy
Quinetia urvillei	+	<1 %	20cm	=Er13-61	Revisit. ?Daisy
Stylidium septentrionale	+	<1 %			Short Stylidium
Thysanotus manglesianus	+	<1 %	20cm	=ER14-54	Revisit. Climber
Trachymene cyanopetala	+	<1 %		ER14-7	
Trachymene ornata	+	<1 %			
Ursinia anthemoides	+	<1 %			
Vulpia myuros var. hirsuta	+	<1 %		ER14-12	Grass
Waitzia nitida	+	<1 %		ER14-15	Daisy
Xanthorrhoea drummondii	+	<1 %	2 m		
Acacia congesta subsp. congesta					
Austrostipa elegantissima	+	<1 %	40cm	ER14-59	Revisit.
Blennospora drummondii	+	<1 %	3cm	ER14-61	Revisit. ?Daisy
Bossiaea sp. Cairn Hill (M Henson CH2-28)			1 m	ER14-16	grazed shrub
Burchardia umbellata	+	<1 %	20cm	ER14-62	Revisit.
Comesperma integerrimum	+	<1 %	1.2m	ER14-58	Revisit.
Daviesia dielsii	+	<1 %			4 of
Dichopogon capillipes	+	<1 %	40cm	=CH10-52	Revisit. Tall
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1cm	Er14-56	Revisit. Flat
Dryandra sessilis var. sessilis					
Goodenia berardiana	+	<1 %	12cm	ER14-57	Revisit.
Olearia dampieri subsp. eremicola	+	<1 %			=ER10-1
Opercularia vaginata	+	<1 %	20cm	ER14-60	Revisit.
Pityrodia dilatata	+	<1 %	12cm		Revisit.
Stypandra glauca	+	<1 %			

Moora **Site** ERG015

Described by BRM **Date** 3/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: West side of Eastern Ridge, adjacent to original mine pit.
MGA Zone 50 407671 **m E** 6623754 **m N** -30.514881 **S lat** 116.03772 **E long**
Habitat: Chert breakaway on west-facing steep rocky slope
Soil: Brown sandy loam amongst chert rock
Rock Type: Chert
Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low woodland to low open forest over Kunzea praestans scattered tall shrubs (at top of breakaway) over Pityrodia dilatata scattered low shrubs over Stypandra glauca, Dichopogon capillipes open herbland with Dioscorea hastifolia open lianes, *Avena barbata, *Briza maxima annual open grassland and Waitzia nitida, Schoenia cassiniana very open annual herbland.
Vegetation condition: Good. ?grazing (certainly of surrounds). Weeds abundant.
Fire age: More than 5-10 years since burnt.
Notes: Datum: WGS84. Lichen abundant (mainly 2 types).
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	25-30%	25-33.3%	6-7m		
Allocasuarina huegeliana	10	5-10%	6-7m		
Amyema preissii	+	<1 %	3-4m		
Arctotheca calendula	+	<1 %	15cm		
Austrodanthonia caespitosa	+	<1 %	10cm	ER15-55	Revisit.
Avena barbata	5-10	5-10%	80cm		
Briza maxima	5-10	5-10%	40cm		
Caesia alfordii	+	<1 %	35cm	ER15-56,6	Revisit.
Caladenia flava subsp. flava	+	<1 %	20cm	ER15-29,2	Also recorded in 30x30. Orchid
Calandrinia calyptrata	+	<1 %	5cm	ER15-11,2	Also recorded in 30x30.
Chamaescilla corymbosa var. corymbosa	+	<1 %	5cm	=ER19-50	Revisit.
Cheilanthes adiantoides	2	1-5%	10cm	ER15-10	Cheilanthes
Comesperma integerrimum	+	<1 %	40cm	ER15-3	Comesperma

Crassula exserta	+	<1 %	5cm	ER15-5A,B	Was mixed, included 15-5B
Dichopogon capillipes	1-2	1-5%	20-30cm	ER15-14	Dichopogon capillipes
Dioscorea hastifolia	2-3	1-5%	20cm	ER15-1,15	
Drosera macrantha subsp. macrantha	+	<1 %	5cm	ER15-61,6	Also recorded in 30x30. Revisit.
Ehrharta longiflora	5	5-10%	30-35cm		
Hypochaeris glabra	+	<1 %		ER15-18	Daisy weed
Hypoxis occidentalis var. occidentalis	+	<1 %	12cm	=ER17-58	Revisit.
Kunzea praestans	+	<1 %	3m		
Lysiana casuarinae	+	<1 %	1.2m	ER15-53	Revisit.
Pityrodia dilatata	1	<1 %	40-50cm	ER15-7	Pityrodia dilatata
Podolepis canescens	+	<1 %	20cm	ER15-12	Waitzia
Podolepis lessonii	+	<1 %	15cm	ER15-13,6	Daisy
Prasophyllum gracile	+	<1 %	12cm	ER15-54	Revisit. Orchid
Schoenia cassiniana	1-2	1-5%	20-30cm	ER15-9,50	pink & white daisy
Stypandra glauca	1-2	1-5%	25-30cm	ER15-4	Stypandra glauca
Thysanotus manglesianus	+	<1 %	80cm	ER15-2	Also ER15-51,60. Thysanotus
Trachymene ornata	+	<1 %	10-15cm	ER15-6,52	Trachymene white top
Trachymene pilosa	+	<1 %	10cm	ER15-16	Trachymene
Trifolium subterraneum	+	<1 %	3cm	=ER15-59	Revisit. Clover
Urospermum picroides	+	<1 %	20cm	ER15-17, 1	Also ER15-57. Daisy weed
Ursinia anthemoides	1	<1 %	20cm		
Waitzia nitida	1-2	1-5%	20-25cm	ER15-8,66	Also recorded in 30x30. Waitzia (high centre)
Aira caryophyllea	+	<1 %	10cm	ER15-20,2	
Allocasuarina campestris	+	<1 %	1.5m		
Austrostipa nitida	+	<1 %	20cm	ER15-27	Austrostipa
Daucus glochidiatus	+	<1 %	15cm	ER15-26	Trachymene
Diuris aff. recurva	+	<1 %	35cm	=ER3-52	Revisit. Orchid
Goodenia berardiana	+	<1 %	8cm	=ER8-52	Revisit.
Hibbertia subvaginata	+	<1 %	1.0m		
Kennedia prostrata	+	<1 %	20cm		
Lawrencella rosea	+	<1 %	20cm	=ER20-54	Revisit. Daisy pink, linear leaves
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	40cm	ER15-22	Restionaceae (wiry head)
Lepidosperma costale	+	<1 %		ER15-65	Revisit
Neurachne alopecuroidea	+	<1 %	5cm		Revisit.
Parentucellia latifolia	+	<1 %	15cm	ER15-30	
Petrorhagia prolifera	+	<1 %	30cm	ER15-28,6	
Pterostylis setulosa	+	<1 %	12cm	=ER2-51	Revisit. Orchid
Vulpia myuros var. hirsuta	+	<1 %	10cm	ER15-21	Poaceae
Xanthorrhoea drummondii	+	<1 %	2.5m		

Moora **Site** ERG016

Described by MET **Date** 3/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: East side of eastern side of ridge, near middle of the ridge length, 15km north of moora.
MGA Zone 50 407902 **m E** 6623878 **m N** -30.51378 **S lat** 116.040138 **E long**
Habitat: East facing, moderately sloping mid to upper slope of a low ridge.
Soil: Gravelly to cobbly (angular chert) grey silty fine sand. 30% of surface is chert.
Rock Type: Chert
Vegetation: Eucalyptus wandoo subsp. wandoo low mallee woodland over Allocasuarina campestris high shrubland to open scrub over Dichopogon capillipes scattered herbs and *Ehrharta longiflora open annual grassland.
Vegetation condition: Good, but weedy consistent with fairly heavy grazing, so may have lost species. Rabbits active.
Fire age: More than 5 years since last fire.
Notes: Datum: WGS84. Last fire was hot - burnt wandoo stems. Fire has killed large wandoo and left only burnet stumps (some trees bigger than in plot nearby). Nearby (about 15-20m from SE corner) Acacia aristulata. One live at 50J0407925/UTM6623864. Three or four dead ones nearby. Revisit - Search limited to areas of Eucalyptus wandoo low open woodland over Allocasuarina campestris scrub.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**

Allocasuarina campestris	25-35%	25-33.3%	(1.6)2-3m		
Anagallis arvensis	+	<1 %	5cm		
Arctotheca calendula	+	<1 %	5cm		Capeweed
Austrodanthonia acerosa	+	<1 %	15(30)cm	ER16-17,2	Austrostipa
Austrostipa trichophylla	+	<1 %	15cm	ER16-22	Austrostipa
Avena barbata	+	<1 %	40cm	ER16-53	Revisit.
Blennospora drummondii	+	<1 %	6cm	ER16-20	Asteraceae
Borya sphaerocephala	+	<1 %	3cm		Borya
Briza maxima	1%	1-5%	10-30cm		
Bromus diandrus	+	<1 %	15cm	ER16-3,2B	Bromus
Burchardia umbellata	+	<1 %	30cm	ER16-1	Burchardia (perennial herb)
Caladenia flava subsp. flava	+	<1 %	15cm	ER16-19,5	Caladenia
Calandrinia calyptrata	+	<1 %	10cm	ER16-14	Calandrinia
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	=ER19-50	Revisit.
Cheilanthes adiantoides	+	<1 %	10cm		Cheilanthes (locally common)
Crassula colorata var. colorata	+	<1 %	2-6cm	ER16-12	Crassula (pale green + pale pink)
Cyanicula deformis	+	<1 %	10cm	=ER17-51	Revisit. Blue beard
Dichopogon capillipes	+	<1 %	5-10cm		Dichopogon
Dioscorea hastifolia	1	<1 %	60cm		
Drosera macrantha subsp. macrantha	+	<1 %	30cm	ER16-15,5	Revisit. Climber ?palida
Ehrharta longiflora	+/-10%	5-10%	5-25cm		
Eucalyptus wandoo subsp. wandoo	>15%	10-25%	5-6m		Mallee form, suggests regeneration
Hedypnois rhagadioloides	+	<1 %	10cm	ER16-13	Asteraceae (cf Urospermum)
Hyalosperma cotula	+	<1 %	10cm	ER16-16	Rhodanthe
Hypochaeris glabra	+	<1 %	5cm		
Hypoxis occidentalis var. occidentalis	+	<1 %	12cm	=ER12-50	Revisit.
Neurachne alopecuroidea	+	<1 %	10cm	ER16-10	Neurachne (per. grass)
Pentaschistis pallida	+	<1 %	5-15cm	ER16-18	Aira
Petrorhagia prolifera	+	<1 %	5cm	ER16-8	'pink'
Platysace cirrosa	+	<1 %	15cm	ER16-9	(perennial rootstock)
Podolepis lessonii	1	<1 %	15cm	ER16-6	Podolepis
Podotheca angustifolia	+	<1 %	6cm	ER16-51	Revisit.
Romulea rosea	+	<1 %	35cm	ER16-52	Revisit.
Silene gallica var. gallica	+	<1 %	10cm	ER16-4	?Silene
Trachymene cyanopetala	+	<1 %	5-8cm	ER16-21	Also recorded in 30x30. Also ER16-52B. Trachymene sp
Trachymene ornata Trachymene ?ornata	+	<1 %	7cm	ER16-7,52	Also recorded in 30x30. (wooly)
Trachymene pilosa	+	<1 %	5-10cm	ER16-24	Trachymene pilosa
Trifolium repens var. repens	+	<1 %	5cm	ER16-11	Clover (Yellow head)
Ursinia anthemoides	+/-1%	1-5%	5-15cm		
Vulpia myuros var. hirsuta	1%	1-5%	5-15cm	ER16-2	Vulpia
Waitzia nitida	+	<1 %	5cm	ER16-5	Waitzia
Acacia acuminata subsp. acuminata	+	<1 %	3.5m		Revisit.
Austrostipa elegantissima	+	<1 %	50cm	ER16-55	Revisit. ?elegantissima
Desmocladus flexuosus	+	<1 %	12cm	=ER4	Revisit.
Hibbertia subvaginata	+	<1 %	40cm		
Olearia dampieri subsp. eremicola	+	<1 %	20cm	=ER4	Revisit.
Thysanotus manglesianus	+	<1 %	20cm	ER16-53	Also ER16-54b. Revisit. Fleshy

Moora **Site** ERG017

Described by BM **Date** 3/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Near (about 300m) southern end of Eastern Range
MGA Zone 50 407924 **m E** 6622781 **m N** -30.52368 **S lat** 116.04027 **E long**
Habitat: Lower slopes of west-facing gentle slope.
Soil: Gravelly, cobbly brown sandy loam. Some laterite rocks on surface with some exposed base rock nearby.
Vegetation: Eucalyptus loxophleba subsp. loxophleba, (Allocasuarina huegeliana) low woodland over Austrostipa trichophylla, Neurachne alopecuroidea, Caesia alfordii scattered grasses and herbs with Gilberta tenuifolia, Podolepis sp. open annual herbland to annual herbland with Dioscorea hastifolia scattered lianes.
Vegetation condition: Very good. Only a few weed taxa and weed cover very low.
Notes: Datum: WGS84. Vegetation community did not extend to full 30x30m - Allocasuarina campestris heath to

north and south of 10x10, fence line to west and Allocasuarina huegeliana and Eucalyptus loxophleba subsp. loxophleba to east.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	5-10	5-10%	6m		
Aira caryophyllea	+	<1 %	10cm	ER17-5	Pentaschistis
Allocasuarina campestris	+	<1 %	1.8m		
Allocasuarina huegeliana	5-10	5-10%	5m		
Arctotheca calendula	+	<1 %	4cm		
Austrodanthonia setacea	+	<1 %	30cm	ER17-9,12	
Austrostipa nitida	+	<1 %	20cm	ER17-15	Austrostipa
Austrostipa trichophylla	+/-1	<1 %		ER17-4	Austrostipa
Avena barbata	+	<1 %	30cm		
Blennospora drummondii	+	<1 %	5cm	ER17-23	Blenospora
Briza maxima	+	<1 %	20cm		
Burchardia umbellata	+	<1 %	30cm	=GH9-52	?Burchardia
Caesia alfordii	+	<1 %		ER17-2	Lilly
Calytrix leschenaultii	+	<1 %	20cm	ER17-7	Calytrix
Chamaescilla corymbosa var. corymbosa	+	<1 %	4cm	=JT5-55	?Lilly
Cheilanthes adiantoides	1	<1 %	10cm	=ER15-10	Cheilanthes
Comesperma integerrimum	+	<1 %	40cm	=ER15-3	Comesperma
Cyanicula deformis	+	<1 %	12cm	ER17-51	Blue beard orchid
Daucus glochidiatus	+	<1 %	10cm	ER17-10	Trachymene grn/red leaf
Dichopogon capillipes	+	<1 %	35cm	ER17-54	?Dichopogon
Dioscorea hastifolia	1	<1 %	50cm	=ER15-1	
Drosera macrantha subsp. macrantha	+	<1 %	15cm	ER17-13,5	Also recorded in 30x30. Drosera macrantha
Ehrharta longiflora	+	<1 %	25cm		
Erodium cygnorum	+	<1 %	10cm	ER17-26,5	Blue flower
Eucalyptus loxophleba subsp. loxophleba	15-20%	10-25%	6m		
Galium murale	+	<1 %	3cm	ER17-28	Tiny
Gilberta tenuifolia	20-30	<1 %	10cm	ER17-59,3	Daisy (20-30% cover in Spring)
Goodenia berardiana	+	<1 %	20-30cm	ER17-6,8	Goodenia
Hedypnois rhagadioloides	+	<1 %	15cm	ER17-19	
Hypochaeris glabra	+	<1 %	20cm	ER17-20	?Sonchus
Hypoxis occidentalis var. occidentalis	+/-1%	<1 %	12cm	ER17-58	(=GH9-50)
Linum trigynum	+	<1 %	15cm	ER17-11	
Lomandra (Moora twisty)	+	<1 %	20cm	ER17-14	
Lupinus angustifolius	+	<1 %	20cm		
Neurachne alopecuroidea	+/-1	<1 %		ER17-1	Neurachne
Parentucellia latifolia	+	<1 %	10cm	ER17-16	Perentucellia
Pentaschistis sp. Moora (doubtful ID)	+	<1 %	10cm	ER17-21	?Vulpia
Phyllangium sulcatum	+	<1 %	10cm	ER17-18,2	
Platysace cirrosa	+	<1 %	12cm	=GH9-54	Perennial Trachymene Climber
Podolepis lessonii	1-2	1-5%	20cm	=ER15-13	Also ER17-35. Daisy
Poranthera microphylla	+	<1 %	2cm	ER17-24	?Polygala
Romulea rosea	+	<1 %	15cm	ER17-22	Romulea rosea
Sowerbaea laxiflora	+	<1 %	25cm	ER17-50	Revisit
Thysanotus manglesianus	+	<1 %	30cm	ER17-53,5	Thysanotus Climber
Trachymene ornata	+	<1 %	15cm	=ER15-6	Trachymene white top
Ursinia anthemoides	+	<1 %	20cm		
Velleia cycnopotamica	+	<1 %	10cm	ER17-25	"Open mouths"
Vulpia myuros var. hirsuta	+	<1 %	20cm	ER17-17	Bromus
Amyema miraculosa subsp. miraculosa	+	<1 %	3m	ER17-31	Amyema (on Santalum)
Calandrinia calyptrata	+	<1 %	10cm	ER17-29,3	Calandrinia
Crassula exserta	+	<1 %	4cm	=ER15-5A	Crassula
Erodium botrys	+	<1 %	10cm	ER17-32	
Lepidosperma leptostachyum	+	<1 %	35cm	ER17-36	Lepidosperma
Petrorhagia prolifera	+	<1 %	35cm	ER17-34	
Pityrodia dilatata	+	<1 %	20cm	=ER15-7	Pityrodia
Santalum spicatum	+	<1 %	3m		
Schoenus clandestinus	+	<1 %	4cm	ER17-57	Western side of 30x30

Silene gallica var. gallica	+	<1 %	25cm	ER17-33	
Stypandra glauca	+	<1 %	30cm		
Tricoryne elatior	+	<1 %	30cm	ER17-37	?Tricoryne

Moora Site ERG018

Described by MET **Date** 3/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Eastern Ridge, south of the mine and near the farm house.
MGA Zone 50 408020 **m E** 6622743 **m N** -30.52403 **S lat** 116.041267 **E long**
Habitat: Just below the crest of a rounded low ridge. Very gently sloping to the west-south-west.
Soil: Gravelly to cobbly silty grey sand. Gravel and pebbles include a lot ferruginous material as well as chert.
Vegetation: Eucalyptus loxophleba subsp. loxophleba, Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low open woodland over Allocasuarina campestris shrubland to high shrubland over Borya sphaerocephala, Cheilanthes adiantoides low open herbland/fernland.
Vegetation condition: Very good or very good to excellent. Low weed invasion, no significant grazing (there would have been some though).
Fire age: Not burnt for more than 10 years.
Notes: Datum - WGS84. Coordinates are for SW corner peg. The eucalypts are mallees. Lomandra (18-2) was found near base of York gum near NW peg; second found in NW corner. No 'Myriocephalus' in 10x10 although this is abundant nearby. In a wet year there would be much more Cheilanthes adiantoides. About 10 dead Xanthorrhoea just out or in plot. One live one. Fire is reducing the number of Xanthorrhoea and probably also the Allocasuarina huegeliana.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	+	<1 %	5-7m		
Allocasuarina campestris	20%	10-25%	2-3m		
Allocasuarina huegeliana	+	<1 %	7-9m		Outside plot
Arctotheca calendula	+	<1 %	5cm		Capeweed
Austrostipa trichophylla	+	<1 %	5-10cm	ER18-1,8	Austrostipa
Avena barbata	+	<1 %	35cm		
Blennospora drummondii	+	<1 %	3cm	=ER16-20	Daisy
Borya sphaerocephala	>5%	5-10%	5-10cm		Borya
Briza maxima	+	<1 %	5cm		
Bromus diandrus	+	<1 %	10cm	=ER16	Bromus
Burchardia umbellata	+	<1 %	20cm	=ER16-1	Burchardia
Caladenia vulgata	+	<1 %	15cm	ER18-3	Caladenia
Chamaescilla corymbosa var. corymbosa	+	<1 %	5cm	ER18-6	Chamaescilla
Cheilanthes adiantoides	2	1-5%	10cm (locally common)		Cheilanthes
Crassula colorata var. colorata	+	<1 %	1-2cm	=ER16	Crassula
Cyanicula deformis			12cm	=ER17-51	Revisit. Blue beard orchid
Desmocladus flexuosus	+	<1 %	20-40cm	ER18-4,50	
Dioscorea hastifolia	+	<1 %	60cm		
Drosera macrantha subsp. macrantha	+	<1 %	45cm	=ER19-51	Revisit. Climber
Eucalyptus loxophleba subsp. loxophleba	<5%	1-5%	6-8m		
Hedypnois rhagadioloides	+	<1 %	5cm	=ER16-13	cf Urospermum
Hypochaeris glabra	+	<1 %	2cm		
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	ER18-5	cf Hypoxis
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	85cm	ER18-7	Lepidosperma
Lomandra (Moora twisty)	+	<1 %	15cm	ER18-2	Lomandra
Neurachne alopecuroidea	+	<1 %	5cm	=ER16	Neurachne
Parentucellia latifolia	+	<1 %	10cm		Parentucellia
Platysace cirrosa	+	<1 %	15cm	=ER16-9	
Podolepis lessonii	+	<1 %	10cm	=ER16	Podolepis lessonii
Romulea rosea	+	<1 %	15cm		
Sowerbaea laxiflora	+	<1 %	25cm		
Thysanotus manglesianus	+	<1 %	25cm	ER18-17	Also recorded in 30x30. Thysanotus manglesianus
Trachymene cyanopetala	+	<1 %	5cm	=ER16-21	Trachymene
Trachymene ornata	+	<1 %	5cm		Woolly head
Trifolium repens var. repens	+	<1 %	1cm	ER18-12	Clover (yellow)
Ursinia anthemoides	+	<1 %	8cm		
Vulpia myuros var. hirsuta	+	<1 %	10cm	=ER016	Vulpia
Xanthorrhoea drummondii	+	<1 %	1.7m		
Aira caryophyllea	+	<1 %	65cm	ER18-14	Aira

Austrodanthonia caespitosa	+	<1 %	15cm	ER18-20	Austrodanthonia
Brunonia australis	+	<1 %	8cm	ER18-21	Brunonia australis
Dichopogon capillipes	+	<1 %	15cm		Dichopogon (amongst rocks)
Drosera aff. macrantha	+	<1 %	60cm	ER18-11	Drosera
Erodium botrys	+	<1 %	5-10cm	ER18-19	Pelargonium
Genus sp.	+	<1 %	12cm	ER18-15	Daisy
Gilberta tenuifolia	+	<1 %	10cm	ER18-9	'Myriocephalus'
Linum trigynum	+	<1 %	10cm		Linum
Lobelia sp. small flowers (K.F. Kenneally 7705)	+	<1 %	15cm	ER18-16	Lobelia
Podotheca angustifolia	+	<1 %	10cm	ER18-18	Podotheca
Stypandra glauca	+	<1 %	25cm	=ER15	Stypandra
Thysanotus dichotomus	+	<1 %	25cm	ER18-10	?Corynotheca
Trifolium hirtum	+	<1 %	7cm	ER18-13	Clover (red)

Moora **Site** ERG019

Described by BRM **Date** 4/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Near south end of Eastern Ridge.
MGA Zone 50 408027 **m E** 6622852 **m N** -30.523047 **S lat** 116.04135 **E long**
Habitat: Narrow convex ridge top, sloping gently southward. Defined by small area of Lepidosperma (19-1) - apparently a natural soak.
Soil: Rocky, cobbly, pebbly brown sandy loam.
Vegetation: Xanthorrhoea drummondii open shrubland over Lepidosperma pubisquameum sedgeland with Podolepis sp., Thysanotus manglesianus, Stypandra glauca annual herbland with *Avena barbata, *Aira caryophyllea open annual grassland.
Vegetation condition: Very good. Some weeds.
Notes: Datum: WGS84. Track running east-west 5m south of plot (10x10) boundary. Area of 30x30 area search limited to small areas with Lepidosperma pubisquameum surrounding 10x10 plot.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Acacia acuminata subsp. acuminata	1	<1 %	1.3m		
Aira caryophyllea	30-40	25-33.3%	10cm	ER19-2	Pentaschistis (thick cover)
Allocasuarina huegeliana	+	<1 %	30cm		juvenile
Anagallis arvensis	+	<1 %	5cm	ER19-22	
Arctotheca calendula	+	<1 %	10cm		Capeweed
Austrodanthonia setacea	+	<1 %	25cm	=ER17-12	Austrodanthonia
Austrostipa elegantissima	1	<1 %	35cm	ER19-3	Austrostipa ?elegantissima
Austrostipa nitida	+	<1 %	40cm	ER19-24	Austrostipa #3
Austrostipa variabilis	+	<1 %		ER19-13	Austrostipa #2
Avena barbata	3-4	1-5%	1.2m		
Blennospora drummondii	+	<1 %	5cm	=ER17-23	?Blennospora
Boronia coerulescens subsp. spinescens	+	<1 %	35cm	ER19-5	Boronia ?coerulescens
Briza maxima	+	<1 %	40cm		
Bromus diandrus	+	<1 %	20cm	ER19-8	?Bromus
Burchardia umbellata	+	<1 %	40cm		
Calotis hispidula	+	<1 %	5cm	ER19-17	
Chamaescilla corymbosa var. corymbosa	+	<1 %	12cm	ER19-50	Revisit. Lilly
Cheilanthes adiantoides	1-2	1-5%	15cm	=ER15-10	Cheilanthes
Comesperma integerrimum	+	<1 %	60cm	ER19-12	(=ERG15-3) Comesperma
Crassula colorata var. colorata	+	<1 %		=ER17	Crassula
Cyanicula deformis	+	<1 %	12cm	=ER17-51	Revisit. Blue beard orchid
Daucus glochidiatus	+	<1 %	15cm	=ER17-10	Trachymene
Dichopogon capillipes	+	<1 %		ER19-14	Dichopogon
Dioscorea hastifolia	+	<1 %	10cm	=ER15-1	
Diuris aff. recurva	+	<1 %	30cm	ER19-54	Revisit. Diuris orchid
Drosera aff. macrantha	+	<1 %	35cm	ER19-51B	Revisit. Climbing
Drosera macrantha subsp. macrantha	+	<1 %	30cm	ER19-4,51	Drosera micrantha
Ehrharta longiflora	+	<1 %	35cm		
Erodium botrys	+	<1 %	20cm	=ER17-32	?Pelargonium pink flower
Erodium cygnorum	+	<1 %	10cm	ER19-23	Blue flower

Galium murale	+	<1 %	3cm	ER19-18	
Genus sp.	+	<1 %	3cm	ER19-16	Grass
Gilberta tenuifolia	+	<1 %	20cm	=ER17-3	Daisy (hanging heads)
Gonocarpus nodulosus	+	<1 %	20cm	ER19-21, 2	Also recorded in 30x30.
Goodenia berardiana	+	<1 %	30cm	=ER17-6	Goodenia
Hypochaeris glabra	+	<1 %	30cm	ER19-9	?Sonchus
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=ER17-58	Revisit.
Lepidosperma pubisquameum	50	50-75%	50cm	ER19-1	Vouchered. Possibly L. aff. pubisquameum.
Neurachne alopecuroidea	+	<1 %	15cm	=ER17-1	Neurachne
Parentucellia latifolia	+	<1 %	10cm	=ER17-16	*Parentucellia
Pentaschistis sp. Moora (doubtful ID)	+	<1 %	15cm	ER19-7	?Vulpia
Petrorhagia prolifera	+	<1 %	35cm	=ER17-34	?Wahlenbergia (single head, pink)
Phyllangium sulcatum	+	<1 %	5cm	ER19-20	
Platysace cirrosa	+	<1 %	20cm	ER19-6,15	Daisy
Podolepis lessonii	30-40	25-33.3%	25cm	=ER15-13	Podolepis
Romulea rosea	+	<1 %	20cm	=ER17-22	*Romulea rosea
Silene gallica var. gallica	+	<1 %	35cm	ER19-10	Silene
Sonchus oleraceus	+	<1 %	35cm	ER19-19	
Sowerbaea laxiflora	+	<1 %	20cm		
Stypandra glauca	1	<1 %	30cm	=ER15-4	
Thysanotus manglesianus	+	<1 %	40cm	ER19-55 (+ =ER17-53)	Revisit. Climbing
Trachymene ornata	2	1-5%	15cm	=ER15-6	Trachymene white tops
Tripteris clandestina	+	<1 %	25cm	ER19-52	Revisit. Stink daisy
Ursinia anthemoides	+	<1 %	15cm		
Wahlenbergia capensis	+	<1 %	20cm	ER19-11	Wahlenbergia capensis (Blue flower)
Xanthorrhoea drummondii	4%	1-5%	1.3-2m		
Dianella revoluta var. divaricata	+	<1 %	15cm	ER19=56	Revisit.
Waitzia nitida	+	<1 %	15cm	=ER15-8	Waitzia high centre

Moora Site ERG020

Described by MET **Date** 4/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Southern end of Eastern Ridge on east side about 150m NW of buildings.
MGA Zone 50 408063 **m E** 6622661 **m N** -30.524773 **S lat** 116.041708 **E long**
Habitat: Upper eastern-facing slope of a low ridge.
Soil: Brown sandy loam amongst cobbles, boulders and low outcrop (massive chert underlying).
Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low open woodland to low woodland over Allocasuarina campestris open high shrubland to high shrubland over Lepidosperma (ERG20-1) tussock sedgeland over Cheilanthes adiantoides low open ferns with Podolepis lessonii, *Ursinia anthemoides, *Briza maxima annual herbland/grassland and Dioscorea hastifolia open lianes
Vegetation condition: Good to very good. A bit weedy for very good (in a wet year, the weeds would be more obvious).
Notes: Datum: WGS84. First coordinate is SW peg; 2nd NW peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	5-10%	5-10%	2-3m		
Allocasuarina huegeliana	+/-10%	5-10%	6-7m		
Arctotheca calendula	+	<1 %	5cm		
Austrodanthonia caespitosa	+	<1 %	20cm	ER20-5	Austrodanthonia
Austrostipa hemipogon	+	<1 %	25cm	ER20-12	Austrostipa
Austrostipa trichophylla	+	<1 %	10cm	ER20-7	Austrostipa
Avena barbata	+	<1 %	15cm		Avena fatua
Boronia coerulescens subsp. spinescens	+	<1 %	55cm	ER20-16,5	Boronia
Briza maxima	5	5-10%	10-20cm		
Bromus diandrus	+	<1 %	10cm	=ER16	Bromus
Brunonia australis	+	<1 %	8cm		
Burchardia umbellata	+	<1 %	20cm	=ER16	Burchardia
Caesia alfordii	+	<1 %	30cm	ER20-10	Lilly
Caladenia flava subsp. flava	+	<1 %	10cm	=JT8-55	Revisit. Orchid
Calandrinia sp.	+	<1 %	5cm	ER20-15	Calandrinia
Chamaescilla corymbosa var. corymbosa	+	<1 %	25cm	=ER19-50	Revisit.
Cheilanthes adiantoides	>5	5-10%	10-25cm		Cheilanthes (locally

					common)
Comesperma integerrimum	+	<1 %	60cm	ER20-14	Comesperma
Cyanicula deformis	+	<1 %	12cm	=ER17-51	Revisit. Blue beard orchid
Desmocladus flexuosus	+	<1 %	15cm	ER20-51	Revisit.
Dichopogon capillipes	+	<1 %	10-20cm		Dichopogon
Dioscorea hastifolia	5-10	5-10%	10-130cm		
Drosera macrantha subsp. macrantha	+	<1 %	25cm	ER20-4	Drosera
Drosera sp.	+	<1 %	20cm	ER20-8	Drosera trailing on the ground
Ehrharta longiflora	+	<1 %	20cm		
Eriochilus dilatatus	+	<1 %	20cm	ER20-52	Revisit.
Goodenia berardiana	+	<1 %	10cm	ER20-6	Also recorded in 30x30. Goodenia ann. herb
Hibbertia subvaginata	+	<1 %	10cm		Juvenile
Hypochaeris glabra	+	<1 %	2cm		
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	60cm	ER20-18	Lepidosperma
Lepidosperma sp.	5-10	5-10%	35-55cm	ER20-1	Lepidosperma
Lomandra aff. micrantha subsp. micrantha	+	<1 %	30cm	ER20-13	Lomandra
Neurachne alopecuroidea	2	1-5%	10cm	=ER16	Neurachne
Opercularia vaginata	+	<1 %	15-25cm	ER20-3	Opercularia
Parentucellia latifolia	+	<1 %	10cm		Parentucellia
Pentaschistis airoides	+	<1 %	10cm	=ER16-8	?Aira
Phyllangium sulcatum	+	<1 %	5-12cm	ER20-2	"Mitrasacme"
Platysace cirrosa	+	<1 %	15cm	=ER16-9	?Trachymene
Podolepis lessonii	2	1-5%	10-20cm		Podolepis lessonii
Podotheca angustifolia	+	<1 %	10cm	Not=ER18-	Podotheca
Sowerbaea laxiflora	+	<1 %	20cm		
Stypandra glauca	+	<1 %	30cm		Stypandra
Thysanotus manglesianus	+	<1 %	170cm	ER20-9	Thysanotus ?manglesii
Thysanotus sp.	+	<1 %	15cm		Thysanotus manglesii (flowering)
Trachymene cyanopetala	+	<1 %	5cm	=ER16-21	Trachymene
Trachymene ornata	+	<1 %	10cm		
Tricoryne elatior	+	<1 %	25cm	ER20-11	Tricoryne
Ursinia anthemoides	2	1-5%	10-25cm		
Acacia acuminata subsp. acuminata	+	<1 %	5-6m		
Acacia lasiocarpa var. sedifolia	+	<1 %	1.3m	ER20-17,5	Acacia aff. pulchella
Austrostipa elegantissima	+	<1 %	60cm		Austrostipa elegantissima
Dianella revoluta var. divaricata	+	<1 %	50cm		Dianella revoluta
Erodium botrys	+	<1 %	10cm	=ER18-19	Erodium
Eucalyptus loxophleba subsp. loxophleba	+	<1 %			
Gilberta tenuifolia	+	<1 %	8-15cm	=ER18-9	"Myriocephalus"
Hypoxis occidentalis var. occidentalis	+	<1 %	20cm	=ER17-58	Revisit.
Lawrencella rosea	+	<1 %	15cm	ER20-54	Revisit. Daisy
Lupinus angustifolius	+	<1 %	15cm		Blue lupin
Pityrodia dilatata	+	<1 %	20cm		Revisit. (common)
Revisit. (common)					
Podolepis canescens	+	<1 %	15cm	ER20-19	Podolepis
Pterostylis sanguinea	+	<1 %	1cm	=CH10-51	Revisit. Flat leaf
Romulea rosea	+	<1 %	10cm		
Tripteris clandestina	+	<1 %	20cm	=JT3-50	Revisit. Stink daisy
Xanthorrhoea drummondii	+	<1 %	70cm		

Moora **Site** ERG021
Described by BRM **Date** 4/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Small ridge just west of north end of Eastern Ridge.
MGA Zone 50 407640 **m E** 6624567 **m N** -30.507543 **S lat** 116.037469 **E long**
Habitat: Low ridge crest and edge of crest with very gentle east facing slope.
Soil: Skeletal brown sandy loam in a matrix of rocky, cobbly chert with exposed chert outcrop.
Rock Type: Chert

Vegetation: Kunzea praestans high shrubland over Hibbertia subvaginata shrubland over Stypandra glauca very open herbland over Cheilanthes adiantoides very open fernland with Dioscorea hastifolia open
Vegetation condition: Very good (a few weeds).
Notes: Datum: WGS84. 1st coord listed for NW peg; 2nd coord for SE peg. Open sample pit 20m to north. Very small area of this vegetation community. : "30x30" search restricted to small area around 10x10 plot with same community.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	+	<1 %	1.3m		
Acacia aristulata	+	<1 %	15cm	ER21-10	Acacia aristulata
Allocasuarina huegeliana	+	<1 %	4m		
Avena barbata	+	<1 %	25cm		
Briza maxima	+	<1 %	20cm		
Burchardia umbellata	+	<1 %	40cm		Burchardia
Caladenia flava subsp. flava	+	<1 %	20cm	ER21-4	Orchid
Chamaescilla corymbosa var. corymbosa	+	<1 %	12cm	=ER19-50	Revisit.
Cheilanthes adiantoides	+	<1 %	15cm	ER21-SN	Also recorded in 30x30.
Crassula exserta	+	<1 %	5cm	=ER15-5A	Crassula
Cyanicula deformis	+	<1 %	10cm	=ER17-51	Revisit. Blue beard orchid
Daucus glochidiatus	+	<1 %	4cm	ER21-9	Trachymene
Dichopogon capillipes	+/-1	<1 %	20cm	ER21-5	Dichopogon
Dioscorea hastifolia	2-3	1-5%	60cm		
Drosera macrantha subsp. macrantha	+	<1 %	20cm	ER21-7,52	Drosera
Ehrharta longiflora	+	<1 %	20cm		
Hibbertia subvaginata	20-30%	25-33.3%		ER21-2	Hibbertia subvaginata
Hypochaeris glabra	+	<1 %	2cm		Revisit.
Hypoxis occidentalis var. occidentalis	+	<1 %	12cm	=ER17-58	Revisit.
Kunzea praestans	20-30%	25-33.3%	2-2.5m	ER21-1	Kunzea praestans
Lepidosperma leptostachyum	+	<1 %	30cm	ER21-3	Lepidosperma
Neurachne alopecuroidea	+	<1 %	20cm	=ER17-1	Neurachne
Pentaschistis pallida	+	<1 %	15cm	ER21-6	*Pentaschistis
Pterostylis sanguinea	+	<1 %	20cm	ER21-50	Revisit.
Pterostylis setulosa	+	<1 %	10cm	ER21-53	Revisit. Flat leaf
Stypandra glauca	1-2	1-5%	20cm	=ER15-4	Stypandra glauca
Trachymene ornata	+	<1 %	10cm	=ER15-6	Trachymene white head
Trachymene pilosa	+	<1 %	4cm	ER21-8	Trachymene ?pilosa
Ursinia anthemoides	+	<1 %	10cm		
Vulpia myuros var. hirsuta	+	<1 %		ER21-11	
Allocasuarina campestris	+	<1 %	1.9m		Revisit.
Diuris aff. recurva	+	<1 %	20cm	=JT7-58	Revisit. Orchid

Moora **Site** ERG022

Described by MET **Date** 4/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Eastern ridge, in the section cut off from the rest of the ridge by the farm track to Kiaka Rd. 50m ENE of old test pits.
MGA Zone 50 407637 **m E** 6624651 **m N** -30.506785 **S lat** 116.037445 **E long**
Habitat: Gentle detrital (colluvial) slope NW-facing, just below areas of outcrop (boulders and outcrop).
Soil: Very gravelly to cobbly grey brown silty sand with a thin litter layer in places. Mostly gravel surface.
Vegetation: Eucalyptus loxophleba subsp. loxophleba low woodland over Allocasuarina campestris scattered tall shrubs over Brunonia australis, Podolepis lessonii, Waitzia sp. annual herbland.
Vegetation condition: Good to very good. Close to very good, but a little weedy for that (although season not a good
one).
Notes: Datum: WGS84. Only a very small area remains undisturbed (a few times the area of the quadrat). Downslope there was more of the Podolepis and less of the Brunonia. An extremely rare remnant of the colluvial slopes of the chert floristic community type.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	+	<1 %	15 cm		juvenile
Aira caryophyllea	>2%	1-5%	5-10 cm	ER22-5	*Aira
Arctotheca calendula	+	<1 %	10 cm		
Austrodanthonia setacea	+	<1 %	5 cm	ER22-15	Austrodanthonia
Austrostipa trichophylla	+/-1	<1 %	5 cm	ER22-7	Austrostipa

Avena barbata	+	<1 %	10-15 cm		
Briza maxima	+	<1 %	10-30 cm		
Brunonia australis	<=15%	10-25%	5-20 cm	ER22-1	Brunonia australis
Caladenia denticulata	+	<1 %	12 cm	=JT6-56	Revisit ?Orchid
Calandrinia calyptrata	+	<1 %	3-5 cm	ER22-8	Crassula
Calandrinia sp.	+	<1 %	2 cm	ER22-50	Revisit.
Chamaescilla corymbosa var. corymbosa	+	<1 %	15 cm	=JT5-55	Revisit. Lilly
Cheilanthes adiantoides	<5%	1-5%	10 cm		Cheilanthes (locally common)
Crassula colorata var. colorata	+	<1 %	5 cm	ER22-10	Crassula
Daucus glochidiatus	+	<1 %	10 cm	ER22-12	Trachymene
Dichopogon capillipes	+	<1 %	10 cm	ER22-17	Dichopogon?
Dioscorea hastifolia	+	<1 %	10-60 cm		
Ehrharta longiflora	+	<1 %	10-40 cm		
Erodium botrys	+	<1 %	8 cm	ER22-11	Erodium
Eucalyptus loxophleba subsp. loxophleba	>10%	10-25%	7 m		
Gilberta tenuifolia	+	<1 %	8 cm	=ER18-9	"Myriocephalus"
Hibbertia subvaginata	+	<1 %	80 cm		
Hypochaeris glabra	+	<1 %	3 cm		
Hypoxis occidentalis var. occidentalis	+	<1 %	10 cm	ER22-16	Hypoxis?
Neurachne alopecuroidea	+	<1 %	7 cm	=ER16	Neurachne
Opercularia vaginata	+	<1 %	10 cm	=ER20	Opercularia
Parentucellia latifolia	+	<1 %	5-8 cm		*Parentucellia
Pentaschistis sp.	+	<1 %	8 cm	ER22-4	*Grass
Podolepis lessonii	2	1-5%	5-20 cm		Podolepis lessonii? (flower button)
Podotheca angustifolia	+	<1 %	5 cm	=ER18	Podotheca
Poranthera microphylla	+	<1 %	1-4 cm	ER22-3	Monotaxis
Schoenus clandestinus	+	<1 %	5 cm	ER22-9,52	Schoenus
Thysanotus manglesianus	+	<1 %	15 cm	ER22-51	Also recorded in 30x30; ER22-18,20. Revisit.
Trachymene ornata	+	<1 %	10 cm		
Ursinia anthemoides	+	<1 %	10-25 cm		
Vulpia myuros var. hirsuta	+	<1 %	15 cm	ER22-6,14	?Vulpia
Wahlenbergia gracilenta	+	<1 %	10 cm	ER22-13	Wahlenbergia
Waitzia nitida	+	<1 %	10-20 cm	ER22-2	Waitzia
Allocasuarina campestris	+	<1 %	3 m		
Dianella revoluta var. divaricata	+	<1 %	10 cm	ER22-53	Revisit. ?revoluta (juv)
Pterostylis sanguinea	+	<1 %	2 cm	=CH10-51	Revisit. Flat leaf base (leaves 2-3 cm long)
Thysanotus patersonii	+	<1 %	70 cm	ER22-19	Thysanotus manglesii
Tripteris clandestina	+	<1 %	12 cm	=JT3-50	Revisit. Stink daisy

Moora Site ERG023

Described by BRM **Date** 4/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: North end of small ridge adjacent to northern end of Eastern Ridge.
MGA Zone 50 407584 **m E** 6624653 **m N** -30.506763 **S lat** 116.036893 **E long**
Habitat: Mid to upper gentle slope, north-facing, on low ridge.
Soil: Skeletal brown sandy loam in pebbly, cobbly, rocky, bouldery matrix.
Vegetation: Eucalyptus loxophleba subsp. loxophleba low scattered trees over Schoenia cassiniana, Brunonia australis annual herbland.
Vegetation condition: Very good: no disturbance and few weeds. (Note: drill point 5m NW of plot)
Notes: Datum: WGS84. 1st coord is for NW peg; 2nd coord for SE peg.
Revisit. Limited 30x30 search Eucalyptus leucophloia areas. Didn't include Allocasuarina campestris areas.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Acacia acuminata subsp. acuminata	+	<1 %	20cm		
Allocasuarina huegeliana	+	<1 %	90cm		
Arctotheca calendula	+	<1 %	5cm		
Austrodanthonia caespitosa	+	<1 %	20cm	ER23-5 hairy base	Austrodanthonia
Austrodanthonia setacea	+	<1 %	30cm	=ER17-12	Austrodanthonia
Austrostipa variabilis	+	<1 %		ER23-3,10	Also recorded in 30x30.
Avena barbata	+	<1 %	30cm		

Briza maxima	+	<1 %	20cm		
Brunonia australis	2-5	1-5%	20cm	ER23-2	Brunonia australis
Caesia alfordii	+	<1 %	30cm	ER23-9,53	
Caladenia denticulata	+	<1 %	15cm	=JT6-56	Revisit. ?
Chamaescilla corymbosa var. corymbosa	+	<1 %	15cm	=JT5-55	(=GH9-52) Lilly
Cheilanthes adiantoides	1-2	1-5%	15cm	=ER15-10	Cheilanthes
Daucus glochidiatus	+	<1 %	30cm	ER23-7	Trachymene
Dichopogon capillipes	+	<1 %	15cm	ER23-51	Revisit. Flat
Dioscorea hastifolia	+	<1 %	10cm		
Drosera macrantha subsp. macrantha	+	<1 %	20cm	ER23-52	Revisit. Climbing
Eucalyptus loxophleba subsp. loxophleba	10-15%	10-25%	8m		
Gilberta tenuifolia	2-3	1-5%	15cm	=ER17-3	?Gilberta
Goodenia berardiana	+	<1 %	2cm	=ER17-6	Goodenia
Hibbertia subvaginata	+	<1 %	70cm		
Hypochaeris glabra	+	<1 %	15cm	ER23-6	?Sonchus
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=JT2	Revisit.
Kennedia prostrata	+	<1 %	10cm		creeping
Linum trigynum	+	<1 %	20cm	ER23-4	Dichopogon
Neurachne alopecuroidea	+	<1 %	30cm	=ER17-1	Neurachne
Parentucellia latifolia	+	<1 %	10cm		*Parentucellia
Podolepis lessonii	3-5	1-5%		=ER15-13	Podolepis
Schoenia cassiniana	15-20	10-25%	30cm	ER23-1,55	Lawrencella
Stypandra glauca	+	<1 %	20cm		
Thysanotus manglesianus	+	<1 %	25cm	ER23-50,5	Also recorded in 30x30. Revisit. Upright
Trachymene cyanopetala	+	<1 %	10cm	=ER21-9	Trachymene (hairy head)
Trachymene ornata	+	<1 %	10cm	=ER15-6	Trachymene (white top)
Ursinia anthemoides	+	<1 %	15cm		
Vulpia myuros var. hirsuta	+	<1 %	20cm	ER23-8	Grass
Waitzia nitida	1-2	1-5%		=ER15-8	Waitzia
Borya sphaerocephala	+	<1 %	10cm		Borya
Ehrharta longiflora	+	<1 %	30cm		
Lepidosperma costale	+	<1 %	35cm	ER23-11	Lepidosperma

GARDINER'S HILL

Moora Site GH001

Described by BRM **Date** 25/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Philip and Jenny Gardiner's block, east side near bore and tank.
MGA Zone 50 408826 **m E** 6617782 **m N** -30.568852 **S lat** 116.049231 **E long**
Habitat: South to south-east facing gentle slope of low ridge, upper slope.
Soil: Gravelly brown sand in rocky matrix.
Rock Type: Chert.
Vegetation: Allocasuarina huegeliana low open forest over Dryandra sessilis open scrub over Kunzea praestans open shrubland over Calytrix leschenaultia , Hibbertia subvaginata low open shrubland over Desmocladus flexuosus very open sedgeland.
Vegetation condition: Very good to excellent (a few weeds).
Fire age: Not burnt for more than 20 years.
Notes: Datum: WGS84. 1st coord is for NW peg; 2nd coord is for SE peg.
30x30 search area was limited on the south side by a change in veg community.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	15 cm		
Allocasuarina huegeliana	40-50%	33.3-50%	6m		
Anagallis arvensis	+	<1 %	3 cm	GH1-14	Anagallis
Austrodanthonia acerosa	+	<1 %	15cm	GH1-8	
Austrostipa hemipogon	+	<1 %		GH1-21	
Austrostipa scabra	+	<1 %	40 cm	GH1-12	twisty
Austrostipa variabilis	+	<1 %	30cm	GH1-6	
Blennospora drummondii	+	<1 %	4cm		Blennospora
Borya sphaerocephala	+	<1 %	3 cm		Borya
Briza maxima	+	<1 %	15cm		
Calandrinia calyptrata	+	<1 %	20 cm	GH1-13	
Calothamnus sanguineus	1	<1 %	1.3m	GH1-1	Calothamnus

					?sanguineus
Calytrix leschenaultii	2-3	1-5%	90cm		purple
Chamaescilla corymbosa var. corymbosa	+	<1 %	20cm	GH1-2	Chamaescilla
Comesperma integerrimum	+	<1 %	45 cm	GH1-15	
Desmocladus flexuosus	5	5-10%	20cm		
Dichopogon capillipes	+	<1 %	15 cm	GH1-51	Revisit. Lilly
Drosera aff. macrantha	+	<1 %	30 cm	GH1-11,57	Also recorded in 30x30.
Dryandra sessilis var. sessilis	40%	33.3-50%	3-3.5m		Dryandra sessilis
Eriochilus helonomos	+	<1 %	15 cm	=CH14-61	Revisit. Orchid
Hibbertia subvaginata	1-2	1-5%	70cm		
Hyalosperma cotula	+	<1 %	10cm	GH1-5	White daisy
Kunzea praestans	3	1-5%	1.8m		
Neurachne alopecuroidea	+	<1 %	25 cm	GH1-16	
Podolepis canescens	+	<1 %	15cm	GH1-7	Yellow daisy
Podotheca angustifolia	+	<1 %	5cm	GH1-4	Podotheca
Pterostylis sanguinea	+	<1 %	15 cm	=GH1-50	Revisit.
Pterostylis setulosa	+	<1 %	15cm	GH1-3	Orchid (lge leaf base)
Stylidium cordifolium	+	<1 %	30 cm	GH1-10,52	Stylidium #2
Stylidium repens	+	<1 %	10 cm	GH1-9	Stylidium ?repens
Trachymene pilosa	+	<1 %	10 cm		short hairs
Urospermum picroides	+	<1 %	15cm	=CH11-10	
Ursinia anthemoides	+/-1	<1 %	20cm		
Arctotheca calendula	+	<1 %	12 cm		Revisit. Cape weed
Astroloma serratifolium	+	<1 %	15 cm	GH1-55	Revisit.
Avena barbata	+	<1 %	40 cm		
Bromus diandrus	+	<1 %	20 cm		Bromus
Caladenia flava subsp. flava	+	<1 %	12 cm	GH1-53	Revisit. Orchid
Cheilanthes adiantoides	+	<1 %	6 cm		Revisit.
Diuris aff. recurva	+	<1 %	30 cm	=CH11-58	Revisit.
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1 cm	GH1-56	Revisit. Flat leaf. Eryth.
Isopogon divergens	+	<1 %	1.6 m	=CH17-2	Isopogon
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	35 cm	GH1-18	
Melaleuca calyptroides	+	<1 %	40 cm	=CH17-1	Melaleuca ?calyptroides
Nemcia acuta	+	<1 %	30 cm	GH1-19	
Opercularia vaginata	+	<1 %	20 cm	=CH17-10	Opercularia
Podolepis lessonii	+	<1 %	4 cm	GH1-54	Revisit. ?Daisy
Stackhousia monogyna	+	<1 %	35 cm	GH1-17	Stackhousia sp.
Thysanotus manglesianus	+	<1 %	1.1 m	=CH11-8	
Tripterococcus brunonis	+	<1 %	35 cm	GH1-20	Tripterococcus

Moora **Site** GH002

Described by MET **Date** 25/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Gardener property west of tank.
MGA Zone 50 408760 **m E** 6617842 **m N** -30.568306 **S lat** 116.048548 **E long**
Habitat: West-facing gentle upper slope of a low ridge.
Soil: Gravelly, pebbly grey silty sand with outcropping chert.
Rock Type: Chert.
Vegetation: Allocasuarina huegeliana scattered low trees over Regelia megacephala tall open shrubland to tall shrubland over Melaleuca calyptroides open shrubland over Calytrix leschenaultii scattered low shrubs over Borya sphaerocephala low open herbland and Podolepis canescens, *Ursinia anthemoides scattered annual herbs.
Vegetation condition: Good to very good, closer to very good. Weed invasion quite low, has been grazed. Fenced-off about 3 years ago.
Notes: Datum: WGS84. 1st coord is for SE peg; 2nd coord is for NW peg.
30x30: Only 5m north and 20m south searched. Rest was different veg community.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Acacia aristulata	+	<1 %	30cm		SW corner
Allocasuarina huegeliana	4%	1-5%	4m		
Amphipogon caricinus	+	<1 %	5cm	GH2-8A	
Anagallis arvensis	+	<1 %	8cm		blue
Austrostipa elegantissima	+	<1 %	30cm		
Austrostipa macalpinei	+	<1 %	5cm	GH2-5	

Austrostipa trichophylla	+	<1 %	6cm	GH2-6	
Blennospora drummondii	+	<1 %	5cm	GH2-3	Daisy
Borya sphaerocephala	5-10%	5-10%	5cm		Borya
Caladenia sp.	+	<1 %	10cm		dead
Calandrinia calyptrata	+	<1 %	5-8cm	GH2-16	
Calothamnus aff. quadrifidus Moora-Watheroo	1%	1-5%	1.8m		
Calytrix leschenaultii	3	1-5%	90cm		
Chamaescilla corymbosa var. corymbosa	+	<1 %	10 cm	=CH12-52	Revisit. Lilly
Crassula colorata var. colorata	+	<1 %	2-4cm		
Crassula exserta	+	<1 %	5-7cm	GH2-15	
Desmocladus flexuosus	+	<1 %	5cm		Desmocladus
Dichopogon capillipes	+	<1 %	25 cm	GH2-50	Revisit. (=CH10-52)
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1 cm	=GH1-56	Revisit. Flat leaf
Drosera macrantha subsp. macrantha	+	<1 %	35cm	GH2-13,52	
Gilberta tenuifolia	+	<1 %	10cm	GH2-10	Daisy
Hyalosperma cotula	1	<1 %	5-8cm	GH2-2	
Hypochaeris glabra	+	<1 %	2cm		
Kunzea praestans	5	5-10%	2.3m		
Melaleuca calyptroides	8-10%	5-10%	1-1.5m		
Millotia tenuifolia var. tenuifolia	+	<1 %	5cm	GH2-14	
Neurachne alopecuroidea	1	<1 %	5cm	GH2-11	
Parentucellia latifolia	+	<1 %	12cm	GH2-7	Scrophulariaceae
Pentaschistis pallida	+	<1 %	5-10cm	GH2-9	
Podolepis canescens	1	<1 %	5-20cm	GH2-1,53	
Podotheca angustifolia	+	<1 %	5cm	GH2-4,54	Podotheca
Pterostylis sanguinea	+	<1 %	10 cm	=CH10-51	Revisit. Flat leaf
Regelia megacephala	25-30%	25-33.3%	2-3m		
Stackhousia monogyna	+	<1 %	30cm	GH2-12	
Thysanotus manglesianus	+	<1 %	20cm	GH2-17	Thysanotus patersonii
Trachymene cyanopetala	+	<1 %	5cm		Trachymene: not ornata or pilosa
Trachymene ornata	+	<1 %	5cm		
Tripterococcus brunonis	+	<1 %	30cm	=GH1	
Ursinia anthemoides	1	<1 %	5-10cm		
Vulpia myuros var. hirsuta	+	<1 %	10cm		
Xanthorrhoea drummondii	<=5	1-5%	1.5-1.9m		
Caladenia flava subsp. flava	+	<1 %	30 cm	=CH10-56	Revisit. Orchid
Cyanicula deformis	+	<1 %	20 cm	=CH12-57	Revisit. Orchid
Diuris aff. recurva	+	<1 %	35 cm	GH2-51	Revisit.
Isopogon divergens	+	<1 %	1.3m		
Nemcia acuta	+	<1 %	15cm(juv)		

Moora **Site** GH003

Described by BRM **Date** 31/10/03 **Type:** QUADRAT 10x10 m, 30x30
Location: Near eastern boundary of Gordon's block.
MGA Zone 50 408709 **m E** 6617635 **m N** -30.57017 **S lat** 116.047998 **E long**
Habitat: Gentle mid to upper slope, south-west facing at southern end of chert ridge.
Soil: Cobbly, pebbly, gravelly fine grey sand.
Rock Type: Chert
Vegetation: Regelia megacephala open scrub over Kunzea praestans, Melaleuca calyptroides shrubland over Hibbertia subvaginata, Calytrix leschenaultii scattered low shrubs over Borya sphaerocephala, Neurachne alopecuroidea very open low herbland/grassland with Podolepis lessonii very open annual herbland.
Vegetation condition: Good to very good. Some weeds and evidence of grazing effects (fairly open in places).
Fire age: Not burnt for more than 7 years.
Notes: Datum: WGS84. 1st coord is for NW peg; 2nd coord is for SE peg.
This area of Regelia ids fairly variable with more open patches dominated by Kunzea and Melaleuca.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Acacia aristulata	+	<1 %			
Anagallis arvensis	+	<1 %	10cm		Anagallis
Astroloma serratifolium	+	<1 %	15cm	GH3-2,32	
Austrostipa elegantissima	+	<1 %	60cm	GH3-18	
Austrostipa trichophylla	+	<1 %	30cm	GH3-14	

Austrostipa variabilis	+	<1 %	35cm	GH3-15	Twisty
Avena barbata	+	<1 %	30cm		
Borya sphaerocephala	5	5-10%	5m		Borya
Briza maxima	+	<1 %	15cm		
Caladenia flava subsp. flava	+	<1 %	15cm	GH3-9	Orchid
Calytrix leschenaultii	1	<1 %	1m		purple
Cassytha pomiformis	+	<1 %	50cm	=CH17-5	
Chamaescilla corymbosa var. corymbosa	+	<1 %	20cm	=GH1-2	
Cyanicula deformis	+	<1 %	12cm	=CH12-57	Revisit. Blue orchid
Desmocladus flexuosus	+	<1 %	15cm		
Dichopogon capillipes	+	<1 %	25cm	GH3-16	Dichopogon
Diuris aff. recurva	+	<1 %	25cm	=GH2-5?	Revisit.
Drosera aff. macrantha	+	<1 %	45cm	=CH11-50	Revisit. Climbing
Drosera macrantha subsp. macrantha	+	<1 %	35cm	GH3-19,50	
Dryandra sessilis var. sessilis	+	<1 %	3.5m		
Ehrharta longiflora	+	<1 %	20cm		
Eriochilus helonomos	+	<1 %	25cm1	=CH14-61 1-leaf/stem	Revisit. Orchid
Hibbertia subvaginata	1	<1 %	1m		
Hyalosperma cotula	+	<1 %	10cm	GH3-7	small white daisy
Hypochaeris glabra	+	<1 %	1cm		Revisit.
Kunzea praestans	5-6%	5-10%	1.5m		
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	35cm	GH3-20,27	
Melaleuca calyptroides	5-8%	5-10%	1.1m	=CH17-1	
Millotia myosotidifolia	+	<1 %	4cm	GH3-8	
Neurachne alopecuroidea	1	<1 %	15cm	GH3-21	
Olearia dampieri subsp. eremicola	+	<1 %	45cm	GH3-22	Olearia
Opercularia vaginata	+	<1 %	30cm	=CH17-10	
Orthrosanthus laxus var. gramineus	+	<1 %	30cm	GH3-24	Orthrosanthus
Parentucellia latifolia	+	<1 %	10cm	GH3-13	Parentucellia
Pentaschistis pallida	+	<1 %	10cm	GH3-4	
Podolepis canescens	2-3	1-5%	25cm	GH3-1,53	Yellow
Podolepis lessonii	+	<1 %	12cm	GH3-51	Revisit. ?Daisy
Podotheca angustifolia	+	<1 %	3cm	GH3-3	Podotheca
Pterostylis sanguinea	+	<1 %	25cm	GH3-11,50	Orchid
Pterostylis sargentii	+	<1 %	30cm	GH3-10	Orchid
Regelia megacephala	50%	50-75%	3-3.5m		
Silene gallica var. gallica	+	<1 %	35cm	GH3-17,54	Silene
Sonchus oleraceus	+	<1 %	20cm	GH3-12	Sonchus
Stackhousia monogyna	+	<1 %	30cm	GH3-23,26	Stackhousia
Stylidium miniatum	+	<1 %	4cm	GH3-6	
Stylidium repens	+	<1 %	15cm	GH3-5	
Thysanotus manglesianus	+	<1 %	40cm	GH3-52	Also recorded in 30x30.
Trachymene pilosa	+	<1 %	4cm		
Tripterococcus brunonis	+	<1 %	30cm	GH3-25	Tripterococcus
Urospermum picroides	+	<1 %	10cm	=CH11-10	
Ursinia anthemoides	+	<1 %	30cm		
Vulpia myuros var. hirsuta	+	<1 %	6cm		Vulpia
Xanthorrhoea drummondii	+	<1 %	1.3m		
Allocasuarina huegeliana	+	<1 %	1.2m		juvenile
Burchardia umbellata	+	<1 %	30cm		Burchardia
Calothamnus sanguineus	+	<1 %	35cm	GH3-31	Grazed
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1cm	=GH1-56	Revisit. Flat
Dryandra fraseri	+	<1 %	35cm	GH3-29	Dryandra ?fraseri
Goodenia hassallii	+	<1 %	50cm	GH3-33	
Lechenaultia biloba	+	<1 %	35cm	GH3-28	
Lepidosperma leptostachyum	+	<1 %	35cm	GH3-30	

Moora **Site** GH004

Described by MET **Date** 31/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Gardiner property
MGA Zone 50 408519 **m E** 6617661 **m N** -30.569921 **S lat** 116.046019 **E long**
Habitat: Fairly flat to gently sloping area on low part of a ridge.
Soil: Very pebbly to gravelly light grey silty fine sand (light brown deeper) amongst cobbles and boulders.

(Possibly some is outcrop).
Vegetation: Allocasuarina huegeliana (Acacia acuminata) low woodland over Kunzea praestans, Xanthorrhoea drummondii high open shrubland to high shrubland over Melaleuca calyptroides low open shrubland over Opercularia vaginata herbland and low annual herbland/grassland.
Vegetation condition: Good to very good. Some grazing damage (now fenced-off). Low-moderate weeds, mostly Briza
and other small species.
Notes: Datum: WGS84. 1st coord is for NW peg; 2nd coord is for SE peg.
30x30 search kept away from Allocasuarina huegeliana stand on NW side.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia lasiocarpa var. sedifolia	+	<1 %	50cm	GH4-5	Typical. Field det = Acacia cf. pulchella
Agrostocrinum scabrum	<1	<1 %	55cm	GH4-3,52	
Allocasuarina campestris	1	<1 %	1m(3d)		
Allocasuarina huegeliana	15-20%	10-25%	5-7.5m		
Astroloma serratifolium	+	<1 %	5cm	GH4-19	
Austrodanthonia caespitosa	+	<1 %	3cm	GH4-17	
Austrodanthonia setacea	+	<1 %	8cm	GH4-12	
Austrostipa nitida	+	<1 %	10cm	GH4-20	
Avena barbata	+	<1 %	30cm		
Borya sphaerocephala	+	<1 %	4cm		Borya
Briza maxima	>1	1-5%	5-10cm		
Burchardia umbellata	+	<1 %	20cm		
Calytrix leschenaultii	2	1-5%	0.4-0.7m		purple
Chamaescilla corymbosa var. corymbosa	+	<1 %	3cm		dead
Cheilanthes adiantoides	1	<1 %	10cm		C. austrotenuifolia
Desmocladus flexuosus	5	5-10%	10cm	GH4-4	Desmocladus flexuosus??
Dichopogon capillipes	+	<1 %	5cm	GH4-8	Lilly Dichopogon
Dioscorea hastifolia	+	<1 %	70cm		
Drosera aff. macrantha	+	<1 %	40 cm	GH4-50	Revisit. Climber
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	2 cm	GH4-51	Revisit.
Drosera macrantha subsp. macrantha	+	<1 %	3 cm	=CH12-53	Also recorded in 30x30. Also GH4-21. Revisit. Lilly
Erodium botrys	+	<1 %	3cm	GH4-18	
Genus sp.	+	<1 %	10-12cm		'pink'
Hibbertia subvaginata	1	<1 %	5(juv) 40 cm		
Hyalosperma cotula	+	<1 %	10cm	GH4-10	
Hypochaeris glabra	+	<1 %	3cm		
Hypoxis occidentalis var. occidentalis	+	<1 %	15 cm	=GH9-50	Revisit. Yellow lilly
Kunzea praestans	10%	10-25%	0.6-2.1m		
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	10-20cm	GH4-9	
Melaleuca calyptroides	>=5%	5-10%	50-90cm	GH4-1	
Neurachne alopecuroidea	1	<1 %	5-8cm		Neurachne
Olearia dampieri subsp. eremicola	<=5%	1-5%	1.6m		Olearia aff axillaris
Opercularia vaginata	10	5-10%	5-20cm	GH4-2	
Pentaschistis pallida	+	<1 %	5-12cm	GH4-11	
Podolepis canescens	+	<1 %	10-20cm	GH4-14	
Podotheca angustifolia	+	<1 %	5cm		Podotheca usual
Pterostylis sanguinea	+	<1 %	7cm	GH4-13	
Stylidium repens	+	<1 %	10cm	GH4-7	
Trachymene pilosa	+	<1 %	8cm		
Trachymene sp.	+	<1 %	20cm		Perennial, linear leaf
Tripteris clandestina	+	<1 %	20 cm	GH4-54	Revisit. ?Daisy
Ursinia anthemoides	+	<1 %	5-15cm		
Vulpia myuros var. hirsuta	2	1-5%	10-15cm		
Waitzia nitida	+	<1 %	15cm	GH4-6	
Xanthorrhoea drummondii	3	1-5%	1.5-2.5(d)		
Acacia acuminata subsp. acuminata	1	<1 %	5-6m		
Austrostipa elegantissima	+	<1 %	40cm		
Caladenia flava subsp. flava	+	<1 %	2 cm	=CH10-56	Revisit. Orchid
Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %	1.6m		
Crassula colorata var. colorata	+	<1 %	5cm		
Cyanicula deformis	+	<1 %	12 cm	=CH12-57	Revisit. Blue orchid
Diuris aff. recurva	+	<1 %	35 cm	=GH9-5	Revisit. Orchid

Dryandra sessilis var. sessilis	+	<1 %	3.2m		
Leporella fimbriata	+	<1 %	1 cm	GH4-53	Revisit. Orchid (SE side) (Maybe just outside the 30x30 boundary)
Trachymene cyanopetala	+	<1 %			Trachymene not pilosa/not ornata

Moora Site GH005

Described by BRM **Date** 31/10/03 **Type:** QUADRAT 10x10 m, 30x30
Location: Eastern most ridge on Gardiner's bush block.
MGA Zone 50 408385 **m E** 6617631 **m N** -30.570181 **S lat** 116.044619 **E long**
Habitat: East-facing upper slope (rocky breakaway) on low ridge.
Soil: Gravelly, cobbly, bouldery brown loamy sand.
Rock Type: Chert.
Vegetation: Acacia acuminata subsp. acuminata scattered low trees over Trymalium ledifolium var. rosmarinifolium
open shrubland over Neurachne alopecuroidea scattered grasses and Cheilanthes adiantoides open fernland with Schoenia cassiniana, Podolepis lessonii annual herbland.
Vegetation condition: Good to very good.
Fire age: Not burnt for more than 10 years.
Notes: Datum: WGS84. 1st coord is for NW peg; 2nd coord is for SE coord.
30x30 searched extra 20-30m each side of plot along breakaway, but not the ridge crest or valley floor above and below the plot.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	5%	5-10%	6-8m		Acacia acuminata
Allocasuarina huegeliana	+	<1 %	1.5m		
Austrodanthonia caespitosa	+	<1 %	10cm	GH5-12	hairy leaf
Austrodanthonia setacea	+	<1 %	40cm	GH5-8	
Austrostipa elegantissima	+	<1 %	35cm	GH5-11	
Austrostipa variabilis	+	<1 %	30cm	GH5-10,13	twisty
Avena barbata	+	<1 %	35cm		
Briza maxima	+	<1 %	20cm		
Bromus diandrus	+	<1 %	15cm		
Burchardia umbellata	+	<1 %	35cm		
Caesia alfordii	+	<1 %	30cm	GH5-22	Lilly
Caladenia flava subsp. flava	+	<1 %	10cm	=CH10-56	Revisit. Orchid
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	=CH12-52	Revisit. Lilly
Cheilanthes adiantoides	20-25%	10-25%	25cm	GH5-4	10-15% Cheilanthes at August 2003 revisit
Cyanicula deformis	+	<1 %	10cm	=CH12-57	Revisit. Blue orchid
Desmocladus flexuosus	1	<1 %	20cm		
Dianella revoluta var. divaricata	1	<1 %	1m	GH5-9	Dianella revoluta
Dichopogon capillipes	+	<1 %	10cm	=GH3-16	
Dioscorea hastifolia	+	<1 %	35cm		Dioscorea
Drosera aff. macrantha	+	<1 %	20cm	=CH11-50	Revisit. Climbing
Drosera macrantha subsp. macrantha	+	<1 %	30cm	GH5-5	CHECK field Drosera sp
Ehrharta longiflora	+	<1 %	25cm		
Goodenia arthrotricha	+	<1 %	35cm	GH5-15	
Goodenia berardiana	+	<1 %	30cm	GH5-23	Lilly
Hyalosperma cotula	+	<1 %	10cm	=GH3-7	small white daisy
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=GH9-50	Revisit.
Kennedia prostrata	+	<1 %	10cm		
Lagenifera huegelii	+	<1 %	10cm	GH5-14,50	Lagenifera
Lepidosperma costale	+	<1 %	30cm	GH5-16	
Lomandra effusa	+	<1 %	40cm	GH5-18	
Neurachne alopecuroidea	1	<1 %	30cm		
Parentucellia latifolia	+	<1 %	20cm	=GH3-13	Parentucellia
Pentaschistis pallida	+	<1 %	10cm	GH5-21	
Podolepis lessonii	10-15%	10-25%	25cm	GH5-3	
Schoenia cassiniana	15-20	10-25%	30cm	GH5-2,51	Pink/white daisy
Sowerbaea laxiflora	+	<1 %	15cm	=GH9-57	Revisit.
Stypandra glauca	+	<1 %	20cm	GH5-17	Stypandra
Thysanotus manglesianus	+	<1 %	40cm		Thysanotus ?patersonii
Trachymene ornata	+	<1 %	15cm		White head

Trachymene pilosa	+	<1 %	20cm	GH5-6	
Trymalium ledifolium var. rosmarinifolium	5-10%	5-10%	1.7m	GH5-1	
Urospermum picroides	+	<1 %	10cm	=CH11-10	
Ursinia anthemoides	+	<1 %	20cm		
Vulpia myuros var. hirsuta	+	<1 %	10cm		Vulpia
Waitzia nitida	+	<1 %	30cm	GH5-7	Yellow daisy
Xanthorrhoea drummondii	+	<1 %	1.5m		
Calytrix leschenaultii	+	<1 %	90cm	GH5-20	purple
Lepidosperma leptostachyum	+	<1 %	50cm	GH5-19	
Olearia dampieri subsp. eremicola	+	<1 %	30cm	=GH3-22	

Moora Site GH006

Described by MET **Date** 31/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Gardiner's bush block on East Dalaroo Rd, about 12km N of Moora.
MGA Zone 50 408372 **m E** 6617553 **m N** -30.570884 **S lat** 116.044477 **E long**
Habitat: Upper east-facing slopes at the end of a ridge.
Soil: Gravelly to pebbly brown silty sand amongst cobbles and outcrop.
Vegetation: Eucalyptus wandoo subsp. wandoo open woodland over Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low open woodland over Xanthorrhoea drummondii open shrubland over Trymalium ledifolium var. rosmarinifolium low open shrubland over Cheilanthes adiantoides, Austrostipa spp. open fern/grassland
Vegetation condition: Good to very good (some weeds). May have been heavily grazed.
Notes: Datum: WGS84. 1st coord is for NW peg; 2nd coord is for SE peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	5-7%	5-10%	4-7m		Acacia acuminata
Aira caryophyllea	+	<1 %	8cm	GH6-5	
Austrodanthonia acerosa	+	<1 %	10cm	GH6-10	
Austrodanthonia caespitosa	+	<1 %	10cm	GH6-4	hairy
Austrostipa elegantissima	+	<1 %	30cm	GH6-3,17	
Austrostipa scabra	+	<1 %	8cm	GH6-16	
Avena barbata	+	<1 %	25cm		
Borya sphaerocephala	+	<1 %	6cm		Borya
Briza maxima	+	<1 %	10-15cm		
Burchardia umbellata	+	<1 %	15cm	GH6-15	Burchardia
Caesia alfordii	+	<1 %	15cm	GH6-9	Lilly
Caladenia flava subsp. flava	+	<1 %	10cm	GH6-14	Dead
Calandrinia calyptrata	+	<1 %		GH6-18	
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	GH6-53	Revisit: ?lilly = ?CH12-52
Cheilanthes adiantoides	5	5-10%	10-15cm		
Crassula colorata var. colorata	+	<1 %	3cm		
Daucus glochidiatus	+	<1 %	9cm		
Desmocladus flexuosus	+	<1 %	8cm	=GH4	
Dianella revoluta var. divaricata	+	<1 %	40cm		
Dichopogon capillipes	+	<1 %	10cm	=GH4	
Dioscorea hastifolia	+	<1 %	30cm		
Drosera macrantha subsp. macrantha	+	<1 %	10cm	=GH5-5	Also GH6-56 in 30x30. Revisit: CHECK field Lagenifera sp
Drosera sp.	+	<1 %	10cm	GH6-13	Climbing
Ehrharta longiflora	+	<1 %	45cm		Dead
Eucalyptus wandoo subsp. wandoo	15%	10-25%	10-12m		Eucalyptus wandoo
Genus sp.	+	<1 %	10cm	GH6-7	Poaceae (grazed)
Goodenia sp.	+	<1 %	10cm	GH6-8	Small annual
Hibbertia subvaginata	1	<1 %	1-1.2m		
Hyalosperma cotula	+	<1 %	5-10cm	=GH4	White
Hypochaeris glabra	+	<1 %	3cm		
Hypoxis occidentalis var. occidentalis	+	<1 %	10 cm	=GH9-50	Also recorded in 30x30. Also GH6-59A. Revisit. Yellow Lilly
Lagenifera huegelii	+	<1 %	2cm	GH6-22	Daisy
Lawrencella rosea	+	<1 %	20 cm	GH6-57	Revisit. Daisy
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	15cm	GH6-11	
Lobelia sp. small flowers (K.F. Kenneally 7705)	+	<1 %	12cm	GH6-19	
Lolium perenne	+	<1 %	5cm	GH6-20	

Lomandra (Moora twisty)	+	<1 %	20 cm	GH6-54	Revisit.
Lomandra aff. micrantha subsp. micrantha	+	<1 %	20cm	GH6-2	
Neurachne alopecuroidea	+	<1 %	6cm		
Phyllangium sulcatum	+	<1 %	10cm	GH6-6	Mitrasacme
Platysace cirrosa	+	<1 %	15cm		Perennial Trachymene "unknown"
Podotheca angustifolia	+	<1 %	7cm		
Pterostylis aff. rufa	+	<1 %		GH6-23	
Pterostylis sanguinea flat leaf	+	<1 %	12cm	GH6-50	Revisit: Pterostylis tall
Schoenia cassiniana	1	<1 %	10-20cm		Daisy pink/white
Sollya heterophylla	+	<1 %	15cm	GH6-21	
Sowerbaea laxiflora	+	<1 %	20cm	=GH9-57	Revisit: ?Thysanotus
Stypandra glauca	+	<1 %	10cm	GH6-12	Stypandra (common)
Thysanotus manglesianus	+	<1 %	40cm	GH6-51,52	Revisit: Climber
Trachymene cyanopetala	+	<1 %	8cm		
Trachymene ornata	+	<1 %	12cm		
Trachymene pilosa	+	<1 %	10cm		
Trymalium ledifolium var. rosmarinifolium	1-2%	1-5%	0.3-1m	GH6-1	
Ursinia anthemoides	1	<1 %	10-20cm		
Vulpia myuros var. hirsuta	+	<1 %	8cm		
Waitzia sp.	+	<1 %	10-15cm	=CH4	
Xanthorrhoea drummondii	2-3%	1-5%	1.5-1.9m		
Austrostipa hemipogon	+	<1 %		GH6-SN	
Calytrix leschenaultii	+	<1 %	1m		Calytrix purple
Cyanicula deformis	+	<1 %	8cm	=CH12-57 (NE corner)	Revisit: Blue orchid
Dampiera lavandulacea	+	<1 %	10cm	GH6-25,55	Dampiera?
Eriochilus helonomos	+	<1 %	30cm	=CH14-61	Revisit: Pterostylis tall
Gilberta tenuifolia	+	<1 %	10-20cm	GH6-31	Daisy
Glischrocaryon flavescens	+	<1 %	70cm	GH6-30	
Goodenia arthrotricha	+	<1 %	25cm	GH6-33	
Hypoxis glabella var. leptantha	+	<1 %	10cm	GH6-59B	Revisit: small yellow lilly flower
Lomandra effusa	+	<1 %	25cm	GH6-27	
Melaleuca radula	+	<1 %	40cm(2m)	GH6-28	
Olearia dampieri subsp. eremicola	+	<1 %	50cm		Olearia aff axillaris
Orthrosanthus laxus var. gramineus	+	<1 %	25cm	GH6-29	
Podolepis lessonii	+	<1 %	10-25cm	GH6-32	
Stenanthemum tridentatum	+	<1 %	5cm	GH6-26,58	

Moora **Site** GH007

Described by BRM **Date** 1/11/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Near SW corner of Gardiner's block, about 100m east of western boundary
MGA Zone 50 408366 **m E** 6617473 **m N** -30.571605 **S lat** 116.044407 **E long**
Habitat: Gentle, south-facing lower slope of low ridge.
Soil: (Surface) Gravelly brown sand.
Rock Type: Chert.
Vegetation: Eucalyptus loxophleba subsp. loxophleba, Acacia acuminata subsp. acuminata low open woodland over Cheilanthes adiantoides fernland with Gilberta tenuifolia, Podolepis lessonii, Hyalosperma glutinosum subsp. glutinosum annual herbland.
Vegetation condition: Good to very good. Very open understorey - probably some long term disturbance to shrub layer.
Fire age: Not burnt for more than 7 to 10 years.
Notes: Datum: WGS84. 1st coord is for NW peg; 2nd coord is for SE peg. Lot of wood debris in plot suggests not burnt for long time.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Acacia acuminata subsp. acuminata	5%	5-10%	5m		Acacia acuminata
Anagallis arvensis	+	<1 %	4cm		
Austrodanthonia acerosa	+	<1 %	30cm	GH7-8	
Austrostipa elegantissima	+	<1 %	30cm	GH7-21	
Austrostipa scabra	+	<1 %	30cm	GH7-23	Grass
Austrostipa variabilis	+	<1 %	30cm	GH7-6	
Avena barbata	+	<1 %	35cm		

Borya sphaerocephala	3	1-5%	3cm		Borya
Bromus diandrus	+	<1 %	15cm		
Burchardia umbellata	+	<1 %	15cm	=GH9-52	Revisit.
Calandrinia calyptrata	+	<1 %	20cm	GH7-22,26	
Cheilanthes adiantoides	30-35%	25-33.3%	10cm	=GH5-4	
Cyanicula deformis	+	<1 %	15cm	=CH12-57	Revisit. Blue beard orchid
Daucus glochidiatus	+	<1 %	10cm	GH7-15	hairy heads
Dichopogon capillipes	+	<1 %	30cm	GH7-11	
Dioscorea hastifolia	+	<1 %	30cm		Dioscorea
Drosera macrantha subsp. macrantha	+	<1 %	20cm	GH7-52	Also GH7-24,55 (30x30). Revisit. Erect
Eucalyptus loxophleba subsp. loxophleba	8-10%	5-10%	8-9m	GH7-1	Stringy grey course bark; smooth bark on upper branches.
Galium murale	+	<1 %	4cm	GH7-20	
Gilberta tenuifolia	30-40%	33.3-50%	20cm	GH7-2	Daisy hanging heads
Goodenia berardiana	+	<1 %	15cm	GH7-16	
Hyalosperma glutinosum subsp. glutinosum	1-2	1-5%	20cm	GH7-4	yellow daisy
Hypoxis glabella var. leptantha	+	<1 %	4cm	GH7-50	Revisit. Small yellow lilly flower
Hypoxis occidentalis var. occidentalis	+	<1 %	12cm	=GH9-50	Revisit. Yellow daisy
Lagenifera huegelii	+	<1 %	4cm	GH7-18	
Lobelia sp. small flowers (K.F. Kenneally 7705)	+	<1 %	6cm	GH7-9	single head
Neurachne alopecuroidea	+	<1 %	10cm		Neurachne
Oxalis corniculata	+	<1 %	4cm	GH7-17,53	
Pentaschistis pallida	+	<1 %	10cm	GH7-12	
Phyllangium sulcatum	+	<1 %	10cm	GH7-10	
Podolepis lessonii	3-5%	1-5%	30cm	GH7-3	
Prasophyllum gracile	+	<1 %	15cm	GH7-19	Orchid
Sowerbaea laxiflora	+	<1 %	12cm	=GH9-57	Revisit.
Thysanotus manglesianus	+	<1 %	20cm	GH7-14, 51	Thysanotus ?patersonii
Trachymene cyanopetala	+	<1 %	10cm	GH7-13	Trachymene hairy
Trachymene ornata	+	<1 %	5cm		White heads
Urospermum picroides	+	<1 %	15cm	=CH11-10	
Ursinia anthemoides	+	<1 %	20cm		
Vulpia myuros var. hirsuta	+	<1 %	15cm		Vulpia
Waitzia nitida	1	<1 %	25cm	GH7-5,7	
Allocasuarina huegeliana	+	<1 %	5-6m		
Amblysperma sp. Moora (GH7-57)	+	<1 %	10cm	GH7-57	Revisit. Herb
Chamaescilla corymbosa var. corymbosa	+	<1 %	3cm	=CH12-52	Revisit. Lilly
Ehrharta longiflora	+	<1 %	20cm		
Erodium cygnorum	+	<1 %	4cm	=CH14-53	Revisit. ?
Eucalyptus wandoo subsp. wandoo	+	<1 %	5m		
Hedypnois rhagadioloides	+	<1 %	20cm	GH7-28	
Lomandra effusa	+	<1 %	25cm	GH7-54	Revisit.
Ptilotus spathulatus forma spathulatus	+	<1 %	4cm	GH7-56	Revisit. Herb
Rhyncharrhena linearis	+	<1 %	30cm	GH7-25	Climber
Silene gallica var. gallica	+	<1 %	30cm	GH7-27	Silene

Moora **Site** GH008

Described by MET **Date** 1/11/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Gardiner's block, about 12 km north of Moora, on East Dalaroo Rd.
MGA Zone 50 408305 **m E** 6617853 **m N** -30.568172 **S lat** 116.043805 **E long**
Habitat: Slight rise on ridge.
Soil: Gravelly to pebbly light grey silty sand, amongst cobbles and outcrop.
Vegetation: Allocasuarina huegeliana low woodland to low open forest over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii, Kunzea praestans open shrubland to tall open shrubland over Calytrix leschenaultii scattered low shrubs to low open shrubland over annual herb/grassland.
Vegetation condition: Difficult to assess. Good; too weedy for very good (although no very aggressive weeds, except
Ehrharta). Also Xanthorrhoea drummondii suffering deaths and unknown grazing impacts.
Notes: Datum: WGS84. 1st coord is NW peg; 2nd coord is for SE peg.
The Kunzea and Calytrix occur in patches with each more abundant where it occurs.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	+	<1 %	3cm(juv)		Acacia acuminata
Allocasuarina huegeliana	25%	25-33.3%	5-8m		
Arctotheca calendula	+	<1 %	12cm		Revisit.
Austrostipa nitida	+	<1 %	10cm	GH8-3	
Avena barbata	+	<1 %	40cm		
Briza maxima	+	<1 %	5-10cm		
Burchardia umbellata	+	<1 %	20cm		
Caladenia flava subsp. flava	+	<1 %	4cm Caladenia orchid	=CH10-56	Revisit.:
Calandrinia calyptrata	1	<1 %	5cm	=GH6	
Calytrix leschenaultii	2	1-5%	0.5m		
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	=CH12-52	Revisit. Lilly
Cheilanthes adiantoides	+	<1 %	5-12cm		
Comesperma integerrimum	+	<1 %	15-35cm	GH8-7	
Comesperma virgatum	+	<1 %	65cm		
Crassula colorata var. colorata	+	<1 %	3-4cm		
Crassula exserta	+	<1 %	3-4cm	GH8-6	
Desmocladus flexuosus	1	<1 %	10-15cm	=GH4	
Dichopogon capillipes	+	<1 %	12cm	GH8-51	Revisit. Dichopogon flat
Drosera aff. macrantha	+	<1 %	20cm	=CH11-50	Revisit. Climbing
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1cm	GH8-52	Revisit. Drosera flat base
Drosera macrantha subsp. macrantha	+	<1 %	15cm	GH8-5,50	Climbing
Dryandra sessilis var. sessilis	4	1-5%	1.8(5)m		Dryandra sessilis
Ehrharta longiflora	5	5-10%	5cm		
Hibbertia subvaginata	1	<1 %	10(juv)-90cm		
Hypochaeris glabra	3-5%	1-5%	3cm		
Kunzea praestans	15	10-25%	1-2.8m		
Neurachne alopecuroidea	+	<1 %	5cm		
Pentaschistis pallida	8	5-10%	5-15cm	GH8-1	
Podolepis lessonii	1	<1 %	10-20cm	=GH6-32	
Pterostylis sanguinea	+	<1 %	15cm	GH8-4	
Silene gallica var. gallica	+	<1 %	5-10cm	GH8-2	
Sowerbaea laxiflora	+	<1 %	15cm	=GH9-57	
Thysanotus manglesianus	+	<1 %	1m		T. patersonii
Trachymene cyanopetala	+	<1 %	10cm		Not T. pilosa/T.ornata
Trachymene pilosa	+	<1 %	10cm		
Ursinia anthemoides	<5	1-5%	10-25cm		
Vulpia myuros var. hirsuta	5	5-10%	10-15cm		
Xanthorrhoea drummondii	10	5-10%	1.5-3m		
Acacia aristulata	+	<1 %	10cm(juv)		
Agrostocrinum scabrum	+	<1 %	60cm	GH8-9,53	Chocolate lilly
Austrodanthonia sp.	+	<1 %	5cm		Glabrous
Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %	2.5m		
Cyanicula deformis	+	<1 %	15cm	=CH12-57	Blue orchid
Dioscorea hastifolia	+	<1 %	3cm		
Erodium botrys	+	<1 %	2cm	GH8-54	
Hyalosperma cotula	+	<1 %		=GH4-10	White
Hypoxis occidentalis var. occidentalis	+	<1 %	12cm	=GH9-50	Lilly
Leporella fimbriata	+	<1 %	1cm	GH8-55	Orchid
Leucopogon sp. Yanchep (M. Hislop 19,861)	+	<1 %	40cm	GH8-8	
Melaleuca calyptroides	+	<1 %	2.2m		Melaleuca common
Opercularia vaginata	+	<1 %	10cm	=GH6	
Stylidium caricifolium	+	<1 %	25cm		Big grass like

Moora **Site** GH009

Described by BRM **Date** 1/11/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Near western boundary near north end of Gardiner's block.
MGA Zone 50 408299 **m E** 6617965 **m N** -30.567161 **S lat** 116.043752 **E long**
Habitat: Gently sloping rocky breakaway on upper north-west-facing slope of medium height ridge.
Soil: Very gravelly, cobbly, bouldery fine brown sand.
Rock Type: Chert. Exposed sheet rock and boulders cover more than 60-70% of ground surface.
Vegetation: Regelia megacephala, (Dryandra sessilis var. sessilis) open scrub over Hibbertia subvaginata scattered low shrubs over Cheilanthes adiantoides very open fernland with Dioscorea hastifolia very

Vegetation condition: Good (heavy weed infestation in parts).
Fire age: Not burnt for more than 7 years.
Notes: Datum: WGS84. Plot is not square. 1st coord is for SE peg; 2nd coord is for NW peg.
This is part of a fairly small Regelia community on a NW-facing chert breakaway slope.
30x30 search avoided NE corner (Allocasuarina campestris veg community) and was limited in area to the north, south and east by different veg communities.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Anagallis arvensis	+	<1 %	10cm		
Austrodanthonia acerosa	+	<1 %	35cm	GH9-18	Hairy short leaves
Austrodanthonia setacea	+	<1 %	30cm	GH9-10	
Austrostipa scabra	+	<1 %	35cm	GH9-11	twisty
Austrostipa variabilis	+	<1 %	60cm	GH9-17	
Avena barbata	+	<1 %	35cm		
Borya sphaerocephala	+	<1 %	10cm		
Briza maxima	+	<1 %	20cm		
Bromus diandrus	+	<1 %	10cm		Bromus
Burchardia umbellata	+	<1 %	30cm	GH9-52	Revisit.
Caladenia flava subsp. flava	+	<1 %	4cm	=CH10-56	Revisit. Orchid
Calandrinia sp.	+	<1 %	2cm	GH9-51	Revisit.
Calytrix leschenaultii	+	<1 %	40cm		purple
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	=CH12-52	Revisit. Lilly
Cheilanthes adiantoides	3-4	1-5%	15cm	=GH5-4	
Crassula colorata var. colorata	+	<1 %	3cm	GH9-7	Crassula
Cyanicula deformis	+	<1 %	10cm	=CH12-57	Revisit. Blue orchid
Desmocladus flexuosus	+	<1 %	20cm		
Dianella revoluta var. divaricata	+	<1 %	60cm	=GH5-9	
Dichopogon capillipes	+	<1 %	20cm	=CH10-52	Revisit.
Dioscorea hastifolia	3-5	1-5%	2m		Dioscorea
Diuris aff. recurva	+	<1 %	30cm	=GH2	Revisit.
Drosera aff. macrantha	+	<1 %	15cm (but 45cm	=CH11-50	Revisit.
Drosera macrantha subsp. macrantha	+	<1 %	20cm	GH9-53	Revisit. Climbing
Dryandra sessilis var. sessilis	4%	1-5%	3m		Dead on revisit
Ehrharta longiflora	3-4	1-5%	30cm		
Erodium botrys	+	<1 %	20cm	GH9-9	hairy stem
Goodenia berardiana	+	<1 %	20cm	=GH7-16	
Hibbertia subvaginata	1	<1 %	70cm		
Hyalosperma cotula	+	<1 %	10cm	=GH3-7	small white daisy
Hypochaeris glabra	3-4	1-5%	20cm	GH9-8	
Hypoxis occidentalis var. occidentalis	+	<1 %	12cm	GH9-50	Revisit. Yellow lilly
Linum trigynum	+	<1 %	20cm	GH9-15	
Neurachne alopecuroidea	+	<1 %	10cm		Neurachne
Olearia dampieri subsp. eremicola	+	<1 %	30cm	=GH3-22	
Parentucellia latifolia	+	<1 %	20cm	GH9-6	Parentucellia
Pentaschistis sp.	+	<1 %	10cm	GH9-5	
Petrorhagia prolifera	open lianes.		+	<1 %35cm	GH9-16
Platysace cirrosa	+	<1 %	15cm	GH9-54	Revisit. Climbing
Podolepis canescens	1	<1 %	25cm	GH9-2,56	Also recorded in 30x30.
Podolepis lessonii	+	<1 %	12cm	=GH3-51	Revisit. ?Daisy
Podotheca angustifolia	+	<1 %	3cm	=GH3-3	
Pterostylis sanguinea	+	<1 %	30cm	GH9-12	Orchid
Regelia megacephala	60-70%	50-75%	3-4m		
Silene gallica var. gallica	+	<1 %	20cm	GH9-4	Silene
Stypandra glauca	+	<1 %	20cm		
Thysanotus dichotomus	+	<1 %	30cm	GH9-1,58	Also recorded in 30x30.
Thysanotus manglesianus	+	<1 %	30cm	=GH7-14	Thysanotus patersonii
Trachymene ornata	+	<1 %	3cm	GH9-55	Revisit. ?pilosa
Tricoryne elatior	+	<1 %	30cm	GH9-3	
Trifolium hirtum	+	<1 %	3cm	GH9-14	
Ursinia anthemoides	+	<1 %	20cm		
Vulpia myuros var. hirsuta	~1	1-5%	10cm		Vulpia
Waitzia acuminata	+	<1 %	35cm	GH9-13	pink white daisy
Xanthorrhoea drummondii	+	<1 %	1.3m		
Acacia acuminata subsp. acuminata	+	<1 %	5m		Acacia acuminata

Allocasuarina huegeliana	+	<1 %	3m		
Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %	2.5m	GH9-19	Calothamnus quadrifidus
Eriochilus helonomos	+	<1 %	15cm	=CH14-61	Revisit. 1-leaf stem orchid
Goodenia arthrotricha	+	<1 %	40cm	GH9-20	
Nemcia acuta	+	<1 %	10cm		
Sowerbaea laxiflora	+	<1 %	20cm	GH9-57	Revisit. Fleshy

Moora **Site** GH010

Described by BRM **Date** 1/11/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Near north end of remnant in Gardiner's block.
MGA Zone 50 408405 **m E** 6618051 **m N** -30.566393 **S lat** 116.044865 **E long**
Habitat: Upper slope of a rocky ridge side, east-facing, moderate to steep slope.
Soil: Silty fine grey sand, gravelly to pebbly, amongst boulders and outcrop. Top 5cm humous rich.
Rock Type: Chert
Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low open woodland to low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drumondii scattered tall shrubs to high open shrubland over Calytrix leschenaultii, Hibbertia subvaginata low open shrubland over Asteraceae, Poaceae annual herb/grassland.
Vegetation condition: Difficult to assess. Probably good. Too many weeds for very good. Also probably grazing damage.
Notes: Datum: WGS84. First coord is for NW peg; 2nd coord is for SE peg.
Many dead X. drummondii and Allocasuarina huegeliana nearby - no regeneration.
30x30 search limited to N and S side (not on crest to west and lower slope to east).
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Allocasuarina huegeliana	10	5-10%	6-8m		
Arctotheca calendula	+	<1 %	5cm		Capeweed
Austrodanthonia sp.	+	<1 %	5cm		glabrous
Austrostipa macalpinei	+	<1 %	25cm	GH10-2	
Austrostipa variabilis	+	<1 %	30cm	GH10-7	
Avena barbata	+	<1 %	30cm		
Briza maxima	+	<1 %	5-15cm		
Burchardia umbellata	+	<1 %	15cm	=GH9-52	Lilly
Caladenia flava subsp. flava	+	<1 %	12cm	=CH10-56	Caladenia orchid
Calandrinia sp.	+	<1 %	5cm	=GH6	
Calytrix leschenaultii	4	1-5%	0.4-1.0m		
Cheilanthes adiantoides	5	5-10%	10-15cm		Cheilanthes
Desmocladus flexuosus	1	<1 %	10cm		usual
Dichopogon capillipes	+	<1 %	25cm	=CH10-52	
Dioscorea hastifolia	1	<1 %	10cm		
Drosera macrantha subsp. macrantha	+	<1 %	15cm	GH10-51,1	Also recorded in 30x30.
Dryandra sessilis var. sessilis juv)4m	7	5-10%	(3cm		Dryandra sessilis
Ehrharta longiflora	5	5-10%	10-30cm		
Genus sp.	+	<1 %	3-5cm	GH10-3	Daisy
Gilberta tenuifolia	+	<1 %	5-12cm	GH10-6	Daisy
Goodenia sp.	+	<1 %	10cm	=GH6	
Hibbertia subvaginata	1	<1 %	15-50cm		
Hyalosperma cotula	+	<1 %	5-8cm	=GH4-10	white
Hypochaeris glabra	+	<1 %	3cm		
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	10cm	GH10-8	
Lobelia sp. small flowers (K.F. Kenneally 7705)	+	<1 %	5cm	=?10-6	
Neurachne alopecuroidea	+	<1 %	3cm		Neurachne
Olearia dampieri subsp. eremicola	+	<1 %	40cm		Olearia aff. axillaris
Opercularia vaginata	+	<1 %	8cm	=GH6	Opercularia
Pentaschistis pallida	+	<1 %	5-12cm	GH10-4	
Podolepis lessonii	+	<1 %	15cm	=GH6	Common
Podotheca angustifolia	+	<1 %	12cm	GH10-50,5	Daisy
Pterostylis sanguinea	+	<1 %	20cm	=GH1-50	Pterostylis orchid
Schoenia cassiniana	+	<1 %	20cm		Daisy pink/white
Solanum nigrum	+	<1 %	20cm	GH10-1	
Trachymene pilosa	+	<1 %	5-10cm		
Tripteris clandestina	+	<1 %	25cm	GH10-53	Daisy weed

Trymalium ledifolium var. rosmarinifolium	1	<1 %	1.4m	GH10-5	Open shrub, bark light grey, leaves dark green above; pale green
Ursinia anthemoides	5	5-10%	10-20cm		
Vulpia myuros var. hirsuta	+	<1 %	6cm		
Xanthorrhoea drummondii	6%	5-10%	1.5-2.3m		
Acacia acuminata subsp. acuminata	+	<1 %	6m		Acacia acuminata
Austrostipa trichophylla	+	<1 %	8cm	GH10-9	
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	=CH12-52	Lilly
Daucus glochidiatus	+	<1 %	20cm	GH10-10	
Hypoxis glabella var. leptantha	+	<1 %	15cm	=CH14-59	Hypoxis
Pleurosorus rutifolius	+	<1 %	5cm	GH10-12	fern
Trachymene ornata	+	<1 %	8cm		

JOHN TONKIN'S

Moora Site JT001

Described by BRM **Date** 10/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Ridge on John Tonkin's property.
MGA Zone 50 409072 **m E** 6626085 **m N** -30.493956 **S lat** 116.052523 **E long**
Habitat: Gently sloping, west-facing upper slope on side of rounded crest of low ridge.
Soil: Pebbly, cobbly rocky brown sand.
Rock Type: Chert.
Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Kunzea praestans, (Xanthorrhoea drummondii) high open shrubland over Melaleuca calyptroides scattered shrubs over Hibbertia subvaginata low open shrubland over *Avena barbata, *Pentaschistis pallida, *Vulpia myuros var. hirsuta annual grassland.
Vegetation condition: Poor to good. High weed cover and probably past grazing, but vegetation structure intact.
Fire age: 5-10 years since burnt.
Notes: Datum: WGS84. 1st coord is for SW peg; 2nd coord is for NE peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	1	<1 %	3.5m		
Acacia aristulata	+	<1 %	20cm	JT1-21	Acacia aristulata (juv)
Acacia restiacea	+	<1 %	35cm	JT1-24	Acacia
Allocasuarina huegeliana	1-2%	1-5%	5m		
Arctotheca calendula	+	<1 %	5cm		
Austrodanthonia setacea	+	<1 %	20cm	JT1-15	Austrodanthonia
Austrostipa elegantissima	+	<1 %	45cm	JT1-19	Austrostipa ?elegantissima
Austrostipa nitida	+	<1 %	30cm	JT1-16	Austrostipa (twisted)
Austrostipa variabilis	1-2	1-5%	35cm	JT1-7	Austrostipa
Avena barbata	5-10	5-10%	70cm		
Borya sphaerocephala	+	<1 %	2CM		Revisit.
Briza maxima	+	<1 %	20cm		
Bromus diandrus	+	<1 %	20cm	JT1-33	Grass
Burchardia umbellata	+	<1 %	25cm	JT1-51	Revisit.
Caladenia flava subsp. flava	+	<1 %	15cm	JT1-31,52	Caladenia
Calandrinia calyptrata	+	<1 %	2cm	JT1-32	?Calandrinia
Calytrix leschenaultii	+	<1 %	50cm	JT1-3	Calytrix
Chamaescilla corymbosa var. corymbosa	+	<1 %	20cm	=CH9-13	Chamaescilla
Cheilanthes adiantoides	+	<1 %	10cm	=ER15-10	Cheilanthes
Comesperma integerrimum	+	<1 %	30cm	JT1-20	shrub ?Rhagodia (heavily grazed)
Crassula colorata var. colorata	+	<1 %	5cm	JT1-11	Crassula
Crassula exserta	+	<1 %	10cm	JT1-25	Crassula #2
Cristonia biloba	+	<1 %	20cm	JT1-23	pea
Desmocladus flexuosus	+	<1 %	10cm	JT1-8	Desmocladus ?flexuosa
Dichopogon capillipes	+	<1 %	10cm	JT1-12	Dichopogon
Dioscorea hastifolia	+	<1 %	10cm		
Diplopeltis huegelii subsp. lehmannii	+	<1 %	30cm	JT1-4	Diplopeltis
Drosera aff. macrantha	+	<1 %	20cm	JT1-6,50	Drosera
Dryandra sessilis var. sessilis	+	<1 %	3cm		juvenile
Ehrharta longiflora	+	<1 %	35cm		
Erodium botrys	+	<1 %	10cm	JT1-9,18	?Pelargonium

				(pink flower)	
Euphorbia drummondii subsp. drummondii	+	<1 %	4cm	JT1-22	Euphorbiaceae
Hibbertia subvaginata	10	5-10%	1m		
Hypochaeris glabra	5	5-10%	15cm	JT1-10	Sonchus
Kunzea praestans	5-7	5-10%	2.5m		
Laxmannia ramosa subsp. ramosa	+	<1 %	15cm	JT1-29	
Lolium perenne	+	<1 %	30cm	JT1-28	?Rye grass
Melaleuca calyptroides	2	1-5%	1.4m	JT1-1	Melaleuca
Neurachne alopecuroidea	+	<1 %	15cm	=ER17-1	Neurachne
Pentaschistis pallida	5-10	5-10%	10cm	JT1-5,26	*Pentaschistis
Petrorhagia prolifera	+	<1 %	20cm	JT1-13 (single pk flower)	?Wahlenbergia
Pityrodia dilatata	+	<1 %	15cm	=ER15-7	Pityrodia dilatata
Silene gallica var. gallica	+	<1 %	35cm	JT1-17	*Silene
Stylidium repens	+	<1 %	10cm	JT1-30	Stylidium
Thysanotus manglesianus	+	<1 %	40cm	JT1-2	Thysanotus
Trifolium hirtum	+	<1 %	10cm	JT1-14	*Trifolium
Tripteris clandestina	+	<1 %	15cm	JT1-27	Daisy
Ursinia anthemoides	+	<1 %	20cm		
Vulpia myuros var. hirsuta	3-5	1-5%	15cm	JT1-X	*Grass (cylinder head)
Allocasuarina campestris	+	<1 %	2.5m		
Cyanicula deformis	+	<1 %	10cm	=CH12-57	Revisit. Blue beard orchid
Opercularia vaginata	+	<1 %	30cm	JT1-34	Opercularia
Ptilotus polystachyus var. polystachyus	+	<1 %	30cm	JT1-35	Ptilotus polystachyus

Moora Site JT002

Described by MET **Date** 10/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Near western boundary of John Tonkin's property between East Coomberdale Rd and Kiaka Rd.
MGA Zone 50 408890 **m E** 6626073 **m N** -30.494051 **S lat** 116.050626 **E long**
Habitat: Moderate slope, south-facing, on a low ridge.
Soil: Gravelly, pebbly light brown silty sand with cobbles, boulders and low outcrop of chert.
Vegetation: Acacia acuminata subsp. acuminata, Allocasuarina huegeliana low woodland to low open forest over Allocasuarina campestris scattered tall shrubs to high open shrubland over Podolepis lessonii, Trachymene spp. annual herbland.
Vegetation condition: Good to very good. The good condition quite surprising given more degraded to west and clearing less than 50m to east.
Notes: Datum: WGS84. 1st coord is for NW peg; 2nd coord is for SE peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Pentaschistis sp. Moora (doubtful ID)	+		8 cm	JT2-55	
Acacia acuminata subsp. acuminata	>15%	10-25%	6-8m		
Aira caryophyllea	+	<1 %	10-15cm	JT2-12	Aira
Allocasuarina huegeliana	<=10%	5-10%	4-5m		
Arctotheca calendula	+	<1 %	5cm		
Austrodanthonia acerosa	+	<1 %	10cm	JT2-9,16	Austrodanthonia
Austrostipa sp.	+	<1 %			Austrostipa
Avena barbata	+	<1 %	40cm		Avena fatua
Blennospora drummondii	+	<1 %	5-8cm	JT2-17	Asteraceae
Borya sphaerocephala	+	<1 %	5cm		Borya
Briza maxima	+	<1 %	10-20cm		
Bromus diandrus	+	<1 %	10cm	JT2-22	Bromus
Caesia (Moora hairy stem)	+	<1 %	10 cm	=JT5-53	Revisit.
Caladenia flava subsp. flava	+	<1 %	12 cm	=CH10-56	Revisit. Hairy leaf orchid
Calytrix leschenaultii	+	<1 %	30cm		Calytrix
Chamaescilla corymbosa var. corymbosa	+	<1 %	5cm	JT2-2	Chamaescilla
Cheilanthes adiantoides	>1%	1-5%	8-15cm		Cheilanthes
Comesperma volubile	+	<1 %	15cm		Com. volubile (juv)
Crassula colorata var. colorata	+	<1 %	5cm	JT2-19	Crassula colorata
Crassula decumbens var. decumbens	+	<1 %	3cm	JT2-20	Crassula
Cyanicula deformis	+	<1 %	12 cm	=CH12-57	Revisit. Blue beard orchid
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1 cm	JT2-51	Revisit. Flat base
Drosera macrantha subsp. macrantha	+	<1 %	10cm	JT2-7,52	Also JT2-54 in 30x30.
Ehrharta longiflora	+	<1 %	10-30cm		

Elythranthera brunonis	+	<1 %	12cm	JT2-21	Orchid
Galium murale	+	<1 %	25cm	JT2-5	Galium
Goodenia berardiana	+	<1 %	10-15cm	JT2-18	Goodenia
Haemodorum simulans	+	<1 %	5cm	JT2-14,29	Also recorded in 30x30. Haemodorum
Hypochaeris glabra	+	<1 %	1-5cm		
Hypoxis occidentalis var. occidentalis	3-5%	<1 %	10cm	JT2-11,50	?Hypoxis
Neurachne alopecuroidea	+	<1 %	5-10cm	JT2-3	Neurachne
Opercularia vaginata	5	5-10%	10-30cm	JT2-1	Opercularia
Parentucellia latifolia	+	<1 %	8cm		Parentucellia
Phyllangium sulcatum	+	<1 %	5cm	JT2-6	"Mitrasacme"
Podolepis lessonii	+	<1 %	10-25cm		Podolepis (button)
Poranthera microphylla	+	<1 %	1cm		Monotaxis
Rhodanthe laevis	+	<1 %	10cm	JT2-8	Asteraceae
Romulea rosea	+	<1 %	12cm		Romulea rosea
Schoenus clandestinus	+	<1 %	5cm	JT2-13	Schoenus
Thysanotus manglesianus	+	<1 %	30 cm	JT2-53,28	Also recorded in 30x30. Revisit. Climber
Trachymene cyanopetala	+	<1 %	5-15cm	JT2-4	Trachymene
Trachymene ornata	+	<1 %	7-12cm		
Trifolium subterraneum	+	<1 %	1 cm	=JT5-52	Revisit. Clover
Ursinia anthemoides	+	<1 %	8-12cm		
Vulpia myuros var. hirsuta	+	<1 %	10-20cm	JT2-10,15	Poaceae
Xanthorrhoea drummondii	+	<1 %			long dead
Burchardia umbellata	+	<1 %	20cm		Burchardia
Calandrinia eremaea	+	<1 %	5-8cm	JT2-25	Calandrinia
Desmocladus flexuosus	+	<1 %	10cm		Desmocladus
Hibbertia subvaginata	+	<1 %	60cm		
Hyalosperma cotula	+	<1 %	8-10cm	JT2-23	Rhodanthe
Kunzea praestans	+	<1 %	(0.4)2.2m		
Melaleuca calyptroides	+	<1 %	1.5m	=JT1	Melaleuca
Petrorhagia prolifera	+	<1 %	20cm		"pink"
Stackhousia monogyna	+	<1 %	40cm	JT2-24	Stackhousia
Stylidium septentrionale	+	<1 %	5cm	=CH8	Stylidium
Stypandra glauca	+	<1 %	20cm		
Thysanotus multiflorus	+	<1 %	25cm	JT2-27	Thysanotus
Waitzia nitida	+	<1 %	20cm	JT2-26	Waitzia

Moora **Site** JT003

Described by BRM **Date** 10/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Ridge in John Tonkins
MGA Zone 50 408919 **m E** 6625718 **m N** -30.497256 **S lat** 116.050897 **E long**
Habitat: Top of broad crest of a low chert ridge, gently sloping and north-west facing.
Soil: Pebbly, cobbly, brown loamy sand amongst chert sheet rock.
Rock Type: Chert.
Vegetation: Kunzea praestans, (Dryandra sessilis var. sessilis, Xanthorrhoea drummondii) high shrubland over Melaleuca calyptroides open shrubland over Hibbertia subvaginata low shrubland over Desmocladus flexuosus, Stylidium septentrionale scattered sedges and herbs.
Vegetation condition: Very good (some weeds).
Fire age: Not burnt for more than 5 to 10 years.
Notes: Datum: WGS84. 1st coord is for SE peg; 2nd coord is for NW peg.
Species List:

Name	**Cover**	**C Class**	**Height**	**Specimen**	**Notes**
Acacia aristulata	+	<1 %	(10)40cm	JT3-9	Acacia aristulata
Arctotheca calendula	+	<1 %	10cm		*Capeweed
Austrostipa nitida	+	<1 %	30cm	JT3-4	Austrostipa
Avena barbata	+	<1 %	35cm		
Briza maxima	+	<1 %	25cm		
Burchardia umbellata	+	<1 %	15cm	JT3-53	Revisit.
Caladenia denticulata	+	<1 %	12cm	=JT6-56	Revisit. ?
Caladenia flava subsp. flava	+	<1 %	10cm	=JT8-55	Revisit. Hairy leaf orchid (?flava)
Calandrinia sp. Blackberry	+	<1 %	10cm	JT3-10	
Calytrix leschenaultii	+	<1 %	60cm	=JT1-3	Calytrix
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	=JT5-55	Revisit. Lilly
Cheilanthes adiantoides	+	<1 %	15cm	JT3-25	Cheilanthes

Comesperma integerrimum	+	<1 %	35cm	JT3-2,12	Also JT3-54. Straggly shrub.
Crassula colorata var. colorata	+	<1 %	1-2cm	JT3-51	Revisit.
Cristonia biloba	+	<1 %	25cm	JT3-15	pea
Desmocladus flexuosus	+	<1 %	15cm	JT3-1	Desmocladus
Dichopogon capillipes	+	<1 %	5cm	=JT9-51	Revisit. Flat
Drosera aff. macrantha	+	<1 %	30cm	JT3-11,52	Drosera
Dryandra sessilis var. sessilis	4%	1-5%	3.5m	JT3-3	Dryandra sessilis
Hibbertia subvaginata	10-15	10-25%	80cm		
Hypochaeris glabra	1-2	1-5%	20cm	JT3-58	*Sonchus
Kunzea praestans	10-15	10-25%	2.5m		
Lomandra (Moora twisty)	+	<1 %	30cm	JT3-14	Lomandra
Melaleuca calyptroides	5	5-10%	1.8m	=JT1-1	Melaleuca
Neurachne alopecuroidea	+	<1 %	30cm	=ER17-1	Neurachne
Parentucellia latifolia	+	<1 %	10cm		Parentucellia
Pentaschistis pallida	5	5-10%		JT3-8	Pentaschistis
Podolepis lessonii	+	<1 %	15cm	JT3-6	Podolepis lessonii
Podotheca gnaphalioides	+	<1 %	10cm	JT3-5	Podotheca
Pterostylis sanguinea	+	<1 %	12cm	=JT10-54	Also JT3-56, 57 in 30x30. Revisit. Blue beard orchid
Scaevola phlebopetala	+	<1 %	10cm	JT3-7	Goodeniaceae
Silene gallica var. gallica	+	<1 %		=JT1-17	*?Silene
Stylidium cordifolium	+	<1 %	15cm	JT3-16	
Stylidium repens	2	1-5%	10cm	=JT1-30	Stylidium
Stylidium septentrionale	+	<1 %	10cm	=CH9-4	Stylidium
Thysanotus manglesianus	+	<1 %	35cm	=JT1-2	Thysanotus
Trachymene cyanopetala	+	<1 %	5cm	JT3-13	Trachymene
Trifolium hirtum	+	<1 %	10cm	=JT1-14	Trifolium (pink heads)
Tripteris clandestina	+	<1 %	25cm	JT3-50	Revisit. Stink daisy
Ursinia anthemoides	1-2	1-5%	25cm		
Vulpia myuros var. hirsuta	1	<1 %	15cm	=CH7-20	Grass (cyl head)
Xanthorrhoea drummondii	1	<1 %	2.2m		
Acacia hemiteles	+	<1 %	1.1m	JT3-22	Acacia
Allocasuarina campestris	+	<1 %	2.5m		
Astroloma serratifolium	+	<1 %	10cm	JT3-19	Astroloma
Austrodanthonia setacea	+	<1 %	30cm	JT3-20	Austrodanthonia
Austrostipa variabilis	+	<1 %	35cm	JT3-24	Austrostipa
Cheilanthes distans	+	<1 %	10cm	JT3-18	Cheilanthes #2 (hairy)
Cyanicula gemmata	+	<1 %	3cm	JT3-55	Revisit. (=JT6-54) Hairy spade leaf orchid (West border of 10x10+ a few beyond)
Diplopeltis huegelii subsp. lehmannii	+	<1 %	20cm	JT3-23	
Diuris aff. recurva	+	<1 %	20cm	=JT7-58	Revisit.
Dryandra fraseri	+	<1 %	40cm	JT3-21	Dryandra (small upright rounded shrub)
Ehrharta longiflora	+	<1 %	30cm		
Erodium botrys	+	<1 %	15cm	=JT1-9	?Geraniaceae
Millotia myosotidifolia	+	<1 %	10cm	JT3-17,26	Daisy
Pityrodia dilatata	+	<1 %	12cm		Revisit. Pityrodia (common)

Moora **Site** JT004

Described by BRM **Date** 10/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: John Tonkin's property, between Coomberdale East Rd and Kiaka Rd, on west side adjacent to Arthur and Rhonda Tonkin's property.
MGA Zone 50 408852 **m E** 6625867 **m N** -30.495907 **S lat** 116.050212 **E long**
Habitat: Gentle, northwest-facing, mid to lower slope on a ridge system.
Soil: Gravelly, pebbly (and some small cobbles) light grey silty sand.
Vegetation: Allocasuarina huegeliana scattered low trees over Kunzea praestans, Xanthorrhoea drummondii high open shrubland to high shrubland over Melaleuca calyptroides open heath over Stylidium septentrionale, Desmocladus flexuosus low open herb/sedgeland.
Vegetation condition: Very good to excellent.
Fire age: Not burnt for more than 10 years.
Notes: Datum: WGS84. 1st coord is for NW peg; 2nd coord is for se peg. Pterostylis orchid present (too far deteriorated for ID).
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Aira caryophyllea	+	<1 %	8-10cm	=JT2-12	*Aira
Allocasuarina huegeliana	1-2%	1-5%	2-7m		
Allocasuarina sp.	+	<1 %	1.8 m		Revisit. ?congestaes
Apium annuum	+	<1 %	3cm	JT4-11	Apium
Arctotheca calendula	+	<1 %	5cm		Capeweed
Austrostipa elegantissima	+	<1 %	30cm	JT4-17	Austrostipa elegantissima
Austrostipa trichophylla	+	<1 %	8cm	JT4-18A	Austrostipa
Borya sphaerocephala	+	<1 %	3cm		Borya
Briza maxima	+	<1 %	5cm		
Bromus diandrus	+	<1 %	5cm	=JT2	Bromus
Caesia (Moora hairy stem)	+	<1 %	20 cm	JT4-51,53	Revisit. Herb
Caladenia denticulata	+	<1 %	6 cm	=JT6-56	Revisit. ?
Calytrix leschenaultii	+	<1 %	1m	JT4-3	Calytrix
Chamaescilla corymbosa var. corymbosa	+	<1 %	5cm	=JT2	Chamaescilla
Crassula colorata var. colorata	+	<1 %	3cm	=JT2-19	Crassula colorata
Desmocladus flexuosus	<=2%	1-5%	20cm	JT4-7	Desmocladus
Drosera aff. macrantha	+	<1 %	15 cm	JT4-52	Revisit. Climbing
Drosera macrantha subsp. macrantha	+	<1 %	20cm	JT4-6	Drosera
Genus sp.	+	<1 %	3-5cm	JT4-12	Asteraceae
Genus sp.	+	<1 %	10cm	=JT2	
Hibbertia subvaginata	+	<1 %	1m	JT4-4	
Homalosciadium homalocarpum	+	<1 %	3cm	JT4-10B	
Hypochaeris glabra	+	<1 %	5cm		
Kunzea praestans	+/-10%	5-10%	2-3.5m		
Laxmannia ramosa subsp. ramosa	+	<1 %	8cm	JT4-16	Lilly
Levenhookia stipitata	+	<1 %	3cm	JT4-10	Levenhookia
Melaleuca calyptroides	45%	33.3-50%	0.8-1.4m	JT4-1	Melaleuca
Millotia tenuifolia var. tenuifolia	+	<1 %	3cm	JT4-13,10	Millotia
Neurachne alopecuroidea	+	<1 %	10cm	JT4-9	Neurachne
Paracaleana carinata	+	<1 %	3-5cm		Parentucellia
Pentaschistis sp. Moora (doubtful ID)	+	<1 %	10cm	JT4-8	Poaceae
Phyllangium sulcatum	+	<1 %	8cm	JT4-15	"Mitrasacme"
Podolepis lessonii	+	<1 %	10-20cm		Podolepis (button)
Podotheca angustifolia	+	<1 %	5cm	JT4-5	Podotheca
Stylidium repens	+	<1 %	5cm	JT4-14	Stylidium repens
Stylidium septentrionale	+/-10%	5-10%	5-8cm	JT4-2	Stylidium
Thysanotus manglesianus	+	<1 %	20 cm	JT4-50	Revisit. Small
Trachymene cyanopetala	+	<1 %	5cm	=JT2-4	Trachymene
Trachymene ornata	+	<1 %	10cm		
Trachymene pilosa	+	<1 %	5cm		
Ursinia anthemoides	+	<1 %	8-15cm		
Vulpia myuros var. hirsuta	+	<1 %	10cm		
Wahlenbergia gracilenta	+	<1 %	10cm	JT4-19	Wahlenbergia
Xanthorrhoea drummondii	1	<1 %	2m		
Acacia acuminata subsp. acuminata	+	<1 %	4cm		
Caladenia flava subsp. flava	+	<1 %	3 cm	=JT8-55	Revisit. Hairy leaf ?flava
Cheilanthes adiantoides	+	<1 %	10cm		Cheilanthes
Cyanicula deformis	+	<1 %	6 cm	=JT8-54	Revisit. Blue beard orchid
Cyanicula gemmata	+	<1 %	3 cm	=JT3-55	Revisit. 1 x Hairy spade leaf Orchid (+ 1 0n south side) (SW
Dichopogon capillipes	+	<1 %	10cm		Dichopogon
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	2 cm	JT4-54	Revisit. Flat leaf base
Pterostylis recurva	+	<1 %	12 cm	JT4-56	Revisit. (No flower. With flat base Pterostylis)
Pterostylis sanguinea	+	<1 %	1 cm	=JT4-55	Revisit. Flat base
Silene gallica var. gallica	+	<1 %	15cm		Silene

Moora **Site** JT005
Described by BRM **Date** 10/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: John Tonkin's property, about 60m downslope of JT2
MGA Zone 50 408906 **m E** 6626039 **m N** -30.494359 **S lat** 116.05079 **E long**
Habitat: Mid-slope of gentle south-facing slope on low ridge.

Soil: Gravelly, pebbly, cobbly brown loamy sand amongst exposed sheet rock. Rock covers about 15-20% of surface.
Rock Type: Chert.
Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low woodland to low open forest over Allocasuarina campestris scattered tall shrubs to high open shrubland over Podolepis lessonii, Trachymene ornata open annual herbland.
Vegetation condition: Good to very good. (Some weeds).
Fire age: Not burnt for more than 10years.
Notes: Datum: WGS84. 1st coord for NE peg; 2nd coord for SW peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	5	5-10%	7-8m		
Aira caryophyllea	+	<1 %	15cm	JT5-1	*Pentaschistis
Allocasuarina campestris	5	5-10%	3m		
Allocasuarina huegeliana	15-20%	10-25%	7m		
Arctotheca calendula	+	<1 %	10cm		*Capeweed
Austrodanthonia acerosa	+	<1 %	20cm	JT5-6	Austrodanthonia
Austrostipa nitida	+	<1 %	30cm	JT5-7,15	Also recorded in 30x30.
Avena barbata	+	<1 %	35cm		
Bromus diandrus	+	<1 %	20cm		*Bromus
Caesia (Moora hairy stem)	+	<1 %	20cm	JT5-12,53	Lilly
Calytrix leschenaultii	+	<1 %	50cm	=JT1-3	Calytrix leschenaultii (purple)
Chamaescilla corymbosa var. corymbosa	+	<1 %	20cm	=CH9-13	Chamaescilla
Cheilanthes adiantoides	+	<1 %		=JT3-25	Cheilanthes
Crassula colorata var. colorata	+	<1 %	3cm	JT5-2	Crassula #1
Crassula exserta	+	<1 %	3cm	JT5-3	Crassula #3
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1cm	JT5-51	Revisit. Flat
Drosera macrantha subsp. macrantha	+	<1 %	30cm	JT5-54	Revisit. Climber
Ehrharta longiflora	+	<1 %	20cm		
Haemodorum simulans	+	<1 %	20cm	JT5-10	Haemodorum ID?
Hypochaeris glabra	+	<1 %	35cm	JT5-13	*Sonchus
Hypoxis occidentalis var. occidentalis				=GH9-50	Revisit.
Millotia tenuifolia var. tenuifolia	+	<1 %	10cm	JT5-8A	?Daisy
Neurachne alopecuroidea	+	<1 %	4cm	=ER17-1	Neurachne
Parentucellia latifolia	+	<1 %	4cm		*Parentucellia
Petrorhagia prolifera	+	<1 %	30cm	=JT1-13	Wahlenbergia (single pink flower)
Phyllangium sulcatum	+	<1 %	10cm	JT5-4	
Platysace cirrosa	+	<1 %	10cm	JT5-18	
Podolepis lessonii	5-10%	5-10%	20cm	=JT3-6	Podolepis lessonii
Rhodanthe laevis	+	<1 %	15cm	JT5-11	
Schoenus clandestinus	+	<1 %	3cm	JT5-9	Schoenus
Trachymene cyanopetala	+	<1 %	4cm	JT5-5	Trachymene
Trachymene ornata	3-5	1-5%	20cm	=CH7-9	Trachymene white top
Trifolium hirtum	+	<1 %	2cm	JT5-52	Revisit. Clover
Tripteris clandestina	+	<1 %	35cm	JT5-14	Daisy
Ursinia anthemoides	+	<1 %	15cm		
Vulpia myuros var. hirsuta	+	<1 %	15cm	=CH7-20	Grass (cyl heads)
Xanthorrhoea drummondii	+	<1 %	2.5m		
Borya sphaerocephala	+	<1 %	2cm		Revisit.
Briza maxima	+	<1 %	20cm		
Desmocladus flexuosus	+	<1 %	15cm		
Dichopogon capillipes	+	<1 %	10cm	=JT1-12	Dichopogon
Kunzea praestans	+	<1 %	2m		
Opercularia vaginata	+	<1 %	20cm	JT1-34	Opercularia
Pterostylis sp.	+	<1 %	4cm	JT5-56	Revisit
Silene gallica var. gallica	+	<1 %	20cm	JT1-17	?*Silene
Stackhousia monogyna	+	<1 %	35cm	JT5-17	Stackhousia
Stylidium septentrionale	+	<1 %	10cm	JT5-16	Stylidium
Thysanotus manglesianus	+	<1 %	20cm	=GH6-52	Revisit.

Moora **Site** JT006
Described by MET **Date** 11/10/02 **Type:** QUADRAT 10x10 m, 30x30

Location: South-western corner of John Tonkin's property about 25m from boundary fence.
MGA Zone 50 409009 **m E** 6625325 **m N** -30.500809 **S lat** 116.051801 **E long**
Habitat: Gentle slope just below the crest of a low ridge, facing slightly westerly.
Soil: Light grey-brown gravelly, pebbly silty sand with cobbles frequent on the surface.
Vegetation: Acacia acuminata subsp. acuminata, Allocasuarina huegeliana scattered low trees to low open woodland over Allocasuarina campestris open to closed scrub over Cheilanthes adiantoides, Dichopogon capillipes, Stylidium septentrionale open fern/herbland.
Vegetation condition: Very good. Low weed invasion, but significant fire damage (death of Acacia acuminata, Xanthorrhoea drummondii).
Notes: Datum: WGS84. Only 3 pegs. 1st coord is for SW peg, 2nd coord is for NW peg; 3rd coord is for NE peg. 30x30m search avoided the area to the north-east, as more open and more rocky.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	>5%	5-10%	2.5-3.5m		6 dead
Aira caryophyllea	+	<1 %		JT6-12B	
Allocasuarina campestris	80%	>75%	(1.7)2-3.4 m		
Avena barbata	+	<1 %	45cm		
Briza maxima	+	<1 %	10-20cm		
Burchardia umbellata	+	<1 %	40cm	JT6-14	Burchardia
Caladenia denticulata	+	<1 %	20 cm	JT6-56	Revisit. ?
Caladenia flava subsp. flava	+	<1 %	3 cm	=CH10-56	Revisit. Hairy leaf orchid
Chamaescilla corymbosa var. corymbosa	+	<1 %	15 cm	JT6-18	Also recorded in 30x30. Also =JT5-55. Revisit. Lilly
Cheilanthes adiantoides	>2	1-5%	10-15cm		Cheilanthes
Crassula colorata var. colorata	+	<1 %	3cm		
Cyanicula deformis	+	<1 %	15 cm	=CH12-57	Revisit. Blue beard orchid
Cyanicula gemmata	+	<1 %	1 cm	JT6-54	Revisit. Hairy spade leaf orchid - 3 near SW peg)
Desmocladus flexuosus	+	<1 %	30cm		Desmocladus
Dichopogon capillipes	+/- 1%		20 cm	JT6-8,50	Revisit.
Dioscorea hastifolia	+	<1 %	15cm		
Drosera aff. macrantha	+	<1 %	20-60 cm	=JT6-52	Revisit. Climbing
Drosera macrantha subsp. macrantha	+	<1 %	30cm	JT6-1,17	Drosera
Ehrharta longiflora	+	<1 %	40cm		
Hypochaeris glabra	+	<1 %	5cm		
Hypoxis occidentalis var. occidentalis	+	<1 %	15 cm	=JT2-50	Revisit.
Neurachne alopecuroidea	+	<1 %	10cm	JT6-4	Neurachne
Pentaschistis pallida	+	<1 %	5-10cm	JT6-12A	Aira
Pentaschistis sp. Moora (doubtful ID)	+	<1 %	8-15cm	JT6-9	Poaceae
Petrorhagia prolifera	+	<1 %	10cm		"pink"
Podolepis lessonii	+	<1 %	10cm		Podolepis (button)
Rhodanthe laevis	+	<1 %	4cm	JT6-15	Daisy
Schoenia cassiniana	+	<1 %	5cm		Daisy (pink & white)
Schoenus clandestinus	+	<1 %	8cm	JT6-5,57	Schoenus
Silene gallica var. gallica	+	<1 %	15cm	JT6-10	*Silene
Stylidium septentrionale	2%	1-5%	10cm	JT6-2,51	Stylidium
Stypandra glauca	+	<1 %	20cm	JT6-13	Stypandra glauca
Thysanotus manglesianus	+	<1 %	60 cm	=JT2-53	Also JT6-11 in 30x30. Revisit. Climbing
Trachymene cyanopetala	+	<1 %	5cm	JT6-6	?Trachymene
Trachymene ornata	+	<1 %	5cm		
Trachymene pilosa	+	<1 %	8cm		
Trifolium hirtum	+	<1 %	1 cm	=JT5	Revisit. Clover
Tripteris clandestina	+	<1 %	20cm	JT6-7	Daisy
Ursinia anthemoides	+	<1 %	10-25cm		
Vulpia myuros var. hirsuta	+	<1 %	10-15cm	JT6-3	Vulpia myuros
Xanthorrhoea drummondii	2	1-5%	2.1m		
Acacia congesta subsp. congesta	+	<1 %	2.2m		Acacia 'not aristulata'
Arctotheca calendula	+	<1 %	5cm		
Borya sphaerocephala	+	<1 %	2 cm		Revisit. (Near SW peg)
Calytrix leschenaultii	+	<1 %	50cm		Calytrix (blue)
Drosera macrophylla subsp. macrophylla	+	<1 %	2 cm	JT6-58	Revisit. Flat base
Dryandra sessilis var. sessilis	+	<1 %	4m		Dryandra sessilis

Kunzea praestans	+	<1 %	2.4m		
Melaleuca sp.	+	<1 %	1.4m		Melaleuca
Pterostylis sanguinea	+	<1 %	12 cm	=CH10-51	Revisit. Flat leaf base (Western edge of 30x30)
Waitzia nitida	+	<1 %	15cm	JT6-19	Waitzia
Wurmbea drummondii	+	<1 %	5 cm	JT6-55	Revisit.

Moora Site JT007

Described by BRM **Date** 11/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Southern most ridge on John Tonkin's property. Gravel pit and Ridgeway's property to south.
MGA Zone 50 409060 **m E** 6625331 **m N** -30.500759 **S lat** 116.052332 **E long**
Habitat: Gentle upper-mid slope, east-facing, on low ridge.
Soil: Gravelly, pebbly, Cobbly brown loamy sand. Soil skeletal amongst rocks and exposed sheet rock.
Rock Type: Chert.
Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Kunzea praestans, (Dryandra sessilis) scattered tall shrubs over Melaleuca calyptroides, (Allocasuarina campestris) open heath over Calytrix leschenaultii low open shrubland over Desmocladus flexuosa, Stylidium septentrionale scattered sedges and herbs.
Vegetation condition: Very good to excellent.
Fire age: Not burnt for more than 7 to 10 years.
Notes: Datum: WGS84. 1st coord is for SW peg; 2nd coord is for NE peg. Nemcia 10m from NW peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	+	<1 %	2.0m		
Aira caryophyllea	+	<1 %		JT7-10B	
Allocasuarina campestris	+	<1 %	1.8m		
Allocasuarina huegeliana	+	<1 %	2.5m		
Arctotheca calendula	+	<1 %	10cm		Capeweed
Avena barbata	+	<1 %	35cm		
Briza maxima	+	<1 %	20cm		
Burchardia umbellata	+	<1 %	20cm		Burchardia
Caladenia flava subsp. flava	+	<1 %	3cm	JT7-52	Revisit. (?=CH10-56) Hairy leaf orchid
Calothamnus sanguineus	+	<1 %	35cm	JT7-15	Calothamnus
Calytrix leschenaultii	5-8%	5-10%	90cm	JT7-1	Calytrix
Chamaescilla corymbosa var. corymbosa	+	<1 %	12cm	=CH12-52	Revisit. Lilly
Cheilanthes adiantoides	+	<1 %	10cm	=JT3-25	Cheilanthes
Crassula colorata var. colorata	+	<1 %	3cm	JT7-14	Crassula
Cyanicula deformis	+	<1 %	12cm	=CH12-57	Revisit. Blue beard orchid
Desmocladus flexuosus	1	<1 %	20cm	JT7-5	Desmocladus flexuosa
Dichopogon capillipes	+	<1 %	20cm	JT7-7,51	Dichopogon
Diplopeltis huegelii subsp. lehmannii	+	<1 %	30cm	JT7-4	Diplopeltis
Drosera aff. macrantha	+	<1 %	20cm	JT7-6,53	Also JT7-54, JT7-60 (30x30). Drosera (climber).
Dryandra sessilis var. sessilis	+	<1 %	2cm		Dryandra sessilis
Hibbertia subvaginata	+	<1 %	20cm		
Hypochaeris glabra	+	<1 %	20cm	=JT1-10	*Sonchus
Kunzea praestans	1-2%	1-5%	2-2.2m		
Lomandra (Moora twisty)	+	<1 %	20cm	JT7-16	Lomandra
Melaleuca calyptroides	60-70%	50-75%	1.2m	JT7-3	Melaleuca
Neurachne alopecuroidea	+	<1 %	10cm	=ER17-1	Neurachne
Parentucellia latifolia	+	<1 %	10cm		Parentucellia
Pentaschistis pallida	+	<1 %	10cm	JT7-10A	*Pentaschistis
Podolepis lessonii	+	<1 %	20cm	=JT3-6	Podolepis lessonii
Podotheca angustifolia	+	<1 %	10cm	JT7-13	Podotheca
Pterostylis setulosa	+	<1 %	12cm	JT7-56	Revisit. Flat leaf
Silene gallica var. gallica	+	<1 %	25cm	=JT1-17	?Silene
Stylidium repens	1	<1 %	10cm	=JT1-30	Stylidium
Stylidium septentrionale	1	<1 %	10cm	JT7-2	Stylidium (pink)
Thysanotus manglesianus	+	<1 %	30cm	JT7-9,55	Also JT7-59. Thysanotus
Trachymene cyanopetala	+	<1 %	10cm	JT7-12	Trachymene hairy
Trachymene ornata	+	<1 %	10cm	JT7-11	Trachymene white heads
Trachymene pilosa	+	<1 %	4cm	JT7-8	Trachymene (short hairs)

Trifolium hirtum	+	<1 %	10cm	=JT1-14	*Trifolium (pink head)
Ursinia anthemoides	+	<1 %	30cm		
Vulpia myuros var. hirsuta	+	<1 %	15cm	=CH7-20	Grass (cylinder heads)
Acacia hemiteles	+	<1 %	1.1m	JT7-17	Acacia
Astroloma serratifolium	+	<1 %	10cm	JT7-61	Revisit.
Nemcia acuta	+	<1 %	30cm	JT7-19	Nemcia
Opercularia vaginata	+	<1 %	25cm	=CH9-31	Opercularia
Pityrodia dilatata	+	<1 %	30cm	JT7-18	Pityrodia
Urospermum picroides	+	<1 %		JT7-20	*Sonchus
Xanthorrhoea drummondii	+	<1 %	1.8m		

Moora Site JT008

Described by MET **Date** 11/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: John Tonkin's property, 200m north-NE of the SW corner.
MGA Zone 50 408835 **m E** 6625542 **m N** -30.498838 **S lat** 116.050007 **E long**
Habitat: Mid to upper, south-west facing slope on ridge.
Soil: Gravelly, Pebbly grey silty sand amongst cobles and boulders.
Vegetation: Acacia acuminata subsp. acuminata, Allocasuarina huegeliana scattered low trees over Regelia megacephala, Kunzea praestans high shrubland over Melaleuca calyptroides shrubland over Desmocladus flexuosus scattered sedges and *Briza maxima, Podotheca angustifolia very open annual grass/herbland.
Vegetation condition: Very good. (Too weedy to be Excellent).
Notes: Datum: WGS84. 1st coord is for SW peg, 2nd coord is for NE peg and 3rd coord is for SE peg. No NW peg. Xanthorrhoea population seems to be declining rapidly. A few young (about 30cm high) Kunzea.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	<5%	1-5%	5m		
Acacia aristulata	+	<1 %	25cm		
Allocasuarina campestris	1	<1 %	1m		
Austrostipa nitida	+	<1 %	10cm	JT8-7	Austrostipa
Avena barbata	+	<1 %	20cm		
Briza maxima	>2	1-5%	2-25cm		
Bromus diandrus	+	<1 %	10-15cm	JT8-6	*Bromus
Burchardia umbellata	+	<1 %	25 cm	=GH9-52	Also JT8-12 (30x30). Revisit.
Caladenia denticulata	+	<1 %	10 cm	=JT6-56	Revisit. ?
Caladenia flava subsp. flava	+	<1 %	3 cm	JT8-55	Revisit. (?=CH10-56) Hairy leaf
Calandrinia calyptrata	+	<1 %	5cm	JT8-8	Calandrinia
Calytrix leschenaultii	1	<1 %	30-150cm		Calytrix (blue)
Chamaescilla corymbosa var. corymbosa	+	<1 %	5 cm	=JT5-55	Revisit. Lilly
Cheilanthes adiantoides	1	<1 %	10-15cm		Cheilanthes
Comesperma integerrimum	+	<1 %	45 cm	JT8-51	Revisit. ?volubile
Crassula colorata var. colorata	+	<1 %	3-5cm	JT8-60	
Cyanicula deformis	+	<1 %	12 cm	JT8-54	Revisit. (?=CH12-57)
Desmocladus flexuosus	1	<1 %	15-30cm		Desmocladus
Dichopogon capillipes	+	<1 %	10cm	=JT6	Dichopogon
Dioscorea hastifolia	+	<1 %	1.2m		
Diuris aff. recurva	+	<1 %	25 cm	=JT7-58	Revisit.
Drosera aff. macrantha	+	<1 %	15cm	JT8-10,56	Also recorded in 30x30.
Ehrharta longiflora	+	<1 %	25cm		
Erodium botrys	+	<1 %	5cm	JT8-2	Erodium
Genus sp.	+	<1 %	5cm		Clover(yellow)
Genus sp.	+	<1 %	10cm		Clover (pink)
Hibbertia subvaginata	+	<1 %	65cm		
Hypochaeris glabra	>1	1-5%	3cm		
Kunzea praestans	10-15	10-25%	(1.2)2.5-4m		
Melaleuca calyptroides	25	25-33.3%	1.5-1.8m	JT8-1	Melaleuca
Neurachne alopecuroidea	+	<1 %	10cm	=JT6	Neurachne
Olearia dampieri subsp. eremicola	1	<1 %	10cm	JT8-4	Olearia aff. axillaris
Parentucellia latifolia	+	<1 %	5cm		Parentucellia
Pentaschistis pallida	+	<1 %	5-10cm	=JT6	Aira
Petrorhagia prolifera	+	<1 %	10-15cm		"pink"

Podolepis lessonii	1	<1 %	5-10cm		Podolepis (button)
Podotheca angustifolia	+	<1 %	3cm	=JT4	Podotheca
Pterostylis setulosa	+	<1 %	12 cm	JT8-59	Revisit. (?CH10-51) Flat leaf base
Regelia megacephala	15-20%	10-25%	4-5m		
Silene gallica var. gallica	+	<1 %	10-15cm	=JT6	*Silene
Stylidium repens	+	<1 %	8cm	JT8-9	Stylidium ?repens
Stylidium septentrionale	<=1%	1-5%	8cm	=JT6	Stylidium
Thysanotus manglesianus	+	<1 %	30-200cm	JT8-3,52	Also JT8-53. Thysanotus
Trifolium hirtum	+	<1 %	2 cm	=JT6	Revisit. Clover
Urospermum picroides	+	<1 %	10cm	JT8-5	Asteraceae
Ursinia anthemoides	>1	1-5%	10-25cm		
Vulpia myuros var. hirsuta	+	<1 %	10cm		
Xanthorrhoea drummondii	2	1-5%	1.6m		
Allocasuarina huegeliana	+	<1 %	4 m		Revisit.
Austrostipa scabra	+	<1 %	35cm	JT8-11	Poaceae
Austrostipa variabilis	+	<1 %		JT8-SN	
Caesia (Moora hairy stem)	+	<1 %	20 cm	JT8-57	Revisit.
Calothamnus aff. quadrifidus Moora-Watheroo	+	<1 %	2m		Calothamnus
Comesperma volubile	+	<1 %	70cm		
Daviesia dielsii	+	<1 %	1.2m		(Rare). 2m across
Dryandra sessilis var. sessilis	+	<1 %	3.5 m		Revisit.
Nemcia acuta	+	<1 %	30 cm	JT08-58	Revisit.
Stylidium caricifolium	+	<1 %	20cm	JT8-13	Stylidium(8-13) was found 5m west of SW peg. See detailed description in field notes.
Stypandra glauca	+	<1 %	10cm		

Moora Site JT009

Described by BRM **Date** 11/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: John Tonkin's ridge, several hundred meters north of Ridgeway's fence line and just east of Arthur & Rhonda Tonkin's fence line.
MGA Zone 50 408850 **m E** 6625476 **m N** -30.499434 **S lat** 116.050157 **E long**
Habitat: North-facing, gently sloping mid-slope of low chert ridge.
Soil: Skeletal cobbly, pebbly, gravelly brown loamy sand amongst exposed sheet rock and boulders.
Rock Type: Chert.
Vegetation: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris, (Calothamnus aff. quadrifidus Moora-Watheroo) open scrub over Neurachne alopecuroidea, Desmocladus flexuosus, Stylidium septentrionale scattered grasses, sedges and
Vegetation condition: Very good. Some weeds (low cover).
Fire age: Not burnt for more than 5 to 10 years.
Notes: Datum: WGS84. 1st coord is for NE peg; 2nd coord is for SW peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	+	<1 %	2m		
Allocasuarina campestris	40%	33.3-50%	2.5m		
Allocasuarina huegeliana	+	<1 %	3.5m		
Arctotheca calendula	+	<1 %	10cm	JT9-16	
Austrodanthonia acerosa	+	<1 %	10cm	JT9-9	Austrodanthonia
Avena barbata	+	<1 %	30cm		
Borya sphaerocephala	+	<1 %	10cm		Borya
Briza maxima	+	<1 %	20cm		
Bromus diandrus	+	<1 %	20cm	JT9-15	*Bromus
Calandrinia calyptrata	+	<1 %	10cm	JT9-14	Calandrinia
Calothamnus aff. quadrifidus Moora-Watheroo	3-4%	1-5%	2.5(4)m	JT9-1	Calothamnus quadrifidus
Chamaescilla corymbosa var. corymbosa	+	<1 %	6cm	=JT5-55	Revisit. Lilly
Cheilanthes adiantoides	+	<1 %	15cm	=JT3-25	Cheilanthes (not hairy)
Crassula colorata var. colorata	+	<1 %	4cm	JT9-13	Crassula
Cyanicula deformis	+	<1 %	12cm	=CH12-57	Revisit. Blue beard orchid
Daviesia dielsii	+	<1 %	1.8m	JT9-3	1 shrub
Desmocladus flexuosus	+	<1 %	20cm	=JT7-5	Desmocladus flexuosus
Dichopogon capillipes	+	<1 %	12cm	JT9-50,51	Revisit.
Diuris aff. recurva	+	<1 %	30cm	=JT7-58	Revisit. Orchid
Drosera macrantha subsp. macrantha	+	<1 %	35cm	JT9-52	Revisit. Climber
Ehrharta longiflora	+	<1 %	35cm		

Erodium botrys	+	<1 %	4cm	JT9-8	?Geraniaceae pink flr
Haemodorum paniculatum	+	<1 %	40cm	JT9-10	Lomandra
Hypochaeris glabra	+	<1 %	10cm	=JT1-10	*Sonchus
Hypoxis occidentalis var. occidentalis	+	<1 %	12cm	=JT2	Revisit.
Kunzea praestans	+	<1 %	4cm		
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	30cm	JT9-6	Lepidosperma
Melaleuca calyptroides	+	<1 %	1.6m	=JT7-3	Melaleuca
Neurachne alopecuroidea	+	<1 %	10cm	JT9-2	Neurachne
Opercularia vaginata	+	<1 %	10cm	=CH9-31	Opercularia
Pentaschistis pallida	+	<1 %	15cm	=JT7-10	Pentaschistis
Petrorhagia prolifera	+	<1 %	25cm	=JT1-13	?Wahlenbergia (single pink flr
Platysace cirrosa	+	<1 %	20cm	JT9-11,55	
Podolepis lessonii	+	<1 %	20cm	=JT3-6	Podolepis lessonii
Schoenus clandestinus	+	<1 %	4cm	JT9-4	Schoenus
Silene gallica var. gallica	+	<1 %	20cm	JT9-12	*Silene
Stylidium septentrionale	+/-1	<1 %	10cm	JT7-2	Stylidium (pink)
Stypandra glauca	+	<1 %	30cm	JT9-5	Stypandra
Trachymene cyanopetala	+	<1 %	10cm	=JT7-12	Trachymene hairy
Trachymene ornata	herbs.	+	<1 %	10cm	=JT7-11
Trachymene white head					
Tripteris clandestina	+	<1 %	10cm	JT9-53,54	Revisit. Herb
Ursinia anthemoides	+	<1 %	30cm		
Vulpia myuros var. hirsuta	+	<1 %	20cm	JT9-7	Grass (cyl head)
Daviesia hakeoides subsp. subnuda	+	<1 %	35cm	JT9-17	Daviesia ?hakeoides
Drosera macrophylla subsp. macrophylla	+	<1 %	1cm	=JT6	Revisit. Flat - White flower
Genus sp.	+	<1 %	40cm		
Pterostylis sp.	+	<1 %	12cm	JT9-56	Revisit. Flat leaf
Waitzia nitida	+	<1 %	10cm	=ER15-8	Waitzia
Xanthorrhoea drummondii	+	<1 %	1.8m		

Moora Site JT010

Described by MET **Date** 11/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: John Tonkin's property, SW corner on second ridge from west
MGA Zone 50 409103 **m E** 6625844 **m N** -30.496133 **S lat** 116.052825 **E long**
Habitat: West facing moderate boulder/outcrop slope.
Soil: Gravelly, pebbly light grey silty sand amongst outcrop and boulders.
Vegetation: Acacia acuminata subsp. acuminata scattered low trees over Kunzea praestans high shrubland over Hibbertia subvaginata shrubland.
Vegetation condition: Poor to good. Too weedy for good.
Notes: Datum: WGS84. 1st coord is for NW peg; 2nd coord is for SE peg. Quite disturbed, but probably hasn't lost any strata. The Hibbertia probably has more cover now than before disturbance and the Kunzea less. The site includes some Actinostrobus individuals. There was just one small patch of these (6 plants).
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	+	<1 %	4m		Dead
Acacia aristulata	+	<1 %	10-20cm		6 plants
Actinostrobus arenarius	3%	1-5%	1.6-2.1m	JT10-1	Actinostrobus (see detailed description in field notes)
Arctotheca calendula	+	<1 %	5-10cm		
Austrostipa hemipogon	+	<1 %	40cm	JT10-5	
Avena barbata	1-2	1-5%	15-40cm		
Briza maxima	>2	1-5%	10-20cm		
Bromus diandrus	10	5-10%	15cm	=JT8	*Bromus
Burchardia umbellata	+	<1 %	30cm	=JT8-6	Burchardia
Caladenia flava subsp. flava	+	<1 %	2 cm	=CH10-56	Revisit. Hairy leaf (?flava)
Cheilanthes adiantoides	>2%	1-5%	10cm		Cheilanthes (austro)
Crassula colorata var. colorata	+	<1 %	2-6cm		
Crassula exserta	+	<1 %	5cm	JT10-3	Crassula
Desmocladus flexuosus	+	<1 %	10cm		
Dichopogon capillipes	+	<1 %	20 cm	JT10-51,5	Revisit. (+CH10-52)
Dioscorea hastifolia	+	<1 %	5-10cm		

Drosera macrantha subsp. macrantha	+	<1 %	20 cm	JT10-51	Revisit. Climber
Ehrharta longiflora	10	5-10%	10-40cm		
Erodium botrys	+	<1 %	8cm	JT10-2	
Genus sp.	+	<1 %	3cm		Clover(red/pink)
Hibbertia subvaginata	>20%	10-25%	(0.4)0.6-1.3m		
Hypochaeris glabra	5	5-10%	5cm		
Kunzea praestans	>=15%	10-25%	2-3.7m		
Neurachne alopecuroidea	+	<1 %	5-10cm	=JT6	*aira
Petrorhagia prolifera	+	<1 %	12cm		"pink"
Pleurosorus rutifolius	+	<1 %	7cm	JT10-4	fern
Podotheca gnaphalioides	+	<1 %	15cm	JT10-8	Podotheca
Pterostylis exserta (ms)	+	<1 %	15cm	JT10-6	Hood transparent between veins; veins brownish green dull.
Pterostylis sanguinea	+	<1 %	2 cm	JT10-54	Revisit. Flat leaf
Thysanotus manglesianus	+	<1 %	30 cm	=CH10-57	Revisit. Climber
Trachymene cyanopetala	+	<1 %	20 cm	=JT5-5	Revisit. Lilly
Trifolium hirtum	+	<1 %	2 cm	=JT5	Revisit. Clover
Tripteris clandestina	+	<1 %	45 cm	JT10-53	Revisit. Yellow daisy
Urospermum picroides	+	<1 %	5-20cm	JT10-7	Asteraceae
Ursinia anthemoides	2	1-5%	10-20cm		
Vulpia myuros var. hirsuta	>1	1-5%	10-20cm		
Caladenia denticulata	+	<1 %	20 cm	JT10-56	Revisit. Hairy - sheathing base leaf
Calytrix leschenaultii	+	<1 %	1m		Calytrix (blue)
Cyanicula deformis	+	<1 %	10 cm	=CH12-57	Revisit. Blue beard orchid
Melaleuca calyptroides	+	<1 %	1-1.6m	=JT8	Melaleuca
Muehlenbeckia adpressa	+	<1 %	70cm	JT10-9	
Nuytsia floribunda	+	<1 %	5m		
Pityrodia dilatata	+	<1 %	25cm		
Xanthorrhoea drummondii	+	<1 %	3.2m		

Moora Site JT011

Described by BRM **Date** 11/10/02 **Type:** QUADRAT 10x10 m, 30x30
Location: Main western ridge, John Tonkin's.
MGA Zone 50 408964 **m E** 6625740 **m N** -30.497061 **S lat** 116.051368 **E long**
Habitat: Flat crest of low chert ridge.
Soil: Gravelly, pebbly, cobbly brown loamy sand in matrix of exposed sheet rock.
Rock Type: Chert. Rock cover of surface about 40 to 50%.
Vegetation: Kunzea praestans high shrubland over Hibbertia subvaginata, (Calytrix leschenaultii) low shrubland over Desmocladus flexuosa, Stylidium septentrionale scattered sedges and herbs.
Vegetation condition: Good to very good. (Considerable weed invasion).
Fire age: Not burnt for more than 5 to 10 years.
Notes: Datum: WGS84. 1st coord is for SW peg; 2nd coord is for NE peg.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	30cm		
Arctotheca calendula	+	<1 %	10cm		Capeweed
Austrostipa nitida	+	<1 %	35cm	JT11-4,19	Also recorded in 30x30.
Avena barbata	+	<1 %	35cm		
Briza maxima	+	<1 %	20cm		
Bromus diandrus	+	<1 %	15cm	=JT9-15	Bromus
Caladenia denticulata	+	<1 %	10cm	=JT6-56	Revisit. ?
Caladenia flava subsp. flava	+	<1 %	20cm	JT11-10	Orchid
Calothamnus aff. quadrifidus Moora-Watheroo	3-4	1-5%	3-5.4	=JT9-1	Calothamnus
Calytrix leschenaultii	1-2	1-5%	50cm	=JT7-1	
Crassula colorata var. colorata	+	<1 %	4cm	JT11-14	Crassula
Crassula exserta	+	<1 %	10cm	JT11-7	Crassula
Cristonia biloba	+	<1 %	10cm	JT11-3	pea
Cyanicula deformis	+	<1 %	12cm	=JT8-54	Revisit. Blue beard orchid
Cyanicula gemmata	+	<1 %	1cm	=JT6-54	Revisit. Hairy spade orchid (2 under Kunzea in centre of plot).
Also 1 about to flower 50J0408960 WGS84 UTM66					
Desmocladus flexuosus	2	1-5%	15cm	=JT7-5	Desmocladus flexuosus

Drosera aff. macrantha	+	<1 %	35cm	JT11-51	Revisit. Climber
Hibbertia subvaginata	10-15%	10-25%	1m		
Hypochaeris glabra	3-4%		2cm		Revisit.
Kunzea praestans	15-20%	10-25%	2.5m		
Melaleuca calyptroides	+	<1 %	1.5m	=JT7-3	Melaleuca
Millotia myosotidifolia	+	<1 %	5cm	JT11-11	tiny daisy
Neurachne alopecuroidea	+	<1 %	30cm	=JT9-2	Neurachne
Parentucellia latifolia	+	<1 %	10cm		Parentucellia
Pentaschistis pallida	+	<1 %	10cm	=JT7-10	Pentaschistis
Petrorhagia prolifera	+	<1 %	20cm	=JT1-13	?Wahlenbergia single pink flower head
Pityrodia dilatata	+	<1 %	20cm	JT7-18	Pityrodia
Podolepis canescens	+	<1 %	25cm	JT11-13	Waitzia
Podolepis lessonii	+	<1 %	12cm	=JT3-6	Podolepis lessonii
Podotheca angustifolia	+	<1 %	4cm	=JT7-13	Podotheca
Silene gallica var. gallica	+	<1 %	25cm	=JT9-12	?Silene
Sonchus oleraceus	+	<1 %	20cm	JT11-16	
Stylidium cordifolium	+	<1 %	30cm	JT11-5	Stylidium white flower
Stylidium repens	1	<1 %	10cm	=JT1-30	Stylidium 'repens'
Stylidium septentrionale	2-3	1-5%	10cm	=JT7-2	Stylidium 'pink'
Thysanotus manglesianus	+	<1 %	40cm	JT11-8,50	Thysanotus Climbing
Trachymene cyanopetala	+	<1 %	10cm	=JT7-12	Trachymene
Trachymene ornata	+	<1 %	5cm	=JT7-11	Trachymene white top
Trachymene pilosa	+	<1 %	5cm	=JT7-8	Trachymene short hairs
Trifolium hirtum	+	<1 %	10cm	JT11-9	?Trifolium
Tripterococcus brunonis	+	<1 %	30cm	JT11-6,15	?Tricoryne
Ursinia anthemoides	+	<1 %	30cm		
Vulpia myuros var. hirsuta	+	<1 %	15cm	=JT9-7	Grass (cylinder head)
Xanthorrhoea drummondii	+	<1 %	35cm		
Acacia restiacea	+	<1 %	30cm	JT11-18	?Acacia prostrate
Allocasuarina campestris	+	<1 %	1-6m		Revisit.
Allocasuarina huegeliana	+	<1 %	3m		Revisit.
Chamaescilla corymbosa var. corymbosa	+	<1 %	10cm	=JT5-55	Revisit. Lilly
Diplopeltis huegelii subsp. lehmannii	+	<1 %	35cm	=JT7-4	Diplopeltis
Dryandra sessilis var. sessilis	+	<1 %			
Stackhousia monogyna	+	<1 %	30cm	JT11-17	Stackhousia
Tripteris clandestina	+	<1 %	25cm	=JT3-50	Revisit. Stink daisy
Waitzia nitida	+	<1 %	20cm	=ER15-8	Waitzia

Moora Site JT012

Described by BRM **Date** 24/08/03 **Type:** QUADRAT 10x10 m, 30x30

Location: Broad crest of John Tonkin's western most ridge, about 80m north of his southern boundary (with Ridgeways). About 50m west of JT6.

MGA Zone 50 408958 **m E** 6625359 **m N** -30.500498 **S lat** 116.051272 **E long**

Habitat: Flat area on broad crest of a low ridge.

Soil: Gravelly, pebbly brown sandy loam.

Vegetation: Acacia acuminata low woodland over Cheilanthes adiantoides, Hypoxis sp.very open fern/herbland and Gilberta tenuifolia, Podolepis lessonii open annual herbland.

Vegetation condition: Very good (some weeds). An unusual open area and therefore not sure if some disturbance many
years ago,

Notes: Podolepis lessonii appears to grow in areas with no canopy. Cheilanthes patchy - mainly at base of trees.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	18-22	10-25%	7-8m		
Arctotheca calendula	+	<1 %	15cm		Arctotheca
Avena barbata	+	<1 %	30cm		
Borya sphaerocephala	+	<1 %	2cm	JT12-13	
Caesia (Moora hairy stem)	+	<1 %	6cm	JT12-9	?Dichopogon sp.
Caesia alfordii	+	<1 %	25cm	JT12-14	Dichopogon #2
Chamaescilla corymbosa var. corymbosa	+	<1 %	4cm	=ER19-50	?Chamaescilla corymbosa
Cheilanthes adiantoides	6-8%	5-10%	15cm		Common Cheilanthes

Crassula exserta	+	<1 %	2-3cm	JT12-10	Crassula
Drosera macrantha subsp. macrantha	+	<1 %	20cm	JT12-12,2	Also recorded in 30x30. Climbing Drosera
Drosera macrophylla subsp. macrophylla	+	<1 %	2cm	JT12-3	
Ehrharta longiflora	+	<1 %	30cm		
Gilberta tenuifolia	10-15	10-25%	10-15cm	JT12-1	Daisy #1
Gonocarpus nodulosus	+	<1 %	12cm	JT12-22	
Goodenia berardiana	+	<1 %	25cm	=ER8-52	
Hyalosperma glutinosum subsp. glutinosum	+	<1 %	25cm	JT12-17	Long flr stalk daisy
Hypochaeris glabra	+	<1 %	1cm		
Hypoxis sp.	3-5	1-5%	15cm	=?	SPECIES NOT RESOLVABLE
Neurachne alopecuroidea	+	<1 %	10cm		
Opercularia vaginata	1-2%	1-5%	20cm	JT12-4	
Phyllangium sulcatum	+	<1 %	6cm	JT12-21	
Podolepis lessonii	10-15	10-25%	10-15cm	JT12-2	Daisy #2
Rhodanthe laevis	+	<1 %	12cm	JT12-18	Flat leaf grey daisy
Rhodanthe manglesii	+	<1 %	15cm	=CHN9-11	Daisy, amplexicaule leaf
Schoenus clandestinus	+	<1 %	2-3cm	JT12-6	Schoenus
Thysanotus manglesianus	+	<1 %	20cm	JT12-5,11	Thysanotus fleshy leaf
Trachymene pilosa	+	<1 %	3cm	JT12-8	Trachymene ?pilosa
Trifolium subterraneum	+	<1 %	2-3cm	JT12-7	Clover
Tripteris clandestina	+	<1 %	15cm	=JT3-50	Stink daisy
Ursinia anthemoides	+	<1 %	20cm		Ursinia
Wahlenbergia capensis	+	<1 %	5cm	JT12-20	
Wurmbea drummondii	+	<1 %	3cm	JT12-19	
Austrodanthonia sp.	+	<1 %	2cm	JT12-15	
Brassica barrelieri subsp. oxyrrhina	+	<1 %	35cm	JT12-16	"Radish"
Briza maxima	+	<1 %	30cm		
Bromus diandrus	+	<1 %	25cm		
Cyanicula deformis	+	<1 %	10cm	=JT8-54	'Blue Beard' Caladenia
Erodium cygnorum	+	<1 %	10cm	=ER17-52	?Erodium
Waitzia nitida	+	<1 %	25cm	JT12-24	Big yellow-flr daisy

RIDGEWAY'S

Moora Site SW1

Described by BRM **Date** 25/08/03 **Type:** QUADRAT 10x10 m, 30x30
Location: East side of western most ridge on Ridgeways property, about 200-250m north of Kiaka Rd.
MGA Zone 50 409402 **m E** 6625048 **m N** -30.503338 **S lat** 116.055871 **E long**
Habitat: Mid to upper slope (below breakaway) on moderate east-facing slope of low ridge
Soil: Gravelly, pebbly, cobbly, bouldery brown loam, with some exposed sheet rock.
Rock Type: Chert?
Vegetation: Acacia acuminata subsp. acuminata, (Allocasuarina huegeliana) low woodland to low open forest over Podolepis lessonii, *Ehrharta longiflora, (*Hypochaeris glabra, *Avena barbata) open annual herb/grassland.
Vegetation condition: Poor to very poor. Heavily infested with weeds, native species depauperate.
Notes: Many old Xanthorrhoea drummondii deaths on slopes and ridge top. Some of the few remaining live X. drummondii have symptoms of '28' parrot damage. A few dead Acacia acuminata. Allocasuarina huegeliana is very scattered. Allocasuarina campestris fallen in plot; only one on slope visible from plot.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	35-40%	33.3-50%	4-6m	SW1-1	
Allocasuarina campestris	2%	1-5%	2m		fallen
Allocasuarina huegeliana	3%	<1 %	5-6m		
Arctotheca calendula	1%	1-5%	10cm		Capeweed
Austrodanthonia acerosa	+	<1 %	10cm	SW1-8B	Grass
Austrostipa exilis	+	<1 %	20cm	SW1-11	PRIORITY Determination provisional. Red base.
Austrostipa trichophylla	+	<1 %	15 cm	SW1-8A	
Avena barbata	1%	1-5%	5-30cm		
Brachyscome perpusilla	+	<1 %		SW1-7B	
Briza maxima	+	<1 %	30cm		Dead

Cheilanthes adiantoides	1-2%	1-5%	10-15cm		common Cheilanthes
Comesperma integerrimum	+	<1 %	5cm	SW1-4	heavily grazed
Crassula colorata var. colorata	+	<1 %	3cm	SW1-10	
Dichopogon capillipes	+	<1 %	5cm	SW1-3	?Dichopogon
Dioscorea hastifolia	+	<1 %	3cm		
Drosera macrantha subsp. macrantha	+	<1 %	15cm	SW1-6	Drosera Climber
Ehrharta longiflora	6-7%	5-10%	15-40cm		
Galium murale	+	<1 %	3cm	SW1-7	pale green herb
Hypochaeris glabra	2-3%	1-5%	2cm		
Hypoxis sp.	+	<1 %	12cm	=?	NOT RESOLVABLE
Neurachne alopecuroidea	+	<1 %	4cm		
Podolepis lessonii	10-20%	10-25%	10-20m	=JT12-2	Daisy
Trachymene ornata	+	<1 %	6cm	SW1-5	Trachymene ?pilosa
Trifolium subterraneum	+	<1 %	2cm	SW1-2	Clover
Urospermum picroides	+	<1 %	4cm	SW1-9	?Sonchus
Ursinia anthemoides	+	<1 %	10cm		
Xanthorrhoea drummondii	+	<1 %			long dead
Bromus diandrus	+	<1 %	25cm	=ER10-58	Bromus
Chamaescilla corymbosa var. corymbosa	+	<1 %	4cm	=ER19-50	?Chamaescilla
Desmocladus flexuosus	+	<1 %	12cm	SW1-12	
Erodium cygnorum	+	<1 %	3cm	=ER17-52	?Erodium
Silene gallica var. gallica	+	<1 %	15-20cm	SW1-13	?
Tripteris clandestina	+	<1 %	20cm	=JT3-50	stink daisy

WASTE DUMP (proposed)

Moora **Site** WDM001

Described by MJH **Date** 22/10/00 **Type:** QUADRAT 10x10 m, 30x30

Location: This area is a proposed waste dump extension to the south of the mine. This site was approx. 600 m east of the entry to 'Goonderoo' from the Midlands Road and 250 m north of the farm track.

MGA Zone 50 407374 **m E** 6623162 **m N** -30.520197 **S lat** 116.034573 **E long**

Habitat: Mid-slope of gently sloping south facing hill.

Soil: Grey sandy loam

Rock Type: Chert boulders, cobbles and gravel, ~80% cover.

Vegetation: Regelia megacephala high shrubland to open scrub over Kunzea praestans open shrubland over Hibbertia subvaginata scattered shrubs to open shrubland.

Vegetation condition: Good. There are some obvious grazing signs, vegetation deaths and litter from mining activities.

Fire age: Old

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia lasiocarpa var. sedifolia	+	<1 %	1 m	WD1-16,5	
Allocasuarina campestris	+	<1 %	2 m		
Anagallis arvensis	+	<1 %	4cm	=WDM2-6	Revisit.
Arctotheca calendula	+	<1 %	12cm		Revisit. Capeweed
Aristida contorta	+	<1 %	15 cm	WD1-5	
Austrostipa variabilis	+	<1 %	20 cm	WD1-11	Grass
Avena barbata	+	<1 %	35cm.	WDM1-57	Revisit.
Briza maxima	+	<1 %	10 cm		
Burchardia umbellata					
Caladenia denticulata	+	<1 %	20cm	WDM1-50	Revisit. Spider orchid
Caladenia flaccida subsp. flaccida	+	<1 %	10cm.	=WOR2-59	Revisit.
Calandrinia sp.	+	<1 %	2cm	WDM1-60	Revisit.
Calytrix leschenaultii	+	<1 %			
Centrolepis pilosa	+	<1 %	<5 cm	WD1-9	
Chamaescilla corymbosa var. corymbosa	+	<1 %	3cm	=ER19-50	Revisit.
Cheilanthes adiantoides	+	<1 %			
Crassula exserta	+	<1 %	2cm	WDM1-61	Revisit.
Desmocladus flexuosus	+	<1 %	20 cm	WD1-10	
Dichopogon capillipes	+	<1 %	20cm	WDM1-59	Revisit.
Dioscorea hastifolia	+	<1 %			'
Diuris aff. recurva	+	<1 %	25cm	=WOR2-72	Revisit. Orchid
Drosera aff. macrantha	+	<1 %	1.2m	WDM1-3,5	Revisit.
Gilberta tenuifolia	1-2	1-5%	5-10 cm	WD1-2a	

Goodenia sp.	+	<1 %	5 cm	WD1-8B	
Hibbertia subvaginata	<5	1-5%	1-1.5 m		
Hyalosperma cotula	+	<1 %	8 cm	WD1-14	White daisy
Hypochaeris glabra	2-3%	1-5%	2cm		Revisit.
Kunzea praestans	<5	1-5%	<2 m		
Lepidosperma leptostachyum	+	<1 %	35cm	WDM1-55,	Also recorded in 30x30.
Lepidosperma sp.	+	<1 %	35cm	WDM1-54	Revisit. Specimen missing 9/2005
Nemcia acuta	+	<1 %	0.1-1 m	WD1-6	
Neurachne alopecuroidea	+	<1 %	10 cm	WD1-12	
Parentucellia latifolia	+	<1 %	2-10 cm	WD1-8A	
Pentaschistis airoides	+	<1 %	<5 cm	WD1-7	
Petrorhagia velutina					
Plantago debilis	+	<1 %	5cm	WDM1-62	Revisit.
Platysace cirrosa	+	<1 %	3 cm	WD1-13	Redet 05/05 Met
Podolepis lessonii	5-7%	5-10%	20cm	WD1-2b,5	
Podotheca angustifolia	+	<1 %	3cm	= GH10-52	Revisit. Daisy
Regelia megacephala	70-80	>75%	2-3 m		
Romulea rosea	+	<1 %	10 cm	WD1-1	
Sonchus oleraceus	+	<1 %	5cm	WDM1-58	Revisit.
Thysanotus manglesianus	+	<1 %	70cm	=WOR2-64	Revisit. Climber
Trachymene ornata	+	<1 %	3cm	WDM1-56	Revisit.
Trifolium arvense var. arvense	+	<1 %	8 cm	WD1-15	
Ursinia anthemoides	+	<1 %	5cm		Revisit.
Vulpia myuros var. hirsuta	+	<1 %	10-15 cm	WD1-4	
Xanthorrhoea drummondii	+	<1 %	2-3 m		
Acacia aristulata	+	<1 %	20 cm	WD1-17	
Allocasuarina huegeliana	+	<1 %	90cm		Revisit. Juvenile. Just outside 10x10 on west side.
Astroloma serratifolium	+	<1 %	20cm	WDM1-64	Revisit.
Austrostipa elegantissima	+	<1 %	80 cm	WD1-19	
Austrostipa tenuifolia				WD1-20	
Borya sphaerocephala	+	<1 %	2cm		Revisit.
Comesperma integerrimum	+	<1 %	40cm	WDM1-68	Revisit.
Cryptandra glabriflora					=WO4
Cyanicula deformis	+	<1 %	12cm	=ER17-51	Blue beard orchid
Dianella revoluta var. divaricata	+	<1 %	35cm	WDM1-63	Revisit.
Eriochilus dilatatus	+	<1 %	4cm	=WOR2-62	Revisit. Leaf 1/2 opposite stem orchid
Hypoxis glabella var. leptantha	+	<1 %	10cm	WDM1-67	Revisit. #2
Hypoxis occidentalis var. occidentalis	+	<1 %	10cm	=ER17-58	Revisit.
Melaleuca calyptroides	+	<1 %	1 m	WD1-18	heavily grazed
Pityrodia dilatata	+	<1 %	20cm		Revisit.
Podotheca aff. gnaphalioides (Moora WDM1-65)	+	<1 %	30cm	WDM1-65	Revisit. Daisy

Moora Site WDM002

Described by BRM **Date** 22/10/00 **Type:** QUADRAT 10x10 m, 30x30

Location: This area is a proposed waste dump extension to the south of the mine. This site was approx. 650 m east of the entry to 'Goonderoo' from the Midlands Road and 200 m north of the farm track.

MGA Zone 50 407393 **m E** 6623095 **m N** -30.520803 **S lat** 116.034765 **E long**

Habitat: Moderate west facing mid-slope.

Soil: Gravelly (quartz), sandy clay.

Rock Type: Chert outcrops, ~ 10-20% cover.

Vegetation: Allocasuarina huegeliana low woodland over Allocasuarina campestris shrubland over Schoenus clandestinus, Borya sphaerocephala, Austrostipa tenuifolia, Austrodanthonia acerosa open sedge/herb/grassland

Vegetation condition: Good. Some grazing, but structure and floristics apparently not significantly changed.

Notes: Fairly open area of Sheoak low woodland; several dead Sheoak trunks in the area.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia restiacea	+	<1 %		WD2-19,5	
Allocasuarina campestris	30	25-33.3%	<1.8	WD2-1	
Allocasuarina huegeliana	4	1-5%	8 m		
Austrodanthonia acerosa	+	<1 %		WD2-18	
Austrostipa tenuifolia	+	<1 %		WD2-9	

Borya sphaerocephala	2-3	1-5%		WD2-4	
Briza maxima	+	<1 %			
Bromus diandrus	+	<1 %		WD2-8	Grass
Caladenia flava subsp. flava	+	<1 %	3cm	=WOR2-59	Revisit.
Chamaescilla corymbosa var. corymbosa	+	<1 %	2cm	=ER19-50	Revisit.
Cheilanthes adiantoides	+	<1 %			=WO1-19
Cyanicula deformis	+	<1 %	10cm	=ER17-51	Revisit. Blue beard
Dichopogon capillipes	+	<1 %	15cm	=WDM1-5	Revisit.
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1cm	WDM2-52,	Also recorded in 30x30. Large flat leaves.
Drosera macrantha subsp. macrantha	+	<1 %	1m	WDM2-53	Revisit.
Eriochilus dilatatus	+	<1 %	3cm	WOR2-62	Revisit. Leaf 1/2 opposite stem
Gilberta tenuifolia	+	<1 %		WD2-6	Daisy
Goodenia berardiana	+	<1 %	6 cm	WD2-13A	Admixture in WD2-13
Hibbertia subvaginata	+	<1 %	1 m		
Hyalosperma cotula	+	<1 %		WD2-2	Daisy
Hypochaeris glabra	+	<1 %		WD2-10	
Hypoxis occidentalis var. occidentalis	1-2%	1-5%	15cm	=ER17-58	Revisit.
Leporella fimbriata	+	<1 %	1cm	WDM2-55	Revisit. Small flat orchid leaf. In west corner of plot.
Neurachne alopecuroidea	+	<1 %			=WO1-4
Parentucellia latifolia	+	<1 %		WD2-14	
Pentaschistis airoides	+	<1 %		WD2-5	
Podolepis lessonii	+	<1 %		WD2-7	Daisy
Pterostylis sanguinea	+	<1 %	12cm	WDM2-58	Revisit. Tall
Pterostylis setulosa	+	<1 %	10cm	WDM2-54	Revisit. Flat base
Schoenus clandestinus	5	5-10%		WD2-3,51	
Stylidium calcaratum	+	<1 %		WD2-16	
Trachymene cyanopetala	+	<1 %		WD2-13	
Trachymene ornata	+	<1 %		WD2-15	
Tricoryne arenicola	+	<1 %		WD2-20	PRIORITY 2
Trifolium arvense var. arvense	+	<1 %		WD2-22	
Ursinia anthemoides	+	<1 %			=WO1-17
Vulpia myuros var. hirsuta	+	<1 %		WD2-17	
Xanthorrhoea drummondii	1	<1 %	1.8 m		
Acacia acuminata subsp. acuminata	+	<1 %		WD2-32	
Arctotheca calendula	+	<1 %	20cm		Revisit.
Calytrix leschenaultii	+	<1 %		WD2-26	
Comesperma integerrimum	+	<1 %	60cm	WDM2-56	Revisit.
Daviesia dielsii	+	<1 %		WD2-28	1, DRF
Desmocladus flexuosus	+	<1 %	20cm	WDM2-57	Revisit.
Dianella revoluta var. divaricata	+	<1 %	30cm	=WDM1-6	Revisit.
Dioscorea hastifolia	+	<1 %	60cm		Revisit.
Drosera aff. macrantha	+	<1 %			=WO1-23
Dryandra sessilis var. sessilis	+	<1 %	6 cm		juv
Haemodorum simulans	+	<1 %		WD2-24	
Lepidobolus chaetocephalus	+	<1 %		WD2-29	
Lomandra aff. micrantha subsp. micrantha	+	<1 %		WD2-30	sedge
Romulea rosea	+	<1 %	35cm		Revisit.
Stypandra glauca	+	<1 %		WD2-27	
Thysanotus manglesianus	+	<1 %		WD2-25	

Moora **Site** WDM003

Described by MET **Date** **Type:** QUADRAT 10x10 m, 30x30

Location: This area is a proposed waste dump extension to the south of the mine. This site was approx. 700 m east of the entry to 'Goonderoo' from the Midlands Road and 150 m north of the farm track.

MGA Zone 50 407501 **m E** 6622996 **m N** -30.521704 **S lat** 116.035882 **E long**

Habitat: Moderate slope on south end of a ridge

Soil: Light greyish-brown gravelly, pebbly silt-fine sand.

Rock Type: Chert gravel to pebble strew (>80% of surface) with some scattered angular cobbles. Partially cleared immediately south of 30x30.

Vegetation: Eucalyptus loxophleba subsp. loxophleba scattered low trees over Allocasuarina campestris open scrub to open heath over Borya sphaerocephala, Cheilanthes adiantoides, Schoenus clandestinus open herb/fern/sedgeland and *Briza maxima, *Pentaschistis airoides very open annual grassland.

Vegetation condition: Very good (-excellent). Would be excellent but has some weed invasion. Towards lower edge of
stand becomes G-VG due to higher weed invasion. Several Xanthorrhoea dead.
Fire age: ?2 ages: 1, +/-15 yrs; 2, >15 yrs.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	+/-60	50-75%	1.8-3.4 m		
Arctotheca calendula	+	<1 %	10cm	WDM3-53	Revisit.
Austrodanthonia acerosa	+	<1 %	8 cm	wd3-24	Redet 2005
Austrodanthonia setacea	+	<1 %	20 cm	WD3-10	
Austrostipa elegantissima	+	<1 %	1 m	WD3-23,5	
Avena barbata	+	<1 %	5-10 cm		
Borya sphaerocephala			2-4 cm	WD3-3	
Briza maxima	+/-1	<1 %	5-15 cm		
Caladenia denticulata	+	<1 %	30cm	=WDM1-5	Revisit. Spider orchid
Chamaescilla corymbosa var. corymbosa	+	<1 %	3cm	=ER19-50	Revisit.
Cheilanthes adiantoides			5-20 cm	WD3-2	
Cyanicula deformis	+	<1 %	15cm	=ER17-51	Blue beard orchid
Dichopogon capillipes	+	<1 %	5 cm	WD3-14	
Dioscorea hastifolia	+	<1 %	40cm		Revisit.
Drosera macrantha subsp. macrantha	+	<1 %	50 cm	WD3-6,50	
Ehrharta longiflora	+	<1 %	30 cm	WD3-11	
Eriochilus dilatatus	+	<1 %	4cm	=WOR2-62	Revisit. Leaf 1/2 opposite stem orchid
Eucalyptus loxophleba subsp. loxophleba	>5	5-10%	4-5.5 m	WD3-1	
Gilberta tenuifolia	+	<1 %	4-6 cm	WD3-8	
Haemodorum paniculatum	+	<1 %	15 cm	WD3-15	
Hypochaeris glabra	+	<1 %	2 cm		
Hypoxis occidentalis var. occidentalis	+	<1 %	15cm	=ER17-58	Revisit.
Neurachne alopecuroidea	+	<1 %	4-6 cm		
Parentucellia latifolia	+	<1 %	5-6 cm		
Pentaschistis airoides	+	<1 %	4-6 cm		=WO3-25
Platysace cirrosa	+	<1 %	10/12cm	=WOR2-66	Revisit. Climber
Podolepis lessonii	+	<1 %	5-15 cm	WD3-4	Daisy
Pterostylis sanguinea	+	<1 %	1cm	WDM3-54	Revisit. Large leaf to leaf 3cm long.
Pterostylis setulosa	+	<1 %	12cm	WDM3-55	Revisit. (Small flat leaf)
Rhodanthe laevis	+	<1 %	5 cm	WD3-13	
Schoenus clandestinus	+	<1 %	5 cm	WD3-5	
Sonchus oleraceus	+	<1 %	20 cm		
Stypandra glauca	+	<1 %	30-60 cm	WD3-20	
Thysanotus manglesianus	1%	<1 %	60 cm	WD3-7,51	
Trachymene ornata	+	<1 %	3-7 cm	WD3-9	
Trifolium arvense var. arvense	+	<1 %	4 cm		
Tripteris clandestina	+	<1 %	10cm	WDM3-52	Revisit. Stink daisy
Ursinia anthemoides	+	<1 %	20 cm		
Vulpia myuros var. hirsuta	+	<1 %	20 cm	WD3-12	
Xanthorrhoea drummondii	+	<1 %	70 cm		Dead
Acacia congesta subsp. congesta	+	<1 %	1.5-2.4 m	WD3-16	
Austrostipa variabilis	+	<1 %	15 cm	WD3-18	
Comesperma integerrimum	+	<1 %			the big creeper
Crassula exserta	+	<1 %	1-2 cm	WD3-21	
Drosera erythrorhiza subsp. erythrorhiza	+	<1 %	1 cm	WD3-22	ssp.??
Romulea rosea	+	<1 %	15 cm		
Trachymene cyanopetala	+	<1 %	4-6 cm	WD3-17	

WESTERN ORE BODY

Moora **Site** WOR001

Described by BRM **Date** 21/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: The westernmost ridge of the mine. The site is approximately 500 m ENE of the entry to 'Goonderoo' from the Midlands Road.
MGA Zone 50 407167 **m E** 6623310 **m N** -30.518845 **S lat** 116.032429 **E long**
Habitat: Crest of north-south trending low ridge. To west, moderate-steep slope; to E, gentle slope. Near the

high point of the ridge.
Soil: Light grey fine silty sand.
Rock Type: Chert outcrop, ~60% surface cover.
Vegetation: Regelia megacephala open scrub over Hibbertia subvaginata low shrubland to open heath.
Vegetation condition: Very good between grid lines. Some weeds.
Notes: No defined herb or very low shrub layers.
Gridlines along N and S plot boundaries, some disturbance. Earthworks S side.
Revisit - Now cleared for mining.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia congesta subsp. congesta	1%	<1 %	1 m	WO1-28	1 shrub
Acacia stenoptera	1%	<1 %	50 cm	WO1-3	
Amphipogon caricinus	+	<1 %	30 cm	WO1-4	
Austrodanthonia setacea	+	<1 %		WO1-13	Grass
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %		WO1-20	
Briza maxima	+	<1 %		WO1-22	
Burchardia umbellata	+	<1 %		WO1-14	
Caladenia flava subsp. flava	+	<1 %		WO1-18	Orchid
Chamaescilla corymbosa var. corymbosa	+	<1 %		WO1-25	
Cheilanthes adiantoides	+	<1 %		WO1-19	
Comesperma integerrimum				WO1-30	Climber
Dichopogon capillipes	+	<1 %		WO1-15	
Dioscorea hastifolia	+	<1 %		WO1-16	Climber
Drosera aff. macrantha	+	<1 %		WO1-23	
Ehrharta longiflora	+	<1 %	15 cm	WO1-5	Grass
Elythranthera brunonis	+	<1 %		WO1-27	Orchid
Hibbertia subvaginata	25-35%	25-33.3%	0.5-1.3 m	WO1-2	
Kunzea praestans	1%	<1 %	1.8 m	WO1-1	
Lepidosperma leptostachyum	+	<1 %		WO1-12	sedge
Pentaschistis airoides	+	<1 %		WO1-6	Grass
Pityrodia dilatata	+	<1 %		WO1-10	
Pterostylis vittata	+	<1 %		WO1-11	
Regelia megacephala	+/-35%	33.3-50%	(0.5)2-3		
Stypandra glauca	+	<1 %		WO1-9	
Tripterococcus brunonis	+	<1 %		WO1-24	
Ursinia anthemoides	+	<1 %		WO1-8	Daisy
Vulpia myuros var. hirsuta	+	<1 %		WO1-7	Grass
Xanthorrhoea drummondii	<1%	<1 %	1.7 m		
Acacia acuminata subsp. acuminata	3%	1-5%			
Acacia aristulata	+	<1 %		WO1-42	
Allocasuarina campestris	+	<1 %	<2 m	WO1-51	S side of plot
Anagallis arvensis	+	<1 %		WO1-40	weed
Austrodanthonia acerosa	+	<1 %		WO1-35	Grass
Austrostipa tenuifolia	+	<1 %		WO1-34	Grass
Avena barbata	+	<1 %			
Boronia ramosa subsp. anethifolia	+	<1 %		WO1-45	from N gridline
Calytrix leschenaultii	+	<1 %		WO1-33	
Desmocladus flexuosus	+	<1 %		WO1-38	
Dianella revoluta var. divaricata	+	<1 %		WO1-32	
Lepidosperma tenue	+	<1 %		WO1-50	sedge, S side of plot
Neurachne alopecuroidea	+	<1 %		WO1-36	Grass
Opercularia vaginata	+	<1 %		WO1-39	
Orobanche minor	+	<1 %		WO1-48	from S gridline
Podolepis lessonii	+	<1 %		WO1-37	Daisy
Scaevola phlebopetala	+	<1 %		WO1-47	from S gridline
Stylidium caricifolium	+	<1 %		WO1-53	S side of plot
Trachymene ornata	+	<1 %		WO1-43	from N gridline
Wahlenbergia gracilenta	+	<1 %		WO1-46	?? from N gridline

Moora **Site** WOR002

Described by MJH **Date** 21/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: The westernmost ridge of the mine. Towards N end of the N-S ridge of the Western Orebody, approximately 600 m NE of the entry to 'Goonderoo' from the Midlands Road.
MGA Zone 50 407142 **m E** 6623441 **m N** -30.517661 **S lat** 116.03218 **E long**

Habitat: West facing slope, moderate slope below site and gentle above. Well below crest of ridge.
Soil: Silty fine grey-brown sandy loam.
Rock Type: Chert outcrop - gravel ~60% cover
Vegetation: Regelia megacephala open scrub to closed scrub over Cheilanthes adiantoides very open fernland with *Bromus diandrus, Podolepis lessonii, Trachymene cyanopetala annual grass/herbland and Comesperma integerrimum open lianes
Vegetation condition: Very good. Weed invasion greater downslope towards paddock. Some Regelia deaths.
Notes: Open underneath, little defined herb or shrub layer.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Anagallis arvensis	+	<1 %	<5	WO2-19,6	
Arctotheca calendula	1-2%	1-5%	12 cm		Revisit. Capeweed
Austrodanthonia acerosa	+	<1 %	<25 cm	WO2-11	Grass
Austrostipa elegantissima	+	<1 %	<30 cm	WO2-10	
Avena barbata	+	<1 %	20 cm	WO2-17	
Boronia ramosa subsp. anethifolia	+	<1 %	20 cm	WOR2-77	Revisit.
Briza maxima	+	<1 %	<15 cm		
Bromus diandrus	40-50	33.3-50%	20 cm	WO2-9	
Burchardia umbellata	+	<1 %	30 cm	=GH9-52	Revisit.
Caladenia denticulata	+	<1 %	20 cm	WOR2-56	Revisit. Orchid
Caladenia flava subsp. flava	+	<1 %	5 cm	WOR2-59	Revisit.
Calandrinia sp.	+	<1 %	2 cm	WOR2-69	Revisit.
Chamaescilla corymbosa var. corymbosa	+	<1 %	12 cm	WOR2-55	Revisit.
Cheilanthes adiantoides	<5%	1-5%	5-10 cm	WO2-6	
Comesperma integerrimum	3-4%		1.7 m	WOR2-83	Revisit.
Crassula colorata var. colorata	+	<1 %	2 cm	WOR2-70	Revisit.
Cyanicula deformis	+	<1 %	15 cm	WOR2-52	Revisit. Blue beard
Desmocladus flexuosus	+	<1 %	35 cm	WOR2-54	Revisit.
Dichopogon capillipes	+	<1 %	20 cm	WOR2-50	Revisit.
Dioscorea hastifolia	+	<1 %	50 cm	WO2-2	Climber
Diuris aff. recurva	+	<1 %	30 cm	WOR2-78	Revisit.
Drosera aff. macrantha	+	<1 %	30 cm	WOR2-51	Revisit. Climbing
Drosera macrantha subsp. macrantha	+	<1 %	1 cm	WOR2-63	Revisit. Flat
Dryandra sessilis var. sessilis	+	<1 %	2 m		
Ehrharta longiflora	+	<1 %	30 cm	WO2-8	
Eriochilus dilatatus	+	<1 %	3 cm	WOR2-62	Revisit. Leaf 1/2 opposite stem orchid
Hibbertia subvaginata	+	<1 %	<1.5 m	WO2-1	
Hypochaeris glabra	+	<1 %	15-20 cm	WO2-23	
Hypoxis occidentalis var. occidentalis	+	<1 %	15 cm	=ER17-58	Revisit.
Kunzea praestans	+	<1 %	1-2.5 m	WO2-12	
Lawrencella rosea	+	<1 %	12 cm	WOR2-57	Revisit. Pink daisy
Lepidosperma leptostachyum	+	<1 %	<60 cm	WO2-5,84	Also recorded in 30x30.
Neurachne alopecuroidea	+	<1 %	12 cm	WO2-5a,7	
Platysace cirrosa	+	<1 %	25 cm	WOR2-66	Revisit. Climber
Podolepis lessonii	+	<1 %	4 cm	=ER1-58	Also WO2-16 (30x30). Revisit. Daisy
Podotheca angustifolia	+	<1 %	3 cm	=GH10-52	Revisit. Daisy
Pterostylis recurva	+	<1 %	20 cm	WOR2-65	Revisit. Tall
Pterostylis sanguinea	+	<1 %	1 cm	WOR2-58	Revisit. Flat base
Regelia megacephala	60-100	50-75%	2-3 m		
Romulea rosea	+	<1 %	20 cm	WOR2-82	Revisit.
Schoenus clandestinus	+	<1 %	<30 cm	WO2-3	
Schoenus pleiostemoneus	+	<1 %	10 cm	WOR2-68	Revisit. Grass
Silene gallica var. gallica	+	<1 %	30 cm	WOR2-74	Revisit.
Spergularia arvensis	+	<1 %	30 cm	wor2-75	Revisit.
Stypandra glauca	<1%	<1 %	80 cm		Revisit.
Thysanotus manglesianus	+	<1 %	90 cm	WOR2-64,	Revisit. Climber
Trachymene cyanopetala	<5	1-5%	5 cm	WO2-7,53	?
Trifolium subterraneum	+	<1 %	2 cm	WOR2-60	Revisit. Clover
Tripteris clandestina	+	<1 %	10 cm	WOR2-76	Revisit.
Ursinia anthemoides	+	<1 %	<20 cm	WO2-4	Daisy
Allocasuarina huegeliana	+	<1 %	< 7 m		Revisit.

Austrostipa tenuifolia	+	<1 %	40-60 cm	WO2-22	Grass
Austrostipa trichophylla	+	<1 %	10 cm	WOR2-80	Revisit.
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	60 cm	WO2-15	pea
Calytrix leschenaultii	+	<1 %	50 cm	WO2-13	
Cryptandra glabriflora	+	<1 %	30 cm	WO2-21	Myrtaceae
Erodium cygnorum	+	<1 %	5 cm	=ER17-52	Revisit. ?
Petrorhagia prolifera	+	<1 %	20 cm	=ER8-65	Revisit.
Petrorhagia velutina	+	<1 %	30 cm	WO2-24	
Pityrodia dilatata	+	<1 %	30-45 cm	WO2-18,6	
Podolepis gracilis	+	<1 %	<30 cm	WO2-14	Yellow daisy
Ptilotus polystachyus var. polystachyus	+	<1 %	20 cm	WOR2-81	Revisit. Daisy
Stylidium septentrionale	+	<1 %	10 cm	WOR2-79	Revisit.
Xanthorrhoea drummondii	+	<1 %	0.5-2 m		

Moora **Site** WOR003

Described by MET **Date** **Type:** QUADRAT 10x10 m, 30x30

Location: The westernmost ridge of the mine. This site is on the lower western slope, near the N-S centre, approximately 450 m ENE from the entry to 'Goonderoo' from the Midlands Road.

MGA Zone 50 407129 **m E** 6623263 **m N** -30.519266 **S lat** 116.032029 **E long**

Habitat: Midslope of a lower ridge on lower part of outcrop zone.

Soil: Light grey silt/silty fine sand, gravelly amongst cobbles(-boulders and outcrop), 50-60% cover.

Vegetation: Allocasuarina huegeliana scattered low trees to low open woodland over Dryandra sessilis var. sessilis, Kunzea praestans, Xanthorrhoea drummondii scattered tall shrubs over Hibbertia subvaginata shrubland to open heath over Neurachne alopecuroidea, Austrostipa mollis, Cheilanthes adiantoides very open grassland/fernland and *Briza maxima, Podolepis lessonii, *Avena barbata very open annual grass/herbland.

Vegetation condition: Very good. Moderate weed invasion of non-aggressive species, probably reducing native annual cover.

Fire age: >15/20 years.

Notes: A narrow strip along the lower edge of the vegetated area, about 3 m outside quadrat to W is cleared. Dense Regelia stand to E (+/-3-4 m) of quadrat. Not wide enough for 30x30 m, so 20 m at each end of plot searched. Revisit - New mine pit/cleared for mining.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	30-50 cm	WO3-19	2 plants
Acacia stenoptera	+	<1 %	35 cm	WO3-26	
Allocasuarina huegeliana	1	<1 %	1.8 m	WO3-1	+outside plot
Austrodanthonia acerosa	+	<1 %	30 cm	WO3-33	Poaceae
Austrostipa elegantissima	+	<1 %	30 cm	WO3-9	
Austrostipa mollis	+	<1 %	40 cm	WO3-31	
Austrostipa tenuifolia	+	<1 %	35 cm	WO3-13	=WO3-9?
Avena barbata	+	<1 %	10-25 cm		
Blennospora drummondii	+	<1 %	5 cm	WO3-29	small grey daisy
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	40 cm	WO3-18	
Briza maxima	>2	1-5%	5-20 cm		
Bromus diandrus	+	<1 %	8 cm	WO3-22	poaceae
Burchardia umbellata	+	<1 %	30 cm	WO3-10	
Caladenia flava subsp. flava	+	<1 %	10 cm	WO3-17	
Calytrix leschenaultii	+	<1 %	50 cm	WO3-2	
Cheilanthes adiantoides	2-3	1-5%	8-1 cm	WO3-8	
Comesperma integerrimum	+	<1 %	0.4-1.3 m	WO3-7	
Desmocladus flexuosus	1-2	1-5%	15-20 cm	WO3-3	
Dichopogon capillipes	+	<1 %	10 cm	WO3-20	Lilly
Dioscorea hastifolia	+	<1 %	40 cm	WO3-16	
Drosera aff. macrantha	+	<1 %	30 cm	WO3-28b	
Drosera macrantha subsp. macrantha				WO3-28a	
Dryandra sessilis var. sessilis	5	5-10%	(5cm)3.8	WO3-12	
Ehrharta longiflora	+	<1 %	10 cm		
Goodenia berardiana	+	<1 %	6 cm	WO3-24	
Hibbertia subvaginata	+/-30	25-33.3%	0.5-1.4 m		
Hypochaeris glabra			2 cm		
Kunzea praestans	2-3	1-5%	2-3 m		
Neurachne alopecuroidea	>2	1-5%	10 cm	WO3-4	

Orthrosanthus laxus var. gramineus	+	<1 %	25cm	WO3-27	
Parentucellia latifolia	+	<1 %	7 cm	WO3-30	
Pentaschistis airoides	+	<1 %	5-10 cm	WO3-25	
Podolepis lessonii	+	<1 %	5 cm	WO3-14	
Pterostylis vittata	+	<1 %	15 cm	WO3-5	
Romulea rosea	+	<1 %	15 cm		
Thysanotus manglesianus	+	<1 %	20 cm	WO3-11	
Trachymene ornata	+	<1 %	7 cm	WO3-21	
Trachymene pilosa	+	<1 %	5 cm	WO3-15	
Ursinia anthemoides	+	<1 %	5-20 cm		
Vulpia myuros var. hirsuta	+	<1 %	5 cm	WO3-23	
Xanthorrhoea drummondii	+	<1 %	30 cm		juv
Acacia acuminata subsp. acuminata	+	<1 %	5-9 m		
Acacia lasiocarpa var. sedifolia	+	<1 %	80 cm	WO3-38	at lower edge of stand
Chamaescilla corymbosa var. corymbosa	+	<1 %	8 cm	WO3-36	
Crassula exserta	+	<1 %	1-3 cm	WO3-35	
Dianella revoluta var. divaricata	+	<1 %	15 cm		juv
Lepidosperma aff. leptostachyum (Moora: ERG18-7)	+	<1 %	30 cm	WO3-37	
Opercularia vaginata	+	<1 %	15 cm	WO3-34	
Pityrodia dilatata	+	<1 %	55 cm	WO3-39	

Moora **Site** WOR004

Described by MJH **Date** 21/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: The westernmost ridge of the mine. This site is towards the southern end of the ridge, approximately 400 m ENE of the entry to 'Goonderoo' from the Midlands Road.
MGA Zone 50 407201 **m E** 6623218 **m N** -30.519678 **S lat** 116.032775 **E long**
Habitat: Crest of north-south trending ridge, moderate slope to east, gentle slope to west.
Soil: Grey sandy loam with gravel.
Rock Type: Chert outcrop, cobbles-gravel. ~70% cover.
Vegetation: Regelia megacephala open heath to open scrub over Hibbertia subvaginata low shrubland to shrubland.
Veg Condition
Notes: No defined herb or grass layers when recorded. Revisit - Subsequently cleared and location is a mine pit.
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia aristulata	+	<1 %	15 cm	WO4-22	4 specimens of
Anagallis arvensis	+	<1 %	5 cm	WO4-19	
Austrodanthonia setacea	+	<1 %	30 cm	WO4-27	
Austrostipa variabilis				WO4-6A	
Avena barbata	+	<1 %	20-50 cm		
Boronia ramosa subsp. anethifolia	+	<1 %	15 cm	WO4-6	
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	60 cm	WO4-1	=WO2-15
Briza maxima	+	<1 %	10 cm	WO4-17	
Bromus diandrus	+	<1 %	15 cm	WO4-18	Grass
Burchardia umbellata	+	<1 %	45 cm	WO4-2	
Caladenia flava subsp. flava	+	<1 %	15 cm	WO4-13	
Chamaescilla corymbosa var. corymbosa	+	<1 %	20 cm	WO4-23	
Cheilanthes adiantoides	+	<1 %	10 cm	WO4-15	
Cryptandra glabriflora	+	<1 %	<1 m	WO4-4	
Dichopogon capillipes	+	<1 %	30 cm	WO4-7	
Drosera aff. macrantha	+	<1 %		WO4-26	
Hibbertia subvaginata	20-30	10-25%	1-1.5 m		
Lepidosperma leptostachyum	+	<1 %		WO4-25	
Neurachne alopecuroidea	+	<1 %	20-60 cm	WO4-16	Grass-Amphipogon?
Parentucellia latifolia	+	<1 %	10 cm	WO4-30	
Pentaschistis airoides	<5	1-5%	10 cm	WO4-8	
Podolepis lessonii	+	<1 %	10 cm	WO4-14	Yellow daisy
Regelia megacephala	70-80	>75%	1.5-3 m		
Stylidium caricifolium	+	<1 %	45 cm	WO4-21	
Stypandra glauca	+	<1 %	1 m	WO4-3	
Thomasia grandiflora	+	<1 %	0.8-1 m	WO4-24	
Trachymene pilosa	+	<1 %	10 cm	WO4-12	
Trifolium arvense var. arvense	+	<1 %	5 cm	WO4-31	

Urospermum picroides	+	<1 %	10 cm	WO4-11	
Ursinia anthemoides	+	<1 %	10 cm		
Vulpia myuros var. hirsuta	+	<1 %	10 cm	WO4-5	Grass
Xanthorrhoea drummondii	+	<1 %	1.5-2.5 m		
Acacia stenoptera	+	<1 %	30 cm	WO4-32	
Allocasuarina campestris	+	<1 %	1 m	WO4-42	
Allocasuarina huegeliana	+	<1 %	3-5 m		
Austrostipa mollis	+	<1 %	60 cm	WO4-35	
Comesperma integerrimum	+	<1 %	20 cm	WO4-41	
Dioscorea hastifolia					
Dryandra sessilis var. sessilis	+	<1 %	4 m		
Ehrharta longiflora	+	<1 %			
Kunzea praestans	+	<1 %	1 m		
Pentaschistis pallida	+	<1 %	15-20 cm	WO4-36	
Pityrodia dilatata	+	<1 %	20-30 cm		
Thysanotus manglesianus				WO4-34	
Trachymene ornata	+	<1 %	10 cm	WO4-38	

Moora **Site** WOR005

Described by BRM **Date** 22/10/00 **Type:** QUADRAT 10x10 m, 30x30
Location: The westernmost ridge of the mine. This site is towards the southern end of the ridge, approximately 350 m ENE of the entry to 'Goonderoo' from the Midlands Road.
MGA Zone 50 407193 **m E** 6623189 **m N** -30.519939 **S lat** 116.032689 **E long**
Habitat: Western slope of north-south trending ridge, towards south end. (Breakaway).
Soil: Grey fine sand.
Rock Type: Chert outcrop, ~70% surface cover.
Vegetation: Regelia megacephala open scrub over Xanthorrhoea drummondii scattered shrubs over Hibbertia subvaginata open shrubland to low open shrubland over Burchardia umbellata, Austrodanthonia acerosa scattered herbs and grasses and *Trifolium arvense var. arvense, *Vulpia myuros var. hirsuta scattered annual herb/grassland.
Vegetation condition: Very good, but has gridlines either side.
Notes: Revisit - Cleared and mined (23 m into new pit from south side).
Species List:

Name	Cover	C Class	Height	Specimen	Notes
Acacia stenoptera	+	<1 %		WO5-20	
Allocasuarina campestris	1	<1 %	1.5 m	WO5-1	
Amphipogon caricinus	+	<1 %		WO5-5	
Austrodanthonia acerosa	+	<1 %		WO5-22	Grass
Avena barbata	+	<1 %			
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %		WO5-14	
Briza maxima	+	<1 %			
Bromus diandrus	+	<1 %		WO5-11	Grass
Burchardia umbellata	+	<1 %		WO5-21	
Cheilanthes adiantoides	+	<1 %		WO5-15	
Comesperma integerrimum	+	<1 %		WO5-3	Climber
Crassula exserta	+	<1 %		WO5-8	
Dichopogon capillipes	+	<1 %		WO5-6	Lilly
Dioscorea hastifolia	+	<1 %		WO5-26	Climber
Drosera aff. macrantha	+	<1 %		WO5-9	
Ehrharta longiflora	+	<1 %		WO5-31	Grass
Hibbertia subvaginata	10	5-10%	1 m		
Hypochaeris glabra	+	<1 %		WO5-33	
Kunzea praestans	+	<1 %		WO5-30	
Lepidosperma leptostachyum	+	<1 %		WO5-7	sedge
Lepidosperma tenue	+	<1 %		WO5-25	sedge
Millotia tenuifolia var. tenuifolia	+	<1 %		WO5-12	
Parentucellia latifolia	+	<1 %		WO5-28	
Pentaschistis airoides	+	<1 %		WO5-10	Grass
Regelia megacephala	50	50-75%	2 m		
Stylidium caricifolium	+	<1 %		WO5-13	
Stypandra glauca	+	<1 %		WO5-4	Lilly
Thomasia grandiflora	+	<1 %		WO5-29	
Trachymene ornata	+	<1 %		WO5-2	
Trachymene pilosa	+	<1 %		WO5-27	

Trifolium arvense var. arvense	+	<1 %		WO5-17	
Urospermum picroides	+	<1 %		WO5-18;3	Daisy
Ursinia anthemoides	+	<1 %			
Vulpia myuros var. hirsuta	+	<1 %		WO5-16	Grass
Xanthorrhoea drummondii	2	1-5%	2.5 m		
Acacia aristulata	+	<1 %		WO5-36	
Acacia congesta subsp. congesta	+	<1 %		WO5-44	
Austrodanthonia setacea	+	<1 %		WO5-43	
Centaurium tenuiflorum	+	<1 %		WO5-37	pink flower
Chamaescilla corymbosa var. corymbosa	+	<1 %		WO5-41	
Daucus glochidiatus	+	<1 %		WO5-39	
Dryandra sessilis var. sessilis	+	<1 %	8 cm	WO5-34	
Elythranthera brunonis	+	<1 %		WO5-35	Orchid
Podolepis lessonii	+	<1 %		WO5-46	Daisy

Moora Site WOR006

Described by MET **Date** **Type:** QUADRAT 10x10 m, 30x30

Location: The westernmost ridge of the mine. This site is towards the southern end of the ridge, approximately 500 m ENE of the entry to 'Goonderoo' from the Midlands Road.

MGA Zone 50 407202 **m E** 6623285 **m N** -30.519074 **S lat** 116.032792 **E long**

Habitat: Gentle mid-slope on east side of ridge, close to cleared area.

Soil: Gravelly, pebbly grey-brown (some humus) silt/fine sand between cobbles and boulders. Has a thin litter layer.

Rock Type: ~25% cover of cobbles/small boulders.

Vegetation: Allocasuarina huegeliana scattered low trees to low open woodland over Dryandra sessilis var. sessilis, Xanthorrhoea drummondii scattered tall shrubs over Kunzea praestans high open shrubland to high shrubland, over Hibbertia subvaginata open heath over Desmocladus flexuosus, Neurachne alopecuroidea, Cheilanthes adiantoides open sedge/grass/fernland with *Pentaschistis airoides, *Briza maxima, *Avena barbata very open annual grassland.

Vegetation condition: Good. Would be Very Good except for weed invasion.

Fire age: >10-15 years.

Notes: Dryandra sessilis var. sessilis large, and skirts on Xanthorrhoea sometimes to ground. Revisit - Subsequently excavated as part of mine pit.

Species List:

Name	Cover	C Class	Height	Specimen	Notes
Allocasuarina campestris	+	<1 %	1.3 m	WO6-7	
Austrodanthonia caespitosa	+	<1 %	7 cm	WO6-18	
Austrodanthonia setacea	+	<1 %	15 cm	WO6-1	Poaceae
Austrostipa mollis	+	<1 %	75 cm	WO6-9	
Austrostipa trichophylla	+	<1 %	6 cm	WO6-5	
Austrostipa variabilis	+	<1 %		WO6-9A	
Avena barbata	+	<1 %	15-20 cm		
Bossiaea sp. Cairn Hill (M Henson CH2-28)	+	<1 %	55 cm	WO6-6	
Briza maxima	+	<1 %	5-10 cm		
Bromus diandrus	+	<1 %	3-5 cm		Poaceae=WO3-22
Burchardia umbellata	+	<1 %	25 cm		=WO3-10
Caesia (Moora hairy stem)	+	<1 %		WO6-4	Redet 14/3/05 MET
Calytrix leschenaultii	<5	1-5%	1-1.2 m		
Chamaescilla corymbosa var. corymbosa	+	<1 %	10-20 cm	WO6-2	
Cheilanthes adiantoides	+	<1 %	5-10 cm		
Comesperma integerrimum	+	<1 %	65 cm		=wo3-7
Desmocladus flexuosus	1-2	1-5%	10-15 cm		
Dianella revoluta var. divaricata	+	<1 %	15 cm		
Dichopogon capillipes	+	<1 %	5 cm		=WO3-20
Dioscorea hastifolia	+	<1 %	1 m		
Drosera aff. macrantha	+	<1 %	50 cm	WO6-3	
Dryandra sessilis var. sessilis	>5	5-10%	4.5 m		
Ehrharta longiflora	+	<1 %	10-15 cm		
Hibbertia subvaginata	35-40	33.3-50%	1-1.5 m		
Hypochaeris glabra	+	<1 %	4 cm		
Kunzea praestans	+/-15	10-25%	2-3.5 m		
Neurachne alopecuroidea	+	<1 %	5 cm		=WO3-4
Parentucellia latifolia	+	<1 %	5 cm		
Pentaschistis airoides	>2	1-5%	3-10 cm		=WO3-25

Schoenia cassiniana	+	<1 %	10 cm	WO6-10	
Stypandra glauca	+	<1 %	40 cm	WO6-8	
Thysanotus manglesianus	+	<1 %	35 cm		
Trifolium arvense var. arvense	+	<1 %	6 cm	WO6-11A	Split.
Trifolium repens var. repens	+	<1 %		WO6-11B	Split from WO6-11B
Ursinia anthemoides	+	<1 %	10-15 cm		
Vulpia myuros var. hirsuta	1	<1 %	3-8 cm		=WO3-23
Acacia aristulata	+	<1 %	40 cm	WO6-16	1 plant.
Acacia lasiocarpa var. sedifolia	+	<1 %	50 cm		=WO3-38
Acacia stenoptera	+	<1 %	40 cm		=WO3-26
Aristida contorta	+	<1 %	20 cm	WO6-21	
Borya sphaerocephala	+	<1 %	2 cm	WO6-14	
Haemodorum simulans	+	<1 %	35 cm	WO6-12	
Hyalosperma cotula	+	<1 %	8-15 cm	WO6-13	
Nuytsia floribunda	+	<1 %	6+ m		
Pityrodia dilatata	+	<1 %	45 cm		
Podolepis lessonii	+	<1 %	8-15 cm	WO6-17	
Trachymene cyanopetala	+	<1 %	4-6 cm	WO6-15	
Tripterococcus brunonis	+	<1 %	40 cm	WO6-20	
Xanthorrhoea drummondii	+	<1 %	1.5-3.1 m		

Arthur and Rhonda Tonkin's

Moora **Site** **ART001**

Described by Malcolm Trudgen **Date** 23/09/2010 **Type** QUADRAT 10x10 m

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 408257 **mE** 6626155 **mN**

Habitat: West-south-westerly to westerly facing gentle upper slope of a ridge.

Soil: Gravely, grey, silty fine sand amongst cobbles and boulders. Coomberdale chert near surface.

Rock Type: Chert

Vegetation: Regelia megacephala open scrub over Ricinocarpos muricatus scattered shrubs over Dichopogon capillipes, Lepidosperma tenue scattered herbs and sedges and *Ursinia anthemoides, Hypochaeris glabra, Ehrharta longiflora, *Vulpia myuros annual herb/grassland with Dioscorea hastifolia open lianes.

Vegetation: Condition: Good, would be very good but high cover of small annual weed species.
Notes: Seasonal conditions: second driest year on record. Cover of all but large shrubs lower than in a higher rainfall year. SE corner is ~1m SSW of a Xanthorrhoea. To the south of quadrat changes to Allocasuarina humilis and Melaleuca (pink) below break away to Southeast Jarrah/Allocasuarina/ Dryandra. Xanthorrhoea dead: alive ratio: 4:1.

SPECIES LIST:

Quad	Name	Cover	C Class	Height	Specimen	Notes
	Allocasuarina humilis	1%		1.8 m	nc	
	Anagallis arvensis	+		0.03 m	nc	blue
	Arctotheca calendula	+		0.08 m	nc	
	Avena barbata	+		0.30 m	nc	
	Bromus diandrus	<1%		0.08-0.12	ART-xx	
	Burchardia umbellata	+		0.40 m	ART01-04	
	Caladenia flava subsp. flava	+		0.10 m	ART01-02	
	Caladenia sp.	+		0.15 m	ART01-X	spiderorchid
	Cheilanthes austrotenuifolia	+		0.10m	ART01-XX	
	Cheilanthes distans	+		0.08 m	ART01-XX	Out (in 30x30 m)
	Crassula colorata var. acuminata	+		0.03 m	ART01-11	
	Crassula exserta				ART01-XX	Bis,
	Desmocladus flexuosus	+		0.10 m	nc	
	Dichopogon capillipes	<1%		0.10-0.15	ART01-05	Lily
	Dioscorea hastifolia	>5%		0.10)0.4-1.	nc	
	Drosera aff. macrantha	+		0.50 m	ART01-03	
	Ehrharta longiflora	>1%		0.10-0.35	nc	
	Hibbertia subvaginata	+		1.1 m	nc	common
	Hypochaeris glabra				nc	

Kennedia prostrata	+	0.05 m	ART01-13	
Lepidosperma tenue	1-2%	0.45 m	ART01-07	
Lolium perenne	+		ART01-x	
Parentucellia latifolia	+	0.05 m	ART01-14	
Petrorhagia prolifera	+	0.05-0.08	ART01-XXx	pink
Podolepis canescens	+	0.08-0.12	ART01-XX	Out (in 30x30 m)
Regelia megacephala	38%	(0.301.5-3.	nc	
Rhodanthe polycephala	+	0.05 m	ART01-12	
Ricinocarpos muricatus	5%	1.4-1.7 m	ART01-01	
Silene gallica var. gallica	+	0.10 m	ART01-Xxy	
Stypandra glauca	+	0.80 m	ART01-06	blue lily
Trifolium arvense var. arvense	+	0.05-0.10	ART01-09	clover hairy, oblong
Trifolium campestre var. campestre	+	0.05 m	ART01-08	clover-yellow
Trifolium hirtum	+	0.05-0.10	ART01-10	clover bristly
Ursinia anthemoides	>1%	0.05-0.15	nc	
Vulpia myuros	+		C	
Xanthorrhoea drummondii	+	1.7 m	nc	

Moora **Site** ART002

Described by Malcolm Trudgen **Date** 24/09/2010 **Type** QUADRAT 10x10 m

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 408210 **mE** 6626037 **mN**

Habitat: Southerly facing upper slope (~50 m below crest).

Soil: Gravely-pebbly (chert). Light grey silty fine siliceous sand.

Rock Type: Chert

Vegetation: Allocasuarina humilis open heath over Stylidium septentrionale, Borya laciniata, Cheilanthes adiantoides open herbland/fernland.

Vegetation Condition:

Notes: Seasonal conditions: second driest year on record. Site Soil: is quite dry. Some litter under shrubs. Bare ground: ~40%. Upslope ~10 m has Regelia scattered over Allocasuarina. ~10 m to the south has been cleared. PEG W 1120 N 1960 2 m SSE of SE corner of quadrat.

SPECIES LIST:

Quad	Name	Cover	C Class	Height	Specimen	Notes
	Allocasuarina humilis			(0.7)1.2-1.	nc	
	Arctotheca calendula	+		0.05 m	nc	
	Borya laciniata	>1%		1.5 m	ART02-02	
	Bromus diandrus	+		0.05 m	nc	Out (in 30x30 m)
	Caladenia flava subsp. flava	+		0.04 m	nc	
	Cheilanthes adiantoides	1%		0.05 m	ART02-05b	maiden Hair fern
	Crassula colorata	+		0.03	nc	Out (in 30x30 m)
	Desmocladus flexuosus	+		0.10 m	nc	
	Diplopeltis huegelii subsp. lehmannii	+			ART02-06b	
	Drosera aff. macrantha	+		0.10 m	ART02-08	climber
	Drosera erythrorhiza subsp. erythrorhiza	+		0.01 m	nc	leaves lax.
	Ehrharta longiflora	+		0.04 m	nc	
	Genus sp.	+		0.05 m	ART02-06	inadequate material
	Genus sp.	+		0.08 m	ART02-09	inadequate material
	Hypochaeris glabra	+		0.02 m	nc	
	Millotia tenuifolia var. tenuifolia	+		0.02 m	ART02-07	
	Pentaschistis airoides	+		0.05 m	ART02-04	
	Stylidium septentrionale	<5%		0.05-0.08	ART02-01	
	Thysanotus manglesianus	+		0.50 m	ART02-05a	
	Trachymene cyanopetala	+		0.03 m	ART02-03	
	Ursinia anthemoides	+		0.15 m	nc	Out (in 30x30 m)
	Vulpia myuros	+		0.05 m	nc	

Moora **Site** **ART003**

Described by Malcolm Trudgen **Date** 24/09/2010 **Type** QUADRAT 10x30 m

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 408555 **mE** 6626174 **mN**

Habitat: Slight ridge between two chert ridges at both ends, but mostly to the north/north-north-west.

Soil: Gravelly pebbly light grey silt, fine siliceous sand. Pebbles and gravel are Coomberdale Chert.

Rock Type: Chert

Vegetation: Eucalyptus loxophleba subsp. loxophleba low woodland to low open forest over Melaleuca concreta over Austrostipa trichophylla scattered low tussocks (with scattered introduced herbs and grasses)

Vegetation Condition: Good

Notes: Seasonal conditions: second driest year on record. To avoid edge effects and to get a good 30 m transect this record is 10-15 m wide, with ~20 m being searched beyond each end. High cover of annual weeds. Moraea setifolia: population >100 in transect and past southern end, most plants are flowering.

SPECIES LIST:

Quad	Name	Cover	C Class	Height	Specimen	Notes
	Acacia ligustrina	+		6 m	ART03-xx	
	Amyema preissii	+			ART03-xx	on Acacia
	Arctotheca calendula	+		0.05 m	nc	capeweed
	Atriplex suberecta	+		0.25 m	ART03-xx	spreading
	Austrodanthonia acerosa	+			ART03-xx	
	Austrostipa trichophylla				ART03-xx	
	Brachyscome perpusilla	+			ART03-xx	
	Bromus diandrus	+			ART03-xx	
	Calandrinia calyptrata	+			ART03-xx	
	Cotula turbinata	+			ART03-xx	
	Crassula colorata var. acuminata	+		0.05 m	ART03-xx	
	Dysphania melanocarpa forma melanocarpa	+		0.15 m	ART03-xx	
	Ehrharta brevifolia var. cuspidata	+		0.10 m	ART03-xx	short flowers, Voucher
	Ehrharta longiflora	+			nc	
	Emex australis	+		0.10 m	ART03-xx	
	Erodium botrys	+			ART03-xx	
	Eucalyptus loxophleba subsp. loxophleba	>/=40%		(8)15-20	nc	york gum
	Hypochaeris glabra	C		0.10 m	nc	0.10 m plus flowers
	Lamarckia aurea	+			ART03-xx	
	Maireana marginata	+			ART03-xx	
	Melaleuca concreta	+		2.4 m	ART03-xx	
	Moraea setifolia	+			MET23,609	
	Pentaschistis airoides	+		0.05-0.08	ART03-xx	
	Polycarpon tetraphyllum	+			ART03-xx	
	Ptilotus spathulatus forma spathulatus	+		0.05 m	ART03-xx	
	Schismus barbatus	+		0.07 m	ART03-xx	0.07 m plus culm
	Senecio glossanthus	+			ART03-xx	
	Solanum nigrum	+			ART03-xx	
	Sonchus asper	+			ART03-xx	
	Trachymene cyanopetala	+			ART03-xx	
	Vulpia myuros	+			ART03-xx	

Moora **Site** ART004

Described by Malcolm Trudgen **Date** 16/10/2010 **Type** QUADRAT 10x10 m

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 408782 **mE** 6625729 **mN**

Habitat: Upper north facing sloped ridge.

Soil: Gravelly pebbles, very silty fine siliceous sand amongst cobbles and boulders.

Rock Type: Coomberdale Chert.

Vegetation: Acacia acuminata scattered low trees over Kunzea praestans (Dryandra sessilis) open scrub over Hibbertia racemosa low shrubland over Desmocladus flexuosus low open shrubland and Cheilanthes adiantoides, Cheilanthes distans low open fernland.

Vegetation Condition:

Notes: Seasonal conditions: second driest year on record. Desmocladus is very grazed by kangaroos. Some Dryandra seedlings present. Vegetation: changes just outside north corner of quadrat to Melaleuca shrubland.

Xanthorrhoea at SE corner.

SPECIES LIST:

Quad	Name	Cover	C Class	Height	Specimen	Notes
	Acacia acuminata subsp. acuminata	+		5 m	nc	
	Amyema preissii	+			ART04-26	Out (in 30x30 m) on jarrah
	Austrostipa trichophylla	+		0.35 m	ART04-10b	
	Avena barbata	1%		0.15 m	ART04-10	
	Brachypodium distachyon	+		0.18 m	ART04-19	
	Briza maxima	+		0.12 m	nc	
	Calytrix leschenaultii	+		0.75 m	ART04-20	
	Cheilanthes adiantoides	1%		0.07 m	ART04-02	ART04-04
	Cheilanthes distans	+		0.05 m	ART04-21	
	Crassula exserta	+		0.03 m	ART04-15	
	Desmocladus flexuosus	2%		0.15 m	ART04-05	
	Dichopogon capillipes	+		0.10 m	nc	Out (in 30x30 m)
	Dioscorea hastifolia	+			nc	
	Diplopeltis huegelii subsp. lehmannii	+		0.03 m	ART04-17	
	Drosera aff. macrantha	+		0.20 m	ART04-03a	
	Dryandra sessilis var. sessilis	3%		3.5-4.5 m	ART04-24	=PJ9957
	Ehrharta longiflora	+		0.20 m	ART04-11	
	Genus sp.	+		0.05 m	ART04-14	unknown
	Hibbertia subvaginata	25-30%		0.6-1 m	nc	
	Hypochaeris glabra	+		0.05 m	nc	
	Kunzea praestans	40%		(1.5)2.5-3	nc	
	Laxmannia ramosa subsp. ramosa	+		0.15 m	ART04-06	
	Melaleuca calyptroides	+		1.5 m	ART04-25	Out (in 30x30 m)
	Millotia myosotidifolia	+		0.05 m	ART04-23	
	Neurachne alopecuroidea	+		0.05 m	nc	
	Nuytsia floribunda	+		5 m	nc	
	Pentaschistis airoides	+		0.07 m	ART04-12	
	Petrorhagia prolifera	+		0.10 m	ART04-07b	
	Podotheca gnaphalioides	+		0.12 m	ART04-01	
	Silene gallica var. gallica	+			ART04-07a	bristly
	Trachymene cyanopetala	+		0.05 m	ART04-22	
	Tripteris clandestina	+			ART04-03	
	Urospermum picroides	+		0.10 m	ART04-16	ART04-13
	Ursinia anthemoides	+		0.04 m	ART04-18	
	Vulpia myuros	3%		0.10 m	ART04-08	
	Xanthorrhoea drummondii	>1%		2.4 m	nc	

Moora **Site** ART005

Described by Malcolm Trudgen **Date** 16/10/2010 **Type** QUADRAT 10x10 m

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 408600 **mE** 6625604 **mN**

Habitat: West-south-westerly to westerly facing gentle upper slope of a ridge.

Soil: Gravelly pebbles, very silty fine siliceous sand amongst cobbles and boulders.

Rock Type: Coomberdale Chert.

Vegetation: Allocasuarina huegeliana scattered low trees over Regelia megacephala high shrubland over Cheilanthes adiantoides Low open herbland.

Vegetation Condition:

Notes: Cheilanthes sp. total Cover <5%

SPECIES LIST:

Quad	Name	Cover	C Class	Height	Specimen	Notes
	Acacia acuminata subsp. acuminata	+		4 m	nc	
	Agrostocrinum scabrum	+		0.08 m	ART05-08	
	Allocasuarina huegeliana	1%		5 m	nc	
	Arctotheca calendula	+		0.05 m	nc	
	Avena barbata	1%		0.60 m	nc	
	Briza maxima	1%		1.2 m	nc	

Caladenia flava subsp. flava	+	0.12 m	ART05-15	
Calandrinia sp.	+	0.04 m	ART05-14	
Cheilanthes adiantoides	<5%	0.10 m	ART05-02	ART05-05
Crassula colorata var. colorata	+	0.02 m	ART05-01	
Daucus glochidiatus	+	0.05 m	ART05-04	
Dichopogon capillipes	+	0.10 m	ART05-13	
Dioscorea hastifolia	1%	1.7 m	nc	
Drosera sp.	+	0.20 m	ART05-12	
Ehrharta longiflora	1%	0.30 m	nc	
Erodium botrys	+	0.10 m	ART05-10	
Hibbertia subvaginata	+	0.30 m	nc	
Hypochaeris glabra	2%	0.10 m	nc	
Hypoxis glabella var. leptantha	+	0.08 m	ART05-19	
Millotia myosotidifolia	+	0.08 m	ART05-16	
Parentucellia latifolia	+	0.04 m	ART05-18	
Pentaschistis airoides	+	0.50 m	ART05-09	
Petrorhagia prolifera	+	0.05 m	ART05-11	
Regelia megacephala	28%	2.5-3.5 m	nc	
Stypandra glauca	+	0.25 m	ART05-03	
Trachymene ornata	+	0.05 m	ART05-06	
Trifolium arvense var. arvense	+	0.03 m	ART05-17	
Urospermum picroides	+	0.05 m	nc	monoculus
Ursinia anthemoides	2%	0.20 m	nc	
Vulpia myuros	2%	0.10 m	ART04-08=	

Moora **Site ART006**

Described by Malcolm Trudgen **Date** 16/10/2010 **Type** QUADRAT 25x10 m

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 408681 **mE** 6625521 **mN**

Habitat: East-west trending flowline with gentle slope between XXX parts of a north-south trending ridge.

Soil: Gravelly pebbles, brownish-grey sandy (fine) silty amongst large pebbles and cobbles.

Rock Type: Chert.

Vegetation: Allocasuarina huegeliana, Acacia acuminata low open woodland over Allocasuarina campestris high shrubland over Cheilanthes adiantoides open fernland and Asteraceae / Poaceae (mature/weedy) annual herb/grassland.

Vegetation Condition:
Notes: Seasonal conditions: second driest year on record. Transect 25 m long.
SPECIES LIST:

Quad Name	Cover C Class	Height	Specimen	Notes
Acacia acuminata subsp. acuminata	</=5%	5-7 m	nc	jam
Allocasuarina campestris	25%	2-3 m	nc	
Allocasuarina huegeliana	</=5%	4-7 m	nc	
Arctotheca calendula	+	0.05 m	nc	
Austrostipa trichophylla	+	0.15 m	ART06-07	
Avena barbata	2%	0.35 m	nc	
Brachypodium distachyon	1%	0.25 m	ART06-06	
Briza maxima	+	0.10 m	nc	
Cheilanthes adiantoides	1%	0.05 m	ART06-11	
Daucus glochidiatus	+	0.03 m	nc	
Desmocladus flexuosus	+	0.10 m	nc	
Dichopogon capillipes	+	0.20 m	ART06-13	
Dioscorea hastifolia	+	1.5 m	nc	
Ehrharta longiflora	+	0.10 m	nc	
Erodium botrys	</=1%	0.45 m	ART06-04	
Euphorbia drummondii subsp. drummondii	+	0.03 m	ART06-03	
Hypochaeris glabra	1%	0.05 m	nc	
Linum trigynum	+	0.07 m	ART06-09	
Neurachne alopecuroidea	+	0.08 m	nc	
Pentaschistis airoides	+	0.08 m	ART06-14	
Petrorhagia prolifera	+	0.05 m	ART06-05	
Podolepis lessonii	</=10%	0.20 m	ART06-02	

Ptilotus gaudichaudii var. parviflorus	+	0.10 m	ART06-10
Schoenia cassiniana	5-10%	0.30 m	ART06-01
Silene gallica var. gallica	+	0.15 m	ART06-08
Stylidium septentrionale	+	0.05 m	ART06-15
Thysanotus manglesianus	+	1.5 m	ART06-12
Trachymene cyanopetala	+	0.08 m	ART06-16
Trachymene ornata	+	0.10 m	nc
Urospermum picroides	+	0.08 m	ART04-16=
Ursinia anthemoides	8%	0.20 m	nc
Vulpia myuros	3%	0.10 m	nc

Moora **Site** **ART007**

Described by Malcolm Trudgen **Date** 17/10/2010 **Type** RAT 10x10 m

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 410277 **mE** 6625428 **mN**

Habitat: Upper west facing slope of a ridge (north-south trending).

Soil: Gravelly pebbly grey, fine silty siliceous sand.

Rock Type: Chert

Vegetation: Allocasuarina huegeliana low woodland over Xanthorrhoea drummondii scattered shrubs over Hibbertia racemosa, Trymalium ledifolium var. rosmarinifolium low open shrubland over Cheilanthes austrotenuifolia low open fernland with Ursinia anthemoides, Dioscorea hastifolia XXXXXXXX annual herbland

Vegetation Condition:

Notes: Seasonal conditions: second driest year on record. Allocasuarina litter under trees. Occasional small patches of Kunzea praestans. Most of Xanthorrhoea dead, (apparently) fire killed and would have been ~3% cover before deaths. Xanthorrhoea at NE corner of quadrat.

SPECIES LIST:

Quad	Name	Cover C Class	Height	Specimen	Notes
	Acacia acuminata subsp. acuminata	+	5.5 m	nc	on edge
	Allocasuarina campestris	+	2.4 m	nc	Out (in 30x30 m)
	Allocasuarina huegeliana	25%	4-5.6 m	nc	
	Austrostipa elegantissima	+	0.25 m	ART07-07	Out (in 30x30 m)
	Austrostipa trichophylla	+	0.10 m	ART07-13	
	Avena barbata	1	0.35 m	nc	
	Briza maxima	+	0.05-0.07	nc	
	Bromus diandrus	+		ART07-xx	
	Cheilanthes austrotenuifolia	1	0.08-0.12	nc	
	Crassula exserta	+		ART07-12	
	Daucus glochidiatus	+	0.05 m	ART07-01	
	Desmocladus flexuosus	+	0.10 m	nc	
	Dichopogon capillipes	+		ART07-11	
	Dioscorea hastifolia	2%	0.15 m	nc	
	Diplopeltis huegelii subsp. lehmannii	+	0.10 m	nc	Out (in 30x30 m)
	Drosera sp.	+	0.10 m	ART07-10	inadequate material
	Ehrharta longiflora	+	0.05 m	nc	
	Elymus sp.	+	0.10 m	ART07-09	inadequate material
	Hibbertia subvaginata	1%	0.30-0.60	nc	
	Hypochaeris glabra	+	0.05 m	nc	
	Kunzea praestans	+	2.5 m	nc	
	Lolium perenne	+	0.10 m	ART07-14	
	Neurachne alopecuroidea	+	0.03 m	ART07-04	
	Pentaschistis airoides	+	0.04 m	ART07-08	
	Petrorhagia prolifera	+	0.05 m	ART07-05	
	Silene gallica var. gallica	+	0.04 m	ART07-03	
	Stypandra glauca	+	0.10 m	nc	
	Trachymene ornata	+	0.07 m	nc	
	Trymalium ledifolium var. rosmarinifolium	+	0.40-0.70	nc	
	Urospermum picroides	+	0.05 m	ART04-16=	
	Ursinia anthemoides	</=5%	0.10-0.25	nc	
	Vulpia myuros	+	0.10 m	ART07-02	
	Xanthorrhoea drummondii	</=3%	1.9 m	nc	mostly dead.

Moora **Site ART008**

Described by Malcolm Trudgen **Date** 17/10/2010 **Type** QUADRAT 10x10 m

MGA Zone 50 408257 **mE** 6626155 **mN**

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 408155 **mE** 6627780 **mN**

Habitat: Crest of a ridge north-south trending.

Soil: Gravelly pebbly light grey silty fine siliceous sand with Allocasuarina needle litter layer 1-2(3) cm thick.

Rock Type: Coomberdale Chert.

Vegetation: Allocasuarina huegeliana, Acacia acuminata low open forest over Xanthorrhoea drummondii open shrubland over Lomandra aff. micrantha subsp. micrantha, Neurachne alopecuroidea, Austrostipa trichophylla scattered low grasses and herbs and *Ehrharta longiflora, *Avena fatua annual grassland.

Vegetation Condition:

Notes: Seasonal conditions: second driest year on record. No Hibbertia or small shrubs. Xanthorrhoea drummondii numbers are declining due to death. However, the live: dead ratio is approximately (currently) the same.

SPECIES LIST:

Quad	Name	Cover	C Class	Height	Specimen	Notes
	Acacia acuminata subsp. acuminata	5%		5-7 m	nc	
	Allocasuarina huegeliana	>/-25%		5-8 m	nc	
	Austrostipa trichophylla	+		0.25 m	ART08-05	
	Avena barbata	2%		0.40 m	nc	
	Briza maxima	+		0.08 m	nc	
	Bromus diandrus	+		0.03 m	ART08-06	
	Calandrinia calyptrata	+		0.03 m	ART08-03	
	Cheilanthes distans	+		0.05 m	ART08-04	
	Comesperma integerrimum	+		0.70 m	ART08-11	Out (in 30x30 m)
	Convolvulus angustissimus subsp. angustissimus	+		0.60 m	ART08-10	Out (in 30x30 m)
	Crassula colorata var. acuminata	+		0.03 m	ART08-08	Out (in 30x30 m)
	Dioscorea hastifolia	+		0.20 m	nc	
	Ehrharta longiflora	5%		0.15-0.60	nc	
	Hypochaeris glabra	+		0.05 m	nc	
	Kunzea praestans	+		1 m	nc	
	Lomandra (Moora twisty)	+		0.15 m	ART08-07	
	Lomandra aff. micrantha subsp. micrantha	1%		0.15 m	ART08-02	
	Neurachne alopecuroidea	1%		0.10 m	ART08-01	
	Pentaschistis sp.	+		0.05 m	nc	
	Petrorhagia dubia	+		0.05 m	=	= Glabrous SILENE
	Pityrodia dilatata	+		0.10 m	ART08-09	
	Schoenia cassiniana	+		0.10 m	nc	
	Stypandra glauca	+		0.05 m	nc	
	Trachymene ornata	+		0.05 m	nc	
	Urospermum picroides	+		0.05 m	nc	'Sonchus' bristly
	Ursinia anthemoides	1%		0.10-0.15	nc	
	Vulpia myuros	+		0.10 m	nc	
	Xanthorrhoea drummondii	3%		1.5-2.2 m	nc	

Moora Site ART009

Described by Malcolm Trudgen **Date** 17/10/2010 **Type** QUADRAT 10x10 m

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 408488 **mE** 6626805 **mN**

Habitat: Southerly facing midslope at the southern end of a ridge.

Soil: Gravelly pebbly very silty light grey siliceous fine sand amongst cobbles and outcrop of Coomberdale Chert.

Rock Type: Coomberdale Chert (at depth)

Vegetation: Kunzea praestans, Dryandra sessilis high shrubland to open scrub over Xanthorrhoea drummondii open shrubland over Hibbertia racemosa low open shrubland over *Avena, *Bromus diandrus, Hypochaeris glabra annual grass/herbland.

Vegetation Condition: Good.

Notes: Very poor season, drought year (second driest year on record). Xanthorrhoea numbers are declining through death.

SPECIES LIST:

Quad	Name	Cover	C Class	Height	Specimen	Notes
	Arctotheca calendula	+		0.02 m	nc	
	Austrostipa trichophylla	1%		0.20 m	ART09-02	
	Avena barbata	2%		0.10-0.30	nc	
	Brachypodium distachyon	+			C	
	Briza maxima	+		0.03-0.05	nc	
	Calytrix leschenaultii	+		0.40 m	C	blue
	Cheilanthes austrotenuifolia	+		0.05 m	nc	
	Crassula colorata var. colorata	+		0.03 m	ART09-05	
	Cynosurus echinatus	1%		0.10 m	ART09-01	
	Desmocladus flexuosus	1-2%		0.10 m	nc	
	Dioscorea hastifolia	+		0.20 m	nc	
	Diplopeltis huegelii subsp. lehmannii	+		0.30 m	nc	
	Dryandra sessilis var. sessilis	2%		3.5-5 m	ART09-xx	
	Ehrharta longiflora	2%		0.20 m	nc	
	Enchylaena tomentosa var. tomentosa	+		0.15 m	ART09-04	
	Erodium botrys	1%		0.05 m	ART09-03	
	Hibbertia subvaginata	<5%		0.40-0.90	nc	
	Hypochaeris glabra	<5%		0.05 m	nc	
	Kunzea praestans	>25%		2.8-4.5 m	nc	
	Melaleuca calyptroides	+		2 m	ART09-08	
	Neurachne alopecuroidea	+		0.07 m	nc	Out (in 30x30 m)
	Nuytsia floribunda	+		3-6 m	nc	
	Opercularia vaginata	+		0.25 m	ART09-06	Out (in 30x30 m)
	Pentaschistis airoides	+		0.05 m	nc	
	Petrorhagia dubia	+		0.05 m	nc	
	Silene gallica var. gallica	+		0.05 m	nc	
	Thysanotus manglesianus	+		1.4 m	ART09-07	
	Urospermum picroides	+		0.10 m	nc	bristly
	Ursinia anthemoides	2%		0.10 m	nc	
	Vulpia myuros	+		0.15 m	nc	
	Xanthorrhoea drummondii	</=1%		2-3 m	nc	

Moora **Site ART010**

Described by Malcolm Trudgen **Date** 17/10/2010 **Type** QUADRAT 10x10 m

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 407669 **mE** 6625875 **mN**

Habitat: North-west facing moderate upper slope to crest of the northern end of a low ridge.

Soil: Gravelly pebbly very silty fine light grey siliceous sand with 1-2 cm litter layer of Allocasuarina needles; amongst cobbles and boulders of Coomberdale Chert.

Rock Type: Coomberdale Chert at depth.

Vegetation: Allocasuarina huegeliana low open forest over Allocasuarina campestris, Xanthorrhoea drummondii shrubland/ high shrubland over Hibbertia racemosa low open shrubland over Austrostipa trichophylla, Austrostipa hemipogon scattered grasses.

Vegetation Condition: Very good.

Notes: Seasonal conditions: second driest year on record. Allocasuarina needles are suppressing weeds; which have very low cover. Some dead Xanthorrhoea but not a high percentage.

SPECIES LIST:

Quad	Name	Cover	C Class	Height	Specimen	Notes
	Allocasuarina campestris	10-15		1.7-2.2 m	nc	
	Allocasuarina huegeliana	30		4-6 m	nc	
	Austrodanthonia acerosa	+		0.10 m	ART10-07	ART10-15
	Austrostipa hemipogon	<1		0.20 m	ART10-06	
	Austrostipa trichophylla	+		0.15 m	ART10-14	Out (in 30x30 m)
	Avena barbata	1		0.15-0.25	nc	
	Borya laciniata	+		0.05 m	ART10-08	
	Briza maxima	+		0.03 m	nc	

Burchardia umbellata	+	0.10 m	nc	
Calandrinia calyptrata	+	0.05 m	ART10-10	
Cheilanthes austrotenuifolia	2	0.03 m	nc	
Desmocladus flexuosus	>1	0.10 m	ART10-05	
Dichopogon capillipes	+	0.03 m	ART10-03	
Dioscorea hastifolia	1	0.10-0.50	nc	
Drosera aff. macrantha	+	0.20 m	ART10-12	Out (in 30x30 m)
Ehrharta longiflora	+	0.15-0.20	nc	
Hibbertia subvaginata	<5	0.5-0.8 m	nc	
Hordeum leporinum	+	0.05 m	nc	
Hypochaeris glabra	+	0.02 m	nc	
Lomandra (Moora twisty)	+	0.20 m	ART10-04	
Neurachne alopecuroidea	+	0.05 m	ART10-02	
Pentaschistis airoides			ART10-09	
Petrorhagia prolifera	+	0.04 m	ART10-11	
Pityrodia dilatata	+	0.20 m	ART10-01	on edge of quadrat
Schoenia cassiniana	+	0.08 m	nc	
Stypandra glauca	+	0.20 m	nc	
Trachymene cyanopetala	+	0.05 m	ART10-13	Out (in 30x30 m)
Trachymene ornata	+	0.03 m	nc	Out, in 30x30 m
Urospermum picroides	+	0.05 m	=	bristly
Ursinia anthemoides	+	0.10 m	nc	
Vulpia myuros	+	0.05 m	nc	
Xanthorrhoea drummondii	</=5	1.5-2.2 m	nc	

Moora **Site ART011**

Described by Malcolm Trudgen **Date** 17/10/2010 **Type** QUADRAT 10x10 m

Location: North of Kiaka Road, East of Midlands Road, approximately 17 km North of Moora.

MGA Zone 50 407635 **mE** 6625755 **mN**

Habitat: Moderate westerly facing midslope of a ridge.

Soil: Grey-brown gravelly pebbly silty grey fine siliceous sand.

Rock Type: Chert

Vegetation: Eucalyptus accedens scattered trees over Acacia acuminata, Allocasuarina huegeliana low woodland over Xanthorrhoea drummondii scattered shrubs/tall shrubs over annual grassland and herbland.

Vegetation Condition: Good?
Notes: Seasonal conditions: second driest year on record. Gilberta tenuifolia: daisy yellow, reflexed bracts, abundant on lower slopes. Gilberta tenuifolia: daisy yellow, reflexed bracts, abundant on lower slopes

SPECIES LIST:

Quad	Name	Cover C Class	Height	Specimen	Notes
	Acacia acuminata subsp. acuminata	10-20%	4-7 m	nc	jam
	Allocasuarina huegeliana	1%	7-8 m	nc	
	Austrodanthonia caespitosa	+		ART11-02	
	Austrostipa trichophylla	1		ART11-05	
	Avena barbata	>15%	0.50 m	nc	
	Borya sp.	+	0.03 m	nc	
	Cheilanthes austrotenuifolia	1%	0.03 m	nc	
	Desmocladus flexuosus	+	0.10 m	nc	
	Dichopogon capillipes	+	0.07 m	ART11-08	
	Dioscorea hastifolia	+	0.30 m	nc	
	Elymus sp.	+	0.05 m	nc	Inadequate material
	Enchylaena tomentosa var. tomentosa	+	0.10 m	nc	
	Eucalyptus wandoo subsp. wandoo	1-2%	7-13 m	ART11-01	
	Gilberta tenuifolia	+	0.05-0.07	ART11-09	
	Goodenia berardiana	+	0.15 m	ART11-07	
	Neurachne alopecuroidea	+		nc	
	Pentaschistis sp.	+	0.08 m	nc	
	Petrorhagia dubia	+	0.10 m	nc	
	Podolepis lessonii	<5%		nc	
	Ptilotus drummondii var. drummondii	+	0.15 m	ART11-06	
	Ptilotus polystachyus var. polystachyus	+	0.15 m	ART11-04	

Schoenia cassiniana	+	0.15 m	nc	
Trachymene ornata	+	0.05 m	nc	
Urospermum picroides	+	0.15 m	nc	Monoculus monstrossa
Ursinia anthemoides	+		nc	
Vulpia myuros	+	0.05 m	nc	
Waitzia nitida	+		ART11-03	
Xanthorrhoea drummondii	<5%	1.5-3 m	nc	

APPENDIX 7: Vegetation Classification of the survey area

Introductory notes

This appendix contains a classification of the vegetation of the Coomberdale Chert Threatened Ecological Community, which is located on a group of chert ridges north of Moora. The vegetation is classified at three levels; vegetation alliance, vegetation association and plant community. Descriptions are provided for each of these levels. The distribution of the plant communities described are shown on Map 5 by their codes and of the alliances by colour (with a key to the alliances by colour given on the map).

Most of this vegetation is either:

- on outcrop of the Coomberdale Chert;
- on soils overlaying the Coomberdale Chert;
- on soils derived from the Coomberdale Chert (e.g. loamy soils with much chert gravel on slopes adjacent to outcrop of Coomberdale Chert); or
- on soils with a significant contribution from the Coomberdale Chert (e.g. soils on dolerite dykes with a surface layer that contains significant amounts of gravel from the Coomberdale Chert.

Some remnant vegetation described and mapped within the survey area was probably not derived from chert. This includes some small areas of sand and some valley floors that may have relatively little influence in the development of their soil from the Coomberdale Chert.

Where plant communities were defined from releve descriptions, those releve descriptions are shown in this appendix. Where plant communities were defined wholly or in part from quadrat descriptions, only the quadrat name is given as details of the quadrats are included in another appendix in this report (Appendix 6).

Vegetation Alliance 1: *Eucalyptus salmonophloia* woodlands to open forests

Salmon gum open forest occurred in a few locations in the study area, in small valleys between low ridges and in a few places in the remnant vegetation at the base of the chert ridges on the edge of broad valley floors now largely cleared for farming.

Vegetation Association Es: *Eucalyptus salmonophloia* (*Eucalyptus wandoo* subsp. *wandoo*) over *Dodonaea inaequifolia* high open shrubland.
Plant Communities:
Es1: *Eucalyptus salmonophloia*, (*Eucalyptus wandoo* subsp. wandoo) woodland over *Dodonaea inaequifolia* high shrubland over *Acacia erinacea* open shrubland over *Austrostipa scabra, Austrostipa elegantissima, Austrostipa trichophylla, Austrodanthonia setacea* scattered grasses.

One quadrat (CAH16) was recorded in this plant community.

Vegetation Association EsEl: *Eucalyptus salmonophloia* woodland over *Eucalyptus loxophleba* subsp. *loxophleba* low woodland over scattered *Acacia erinacea* and scattered herbs and grasses including *Ptilotus divaricatus* var. *divaricatus, Rhodanthe polycephala* and **Bromus diandrus*.

Plant Communities:

EsEl.1: *Eucalyptus salmonophloia* woodland over *Eucalyptus loxophleba* subsp. *loxophleba* low woodland over (*Rhagodia preissii* ssp. *preissii* scattered shrubs) over *Ptilotus divaricatus* var. *divaricatus*, *Rhodanthe polycephala* scattered herbs
Two releves were recorded in this plant community: releves CR52 and G329.
Releve CR52
Date: 23/11/03
Location: Cairn Hill Reserve (eastern boundary).
AMG84: 50J 0407779/UTM 66 21175 (WGS 84; GPS unit).
Site description: Lower slope and valley floor at base of east-facing slope of low rocky ridge (flat to very gently sloping to the east).
Soil: Gravelly, pebbly brown sand.
Vegetation description: Eucalyptus salmonophloia (10-20%, 18-20m,) woodland over Eucalyptus loxophleba subsp. loxophleba (20-30%, 8-10m) low woodland over Acacia ligustrina (+, 3-3.5m) scattered tall shrubs over Rhagodia preissii ssp. preissii scattered shrubs over Ptilotus divaricatus var. divaricatus, Lepidium rotundum, Rhodanthe polycephala scattered herbs.
Associated species: Crassula colorata, Acacia erinacea.

Releve G329
Date: 17/2/05
Location: Gardiner's Property
AMG84: 50J 0407385/UTM 66 18820(WGS 84; GPS unit).
Vegetation description: Eucalyptus salmonophloia, Eucalyptus loxophleba subsp. loxophleba low open forest over *Bromus diandrus annual grassland.

EsEl.2: *Eucalyptus salmonophloia* open forest over *Eucalyptus loxophleba* subsp. *loxophleba* low open woodland over (*Acacia erinacea* scattered shrubs) over *Ptilotus divaricatus* var. *divaricatus*, *Maireana marginata*, *Maireana enchylaenoides* very open herbland.

This plant community differed by having a number of Chenopod herb species present. It occurred at Gardiner's Hill. Releves GHR266 and GHR267.

Releve GHR267
Date: 15/1/04
Location: Gardiner's hill
AMG84: 50J 0408382/UTM 66 17316 (WGS 84; GPS unit).
Site description: Gentle, north-west facing floor of broad drainage line (elevation 250 m).
Vegetation description: Eucalyptus salmonophloia (40-50%) open forest over Eucalyptus loxophleba subsp. loxophleba ((8)10-12 m) (5%) low open woodland over Acacia microbotrya scattered tall shrubs over Templetonia smithiana (1.3m), Acacia erinacea scattered shrubs over Ptilotus divaricatus var. divaricatus scattered low shrubs over Maireana marginata (2-3%) (patchy), Maireana enchylaenoides, Calandrinia sp. (3-5%) (patchy), Crassula colorata var. colorata very open herbland over Austrostipa elegantissima, Austrodanthonia setacea, Austrostipa trichophylla scattered grasses and Ehrharta longiflora very open annual grassland.
Associated species: Austrostipa elegantissima, Maireana brevifolia (generally slightly upslope on the lower slopes), Lythrum trigynum (patches of closed herbland further down drainage line).
Condition: Very good - low weed cover.
Note: similar to CR52.

Releve GHR267
Date: 15/1/04
Location: Gardiner's Hill
AMG84: 50J 0408292/UTM 66 17568 (WGS 84; GPS unit).
Site description: Gentle, south-west facing lower to mid slope at base of rocky ridge
Rock type: Unknown.

Vegetation description: Eucalyptus salmonophloia (30-50%) open forest over Eucalyptus loxophleba subsp. loxophleba (5-10%) low open woodland over Ptilotus divaricatus var. divaricatus, Maireana marginata, Maireana enchylaenoides, Atriplex suberecta (30 cm) scattered low herbs over Calandrinia sp. (5-10%) very open to open herbland with Bromus diandrus scattered annual grasses.
Condition: Very good to excellent.
Notes: Upslope from unit R266. (Elevation 248 m).

Vegetation Alliance 2: *Eucalyptus wandoo* subsp. *wandoo* woodlands and open forests

Vegetation Association Ew: *Eucalyptus wandoo* subsp. *wandoo* low woodland or open forest over open herb/grassland that included *Opercularia vaginata*, *Lomandra effusa*, *Orthrosanthus laxus*, *Crassula colorata* var. *colorata*, *Trachymene pilosa* and *Waitzia nitida* herbs and *Austrodanthonia setacea* and *Austrostipa exilis* grasses.
Plant Communities:
Ew.1: *Eucalyptus wandoo* subsp. *wandoo* woodland over scattered herbs.
Quadrats ERG4 and CAH20; releves NBPD6 and CSR326.

Releve NBPD6
Date: 12/04
Location: Doblestein's property.
AMG84: 50J 409150/UTM 6621500 (WGS 84; GPS unit).
Site description: Ridge
Vegetation description: Eucalyptus wandoo subsp. wandoo low open woodland.
Notes: Off map. Eucalyptus wandoo subsp. wandoo low open woodland on the eastern side of NW to SE line along the ridge crest (York gum on the west side). Photo: BM13-19.

Releve CSR326
Date: 17/2/05
Location: Kim Chester's property.
AMG84: 50J 0407619/UTM 66 19640 (WGS 84; GPS unit).
Site description: Moderate, east-facing slope of low ridge.
Soil: Gravelly, pebbly brown sand.
Rock type: Chert?
Vegetation description: *Eucalyptus wandoo* subsp. *wandoo* (40-50%) low open forest over **Avena barbata*, **Ehrharta longiflora* annual grassland.
Condition: Very poor (annual grassland of weeds).

Ew.2: *Eucalyptus wandoo* subsp. *wandoo* woodland over *Allocasuarina campestris* high shrubland (probably an intermediate unit). Quadrat ERG16 (see description in Appendix 6).

Ew.3: *Eucalyptus wandoo* subsp. *wandoo* woodland over *Acacia acuminata* subsp. *acuminata* low woodland over herbland/sedgeland/grassland. Releves CR5, CR6, GHR296 and ATR012.

Releve CR5.
Date: 7/11/03
Location: South-east corner of Cairn Hill.
AMG84: 50J 0407804/UTM 66 20140 (WGS 84; GPS unit).
Site description: East facing, moderate mid slope to lower slope of a low ridge.
Soil: Cobbly, gravelly brown clayey loam.
Vegetation description: *Eucalyptus wandoo* subsp. *wandoo* woodland over *Acacia acuminata* subsp. *acuminata* low woodland over *Allocasuarina campestris* scattered tall shrubs over *Opercularia vaginata*, *Lomandra effusa*, *Orthrosanthus laxus*, *Waitzia nitida* very open herbland.

Associated species: Austrostipa elegantissima, Cheilanthes adiantoides, Crassula colorata var. colorata, Neurachne alopecuroidea, Ptilotus manglesii (lower slopes).
Condition: Excellent (disturbance (old tracks) near by).

Releve CR6 (~CR5)
Date: 8/11/03
Location: Southern boundary of Cairn Hill.
AMG84: 50J 0407832/UTM 66 20037 (WGS 84; GPS unit).
Site description: Gently sloping mid-slope, east facing, of low ridge.
Soil: Gravelly, cobbly brown loamy sand.
Vegetation description: Eucalyptus wandoo subsp. wandoo (~35-40%) open forest over Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris scattered tall shrubs over Ptilotus drummondii var. drummondii (+), Dichopogon capillipes scattered herbs over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses.
Associated species: Austrodanthonia setacea, Austrostipa exilis, Vulpia myuros var. hirsuta, Ursinia anthemoides, Trachymene cyanopetala, Crassula colorata var. colorata.
Condition: Excellent.
Notes: Similar and near CR5 but soil with less clay and much less Acacia acuminata subsp. acuminata and herb/sedge layer different.

Releve GHR296
Date: 18/1/04
AMG84: 50J 0408455/UTM 66 17005 (WGS 84; GPS unit).
Location: Gardiner's Hill
Site description: Moderate, east-facing lower slope of low rocky ridge.
Rock type: Chert.
Vegetation description: Eucalyptus wandoo subsp. wandoo scattered trees over Acacia acuminata subsp. acuminata scattered low trees over Neurachne alopecuroidea scattered tall grasses with Podolepis canescens (30%), Lawrencella rosea (3-5%), Gilberta tenuifolia (5-10%) herbland and Cheilanthes adiantoides very open fernland.
Condition: Very good.

Ew.4: *Eucalyptus wandoo* subsp. *wandoo* woodland over *Olearia dampieri* subsp. *eremicola*, *Hibbertia subvaginata* open (low) shrubland (probably an intermediate unit). Releve ERR189.

Releve ERR189
Date: 3/1/04
Location: Eastern Ridge.
AMG84: 50J 0407907/UTM 66 23764 (WGS 84; GPS unit).
Site description: Moderate, east-facing rocky lower slope of low rocky ridge (elevation 253 m).
Soil: Gravelly, pebbly, cobbly brown sand amongst rocks and rock outcrop (~10-20% of surface cover).
Rock type: chert.
Vegetation description: Eucalyptus wandoo subsp. wandoo (20-25%) woodland over Olearia dampieri subsp. eremicola (2-3%) open shrubland over Trymalium ledifolium var. rosmarinifolium (2-3%), Hibbertia subvaginata (+) (more along boundary of unit) low open shrubland over Lepidosperma tenue (2-3%), Neurachne alopecuroidea (+) very open sedgeland/grassland with Stypandra glauca scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Burchardia umbellata, Trachymene pilosa, Acacia acuminata subsp. acuminata, Dioscorea hastifolia, Chamaescilla corymbosa var. corymbosa.
Condition: Very good (some annual weeds – Ehrharta longiflora, Avena barbata).

Vegetation Association EwDi: *Eucalyptus wandoo* subsp. *wandoo* low open forest over *Dodonaea inaequifolia* scattered tall shrubs to high shrubland.

Plant Communities:
EwDi.1: *Eucalyptus wandoo* subsp. *wandoo* scattered low trees/trees over *Allocasuarina huegeliana* low woodland over *Dodonaea inaequifolia* scattered tall shrubs to high open shrubland over *Trymalium ledifolium* var. *rosmarinifolium*, *Xanthosia fruticulosa* low open shrubland.
Recorded at quadrat CAH10 and releve CR1.

Releve CR1
Date: 7/11/03
Location: Mid southern boundary of Cairn Hill Reserve, in valley (North of CAH 16).
AMG84: 50J 0407560/UTM 66 20092 (WGS 84; GPS unit).
Site description: Lower slope adjacent to valley floor.
Soil: Gravelly, brown loamy sand.
Vegetation description: Eucalyptus wandoo subsp. wandoo woodland over Dodonaea inaequifolia high shrubland to open scrub over Acacia erinacea scattered shrubs over Trymalium ledifolium var. rosmarinifolium (upslope only) low open shrubland over Neurachne alopecuroidea scattered grasses with Cheilanthes adiantoides very open fernland.
Condition: Good to very good (weedy).
Notes: Similar to CAH16, but Eucalyptus wandoo subsp. wandoo rather than Eucalyptus salmonophloia. Dodonaea drops out as move up slope and Trymalium comes in.

Vegetation Association EwTl: *Eucalyptus wandoo* subsp. *wandoo* open woodland over Allocasuarina huegeliana (*Acacia acuminata* subsp. *acuminata*) low open woodland over *Trymalium ledifolium* var. *rosmarinifolium* low open shrubland.

Plant Communities:
EwTl.1: *Eucalyptus wandoo* ssp. *wandoo* open woodland over an *Allocasuarina huegeliana* and *Acacia acuminata* subsp. *acuminata* low open woodland over *Xanthorrhoea drummondii* open shrubland over *Trymalium ledifolium* var. *rosmarinifolium* low open shrubland. Quadrat GH6.

EwTl.2: *Eucalyptus wandoo* ssp. *wandoo* open woodland over *Allocasuarina huegeliana* scattered trees and *Allocasuarina campestris* scattered tall shrubs over *Trymalium ledifolium* var. *rosmarinifolium* scattered low shrubs to low open shrubland. Releve CR15.

Releve CR15
Date: 9/11/03
Location: Cairn Hill, south end (near CAH13).
AMG84: 50J 0407530/UTM 66 20131 (WGS 84; GPS unit).
Site description: Moderately sloping, east-facing, lower to mid slope of low ridge.
Soil: Gravelly, cobbly, bouldery brown sand.
Vegetation description: Eucalyptus wandoo ssp. wandoo (10 to 30-40%) open woodland over Allocasuarina huegeliana scattered low trees over Allocasuarina campestris scattered tall shrubs to high open shrubland over Trymalium ledifolium var. rosmarinifolium (1 to 2-3%), Xanthosia fruticulosa scattered low shrubs to low open shrubland over Neurachne alopecuroidea, Austrodanthonia setacea scattered grasses with Stypandra glauca scattered low herbs and Cheilanthes adiantoides scattered ferns (dead).
Associated species: Acacia microbotrya (to 2-2.5 m), Dichopogon capillipes, Sollya heterophylla, Trachymene pilosa, Austrodanthonia scabra.

Vegetation Association EwAa: *Eucalyptus wandoo* subsp. *wandoo* open woodland over *Acacia acuminata* subsp. *acuminata* low open woodland over *Allocasuarina campestris* open scrub.

Plant Communities:
EwAa.1: *Eucalyptus wandoo* subsp. *wandoo* open woodland over *Acacia acuminata* subsp. *acuminata* low open woodland over *Allocasuarina campestris* open scrub over *Neurachne alopecuroidea* scattered grasses and *Borya sphaerocephala* very open herbland

Recorded at quadrat ART011 and Releve ATR012.

Releve ATR012
Date: 13/11/2010
MGA94: 50J 407671 mE 6625403 mN (WGS 84; GPS unit).
Location: Arthur and Rhonda Tonkin's property.
Site description: Gentle west facing mid slope or a low ridge.
Soil description: Pale brown clay on chert.
Rock type: Coomberdale Chert
Vegetation description: Eucalyptus wandoo subsp. wandoo open woodland over Acacia acuminata subsp. acuminata low open woodland over Allocasuarina campestris open scrub over Neurachne alopecuroidea scattered grasses and Borya sphaerocephala very open herbland.
Associated species: *Avena barbata, Podolepis canescens, Podolepis lessonii
Condition: Good.
Fire Age: >10 years.
Notes: Photos BM33

Vegetation Alliance 3: *Eucalyptus loxophleba* subsp. *loxophleba* low woodlands to low open forests

Vegetation Association El: *Eucalyptus loxophleba* subsp. *loxophleba* low woodland over scattered shrubs and very open herbland.
Plant Communities:
El.1: *Eucalyptus loxophleba* subsp. *loxophleba*, (*Allocasuarina huegeliana*) low woodland.
Recorded at Quadrat ERG17 and releves CNR102 and ERR148.

Releve CNR102
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407817/UTM 66 22007 (WGS 84; GPS unit).
Site description: Gently sloping, east-facing, lower slope of low rocky rise adjacent to valley drainage line.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (10-15%), Acacia acuminata subsp. acuminata (3-5%) low woodland over Eremophyllum tenellum, Podolepis lessonii (1-2%), Waitzia nitida (+) very open herbland.
Associated species: Chamaescilla corymbosa var. corymbosa, Allocasuarina huegeliana.
Notes: Area is very open relative to adjacent units (ie: no Allocasuarina campestris) and therefore may be disturbed.

Releve ERR148
Date: 20/12/03
Location: Eastern Ridge.
AMG84: 50J 0407978/UTM 66 24640 (WGS 84; GPS unit).
Site description: Mid slope of low rocky ridge, moderate slope, east-facing.
Soil: Gravelly, pebbly, cobbly brown sand.

Vegetation description: Eucalyptus loxophleba subsp. loxophleba (20-25%), Allocasuarina huegeliana (5-6%), Acacia acuminata subsp. acuminata (5-8%) low open forest over Waitzia nitida (3-5%), Podolepis lessonii (3-5%) very open herbland and Avena barbata, Briza maxima, Bromus diandrus grassland with Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Dioscorea hastifolia, Allocasuarina campestris, Gilberta tenuifolia, Ptilotus polystachyus.
Condition: Good. Quite high weed cover.

El.2: *Eucalyptus loxophleba* subsp. *loxophleba*, (*Acacia acuminata* subsp. *acuminata*) low woodland. Represented by quadrat GH7 and releves RM3, SWR260 and GHR269.

Releve RM3
Date: 10/12/04
Location: Ron Manning's property.
AMG84: 50J 0408663/UTM 66 22550 (WGS 84; GPS unit).
Site description: Crest (flat) of very shallow saddle with north-south orientation.
Soil: Gravelly brown loamy sand.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba low woodland over Schoenus clandestinus scattered sedges and Borya sphaerocephala (1-2%), Waitzia nitida, Gilberta tenuifolia, Podolepis lessonii, Hyalospermum glutinosum ssp. glutinosum open herbland with Avena barbata, Austrodanthonia sp., Austrostipa scabra scattered grasses to very open grasslands.
Associated species: Lomandra effusa, Acacia acuminata subsp. acuminata, Ptilotus manglesii, Neurachne alopecuroidea, Austrostipa elegantissima.
Condition: Very good (low weed presence) Herb layer present.

Releve SWR260
Date: 15/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0407908/UTM 66 25131 (WGS 84; GPS unit).
Site description: Moderate, south-facing slope of low rocky ridge (elevation 235 m).
Soil: Gravelly, pebbly brown sand amongst boulders and rock outcrop (30-40% surface cover).
Rock type: Chert.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (20-30%), Acacia acuminata subsp. acuminata (5-10%) low woodland to low open forest over Dryandra sessilis var. sessilis (+) scattered tall shrubs over Austrostipa nitida scattered grasses with Podolepis canescens (3-5%), Podolepis lessonii (1-2%), Trachymene cyanopetala (+) very open herbland and Cheilanthes adiantoides scattered ferns and Avena barbarta, Briza maxima open annual grassland.
Associated species: Dichopogon capillipes, Olearia dampieri subsp. eremicola, Tricoryne elatior, Waitzia nitida.
Condition: Poor to good.
Notes: Grass trees dead (quite large).

Releve GHR269
Date: 15/1/04
Location: Gardiner's hill.
AMG84: 50J 0408355/UTM 66 17437 (WGS 84; GPS unit).
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (30-40%), Acacia acuminata subsp. acuminata (1-3%) low open forest over Neurachne alopecuroidea scattered grasses over Waitzia nitida (1-2%), Eremophyllum tenellum (+), Gilberta tenuifolia, Lomandra effusa, Borya sphaerocephala (+) very open herbland and Ursinia anthemoides, Avena barbata, Pentaschistis pallida very open annual grassland/herbland.
Associated species: Dioscorea hastifolia, Dichopogon capillipes.
Condition: Very good. Weed cover ranges from scattered to very open.
Notes: Similar to GH7.

E1.3: *Eucalyptus loxophleba* subsp. *loxophleba*, *Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana* low woodland over *Pityrodia dilatata* low open shrubland. Represented by releve D7.

Releve D7
Date: 9/12/04
Location: Doblestein's property.
AMG84: 50J 0408751/UTM 66 23470 (WGS 84; GPS unit).
Site description: West-facing slopes of low rise.
Rock type: Very rocky – chert.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba, Acacia acuminata subsp. acuminata, Allocasuarina huegeliana low woodland over Pityrodia dilatata low open shrubland (in patches) over Lepidosperma leptostachyum scattered sedges and Austrodanthonia caespitosa (2-4%) (patchy), Avena barbata open grassland with Opercularia vaginata, Gilberta tenuifolia, Podolepis lessonii, Tricoryne elatior open herbland.
Associated species: Neurachne alopecuroidea, Solanum oldfieldii, Trachymene pilosa, Kennedia prostrata, Cheilanthes adiantoides, Dichopogon capillipes.
Condition: Good.

El.4: *Eucalyptus loxophleba* subsp. *loxophleba* scattered trees to low woodland over daisy annual herbland. Recorded at two quadrats, ERG22 and ERG23, on the lower slopes at the base of a low ridge.

El.5: *Eucalyptus loxophleba* subsp. *loxophleba*, *Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana* low woodland over *Trymalium ledifolium* subsp. *rosmarinifolium* scattered shrubs. Recorded on the lower rocky slope of a low ridge at releve CR17.

Releve CR17
Date: 9/11/03
Location: Cairn Hill.
AMG84: 50J 0407492/UTM 66 20230 (WGS 84; GPS unit).
Site description: Moderate, lower rocky slope, north-east facing of low ridge.
Soil: Gravelly, pebbly, cobbly, bouldery brown sand.
Vegetation description: Eucalyptus loxophleba low woodland (15-20%) over Acacia acuminata subsp. acuminata (2-3%), Allocasuarina huegeliana (2-3%) low open woodland over Allocasuarina campestris scattered tall shrubs to high open scrubland over Trymalium ledifolium var. rosmarinifolium, Xanthosia fruticulosa scattered low shrubs over Stypandra glauca low, very open herbland over Neurachne alopecuroidea, Cheilanthes adiantoides scattered grasses and ferns.
Associated species: Austrodanthonia setacea, Dichopogon capillipes, Austrostipa elegantissima, Millotia tenuifolia var. tenuifolia, Trachymene pilosa.
Notes: Large areas of approximately this unit have Allocasuarina huegeliana scattered low trees in the structure.

Vegetation Association Elo: *Eucalyptus loxophleba* subsp. *loxophleba* low open to closed forest over scattered shrubs and very open herbland.

Note: Some degraded sites that are likely to have lost an original shrub layer have been placed here.

Plant Communities:
Elo.1: *Eucalyptus loxophleba* subsp. *loxophleba* low woodland over *Trymalium daphnifolium*. Recorded at quadrat CHN9.

Elo.2: *Eucalyptus loxophleba* subsp. *loxophleba* low open forest over *Dodonaea pinifolia* scattered shrubs. Recorded at releve CR66.

Releve CR66
Date: 25/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407119/UTM 66 21321 (WGS 84; GPS unit).
Site description: Floor of small valley between low rocky ridges, gentle south-facing slope.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (12-14 m – 50-60%) open forest over Dodonaea pinifolia scattered shrubs over Enchylaena tomentosa, Rhagodia drummondii scattered low shrubs over Austrodanthonia scabra, Austrodanthonia acerosa scattered grasses with Lomandra effusa, Chamaescilla corymbosa var. corymbosa, Calandrinia sp. (1-2%), Rhodanthe polycephala (1%), Crassula colorata var. colorata very open herbland.
Associated species: Stylobasium australe (shrub ~ 40 cm), Dichopogon capillipes.

Elo.3: *Eucalyptus loxophleba* subsp. *loxophleba* low open forest over very open herbland. Recorded at releves CR55, CNR96 and CNR101.

Releve CR55
Date: 23/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407820/UTM 66 21420 (WGS 84; GPS unit).
Site description: Valley flat.
Soil: Gravelly, pebbly brown sandy loam (surface).
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (8-10 m, 30-40%) low woodland over Melaleuca concreta scattered tall shrubs to high open shrubland over Neurachne alopecuroidea, Austrostipa elegantissima scattered grasses with Rhodanthe polycephala (5-10%) open herbland.

Releve CNR96
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407604/UTM 66 21874 (WGS 84; GPS unit).
Site description: Flat floor of broad shallow gully sloping very gently to the north between two low rocky rises.
Soil: Gravelly, pebbly.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (30-35%) low mallee woodland over Austrodanthonia scabra (2-3%) very open grassland with Ptilotus drummondii var. drummondii (+), Borya sphaerocephala (+), Calandrinia sp. (2-4%), Eremophyllum tenellum (2-4% mainly between mallee clumps) very open to open herbland.
Associated species: Waitzia nitida, Hakea recurva ssp. recurva, Acacia acuminata subsp. acuminata.
Releve CNR101
Date: 28/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407874/UTM 66 22028 (WGS 84; GPS unit).
Site description: Broad drainage line of moderately wide valley (1/2 km) with low rocky ridges either side.
Soil: Gravelly brown sand with rocks and small boulders (up to 1m diameter).
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (70-80%) closed forest over Rhodanthe polycephala (3-5%), Calandrinia sp. (3-5%), Ptilotus divaricatus var. divaricatus (+) very open herbland.
Associated species: Waitzia nitida.
Condition: Good, some weeds (especially rubbish).

Elo.4: *Eucalyptus loxophleba* subsp. *loxophleba* low woodland over *Santalum acuminatum* scattered shrubs. Recorded at releve SWR242.

Releve SWR242
Date: 12/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408783/UTM 66 25198 (WGS 84; GPS unit).
Site description: Gentle, south-facing slope in narrow but flat (across) valley floor between two rocky (chert) low ridges.
Rock type: Chert.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (25-30%) low woodland over Acacia microbotrya scattered tall shrubs over Crassula colorata, Calandrinia sp. very open herbland with Bromus diandrus very open annual grassland.
Associated species: Acacia acuminata subsp. acuminata.
Condition: Poor to good.

Elo.5: *Eucalyptus loxophleba* subsp. *loxophleba* low open forest. Releve EER142, EER142, ATR011

Releve ERR142
Date: 8/12/03
Location: Eastern Ridge.
AMG84: 50J 0407598/UTM 66 24698 (WGS 84; GPS unit).
Site description: Very gently, north-facing lower slope at base of very low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (60-70%) mallee low open forest over Austrostipa nitida, Austrodanthonia setacea, Avena barbata (1-2%), Bromus diandrus open grassland.
Associated species: Dioscorea hastifolia.
Condition: Poor to very poor. Very heavy weed infestation. Unit adjacent to paddocks.
Note: This community was placed in the association above in the 2006 report as El.5, but is considered better placed here.

Elo.6: *Eucalyptus loxophleba* subsp. *loxophleba* (*Casuarina obesa*) low open forest over ATR09-01, **Ehrharta longiflora* very open annual grassland

Releve ATR011
Date: 12/11/2010
MGA94: 50J 408074 mE 6627384 mN (WGS 84; GPS unit).
Location: Arthur and Rhonda Tonkin's property.
MGA84: 50J 408074 mE 6627384 mN (WGS 84; GPS unit).
GDA: 50J 408074 mE 6627384 mN (WGS 84; GPS unit).
Site description: Flow line at edge of broad flat plain.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (Casuarina obesa) low open forest over ATR09-01, *Ehrharta longiflora very open annual grassland.
Condition: Very poor to Completely Degraded
Fire Age: > 10 years.
Notes: High weed cover, small remnant in paddock with stock?
NB: Similar to vegetation type ATR1

Vegetation Association ElEo: *Eucalyptus loxophleba* subsp. *loxophleba, Eucalyptus obtusiflora* low open woodland over scattered tall shrubs over *Dodonaea inaequifolia* low woodland over scattered shrubs over scattered sedges and very open herbland.
Plant Communities:
ElEo.1: *Eucalyptus loxophleba* subsp. *loxophleba, Eucalyptus obtusiflora, Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana* low open woodland over *Melaleuca radula, Acacia*

microbotrya scattered tall shrubs over *Dodonaea pinifolia, Hakea lissocarpha* low open shrubland over *Desmocladus flexuosus* scattered sedges with *Lawrencella rosea, Podolepis lessonii* very open herbland.
Recorded along the banks of a shallow creek in a deep gully, at releve CR58.

Releve: CR58
Date: 23/11/03
Location: Border between Cairn Hill Reserve and Cairn Hill North.
AMG84: 50J 0407470/UTM 66 21473 (WGS 84; GPS unit).
Site description: Creek bed of deep (10m) gully.
Soil: Gravelly brown sand.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (5-10%), Eucalyptus obtusiflora), Acacia acuminata subsp. acuminata (3-4%), Allocasuarina huegeliana (1-2%) (one overhanging) low open woodland over Melaleuca radula (2%), Acacia microbotrya scattered tall shrubs over Dodonaea pinifolia (5-7%), Hakea lissocarpha low open shrubland over Desmocladus flexuosus, Lepidosperma sp. scattered sedges with Lawrencella rosea, Podolepis lessonii (2-3%) very open herbland and Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Comesperma integerrimum, Austrostipa elegantissima, Waitzia nitida.

Vegetation Association ElXd: *Eucalyptus loxophleba* subsp. *loxophleba* low woodland to low open forest over Xanthorrhoea drummondii scattered shrubs to high open shrubland.
Plant Communities:
ElXd.1: *Eucalyptus loxophleba* subsp. *loxophleba* low woodland to low open forest over Xanthorrhoea drummondii scattered shrubs to high open shrubland.
Represented by releves RM12, CSR323. and G341

Releve RM12
Date: 11/12/04
Location: Ron Manning's property.
AMG84: 50J 0408470/UTM 66 21827 (WGS 84; GPS unit).
Site description: Gentle, west-facing slope of low ridge.
Rock type: Chert (very rocky with rock outcrop).
Vegetation description: Eucalyptus loxophleba subsp. loxophleba scattered low trees over Xanthorrhoea drummondii high open shrubland over Allocasuarina campestris scattered tall shrublands over *Briza maxima, (Neurachne alopecuroidea) very open grassland with Tricoryne elatior, (Gilberta tenuifolia) herbland.
Associated species: Haemodorum simulans, Cheilanthes adiantoides, Dichopogon capillipes, Podolepis lessonii, Austrodanthonia sp., Acacia acuminata subsp. acuminata (juvenile).
Condition: Good.
Notes: Fire >10 years.

Releve CSR323
Date: 16/2/05
Location: Kim Chester's property, south of Cairn Hill.
AMG84: 50J 0407604/UTM 66 19348 (WGS 84; GPS unit).
Site description: Steep, east-facing mid slope of low rocky ridge.
Rock type: Chert.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba, Acacia acuminata subsp. acuminata low woodland over Xanthorrhoea drummondii, Dryandra sessilis var. sessilis, Allocasuarina campestris scattered tall shrubs over Avena barbata, Vulpia myuros var. hirsuta annual grassland.
Condition: Poor to very poor.

Releve G341

Date: 18/2/05
Location: West of Gardiner's Hill.
AMG84: 50J 0407890/UTM 66 18002 (WGS 84; GPS unit).
Site description: Low rocky slope/breakaway on lower slope of valley.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba, (Acacia acuminata subsp. acuminata (+)) low open forest over Xanthorrhoea drummondii scattered tall shrubs over *Avena barbata open annual grassland.
Condition: Poor – very poor.

Vegetation Alliance 4: *Eucalyptus eudesmioides* low mallee woodlands to low mallee open forests

Vegetation Association Ee: *Eucalyptus eudesmioides* low mallee woodland to low mallee open forest over annual grassland.
Plant Communities:
Ee.1: See vegetation description for releve CSR319 below.
Represented by releve CSR319.

Releve CSR319
Date: 16/21/05
Location: Kim Chester's property, south of Cain Hill.
AMG84: 50J 0407251/UTM 66 19392 (WGS 84; GPS unit).
Site description: Moderate, west-facing slope of low rocky ridge.
Vegetation description: Eucalyptus eudesmioides low woodland over Xanthorrhoea drummondii scattered tall shrubs over *Avena barbata, *Bromus diandrus open annual grassland.
Associated species:
Condition: Poor – Very Poor.

Vegetation Association EeDs: *Eucalyptus eudesmioides* low mallee open forest over *Dryandra sessilis* var. *sessilis* high open shrubland and *Hibbertia subvaginata* low open shrubland.
Plant Communities:
EeDs.1: *Eucalyptus eudesmioides* low open forest over *Dryandra sessilis* var. *sessilis* high open shrubland over *Hibbertia subvaginata*, *Calytrix leschenaultii* low open shrubland over *Desmocladus flexuosus* scattered sedges.
Described from releve CR57.

Releve: CR57
Date: 23/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407647/UTM 66 21332 (WGS 84; GPS unit).
Site description: Flat, broad ridge top.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Eucalyptus eudesmioides (60-70%), (4-8m) low open forest over Dryandra sessilis var. sessilis (5-7%) high open shrubland over Hibbertia subvaginata (2-3%), Calytrix leschenaultii (+) low open shrubland over Desmocladus flexuosus scattered sedges.
Associated species: Baeckea sp. Moora (R.Bone 1993/1), Bossiaea sp. Cairn Hill (M Henson CH2-28), Trachymene pilosa, Neurachne alopecuroidea, Xanthorrhoea drummondii, Acacia acuminata subsp. acuminata.

Vegetation Association EeKp: *Eucalyptus eudesmioides* low mallee woodland over *Kunzea praestans* scattered tall shrubs to high shrubland.
Plant Communities:
EeKp.1: *Allocasuarina huegeliana* scattered low trees over *Eucalyptus eudesmioides* low mallee woodland over *Xanthorrhoea drummondii* high open shrubland over *Kunzea praestans* open

shrubland over *Melaleuca calyptroides* open shrubland over *Baeckea* sp. Moora (R.Bone 1993/1), *Calytrix leschenaultii* low open heath over *Lepidosperma leptostachyum* scattered sedges.
Based on description of vegetation at releve CR61.

Releve CR61
Date: 24/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407417/UTM 66 20954 (WGS 84; GPS unit).
Site description: Moderate to steep, west-north-west facing mid-slope of a spur from a low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and rock outcrop.
Vegetation description: Allocasuarina huegeliana scattered low trees over Eucalyptus eudesmioides (20-25%) low mallee woodland over Xanthorrhoea drummondii (2-4%) high open shrubland over Kunzea praestans (10-15%) open shrubland over Melaleuca calyptroides (2-3%) open shrubland over Baeckea sp. Moora (R.Bone 1993/1) (40-50%), Calytrix leschenaultii (1-2%) low open heath over Lepidosperma leptostachyum scattered sedges.

EeKp2: *Allocasuarina huegeliana* low woodland over *Eucalyptus eudesmioides* low woodland over *Dryandra sessilis* subsp. *sessilis* scattered tall shrubs over *Kunzea praestans* scattered tall shrubs over *Xanthorrhoea drummondii* scattered shrubs over *Hibbertia subvaginata* open shrubland over *Bossiaea* sp. Cairn Hill (M Henson CH2-28) scattered low shrubs over very open sedgeland with scattered herbs and scattered ferns.
Based on description of vegetation at releve CR79.

Releve CR79
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407016/UTM 66 21173 (WGS 84; GPS unit).
Site description: Moderate, south-facing mid to lower slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (10-15%) low woodland over Eucalyptus eudesmioides (20-25%) low woodland over Dryandra sessilis subsp. sessilis scattered tall shrubs over Kunzea praestans (1-2%) scattered tall shrubs over Xanthorrhoea drummondii (2-3%) scattered shrubs over Hibbertia subvaginata (3%) open shrubland over Bossiaea sp. Cairn Hill (M Henson CH2-28), Xanthosia fruticulosa (1-2%) scattered low shrubs over Lepidosperma leptostachyum, Desmocladus flexuosus very open sedgeland with Stypandra glauca (+) scattered herbs with Cheilanthes adiantoides scattered ferns.
Associated species: Sollya heterophylla, Neurachne alopecuroidea, Dichopogon capillipes.
Notes: Very small unit.

EeKp.3: *Allocasuarina huegeliana, Eucalyptus eudesmioides* subsp. *eudesmioides*, (*Acacia acuminata* subsp. *acuminata* (+)) low woodland over *Allocasuarina campestris*, *Kunzea praestans*, *Melaleuca radula* high shrubland over *Dodonaea pinifolia* low open shrubland over scattered sedges.
Based on the description of vegetation at releve CR87.

Releve CR87
Date: 27/11/03
Location: Cairn Hill Reserve (near north boundary).
AMG84: 50J 0406986/UTM 66 21462 (WGS 84; GPS unit).
Site description: Lower slope, gently to moderately sloping, north-east facing of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (3-5%), Eucalyptus eudesmioides (10-15%), (Acacia acuminata subsp. acuminata (+)) low woodland over Allocasuarina campestris (15-20%),

Kunzea praestans (1-2%), Melaleuca radula (3-5%), high shrubland over Dodonaea pinifolia (4-5%) low open shrubland over Lepidosperma leptostachyum, Desmocladus flexuosus scattered sedges.
Associated species: Trachymene pilosa, Calytrix leschenaultii, Neurachne alopecuroidea.

Vegetation Association EeId: *Eucalyptus eudesmioides* low mallee woodland over *Xanthorrhoea drummondii* and *Isopogon divergens* scattered shrubs.
Plant Communities:
EeId.1: See releve CR31 vegetation description.

Releve CR31
Date: 15/11/03
Location: Cairn Hill.
AMG84: 50J 0407381/UTM 66 20425 (WGS 84; GPS unit).
Site description: South-west facing moderate upper slope.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and exposed sheet rock.
Vegetation description: Eucalyptus eudesmioides low mallee woodland (10-15%) (in clumps) over Xanthorrhoea drummondii, Isopogon divergens scattered shrubs over Astroloma serratifolium scattered low shrubs over Lepidobolus chaetocephalus, Lepidosperma tenue scattered sedges with Stypandra glauca, Stylidium septentrionale very open herbland.
Associated species: Daviesia dielsii, Chamaescilla corymbosa var. corymbosa, Melaleuca radula, Dichopogon capillipes, Hakea incrassata, Dampiera lavandulacea (~ 30 cm).

Vegetation Association EeRm: *Eucalyptus eudesmioides* low mallee open forest over *Calothamnus* aff. *quadrifidus* Moora-Watheroo, *Regelia megacephala* high open shrubland.
Plant Communities:
EeRm.1: See releve CR28 vegetation description.

Releve CR28
Date: 15/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 407340/UTM 66 20530 (WGS 84; GPS unit).
Site description: Unusual vegetation under Eucalyptus eudesmioides subsp. eudesmioides.
Vegetation description: Eucalyptus eudesmioides (50-70%) (3.5-4 m) low mallee open forest over Calothamnus aff. quadrifidus Moora-Watheroo (5-10%), Regelia megacephala (2-3%) (with more on adjacent slopes), Alyogyne huegelii ssp. grossulariifolia, Allocasuarina campestris high open shrubland to high shrubland over Acacia congesta subsp. congesta (2-3%), Hibbertia subvaginata (1-2%), Bossiaea sp. Cairn Hill (M Henson CH2-28) (C28-3) (3-4%) open shrubland over Lepidosperma tenue scattered sedges.
Associated species: Dianella revoluta var. divaricate, Thomasia grandiflora, Dioscorea hastifolia, Desmocladus flexuosus, Dichopogon capillipes.

Vegetation Alliance 5: *Eucalyptus camaldulensis* open forest to low mallee open forests

Vegetation Association Ec: *Eucalyptus camaldulensis* open forest.
Plant Communities:
Ec.1: See releve CSR346 description.

Releve CSR346
Date: 18/02/05
Location: Kim Chester's property, south of Cain Hill.
AMG84: 50J 0406900/UTM 66 19760 (WGS 84; GPS unit).
Site description: Creek line in valley floor.
Vegetation description: Eucalyptus camaldulensis open forest.

Condition: Poor

Vegetation Alliance 6: *Eucalyptus obtusiflora* low woodlands to low open forests
Vegetation Association Eo: *Eucalyptus obtusiflora,* (*Eucalyptus loxophleba* subsp. *loxophleba*) low mallee open forest over *Acacia erinacea* scattered shrubs over a very open herbland.
Plant Communities:
Eo.1: See releve CNR127 vegetation description below.

Releve CNR127
Date: 4/12/03
Location: Cairn Hill North.
AMG84: 50J 0407444/UTM 66 21737 (WGS 84; GPS unit).
Site description: Flat floor of a dyke, gently sloping north-west, adjacent to top of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown loamy sand.
Vegetation description: Eucalyptus obtusiflora (50-60%), (Eucalyptus loxophleba subsp. loxophleba (3-5%)) low mallee open forest over Acacia erinacea scattered shrubs over Ptilotus divaricatus var. divaricatus (3-5%) very open herbland with Rhodanthe polycephala (2-4%), Calandrinia sp. (+) very open herbland.
Associated species: Comesperma integerrimum.

Vegetation Association EoTd: *Eucalyptus obtusiflora* low mallee woodland to low open forest over *Trymalium daphnifolium, Acacia erinacea* shrubland.
Plant Communities:
EoTd.1: *Eucalyptus obtusiflora* mallee scrub to closed mallee scrub over *Trymalium daphnifolium, Acacia erinacea* shrubland over *Austrodanthonia setacea, Austrostipa elegantissima* scattered low grasses.
One quadrat (CAH14) was recorded in this plant community.

Vegetation Alliance 7: *Eucalyptus horistes* low woodlands to low open forests
Vegetation Association EhAh: *Eucalyptus horistes* mallee woodland over *Allocasuarina huegeliana* low open woodland over scattered shrubs.
Plant Communities:
EhAh.1: See releve CNR121 vegetation description below.
Only a small area of this unit, described at releve CNR121.

Releve CNR121
Date: 4/12/03
Location: Cairn Hill North.
AMG84: 50J 0407470/UTM 66 21643 (WGS 84; GPS unit).
Site description: Flat area on top of low rock ridge.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Eucalyptus horistes (20-30%) mallee woodland over Allocasuarina huegeliana (5-8%) low open woodland over Xanthorrhoea drummondii (1-2%) scattered open shrubland.
Condition: Very disturbed and a very small unit, description not reliable.

Vegetation Association EhEe: *Eucalyptus horistes,* (*Eucalyptus eudesmioides* subsp. *eudesmioides*) mallee woodland to low open forest.
Plant Communities:
EhEe.1: *Eucalyptus horistes,* (*Eucalyptus eudesmioides* (+)) low open forest over annual grassland.
Based on the description at releve CSR327.

Releve CSR327
Date: 17/2/05

Location: Kim Chester's property, south of Cain Hill.
AMG84: 50J 0407395/UTM 66 19571 (WGS 84; GPS unit).
Site description: Gentle, west-facing lower slope of low ridge.
Soil:
Rock type: Chert, cobbles.
Vegetation description: Eucalyptus horistes, (Eucalyptus eudesmioides (+)) low open forest over Ehrharta longiflora, Vulpia myuros var. hirsuta annual grassland.
Associated species:
Condition: Very poor (weed grassland).

EhEe.2: *Eucalyptus horistes*, (*Eucalyptus eudesmioides* subsp. *eudesmioides*) low open mallee woodland over *Allocasuarina campestris*, *Regelia megacephala* high open shrubland to high shrubland over *Melaleuca calyptroides* open shrubland over *Hibbertia subvaginata* scattered low shrubs over *Schoenus brevisetis*, *Lepidosperma leptostachyum* scattered sedges and very open herbland.
Based on the description at releve CR20 (see below).

Releve CR20
Date: 9/11/03
Location: Cairn Hill, southern boundary.
AMG84: 50J 0407372/UTM 66 20015 (WGS 84; GPS unit).
Site description: Lower, moderate slope, south-facing of lower ridge.
Soil: Gravelly, pebbly, dark grey loamy sand.
Vegetation description: Eucalyptus horistes (20-30%, 4-5 m) (Eucalyptus eudesmioides subsp. eudesmioides) low open mallee woodland over Allocasuarina campestris (10%), Regelia megacephala (1-2%), Calothamnus aff. quadrifidus Moora-Watheroo (1-2%), Kunzea praestans (1-2%), Xanthorrhoea drummondii (1-2%) high open shrubland to high shrubland over Melaleuca calyptroides (2-3%) open shrubland over Hibbertia subvaginata, Calytrix leschenaultii, Xanthosia fruticulosa scattered low shrubs over Schoenus brevisetis, Lepidosperma leptostachyum, Desmocladus flexuosus scattered sedges with Stylidium cordifolium, Goodenia glareicola, Stylidium septentrionale very open herbland.
Associated species: Nemcia acuta, Eucalyptus eudesmioides subsp. eudesmioides, Leptomeria preissiana (tree 3 to 3.5 m, appears parasitic growing from base of the Eucalyptus horistes), Neurachne alopecuroidea, Baeckea sp. Moora (R. Bone 1993/1).
Notes: Larger vegetation unit includes areas where Eucalyptus eudesmioides is the dominant Eucalyptus.

Vegetation Alliance 8: *Eucalyptus pruiniramis* low woodland

Vegetation Association Ep: *Eucalyptus pruiniramis* low mallee woodland.
Plant Communities:
Ep.1: Based on the description at releve G347 (see below).
Releve G347.

Releve G347
Date: 12/12/04
Location: Location: Phil & Jenny Gardiner's property, small remnants, just east of Cairn Hill.
AMG84: 50J 0408502East/UTM 66 20294 (WGS 84; GPS unit).
Site description: flat? Crest of low rise, in undulating area.
Rock type: Chert (some exposed outcrop)
Vegetation description: Eucalyptus pruiniramis low mallee woodland.
Associated species:
Condition: Good

Notes: very small area with clump of a few Eucalyptus pruiniramis mallees. Eucalyptus pruiniramis mallee also collected nearby.

Vegetation Alliance 9: *Allocasuarina huegeliana* low woodlands to low open forests
Vegetation Association Ah: *Allocasuarina huegeliana* low woodland to low closed forest over scattered shrubs.

Plant Communities:
Ah.1: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low closed forest (over *Allocasuarina campestris* scattered tall shrubs) over *Crassula colorata* scattered herbs and very open annual grassland.
Releves SWR238, SWR240 and SWR262.

Releve SWR238
Date: 12/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408944/UTM 66 24976 (WGS 84; GPS unit).
Site description: Moderate, south-facing slope along edge of very low chert ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (80-90%), Eucalyptus loxophleba subsp. loxophleba (1-2%), Acacia acuminata subsp. acuminata (1-2%) low closed forest over Crassula colorata scattered herbs with Avena barbata, Ehrharta longiflora, Bromus diandrus very open annual grassland.
Condition: Poor (to very poor).

Releve SWR240
Date: 12/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408911/UTM 66 25175 (WGS 84; GPS unit).
Site description: South-facing gentle rocky upper slope of low chert ridge (elevation 255 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (40-50%), Acacia acuminata subsp. acuminata (3-5%) low open forest over Allocasuarina campestris (+) scattered tall shrubs over Austrostipa sp. scattered grasses and Podolepis lessonii scattered herbs with Avena barbata, Bromus diandrus, Ehrharta longiflora very open annual grassland.
Condition: Poor to very poor.

Releve SWR262
Date: 15/1/04
Location: Stan Ridgeway's property (west).
AMG84: 50J 0407903/UTM 66 25270 (WGS 84; GPS unit).
Site description: Gentle, east-facing upper slope of low rocky ridge (elevation 229 m).
Soil: Gravelly brown sand with rocks and boulders.
Rock type: Blue 'dolerite'?
Vegetation description: Allocasuarina huegeliana (60-70%), Acacia acuminata subsp. acuminata (1-2%), Santalum acuminatum (4-5 m, 2-3%) (in patches) low open forest to low closed forest over Olearia dampieri subsp. eremicola, Allocasuarina campestris (+) scattered tall shrubs over Neurachne alopecuroidea, Austrodanthonia setacea scattered grasses with Cheilanthes adiantoides very open fernland and Avena barbata, Briza maxima very open annual grassland.
Associated species: Dioscorea hastifolia, Wahlenbergia preissii, Phyllangium paradoxum, Chamaescilla corymbosa var. corymbosa.

Ah.2: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland to low woodland over *Xanthorrhoea drummondii*, (*Allocasuarina campestris*) scattered shrubs over *Neurachne alopecuroidea* very open grassland/sedgeland with very open herbland/fernland.
Releves CNR92 and ERR145.

Releve CNR92
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407743/UTM 66 21630 (WGS 84; GPS unit).
Site description: Crest of very low rise (rocky).
Vegetation description: Allocasuarina huegeliana (5-10 (20%)), Acacia acuminata subsp. acuminata (2-3%) low open woodland over Xanthorrhoea drummondii (1-2%) scattered shrubs over Lepidosperma tenue (2-3%), Neurachne alopecuroidea very open sedgeland/grassland with Boronia coerulescens subsp. spinescens (+), Stypandra glauca, Hyalospermum glutinosum ssp. glutinosum (1%), Podolepis lessonii (1-2%), Gilberta tenuifolia (3-5%) very open herbland with Cheilanthes adiantoides (3-5%) very open fernland.
Associated species: Lepidosperma pubisquameum, Dichopogon capillipes.
Condition: Quite a lot weeds (including Clover, therefore Poor to Good.

Releve ERR145
Date: 9/12/03
Location: Eastern Ridge.
AMG84: 50J 0407610/UTM 66 23933 (WGS 84; GPS unit).
Site description: Gentle to moderate, west-facing mid to upper slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with boulders and some rocks (NT).
Vegetation description: Allocasuarina huegeliana (5-8%), Acacia acuminata subsp. acuminata (5-6%) low open woodland to low woodland over Allocasuarina campestris, Xanthorrhoea drummondii scattered tall shrubs over Lepidosperma leptostachyum, Neurachne alopecuroidea scattered sedges/grasses to very open sedgeland over Waitzia nitida, Podolepis lessonii, Gilberta tenuifolia scattered herbs to very open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Goodenia berardiana, *Avena barbarta (2-3%), *Ehrharta longiflora (5%), *Bromus diandrus.
Condition: Poor to very poor. Some areas with less weeds => good condition. Very weedy and may be partially cleared.
Notes: 1) Sedgeland of Lepidosperma pubisquameum in small areas nearby.
2) Probably disturbed – hard to say – a very open area with Allocasuarina campestris scrub areas nearby.

Ah.3: *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low woodland to low open forest over *Allocasuarina campestris* scattered tall shrubs to high open shrubland over *Podolepis lessonii, Trachymene ornata* open annual herbland.
Quadrats JT2 and JT5.

Ah.4: *Allocasuarina huegeliana* low woodland to low open forest over (*Kunzea praestans*, *Xanthorrhoea drummondii*, *Allocasuarina campestris*) scattered tall shrubs over *Xanthosia fruticulosa* scattered low shrubs over *Neurachne alopecuroidea*, *Desmocladus flexuosus* scattered grasses and sedges with *Stypandra glauca* very open herbland.
Quadrat CAH8 and releves CR4 and CR43.

Releve CR4.
Date: 7/11/07
Location: Cairn Hill (Southern end).
AMG84: 50J 0407713/UTM 66 20134 (WGS 84; GPS unit).
Site description: Very gently sloping, north-facing upper slope to crest of low ridge.

Soil: Gravelly, cobbly, bouldery grey sand.
Vegetation description: Allocasuarina huegeliana (40-50%) low open forest over Kunzea praestans, Calothamnus aff. quadrifidus Moora-Watheroo (+), Regelia megacephala (+) scattered tall shrubs to high open shrubland over Xanthosia fruticulosa (5-10%) low open shrubland over Stypandra glauca (+) scattered herbs over Lepidosperma tenue, Desmocladus flexuosus scattered sedges.
Associated species: Neurachne alopecuroidea, Dichopogon capillipes, Trymalium ledifolium var. rosmarinifolium, Lawrencella rosea.

Releve CR43.
Date: 22/11/03
Location: Cairn Hill.
AMG84: 50J 0407717/UTM 66 20600 (WGS 84; GPS unit).
Site description: North-east facing short breakaway (chert) slope above shallow gully near crest of low ridge.
Soil: Gravelly, pebbly, cobbly, bouldery brown sand.
Vegetation description: Allocasuarina huegeliana (40-50%), (Acacia acuminata subsp. acuminata (+) low open forest over Allocasuarina campestris (2% (~ 5-8% on adjacent slope)), Calothamnus aff. quadrifidus Moora-Watheroo (2-3%) high open shrubland over Xanthorrhoea drummondii (3-4%) open shrubland over Hibbertia subvaginata (1-2%), Bossiaea sp. Cairn Hill (M Henson CH2-28) (1%), Xanthosia fruticulosa scattered low shrubs to low open shrubland over Lepidosperma leptostachyum (1%), Desmocladus flexuosus (1-2%), Neurachne alopecuroidea scattered sedges and grasses with Stypandra glauca very open herbland.
Associated species: Dichopogon capillipes, Acacia aristulata, Calytrix leschenaultii, Dioscorea hastifolia, Cheilanthes adiantoides, Lawrencella rosea, Podotheca angustifolia.

Vegetation Association AhAc: *Allocasuarina huegeliana* low woodland to low open forest over *Allocasuarina campestris* scattered shrubs to high open shrubland.

The plant communities referred to this association often have small amounts of additional tree species in the upper layers.

Plant Communities:
AhAc.1: *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata*, *Eucalyptus loxophleba* subsp. *loxophleba* low open woodland over *Allocasuarina campestris*, *Xanthorrhoea drummondii* scattered tall shrubs to high open shrubland over *Lepidosperma tenue* scattered sedges/grasses with very open herbland/fernland.
Releves ERR177, ERR178, ERR180 and G343.

Releve ERR177
Date: 24/12/03
AMG84: 50J 0408065/UTM 66 23003 (WGS 84; GPS unit).
Location: Eastern Ridge.
Site description: Moderate, east-facing mid to upper slope of low rocky ridge.
Rock type: ?Chert (poor quality).
Vegetation description: Allocasuarina huegeliana (2-5%), Acacia acuminata subsp. acuminata (2-3%), Eucalyptus loxophleba subsp. loxophleba (2-3%) low open woodland over Allocasuarina campestris (2) 5-10%), Xanthorrhoea drummondii (3-4%) high open shrubland over Calytrix leschenaultii scattered low shrubs over Lepidosperma tenue (1-2%), Neurachne alopecuroidea, Austrodanthonia acerosa scattered sedges/grasses with Stypandra glauca (+), Podolepis lessonii (2-3%) very open herbland with Cheilanthes adiantoides scattered ferns to very open fernland and Avena barbata, Briza maxima very open annual grassland.
Associated species: Pityrodia sp., Phyllanthus calycinus, Dichopogon capillipes, Chamaescilla corymbosa var. corymbosa, Burchardia umbellata.

Condition: Good to very good. Some weed cover in Avena barbata, Briza maxima, Hypochaeris glabra.
Notes: Very similar to R171.

Releve ERR178
Date: 24/12/03
Location: Eastern Ridge.
AMG84: 50J 0408061/UTM 66 23052 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid to upper slope of low ridge (elevation 244 m).
Vegetation description: Allocasuarina huegeliana (3-5%), Eucalyptus loxophleba subsp. loxophleba (1-2%), Acacia acuminata subsp. acuminata (1-2%) low open woodland over Allocasuarina campestris (+), Xanthorrhoea drummondii scattered tall shrubs over Lepidosperma tenue (2-4%), Austrodanthonia acerosa (1-2%), Neurachne alopecuroidea (+) very open sedgeland/grassland with Pityrodia sp. (+), Tricoryne elatior (+), Podolepis lessonii (2-3%), Borya sphaerocephala (1-2%) very open herbland and Cheilanthes adiantoides scattered ferns.
Associated species: Thysanotus dichotomus, Dichopogon capillipes, Stypandra glauca, Gilberta tenuifolia, Phyllanthus calycinus.

Releve ERR180
Date: 24/12/03
Location: Eastern Ridge.
AMG84: 50J 0407919/UTM 66 23058 (WGS 84; GPS unit).
Site description: Gentle, south to south-west facing upper slope adjacent to ridge top of low rocky ridge.
Vegetation description: Allocasuarina huegeliana (3-5%), Acacia acuminata subsp. acuminata (2-3%), (Eucalyptus loxophleba subsp. loxophleba (1-2%)) low open woodland over Allocasuarina campestris (2-3%) scattered tall shrubs (high open shrubland in small clumps) over Xanthorrhoea drummondii (2-3%) scattered shrubs to open shrubland over Lepidosperma tenue (+), Schoenus clandestinus (2-3%), Austrodanthonia acerosa very open sedgeland/grassland over Gilberta tenuifolia (10-20%), Borya sphaerocephala (2-3 (5-10%) open herbland with areas of annual Avena barbata very open annual grassland.
Condition: Very good (Main weeds Avena barbata and Hypochaeris glabra. Unknown amount of physical disturbance (clearing) in this area. Quite a lot of tree debris down. Small patchy clumps of Allocasuarina campestris scrub with large open areas between. Herbland is intact.)

Releve G343
Date: 18/2/05
Location: Gardiner's property.
AMG84: 50J 0407447/UTM 66 17889 (WGS 84; GPS unit).
Site description: South-facing gentle slope of low ridge.
Vegetation description: Allocasuarina huegeliana (30-40%), (Acacia acuminata subsp. acuminata (+)), Eucalyptus loxophleba subsp. loxophleba (2-4%) low open forest over Allocasuarina campestris (5-15%) high open shrubland to high shrubland over *Avena barbata open annual grasses.
Associated species:
Condition: Poor.

AhAc.2: *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low woodland over *Allocasuarina campestris*, *Xanthorrhoea drummondii*, (*Kunzea praestans*) high open shrubland over *Hakea lissocarpha*, *Calytrix leschenaultii* low open shrubland over *Lepidosperma tenue* scattered sedges/grasses and very open herbland/fernland.
Releve ERR198

Releve ERR198

Date: 4/1/04
Location: Eastern Ridge.
AMG84: 50J 0407866/UTM 66 23121 (WGS 84; GPS unit).
Site description: Gentle, west-south-west facing rocky mid slope of low rocky ridge.
Soil: (NT) gravelly, pebbly, cobbly brown sand with high % of rock cover on surface.
Rock type: = site R168
Vegetation description: Allocasuarina huegeliana (10-15%), Acacia acuminata subsp. acuminata (3-5%) low woodland over Allocasuarina campestris (5-10%), Xanthorrhoea drummondii (2-5%), (Kunzea praestans (+)) high open shrubland over Hakea lissocarpha (2-3%) (80 cm), Calytrix leschenaultii (+) low open shrubland over Lepidosperma tenue (1%), Schoenus clandestinus (+), Desmocladus flexuosus, Neurachne alopecuroidea, Austrodanthonia caespitosa (1%) scattered sedges/grasses to very open sedgeland/grassland with Borya sphaerocephala (1-2%), Gilberta tenuifolia (3-5%) very open herbland and Cheilanthes adiantoides (1-3%) scattered ferns to very open fernland.
Associated species: Dioscorea hastifolia, Burchardia umbellata, Dianella revoluta var. divaricata, Dichopogon capillipes, Podolepis lessonii, Pityrodia dilatata, Stypandra glauca.
Condition: Very good (low weed cover).
Notes: Similar to R168. Hakea lissocarpha not consistent distribution in area. More on mid to lower slope.

AhAc.3: *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low open woodland to low open forest over *Allocasuarina campestris* high open shrubland over *Hibbertia subvaginata* scattered low shrubs over *Neurachne alopecuroidea* scattered grasses/sedges and very open herbland.
Releves CR48, ERR184 and ERR185.

Releve CR48
Date: 21/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407788/UTM 66 21074 (WGS 84; GPS unit).
Site description: Small unit down slope (moderate east-facing chert slope – short slope) of small Regelia megacephala scrub unit.
Vegetation description: Allocasuarina huegeliana (30-40%), Acacia acuminata subsp. acuminata (5-10%) low open forest over Allocasuarina campestris (3-5%) high open shrubland over Hibbertia subvaginata scattered low shrubs over Neurachne alopecuroidea, Desmocladus flexuosus scattered grasses/sedges.
Notes: Lot of Allocasuarina huegeliana lying on ground (recent storm damage) => estimated normal cover (before storm).

Releve ERR184
Date: 1/1/04
Location: Eastern Ridge.
AMG84: 50J 0407710/UTM 66 23708 (WGS 84; GPS unit).
Site description: Rocky gentle, west-facing slope on edge of ridge top and immediately upslope of breakaway on low rocky ridge (elevation 264 m).
Soil: Gravelly, pebbly brown sand with high surface cover of cobbles and rock.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (3-5%), Acacia acuminata subsp. acuminata (2-3%) low open woodland over (Allocasuarina campestris scattered tall shrubs)/Hibbertia subvaginata (1-2%) scattered low shrubs over Neurachne alopecuroidea, Austrodanthonia setacea, Lepidosperma tenue very open grassland/sedgeland with Stypandra glauca scattered herbs and Gilberta tenuifolia very open low herbland with Cheilanthes adiantoides scattered ferns.
Condition: Very good (not many weeds).

Releve ERR185

Date: 2/1/04
Location: Eastern Ridge.
AMG84: 50J 0407780/UTM 66 23744 (WGS 84; GPS unit).
Site description: Gentle, west-facing upper slope of ridge top, just below crest of ridge (elevation 270 m).
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and outcrop (sheet rock) (20-30% surface cover).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5-8%), Acacia acuminata subsp. acuminata (2-3%) low open woodland over Allocasuarina campestris (1-2%) scattered tall shrubs over Xanthorrhoea drummondii (1-2%) scattered tall shrubs over Hibbertia subvaginata (3-4% (5-10%)) open shrubland over Austrodanthonia caespitosa, Austrodanthonia setacea, Neurachne alopecuroidea, Lepidosperma sp., Lepidosperma tenue very open grassland/sedgeland with Podolepis lessonii, Gilberta tenuifolia very open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Olearia dampieri subsp. eremicola, Waitzia nitida Waitzia nitida, Thysanotus dichotomous, Burchardia umbellata, Lawrencella rosea, Dryandra sessilis var. sessilis.
Condition: Very good (only scattered Avena barbata, Briza maxima).

AhAc.4: *Allocasuarina huegeliana* low open woodland over *Santalum acuminatum* low open woodland over *Allocasuarina campestris* high open shrubland over *Hibbertia subvaginata*, *Calytrix leschenaultii*, *Bossiaea* sp. Cairn Hill (M Henson CH2-28) low open shrubland over scattered grasses and scattered herbs.
Releve CNR116.

Releve CNR116
Date: 3/12/03
Location: Cairn Hill North.
AMG84: 50J 0407322/UTM 66 22355 (WGS 84; GPS unit).
Site description: Gentle to moderate, west-facing rocky slope (short slope) on edge of dyke, near ridge top of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with 15% surface rock outcropping.
Vegetation description: Allocasuarina huegeliana (5-10%) low open woodland over Santalum acuminatum (8-10%) low open woodland over Allocasuarina campestris (5-10%) high open shrubland over Hibbertia subvaginata (3-4%), Calytrix leschenaultii (+), Bossiaea sp. Cairn Hill (M Henson CH2-28) (+) low open shrubland over Neurachne alopecuroidea scattered grasses with Stypandra glauca scattered herbs.
Associated species: Acacia acuminata subsp. acuminata, Dichopogon capillipes, Eucalyptus loxophleba subsp. loxophleba.

AhAc.5: Allocasuarina huegeliana (Acacia acuminata subsp. acuminata) low open forest over Allocasuarina campestris, Ricinocarpos muricatus scattered tall shrubs over Hibbertia subvaginata scattered low shrubs.
Releve ATR004.

Releve ATR004
Date**:** 10/11/2010
Location: Arthur and Rhonda Tonkin's property.
MGA94: 50J 408694 mE 6625459 mN (WGS 84; GPS unit).
Site description: Moderate north facing slope of ridge.
Rock type: Chert (high rock cover > 80%)
Vegetation description: Allocasuarina huegeliana (Acacia acuminata subsp. acuminata) low open forest over Allocasuarina campestris, Ricinocarpos muricatus scattered tall shrubs over Hibbertia

subvaginata scattered low shrubs.
Associated species: Austrostipa elegantissima, Dichopogon capillipes, *Ursinia anthemoides
Condition: Good

Vegetation Association AhDf: *Allocasuarina huegeliana* low open forest over *Stylobasium australe scattered shrubs* and *Dryandra fraseri, Calytrix depressa* low open shrubland over *Lepidosperma leptostachyum* very open sedgeland.
Plant Communities:
AhDf.1: See releve CR72 vegetation description below.
Releve CR72. This plant community was recorded from the flat valley floor on the western boundary of Cairn Hill.

Releve CR72
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406872/UTM 66 20452 (WGS 84; GPS unit).
Site description: Flat on edge of wide, flat plain.
Soil: (surface) Brown sand.
Vegetation description: Allocasuarina huegeliana (30-35%), Acacia acuminata subsp. acuminata (5-10%) low open forest/Allocasuarina campestris (1-2%(5%) scattered tall shrubs over Stylobasium australe (1-2%), Dryandra fraseri (1-2%), Calytrix depressa low open shrubland over Lepidosperma leptostachyum (3-5%) very open sedgeland with Podolepis canescens (5-10%), Ptilotus declinatus (+) open herbland.
Associated species: Keraudrenia velutina subsp. velutina, Dianella revoluta var. divaricate, Dichopogon capillipes, Neurachne alopecuroidea.
Notes: Close to railway line (west side) and gravel pit (east side) and some signs of disturbance – not sure how much.

Vegetation Association AhDp: *Allocasuarina huegeliana* low woodland to low open forest over *Dodonaea pinifolia* scattered shrubs over *Xanthosia fruticulosa* low open shrubland.
Plant Communities:
AhDp.1: *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low woodland to low open forest over *Dodonaea pinifolia* low open shrubland to scattered low shrubs over scattered sedges and scattered herbs and ferns.
Releve CNR130.

Releve CNR130
Date: 5/12/03
Location: Cairn Hill North.
AMG84: 50J 0407459/UTM 66 21779 (WGS 84; GPS unit).
Site description: Moderately steep, west-facing breakaway slope (short slope about 15m long) between top of low rocky ridge and floor of a dyke.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and rock outcrop.
Vegetation description: Allocasuarina huegeliana (30-40%), Acacia acuminata subsp. acuminata (+) low woodland to low open forest over Dodonaea pinifolia (2-3%) low open shrubland to Xanthosia fruticulosa scattered low shrubs over Lepidosperma leptostachyum scattered sedges with Stypandra glauca scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Lawrencella rosea.

AhDp.2: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open forest over *Eucalyptus eudesmioides* low woodland over *Allocasuarina campestris*, *Xanthorrhoea drummondii* high open shrubland over *Melaleuca radula, Dodonaea pinifolia* scattered shrubs over scattered sedges and very open herbland.

Releve CR65.

Releve CR65
Date: 24/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407538/UTM 66 21202 (WGS 84; GPS unit).
Site description: Steep to moderate, west-facing breakaway/slope (short slope) 5-8m high).
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (35-40%), Acacia acuminata subsp. acuminata (5-8% - mainly immediately above breakaway) low open forest over Eucalyptus eudesmioides (20-25%) low woodland over Allocasuarina campestris (5-8%), Xanthorrhoea drummondii high open shrubland over Melaleuca radula, Dodonaea pinifolia scattered shrubs Xanthosia fruticulosa (2-3%) low open shrubland over Desmocladus flexuosus, Lepidosperma tenue scattered sedges with scattered herbs.
Associated species: Dichopogon capillipes, Bossiaea sp. Cairn Hill (M Henson CH2-28) (base of breakaway), Burchardia umbellata, Stypandra glauca, Daviesia hakeoides subsp. subnuda, Calytrix leschenaultii.
Notes: Very small unit. Similar to unit CAH13, but has Eucalyptus eudesmioides subsp. eudesmioides.

Vegetation Association AhDs: *Allocasuarina huegeliana* low woodland to low open forest over *Dryandra sessilis var. sessilis* scattered tall shrubs to high open shrubland.
Plant Communities: **AhDs.1:** *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* low open forest over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Xanthorrhoea drummondii*, (*Allocasuarina campestris*) scattered tall shrubs.
Releves CNR113, SWR226, CSR322 and JTR246.

Releve CNR113
Date: 3/12/03
Location: Cairn Hill North.
AMG84: 50J 0407362/UTM 66 22044 (WGS 84; GPS unit).
Site description: Gently sloping, west-facing shallow drainage line leading down slope from dyke.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Allocasuarina huegeliana (20-25%), Acacia acuminata subsp. acuminata (10-15%), Eucalyptus loxophleba subsp. loxophleba (10-15%) low open forest over Dryandra sessilis var. sessilis scattered shrubs over Allocasuarina campestris (3-5%) high open shrubland over Desmocladus flexuosus scattered sedges with Cheilanthes adiantoides scattered ferns.
Associated species: Xanthorrhoea drummondii.
Condition: Good. Quite heavy weed invasion (Avena barbata, Ursinia anthemoides).

Releve SWR226
Date: 11/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409075/UTM 66 24937 (WGS 84; GPS unit).
Site description: Moderate, south-facing lower slope of low rocky chert ridge.
Soil: Gravelly, pebbly brown sand with boulders and rock outcrop (~80-90% of surface covered by rock).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (40-50%), Acacia acuminata subsp. acuminata (5%) low open forest over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii scattered shrubs over Cheilanthes adiantoides (2-3%) very open fernland.
Associated species: Calytrix leschenaultii, Lomandra sp., Chamaescilla corymbosa var. corymbosa
Condition: Very good (low weed cover of Avena barbata, Ehrharta longiflora).

Releve CSR322
Date: 16/2/05
Location: Kim Chester's property.
AMG84: 50J 0407592/UTM 66 19328 (WGS 84; GPS unit).
Site description: Crest and upper slopes of low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (40-50%), Acacia acuminata subsp. acuminata (5-10%) low open forest over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii scattered tall shrubs over Avena barbata, Ehrharta longiflora, *Pentaschistis airoides annual grassland.
Condition: Poor – very poor (annual grassland of weeds).

Releve JTR246
Date: 13/1/04
Location: John Tonkin's property.
AMG84: 50J 0408915/UTM 66 26942 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of low rocky ridge (elevation 260 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (15-20%), Acacia acuminata subsp. acuminata (5-6%) low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii (1-2%) scattered tall shrubs over Allocasuarina campestris scattered tall shrubs to high open shrubland (patches) over Cheilanthes adiantoides scattered ferns with Avena barbata, Hypochaeris glabra, Bromus diandrus closed annual grassland/herbland.
Condition: Very poor to degraded.

AhDs.2: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low woodland to low open forest over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Xanthorrhoea drummondii* scattered tall shrubs to high open shrubland over *Hibbertia subvaginata*, *Calytrix leschenaultii* low open shrubland over scattered sedges and grasses.
This plant community was distinguished by having a low (open) shrubland of *Hibbertia subvaginata*. Quadrat GH10 and releves GHR281, GHR284 and GHR298.

Releve GHR281
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408344/UTM 66 17761 (WGS 84; GPS unit).
Site description: Saddle on top of low rocky ridge between 2 crests. (elevation 262 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (30-40%) low open forest over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii (1-2%) scattered high shrubs over Calytrix leschenaultii (2-4%), Hibbertia subvaginata (+) low open shrubland over Desmocladus flexuosus (+), Neurachne alopecuroidea (+) scattered sedges/grasses with Podolepis canescens (5-10%), Lawrencella rosea (1-2%), Borya sphaerocephala (+), Opercularia vaginata (+) open herbland and Cheilanthes adiantoides very open fernland.
Associated species: Nuytsia floribunda, Dichopogon capillipes.
Condition: Very good.
Notes: Similar to GHR280.

Releve GHR284
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408281/UTM 66 17889 (WGS 84; GPS unit).
Site description: Gentle, west-facing slope on top of low rocky ridge.
Rock type: Chert.

Vegetation description: Allocasuarina huegeliana (5-6%), (Acacia acuminata subsp. acuminata (+)) low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii scattered tall shrubs over Hibbertia subvaginata (5-6%), Calytrix leschenaultii (2-3%) open shrubland over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses over Opercularia vaginata (+), Borya sphaerocephala (+) scattered herbs with Cheilanthes adiantoides scattered ferns.
Associated species: Nuytsia floribunda, Dichopogon capillipes, Calytrix leschenaultii.

Releve GHR298
Date: 18/1/04
Location: Gardiner's hill.
AMG84: 50J 0408539/UTM 66 17679 (WGS 84; GPS unit).
Site description: Flat crest of low rocky ridge (elevation 260 m).
Soil: Very gravelly, pebbly brown sand amongst boulders and rock outcrop (about 10-15% surface cover).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (25-30%), Acacia acuminata subsp. acuminata (+) low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii (1-2%) scattered tall shrubs over Olearia dampieri subsp. eremicola, Calytrix leschenaultii (1-2%), Hibbertia subvaginata (1%) low open shrubland over Schoenus clandestinus, Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Borya sphaerocephala (+), Podolepis canescens (+) scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Podotheca angustifolia, Burchardia umbellata, Trachymene pilosa.
Condition: Very good (low weed cover).
Notes: Similar to GHR280. No Trymalium ledifolium var. rosmarinifolium.

AhDs.3: *Allocasuarina huegeliana* low woodland to low open forest over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Xanthorrhoea drummondii* scattered tall shrubs to high open shrubland over *Trymalium ledifolium* var. *rosmarinifolium*, *Calytrix leschenaultii*, (*Olearia dampieri* subsp. *eremicola*) open shrubland over scattered sedges/grasses
This plant community occurred on rocky ridge slopes at Gardiner's Hill and included *Trymalium ledifolium* ver. *rosmarinifolium* low open shrublands. Releves GHR 280, GHR283 and GHR 307.

Releve GHR280
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408342/UTM 66 17700 (WGS 84; GPS unit).
Site description: Crest and gentle, west-facing upper slope from crest on low rocky ridge (elevation 263 m).
Soil: Gravelly, pebbly, cobbly brown sand with rocks, boulders and outcrop (about 30% surface cover).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (30-40%), Acacia acuminata subsp. acuminata (+) low open forest over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii (2-4%), (Olearia dampieri subsp. eremicola) (+) high open shrubland over Hibbertia subvaginata (3-5%), Calytrix leschenaultii (2-3%), Trymalium ledifolium var. rosmarinifolium (1-2%) low open shrubland over Desmocladus flexuosus (1%), Neurachne alopecuroidea scattered sedges/grasses with Borya sphaerocephala (+), Opercularia vaginata (3-5%), Thysanotus dichotomus (+), Podolepis canescens (1-2%) very open herbland with Cheilanthes adiantoides very open fernland and Ehrharta longiflora, Ursinia anthemoides, Hypochaeris glabra open grassland/herbland.
Associated species: Podotheca angustifolia, Dichopogon capillipes, Goodenia arthrotricha, Trachymene pilosa.
Condition: Good (quite weedy).

Releve GHR283
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408268/UTM 66 17789 (WGS 84; GPS unit).
Site description: Moderate, west-facing slope of low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs to high open shrubland over Xanthorrhoea drummondii (2-3%) scattered tall shrubs (high open shrubland upslope) over Olearia dampieri subsp. eremicola (+), Trymalium ledifolium var. rosmarinifolium (2-3%) low open shrubland to open scrub over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Lawrencella rosea (5-10%), Podolepis canescens (15-20%) open herbland and Cheilanthes adiantoides scattered ferns and Avena barbata, Ehrharta longiflora, Briza maxima open annual grassland.
Associated species: Hibbertia subvaginata, Calytrix leschenaultii, Trachymene pilosa, Rhodanthe polycephala, Dichopogon capillipes.
Condition: Good to very good – patches of high weed cover.
Notes: Similar to GHR279.

Releve GHR307
Date: 7/12/04
Location: Gardiner's hill.
AMG84: 50J 0408573/UTM 66 18147 (WGS 84; GPS unit).
Site description: Steep, south-facing slope of ridge.
Soil: Gravelly, pebbly, cobbly rocky brown sand in matrix of outcrop.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, (Acacia acuminata subsp. acuminata) low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris (3-5%), Xanthorrhoea drummondii (3-5%), (Calothamnus aff. quadrifidus Moora-Watheroo (+), Melaleuca radula (+), Kunzea praestans (3-5%)) high open shrubland to high shrubland over Trymalium ledifolium var. rosmarinifolium (1-2%), Hakea recurva subsp. recurva (1-2%), Calytrix leschenaultii low open shrubland over Desmocladus flexuosus, Schoenus clandestinus scattered sedges and Podolepis lessonii, Borya sphaerocephala very open herbland.
Associated species:
Condition: Good (moderate weed cover of Avena barbata, Briza maxima).

AhDs.4: See releve GHR305 vegetation description below.
Releve GHR305.

Releve GHR305
Date: 7/12/04
Location: Gardiner's hill, Central block.
AMG84: 50J 0408611/UTM 66 17765 (WGS 84; GPS unit).
Site description: Moderate, west-facing lower slope.
Soil: Gravelly, pebbly, cobbly rocky brown sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (3-5%), Acacia acuminata subsp. acuminata (2-3%) low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Calothamnus aff. quadrifidus Moora-Watheroo scattered tall shrubs over Xanthorrhoea drummondii open shrubland over Olearia dampieri subsp. eremicola (1-2%) Melaleuca radula (1-2%) open shrubland over Hakea lissocarpha (3-5%), Calytrix leschenaultii (1-2%) low open shrubland over Desmocladus flexuosus (1-2%), Schoenus clandestinus very open sedgeland and Borya sphaerocephala, Podolepis canescens, Hyalosperma cotula, Lomandra effusa open herbland and Cheilanthes adiantoides very open fernland.

Associated species: Lepidobolus chaetocephalus, Opercularia vaginata, Verticordia densiflora var. densiflora (35 cm), Dichopogon capillipes.
Condition: Very good.

Vegetation Association AhDsKp: *Allocasuarina huegeliana* low woodland to low open forest over *Dryandra sessilis var. sessilis* scattered tall shrubs to high shrubland over *Kunzea praestans* scattered tall shrubs to high open shrubland.
Plant Communities:
AhDsKp.1: *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* low woodland to low open forest over *Dryandra sessilis var. sessilis* scattered tall shrubs to high shrubland over *Kunzea praestans, Allocasuarina campestris* high open shrubland to high shrubland over (*Hibbertia subvaginata), Calytrix leschenaultii* scattered low shrubs to low open shrubland.
Releves CNR95, CNR129 and CNR132.

Releve CNR95
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407612/UTM 66 21740 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of (short slope about 70 m long) low rocky ridge.
Vegetation description: Allocasuarina huegeliana (40-50%), Eucalyptus loxophleba subsp. loxophleba (2-3%), Acacia acuminata subsp. acuminata (1-2%) low open forest over Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris (5-10%), Kunzea praestans (3-5%) high shrubland over Calytrix leschenaultii scattered low shrubs over Neurachne alopecuroidea, Desmocladus flexuosus scattered grasses/sedges with Cheilanthes adiantoides (1%) scattered ferns.
Associated species: Podotheca angustifolia, Xanthorrhoea drummondii, Dichopogon capillipes, Dioscorea hastifolia.

Releve CNR129
Date: 5/12/03
Location: Cairn Hill North.
AMG84: 50J 0407491/UTM 66 21800 (WGS 84; GPS unit).
Site description: Very gently sloping, north-facing flat top of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders.
Vegetation description: Allocasuarina huegeliana (35-40%), Acacia acuminata subsp. acuminata (5-7%) low open forest over Dryandra sessilis var. sessilis (1-2%) scattered tall shrubs over Allocasuarina campestris (2-3%), Kunzea praestans (+), Xanthorrhoea drummondii, Regelia megacephala scattered tall shrubs over Hibbertia subvaginata (1%), Calytrix leschenaultii (1%), Xanthosia fruticulosa scattered low shrubs over Lepidosperma leptostachyum, Neurachne alopecuroidea scattered sedges/grasses.
Notes: - Unit CNR129 includes some area where Hibbertia subvaginata is about 2-3(5)% and Xanthosia fruticulosa about 8-10%.

Releve CNR132
Date: 5/12/03
Location: Cairn Hill North.
AMG84: 50J 0407488/UTM 66 22084 (WGS 84; GPS unit).
Site description: Gentle to moderate, east-facing mid slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (10-12%), Acacia acuminata subsp. acuminata (2-3%) low woodland over Dryandra sessilis var. sessilis (4-5%) high open shrubland over Allocasuarina campestris (10-15%), (Kunzea praestans) (+) high shrubland over Hibbertia subvaginata (+), Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses.

Associated species: Trachymene pilosa, Podotheca angustifolia, Goodenia berardiana.
Notes: 1) Similar to R97 but more Allocasuarina campestris and not Kunzea praestans open scrub. 2) An extremely variable vegetation which should possibly be mosaic of Allocasuarina campestris open scrub (eg: R115) to high open shrubland under Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low open woodland with something else.

AhDsKp.2: *Allocasuarina huegeliana* low woodland to low open forest over *Dryandra sessilis var. sessilis* scattered tall shrubs to high shrubland over *Kunzea praestans* scattered tall shrubs to high open shrubland over *Hibbertia subvaginata* scattered low shrubs to low open shrubland. Releves CR78, JTR221, JTR223, SWR228, JTR248, JTR256 and G335.

Releve: CR78
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406972/UTM 66 21144 (WGS 84; GPS unit).
Site description: Moderate, south-facing lower slope (below steep rocky slope) of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (40-50%) low open forest over Dryandra sessilis var. sessilis (3-4%) high open shrubland over Kunzea praestans (15-25%) (2-3 m) high shrubland over Acacia congesta subsp. congesta (1%), Hibbertia subvaginata (6%) open shrubland over Bossiaea sp. Cairn Hill (M Henson CH2-28) (8-10%) low open shrubland over Desmocladus flexuosus (3-5%) very open sedgeland.
Associated species: Trachymene ornata, Lawrencella rosea, Dichopogon capillipes, Dioscorea hastifolia, Trachymene pilosa, Xanthorrhoea drummondii (2%), Cheilanthes adiantoides.

Releve JTR221
Date: 11/1/04
Location: John Tonkin's property.
AMG84: 50J 0408840/UTM 66 26044 (WGS 84; GPS unit).
Site description: Gentle, west of south-facing mid slope of very low rocky ridge.
Rock type: Chert.
Soil: See R220.
Vegetation description: Allocasuarina huegeliana (5-10%) low open woodland over Dryandra sessilis var. sessilis (1-2%) scattered tall shrubs over Kunzea praestans (+) scattered tall shrubs over Calytrix leschenaultii (+), Hibbertia subvaginata (+) scattered low shrubs over Desmocladus flexuosus, Lepidobolus chaetocephalus scattered scrub with Borya sphaerocephala scattered herbs and Ehrharta longiflora, Pentaschistis pallida, Vulpia myuros var. hirsuta, Hypochaeris glabra annual grassland/herbland.
Condition: Very poor to poor – partially cleared or severe grazing effects and very high weed cover.

Releve JTR223
Date: 11/1/04
Location: John Tonkin's property.
AMG84: 50J 0408961/UTM 66 26336 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of low rocky ridge (elevation 281 m).
Soil: Gravelly, pebbly brown silty sand with rocks and rock outcrop (10-15%).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (10-15%) low woodland over Dryandra sessilis var. sessilis (2-5%) high open shrubland over Kunzea praestans scattered tall shrubs over Hibbertia subvaginata (5-10%) open shrubland over Desmocladus flexuosus scattered sedges with Avena barbata, Ehrharta longiflora, Hypochaeris glabra annual grassland/herbland.
Associated species: Melaleuca calyptroides, Xanthorrhoea drummondii, Dichopogon capillipes.
Condition: Good.

Releve SWR228
Date: 11/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409080/UTM 66 25034 (WGS 84; GPS unit).
Site description: Similar to R227.
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (3-5%) low open woodland to low woodland over Dryandra sessilis var. sessilis (2-5%) high open shrubland over Xanthorrhoea drummondii scattered shrubs over Hibbertia subvaginata, Trymalium ledifolium var. rosmarinifolium scattered low shrubs over Desmocladus flexuosus scattered sedges and Cheilanthes adiantoides very open fernland.
Associated species: Kunzea praestans.
Condition: Good.

Releve JTR248
Date: 13/1/04
Location: John Tonkin's property.
AMG84: 50J 0409150/UTM 66 27363 (WGS 84; GPS unit).
Site description: Rock top and sides of low rocky ridge.
Rock type:
Vegetation description: Allocasuarina huegeliana (10-15%) low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans, Xanthorrhoea drummondii scattered tall shrubs over Hibbertia subvaginata scattered low shrubs over Desmocladus flexuosus scattered sedges with Avena barbata, Hypochaeris glabra closed annual grassland/herbland.
Associated species: Acacia restiacea
Condition: Very poor (high weed cover).

Releve JTR256
Date: 14/1/04
Location: John Tonkin's property.
AMG84: 50J 0409354/UTM 66 25563 (WGS 84; GPS unit).
Site description: Steep, east-facing upper slope of low rocky ridge (elevation 263 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5-8%) low open woodland over Dryandra sessilis var. sessilis (5-10%) high open shrubland over Kunzea praestans (2-3%), (Xanthorrhoea drummondii (+)) high open shrubland over Hibbertia subvaginata, Calytrix leschenaultii, Trymalium ledifolium var. rosmarinifolium scattered low shrubs over Desmocladus flexuosus (1-2%), Lepidosperma tenue scattered sedges to very open sedgeland with Stypandra glauca (1-2%) scattered low herbs and Cheilanthes adiantoides scattered ferns and Avena barbata, Briza maxima, Sonchus oleraceus, Ursinia anthemoides very open annual grassland/herbland.
Associated species: Acacia aristulata.
Condition: Poor to good (high weed cover).

Releve G335
Date: 18/2/05
Location: Location: Gardiner's property, just east of Morgan’s.
AMG84: 50J 0407089/UTM 66 17650 (WGS 84; GPS unit).
Site description: Crest of very low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (2-5%), (Acacia acuminata subsp. acuminata (+), Eucalyptus loxophleba subsp. loxophleba (+) scattered low trees to low open woodland over Dryandra sessilis var. sessilis (2-4%), Xanthorrhoea drummondii (2-4%), (Kunzea praestans (+)) high open shrubland over Hibbertia subvaginata, Calytrix leschenaultii low open shrubland over *Avena barbata, Ehrharta longiflora open annual grassland.
Condition: Good.

AhDsKp.3: *Allocasuarina huegeliana* low open forest over *Dryandra sessilis* open scrub over *Kunzea praestans* open shrubland over *Calytrix leschenaultia*, *Hibbertia subvaginata* low open shrubland over *Desmocladus flexuosus* very open sedgeland.
This plant community was differentiated by having *Dryandra sessilis var. sessilis* form an open scrub under an *Allocasuarina huegeliana* low open forest. Quadrat GH1.

AhDsKp.4: *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* low woodland over *Dryandra sessilis* var. *sessilis* high shrubland over *Kunzea praestans* high open shrubland over *Baeckea* sp. Moora (R. Bone 1993/1) shrubland over scattered sedges/grasses/herbs.
This plant community was distinguished by having a *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland to shrubland. Releves CNR94 and CNR122.

Releve CNR94
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407624/UTM 66 21644 (WGS 84; GPS unit).
Site description: Gentle, east-facing mid slope of a short slope.
Soil: Gravelly, pebbly, cobbly brown sand amongst rock outcrop (~ 5-10% of surface cover).
Vegetation description: Allocasuarina huegeliana (15-25%), Acacia acuminata subsp. acuminata (+) low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris (3-7%), Kunzea praestans (1%), Xanthorrhoea drummondii (2-4%) open shrubland over Calytrix leschenaultii (5-7%), Baeckea sp. Moora (R. Bone 1993/1) (5-7%) low open shrubland to low shrubland over Schoenus clandestinus (+), Neurachne alopecuroidea (+) scattered sedges/grasses with Borya sphaerocephala (7-10%), Stylidium septentrionale (+), Podolepis lessonii (2-5%), Gilberta tenuifolia (1-2%) open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Trachymene cyanopetala, Lawrencella rosea, Thysanotus manglesianus, Melaleuca radula.

Releve CNR122
Date: 4/12/03
Location: Cairn Hill North.
AMG84: 50J 0407594/UTM 66 21525 (WGS 84; GPS unit).
Site description: Very gently sloping, south-west facing ridge top on low rocky ridge.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Allocasuarina huegeliana (15-20%), Acacia acuminata subsp. acuminata (2-3%) low woodland over Dryandra sessilis var. sessilis (10-15%) high shrubland over Kunzea praestans (2-3%) high open shrubland over Baeckea sp. Moora (R. Bone 1993/1) (20-30%), Calytrix leschenaultii (2-3%) shrubland over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Stylidium septentrionale scattered herbs.
Associated species: Acacia lasiocarpa var. sedifolia, Lawrencella rosea, Trachymene pilosa, Chamaescilla corymbosa var. corymbosa.

Vegetation Association AhHr: *Allocasuarina huegeliana* low open forest over *Hakea recurva* subsp. *recurva* scattered tall shrubs.
This vegetation association included one plant community that was recorded at Gardiner's Hill.

Plant Communities:
AhHr.1: See the vegetation description for releve GHR282 below.
Releve GHR282.

Releve GHR282
Date: 17/1/04

Location: Gardiner's hill.
AMG84: 50J 0408321/UTM 66 17127 (WGS 84; GPS unit).
Site description: Gentle, south-east facing slope on top of low rocky rise.
Rock type: ?Sandstone.
Vegetation description: Allocasuarina huegeliana (5-10%) low open woodland over Hakea recurva subsp. recurva (1-2%) scattered tall shrubs over Allocasuarina campestris (+) scattered tall shrubs over Calytrix leschenaultii (1-2%), (Acacia lasiocarpa var. sedifolia (1.2 m)) scattered shrub to open shrubland over Lepidosperma tenue, Neurachne alopecuroidea, Austrodanthonia setacea, Desmocladus flexuosus, Schoenus clandestinus (1%) very open sedgeland/grassland with Borya sphaerocephala (5-10%), Opercularia vaginata (1-2%), Stypandra glauca (+), Lomandra effusa open herbland.
Associated species: Gastrolobium obovatum, Baeckea crispiflora var. tenuior, Stenanthemum tridentatum, Blennospora drummondii, Hyalospermum glutinosum ssp. glutinosum, Burchardia umbellata.
Condition: Good to very good (but grazed and low weed cover).

Vegetation Association AhHs: *Allocasuarina huegeliana* low open woodland to low woodland over *Hibbertia subvaginata* low open shrubland to low shrubland.

Plant Communities:
AhHs.1: *Allocasuarina huegeliana* low open woodland to low woodland (over Xanthorrhoea drummondii scattered tall shrubs) over *Hibbertia subvaginata* low open shrubland to low shrubland over very open sedgeland/grassland/herbland.
Releves ERR140, ERR153, ERR169 and ERR179.

Site number: ERR140
Date: 8/12/03
Location: Eastern Ridge.
AMG84: 50J 0407599/UTM 66 24586 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of very low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and outcrop.
Vegetation description: Allocasuarina huegeliana (10-15%), Acacia acuminata subsp. acuminata (5-6%) low woodland over Allocasuarina campestris scattered tall shrubs over Hibbertia subvaginata (5-6%) low open shrubland over Lepidosperma tenue (2-3% (5-10%)) very open sedgeland with Stypandra glauca scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Waitzia nitida, Dioscorea hastifolia.
Condition: Very good. Few weeds.
Notes: Very similar to CWR139 but no Eucalyptus loxophleba subsp. loxophleba on slopes and more Lepidosperma tenue.
Releve ERR153
Date: 20/12/03
Location: Eastern Ridge.
AMG84: 50J 0407952/UTM 66 24473 (WGS 84; GPS unit).
Site description: Moderately steep, east-facing slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with boulders and some outcrop (2-3%).
Vegetation description: Allocasuarina huegeliana scattered low trees over Allocasuarina campestris (1-2%) scattered tall shrubs over Hibbertia subvaginata (10-12%), Oleara dampieri subsp. eremicola (1-2%), Calytrix leschenaultii (+) open shrubland to shrubland over Lepidosperma tenue, Neurachne alopecuroidea scattered sedges/grasses with Cheilanthes adiantoides scattered ferns.
Associated species: Dioscorea hastifolia, Burchardia umbellata, Dichopogon capillipes, Xanthorrhoea drummondii, Acacia congesta subsp. congesta, Austrodanthonia acerosa, Opercularia vaginata.

Releve ERR169

Date: 22/12/03
Location: Eastern Ridge.
AMG84: 50J 0408066/UTM 66 22936 (WGS 84; GPS unit).
Site description: Gentle, east-facing mid to upper slope of low rocky ridge (elevation 241 m).
Rock type: - Chert! Mixture (2 rocks?) but a lot chert.
Vegetation description: Allocasuarina huegeliana (3-5%) low open woodland over Xanthorrhoea drummondii (1-2%) scattered tall shrubs over Hibbertia subvaginata (1.1-1.4 m, (15) 20-30%), Calytrix leschenaultii (1%) shrubland over Lepidosperma tenue (2-3%), (Lepidosperma sp. (+)), Austrodanthonia caespitosa, Neurachne alopecuroidea, Austrostipa mollis very open sedgeland/grassland with Stypandra glauca, Podolepis lessonii scattered herbs with Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Dioscorea hastifolia, Acacia acuminata subsp. acuminata, Dichopogon capillipes.
Condition: Good to very good.

Releve ERR179
Date: 24/12/03
Location: Eastern Ridge.
AMG84: 50J 0407959/UTM 66 23246 (WGS 84; GPS unit).
Site description: Moderate, east-facing upper rocky slope of low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (10-20)%), Acacia acuminata subsp. acuminata (5-8%) low woodland over Xanthorrhoea drummondii (1-4%) scattered tall shrubs to high open shrubland over Hibbertia subvaginata (10-20%) shrubland over Lepidosperma tenue (1-2%), Austrodanthonia caespitosa (1-2%), Neurachne alopecuroidea very open sedgeland/grassland with Borya sphaerocephala (1-2%), Stypandra glauca (1%), Gilberta tenuifolia (2-3%), Podolepis lessonii very open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Thomasia grandiflora, Kunzea praestans, Calytrix leschenaultii, Pityrodia dilatata, Dioscorea hastifolia, Burchardia umbellata, Olearia dampieri subsp. eremicola, Scaevola glandulifera.
Condition: Good to very good (much of it very good). Some weeds.
Notes: Very similar to R164 and R169.

Vegetation Association AhKp: *Allocasuarina huegeliana* low woodland to low open forest over *Kunzea praestans* scattered tall shrubs to high open shrubland.
Plant Communities:
AhKp.1: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open forest over *Kunzea praestans* scattered tall shrubs to high shrubland over *Hibbertia subvaginata*, (*Calytrix leschenaultii*) scattered low shrubs to low open shrubland over scattered sedges/grasses/herbs. This plant community was differentiated by having an *Hibbertia subvaginata* scattered low shrubs to low open shrubland. Releves DR135a, ERR183, JTR212, JTR218 and JTR220.

Releve DR135 (R135a)
Date: 6/12/03
Location: Waste Dump Area.
AMG84: 50J 0407389/UTM 66 23070 (WGS 84; GPS unit).
Site description: Moderate, west-facing lower slope of low rocky ridge.
Soil: (NT) Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (30-40%) low open forest over Kunzea praestans scattered tall shrubs over Hibbertia subvaginata, Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Podolepis lessonii (1-2%) scattered herbs.

Releve ERR183

Date: 1/1/04
Location: Eastern Ridge.
AMG84: 50J 0407643/UTM 66 23789 (WGS 84; GPS unit).
Site description: Mid to upper moderately, west-facing rocky slope of low rocky ridge.
Soil: (NT) Gravelly, pebbly, cobbly brown sand amongst boulders and outcrop (30-40% surface cover).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (10-20)%), (Acacia acuminata subsp. acuminata (2-3%)) low woodland over Kunzea praestans (3-4%) high open shrubland over Hibbertia subvaginata (3-5 to (10-15%)) open shrubland to shrubland over Pityrodia dilatata scattered low shrubs over Lepidosperma sp., Lepidosperma tenue, Austrodanthonia setacea, Neurachne alopecuroidea very open grassland/sedgeland with Stypandra glauca (3-5%), Borya sphaerocephala (1-2%) very open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Burchardia umbellata, Dioscorea hastifolia, Lawrencella rosea, Chamaescilla corymbosa var. corymbosa.
Condition: Very good. Some annual weeds (Briza maxima) Avena barbata <1-2%), also Ursinia anthemoides.

Releve JTR212
Date: 10/1/04
Location: John Tonkin's property.
AMG84: 50J 0408847/UTM 66 25827 (WGS 84; GPS unit).
Site description: Very gentle, north-west facing slope at base of low rocky ridges at head of drainage line (head of valley floor) (elevation 256 m).
Soil: Gravelly, pebbly, cobbly brown sand with boulders and rock outcrop (5%).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (40-50%), Acacia acuminata subsp. acuminata (3-5%) low open forest over Kunzea praestans (4-5%) high open shrubland over Hibbertia subvaginata (1-2%), Calytrix leschenaultii (+) scattered low shrubs to low open shrubland over Desmocladus flexuosus (1%) scattered sedges.
Condition: Good to very good.

Releve JTR218
Date: 11/1/04
Location: John Tonkin's property.
AMG84: 50J 0408868/UTM 66 26026 (WGS 84; GPS unit).
Site description: Gentle, south-facing lower slope on ridge top near end of ridge (elevation 254 m).
Soil: Gravelly, pebbly silty sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (30-40%), Acacia acuminata subsp. acuminata (+) low woodland over Calytrix leschenaultii (3-5%), (Hibbertia subvaginata)(+)) low open shrubland over Lepidobolus chaetocephalus (+), Schoenus clandestinus (2-5%), Desmocladus flexuosus (+), Austrodanthonia setacea (1-2%) very open sedges/grasses to open sedges/grasses with Borya sphaerocephala (1-3%), Stylidium septentrionale (+), Podolepis lessonii (1-2%) very open herbland with Vulpia myuros var. hirsuta very open annual grassland.
Associated species: Kunzea praestans.
Condition: Very good.

Releve JTR220
Date: 11/1/04
Location: John Tonkin's property.
AMG84: 50J 0408873/UTM 66 26085 (WGS 84; GPS unit).
Site description: Mid slope of low rocky ridge, west of south-facing, gentle slope.
Soil: Gravelly, pebbly brown silty fine sand with cobbles and some rock outcrop (3-5%).

Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (15-20%) low woodland over Kunzea praestans (10-20%) high shrubland over Calytrix leschenaultii (1-2%), Hibbertia subvaginata (+) scattered low shrubs over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Borya sphaerocephala, Stylidium septentrionale very open herbland and Pentaschistis pallida, Avena barbata, Briza maxima, Hypochaeris glabra, Vulpia myuros var. hirsuta annual grassland/herbland.
Condition: Poor to good.

AhKp.2: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low woodland to low open forest over *Kunzea praestans*, *Xanthorrhoea drummondii* scattered tall shrubs to high open shrubland over (*Hibbertia subvaginata*, *Calytrix leschenaultii*) open shrubland over scattered sedges/grasses/herbs/ferns.
This plant community was differentiated by having a *Xanthorrhoea drummondii* high shrubland and a (*Calytrix leschenaultia*, *Hibbertia subvaginata*) low open shrubland. Releve CR73, CNR98, ERR199, JTR255, GHR287, GHR303, D10, ERR171 and CNR135.

Releve CR73
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406932/UTM 66 20797 (WGS 84; GPS unit).
Site description: Moderately steep, west-facing mid to upper slope of rocky (chert) ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and rock outcrop.
Vegetation description: Allocasuarina huegeliana (4-5 m, 30-40%) low open forest over Acacia congesta subsp. congesta (3-4%), Kunzea praestans (2%), high open shrubland over Hibbertia subvaginata (3%) open shrubland over Stypandra glauca (10-15%) open herbland over Borya sphaerocephala (1-2%) scattered low herbs and Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Burchardia umbellata, Dichopogon capillipes, Regelia megacephala, Lawrencella rosea, Dioscorea hastifolia, Xanthorrhoea drummondii, Neurachne alopecuroidea.

Releve CNR98
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407521/UTM 66 21985 (WGS 84; GPS unit).
Site description: Gentle, east-facing, mid to lower slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst rock outcrop and boulders.
Vegetation description: Allocasuarina huegeliana (40-50%), Acacia acuminata subsp. acuminata (2-3%) low open forest over Kunzea praestans (2-3%), Xanthorrhoea drummondii scattered tall shrubs to high open shrubland over Hibbertia subvaginata (2-4%), Calytrix leschenaultii open shrubland over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Pityrodia dilatata, Dioscorea hastifolia, Dichopogon capillipes, Burchardia umbellata.
Condition: Very good (some weeds).

Releve ERR199
Date: 4/1/04
Location: Eastern Ridge.
AMG84: 50J 0407810/UTM 66 23213 (WGS 84; GPS unit).
Rock type: =R168 (with occasional piece of chert cobble/rock on surface – probably blown across in mine blasts - mine about 70m away).
Vegetation description: Allocasuarina huegeliana (40-50%), Acacia acuminata subsp. acuminata (5-10%) low open forest over Kunzea praestans (1-2%) scattered tall shrubs (NB: about another 2-3% dead) over Xanthorrhoea drummondii (3-5%) high open shrubland over Calytrix leschenaultii

scattered low shrubs over Lepidosperma tenue (+), Neurachne alopecuroidea (1%), Desmocladus flexuosus (+) scattered sedges/grasses with Cheilanthes adiantoides scattered ferns.
Associated species: Chamaescilla corymbosa var. corymbosa, Stypandra glauca.
Condition: Very good.

Releve JTR255
Date: 14/1/04
Location: John Tonkin's property.
AMG84: 50J 0409319/UTM 66 25506 (WGS 84; GPS unit).
Site description: Gentle, south-east facing slope on crest of low rocky ridge (elevation 276 m).
Soil: See 254.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5) 10-15%), (Acacia acuminata subsp. acuminata (1-3%)) low open woodland to low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans (3-5%), Allocasuarina campestris (+), Calothamnus aff. quadrifidus Moora-Watheroo (+), Xanthorrhoea drummondii (+) high open shrubland over Hibbertia subvaginata (2-5%), Trymalium ledifolium var. rosmarinifolium (1-3%) open shrubland over Acacia aristulata scattered low shrubs over Desmocladus flexuosus (2-3%), Lepidosperma tenue (+) very open sedgeland and Cheilanthes adiantoides scattered ferns and Avena barbata, Briza maxima, Hypochaeris glabra (30-40%) annual grassland/herbland.
Associated species: Diplopeltis huegelii ssp. lehmannii, Dichopogon capillipes, Dioscorea hastifolia, Austrostipa sp., Muehlenbeckia adpressa.
Condition: Poor to good (very high weed cover may have displaced some species).
Notes: Similar to JTR248.

Releve GHR287
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408426/UTM 66 17829 (WGS 84; GPS unit).
Site description: Flat crest of low rocky ridge (elevation 269 m).
Soil: Gravelly, pebbly brown silty fine sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (15-25%), (Acacia acuminata subsp. acuminata (+)) low open woodland over Xanthorrhoea drummondii (4-5%) high open shrubland over Kunzea praestans scattered tall shrubs over Calytrix leschenaultii scattered low shrubs over Schoenus clandestinus, Neurachne alopecuroidea scattered sedges/grasses with Podolepis canescens (10-20%) open daisy herbland over Borya sphaerocephala (3-5%) very open low herbland and Hypochaeris glabra, Pentaschistis pallida very open annual grassland/herbland.
Associated species:
Condition: Very good – too many weeds for ‘excellent’.
Notes: 1) Kunzea praestans and Calytrix leschenaultii heavily grazed.
2) Allocasuarina huegeliana often in ‘groups’.
3) Xanthorrhoea drummondii observed with severe ‘28’ parrot damage (3 dead). Many healthy plants remain.

Site number: GHR303
Date: 6/12/04
Location: Gardiner's hill.
AMG84: 50J 0408815/UTM 66 17857 (WGS 84; GPS unit).
Site description: Flat crest of low ridge.
Soil: Gravelly, rocky brown sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (40-50%) low open forest over Allocasuarina campestris (+) scattered tall shrubs over Xanthorrhoea drummondii (+), Kunzea praestans (3-5%)

open shrubland over Calytrix leschenaultii (2-3%) low open shrubland over Schoenus clandestinus (3-5%) very open sedgeland with Borya sphaerocephala (20-30%), Podolepis canescens (1-2%) herbland.
Associated species: Melaleuca calyptroides, Lomandra effusa, Goodenia hassallii, Isopogon divergens, Calytrix depressa.
Condition: Very good to excellent.

Releve D10
Date: 10/12/04
Location: Doblestein's property.
AMG84: 50J 0408946/UTM 66 22379 (WGS 84; GPS unit).
Site description: Gentle, west-facing slope of low ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, (Acacia acuminata subsp. acuminata) low woodland over Xanthorrhoea drummondii high open shrubland over Kunzea praestans scattered shrubs over Hibbertia subvaginata, Calytrix leschenaultii, Pityrodia dilatata low open shrubland to low shrubland over Desmocladus flexuosus, Schoenus clandestinus scattered sedges and Neurachne alopecuroidea, Avena barbata, Ehrharta longiflora scattered grasses with Gilberta tenuifolia, Podolepis lessonii very open herbland.
Associated species: Dichopogon capillipes, Allocasuarina campestris.
Condition: Good.

Releve CNR135
Date: 6/12/03
Location: Cairn Hill North.
AMG84: 50J 0407316/UTM 66 21722 (WGS 84; GPS unit).
Site description: Moderate sloping, west-facing mid slope of lower rock ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (2-3%), Acacia acuminata subsp. acuminata (3-5%) low open woodland over Kunzea praestans (2-3%), Xanthorrhoea drummondii (2%) high open shrubland over Hibbertia subvaginata (1-2%), Calytrix lechenaultii (+) scattered low shrubs over Neurachne alopecuroidea scattered grasses with Podolepis lessonii (~1%) scattered herbs and Cheilanthes adiantoides scattered ferns.

Releve ERR171
Date: 22/12/03
Location: Eastern Ridge.
AMG84: 50J 0408058/UTM 66 22888 (WGS 84; GPS unit).
Site description: Gentle, east-facing mid to upper slope of low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (2-3%) scattered low trees to low open woodland over Xanthorrhoea drummondii (4-5%) high open shrubland over Calytrix leschenaultii (1%), Phyllanthus calycinus (1%), Kunzea praestans (90 cm) scattered low shrubs over Lepidosperma tenue (2-4%), Neurachne alopecuroidea very open sedgeland/grassland with Stypandra glauca, Ptilotus polystachyus, Podolepis lessonii, Gilberta tenuifolia scattered herbs to very open herbland.
Condition: Good to very good. Quite a lot of Avena barbata and Briza maxima.

AhKp.3: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low woodland to low open forest over *Kunzea praestans*, *Allocasuarina campestris*, (*Xanthorrhoea drummondii*) high open shrubland to high shrubland over *Hibbertia subvaginata* scattered low shrubs to low open shrubland over scattered sedges/grasses/herbs/ferns.
This plant community an *Allocasuarina campestris* high open shrubland over *Hibbertia subvaginata* scattered low shrubs to low open shrubland. Releves ERR147, ERR182 and ERR192.

Releve ERR147
Date: 9/12/03
Location: Eastern Ridge.
AMG84: 50J 0407757/UTM 66 24077 (WGS 84; GPS unit).
Site description: Rock flat ridge top of long low rocky ridge (Elevation 260 m).
Vegetation description: Allocasuarina huegeliana (5-8%), Acacia acuminata subsp. acuminata (5-6%), (Eucalyptus loxophleba subsp. loxophleba (+)) low woodland over Allocasuarina campestris (6-7%), Kunzea praestans (2-6 (15%)) high open shrubland to high shrubland over Hibbertia subvaginata (juvenile (+)) scattered shrubs over Lepidosperma leptostachyum, Neurachne alopecuroidea scattered sedges/grasses.
Associated species: Dichopogon capillipes, Podolepis lessonii, Thysanotus manglesianus.
Condition: Good to very good – some weeds.

Releve ERR182
Date: 24/12/03
Location: Eastern Ridge.
AMG84: 50J 0407799/UTM 66 23168 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of low rocky ridge (elevation 244 m).
Vegetation description: Allocasuarina huegeliana (30-40%), Acacia acuminata subsp. acuminata (2-3%) low open forest over Xanthorrhoea drummondii (2-3%), Kunzea praestans (1-2%), Allocasuarina campestris (+(1-2%)) high open shrubland over Calytrix leschenaultii (2-3%), Hakea lissocarpha (1%), Hibbertia subvaginata (+) open shrubland over Schoenus clandestinus (+), Desmocladus flexuosus, Neurachne alopecuroidea, Lepidosperma tenue scattered sedges/grasses with Gilberta tenuifolia (3-5%) very open herbland.
Associated species: Podolepis lessonii.
Notes: Similar to R168, R187 and R197.
Releve ERR192
Date: 3/1/04
Location: Eastern Ridge.
AMG84: 50J 0407892/UTM 66 23636 (WGS 84; GPS unit).
Site description: Steep, east-facing upper slope of low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata low open woodland over Kunzea praestans (5-10%), Allocasuarina campestris (1-2%), Xanthorrhoea drummondii (1-2%) high open shrubland to high shrubland over Hibbertia subvaginata (1-2%) low open shrubland over Neurachne alopecuroidea (+), Lepidosperma tenue scattered sedges/grasses with Stypandra glauca, Podolepis lessonii scattered herbs and Cheilanthes adiantoides scattered ferns.
Condition: Very good (some weeds).
Notes: Similar to R187.

Vegetation Association AhRm: *Allocasuarina huegeliana* low open forest over *Regelia megacephala*, *Allocasuarina campestris* high open shrubland.

Notes: The composition of the main shrub layer varies significantly, usually both *Regelia megacephala* and *Allocasuarina campestris* are present, but in some stands only one is present.

Plant Communities:
AhRm.1: See the vegetation description for releve CR75 below.
Releve CR75.

Releve CR75
Date: 26/11/03
Location: Cairn Hill Reserve.

AMG84: 50J 0406979/UTM 66 20756 (WGS 84; GPS unit).
Site description: Flat crest (narrow) of low rocky ridge.
Soil: Gravelly, pebbly brown sand amongst boulders and rock outcrop (90% of surface).
Vegetation description: Allocasuarina huegeliana (50-60%) low open forest over Regelia megacephala (5-10%) high open shrubland over Xanthorrhoea drummondii scattered shrubs over Stypandra glauca (15-20%) open herbland.
Associated species: Dichopogon capillipes, Dioscorea hastifolia, Hibbertia subvaginata.
Notes: This is very similar to CR74 and is a neighbour to it.

AhRm.2: See the vegetation description for releve CR69 below.
This plant community occurred on the ridge slopes and included a *Kunzea praestans* high shrubland.
Releve CR69.

Releve CR69
Date: 25/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407224/UTM 66 20829 (WGS 84; GPS unit).
Site description: Gentle, south facing slope on edge of crest of low rocky ridge.
Soil: Gravelly, pebbly cobbly brown sand with some boulders and rock outcrop.
Vegetation description: Allocasuarina huegeliana (40-60%) low open forest over Allocasuarina campestris (5-6%), Regelia megacephala (1-2%) high open shrubland over Kunzea praestans (10-15%), Acacia congesta subsp. congesta (1%) high open shrubland over Melaleuca calyptroides (+) scattered shrubs over Xanthosia fruticulosa (1-2%) scattered low shrubs over Desmocladus flexuosus scattered sedges and Stypandra glauca (+) very open herbland.
Associated species: Dichopogon capillipes, Cheilanthes adiantoides, Dioscorea hastifolia.

Vegetation Association AhRmAc: Allocasuarina huegeliana low open woodland over Regelia megacephala, Allocasuarina campestris open scrub over Ricinocarpos muricatus scattered shrubs to open shrubland

Plant Communities:
AhRmAc.1: See the vegetation description for releve ATR003 below.
Releve ATR003, ATR005

Releve ATR003
Date**:** 10/11/2010
Location: Arthur and Rhonda Tonkin's property.
MGA94: 50J 408762 mE 6625491 mN (WGS 84; GPS unit).
Site description: Moderate, north facing slope of low ridge.
Rock type: Chert (20% outcropping)
Vegetation description: Allocasuarina huegeliana low open woodland over Regelia megacephala, Allocasuarina campestris open scrub over Ricinocarpos muricatus scattered shrubs to open shrubland over Hibbertia subvaginata scattered low shrubs over Lepidosperma tenue scattered sedges.
Associated species: Cheilanthes distans, *Ursinia anthemoides

Releve ATR005
Date: 10/11/2010
Location: Arthur and Rhonda Tonkin's property.
MGA94: 50J 408630 mE 6625609 mN (WGS 84; GPS unit).
Site description: Crest of low rocky ridge.
Rock type: Chert, >50% outcropping/
Vegetation description: (Allocasuarina huegeliana scattered low trees) over Regelia megacephala

high shrubland to open scrub over Ricinocarpos muricatus scattered shrubs to open shrubland over *Avena barbata, *Ehrharta longiflora open grassland with *Hypochaeris glabra, *Ursinia anthemoides open herbland.
Associated species: Cheilanthes distans, Dioscorea sp., Stypandra glauca, *Urospermum picroides

Condition: Good

Fire Age: >10 years

Notes: Moderate weed cover amongst rocks
ATR03 is very similar to ATR05 (probably fragmented To ATR05) on south facing slopes and east facing slope doesn't have tree layer.

Vegetation Association AhTl: *Allocasuarina huegeliana* low woodland to low open forest over *Trymalium ledifolium* ver. *rosmarinifolium, Hibbertia subvaginata, Xanthosia fruticulosa* low open shrubland over scattered sedges and grasses and *Cheilanthes adiantoides* scattered ferns.
Plant Communities:
AhTl.1: *Acacia huegeliana* low open forest over *Trymalium ledifolium* var. *rosmarinifolium, Xanthosia fruticulosa* low open shrubland over *Neurachne alopecuroidea*, *Desmocladus flexuosa* very open grass/sedgeland with *Dioscorea hastifolia* very open lianes.

This plant community, recorded at Cairn Hill. Quadrat CAH13.

AhTl.2: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata*) low open woodland over *Trymalium ledifolium* var. *rosmarinifolium, Hibbertia subvaginata* low open shrubland to open shrubland over scattered herbs and *Cheilanthes adiantoides* ferns and very open annual grassland.
Quadrat ERG6, releve ERR159.

Releve ERR159
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407963/UTM 66 24166 (WGS 84; GPS unit).
Site description: Steep, south-east facing mid to upper slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with boulders and outcrop (NT).
Vegetation description: Allocasuarina huegeliana (15-20%), Acacia acuminata subsp. acuminata (3-5%) low woodland over Allocasuarina campestris (1-2%), Acacia congesta subsp. congesta (1-2%) scattered tall shrubs over Hibbertia subvaginata (1-2%), Trymalium ledifolium var. rosmarinifolium (1-2%) scattered shrubs to open shrubland over Avena barbata, Ehrharta longiflora very open grassland with Rhodanthe polycephala scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Blennospora drummondii, Dichopogon capillipes, Dryandra sessilis var. sessilis, Acacia aristulata.

Vegetation Association AhXd: *Allocasuarina huegeliana* low open woodland to low woodland over *Xanthorrhoea drummondii* scattered tall shrubs to high open shrubland over scattered low shrubs.
Plant Communities:
AhXd.1: Allocasuarina huegeliana, (*Acacia acuminata* subsp. *acuminata*) low open woodland to low woodland over *Xanthorrhoea drummondii* high shrubland over *Calytrix leschenaultii* scattered low shrubs over scattered to very open sedgeland/grassland with very open herbland.
Releves ERR168, ERR170, GHR302 and ATR013.

Releve ERR168
Date: 22/12/03

Location: Eastern Ridge.
AMG84: 50J 0408004/UTM 66 22885 (WGS 84; GPS unit).
Site description: Gentle, south-facing slope on ridge top on a long, low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with high rock and boulder surface cover.
Vegetation description: Allocasuarina huegeliana (15-20%), Acacia acuminata subsp. acuminata (3-5%) low woodland over Xanthorrhoea drummondii (5-10%), (Allocasuarina campestris (+)) high open shrubland over Hakea lissocarpha (+), Calytrix leschenaultii (+), Phyllanthus calycinus scattered low shrubs over Lepidosperma sp., Lepidosperma leptostachyum, Desmocladus flexuosus (+), Neurachne alopecuroidea (>1%), Austrodanthonia caespitosa (>1%), Austrostipa nitida scattered to very open sedgeland/grassland with Stypandra glauca (+), Borya sphaerocephala (+), Gilberta tenuifolia (2-3 (5)%), Eremophyllum tenellum (+), Podolepis lessonii (+/- 1%), Pityrodia sp. very open herbland and Avena barbata (1-2%) scattered annual grasses to very open annual grassland and Cheilanthes adiantoides very open fernland.
Associated species: Burchardia umbellata, Dichopogon capillipes, Trachymene ornata, Chamaescilla corymbosa var. corymbosa, Tricoryne elatior, Dioscorea hastifolia, Sowerbaea laxiflora.
Condition: Good to very good.
1) Unusual area with unknown amount of disturbance; includes small area of old machinery dump.
2) Some weeds (especially *Avena barbata* in some areas).
3) Include old track. Many trees/shrubs lying on the ground – blown over?

Notes: Very unusual area with herbaceous ground cover (only scattered clumps of low shrubs), lot of Xanthorrhoea drummondii, very few Allocasuarina campestris shrubs except odd individual or few small clumps. Hard to tell if disturbance had a role.

Releve ERR170
Date: 22/12/03
Location: Eastern Ridge.
AMG84: 50J 0407058/UTM 66 22909 (WGS 84; GPS unit).
Site description: Gentle to moderate, east-facing mid to upper slope of low rocky ridge.
Rock type: Chert (mainly).
Vegetation description: Allocasuarina huegeliana (2-3%) scattered low trees over Xanthorrhoea drummondii (4-5%) high open shrubland over Calytrix leschenaultii scattered low shrubs over Lepidosperma sp. (10-12% (15)), Lepidosperma sp. open sedgeland with Stypandra glauca (+), Podolepis lessonii, Gilberta tenuifolia very open herbland and Avena barbata, Briza maxima scattered annual grasses to very open annual grassland and Cheilanthes adiantoides scattered ferns.
Associated species: Acacia acuminata subsp. acuminata, Lepidosperma tenue, Dioscorea hastifolia, Dichopogon capillipes, Dianella revolute var. divaricata, Burchardia umbellata.
Condition: Good. (Quite a lot of weeds).

Releve GHR302
Date: 6/12/04
Location: Near south-east fenceline of Gardener's block.
AMG84: 50J 0408716/UTM 66 17575 (WGS 84; GPS unit).
Site description: Gentle, south-facing lower to mid slope of ridge.
Soil: Gravelly sand (with a few chert pebbles and cobbles).
Rock type: Chert, pebbles and cobbles.
Vegetation description: Allocasuarina huegeliana (50-70%), (Acacia acuminata subsp. acuminata (+)) low open forest over Xanthorrhoea drummondii scattered shrubs over Calytrix leschenaultii scattered low shrubs over Borya sphaerocephala (3-5%), Podolepis canescens (3-5%), Trachymene pilosa open herbland and Neurachne alopecuroidea scattered grasses and open annual grassland.
Associated species: Burchardia umbellata, Avena barbata (+), Olearia dampieri subsp. eremicola (+), Hyalosperma cotula, Eucalyptus loxophleba subsp. loxophleba.
Condition: Excellent (low weed cover).

Releve ATR013
Location: Arthur and Rhonda Tonkin's property.
MGA94: 407673 mE 6625817 mN (WGS 84; GPS unit).
Soil description: Brown sandy loam
Rock type: Chert
Vegetation description: Allocasuarina huegeliana (Acacia acuminata subsp. acuminata) low woodland to low open forest over Xanthorrhoea drummondii scattered low shrubs to low open shrubland over Hibbertia subvaginata scattered low shrubs over Austrodanthonia sp. (specimen ATR13-01), Neurachne alopecuroidea scattered grasses.
Associated species: *Avena barbata, Borya sphaerocephala, Cheilanthes distans, Dioscorea sp., Opercularia vaginata, Trymalium ledifolium var. rosmarinifolium, *Ursinia anthemoides
Condition: Good.
Fire Age: >10 years.
Notes: Photos BM34-36
AhXd1

AhXd.2: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland over *Xanthorrhoea drummondii*, (*Allocasuarina campestris*) scattered tall shrubs to high open shrubland over *Trymalium ledifolium* var. *rosmarinifolium*, *Olearia dampieri* subsp. *eremicola* low open shrubland over scattered sedges and grasses with very open herbland.

This plant community was recorded on rocky slopes and included *Trymalium ledifolium* ver. *rosmarinifolium* scattered shrubs to low open shrubland. Releves D1, D2, D4, ERR191 and GHR279.

Releve D1
Date: 9/12/04
Location: Doblestein's property.
AMG84: 50J 0409377/UTM 66 24433 (WGS 84; GPS unit).
Site description: Moderate to steep, west-facing slope of low ridge.
Rock type: Extensive chert outcropping (chert ridge slope)
Vegetation description: Allocasuarina huegeliana, (Acacia acuminata subsp. acuminata) low open woodland over Xanthorrhoea drummondii scattered tall shrubs to high open shrubland over Kunzea praestans scattered shrubs over Trymalium ledifolium var. rosmarinifolium, Pityrodia dilatata, Acacia lasiocarpa var. sedifolia low open shrubland to low shrubland over Avena barbata, Briza maxima annual open grassland and Stypandra glauca, Podolepis lessonii very open herbland and Cheilanthes adiantoides scattered ferns and Neurachne alopecuroidea scattered native grasses.
Associated species: Dichopogon cap, Ehrharta longiflora, Austrodanthonia sp., Ursinia anthemoides, Dioscorea hastifolia, Burchardia umbellata.
Condition: Poor (to very poor) annual open grassland.\
Notes: Photo:BM12-16

Releve D2
Date: 9/12/04
Location: Doblestein's property.
AMG84: 50J 0408955/UTM 66 24373 (WGS 84; GPS unit).
Site description: Moderate west-facing slope of low ridge.
Rock type: 70% Chert rock outcrop.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low woodland over Xanthorrhoea drummondii scattered tall shrubs over Olearia dampieri subsp. eremicola, Trymalium ledifolium var. rosmarinifolium scattered low shrubs over Neurarchne alopecuroidea, Austrodanthonia sp. scattered grasses and Dichopogon capillipes, Trachymene pilosa, Podolepis

lessonii very open herbland and Cheilanthes adiantoides very open fernland with Ehrharta longiflora, Avena barbata very open annual grassland.
Associated species: Dioscorea hastifolia, Chamaescilla corymbosa var. corymbosa.
Condition: Good?
Notes: Photo:BM12-19 (looking east)

Releve D4
Date: 9/12/04

Location: Doblestein's property.
AMG84: 50J 0409019/UTM 66 24073 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of low ridge.
Rock type: Chert rock (lot of rock outcrop).
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees to low open woodland over Xanthorrhoea drummondii scattered tall shrubs to high open shrubland over Solanum oldfieldii, Pityrodia dilatata scattered low shrubs over Lepidosperma leptostachyum scattered sedges and Avena barbata open annual grassland with Gilberta tenuifolia (3-5%), Hyalospermum glutinosum ssp. glutinosum, Waitzia nitida open herbland.
Associated species: Dichopogon capillipes, Tricoryne elatior, Opercularia vaginata, Trymalium ledifolium var. rosmarinifolium.
Condition: Poor.
Notes: Photo: BM12-21

Releve ERR191
Date: 3/1/04
Location: Eastern Ridge.
AMG84: 50J 0407972/UTM 66 23518 (WGS 84; GPS unit).
Site description: Moderate, east-facing rocky mid slope of low rocky ridge
Rock type: Chert. Boulders and rock outcrop about 30-40% surface cover.
Vegetation description: Allocasuarina huegeliana (5-8%) low open woodland over Allocasuarina campestris (1-2%), Melaleuca radula (1%), Xanthorrhoea drummondii (1-2%) high open shrubland to scattered tall shrubs over Olearia dampieri subsp. eremicola (1-2%) scattered shrubs over Calytrix leschenaultii (1%) scattered low shrubs over Lepidosperma tenue (4-5%) very open sedgeland with Gilberta tenuifolia (3-5%), Podolepis lessonii very open herbland and Avena barbata very open annual grassland.
Condition: Good to very good.

Releve GHR279
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408365/UTM 66 17634 (WGS 84; GPS unit).
Site description: Flat crest of low rocky (chert) ridge (elevation 262 m).
Soil: Gravelly brown sand with rocks, boulders and rock outcrop (about 25% surface cover).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (lot of dead trees - possibly old fire) (5%), Acacia acuminata subsp. acuminata (2-3%) low open woodland over Xanthorrhoea drummondii (5-10%), Allocasuarina campestris (+), (Melaleuca radula (+)) high open shrubland over Olearia dampieri subsp. eremicola scattered shrub over Calytrix leschenaultii (1-2%), Trymalium ledifolium var. rosmarinifolium (2-3%) low open shrubland over Lepidosperma sp., Schoenus clandestinus, Neurachne alopecuroidea, Desmocladus flexuosus over Podolepis lessonii (1-2%), Podolepis canescens (5-10%), Goodenia arthrotricha (+), Opercularia vaginata (1-2%) open herbland with Cheilanthes adiantoides scattered ferns and Ehrharta longiflora, Avena barbata open annual grassland.

Associated species: Pityrodia dilatata, Dioscorea hastifolia, Waitzia nitida, Lawrencella rosea, Dianella revoluta var. divaricate
Condition: Good to very good.

AhXd.3: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata*) low woodland to low open forest over *Xanthorrhoea drummondii* scattered tall shrubs over *Hibbertia subvaginata* scattered low shrubs to low shrubland over scattered grasses/sedges with very open herbland and scattered ferns.
Releves G334 and RM5.

Releve G334
Date: 18/2/05
Location: Gardiner's property, just east of Morgan's block.
AMG84: 50J 0407062/UTM 66 17515 (WGS 84; GPS unit).
Site description: Gentle, south-east facing slope of low ridge.
Vegetation description: Allocasuarina huegeliana (60%), (Acacia acuminata subsp. acuminata (+)) low open forest over Xanthorrhoea drummondii high open shrubland over Hibbertia subvaginata scattered low shrubs over *Ehrharta longiflora *Avena barbata very open annual grassland.
Condition: Good.

Releve RM5
Date:10/12/04
Location: Ron Manning's property.
AMG84: 50J 0408054/UTM 66 22351 (WGS 84; GPS unit).
Site description: Moderate, north-facing lower to mid slope of ridge.
Soil: Gravelly, pebbly, cobbly brown sand in matrix of boulders and rock outcrop.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (Acacia acuminata subsp. acuminata) low open woodland to low woodland over Xanthorrhoea drummondii scattered tall shrubs over Hibbertia subvaginata (Pityrodia dilatata lower on slope) low open shrubland to low shrubland over Lepidosperma tenue very open to open sedgeland with Austrodanthonia caespitosa, Neurachne alopecuroidea scattered grasses with Hyalosperma cotula, Podolepis lessonii, Opercularia vaginata very open herbland and Cheilanthes adiantoides scattered ferns.
Associated species: Dioscorea hastifolia, Stypandra glauca, Dichopogon capillipes, Waitzia nitida.
Condition: Good to very good.
Notes: Last fire more than 10 years ago.

AhXd.4: *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low open woodland to low woodland over *Xanthorrhoea drummondii* scattered tall shrubs over very open sedgeland/grassland with *Opercularia vaginata* very open herbland to herbland.

This plant community differed by having an *Opercularia vaginata* open herbland. Releves RM1 and RM7.

Releve RM1
Date: 10/12/04
Location: Ron Manning's property.
AMG84: 50J 0408478/UTM 66 22559 (WGS 84; GPS unit).
Site description: Moderate, west-facing lower to mid slope of ridge.
Soil: Gravelly, pebbly brown sand in matrix of rock outcrops.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low open woodland to low woodland over Xanthorrhoea drummondii scattered tall shrubs over Pityrodia dilatata scattered low shrubs (patches of low open shrubland to low shrubland) over Austrodanthonia

caespitosa, Neurachne alopecuroidea very open to open sedgeland and scattered grasses with Opercularia vaginata (10-15%), Stypandra glauca (+), Hyalosperma cotula, Gilberta tenuifolia (1-2%), Podolepis lessonii open herbland and Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Tricoryne elatior, Dryandra sessilis var. sessilis, Dioscorea hastifolia, Kennedia prostrata, Austrostipa elegantissima.
Condition: Very good (low weed cover).
Notes: Similar to sites D4 and D7. Photo: BM12-23 (looking SW)

Releve RM7
Date: 10/12/04
Location: Ron Manning's property.
AMG84: 50J 0408145/UTM 66 22208 (WGS 84; GPS unit).
Site description: Moderate, east-facing slope of low ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low open woodland over (Allocasuarina campestris scattered tall shrubs) over Xanthorrhoea drummondii scattered tall shrubs over Lepidosperma tenue open sedgeland with Opercularia vaginata very open herbland to herbland.
Associated species: Waitzia nitida, Podolepis lessonii, Neurachne alopecuroidea.
Condition: Good to very good.
Notes: Fire > 7 years.

AhXd.5: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low woodland to low open forest over Xanthorrhoea drummondii high open shrubland over Neurachne alopecuroidea scattered grasses.
Releve: ATR010

Releve ATR010
Date: 12/11/2010
Location: Arthur and Rhonda Tonkin's property.
MGA94: 408106 mE 6627865 mN (WGS 84; GPS unit).
Site description: Moderate west facing mid to upper slope of ridge.
Soil description: Brown sand.
Rock type: Chert
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low woodland to low open forest over Xanthorrhoea drummondii high open shrubland over Neurachne alopecuroidea scattered grasses.
Associated species: *Avena barbata, Crassula colorata var. acuminata, Dioscorea sp., *Ehrharta longiflora, Lawrencella rosea, *Pentaschistis airoides, Thysanotus manglesianus, *Ursinia anthemoides, Wahlenbergia gracilenta
Condition: Poor
Fire Age: >10 years.
Notes: Photos BM30-32. NB: this similar to unit AhXd1. The eastern side of this ridge has Xanthorrhoea drummondii as scattered shrubs.

Vegetation Alliance 10: *Casuarina obesa* open forest

Vegetation Association Co: *Casuarina obesa* open forest.
Plant Communities:
Co.1: See the vegetation description for releve SWR258 below.
Releves SWR258, ATR009

Releve SWR258

Date: 15/1/04
Location: Stan Ridgeway's property (West).
AMG84: 50J 0408022/UTM 66 25166 (WGS 84; GPS unit).
Site description: Flats at base of low rocky ridge (elevation 223 m).
Soil: Brown clayey loam.
Vegetation description: Casuarina obesa (10-12 m) (30-40%) open forest over (80-90%) closed annual grassland.
Associated species:
Condition: Probably very poor to degraded (very high weed cover and signs of very intense stock use).

Releve ATR009
Date: 12/11/2010
Location: Arthur and Rhonda Tonkin's property.
MGA94: 408501 mE 6627666 mN (WGS 84; GPS unit).
Site description: Low lying area (depression) on valley floor.
Soil description: Pale grey-brown, light clay (sampled)
Vegetation description: Casuarina obesa low open forest over annual weed closed grassland.
Condition: Very Poor-Completely Degraded.
Fire Age: >7-10 years.
Notes: Photos BM29. ATR09 similar to Co.

Vegetation Alliance 11: *Acacia acuminata* low woodlands to low open forests
Vegetation Association Aa: *Acacia acuminata* subsp. *acuminata* low open forest over scattered grasses sedges and very open herbland.
Plant Communities:
Aa.1: *Acacia acuminata* subsp. *acuminata* low woodland to low open forest over *Cheilanthes adiantoides* very open fernland and *Hypoxis* sp., *Gilberta tenuifolia*, *Podolepis lessonii* open annual herbland.
Quadrats JT12 and SW1. Releves SWR251, SWR259, GHR263 and RM4.

Releve SWR251
Date: 13/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408719/UTM 66 25196 (WGS 84; GPS unit).
Site description: West-facing lower slope of low rocky ridge.
Vegetation description: Acacia acuminata subsp. acuminata (30-40%) low open forest over Podolepis lessonii (10-15%), Crassula colorata open herbland and Avena barbata, Pentaschistis pallida, Ehrharta longiflora very open to open annual grassland.
Associated species: Dichopogon capillipes.
Condition: Poor to good.

Releve SWR259
Date: 15/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0407934/UTM 66 25178 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope on low rocky ridge (elevation 223 m).
Soil: Gravelly, pebbly brown sand with rocks and boulders.
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (20-25%) low woodland over Austrostipa nitida, Schoenus clandestinus (+) scattered sedges/grasses with Podolepis lessonii (2-3%), Waitzia nitida (1-2%), Crassula colorata (+) very open herbland and Cheilanthes adiantoides

scattered ferns and Avena barbata, Hypochaeris glabra, Pentaschistis pallida (total cover 15-20%) open annual grassland/herbland.
Associated species: Dichopogon capillipes.
Condition: Poor to good (quite high weed cover and hard to find Cheilanthes adiantoides, Crassula etc).
Notes: Similar to SWR 251.

Releve GHR263
Date: 15/1/04
Location: Gardiner's hill.
AMG84: 50J 0408400/UTM 66 17196 (WGS 84; GPS unit).
Site description: Very gentle, south-east facing ridge top of low rocky rise (elevation 248 m).
Rock type: Coomberdale Chert
Vegetation description: Acacia acuminata subsp. acuminata (2-5%) low open woodland over Schoenus clandestinus, Neurachne alopecuroidea scattered sedges/grasses with Waitzia nitida (+), Borya sphaerocephala (2-5%), Podolepis lessonii (+) very open herbland to open herbland with Cheilanthes adiantoides scattered ferns and Avena barbata, Vulpia myuros var. hirsuta very open annual grassland.
Associated species: Dichopogon capillipes.
Condition: Good – quite a lot of weeds but still good herb layer.

Releve RM4
Date: 10/12/04
Photo: BM13-2
Location: Ron Manning's property.
AMG84: 50J 0408667/UTM 66 22642 (WGS 84; GPS unit).
Site description: Gentle, north-facing slope of ridge.
Vegetation description: Acacia acuminata subsp. acuminata low woodland over Schoenus clandestinus open sedgeland and Austrodanthonia sp. Neurarchne alopecuroidea, Avena barbata scattered grasses with Borya sphaerocephala (1-2%), Waitzia nitida, Gilberta tenuifolia, Podolepis lessonii open herbland.
Condition: Good to very good.

Aa.2: *Acacia acuminata* subsp. *acuminata* low open woodland over *Xanthorrhoea drummondii* scattered tall shrubs over scattered sedges/ with *Gilberta tenuifolia*, *Podolepis lessonii*, *Waitzia nitida* open herbland and *Cheilanthes adiantoides* very open fernland.

This plant community was distinguished by having a *Xanthorrhoea drummondii* high open shrubland. Releves D3, D5, NBPD1 and NBPD2.

Releve D3
Date: 9/12/04
Location: Doblestein's property.
AMG84: 50J 0408991/UTM 66 24168 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of low ridge.
Rock type: Chert – rocky with considerable outcropping (greater than 10 %).
Vegetation description: Acacia acuminata subsp. acuminata low open woodland over Xanthorrhoea drummondii scattered tall shrubs over Schoenus clandestinus scattered sedges and Avena barbata very open annual grassland with Borya sphaerocephala, Gilberta tenuifolia (10-15%), Podolepis lessonii, Waitzia nitida over open herbland and Cheilanthes adiantoides very open fernland.
Associated species: Austrostipa sp., Tricoryne elatior (+), Dichopogon capillipes, Comesperma integerrimum, Austrodanthonia sp., Allocasuarina huegeliana, Eucalyptus loxophleba subsp. loxophleba.
Condition: Good.

Notes: Photo BM12-20

Releve D5
Date: 9/12/04
Location: Doblestein's property.
AMG84: 50J 0409028/UTM 66 24032 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of ridge.
Rock type: 70% rock cover (chert) of surface, including > 40% rock outcrop.
Vegetation description: Acacia acuminata subsp. acuminata, Allocasuarina huegeliana low open woodland over Xanthorrhoea drummondii high open shrubland over Lepidosperma leptostachyum open sedgeland over Avena barbata very open to scattered annual grasses with Podolepis lessonii, Gilberta tenuifolia, Waitzia nitida very open to open herbland.
Condition: Good.
Notes: Similar to and just south of site D4.
Notes: Photo BM12-22

Releve**:** NBPD1
Date: 12/04
Location: Doblestein's property.
AMG84: 50J 0409333/UTM 66 23991 (WGS 84; GPS unit).
Site description: Low chert ridge.
Vegetation description: Acacia acuminata subsp. acuminata low open woodland over Xanthorrhoea drummondii high open shrubland over some remnant low shrubs and herbs (Pityrodia dilatata, Opercularia vaginata) and annual grasslands.
Associated species: Hibbertia subvaginata.
Condition: Very poor.
Notes: Disturbed Remnant: can't identify original vegetation type. Photo: BM12-14 (looking south)

Releve NBPD2
Date: 12/04
Location: Doblestein's property.
AMG84: 50J 0409493/UTM 66 24381 (WGS 84; GPS unit).
Site description: Crest and slopes of low chert ridge.
Vegetation description: Acacia acuminata subsp. acuminata low open woodland over Xanthorrhoea drummondii high open shrubland to scattered tall shrubs over Avena barbata, Ehrharta longiflora, Briza maxima annual grassland and Ptilotus drummondii var. drummondii, Waitzia nitida, Lawrencella rosea open herbland.
Associated species: Also Austrostipa sp., Austrodanthonia sp., Cheilanthes adiantoides, Podolepis lessonii, Neurachne alopecuroidea, Chamaescilla corymbosa var. corymbosa, Brunonia australis.
Condition: Poor to very poor. Number of daisy herbs and native grasses and other herbs still remain.
Notes: **A** disturbed Remnant: The same as the Acacia acuminata subsp. acuminata vegetation unit. Some York gum scattered round lower slopes. Photo: BM12-15

Aa.3: *Acacia acuminata* subsp. *acuminata*, (*Allocasuarina huegeliana*) low open woodland to low open forest over scattered sedges/grasses/herbs and *Cheilanthes adiantoides* scattered ferns.
This plant community was distinguished by having *Allocasuarina huegeliana* present in the tree layer. Releves ERR174 and SWR237.

Releve ERR174
Date: 23/12/03
Location: Eastern Ridge.
AMG84: 50J 0408075/UTM 66 22787 (WGS 84; GPS unit).
Site description: Gentle, east-facing lower slope of low rocky ridge.
Rock type: Chert.

Vegetation description: Acacia acuminata subsp. acuminata (3-5%), (Allocasuarina huegeliana (+)) scattered low trees to low open woodland over Neurachne alopecuroidea, Schoenus clandestinus scattered sedges/grasses and Borya sphaerocephala (5-10%), Eremophyllum tenellum (3-5%) open herbland with Avena barbata, Briza maxima very open to open annual grassland.
Condition: Poor to good. Unsure of extent of physical disturbance.

Releve SWR237
Date: 12/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408963/UTM 66 24981 (WGS 84; GPS unit).
Site description: Rocky boulder outcrop (70-80% surface cover) Calandrinia sp. chert ridge.
Vegetation description: Acacia acuminata subsp. acuminata (40-50%), (Allocasuarina huegeliana) low open forest over Crassula colorata, scattered herbs and Cheilanthes adiantoides scattered ferns with Ehrharta longiflora, Avena barbata, Pentaschistis pallida very open weedland.
Condition: Poor – very weedy between the rocks.

Vegetation Association AaAc: *Acacia acuminata* subsp. *acuminata* low woodland over *Allocasuarina campestris* scattered tall shrubs to high open shrubland over very open herbland.
Plant Communities:
AaAc.1*:* *Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana* low woodland to low open forest over *Allocasuarina campestris* high shrubland over annual grassland.
This plant community differed by having *Allocasuarina huegeliana* present in the tree layer.
Releve N13.

Releve N13
Date: 12/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409313/UTM 66 25046 (WGS 84; GPS unit).
Vegetation description: Acacia acuminata subsp. acuminata (30-40%), Allocasuarina huegeliana (2-4%) low woodland to low open forest over Allocasuarina campestris (15-30%) high shrubland over Avena barbata, Bromus diandrus annual grassland.
Condition: Very poor – couldn't see any herb/sedge natives in this area.

AaAc.2: *Acacia acuminata* subsp. *acuminata* (10-15 (30)%) low woodland to low open forest over *Allocasuarina campestris* ((+) 5-10%) scattered tall shrubs to high open shrubland over scattered grasses with very open herbland and *Cheilanthes adiantoides* scattered ferns.
Releves CR8, CR54, JTR225 and G331.

Releve CR8
Date: 8/11/03
Location: South-east corner of Cairn Hill.
AMG84: 50J 0407924/UTM 66 20114 (WGS 84; GPS unit).
Site description: Gentle to moderate steep banks and adjacent slope of creek.
Soil: Brown sandy loam (surface).
Vegetation description: Acacia acuminata subsp. acuminata (40%) low open forest over Allocasuarina campestris (1-2 (10%)) scattered tall shrubs to high open shrubland over Cheilanthes adiantoides (3-5%) very open fernland and Schoenus clandestinus, Austrodanthonia acerosa, Austrostipa eremophila scattered grasses/sedges with Waitzia nitida (3-5 to 10 %), Opercularia vaginata (2-5%), Ptilotus declinatus (1-2%) open herbland.
Condition: Very good.

Releve CR54
Date: 23/11/03
Location: Cairn Hill Reserve.

AMG84: 50J 0407710/UTM 66 21424 (WGS 84; GPS unit).
Site description: Gently sloping, east-facing lower slope of low broad rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Acacia acuminata subsp. acuminata (30-40%) low open forest over Allocasuarina campestris scattered tall shrubs over Austrodanthonia scabra, Neurachne alopecuroidea scattered grasses with Podolepis canescens (50%) very open herbland.
Associated species: Trachymene cyanopetala, Lomandra effusa, Dichopogon capillipes.
Notes: Similar unit to CR8.

Releve JTR225
Date: 11/1/04
Location: John Tonkin's property.
AMG84: 50J 0408972/UTM 66 26462 (WGS 84; GPS unit).
Site description: Gentle, west-facing upper slope (from edge of crest) on low rocky ridge (elevation 283 m).
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (10-15 (30)%) low woodland over Allocasuarina campestris ((+) 5-10%) high open shrubland over Borya sphaerocephala (+), Podolepis lessonii (3-5%), Gilberta tenuifolia very open herbland with Cheilanthes adiantoides scattered ferns and Avena barbata, Pentaschistis pallida, Ehrharta longiflora annual grassland (patchy).
Condition: Good (lot of weed cover, competing with herb layer).
Notes: Similar to JT12.

Releve G331
Date: 17/2/05
Location: Gardiner's property.
AMG84: 50J 0407398/UTM 66 18495 (WGS 84; GPS unit).
Site description: Moderate, south-facing slope of low ridge.
Vegetation description: Acacia acuminata subsp. acuminata (30-40%) low open forest over Allocasuarina campestris scattered tall shrubs over *Avena barbata open grassland.

AaAc.3: *Acacia acuminata* subsp. *acuminata* (30-40%), (*Allocasuarina huegeliana*) (3-5%) low woodland to low open forest over *Allocasuarina campestris* (2-3%), *Xanthorrhoea drummondii* (+) high open shrubland over scattered sedges/grasses/herbs with *Cheilanthes adiantoides* scattered ferns.

This plant community was distinguished by having *Allocasuarina huegeliana* present in the tree layer and a *Xanthorrhoea drummondii* high open shrubland.
Releves CNR100 and SWR208.

Releve CNR100
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407705/UTM 66 21999 (WGS 84; GPS unit).
Site description: Gently sloping, east-facing lower slope of low rocky rise.
Soil: Gravelly, pebbly, cobbly brown sand amongst rocks and outcrop (~ 1-5% cover).
Vegetation description: Acacia acuminata subsp. acuminata (20-40%), Allocasuarina huegeliana (2-3%) low open forest over Allocasuarina campestris ((3) 5-10%), Xanthorrhoea drummondii scattered shrubs over Schoenus clandestinus (1-2%), Neurachne alopecuroidea (+) scattered sedges/grasses with Gilberta tenuifolia (3-5%) very open herbland and Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Baeckea sp. Moora (R. Bone 1993/1), Dichopogon capillipes, Stypandra glauca, Thysanotus manglesianus, Tricoryne arenicola.

Condition: Good (some weeds).

Releve SWR208
Date: 9/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409249/UTM 66 25209 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand (NT).
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (30-40%), Allocasuarina huegeliana (3-5%) low woodland to low open forest over Allocasuarina campestris (2-3%), Xanthorrhoea drummondii (+) high open shrubland over Borya sphaerocephala (+), Crassula colorata var. colorata scattered herbs with Cheilanthes adiantoides scattered ferns and Avena barbata and Parentucellia latifolia scattered annual scattered grasses/herbs.
Associated species: Podolepis lessonii.
Condition: Good to very good – possibly signifying grazing effects on herb layer.
Notes: - >10 dead Xanthorrhoea drummondii within 15m radius.

Vegetation Association AaDs: *Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana* low woodland over *Dryandra sessilis var. sessilis (Xanthorrhoea drummondii*) scattered tall shrubs over very open herbland.
Plant Communities:
AaDs.1: *Acacia acuminata* subsp. a*cuminata*, (*Allocasuarina huegeliana*) low woodland to low open forest over *Dryandra sessilis* var. *sessilis*, (*Xanthorrhoea drummondii*) scattered tall shrubs over scattered grasses with very open herbland and *Cheilanthes adiantoides* scattered ferns.
Releves SWR227, SWR261 and N18.

Releve SWR227
Date: 11/1/04
Location Ridgeways East.
AMG84: 50J 0409089/UTM 66 24992 (WGS 84; GPS unit).
Site description: Moderate, east-facing rocky mid slope of low rocky ridge.
Soil: as per site R226.
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (10-15%), (Allocasuarina huegeliana) low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii scattered shrubs over Trymalium ledifolium var. rosmarinifolium scattered low shrubs over Cheilanthes adiantoides very open fernland and Avena barbarta, Ursinia anthemoides, Hypochaeris glabra, Ehrharta longiflora (Total =5-10%) very open annual grassland/herbland.
Associated species: Diplopeltis huegelii ssp. lehmannii (small shrub to 40 cm (grazed); on border with next unit north).
Condition: Good.

Releve SWR261
Date: 15/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0407858/UTM 66 25165 (WGS 84; GPS unit).
Site description: Gentle, south-east facing upper slope of low rocky ridge (elevation 227 m).
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (20-30%), Allocasuarina huegeliana (5-10%) low woodland to low open forest over Dryandra sessilis var. sessilis scattered tall shrubs over Austrostipa nitida scattered grasses with Podolepis lessonii very open herbland and Cheilanthes adiantoides scattered ferns and Avena barbata, Ursinia anthemoides, Briza maxima open annual grassland/herbland.

Associated species: Waitzia nitida. Trachymene cyanopetala, Phyllangium paradoxum.
Condition: Very poor to poor (to good).
Notes: Similar to N18.

Releve N18 SW
Date: 10/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409378/UTM 66 24929 (WGS 84; GPS unit).
Vegetation description: Acacia acuminata subsp. acuminata (40-50%), Allocasuarina huegeliana (5-10%), (Eucalyptus loxophleba subsp. loxophleba) low open forest over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii scattered shrubs over annual grassland/herbland.

AaDs.2: See the vegetation description for releve CR88 below.
This plant community was distinguished by the presence of an *Opercularia vaginata* herbland.
Releve CR88.

Releve CR88
Date: 27/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406930/UTM 66 21600 (WGS 84; GPS unit).
Site description: Gentle, north-east facing lower slope near end of low rocky ridge.
Soil: Very gravelly, pebbly brown sand with some small boulders (30-40 cm diameter).
Vegetation description: Acacia acuminata subsp. acuminata (15-25%), Allocasuarina huegeliana (15-20%) low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii (3%) scattered shrubs over Opercularia vaginata (10-15%), Lawrencella rosea (5-10%) open herbland to herbland.
Associated species: Podolepis canescens, Blennospora drummondii, Dichopogon capillipes, Cheilanthes adiantoides, Ptilotus polystachyus.
Notes: Similar to creek unit CR8.

Vegetation Association AaDsKp: *Acacia acuminata* subsp. *acuminata* low woodland over *Dryandra sessilis var. sessilis (Xanthorrhoea drummondii*) scattered tall shrubs over *Kunzea praestans* scattered tall shrubs to high open shrubland over very open herbland.
Plant Communities:
AaDsKp.1: See the vegetation description for releve JTR249 below.
This plant community had *Hibbertia vaginata* scattered low shrubs.
Releve JTR249.

Releve JTR249
Date: 13/1/04
Location: John Tonkin's property.
AMG84: 50J 0409178/UTM 66 27211 (WGS 84; GPS unit).
Site description: Very gentle, south-facing slope along top of low rocky ridge.
Rock type: chert
Vegetation description: Acacia acuminata subsp. acuminata, Nuytsia floribunda scattered low trees over Dryandra sessilis var. sessilis (3-5%) high open shrubland over Xanthorrhoea drummondii (2-3%), Kunzea praestans (+) high open shrubland over Hibbertia subvaginata (+), Acacia restiacea scattered low shrubs over Avena barbata, Hypochaeris glabra closed annual grassland/herbland.
Condition: Poor to very poor.

AaDsKp.2: See the vegetation description for releve SWR230 below.
This plant community had a *Melaleuca calyptroides* open shrubland.
Releve SWR230.

Releve SWR230
Date: 11/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409010/UTM 66 25195 (WGS 84; GPS unit).
Site description: Very gentle, west-facing upper slope of low rocky ridge (elevation 250 m).
Soil: Gravelly, pebbly brown sand with rocks, boulders and outcrop (~5-10%).
Vegetation description: Acacia acuminata subsp. acuminata (10-20%), Allocasuarina huegeliana (2-3%) low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans (4-5%), (Allocasuarina campestris (+)) high open shrubland over Melaleuca calyptroides (3-5%) open shrubland over Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus (1%) scattered sedges with Cheilanthes adiantoides scattered ferns and Avena barbata, Ehrharta longiflora, Vulpia myuros var. hirsuta (Total =10-20%) annual open grassland to grassland.
Associated species: Xanthorrhoea drummondii, Olearia dampieri subsp. eremicola.
Condition: Good to very good (high weed cover).

Vegetation Association AaEl: *Acacia acuminata* subsp. *acuminata, Eucalyptus loxophleba* subsp. *loxophleba* low woodland to low open forest over very open grassland/herbland.
Plant Communities:
AaEl.1: See the vegetation description for releve G342 below.
This plant community had scattered *Xanthorrhea drummondii* and *Olearia dampieri* subsp. *eremicola* in the shrub layer.
Releve G342.

Releve G342
Date: 18/2/05
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0408142/UTM 66 17844 (WGS 84; GPS unit).
Site description: Crest and upper slopes of small, high rocky ridge.
Vegetation description: Acacia acuminata subsp. acuminata (10-15%), Eucalyptus loxophleba subsp. loxophleba (5-6%), Allocasuarina huegeliana (+) low woodland over Xanthorrhoea drummondii scattered tall shrubs over Olearia dampieri subsp. eremicola scattered shrubs over Gilberta tenuifolia very open herbland and *Avena barbata very open grassland.
Condition: Good – very good.

AaEl.2: *Acacia acuminata* subsp. *acuminata*, *Eucalyptus loxophleba* subsp. *loxophleba* low open forest over open annual grassland/herbland.
Releve SWR217.

Releve SWR217
Date: 10/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409389/UTM 66 24865 (WGS 84; GPS unit).
Site description: Moderate, mid slope, north-east facing, of low rocky ridge (elevation 238 m).
Soil: Gravelly, pebbly brown loamy sand with boulders and rock outcrop (about 50% surface cover).
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (40-50%), Eucalyptus loxophleba subsp. loxophleba (5%) low open forest over Avena barbata, Hypochaeris glabra, Ehrharta longiflora, Briza maxima (5-10%) open annual grassland/herbland.

AaEl.3: *Acacia acuminata* subsp. *acuminata*, (*Eucalyptus loxophleba* subsp. *loxophleba*) low open woodland over *Allocasuarina campestris* scattered tall shrubs over open herbland and very open annual grassland.
This plant community was distinguished by the *Allocasuarina campestris* scattered tall shrubs layer.

Releves ERR149 and GHR268.

Releve ERR149
Date: 20/12/03
Location: Eastern Ridge.
AMG84: 50J 0407845/UTM 66 24674 (WGS 84; GPS unit).
Site description: Gentle, west-facing upper slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and rock outcrop (80% surface cover).
Vegetation description: Acacia acuminata subsp. acuminata (5 m, 10-15%) low woodland over Allocasuarina campestris scattered tall shrubs over Austrostipa nitida, Avena barbata (1-2%), Ehrharta longiflora (3-5%), Austrodanthonia acerosa (1-2%) very open annual grassland/grassland, Lawrencella rosea, Podolepis lessonii very open herbland with Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Trachymene ornata, Dichopogon capillipes, Eucalyptus loxophleba subsp. loxophleba, Rhodanthe polycephala, Phyllangium paradoxum (15 cm).
Condition: Good – high weed cover – Avena barbata, Ehrharta longiflora.

Releve GHR268
Date: 15/1/04
Location: Gardiner's hill.
AMG84: 50J 0408390/UTM 66 17403 (WGS 84; GPS unit).
Site description: Gentle, north-west facing lower slope of low rocky rise (elevation 242 m).
Rock type: Chalky sand stone.
Vegetation description: Acacia acuminata subsp. acuminata (8-10%), Eucalyptus loxophleba subsp. loxophleba (+) low open woodland over (Allocasuarina campestris (+) scattered shrubs) over Eremophyllum tenellum (3-5%), Gilberta tenuifolia (2-3%), Podolepis lessonii (+), Waitzia nitida (+), Borya sphaerocephala (3-5%) open herbland and Vulpia myuros var. hirsuta, Avena barbata, Pentaschistis pallida scattered annual grasses (open annual grassland adjacent to unit R266).
Associated species: Allocasuarina huegeliana.
Condition: Very good in places to good to poor (more weed cover on edge of unit).
Notes: = to R263.

Vegetation Association AaHr: *Acacia acuminata* subsp. *acuminata, (Eucalyptus loxophleba* subsp. *loxophleba*) scattered low trees over *Hakea recurva subsp. recurva* scattered tall shrubs to high open shrubland over very open herbland.
Plant Communities:
AaHr.1: *Acacia acuminata* subsp. *acuminata* low open woodland over *Hakea recurva* ssp. *recurva* (2-3%) scattered tall shrubs to high open shrubland over very open sedgeland/annual grassland/grassland with *Borya sphaerocephala, Eremophyllum tenellum, Waitzia nitida* open herbland and very open *Cheilanthes adiantoides* fernland.
Releves SWR257, GHR264 and GHR277

Releve SWR257
Date: 14/11/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408700/UTM 66 25016 (WGS 84; GPS unit).
Site description: Gentle, south-west facing slope on very low rocky rise.
Soil: Gravelly reddish – brown sandy loam.
Vegetation description: Acacia acuminata subsp. acuminata (5-10%) low open woodland over Hakea recurva ssp. recurva (3-4 m) scattered tall shrubs over Avena barbata, Pentaschistis pallida, Hypochaeris glabra very open annual grassland/herbland.
Condition: Poor to very poor.
Notes: See N25

Releve GHR264
Date: 15/1/04
Location: Gardiner's hill.
AMG84: 50J 0408391/UTM 66 17221 (WGS 84; GPS unit).
Site description: Very, very gentle, north-west facing slope just off west of low rocky rise (adjacent to flow line) (elevation 250 m).
Soil: Gravelly brown loamy sand with rock outcrop (about 5% surface cover).
Vegetation description: Acacia acuminata subsp. acuminata (5-8%) low open woodland over Hakea recurva ssp. recurva scattered tall shrubs over Lepidosperma tenue (10-15%), (Austrodanthonia caespitosa, Neurachne alopecuroidea) open sedgeland/grassland with Caesia sp. Moora (1%), Borya sphaerocephala (5-10%), Eremophyllum tenellum (1-2%), Waitzia nitida (+), Podolepis lessonii (1-2%) open herbland and Cheilanthes adiantoides very open fernland.
Notes: High lichen cover of ground amongst patches of Lepidosperma tenue.

Releve GHR277
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408435/UTM 66 17343 (WGS 84; GPS unit).
Site description: Gentle,west-facing slope of low rise.
Rock type: Shaley rock ?
Vegetation description: Acacia acuminata subsp. acuminata (3-5%) (NB: numerous dead trees still standing), (Eucalyptus loxophleba subsp. loxophleba) scattered low trees to low open woodland over Hakea recurva ssp. recurva (2-3%) high open shrubland over Austrostipa tricophylla, Neurachne alopecuroidea, Schoenus clandestinus very open sedges/grassland with Waitzia nitida (2-5%), Eremophyllum tenellum (1-2%), Ptilotus drummondii var, drummondii (+), Borya sphaerocephala (2-3%) open herbland and Cheilanthes adiantoides (2-5%) very open fernland.
Associated species: Stenanthemum tridentatum.
Condition: Very good (good cover of natives and only a few weeds).
Notes: Similar to 263.

AaHr.2: See the vegetation description for releve GHR265 below.
This plant community differed by having an *Allocasuarina campestris* scattered tall shrubs component and a *Dodonaea pinifolia* low open shrubland over *Stenanthemum tridentatum* scattered low shrubs.
Releve GHR265.

Releve GHR265
Date: 15/1/04
Location: Gardiner's hill.
AMG84: 50J 0408372/UTM 66 17262 (WGS 84; GPS unit).
Site description: Gentle, north-east facing slopes adjacent to drainage line (elevation 253 m NB: lower by 1-2 m than R264!).
Rock type: Coomberdale Chert (laterite on west side up slope with York gum on it)
Vegetation description: Acacia acuminata subsp. acuminata, (Eucalyptus loxophleba subsp. loxophleba) scattered low trees over Hakea recurva ssp. recurva, (Allocasuarina campestris) scattered tall shrubs over Dodonaea pinifolia (on laterite?) (2-3%) low open shrubland, Stenanthemum tridentatum (12 cm, grazed) (+) over Lepidosperma sp., Austrodanthonia caespitosa, Schoenus clandestinus (2-3%), Neurachne alopecuroidea very open sedgeland/grassland with Eremophyllum tenellum (3-5%), Waitzia nitida (2-3%), Borya sphaerocephala (1-2%) very open herbland to open herbland and Cheilanthes adiantoides scattered ferns.
Associated species: Melaleuca radula, Gastrolobium obovatum (35 cm), Austrostipa elegantissima (60 cm), Blennospora drummondii, Caesia sp. Moora.
Condition: Very good (low weed cover).
Notes: Small unit and not very ‘fine’.

Vegetation Association AaHs: *Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana, (Eucalyptus loxophleba* subsp. *loxophleba*) low woodland over *Allocasuarina campestris* scattered tall shrubs over *Hibbertia subvaginata* low open shrubland to low shrubland.
Plant Communities:
AaHs.1: *Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana, (Eucalyptus loxophleba* subsp. *loxophleba*) low woodland over *Allocasuarina campestris* scattered tall shrubs over *Hibbertia subvaginata* low open shrubland to low shrubland over *Lepidosperma tenue, Neurachne alopecuroidea* scattered sedges/grasses/herbs with *Cheilanthes adiantoides* scattered ferns.
There was one plant community in this vegetation association. It was only recorded on the Eastern Ridge.
Releves ERR139 and ERR164.

Releve ERR139
Date: 8/12/03
Location: Eastern Ridge.
AMG84: 50J 0407621/UTM 66 24633 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of very low rocky ridge.
Soil: Gravelly, pebbly, cobbly bouldery brown sand amongst outcrop (~ 20-30% of surface).
Vegetation description: Eucalyptus loxophleba subsp. loxophleba, Acacia acuminata subsp. acuminata, Allocasuarina huegeliana low woodland over Allocasuarina campestris scattered tall shrubs over Hibbertia subvaginata (6-7%) low open shrubland (about 90 cm) over Lepidosperma tenue, Neurachne alopecuroidea scattered sedges/grasses with *Stypandra glauca* (2-3%) very open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Podolepis lessonii, Acacia aristulata, Chamaescilla corymbosa var. corymbosa.
Note: Similar to ERG10.

Releve ERR164
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407815/UTM 66 23950 (WGS 84; GPS unit).
Site description: Gently sloping, east-facing, shoulder of ridge top (upper slope).
Soil: Gravelly, pebbly, cobbly brown sand (NT) amongst boulders and outcrop (rock cover ~ 70%).
Vegetation description: Acacia acuminata subsp. acuminata (15-20%), Allocasuarina huegeliana (2-3%) low woodland over (Allocasuarina campestris (2-3%) high open shrubland to high shrubland) over Hibbertia subvaginata (15-20%), (Calytrix leschenaultii (+), Trymalium ledifolium var. rosmarinifolium (1%)) low shrubland over Lepidosperma tenue, Neurachne alopecuroidea scattered sedges/grasses with Cheilanthes adiantoides scattered ferns.
Associated species: Burchardia umbellata, Thysanotus dichotomous, Trymalium ledifolium var. rosmarinifolium, Dioscorea hastifolia, Dichopogon capillipes, Trachymene pilosa, Chamaescilla corymbosa var. corymbosa, Pityrodia dilatata, Dryandra sessilis var. sessilissil.
Condition: Very good (low weed cover).
Notes: AMG84: 50J 0407842/UTM 66 23815 (WGS 84; GPS unit). Low woodland varies to Allocasuarina huegeliana (10-20%), Acacia acuminata subsp. acuminata (3-5 %).

Vegetation Association AaKp: *Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana* low woodland to low open forest over *Kunzea praestans* scattered tall shrubs to high open shrubland over very open herbland.
Plant Communities:
AaKp.1: *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* low woodland to low open forest over *Kunzea praestans* scattered tall shrubs (at top of breakaway) over *Pityrodia dilatata* scattered low shrubs over *Stypandra glauca* open herbland and annual open grassland.
Quadrat ERG15.

AaKp.2: See the vegetation description for releve SWR233 below.
This plant community was differentiated by having *Allocasuarina campestris* and *Xanthorrhoea drummondii* in the high open shrubland layer.
Releve SWR233.

Releve: SWR233
Date: 11/11/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409097/UTM 66 25187 (WGS 84; GPS unit).
Site description: Moderate to steep, east-facing, rock mid slope of low rocky ridge (Elevation – 247 m).
Soil: Gravelly brown sand amongst boulders and rocky outcrop.
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (15-20%) (Allocasuarina huegeliana (+)) low woodland over Kunzea praestans (1-3%), Allocasuarina campestris (5-6%), Xanthorrhoea drummondii (2-3%) high open shrubland over Lepidosperma tenue, Desmocladus flexuosus (1%) scattered sedges with Cheilanthes adiantoides scattered ferns and Avena barbata, Briza maxima, Hypochaeris glabra annual grassland/herbland.
Associated species: Podolepis lessonii, Dichopogon capillipes, Austrostipa sp.

Vegetation Association AaMcor: (*Eucalyptus wandoo* scattered trees) over *Acacia acuminata* subsp. *acuminata* scattered low trees over *Melaleuca coronicarpa* low open shrubland over very open herbland.
Plant Communities:
AaMcor.1: See the vegetation description for releve N26 below.
Releve N26.

Releve N26
Date: 1/12/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408286/UTM 66 17056 (WGS 84; GPS unit).
Site description: Small laterite ironstone area (disturbed?).
Vegetation description: (Eucalyptus wandoo subsp. wandoo scattered low trees) over Acacia acuminata subsp. acuminata scattered low trees over Melaleuca coronicarpa low open shrubland over Austrodanthonia caespitosa very open grassland.

Vegetation Association AaMr: *Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana* low woodland over *Melaleuca radula* scattered tall shrubs to high shrubland.
Plant Communities:
AaMr.1: See the vegetation description for releve CR53 below.
This plant community had an *Allocasuarina campestris* high shrubland strata.
Releve CR53.

Releve CR53
Date: 23/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407699/UTM 66 21384 (WGS 84; GPS unit).
Site description: Gentle east facing mid slope of a low broad ridge.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Acacia acuminata subsp. acuminata (15%), Allocasuarina huegeliana (5%) low woodland over Allocasuarina campestris (10-15%) high shrubland over Melaleuca radula (1.5m, 15-20%) shrubland over Neurachne alopecuroidea scattered grasses with Opercularia vaginata, Dichopogon capillipes scattered herbs.

Associated species: Trachymene pilosa, Desmocladus flexuosus, Austrostipa elegantissima, Podolepis lessonii.

AaMr.2: (*Eucalyptus wandoo* subsp. *wandoo* scattered low trees) over *Acacia acuminata* subsp. *acuminata* scattered low trees over *Melaleuca radula* scattered shrubs over *Schoenus clandestinus* open sedgeland/grassland with *Borya sphaerocephala* very open herbland and *Cheilanthes adiantoides* very open fernland.
Releves CR14 and GHR278.

Releve CR14
Date: 8/11/03
Location: Cairn Hill (east-south-east boundary).
AMG84: 50J 0407922/UTM 66 20234 (WGS 84; GPS unit).
Site description: Moderately sloping, south-east-facing mid to lower slope of lower ridge.
Soil: Gravelly grey-brown sand.
Vegetation description: Eucalyptus wandoo subsp. wandoo (1-2% to 5%) scattered low trees to low open woodland over Acacia acuminata subsp. acuminata (20-30%), Allocasuarina huegeliana (20-30%) low woodland over Melaleuca radula (2-3 m, +) scattered shrubs over Calytrix leschenaultii scattered low shrubs over Cheilanthes adiantoides (dead, 5-10 to 20-30%) open fernland and Schoenus clandestinus (1-2%), Neurachne alopecuroidea scattered grasses/sedges with Lomandra effusa (1-2%), Opercularia vaginata (3-5%), Borya sphaerocephala (5-10%) open herbland.
Associated species: Glischrocaryon flavescens, Chamaescilla corymbosa var. corymbosa, Trachymene ornata, Caesia alfordii, Waitzia nitida, Stylidium septentrionale.
Condition: Very good (some weeds especially Ursinia anthemoides).
Notes: Includes more open woodland with Allocasuarina campestris high open scrub to open scrub.

Releve GHR278
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408379/UTM 66 17494 (WGS 84; GPS unit).
Site description: Moderate, south-facing mid slope at end of low rocky ridge (elevation 249 m).
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Melaleuca radula scattered shrubs over Schoenus clandestinus (1%), Lepidosperma tenue (25-30%), Neurachne alopecuroidea open sedgeland/grassland with Borya sphaerocephala very open herbland and Cheilanthes adiantoides very open fernland.
Associated species: Waitzia nitida, Caesia sp. Moora, Calandrina sp., Sollya heterophylla (edge), (Eucalyptus wandoo subsp. wandoo), Eucalyptus loxophleba subsp. loxophleba.
Condition: Very good.
Notes: Similar to R264.

Vegetation Association AaTl: *Acacia acuminata* subsp. *acuminata* scattered low trees over *Trymalium ledifolium* var. *rosmarinifolium* open shrubland.
Plant Communities:
AaTl.1: *Acacia acuminata* subsp. *acuminata* scattered low trees over *Trymalium ledifolium* var. *rosmarinifolium* open shrubland over *Neurachne alopecuroidea* scattered grasses and *Cheilanthes adiantoides* open fernland with *Schoenia cassiniana*, *Podolepis lessonii* annual herbland.
Quadrat GH5.

Vegetation Alliance 12: *Banksia prionotes* scattered low trees.
Vegetation Association Bp: *Banksia prionotes* scattered low trees over *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland.

Plant Communities:
Bp.1: (*Banksia prionotes*), *Acacia acuminata* subsp. *acuminata* scattered low trees over *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland over *Xanthorrhoea drummondii*, *Allocasuarina campestris* scattered tall shrubs over *Baeckea crispiflora* var. *tenuior*, *Hakea lissocarpha* scattered low shrubs over annual grassland.
This plant community was recorded near the head of a gully between low ridges.
Releve CH314.

Releve CH314
Date: 12/12/04
Location: Kim Chester's property.
AMG84: 50J 0408310/UTM 66 20042 (WGS 84; GPS unit).
Site description: Very gentle, south-facing slope of drainage line between low ridges.
Soil: Pale grey sand.
Vegetation description: (Banksia prionotes), Acacia acuminata subsp. acuminata scattered low trees over Dryandra sessilis var. sessilis scattered tall shrubs to high open shrubland over Xanthorrhoea drummondii, Allocasuarina campestris, Calothamnus aff. quadrifidus Moora-Watheroo scattered tall shrubs over Calytrix leschenaultii, Baeckea crispiflora var. tenuior, Hakea lissocarpha scattered low shrubs over Vulpia myuros var. hirsuta, Pentaschistis pallida, Avena barbata annual grassland.
Associated species: Eremaea beaufortioides aff. var. lachnosanthe (small fruit form), Erodium sp., Calytrix strigosa.
Condition: Poor to very poor.
Notes: Fire > 10 years.

Bp.2: *Banksia prionotes* scattered low trees over *Dryandra sessilis* var. s*essilis* high open shrubland over *Leptospermum erubescens*, *Grevillea amplexicans* ssp. *semivestita*, *Kunzea praestans* high shrubland over *Calytrix leschenaultii* scattered low shrubs over open (annual) grassland and *Podolepis lessonii* very open herbland.
This plant community was recorded on the crest of a low rise. It included a *Leptospermum erubescens*, *Grevillea amplexicans* subsp. *semivestita*, *Kunzea praestans* high shrubland. Releve G315.

Releve G315
Date: 12/12/04
Photo: BM13-14
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0408388/UTM 66 20272 (WGS 84; GPS unit).
Site description: Crest of low rise in series of ridges.
Soil: Yellow sand.
Rock type: < 2% exposed rock (?Chert).
Vegetation description: Banksia prionotes scattered low trees over Dryandra sessilis var. sessilis high open shrubland over Leptospermum erubescens, Grevillea amplexicans ssp. semivestita, Kunzea praestans high shrubland (but lot of Leptospermum erubescens grazed down to 30-40 cm) over Calytrix leschenaultii scattered low shrubs over Vulpia myuros var. hirsuta, (Neurachne alopecuroidea) open grassland and Podolepis lessonii very open herbland.
Associated species: Baeckea crispiflora var. tenuior
Condition: Poor to good.
Notes: More than 10 years since fire. Difficult to describe because heavily grazed.
Mapping Note: G315a: Banksia prionotes not present in unit.

Vegetation Alliance 13: *Allocasuarina campestris* high shrublands to open and closed scrub.

Vegetation Association Ac: *Allocasuarina campestris* open to closed scrub over scattered sedges/grasses/herbs.

Plant Communities:
Ac.1: *Allocasuarina campestris* open heath to closed heath over scattered sedges/grasses with *Borya sphaerocephala* (+) scattered herbs and *Cheilanthes adiantoides* scattered ferns.
Releves CR25, CNR106, DR136, JTR203, GHR271, GHR288, GHR293, GHR301 and CSR333.

Releve CR25
Date: 14/11/03
Location: Cairn Hill.
AMG84: 50J 0407324/UTM 66 20197 (WGS 84; GPS unit).
Site description: Mid slope of steep, west-facing slope of low to medium ridge (altitude = 241m).
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina campestris (60-70%) open scrub over Calytrix leschenaultii scattered low shrubs over Neurachne alopecuroidea scattered grasses with Stylidium septentrionale (1-2%), Borya sphaerocephala (1-2%) very open herbland.
Associated species: Schoenus clandestinus, Trachymene pilosa, Trachymene ornata, Chamaescilla corymbosa var. corymbosa, Pterostylis sp., Blennospora drummondii, Trachymene cyanopetala, Podolepis canescens.

Releve CNR106
Date: 29/11/03
Location: Cairn Hill North.
AMG84: 50J 0407136/UTM 66 22476 (WGS 84; GPS unit).
Site description: West-facing, gently sloping lower slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina campestris (60-70%) open to closed scrub over Xanthorrhoea drummondii scattered shrubs over Calytrix leschenaultii scattered low shrubs over Neurachne alopecuroidea, Schoenus clandestinus scattered grasses/sedges with Borya sphaerocephala (2-4%), Stypandra glauca (+) very open herbland.

Releve DR136 (R136a)
Date: 7/12/03
Location: Waste Dump Area.
AMG84: 50J 0407521/UTM 66 23049 (WGS 84; GPS unit).
Site description: Gently sloping, south-west facing mid slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina campestris (60-70%) open heath to closed heath over Lepidosperma tenue, Schoenus clandestinus, Neurachne alopecuroidea scattered sedges/grasses with Stypandra glauca, Borya sphaerocephala (+) scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Podolepis lessonii, Dichopogon capillipes.

Releve JTR203
Date: 9/1/04
Location: John Tonkin's property.
AMG84: 50J 0408853/UTM 66 25340 (WGS 84; GPS unit).
Site description: Flat low rocky ridge top.
Soil: Very gravelly, pebbly, cobbly.
Rock type: Chert low grade.
Vegetation description: Allocasuarina campestris (>90%) closed scrub over scattered Cheilanthes adiantoides ferns and scattered herbs.
Associated species: Podolepis lessonii.
Condition: Very good + (very low weed cover).

Releve GHR271

Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408286/UTM 66 17186 (WGS 84; GPS unit).
Site description: Gently, west-facing slope of low rocky ridge.
Vegetation description: Allocasuarina campestris closed scrub over Amphipogon caricinus, Desmocladus flexuosus, Schoenus clandestinus, Lepidobolus chaetocephalus scattered sedges with Borya sphaerocephala (2-3%), Stylidium septentrionale very open herbland and Cheilanthes adiantoides scattered ferns.
Associated species: Austrostipa elegantissima.
Condition: Very good (very few weeds - Ursinia anthemoides).

Releve GHR288
Date: 17/1/04
Location: Gardiner's hill
AMG84: 50J 0408433/UTM 66 17808 (WGS 84; GPS unit).
Site description: Flat crest of low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina campestris (80-90%) closed scrub over Neurachne alopecuroidea, Schoenus clandestinus scattered sedges/grasses with Podolepis canescens scattered herbs.
Associated species: Chamaescilla corymbosa var. corymbosa, Trachymene pilosa.
Condition: Good to very good.

Releve GHR293
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408514/UTM 66 17385 (WGS 84; GPS unit).
Site description: Gentle, south-west facing slope of low rocky ridge (elevation 258 m).
Rock type: Chert.
Vegetation description: Allocasuarina campestris (80-90%) closed scrub over Schoenus clandestinus (4-5%), Neurachne alopecuroidea very open sedgeland/grassland with Borya sphaerocephala (5-6%), Stylidium septentrionale (+), Opercularia vaginata (+) very open herbland and Cheilanthes adiantoides scattered ferns.
Associated species: Dianella revoluta var. divaricata, Amphipogon caricinus, Lomandra effusa.
Condition: Very good.
Notes: Varies to Allocasuarina campestris (50-60%) open scrub over Schoenus clandestinus, Neurachne alopecuroidea very open sedges/grasses with Borya sphaerocephala (25-30%), Stylidium septentrionale (1-2%), Lomandra effusa open herbland.

Releve GHR301
Date: 6/12/034
Location: Gardiner's hill, east side of block, (just east of near eastern fence line).
AMG84: 50J 0408933/UTM 66 17855 (WGS 84; GPS unit).
Site description: Mid – lower slope of ridge, gently sloping, east facing.
Soil: Gravelly, pebbly, cobbly grey-brown sand.
Rock type: ?Chert.
Vegetation description: Allocasuarina campestris (60-70%) open to closed scrub over Calytrix leschenaultii scattered low shrubs over Schoenus clandestinus very open sedgeland and Borya sphaerocephala (15-20%), Podolepis canescens (3-5%) open herbland and Avena barbata, open annual grassland.
Associated species: Neurachne alopecuroidea, Thysanotus manglesianus, Dichopogon capillipes, Calothamnus aff. quadrifidus Moora-Watheroo, Briza maxima.
Condition: Very good.
Notes: (similar to GHR293).

Releve CSR333
Date: 18/2/05
Location: Kim Chester's property.
AMG84: 50J 0407197/UTM 66 18976 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of low ridge.
Rock type: Chert.
Vegetation description: Allocasuarina campestris (50-70%), (Xanthorrhoea drummondii (+)) open to closed scrub over *Avena barbata, *Bromus diandrus annual grassland.
Condition: Poor – very poor.

Ac.2: (*Acacia acuminata* subsp. *acuminata* (+ (3-5%)) scattered low trees to low open woodland over *Allocasuarina campestris* (90%) closed scrub over scattered grasses/sedges with *Cheilanthes adiantoides* scattered ferns and *Borya sphaerocephala* scattered herbs.

This plant community differed by having an *Acacia acuminata* subsp. *acuminata* scattered low trees to low open woodland strata. Releves CNR111, CNR114, ERR176, JTR204, JTR224, JTR244, GHR285, CH309, G313 and G330.

Releve: CNR111
Date: 2/12/03
Location: Cairn Hill North.
AMG84: 50J 0407123/UTM 66 22624 (WGS 84; GPS unit).
Site description: North-facing, gently sloping, mid slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (80-90%) closed scrub over Calytrix leschenaultii scattered low shrubs over Neurachne alopecuroidea scattered grasses with Stylidium septentrionale scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Lawrencella rosea, Dioscorea hastifolia, Thysanotus manglesianus, Chamaescilla corymbosa var. corymbosa, Burchardia umbellata, Acacia acuminata subsp. acuminata, Borya sphaerocephala.

Releve CNR114
Date: 3/12/03
Location: Cairn Hill North.
AMG84: 50J 0407286/UTM 66 22102 (WGS 84; GPS unit).
Site description: Gently sloping, west-facing upper slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Acacia acuminata subsp. acuminata (+ (3-5%)) scattered low trees to low open woodland over Allocasuarina campestris (90%) closed scrub over Neurachne alopecuroidea (+), Schoenus clandestinus (1%) scattered grasses/sedges with Cheilanthes adiantoides scattered ferns and Borya sphaerocephala scattered herbs.
Associated species: Chamaescilla corymbosa var. corymbosa, Burchardia umbellata, Thysanotus manglesianus, Comesperma integerrimum.
Notes: Similar to CHN1, but with Acacia acuminata subsp. acuminata scattered tree layer.

Releve ERR176
Date: 23/12/03
Location: Eastern Ridge.
AMG84: 50J 0407968/UTM 66 23044 (WGS 84; GPS unit).
Site description: Gentle, south-west facing slope of low rocky ridge.
Soil: Gravelly, pebbly with few cobbles, brown sand.

Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (40-50%) open scrub over Schoenus clandestinus scattered sedges with Borya sphaerocephala (2-(5-10%), Gilberta tenuifolia (5-10%) (not under Allocasuarina campestris) and Podolepis lessonii (1-2%) open herbland to herbland.
Condition: Very good (only few weeds). Maybe some disturbance associated with old cleared track nearby.

Releve JTR204
Date: 9/1/04
Location: John Tonkin's property.
AMG84: 50J 0408977/UTM 66 25430 (WGS 84; GPS unit).
Site description: Flat to very gently sloping, north-west facing, slope on low rocky ridge (elevation 260 m).
Soil: Very gravelly, pebbly silty fine sand.
Vegetation description: Acacia acuminata subsp. acuminata (5-8%) low open woodland over Allocasuarina campestris (60-70%) open scrub over Schoenus sp. scattered sedges with Borya sphaerocephala (+), Podolepis lessonii (+) scattered herbs to very open herbland and Cheilanthes adiantoides scattered ferns and Avena barbata, Briza maxima scattered annual grasses.
Associated species: Chamaescilla corymbosa var. corymbosa.
Condition: Very good (not many weeds).

Releve JTR224
Date: 11/1/04
Location: John Tonkin's property.
AMG84: 50J 0409055/UTM 66 26361 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of low rocky ridge.
Vegetation description: (Acacia acuminata subsp. acuminata) scattered low trees over Allocasuarina campestris (80-90%) closed scrub over Schoenus clandestinus scattered sedges over Borya sphaerocephala. (2-3%), Podolepis lessonii (+) very open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Trachymene ornata, Crassula colorata.
Condition: Very good. Low weed cover.

Releve JTR244
Date: 13/1/04
Location: John Tonkin's property.
AMG84: 50J 0409071/UTM 66 26430 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of rocky low ridge (elevation 274 m).
Soil: Gravelly, pebbly brown sand with outcrop/boulders (5-10%).
Rock type: Chert?
Vegetation description: Acacia acuminata subsp. acuminata (3-5%), Allocasuarina huegeliana (3-5%), (Eucalyptus loxophleba subsp. loxophleba (+)) low open woodland over Allocasuarina campestris (70-90%) closed scrub over Desmocladus flexuosus, Schoenus clandestinus scattered sedges with Borya sphaerocephala (2-3%) (heavily grazed), Podolepis lessonii (1-2%) very open herbland and Avena barbata, Vulpia myuros var. hirsuta scattered to very open annual grassland.
Associated species: Chamaescilla corymbosa var. corymbosa.
Condition: Very good (low weed cover).

Releve GHR285
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408246/UTM 66 18007 (WGS 84; GPS unit).
Site description: Moderate, north-west facing mid to lower slope of low rocky ridge.
Soil: Gravelly, pebbly silty fine sand.

Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (4-5m) (70-80%) closed scrub over Schoenus clandestinus scattered sedges with Borya sphaerocephala scattered herbs and Cheilanthes adiantoides (5-6%) very open fernland.
Associated species: Chamaescilla corymbosa var. corymbosa.
Condition: Very good (few Hypochaeris glabra weeds).

Releve CH309
Date: 11/12/04
Location: Kim Chester's property.
AMG84: 50J 0408092/UTM 66 21425 (WGS 84; GPS unit).
Site description: Crest of low rise.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris closed scrub over Schoenus clandestinus very open sedgeland and Borya sphaerocephala very open herbland.
Associated species: Melaleuca radula, Thysanotus manglesianus, Chamaescilla corymbosa var. corymbosa, Burchardia umbellata, Podolepis lessonii, Dichopogon capillipes.
Condition: Good to very good.

Releve G313
Date: 11/12/04
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0408443/UTM 66 20952 (WGS 84; GPS unit).
Site description: Gentle, north-facing slope of low ridge.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris open to closed scrub over Calytrix leschenaultii scattered low shrubs over Pentaschistis pallida very open annual grassland with Borya sphaerocephala very open herbland.
Associated species: Kunzea praestans (nearby), Baeckea crispiflora (common or small leaf form) (nearby), Podolepis lessonii, Daviesia dielsii, Baeckea sp. Moora (nearby).
Condition: Good to very good.

Releve G330
Date: 17/2/05
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0407379/UTM 66 18588 (WGS 84; GPS unit).
Site description:
Vegetation description: Acacia acuminata subsp. acuminata (+) scattered low trees over Allocasuarina campestris (50-60%) open scrub over *Avena barbata, *Bromus diandrus annual open grassland.
Condition: Poor – very poor (high weed cover).
Ac.3: *Eucalyptus loxophleba* subsp. *loxophleba*, (*Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana*) low open woodland over *Allocasuarina campestris* open scrub over *Calytrix leschenaultii* low open shrubland over scattered sedges/grasses and *Borya sphaerocephala* very open herbland.
This plant community had a *Eucalyptus loxophleba* subsp. *loxophleba*, (*Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana*) scattered low trees to low open woodland layer. Quadrats ERG12, ERG18 and WDM3. Releves CNR104, CNR133, ERR141, ERR151, ERR162, G336, NBPD5 and NBPD3.

Releve CNR104
Date: 28/11/03
Location: North-east end of Cairn Hill North.
AMG84: 50J 0407452/UTM 66 22235 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of short slope of low rocky ridge.

Soil: Gravelly, pebbly brown sand.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (5-10%), Acacia acuminata subsp. acuminata (+), Allocasuarina huegeliana (+) low open woodland over Allocasuarina campestris (60-70%) open scrub over Calytrix leschenaultii (2-3%) low open shrubland over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses and Borya sphaerocephala (2-7%) very open herbland.
Associated species: Chamaescilla corymbosa var. corymbosa, Trachymene cyanopetala, Lepidosperma tenue, Hibbertia subvaginata.

Releve CNR133
Date: 6/12/03
Location: Cairn Hill North.
AMG84: 50J 0407356/UTM 66 21800 (WGS 84; GPS unit).
Site description: Narrow drainage bed in steep walled gully between low rocky ridges.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba, Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (4-4.5 m, 80-90%) closed scrub over Cheilanthes adiantoides (3-5%) very open fernland.
Associated species: Thysanotus manglesianus, Dichopogon capillipes, Dioscorea hastifolia.
Condition: Good. Heavy weed infestation (Avena barb, Ehrharta longiflora, Hypochaeris glabra).

Releve ERR141
Date: 8/12/03
Location: Eastern Ridge.
AMG84: 50J 0407660/UTM 66 24516 (WGS 84; GPS unit).
Site description: Very gently sloping, east-facing, rocky lower slope of very low ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and outcrop.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (1-2%), Acacia acuminata subsp. acuminata (1%) scattered low trees over Allocasuarina campestris (50-60%) open scrub over Neurachne alopecuroidea scattered grasses with Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Thysanotus manglesianus, Dioscorea hastifolia, Goodenia berardiana.
Condition: Very good - some weeds.
Notes: Unit also includes area with scattered Allocasuarina huegeliana.
Releve ERR151
Date: 20/12/03
Location: Eastern Ridge.
AMG84: 50J 0407867/UTM 66 24598 (WGS 84; GPS unit).
Site description: Top of spur between low ridges.
Soil: (See ERG150).
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (10% - (regrowth to 4,5 m)), Allocasuarina huegeliana (3-5%) low open woodland to low woodland over Allocasuarina campestris (40-50%) open scrub over Calytrix leschenaultii scattered low shrubs over Lepidosperma tenue scattered sedges.
Associated species: Dichopogon capillipes, Chamaescilla corymbosa var. corymbosa.
Condition: Good to very good – low weed cover.

Releve ERR162
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407925/UTM 66 24060 (WGS 84; GPS unit).
Site description: Gently sloping, east-facing lower to mid slope of low rocky ridge.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba scattered low trees over Allocasuarina campestris (60-80%) open to closed scrub over Gilbertia tenuifolia, Podolepis lessonii

(1-3%) very open herbland with Cheilanthes adiantoides scattered ferns and Avena barbata, Bromus diandrus scattered annual grasses.
Associated species: Chamaescilla corymbosa var. corymbosa.
Condition: Good to very good. Some weeds.
Notes: Similar to R141, but with no Acacia acuminata subsp. acuminata.

Releve G336
Date: 18/2/05
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0407172/UTM 66 17687 (WGS 84; GPS unit).
Site description: Gentle, south-facing slope of low rounded ridge.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (3-5%), Acacia acuminata subsp. acuminata (+) scattered low trees over Allocasuarina campestris (40-60%), (Xanthorrhoea drummondii (+)) open scrub over Austrostipa sp. *Avena barbata scattered grasses and Gilberta tenuifolia, Podolepis lessonii Waitzia nitida very open herbland.
Condition: Good to very good.

Releve NBPD3
Date: 9/12/03
Location: Doblestein's property.
AMG84: 50J 0408932/UTM 66 23714 (WGS 84; GPS unit).
Site description:
Vegetation description: Eucalyptus loxophleba subsp. loxophleba, Acacia acuminata subsp. acuminata low woodland over Allocasuarina campestris scattered tall shrubs over Avena barbata annual grassland and Gilberta tenuifolia very open herbland.
Condition: Very poor condition.

Releve**:** NBPD5
Date: 9/12/03
Location: Doblestein's property.
AMG84: 50J 0409211/UTM 66 23477 (WGS 84; GPS unit).
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata, (Eucalyptus loxophleba subsp. loxophleba) low open woodland over Allocasuarina campestris open to closed scrub over Gilberta tenuifolia, Podolepis lessonii very open herbland and Avena barbata, Pentaschistis pallida annual grassland.
Condition: Poor to good condition.

Ac.4: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland over *Allocasuarina campestris* closed scrub over *Neurachne alopecuroidea* scattered grasses with scattered herbs and *Cheilanthes adiantoides* scattered ferns.
This plant community differed by having an *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) scattered low trees to low open woodland layer. Quadrats ERG1 and JT6. Releves CNR93, CNR99, CNR103, CNR108, ERR161, ERR165, ERR173, ER175, ERR181, ERR186, ERR188, ERR194, ERR196, SWR205, SWR209, JTR210, SWR241, GHR297, GHR304, G311 and RM10.

Releve CNR93
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407719/UTM 66 21736 (WGS 84; GPS unit).
Site description: Crest of very low rocky rise (ridge).
Soil: Gravelly, pebbly, cobbly rocky brown sand.
Vegetation description: Acacia acuminata subsp. acuminata (10-15%), (Allocasuarina huegeliana) (+) low woodland similar to Allocasuarina campestris (70-80%) closed scrub. Similar to Schoenus

clandestinus, Neurachne alopecuroidea scattered sedges/grasses with Cheilanthes adiantoides (3-5%) very open fernland and Podolepis lessonii (1-2%), Gilberta tenuifolia (1-2%) very open herbland.
Associated species: Salmon gum, Thysanotus manglesianus, Trachymene ornata, Burchardia umbellata, Comesperma integerrimum.

Releve CNR99
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407647/UTM 66 22053 (WGS 84; GPS unit).
Site description: Gently sloping, east-facing upper slope (adjacent to ridge top) of very low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (3-5%), Acacia acuminata subsp. acuminata (1%) scattered low trees to low open woodland over Allocasuarina campestris (40-50%), Xanthorrhoea drummondii (2-3%) open scrub over Schoenus clandestinus (1-5%), Neurachne alopecuroidea (+) scattered sedges/grasses with Boronia coerulescens subsp. spinescens, Stypandra glauca (+), Gilberta tenuifolia, Podolepis lessonii (1-2%) scattered herbs with Cheilanthes adiantoides (1%) scattered ferns.
Associated species: Trachymene cyanopetala, Waitzia nitida, Trachymene ornata, Dichopogon capillipes.

Releve CNR103
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407600/UTM 66 22173 (WGS 84; GPS unit).
Site description: Gentle, north-facing upper slope of low rocky rise (ridge).
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (5-6%), Acacia acuminata subsp. acuminata (+) low open woodland over Allocasuarina campestris (80-100%) closed scrub over Neurachne alopecuroidea scattered grasses with Rhodanthe polycephala scattered herbs and Cheilanthes adiantoides (+/-1%) scattered ferns.
Associated species: Chamaescilla corymbosa var. corymbosa, Thysanotus manglesianus, Xanthorrhoea drummondii, Stypandra glauca.

Releve CNR108
Date: 2/12/03
Location: Cairn Hill North.
AMG84: 50J 0407023/UTM 66 22582 (WGS 84; GPS unit).
Site description: Gentle lower slope, west-facing, of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (3-4%) scattered low trees to low open woodland over Allocasuarina campestris (70-80%) open to closed scrub over Stypandra glauca, Chamaescilla corymbosa var. corymbosa, Dichopogon capillipes scattered herbs with Cheilanthes adiantoides (2-4%) very open fernland.
Associated species: Neurachne alopecuroidea, Thysanotus manglesianus, Acacia acuminata subsp. acuminata.
Notes: Mapping unit generally has Acacia acuminata subsp. acuminata as scattered low trees in tree layer.

Releve ERR161
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407835/UTM 66 24064 (WGS 84; GPS unit).
Site description: Mid slope of low ridge, east-facing moderate slope (elevation 250 m).

Vegetation description: Acacia acuminata subsp. acuminata (2-4%), (Allocasuarina huegeliana) low open woodland over Allocasuarina campestris (50-60%) open to closed scrub over Cheilanthes adiantoides scattered ferns with Avena barbata, Briza maxima, Ehrharta longiflora very open annual grassland.
Associated species: Acacia congesta subsp. congesta, Hibbertia subvaginata (upslope), Ursinia anthemoides, Dichopogon capillipes, Dioscorea hastifolia.
Condition: Good to very good. Generally weed cover is low, except in openings in the scrub.

Releve ERR165
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407836/UTM 66 23994 (WGS 84; GPS unit).
Site description: East-facing, moderate upper slope of low rocky ridge.
Vegetation description: Allocasuarina huegeliana (2-3%), Acacia acuminata subsp. acuminata (2-3%) low open woodland over Allocasuarina campestris (50-70%) open scrub over Lepidosperma tenue scattered sedges.
Condition: Very good (few weeds).
Notes: Only small patches.

Releve ERR173
Date: 23/11/03
Location: Eastern Ridge.
AMG84: 50J 0408044/UTM 66 22604 (WGS 84; GPS unit).
Site description: Gentle, south-west facing slope of low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5-6%), Acacia acuminata subsp. acuminata (4-5%) low open woodland to low woodland over Allocasuarina campestris (50-60%) open scrub over Neurachne alopecuroidea scattered sedges/grasses to very open sedgeland with Stypandra glauca scattered herbs and Cheilanthes adiantoides scattered ferns.
Condition: Very good (low weed cover).

Releve ERR175
Date: 23/12/03
Location: Eastern Ridge.
AMG84: 50J 0407892/UTM 66 22957 (WGS 84; GPS unit).
Site description: Gentle, south-west facing slope of low rocky ridge.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (70-80%) closed scrub over Borya sphaerocephala (1%), Gilberta tenuifolia (2-3%) very open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Burchardia umbellata, Trachymene cyanopetala.
Condition: Very good - not much weed cover.

Releve ERR181
Date: 24/12/03
Location: Eastern Ridge.
AMG84: 50J 0407895/UTM 66 23015 (WGS 84; GPS unit).
Site description: Gentle to moderate west-facing slope of low rocky ridge.
Rock type: See R168.
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (3-5%) low open woodland to low woodland over Allocasuarina campestris (20-30% (50-60% in patches), Xanthorrhoea drummondii, Acacia congesta subsp. congesta open scrub over Lepidosperma tenue, Neurachne alopecuroidea scattered sedges/grasses with Gilberta tenuifolia (5-10%), Podolepis lessonii (+) very open herbland to open herbland and Cheilanthes adiantoides scattered ferns and Avena barbata, Ehrharta longiflora very open annual grassland.

Associated species: Dioscorea hastifolia, Burchardia umbellata, Lomandra sp.
Condition: Good to very good (some weeds).
Notes: Similar to R180.

Releve ERR186
Date: 2/1/04
Location: Eastern Ridge.
AMG84: 50J 0407810/UTM 66 23521 (WGS 84; GPS unit).
Site description: Steep, west-facing, breakaway slope near top of low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana scattered low trees over Allocasuarina campestris (30-40%), (Xanthorrhoea drummondii (1-2%)) open scrub over Lepidosperma tenue (2-3%), Neurachne alopecuroidea (+), Austrodanthonia caespitosa very open sedgeland/grassland with Borya sphaerocephala scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Waitzia nitida, Dichopogon capillipes, Gilberta tenuifolia.
Condition: Good to very good. Quite a few weeds.

Releve ERR188
Date: 2/4/04
Location: Eastern Ridge.
AMG84: 50J 0407703/UTM 66 23553 (WGS 84; GPS unit).
Site description: Gentle, south-facing lower slope of low rocky ridge (elevation 255 m).
Soil: Gravelly, pebbly, cobbly brown sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (3-5%), Acacia acuminata subsp. acuminata (1-2%) low open woodland over Allocasuarina campestris (50-60%), (Xanthorrhoea drummondii (1-2%)) open scrub over Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus, Lepidosperma tenue scattered sedges with Borya sphaerocephala (2-4%) very open herbland.
Associated species: Acacia lasiocarpa var. sedifolia
Condition: Very good to excellent.
Notes: Much of the Allocasuarina campestris is 1-1.2m high => regrowth, perhaps from fire (burnt trunk of Allocasuarina huegeliana nearby).

Releve ERR194
Date: 3/1/04
Location: Eastern Ridge.
AMG84: 50J 0407954/UTM 66 23609 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of low rocky ridge.
Rocky type: Chert.
Vegetation description: Allocasuarina huegeliana scattered low trees over Allocasuarina campestris (50-60%), Xanthorrhoea drummondii (+) open scrub over Lepidosperma tenue (2-3%), Lepidosperma sp. very open sedges with Podolepis lessonii scattered herbs.
Condition: (Good) to very good – some weeds present.

Releve ERR196
Date: 4/1/04
Location: Eastern Ridge.
AMG84: 50J 0407773/UTM 66 23273 (WGS 84; GPS unit).
Site description: West-facing, moderate lower slopes of low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana scattered low trees over Allocasuarina campestris (50-60%), Xanthorrhoea drummondii (2-3%) open scrub over Lepidosperma tenue, Schoenus clandestinus (2-4%), Neurachne alopecuroidea (+), Desmocladus flexuosus very open

sedgeland/grassland with Borya sphaerocephala (2-5%), Stylidium septentrionale (+) very open low herbland.
Condition: Very good.

Releve SWR205
Date: 9/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409243/UTM 66 25111 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of low rocky ridge.
Soil: Gravelly, pebbly brown sand with rock outcrop (5-10% surface cover).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (70-80%) open to closed scrub over Borya sphaerocephala scattered herbs with Cheilanthes adiantoides scattered ferns.
Condition: Very good (low weed cover (<1%)).
Notes: Quite a few mosses present.

Releve**:** SWR209
Date: 9/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409374/UTM 66 25296 (WGS 84; GPS unit).
Site description: Gentle to moderate, east-facing upper slope of low rocky ridge (elevation 163 m).
Soil: Gravelly, pebbly brown sand (NT).
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (5-10%), Allocasuarina huegeliana (4-5%) low woodland over Allocasuarina campestris (80%) closed scrub over Borya sphaerocephala scattered herbs with Avena barbata, Ursinia anthemoides, Briza maxima scattered annual grasses/herbs to very open annual grassland/herbland.
Associated species:
Condition: Good to very good.

Releve JTR210
Date: 10/1/04
Location: John Tonkin's property.
AMG84: 50J 0409026/UTM 66 25523 (WGS 84; GPS unit).
Site description: Gentle, east-facing mid to lower slope of low rocky ridge (elevation 251 m).
Soil: Gravelly, pebbly, cobbly brown silty fine sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (1-2%), Acacia acuminata subsp. acuminata (3-5%) low open woodland over Allocasuarina campestris (80-90%) closed scrub over Lepidobolus chaetocephalus, Schoenus clandestinus, Neurachne alopecuroidea scattered sedges/grasses with Stylidium septentrionale, Borya sphaerocephala and Cheilanthes adiantoides scattered herbs and ferns.
Associated species: Burchardia umbellata.
Condition: Very good –only scattered annual weeds (Vulpia myuros var. hirsuta, Briza maxima).

Releve SWR241
Date: 12/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408888/UTM 66 25243 (WGS 84; GPS unit).
Site description: Very gentle, south-facing upper slope of low rocky ridge (elevation 255 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (5-10%) low open woodland to low woodland over Allocasuarina campestris (40-50%) open scrub over

Lepidosperma tenue scattered sedges with Podolepis lessonii (2-3%), Rhodanthe polycephala (1-2%) very open herbland with Cheilanthes adiantoides scattered ferns and Avena barbata, Vulpia myuros var. hirsuta, Hypochaeris glabra very open annual grassland/herbland.
Condition: Good to very good.

Releve GHR297
Date: 18/1/04
Location: Gardiner's hill.
AMG84: 50J 0408441/UTM 66 17964 (WGS 84; GPS unit).
Site description: Moderate, north-east facing upper slope of low rocky ridge (elevation 266 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata, Eucalyptus salmonophloia (6-7 m) low open woodland over Allocasuarina campestris (5-6m, 30% NB: a lot blown over and dead) high shrubland to open scrub over Schoenus clandestinus, Neurachne alopecuroidea scattered sedges/grasses with Calandrinia sp. (1-2%), Trachymene pilosa (+), Podolepis canescens very open herbland with Cheilanthes adiantoides (2-3%) very open fernland and Ursinia anthemoides, Ehrharta longiflora, Pentaschistis pallida annual open herbland/grassland.
Associated species: Dichopogon capillipes, Dioscorea hastifolia, Trymalium ledifolium var. rosmarinifolium (juvenile).
Condition: Very good on slope, but Poor to Good at top of slope (high weed cover = annual grassland/herbland).

Releve GHR304
Date: 7/12/04
Location: Gardiner's Hill.
AMG84: 50J 0408629/UTM 66 17903 (WGS 84; GPS unit).
Site description: Moderate, west-facing slope of low ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Rock type: Chert (considerable exposed rock in parts)
Vegetation description: (Allocasuarina huegeliana scattered low trees) over Allocasuarina campestris (50%) open scrub over Xanthorrhoea drummondii scattered shrubs to open shrubland over Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus, Schoenus clandestinus scattered sedges and Cheilanthes adiantoides very open fernland with Podolepis canescens, (Stypandra glauca), Borya sphaerocephala very open herbland.
Associated species: Goodenia hassallii, Avena barbata, Ursinia anthemoides, Opercularia vaginata, Olearia dampieri subsp. eremicola, Allocasuarina huegeliana.
Condition: Very good.

Releve G311
Date: 11/12/04
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0408519/UTM 66 21437 (WGS 84; GPS unit).
Site description: Gentle, north-west facing lower slope of ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, (Acacia acuminata subsp. acuminata) low open woodland over Allocasuarina campestris, Xanthorrhoea drummondii high open shrubland to high shrubland over Avena barbata, Vulpia myuros var. hirsuta, Ehrharta longiflora very open annual grassland to annual grassland and with Cheilanthes adiantoides scattered ferns.
Associated species: Waitzia nitida, Podolepis lessonii, Dichopogon capillipes, Thysantus manglesianus, Chamaescilla corymbosa var. corymbosa.
Condition: Very poor to poor.
Notes: > 10 years since fire.

Releve RM10

Date: 11/12/04
Location: Ron Manning's property.
AMG84: 50J 0408169/UTM 66 21688 (WGS 84; GPS unit).
Site description: Gentle, east-facing slope of low ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (Acacia acuminata subsp. acuminata) scattered low trees over Allocasuarina campestris, (Xanthorrhoea drummondii (+)) open scrub over Ehrharta longiflora, Avena barbata, (Neurachne alopecuroidea) open grassland and Podolepis lessonii, Borya sphaerocephala scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Waitzia nitida.
Notes: > 10 years since fire.

Ac.5: *Allocasuarina campestris* open to closed scrub over *Calytrix depressa* scattered low shrubs over scattered grasses with scattered herbs.

This plant community differed by having a *Calytrix depressa* scattered low shrub layer. Releves CR12 and CNR125.

Releve CR12
Date: 8/11/03
Location: Cairn Hill.
AMG84: 50J 0407869/UTM 66 20373 (WGS 84; GPS unit).
Site description: East-facing, gently sloping, upper slope of low ridge.
Soil: Grey gravelly, pebbly silty sand.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (80-90%) closed scrub over Baeckea crispiflora var. tenuior scattered shrubs over Calytrix depressa scattered shrubs over Neurachne alopecuroidea scattered grasses with Stypandra glauca (2-3%), Borya sphaerocephala (2-3%) very open herbland.
Associated species: Cheilanthes adiantoides, Trachymene cyanopetala, Schoenus clandestinus.
Notes: Similar to CR10 but different Calytrix.

Releve CNR125
Date: 4/12/03
Location: Cairn Hill North.
AMG84: 50J 0407551/UTM 66 21812 (WGS 84; GPS unit).
Site description: Gently sloping, east-facing mid slope of low rocky ridge.
Soil: Gravelly, pebbly brown sand (NT).
Vegetation description: Allocasuarina campestris (60-70%), Xanthorrhoea drummondii (+) open to closed scrub over Calytrix depressa, Baeckea sp. Moora (R. Bone 1993/1) scattered low shrubs over Neurachne alopecuroidea scattered grasses with Goodenia hassallii scattered herbs over Borya sphaerocephala (1-2%) scattered low herbs to very open herbland.
Associated species: Tricoryne arenicola, Melaleuca radula.

Ac.6: See the vegetation description for releve CR86 below.
This plant community differed by having *Dryandra fraseri* associated scattered low shrubs. It occurred on the valley floor near the western boundary of Cairn Hill.
Releve CR86.

Releve CR86
Date: 27/11/03
Location: Near the western boundary of Cairn Hill
AMG84: 50J 0406831/UTM 66 21075 (WGS 84; GPS unit).
Site description: Flat to very gently sloping, west-facing lower slope at base of low rocky ridge on edge of wide plain.

Soil: Gravelly, pebbly pale brown loamy fine sand.
Vegetation description: Allocasuarina campestris (80-90%), (Xanthorrhoea drummondii (2%)) closed scrub over Dryandra fraseri (5-7%), Astroloma serratifolium low open shrubland over Lepidosperma leptostachyum, Schoenus clandestinus (+), Neurachne alopecuroidea scattered sedges/grasses with Dampiera lavandulacea (+), Podolepis lessonii (1%), Borya sphaerocephala (1%) scattered herbs.
Associated species: Burchardia umbellata, Trachymene ornata, Trachymene cyanopetala, Dianella revoluta var. divaricate.

Ac.7: *Allocasuarina campestris* open to closed heath over *Melaleuca calyptroides* scattered shrubs over *Calytrix leschenaultii* scattered low shrubs over *Stylidium septentrionale* very open herbland. This plant community differed by having *Melaleuca calyptroides* associated scattered low shrubs. Releves CR3 and CR80.

Releve CR3
Date: 7/11/03
Location: Southern end of Cairn Hill.
AMG84: 50J 0407738/UTM 66 20032 (WGS 84; GPS unit).
Site description: Crest of low ridge.
Soil: Gravelly grey sand.
Vegetation description: Allocasuarina campestris (70-80%) open to closed heath over Melaleuca calyptroides scattered shrubs over Calytrix leschenaultii scattered low shrubs over Stylidium septentrionale very open herbland.
Notes: Mapping Unit CR4 is a mosaic with CH13 on nearby slopes.

Releve CR80
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406891/UTM 66 21164 (WGS 84; GPS unit).
Site description: Lower gentle west-facing slope.
Vegetation description: Allocasuarina campestris (80-90%), (Xanthorrhoea drummondii (+)) closed scrub over Melaleuca calyptroides scattered shrubs over Calytrix leschenaultii scattered low shrubs over Lepidosperma leptostachyum, Desmocladus flexuosus scattered sedges with Stylidium septentrionale (5-8%), Borya sphaerocephala (2-3%) very open herbland.
Associated species: Kunzea praestans (juvenile).

Ac.8: (*Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata*) scattered low trees over *Allocasuarina campestris* open to closed scrub over *Hibbertia subvaginata* scattered low shrubland over very open sedgeland and open herbland.
This plant community differed by having *Hibbertia subvaginata* associated scattered low shrubs. Quadrats CHN1 and ERG11 and releve G338.

Releve G338
Date: 18/2/05
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0407105/UTM 66 17935 (WGS 84; GPS unit).
Site description: Gentle, west-facing slope of very low rocky ridge.
Vegetation description: Allocasuarina huegeliana, (Acacia acuminata subsp. acuminata, Eucalyptus loxophleba subsp. loxophleba) scattered low trees over Allocasuarina campestris (20-30%) (Dryandra sessilis (+), Xanthorrhoea drummondii (2-3%)) high shrubland over Hibbertia subvaginata scattered low shrubland over Schoenus clandestinus very open sedgeland and Borya sphaerocephala open herbland.
Condition: Good – very good.

Vegetation Association AcAa: *Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana* low woodland over *Allocasuarina campestris* high open shrubland to high shrubland.
Plant Communities:
AaAc.1: See the vegetation description for releve D6 below.
Releve D6.

Releve D6
Date: 9/12/04
Location: Doblestein's property.
AMG84: 50J 0408902/UTM 66 23657 (WGS 84; GPS unit).
Site description: Very gentle, north-east facing slopes of low rise.
Rock type: (Rocky)
Vegetation description: Acacia acuminata subsp. acuminata, Allocasuarina huegeliana low woodland over Allocasuarina campestris high open shrubland (patches) to high shrubland over Lepidosperma leptostachyum scattered sedges) and Avena barbata very open to open annual grassland and Gilberta tenuifolia, Podolepis lessonii open herbland to herbland.
Condition: Poor to good.

Vegetation Association AcAh: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland to low open forest over *Allocasuarina campestris* high open shrubland to open to closed scrub.
Plant Communities:
AcAh.1: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low woodland to open forest over *Allocasuarina campestris* open scrub over very open herbland and scattered ferns.

This plant community included *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open forest over *Allocasuarina campestris* open to closed scrub.
Quadrat EOR1 and releves ERR146 and SWR250

Site number: ERR146
Date: 9/12/03
Location: Eastern Ridge.
AMG84: 50J 0407744/UTM 66 24167 (WGS 84; GPS unit).
Site description: Rocky gently sloping, north-east facing upper slope adjacent to ridge top.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and rock outcrop.
Vegetation description: Allocasuarina huegeliana (50-60%), (Acacia acuminata subsp. acuminata (1-2%)) open forest over Allocasuarina campestris (30-40%) open scrub over Borya sphaerocephala scattered herbs with Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Podolepis lessonii, Waitzia nitida, Gilberta tenuifolia, Kunzea praestans.
Condition: Very good (not many weeds).

Releve SWR250
Date: 13/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408716/UTM 66 25295 (WGS 84; GPS unit).
Site description: Gentle, west-facing upper slope on low rocky ridge (elevation 254 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (40-50%) low open forest over Allocasuarina campestris (40-70%) open scrub over Rhodanthe polycephala (3-5%) very open herbland with Cheilanthes adiantoides scattered ferns and Avena barbata, Hypochaeris glabra very open to open annual grassland/herbland.

Condition: Good to very good.

AcAh.2: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland to low woodland over *Allocasuarina campestris* high shrubland to open and closed scrub over open sedgeland/grassland/herbland.
Quadrats ERG20, WDM002 and releves ERR150, JTR252, EER143, JTR236, JTR247, CSR320 and MR345.

Releve ERR150
Date: 20/12/03
Location: Eastern Ridge.
AMG84: 50J 0407802/UTM 66 24592 (WGS 84; GPS unit).
Site description: Gentle, west-facing mid to lower slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand (NT).
Vegetation description: Allocasuarina huegeliana (15-20%), Eucalyptus loxophleba subsp. loxophleba (4-5%) (regrowth) low woodland over Allocasuarina campestris (15-20%), (Acacia congesta subsp. congesta (1%)) high shrubland over Lepidosperma tenue scattered sedges and Podolepis lessonii (2-3%) very open herbland.
Associated species: Waitzia nitida, Calothamnus aff. quadrifidus Moora-Watheroo.
Condition: Good to very good – some to many weeds. May be some disturbance.
Notes: Eucalyptus loxophleba subsp. loxophleba seems to be regeneration from fire. Also may have been some physical disturbance in the area.

Releve JTR252
Date: 14/1/04
Location: John Tonkin's property.
AMG84: 05J 409263/UTM 66 25499 (WGS 84; GPS unit).
Site description: Moderate, south-west facing mid to upper slope of low rocky ridge (elevation 279 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (25-30%) low woodland over Allocasuarina campestris (10-20%) high shrubland over Desmocladus flexuosus, Schoenus clandestinus (3-5%), Neurachne alopecuroidea very open sedgeland/grassland with Podolepis lessonii (3-5%), Borya sphaerocephala (1-2%) very open herbland to open herbland with Cheilanthes adiantoides scattered ferns and Avena barbata very open annual grassland.
Associated species: Olearia dampieri subsp. eremicola, Xanthorrhoea drummondii.
Condition: Good to very good.
Notes: Similar to J5 and J2.

Releve ERR143
Date: 8/12/03
Location: Eastern Ridge.
AMG84: 50J 0407670/UTM 66 24263 (WGS 84; GPS unit).
Site description: Gentle, north-facing upper slope on ridge top (not crest but highest tranverse point) of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst some outcrop (3-5% of surface).
Vegetation description: Allocasuarina huegeliana (8-10%), Acacia acuminata subsp. acuminata (2-3%) low open woodland to low woodland over Allocasuarina campestris (70-80%), Xanthorrhoea drummondii (+) closed scrub over Lepidosperma tenue, Neurachne alopecuroidea scattered sedges/grasses with Podolepis lessonii scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Hibbertia subvaginata, Dioscorea hastifolia, Burchardia umbellata, Gilberta tenuifolia.
Condition: Very good with some weeds - Avena barbarta, Briza maxima.

Releve JTR236
Date: 12/1/04
Location: John Tonkin's property.
AMG84: 50J 0408798/UTM 66 25467 (WGS 84; GPS unit).
Site description: Moderate/gentle, west-facing lower slope of low rocky ridge (elevation 270 m).
Soil: Brown loamy sand amongst rocks, boulders and outcrop (about 50 % surface cover).
Rock type: Chalky chert.
Vegetation description: Allocasuarina huegeliana (20-25%), (Acacia acuminata subsp. acuminata (+)) low woodland over Allocasuarina campestris (70-90%) closed scrub over Desmocladus flexuosus, Schoenus clandestinus scattered sedges with Cheilanthes adiantoides scattered ferns.
Associated species: Dioscorea hastifolia, Stypandra glauca, Blennospora drummondii.
Condition: Very good.

Releve JTR247
Date: 13/1/04
Location: John Tonkin's property.
AMG84: 50J 0409114/UTM 66 27507 (WGS 84; GPS unit).
Site description: Very gentle, north-facing slope of top of low rocky ridge, near end of ridge (elevation 233 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (20-30%), Acacia acuminata subsp. acuminata (+) low woodland to low open forest over Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris (70-80%) closed scrub over Desmocladus flexuosus scattered sedges and Cheilanthes adiantoides scattered ferns with Avena barbata, Ehrharta longiflora annual grassland.
Associated species: Podolepis lessonii, Schoenus clandestinus.
Condition: Poor (high weed cover).

Releve CSR320
Date: 16/2/05
Location: Kim Chester's property, north-west corner, south of Cairn Hill.
AMG84: 50J 0406983/UTM 66 19570 (WGS 84; GPS unit).
Site description: Crest and gently sloping west-facing upper slope of low rocky ridge.
Vegetation description: Allocasuarina huegeliana (15-20%) low woodland over Allocasuarina campestris (30-40%), (Xanthorrhoea drummondii (+), Dryandra sessilis var. sessilis (+)) open scrub over Avena barbata annual grassland.
Condition: Poor – very poor (Heavy infestation of Avena barbata).

Releve MR345
Date: 18/2/05
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0407013/UTM 66 17181 (WGS 84; GPS unit).
Site description: Crest of low rocky ridge.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low woodland over Allocasuarina campestris open scrub over Acacia restiacea scattered low shrubs over *Avena barbata open annual grassland.
Associated species:
Condition: Good.

Vegetation Association AcAhu: *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Allocasuarina campestris*, *Allocasuarina humilis* open scrub over *Hibbertia subvaginata* shrubland.
Plant Communities:
AcAhu.1: See the vegetation description of releve CR41 below.
This plant community occurred on a steep, lower to mid slope of a low chert ridge.

Releve CR41.

Releve CR41
Date: 21/11/03
Location: Cairn Hill.
AMG84: 50J 0407585/UTM 66 20384 (WGS 84; GPS unit).
Site description: Lower to mid slope of west-facing steep slope of low ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders (~90% surface cover in rock = chert).
Vegetation description: Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina humilis (10-15 %), Allocasuarina campestris (15-20%) open scrub over Hibbertia subvaginata (15-20%) shrubland over Thomasia grandiflora (1%), Bossiaea sp. Cairn Hill (M Henson CH2-28) (+), Xanthosia fruticulosa (1-2%) scattered low shrubs to low open shrubland over Dichopogon capillipes scattered herbs.
Associated species: Regelia megacephala, Calothamnus aff. quadrifidus Moora-Watheroo, Cheilanthes adiantoides, Xanthorrhoea drummondii.
Notes: Narrow strip along base of chert breakaway below Regelia megacephala scrub on west-facing slope.

Vegetation Association AcAs: *Acacia scirpifolia*, *Acacia saligna* high open shrubland over *Allocasuarina campestris*, (*Calothamnus quadrifidus* var. Moora-Watheroo) closed scrub over *Melaleuca calyptroides*, *Acacia congesta* subsp. *congesta* open shrubland.
Plant Communities:
AcAs.1: See the vegetation description of releve CR71 below.
Releve CR71.

Releve CR71
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407129/UTM 66 20617 (WGS 84; GPS unit).
Site description: Valley floor, flat and broad between 2 low ridges. No clear drainage line seen.
Soil: Gravelly, pebbly, cobbly pale brown sand.
Vegetation description: Acacia scirpifolia (3-5%, 3 m to 3.5 m tall shrub), Acacia saligna (2-4%) high open shrubland over Allocasuarina campestris (80-90%), Calothamnus aff. quadrifidus Moora-Watheroo (5-10%) closed scrub over Melaleuca calyptroides (3-4%), Acacia congesta subsp. congesta (1%) open shrubland over Calytrix leschenaultii (1%) scattered low shrubs over Desmocladus flexuosus (10-12%) open sedgeland with Stylidium septentrionale (1-2%) scattered herbs.
Associated species: Baeckea crispiflora, Trachymene ornata, Hakea lissocarpha, Dichopogon capillipes, Chamaescilla corymbosa var. corymbosa, Neurachne alopecuroidea, Lepidobolus chaetocephalus, Allocasuarina huegeliana, Stypandra glauca, Acacia restiacea.

Vegetation Association AcB: *Allocasuarina campestris* open scrub over *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland to open heath.
Plant Communities:
AcB.1: (*Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana* scattered low trees) over *Allocasuarina campestris* open to closed scrub over *Melaleuca radula* scattered shrubs to open shrubland over *Baeckea* sp. Moora (R. Bone 1993/1), *Calytrix leschenaultii* scattered shrubs to low open shrubland over *Schoenus clandestinus*, *Neurachne alopecuroidea* scattered sedges/grasses with very open herbland.
This plant community differed by having a *Melaleuca radula* component in the shrubland and *Baeckea* sp. Moora (R. Bone 1993/1) scattered shrubs to open shrubland under an *Allocasuarina campestris* open scrub. Releves CR37, CR90 and CR91.

Releve CR37

Date: 20/11/03
Location: Cairn Hill
AMG84: 50J 0407692/UTM 66 20673 (WGS 84; GPS unit).
Site description: Moderate, mid to lower north-facing slope.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (50-60%) open scrub over Melaleuca radula (2-3%) open shrubland over Baeckea sp. Moora (R. Bone 1993/1) (3-5%), Calytrix leschenaultii (3-5%) low open shrubland over Lepidobolus chaetocephalus, Neurachne alopecuroidea scattered sedges and grasses with Stylidium septentrionale (3-5%), Borya sphaerocephala (2-3%) very open herbland.
Associated species: Trachymene cyanopetala, Lawrencella rosea, Hakea lissocarpha, Schoenus clandestinus, Verticordia huegelii var. stylosa, Goodenia hassallii, Xanthorrhoea drummondii, Podolepis lessonii.
Notes: Very similar to CR32

Releve CR90
Date: 27/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407039/UTM 66 21549 (WGS 84; GPS unit).
Site description: Gently sloping, north-east facing lower slopes.
Vegetation description: Allocasuarina campestris (60-80%) open scrub to closed scrub over Xanthorrhoea drummondii scattered shrubs over Baeckea sp. Moora (R. Bone 1993/1), Melaleuca radula, Calytrix leschenaultii scattered low shrubs to low open shrubland over Astroloma serratifolium scattered low shrubs over Neurachne alopecuroidea, Schoenus clandestinus (+) scattered grasses/sedges with Stylidium septentrionale (1-2%), Borya sphaerocephala (+), Podolepis lessonii scattered herbs to very open herbland.

Releve CR91
Date: 27/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407126/UTM 66 21426 (WGS 84; GPS unit).
Site description: Gently sloping, north-east facing lower slopes of low ridge.
Vegetation description: Acacia acuminata subsp. acuminata (2-5%), Allocasuarina huegeliana (2-3%) scattered low trees to low open woodland over Allocasuarina campestris (80-90%) closed scrub over Melaleuca radula (1-2%), Baeckea sp. Moora (R. Bone 1993/1) (1%), Calytrix leschenaultii (+) scattered shrubs over Lepidobolus chaetocephalus, Schoenus clandestinus (1-2%), Neurachne alopecuroidea scattered sedges/grasses with Stypandra glauca (1-2%) scattered herbs.
Notes: Similar to CR90 but has tree layer and similar to CR89, but that had Eucalyptus eudesmioides as tree species.

AcB.2: (*Acacia acuminata* subsp. *acuminata*, (*Allocasuarina huegeliana*) scattered low trees) over *Allocasuarina campestris* (70-80%) open to closed scrub over *Baeckea* sp. Moora (R. Bone 1993/1) (2-3%), (*Baeckea crispiflora* var. *tenuior*, *Calytrix leschenaultii*) scattered low shrubs to open shrubland over scattered grasses/sedges with very open herbland.
Releves CR10, CR21 and CNR119.

Releve CR10
Date: 8/11/03
Location: Eastern side of Cairn Hill.
AMG84: 50J 0407774/UTM 66 20341 (WGS 84; GPS unit).
Site description: Crest of low ridge.
Soil: Gravelly, pebbly pale brown sand.
Vegetation description: Acacia acuminata subsp. acuminata, (Allocasuarina huegeliana) scattered low trees over Allocasuarina campestris (60-80%) open to closed scrub over Baeckea sp. Moora (R.

Bone 1993/1), Baeckea crispiflora (common or small leaf form) (40 cm-1.8m), Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus scattered sedges with Stylidium septentrionale (5-10%), Borya sphaerocephala (5-10%) open herbland.
Associated species: Acacia acuminata subsp. acuminata, Calothamnus aff. quadrifidus Moora-Watheroo, Trachymene cyanopetala, Neurachne alopecuroidea, Millotia tenuifolia var. tenuifolia.
Condition: Excellent (few weeds).

Releve CR21
Date: 14/11/03
Location: Cairn Hill (southern boundary).
AMG84: 50J 0407385/UTM 66 19969 (WGS 84; GPS unit).
Site description: Very gently sloping, south-facing lower slope of low rocky (chert) ridge.
Soil: Gravelly, pebbly, cobbly pale brown sand.
Vegetation description: Allocasuarina campestris, (Calothamnus aff. quadrifidus Moora-Watheroo (+), Kunzea praestans (1-2%) open to closed scrub (70-90%) over Baeckea crispiflora var. tenuior, Baeckea sp. Moora (R. Bone 1993/1) low open shrubland over Lepidosperma leptostachyum, Lepidobolus chaetocephalus, Lepidosperma sp P1 small head (M.D. Tindale 166A) scattered sedges with Stylidium septentrionale (1-5%), Borya sphaerocephala (1-3%) very open herbland.
Associated species: Xanthorrhoea drummondii, Gompholobium glutinosum (shrub straggly to 35 cm), Schoenus clandestinus.
Notes: Includes area on east side with small open areas of Kunzea praestans vegetation amongst Allocasuarina campestris scrub.

Releve CNR119
Date: 4/12/03
Location: Cairn Hill North.
AMG84: 50J 0407499/UTM 66 21565 (WGS 84; GPS unit).
Site description: Very gently sloping, west-facing floor of shallow depression area on top of low rocky ridge.
Soil: Very gravelly, pebbly brown sand (tested).
Vegetation description: Allocasuarina campestris (70-80%) open to closed scrub over Baeckea sp. Moora (R. Bone 1993/1) (2-3%), Calytrix leschenaultii (1-2%) open shrubland over Astroloma serratifolium, Neurachne alopecuroidea, Amphipogon caricinus, Lepidosperma sp. scattered grasses/sedges with Borya sphaerocephala (2-3%), Stylidium septentrionale very open herbland.
Associated species: Lawrencella rosea, Trachymene pilosa, Trachymene cyanopetala.
Notes: Quite a lot of ‘gaps’ in area due to disturbance.

AcB.3: See the vegetation description for releve CR32 below.
This plant community was recorded on a lower slope and on a broad ridge top and differed by having a *Baeckea* sp. Moora (R. Bone 1993/1), *Melaleuca calyptroides* (open) shrubland to open heath under an *Allocasuarina campestris* closed scrub. Releve CR32 and CR56.

Releve CR32
Date: 15/11/03
Location: Cairn Hill.
AMG84: 50J 0407473/UTM 66 20529 (WGS 84; GPS unit).
Site description: Gently sloping, west-facing lower slope of low ridge.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Allocasuarina campestris (70-80%) closed scrub over Baeckea sp. Moora (R. Bone 1993/1) (5-10%), Melaleuca calyptroides (3-5%) shrubland over Stylidium septentrionale (2-4%), Borya sphaerocephala very open herbland.
Associated species: Schoenus clandestinus, Stypandra glauca, Baeckea crispiflora, Hakea incrassata, Pimelea imbricata var. piligera, Lepidobolus chaetocephalus, Trachymene cyanopetala, Calytrix leschenaultia.

Notes: Burnt few years ago? Allocasuarina campestris burnt in recent years? (about 90 cm to 1.3 m high).

Releve CR56
Date: 23/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407573/UTM 66 21426 (WGS 84; GPS unit).
Site description: Gently sloping north-west facing low ridge top.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Allocasuarina huegeliana (+) scattered low trees over Allocasuarina campestris (35-40%), Xanthorrhoea drummondii (2-3 m, 1-2%) open scrub over Melaleuca radula (1%), Kunzea praestans (2%) scattered tall shrubs to high open shrubland over Baeckea sp. Moora (R.
Bone 1993/1) (30-35%), Melaleuca calyptroides, Calytrix leschenaultii (3-4%) shrubland to low shrubland over Neurachne alopecuroidea scattered grasses with Stylidium septentrionale (3-5%), Borya sphaerocephala (2-3%) very open herbland.
Associated species: Lawrencella rosea, Schoenus clandestinus, Burchardia umbellata, Trachymene cyanopetala, Blennospora drummondii, Opercularia vaginata.
Notes: 1) Unit similar to R42 and R47 but has Allocasuarina huegeliana scattered.

AcB.4: *Allocasuarina huegeliana* scattered low trees over *Dryandra sessilis* var. *sessilis*, (*Xanthorrhoea drummondii*) scattered tall shrubs to high open shrubland over *Allocasuarina campestris* shrubland to closed scrub over *Baeckea* sp. Moora (R. Bone 1993/1), (*Melaleuca calyptroides*) scattered shrubs to open shrubland over very open herb/grass/sedgeland.
This plant community was recorded at three sites on the broad top of a low ridge in Cairn Hill and Cairn Hill North and was differentiated by having a strata of scattered *Allocasuarina huegeliana* low trees over *Dryandra sessilis* var. *sessilis* scattered tall shrubs.
Quadrat CAH3 and releves CR42 and CNR118.

Releve CR42
Date: 21/11/03
Location: Cairn Hill.
AMG84: 50J 0407667/UTM 66 20395 (WGS 84; GPS unit).
Site description: Crest of low ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana scattered low trees over Dryandra sessilis ssp. sessilis, Calothamnus aff. quadrifidus Moora-Watheroo, Xanthorrhoea drummondii scattered tall shrubs over Allocasuarina campestris (70-80%) closed shrub over Melaleuca calyptroides (3-5%), Baeckea sp. Moora (R. Bone 1993/1) open shrubland over Calytrix leschenaultii scattered low shrubs over Neurachne alopecuroidea scattered grasses with Borya sphaerocephala (1-2%), Stypandra glauca (+) very open herbland
Associated species: Acacia aristulata, Daviesia dielsii, Trachymene pilosa.

Releve CNR118
Date: 4/12/03
Location: Cairn Hill North.
AMG84: 50J 0407619/UTM 66 21523 (WGS 84; GPS unit).
Site description: Flat top of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with rock outcrop (~ 5-10%).
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Dryandra sessilis var. sessilis (2-3%) high open shrubland over Allocasuarina campestris (70-80%) closed scrub over Baeckea sp. Moora (R. Bone 1993/1), Kunzea praestans, Calytrix

leschenaultii scattered shrubs over Neurachne alopecuroidea, Desmocladus flexuosus scattered grasses/sedges with Stypandra glauca scattered herbs.
Notes: 1) This unit was in small patches in a mosaic of units.
2) This unit recorded immediately adjacent to CNR117.

Vegetation Association AcCq: *Allocasuarina campestris, Calothamnus quadrifidus* var. Moora-Watheroo open to closed scrub.
Plant Communities:

AcCq.1: *Acacia acuminata* subsp. *acuminata*, (*Allocasuarina huegeliana*) scattered low trees to low open woodland over *Allocasuarina campestris*, (*Calothamnus* aff. *quadrifidus* Moora-Watheroo) open to closed scrub over scattered grasses/sedges/herbs.
Quadrat JT9 and releve SWR207.

Releve SWR207
Date: 9/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409245/UTM 66 25159 (WGS 84; GPS unit).
Site description: Gentle to moderate, west-facing mid to upper slope of low rocky ridge (elevation 245 m).
Soil: Gravelly, pebbly, cobbly brown sand with some boulders and rock outcrop (~1-2% surface cover).
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (5-10%) low open woodland to low woodland over Allocasuarina campestris (70-80%), Calothamnus aff. quadrifidus Moora-Watheroo (2-3%) closed scrub over Borya sphaerocephala scattered herbs.
Associated species: ? none.
Condition: Very good (low weed cover).

AcCq.2: *Allocasuarina campestris*, (*Acacia congesta* subsp. *congesta, Calothamnus* aff. *quadrifidus* Moora-Watheroo) closed scrub over *Melaleuca calyptroides* scattered shrubs over (*Baeckea* sp. Moora (R. Bone 1993/1), *Calytrix leschenaultii*) scattered low shrubs over scattered sedges and grasses and very open herbland.
This plant community was differentiated by having a *Melaleuca calyptroides* scattered shrubs to open shrubland layer. Releves CR9, CR44 and CR67.

Releve CR9
Date: 8/11/03
Location: South-east corner of Cairn Hill,
AMG84: 50J 0407726/UTM 66 20092 (WGS 84; GPS unit).
Site description: Flat to very gently sloping north-west facing crest of low ridge.
Soil: Gravelly, pebbly, cobbly grey sand with some exposed sheet rock.
Vegetation description: Allocasuarina huegeliana scattered low trees over Allocasuarina campestris (~40-50%), Calothamnus aff. quadrifidus Moora-Watheroo (2-5 m, (2-5%) open scrub over Melaleuca radula (+), Melaleuca calyptroides (1-2%), Kunzea praestans (1%) scattered shrubs to open shrubland over Baeckea sp. Moora (R. Bone 1993/1), Calytrix leschenaultii, Xanthosia fruticulosa scattered low shrubs over Lepidosperma tenue, Neurachne alopecuroidea scattered sedges/grasses with Borya sphaerocephala (5-10% dead), Stylidium septentrionale open herbland.
Associated species: Waitzia nitida, Desmocladus flexuosus, Stypandra glauca, Cheilanthes adiantoides, Podotheca angustifolia, Trachymene cyanopetala, Xanthorrhoea drummondii.
Condition: Excellent to very good (some weeds).

Releve CR44
Date: 22/11/03

Location: Cairn Hill.
AMG84: 50J 0407605/UTM 66 20364 (WGS 84; GPS unit).
Site description: Steep, south-west facing mid slope of rocky ridge.
Soil: Gravelly, pebbly, cobbly brown loamy sand.
Vegetation description: Allocasuarina campestris (60-70%), Calothamnus aff. quadrifidus Moora-Watheroo (2-3%) open scrub to closed scrub over Acacia congesta subsp. congesta (2-3%), Melaleuca calyptroides (3-5%) open shrubland over Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus, Lepidosperma tenue, Neurachne alopecuroidea scattered sedges/grasses with Stylidium septentrionale (3-5%), Borya sphaerocephala (1-2%) very open herbland.
Associated species: Melaleuca radula, Isopogon divergens, Baeckea sp. Moora (R. Bone 1993/1), Regelia megacephala, Astroloma serratifolium.

Releve CR67
Date: 25/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407166/UTM 66 20980 (WGS 84; GPS unit).
Site description: Moderate steep, north-facing lower to mid slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and rock outcrop.
Vegetation description: Allocasuarina campestris (70-80%), Acacia congesta subsp. congesta (3-4%), Calothamnus aff. quadrifidus Moora-Watheroo closed scrub over Melaleuca calyptroides (1-2%) scattered shrubs over Stypandra glauca (1-2%) very open herbland.
Associated species: Regelia megacephala (1 to 2-3% in some parts of slope), Dichopogon capillipes, Thysanotus manglesianus, Cheilanthes adiantoides, Dioscorea hastifolia, Xanthosia fruticulosa, Lawrencella rosea.
Notes: This is an Allocasuarina campestris scrub unit on rocky chert slopes.

AcCq.3: See vegetation description for releve CR36 below.
This plant community differed by having a scattered *Astroloma serratifolium* and *Hakea lissocarpha* low shrub layer. Releve CR36.

Releve CR36
Date: 20/11/03
Location: Cairn Hill.
AMG84: 50J 0407676/UTM 66 20777 (WGS 84; GPS unit).
Site description: West-facing moderate mid slope.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Santalum acuminatum, Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris (60-70%), Calothamnus aff. quadrifidus Moora-Watheroo (3-5%) open to closed scrub over Calytrix leschenaultii (1-2%), Hakea lissocarpha (+), Astroloma serratifolium scattered low shrubs over Desmocladus flexuosus (1-2%), Lepidobolus chaetocephalus (+), Schoenus clandestinus (1-2%) very open sedgeland with Stypandra glauca, Stylidium septentrionale, Borya sphaerocephala , very open herbland.
Associated species: Acacia aristulata, Kunzea praestans, Baeckea sp. Moora (R. Bone 1993/1), Lawrencella rosea, Xanthorrhoea drummondii, Regelia megacephala.

Vegetation Association AcDs: *Allocasuarina huegeliana,* (*Acacia acuminata* subsp. *acuminata*) scattered low trees to low open woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland over *Allocasuarina campestris* open to closed scrub.
Plant Communities:
AcDs.1: *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* scattered low trees to low woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland over *Allocasuarina campestris* open to closed scrub over scattered sedges.
Releves JTR200 and CH310.

Releve JTR200
Date: 9/1/04
Location: John Tonkin's property.
AMG84: 50J 0409083/UTM 66 25383 (WGS 84; GPS unit).
Site description: Moderate, east-facing slope of low ridge.
Soil: Very gravelly, pebbly brown sand with some rock outcrop and boulders (10%).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Dryandra sessilis var. sessilis (6-7%) high open shrubland over Allocasuarina campestris (50-60%) (regrowth: mainly about 1.1 m to 1.4 m high only) open scrub over Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus (3-5%), Lepidosperma sp. (+), Neurachne alopecuroidea very open sedgeland/grassland with Stylidium septentrionale very open herbland.
Associated species: Kunzea praestans (seedlings), Chamaescilla corymbosa var. corymbosa, Xanthorrhoea drummondii, Melaleuca calyptroides.
Condition: Very good (low weed cover).

Releve CH310
Date: 11/12/04
Location: Kim Chester's property.
AMG84: 50J 0408123/UTM 66 21456 (WGS 84; GPS unit).
Site description: Gentle, east-facing upper slope of low ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low open woodland to low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris open to closed scrub over Desmocladus flexuosus scattered sedges.
Associated species:
Condition: Good

AcDs.2: *Allocasuarina huegeliana,* (*Acacia acuminata* subsp. *acuminata*) low open woodland to low woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Allocasuarina campestris*, (*Kunzea praestans, Xanthorrhoea drummondii*) open scrub over *Calytrix leschenaultii* scattered low shrubs over scattered sedges with very open herbland.

This plant community was distinguished by the presence of *Kunzea praestans* in the open scrub layer. Releves EOR137 and JTR202.

Releve EOR137
Date: 7/12/03
Location: Eastern ore body.
AMG84: 50J 0407551/UTM 66 23071 (WGS 84; GPS unit).
Site description: Moderate sloping, south-west facing upper slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst outcrop (~ 5 %).
Vegetation description: Allocasuarina huegeliana (~ 3-5 %) low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris (20-30%), Kunzea praestans (1-2%), Acacia congesta subsp. congesta (1%), Xanthorrhoea drummondii (+) open scrub over Hibbertia subvaginata (3-5%), (Calytrix leschenaultii) open shrubland over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Borya sphaerocephala scattered herbs.
Associated species: Acacia lasiocarpa sedifolia, Daviesia dielsii, Burchardia umbellata, Pityrodia dilatata, Chamaescilla corymbosa var. corymbosa.
Notes: Regrowth from fire or some disturbance - Allocasuarina campestris stand only about 1 to 1.4 m high.

Releve JTR202

Date: 9/1/04
Location: John Tonkin's property.
AMG84: 50J 0409084/UTM 66 25453 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope on low rocky ridge.
Soil: Very gravelly, pebbly brown sand with rock outcrops (~10% surface area).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (3%), Acacia acuminata subsp. acuminata (3-5%) low open woodland to low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris (30-40% (50)), Calothamnus aff. quadrifidus Moora-Watheroo (1-2%), Kunzea praestans (+), Xanthorrhoea drummondii (+) open scrub over Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus scattered sedges with Stylidium septentrionale very open herbland.

AcDs.3: (*Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata*) low woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland over *Allocasuarina campestris*, (*Melaleuca radula*, *Xanthorrhoea drummondii*) high shrubland to open scrub over *Calytrix leschenaultii* scattered low shrubs over scattered grasses and herbs.

This plant community differed by having a high open shrubland of *Melaleuca radula* and *Xanthorrhoea drummondii*. Releves CNR120, CNR136.

Releve CNR120
Date: 4/12/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407478/UTM 66 21504 (WGS 84; GPS unit).
Site description: Moderate to steeply sloping, south-facing upper slope of deep gully (10m deep).
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris (40-50%), Xanthorrhoea drummondii (3-5%), Melaleuca radula (1-2%) open scrub over Calytrix leschenaultii (1-2%) scattered low shrubs over Lepidosperma leptostachyum, Neurachne alopecuroidea, Desmocladus flexuosus scattered sedges/grasses with Stypandra glauca scattered herbs.
Associated species: Hakea lissocarpha, Stypandra glauca, Kunzea praestans, Dichopogon capillipes, Burchardia umbellata.

Releve CNR136
Date: 6/12/03
Location: Cairn Hill North.
AMG84: 50J 0407380/UTM 66 21717 (WGS 84; GPS unit).
Site description: Upper slope of low rocky ridge, west-facing.
Vegetation description: Allocasuarina huegeliana (10-15%), Acacia acuminata subsp. acuminata (1-2%) low woodland over Dryandra sessilis var. sessilis (4-5%) high open shrubland over Allocasuarina campestris (15-18%), Melaleuca radula (+), Xanthorrhoea drummondii (4%) high shrubland over Calytrix leschenaultii scattered low shrubs over Neurachne alopecuroidea scattered grasses with Podolepis lessonii (1-2%) scattered herbs.
Notes: Similar to CNR135 but upslope with Dryandra sessilis var. sessilis high open shrubland.

AcDs.4: (*Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana*) scattered low trees to low open woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland over *Allocasuarina campestris*, *Xanthorrhoea drummondii* high open shrubland to high shrubland over scattered sedges/grasses with scattered ferns (and annual grassland/herbland).
This plant community differed by having a high open shrubland of *Xanthorrhoea drummondii*. Releves CWR138, JTR245, JTR253 and CSR321.

Releve: CWR138
Date: 7/12/03
Location: West of Western Ridge.
AMG84: 50J 0407059/UTM 66 23375 (WGS 84; GPS unit).
Site description: Gently sloping mid slope, west-facing, of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand (NT).
Vegetation description: Allocasuarina huegeliana scattered low trees over Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris (20-25%), Xanthorrhoea drummondii (2-3%) high shrubland over Lepidosperma tenue, Schoenus clandestinus, Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Cheilanthes adiantoides scattered ferns.
Vegetation Condition: Poor to very poor condition

Releve JTR245
Date: 13/1/04
Location: John Tonkin's property.
AMG84: 50J 0409029/UTM 66 26530 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of rocky low ridge (elevation 274 m).
Soil: Gravelly, pebbly brown sand with outcrop/boulders (5-10%).
Rock type: Chert?
Vegetation description: Acacia acuminata subsp. acuminata (1-3%), Allocasuarina huegeliana (1-2(5)%) scattered low trees to low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Allocasuarina campestris (15-25%), Xanthorrhoea drummondii (2-5%) high shrubland over Desmocladus flexuosus, Lepidosperma sp. scattered sedges and Podolepis lessonii, Borya sphaerocephala scattered herbs with Avena barbata, Hypochaeris glabra, Briza maxima (50-70%) annual grassland/herbland.
Associated species:
Condition: Poor to very poor. (Heavy weed infestation and grazing effects).

Releve JTR253
Date: 14/1/04
Location: John Tonkin's property.
AMG84: 50J 0409423/UTM 66 26114 (WGS 84; GPS unit).
Site description: Moderate to steep, east-facing mid to upper slope on low rocky ridge (elevation 285 m??).
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (Allocasuarina huegeliana) scattered low trees to low open woodland over Dryandra sessilis var. sessilis (2-3%) scattered tall shrubs to high open shrubland over Allocasuarina campestris (5-15%), Xanthorrhoea drummondii (1-2%) high open shrubland to high shrubland over Crassula colorata, Borya sphaerocephala with Cheilanthes adiantoides scattered ferns and Avena barbata, Hypochaeris glabra closed annual grassland/herbland.
Associated species:
Condition: Very poor to degraded.
Notes: Similar to R245.

Releve CSR321
Date: 16/2/05
Location: Kim Chester's property, south of Cairn Hill.
AMG84: 50J 0407606/UTM 66 19256 (WGS 84; GPS unit).
Site description: Steep, south-facing mid slope of low rocky ridge.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (10-15%) low open woodland over Allocasuarina campestris (10-15%), (Dryandra sessilis var. sessilis (+)) high open shrubland to high shrubland over Xanthorrhoea drummondii high open shrubland over Avena barbata, Vulpia myuros var. hirsuta annual grassland.

Associated species:
Condition: Poor – very poor (annual grassland of weeds).

Vegetation Association AcEe: *Eucalyptus eudesmioides* scattered low mallees to low mallee woodland over *Allocasuarina campestris* open scrub over *Baeckea* sp. Moora (R. Bone 1993/1) scattered low shrubs to low shrubland.

Plant Communities:
AcEe.1: *Eucalyptus eudesmioides* scattered low mallees to low mallee woodland over *Allocasuarina campestris*, (*Kunzea praestans, Regelia megacephala*) open scrub over *Melaleuca calyptroides, Baeckea* sp. Moora (R. Bone 1993/1) shrubland over scattered sedges, grasses and herbs..
This plant community differed by having a *Kunzea praestans, Regelia megacephala* high shrubland component and a *Melaleuca calyptroides* open shrubland to shrubland component. Quadrat CAH6 and releve CR27 and CR29.

Releve CR27 (?same as CAH6)
Date: 15/11/03
Location: Cairn Hill.
AMG84: 50J 0407366/UTM 66 20501 (WGS 84; GPS unit).
Site description: Gently sloping, south-east facing rocky (chert) crest of low ridge.
Soil: Gravelly, pebbly, cobbly pale brown sand amongst boulders and exposed sheet rock.
Vegetation description: Eucalyptus eudesmioides scattered low mallees over Allocasuarina campestris (80 cm burnt? – 30-40%), Kunzea praestans (3-5%), (Regelia megacephala (+)) open scrub over Melaleuca calyptroides (10-15%), Baeckea sp. Moora (R. Bone 1993/1) (5-8%) shrubland over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges and grasses with Stylidium septentrionale scattered herbs.
Associated species: Calothamnus sanguineus, Xanthorrhoea drummondii, Dryandra sessilis var. sessilis, Acacia acuminata subsp. acuminata, Acacia pulchella var. goadbyi, Burchardia umbellata, Lawrencella rosea, Millotia tenuifolia var. tenuifolia, Hibbertia subvaginata.
Notes: 1) Allocasuarina campestris ~ 1 m high => appears hot fire here 2-3 years ago =>regrowth. But Eucalyptus are 3-5 m and Regelia to 3.5 m => maybe longer since fire.
2) Variable scrub dominant in area. Few patches Regelia megacephala high open shrubland, Kunzea praestans high open shrubland. Melaleuca calyptroides and Baeckea dominant with Allocasuarina campestris.

Releve: CR29
Date: 15/11/03
Location: Cairn Hill
AMG84: 50J 0407266/UTM 66 20484 (WGS 84; GPS unit).
Site description: West-south-west facing, moderate sloping mid slope of low rocky ridge.
Soil: Gravelly, pebbly brown sand amongst exposed sheet rock.
Vegetation description: Allocasuarina huegeliana scattered low trees over Eucalyptus eudesmioides scattered mallees (clumps) over Allocasuarina campestris (35-50%), Kunzea praestans (3-5%), (Regelia megacephala) open scrub over Melaleuca calyptroides (15-20%) shrubland over Xanthosia fruticulosa scattered low shrubs over Stypandra glauca, Stylidium septentrionale, Borya sphaerocephala scattered low herbs with Lepidosperma tenue, Neurachne alopecuroidea scattered grasses and scattered sedges.
Associated species: Baeckea sp. Moora (R. Bone 1993/1), Isopogon divergens, Xanthorrhoea drummondii.
Notes: 1) Very variable vegetation on these slopes.
2) Very similar to CR27 unit on crest, but Allocasuarina huegeliana comes in on upper to mid slope

AcEe.2: *Eucalyptus eudesmioides* low woodland to low open forest over *Allocasuarina campestris* closed scrub over *Baeckea* sp. Moora (R. Bone 1993/1), *Calytrix leschenaultii* scattered low shrubs to low open shrubland over scattered sedges with very open herbland
Quadrat CAH18 and releve CR89.

Releve CR89
Date: 27/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406999/UTM 66 21580 (WGS 84; GPS unit).
Site description: Gently sloping north to north-east facing lower slope on edge of broad flat plain.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Eucalyptus eudesmioides (3-5% in clump) low open woodland over Allocasuarina campestris (70-80%) closed scrub over Xanthorrhoea drummondii scattered shrubs over Baeckea sp. Moora (R. Bone 1993/1) (1-2%), Calytrix leschenaultii (+) scattered low shrubs over Lepidosperma leptostachyum scattered sedges with Stylidium septentrionale (2-3%) very open herbland
Associated species: Dodonaea pinifolia, Neurachne alopecuroidea, Kunzea praestans, Schoenus clandestinus, Borya sphaerocephala (+).
Notes: ~ CH18 Eucalyptus eudesmioides low open woodland over Allocasuarina campestris closed scrub.

Vegetation Association AcEl: *Eucalyptus loxophleba* subsp. *loxophleba* low open woodland to low open forest over *Allocasuarina campestris* open scrub.
Plant Communities:
AcEl.1: *Eucalyptus loxophleba* subsp. *loxophleba* low open forest over *Allocasuarina campestris* open to closed scrub over scattered sedges/grasses.
This plant community had a low open forest of *Eucalyptus loxophleba* subsp. *loxophleba*. Releves CNR110 and ERR144.

Releve CNR110
Date: 2/12/03
Location: Cairn Hill North.
AMG84: 50J 0407047/UTM 66 22684 (WGS 84; GPS unit).
Site description: Gentle, west-facing lower slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (30-40%) low open forest over Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (70-80%) closed scrub over Neurachne alopecuroidea scattered grasses.

Releve ERR144
Date: 8/12/03
Location: Eastern Ridge.
AMG84: 50J 0407843/UTM 66 24184 (WGS 84; GPS unit).
Site description: Saddle between two low rocky ridges along a drainage line/fault.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (40-50%) low open forest over Allocasuarina campestris (30-40%) (variable and patchy) open scrub (to high open shrubland) over Lepidosperma tenue, Neurachne alopecuroidea (+), Schoenus clandestinus (+) scattered sedges/grasses.
Condition: Very good.
Notes: Lot of bare ground.

AcEl.2: *Eucalyptus loxophleba* subsp. *loxophleba* low open woodland over *Allocasuarina campestris* open scrub over scattered sedges/grasses/herbs.

This plant community had a low open woodland of *Eucalyptus loxophleba* subsp. *loxophleba*. Releves ERR172 and ERR193.

Releve: ERR172
Date: 23/12/03
Location: Eastern Ridge.
AMG84: 50J 0407985/UTM 66 22688 (WGS 84; GPS unit).
Site description: West-facing moderate slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand (NT) amongst boulders and rock outcrop (50-60% of surface) (elevation 232 m).
Rock type: Chert.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (5-8%) low open woodland over Allocasuarina campestris (50-60%) open scrub over Lepidosperma tenue (1%), Neurachne alopecuroidea scattered sedges/grasses with Borya sphaerocephala (1-2%) scattered herbs with Cheilanthes adiantoides scattered ferns.
Condition: Excellent (not many weeds).

Releve ERR193
Date: 3/1/04
Location: Eastern Ridge.
AMG84: 50J 0407910/UTM 66 23509 (WGS 84; GPS unit).
Site description: Gentle, east-facing, upper slope of rocky low ridge.
Rock type: Chert on slopes.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (15-20%) low open woodland over Allocasuarina campestris (60-70%) open scrub over Lepidosperma sp. very open sedgeland.
Associated species: Dioscorea hastifolia, Dichopogon capillipes, Trachymene pilosa, Chamaescilla corymbosa var. corymbosa.
Condition: Good to very good (high weed cover in parts).

Vegetation Association AcEw: *Eucalyptus wandoo* subsp. *wandoo* low open woodland over *Allocasuarina campestris* open to closed scrub.
Plant Communities:
AcEw.1: *Eucalyptus wandoo* subsp. *wandoo* low open woodland over *Allocasuarina campestris* (none under *E. wandoo* subsp. *wandoo* trees) open to closed scrub over scattered herbs and ferns. Releves ERR167 and GHR292.

Releve ERR167
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407960/UTM 66 23904 (WGS 84; GPS unit).
Site description: Gentle, east-facing low to mid slope of low rocky ridge (elevation 240 m).
Vegetation description: Eucalyptus wandoo subsp. wandoo (4-5%) low open woodland over Allocasuarina campestris (70-80%, NB: none under Eucalyptus wandoo subsp. wandoo) open to closed scrub over Podolepis lessonii (1%), Dichopogon capillipes scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Dioscorea hastifolia, Chamaescilla corymbosa var. corymbosa.
Condition: Very good. Low weed cover.

Releve GHR292
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408258/UTM 66 18076 (WGS 84; GPS unit).
Site description: Eucalyptus wandoo subsp. wandoo scattered trees to open woodland over Allocasuarina campestris open scrub.

AcEw.2: *Eucalyptus wandoo* subsp. *wandoo* low mallee woodland over *Allocasuarina campestris*, (*Calothamnus* aff. *quadrifidus* Moora-Watheroo) high shrubland to open scrub over scattered shrubs over *Desmocladus flexuosus* scattered sedges with scattered herbs.

This plant community differed by having a *Calothamnus quadrifidus* var. Moora-Watheroo high shrubland component. Releves CR40 and CR70.

Releve CR40
Date: 21/11/03
Location: Cairn Hill.
AMG84: 50J 0407546/UTM 66 20424 (WGS 84; GPS unit).
Site description: 'Shelf of dyke' on fault band – band of Eucalyptus wandoo subsp. wandoo to the north on lower to mid slopes of low ridge, west-facing.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Eucalyptus wandoo subsp. wandoo low mallee woodland over Allocasuarina campestris (30-50%), Calothamnus aff. quadrifidus Moora-Watheroo (1-2%) open scrub over Melaleuca calyptroides (1-2%), Acacia congesta subsp. congesta scattered shrubs over Desmocladus flexuosus scattered sedges with scattered herbs.

Releve CR70
Date: 25/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407166/UTM 66 20531 (WGS 84; GPS unit).
Vegetation description: Eucalyptus wandoo subsp. wandoo low mallee open woodland (~30%) over Allocasuarina campestris (15-20%), Calothamnus aff. quadrifidus Moora-Watheroo (5-7%) high shrubland over Thomasia grandiflora, Bossiaea sp. Cairn Hill (M Henson CH2-28), Hibbertia subvaginata scattered low shrubs over Desmocladus flexuosus (5-6%) very open sedgeland.
Associated species: Stylobasium australe (shrub about 1 m).

AcEw.3: *Eucalyptus wandoo* subsp. *wandoo* scattered low trees to low open woodland over *Acacia acuminata* subsp. *acuminata*, (*Allocasuarina huegeliana*) scattered low trees to low open woodland over *Allocasuarina campestris* open to closed scrub over scattered sedges and low open fern/herbland.
This plant community differed by having an *Acacia acuminata* subsp. *acuminata*, (*Allocasuarina huegeliana*) scattered low trees to low open woodland layer.
Quadrat CAH12 and releves CR13 and CR16.

Releve CR13
Date: 8/11/03
Location: Cairn Hill, south-east corner.
AMG84: 50J 0407917/UTM 66 20378 (WGS 84; GPS unit).
Site description: East-facing, moderate sloping, mid slope of low ridge.
Soil: Gravelly, pebbly, cobbly grey silty sand.
Vegetation description: Eucalyptus wandoo subsp. wandoo (2-5%) scattered low trees to low open woodland over Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (40-50%) open scrub over Borya sphaerocephala (10-15%), Stypandra glauca (1-2%) open herbland and Cheilanthes adiantoides (2-3%) very open fernland with Stylidium septentrionale (1-2%) open herbland.
Associated species: Blennospora drummondii, Trachymene cyanopetala, Trachymene ornata, Neurachne alopecuroidea, Lomandra effusa on lower slopes as is scattered Baeckea sp. Moora (R. Bone 1993/1).
Notes: Cf CR7- CR7 was on rocky (chert) slope => hence Xanthosia fruticulosa etc.

Releve CR16
Date: 9/11/03
Location: Cairn Hill (south end).
AMG84: 50J 0407512/UTM 66 20098 (WGS 84; GPS unit).
Site description: Moderately sloping, east-facing, rocky upper slope of low ridge.
Soil: Gravelly, bouldery brown sand amongst large areas of exposed sheet rock.
Vegetation description: Eucalyptus wandoo ssp. wandoo scattered trees over Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (+) scattered low trees to low open woodland over Allocasuarina campestris (50-80%) open to closed scrub over Neurachne alopecuroidea scattered grasses with Dichopogon capillipes, Stypandra glauca very open herbland.
Associated species: Trachymene pilosa, Acacia aristulata, Dryandra sessilis var. sessilis ssp.ses, Goodenia arthrotricha (50J 0407512/UTM 66 20103), Trichoryne elatior, Dichopogon capillipes, Chamaescilla corymbosa var. corymbosa, Trymalium ledifolium var. rosmarinifolium, Cheilanthes adiantoides.

AcEw.4: See vegetation description for releve CR7 below.
This plant community was described from a breakaway rocky slope of a low ridge with scattered *Kunzea praestans* and *Melaleuca calyptroides* present and typical breakaway slope species present (*Xanthosia fruticulosa*, *Stypandra glauca* and *Trymalium ledifolium* subsp. *rosmarinifolium*).
Releve CR7.

Releve CR7
Date: 8/11/03
Location: Cairn Hill Reserve, near southern boundary.
AMG84: 50J 0407780/UTM 66 20048 (WGS 84; GPS unit).
Site description: Rocky (chert) upper slope, (moderate slope, east facing) on low ridge.
Soil: Gravelly, cobbly, bouldery grey sand.
Vegetation description: Eucalyptus wandoo subsp. wandoo (5-10%), (Allocasuarina huegeliana, Acacia acuminata subsp. acuminata) low open woodland over Allocasuarina campestris (40-50%) Kunzea praestans (1-2%) open to closed scrub over Melaleuca calyptroides scattered shrubs over Calytrix leschenaultii, Xanthosia fruticulosa scattered low shrubs with Stypandra glauca very open herbland.
Associated species: Waitzia nitida, Neurachne alopecuroidea, Austrostipa exillis, Desmocladus flexuosus, Xanthosia fruticulosa, Dichopogon capillipes, Trymalium ledifolium var. rosmarinifolium in lower part of unit.
Condition: Excellent.
Notes: Similar to CH10, CR2 also CAH 13.

Vegetation Association AcHa: *Allocasuarina campestris* scattered tall shrubs over *Hypocalymma angustifolium* low open shrubland over *Pityrodia dilatata* low open shrubland.
Plant Communities:
AcHa.1: See vegetation description for releve GHR275 below.

Releve GHR275
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408295/UTM 66 17171 (WGS 84; GPS unit).
Site description: very gentle, west-facing crest of very low ?chert ridge.
Rock type:
Vegetation description: (Allocasuarina campestris scattered tall shrubs) over Hypocalymma angustifolium (1-2%) low open shrubland over Pityrodia dilatata (30 cm) (15-20%) low open shrubland over Neurachne alopecuroidea, Lepidosperma tenue scattered sedges/grasses with Dampiera lavandulacea (15-20%), Opercularia vaginata (1-2%) open herbland.

Associated species: Acacia aristulata, Daviesia dielsii, Calothamnus aff. quadrifidus Moora-Watheroo, Calytrix leschenaultii, Orthrosanthus laxus, Melaleuca calyptroides, Burchardia umbellata, Xanthorrhoea drummondii, Astroloma serratifolium.
Condition: Very good.

AcHa.2: See vegetation description for releve GHR273 below.
This plant community differed by having *Dryandra fraseri* and *Hakea lissocarpha* in the low open shrubland over a low open shrubland of *Acacia aristulata* with only scattered *Pityrodia dilatata.*
Releve GHR273.

Releve GHR273
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408295/UTM 66 17191 (WGS 84; GPS unit).
Site description: Crest of low rocky ridge (elevation 250 m).
Rock type: Grey chert.
Vegetation description: (Allocasuarina campestris (+)) scattered tall shrubs over Melaleuca radula scattered shrub over Dryandra fraseri (60-80 cm) (2-3%), Hakea lissocarpha, Hypocalymma angustifolium low open shrubland over Acacia aristulata (2-3%) low open shrubland over Desmocladus flexuosus, Neurachne alopecuroidea, Lepidosperma tenue scattered sedges/grasses with Dampiera lavandulacea (5-10%), Opercularia vaginata ((+) 2%), Stypandra glauca (+) open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Burchardia umbellata, Pityrodia dilatata, Daviesia dielsii, Melaleuca calyptroides.
Condition: Very good (some annual weeds – Ursinia anthemoides, Avena barbata).

Vegetation Association AcHs: *Allocasuarina campestris* open to closed scrub over *Hibbertia subvaginata* scattered low shrubs to low open shrubland.
Plant Communities:
AcHs.1: *Allocasuarina campestris* (high open shrubland) to closed scrub over *Hibbertia subvaginata*, (*Calytrix leschenaultii*) scattered low shrubs to low open shrubland over scattered sedges/grasses/herbs.
Releves CNR115, ERR155 and ERR195.

Releve CNR115
Date: 3/12/03
Location: Cairn Hill North.
AMG84: 50J 0407394/UTM 66 21894 (WGS 84; GPS unit).
Site description: Crest of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina campestris (70-80%) closed scrub over Xanthorrhoea drummondii scattered shrubs over Hibbertia subvaginata, Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Stypandra glauca, Stylidium septentrionale, Borya sphaerocephala scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Dryandra sessilis var. sessilis.

Releve ERR155
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407905/UTM 66 24545 (WGS 84; GPS unit).
Site description: Mid slope of low rocky ridge, east-facing, gentle slope.
Soil: Gravelly, pebbly, cobbly brown sand with boulders and rock outcrop.

Vegetation description: Allocasuarina campestris (80%), Acacia congesta subsp. congesta (1-2%) closed scrub over Hibbertia subvaginata (<1%) scattered low shrubs over Stypandra glauca scattered herbs with Cheilanthes adiantoides scattered ferns.
Associated species: Burchardia umbellata, Chamaescilla corymbosa var. corymbosa, Dichopogon capillipes, Dioscorea hastifolia, Allocasuarina huegeliana (on lower slopes).
Condition: Very good. Weed cover <3% (low).

Releve ERR195
Date: 3/1/04
Location: Eastern Ridge.
AMG84: 50J 0407967/UTM 66 23428 (WGS 84; GPS unit).
Site description: Steep, east-facing mid slope of low rocky ridge (elevation 262 m).
Soil: (NT) Gravelly, pebbly, cobbly brown sand amongst boulders and rock outcrop (50% +).
Vegetation description: Allocasuarina campestris (3-5%), Xanthorrhoea drummondii (2-3%) high open shrubland over Hibbertia subvaginata (3-5%), Calytrix leschenaultii (1%) low open shrubland over Lepidosperma tenue, Desmocladus flexuosus, Neurachne alopecuroidea, Austrodanthonia caespitosa scattered sedges/grasses with Stypandra glauca scattered herbs.
Associated species: Dioscorea hastifolia, Dichopogon capillipes, Burchardia umbellata, Acacia aristulata, Olearia dampieri subsp. eremicola, Baeckea crispiflora var. tenuior (shrub x 5) (nearby about 10 m north).

AcHs.2: *Allocasuarina huegeliana* and *Acacia acuminata* subsp. *acuminata*, (*Eucalyptus loxophleba* subsp. *loxophleba*) scattered low trees to low open woodland over *Allocasuarina campestris* high open shrubland to open scrub over *Hibbertia subvaginata*, (*Calytrix leschenaultii*) scattered low shrubs to open shrubland.
This community differed by having an *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland.
Quadrat ERG7 and releves ERR160, ERR163, ERR152, ERR154, ERR156 and RM15.

Releve ERR154
Date: 20/12/03
Location: Eastern Ridge.
AMG84: 50J 0407947/UTM 66 24417 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of low rocky ridge.
Vegetation description: Allocasuarina huegeliana (8-10%) low open woodland over Allocasuarina campestris (15%) high open shrubland over Hibbertia subvaginata (1%) scattered low shrubs over Neurachne alopecuroidea scattered grasses with Stypandra glauca, Podolepis lessonii, Lawrencella rosea scattered herbs to very open herbland and Avena barbarta, Ehrharta longiflora very open annual grassland and Cheilanthes adiantoides scattered ferns.
Condition: Good (some weed infestation).

Releve ERR156
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407864/UTM 66 24419 (WGS 84; GPS unit).
Site description: Gentle, west-facing, upper slope of low rocky ridge with boulders and outcrop (cover 20-30%).
Soil: See R155.
Vegetation description: Allocasuarina huegeliana (1-2%), Acacia acuminata subsp. acuminata (<1%), Eucalyptus loxophleba subsp. loxophleba (<1%) scattered low trees over Allocasuarina campestris (50%), (Xanthorrhoea drummondii (1-2%), Kunzea praestans (<1%), Acacia congesta subsp. congesta (1-2%)) open scrub over Hibbertia subvaginata (1-2%), Calytrix leschenaultii (<1%)

scattered low shrubs over Lepidosperma tenue, Neurachne alopecuroidea scattered sedges/grasses with Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Dioscorea hastifolia, Trachymene pilosa.
Notes: Similar to R155 but with low tree strata.

Releve ERR160
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407741/UTM 66 24270 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of low ridge (Elevation 254 m).
Soil: Gravelly, pebbly, cobbly brown sand (NT) amongst boulders and rock outcrop (~ 50-70% cover).
Vegetation description: Allocasuarina huegeliana ((2-3%) 5-6%), Acacia acuminata subsp. acuminata (1%), Eucalyptus loxophleba subsp. loxophleba (1%) low open woodland over Allocasuarina campestris (20-25%) high shrubland over Hibbertia subvaginata (5-10%), Calytrix leschenaultii (+) open shrubland over Lepidosperma tenue (1-2%) scattered sedges with Cheilanthes adiantoides scattered ferns.
Associated species: Goodenia berardiana, Dichopogon capillipes, Dioscorea hastifolia, Olearia dampieri subsp. eremicola, Borya sphaerocephala.
Condition: Very good to excellent. Very few weeds.
Notes: Similar to R139, R155.
Releve ERR163
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407815/UTM 66 24031 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid to upper rocky slope of low rocky ridge (elevation 254 m).
Soil: Gravelly, pebbly, cobbly brown sand (NT) amongst boulders and outcrop (rock cover ~ 50-60 % surface cover).
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (1-2%) low open woodland over Allocasuarina campestris (5-15%), (Kunzea praestans (+)) high open shrubland to high shrubland over Hibbertia subvaginata (2-3%), Trymalium ledifolium var. rosmarinifolium (1%), Olearia dampieri subsp. eremicola (+), Calytrix leschenaultii (+) open shrubland over Neurachne alopecuroidea scattered grasses with Cheilanthes adiantoides scattered ferns and Podolepis lessonii very open herbland.
Associated species: Dichopogon capillipes, Chamaescilla corymbosa var. corymbosa, Lawrencella rosea, Dioscorea hastifolia, Eucalyptus loxophleba subsp. loxophleba.

Releve ERR152
Date: 20/12/03
Location: Eastern Ridge.
AMG84: 50J 0407907/UTM 66 24591 (WGS 84; GPS unit).
Site description: Mid slope, east-facing moderate slope on low rocky ridge.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba (5-6 m, 5%), Allocasuarina huegeliana (3.5 m, 2-3%) low open woodland over Allocasuarina campestris (30-35%), Acacia congesta subsp. congesta (<1%) open scrub over Hibbertia subvaginata (3-5%) low open shrubland over Neurachne alopecuroidea scattered grasses with Cheilanthes adiantoides scattered ferns.
Associated species: Dioscorea hastifolia, Chamaescilla corymbosa var. corymbosa.

Releve RM15
Date: 11/12/04
Location: Ron Manning's property.
AMG84: 50J 0408807/UTM 66 21554 (WGS 84; GPS unit).
Site description: Gentle, east-facing slope.

Vegetation description: Eucalyptus loxophleba subsp. loxophleba, Allocasuarina huegeliana, Acacia acuminata subsp. acuminata low open woodland over Xanthorrhoea drummondii scattered tall shrubs to high open shrubland over Allocasuarina campestris high open shrubland over Hibbertia subvaginata, Calytrix leschenaultii low open shrubland over Borya sphaerocephala open herbland.
Condition: Good.
Notes: Similar to site D10. Ecotonal unit. More than 10 years since last fire.

Vegetation Association AcId: *Allocasuarina campestris* open to closed scrub over *Isopogon divergens* open shrubland.
Plant Communities:
AcId.1: *Allocasuarina campestris* open to closed scrub over *Xanthorrhoea drummondii* high open shrubland over *Isopogon divergens*, *Melaleuca calyptroides*, *Baeckea* sp. Moora (R. Bone 1993/1) open shrubland to shrubland over *Calytrix leschenaultii*, *Dryandra fraseri* scattered low shrubs to low open shrubland with scattered sedges and very open herbland.

This plant community included a *Melaleuca calyptroides*, *Baeckea* sp. Moora (R. Bone 1993/1), (*Calothamnus sanguineus*) open shrubland to shrubland and *Calytrix leschenaultii*, *Dryandra fraseri* scattered low shrubs. Releves CR34 and CR47.

Releve CR34
Date: 15/11/03
Location: Cairn Hill
AMG84: 50J 0407591/UTM 66 20635 (WGS 84; GPS unit).
Site description: Flat crest of low ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst exposed sheet rock.
Vegetation description: Allocasuarina campestris (40-50%), Calothamnus aff. quadrifidus Moora-Watheroo (3-4%) open scrub over Isopogon divergens (4-5%), Melaleuca calyptroides (2-3%), Baeckea sp. Moora (R. Bone 1993/1) (3-4%) open shrubland over Hibbertia subvaginata (1-2%), Calytrix leschenaultii (1-2%), Dryandra fraseri (2-3%), Xanthosia fruticulosa (1-2%) low open shrubland over Stylidium septentrionale (1-2%), Borya sphaerocephala (2-3%) very open herbland with Desmocladus flexuosus scattered sedges.
Associated species: Lawrencella rosea, Acacia acuminata subsp. acuminata, Xanthorrhoea drummondii, Calothamnus sanguineus, Dampiera lavandulacea (40 cm), Neurachne alopecuroidea, Hakea incrassata, Goodeniaceae hassallii, Daviesia dielsii.

Releve CR47
Date: 22/11/03
Location: Cairn Hill.
AMG84: 50J 0407700/UTM 66 20945 (WGS 84; GPS unit).
Site description: Crest of low ridge.
Soil: Gravelly, pebbly, cobbly brow sand.
Vegetation description: Allocasuarina campestris (70-80%) closed scrub over Xanthorrhoea drummondii (3-4%) high open shrubland over Melaleuca calyptroides (10-12%), Isopogon divergens (3-5%), Calothamnus sanguineus (1-2%), Daviesia dielsii (3-4%), Baeckea sp. Moora (R. Bone 1993/1) (3-4%) shrubland over Calytrix leschenaultii scattered low shrubs with Stylidium septentrionale, Borya sphaerocephala scattered herbs.
Associated species: Chamaescilla corymbosa var. corymbosa, Burchardia umbellata, Thysanotus manglesianus, Hakea incrassata, Dryandra fraseri, Kunzea praestans, Acacia pulchella, Neurachne alopecuroidea.
Notes: 1) Include this releve because no tree layer.
2) Has scattered Acacia acuminata subsp. acuminata about 50 m south. Allocasuarina campestris only about 0.8-1 m high regrowth => % of Melaleuca and Kunzea etc; shrubland cover decreases Allocasuarina campestris gets higher height and cover.

AcId.2: *Allocasuarina huegeliana* scattered low trees over *Allocasuarina campestris, Kunzea praestans* high shrubland to open scrub over *Melaleuca calyptroides, Isopogon divergens* shrubland over *Calytrix leschenaultii* scattered low shrubs to low open shrubland over very open herbland.

This plant community differed by having an *Allocasuarina huegeliana* scattered low tree layer along with *Kunzea praestans* high open shrubland and *Melaleuca calyptroides* shrubland component. Quadrat CAH17 and releve CR23.

Releve CR23
Date: 14/11/03
Location: Cairn Hill.
AMG84: 50J 0407443/UTM 66 20155 (WGS 84; GPS unit).
Site description: Very gently sloping, west-facing, upper slope just adjacent to crest of low ridge (elevation =262 m).
Soil: Gravelly, pebbly, cobbly brown sand with exposed boulders/bare rock.
Vegetation description: Allocasuarina huegeliana (+) low scattered trees over Allocasuarina campestris (30-40%), Kunzea praestans (1-3% (15-20%)) open scrub over Melaleuca calyptroides (10-15%), Isopogon divergens (5-8%) shrubland over Calytrix leschenaultii, Xanthosia fruticulosa (+) scattered low shrubs over Neurachne alopecuroidea scattered grasses with Stylidium septentrionale (1-2%), Borya sphaerocephala (1-2%) very open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Dryandra fraseri, Dryandra sessilis var. sessilis, Desmocladus flexuosus, Dichopogon capillipes

AcId.3: *Allocasuarina campestris* closed scrub over *Isopogon divergens* open shrubland over scattered grasses.
Quadrat CAH19.

Vegetation Association AcMr: *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* low open woodland to low woodland over *Allocasuarina campestris*, (*Melaleuca radula*) open scrub.
Plant Communities:
AcMr.1: *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* low open woodland to low woodland over *Allocasuarina campestris, Melaleuca radula* open scrub over *Calytrix leschenaultii*, (*Astroloma serratifolium*) scattered low shrubs to low open shrubland scattered low shrubs over scattered sedges/grasses with very open herbland and scattered ferns.
Releves CNR134 and GHR295.

Releve CNR134
Date: 6/12/03
Location: Cairn Hill North.
AMG84: 50J 0407261/UTM 66 21751 (WGS 84; GPS unit).
Site description: Very gently sloping, west-facing lower slope (floor area adjcent to drainage line?) of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (3-5%) low woodland over Allocasuarina campestris (50-60%), (Melaleuca radula (1-2%)) open scrub over Calytrix leschenaultii scattered shrubs over Lepidosperma tenue, Schoenus clandestinus (+), Neurachne alopecuroidea scattered sedges/grasses with Borya sphaerocephala, Podolepis lessonii (1-2%) scattered herbs with Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Eucalyptus loxophleba subsp. loxophleba (near drainage line).

Releve GHR295

Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408483/UTM 66 17508 (WGS 84; GPS unit).
Site description: Gentle, west-facing lower mid slope of low rocky ridge (elevation 255 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (5%) low open woodland to low woodland over Allocasuarina campestris (20-25%), Melaleuca radula (8-10%) open scrub over Calytrix leschenaultii scattered low shrubs over Schoenus clandestinus, Neurachne alopecuroidea scattered sedges/grasses with Borya sphaerocephala (5-6%) very open herbland and Cheilanthes adiantoides scattered ferns.
Associated species: Podolepis canescens, Podolepis lessonii, Kunzea praestans.
Condition: Very good.

AcMr.2: *Allocasuarina campestris*, (*Calothamnus* aff. *quadrifidus* Moora-Watheroo, *Melaleuca radula*) closed scrub over *Calytrix leschenaultii*, (*Astroloma serratifolium*) scattered low shrubs over scattered sedges and herbs.
This plant community differed by having no tree layer and an *Allocasuarina campestris*, (*Calothamnus* aff. *quadrifidus* Moora Watheroo, *Melaleuca radula*) closed scrub.
Quadrat CAH4 and releves CR26 and CR38.

Releve CR26
Date: 15/11/03
Location: Cairn Hill.
AMG84: 50J 0407433/UTM 66 20399 (WGS 84; GPS unit).
Site description: Moderate sloping, east-facing mid slope.
Soil: Gravelly, pebbly, cobbly brown loamy sand.
Vegetation description: Allocasuarina campestris (80-90%) (Calothamnus aff. quadrifidus Moora-Watheroo) closed scrub over Melaleuca radula, Acacia congesta subsp. congesta scattered shrubs over Desmocladus flexuosus (1-3%), Lepidosperma tenue scattered sedges to very open sedgeland with Cheilanthes adiantoides (5-10% dead) open fernland and Dichopogon capillipes very open herbland.
Associated species: Acacia restiacea, Dioscorea hastifolia, Daviesia dielsii, Burchardia umbellata, Stypandra glauca, Astroloma serratifolium.
Notes: Grevillea biternata at AMG84: 50J 04074393/UTM 66 20462 (WGS 84; GPS unit).

Releve CR38 (~ to CR37)
Date: 21/11/03
Location: Cairn Hill.
AMG84: 50J 0407609/UTM 66 20840 (WGS 84; GPS unit).
Site description: Mid, south-west facing moderate slope on low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: (Allocasuarina huegeliana) scattered low trees over Allocasuarina campestris (70-80%), (Calothamnus aff. quadrifidus Moora-Watheroo (1-2%), Melaleuca radula (2-4%)) closed scrub over Calytrix leschenaultii, Astroloma serratifolium (1-2%) scattered low shrubs to low open shrubland over Neurachne alopecuroidea (+), Lepidosperma leptostachyum scattered grasses and sedges with Chamaescilla corymbosa var. corymbosa (+), Stypandra glauca (+), Borya sphaerocephala (1%) scattered herbs with Cheilanthes adiantoides (+) scattered ferns.
Associated species: Schoenus clandestinus, Blennospora drummondii, Stylidium septentrionale, Trachymene pilosa, Dichopogon capillipes
Notes: 1) ~ to CR37 and in the same valley.
2) Scattered Acacia acuminata subsp. acuminata on lower slopes.
3) Quite a lot of old disturbance in the area (old tracks, old gridlines).

AcMr.3: *Acacia acuminata* subsp. *acuminata* scattered low trees to low open woodland over *Allocasuarina campestris* open scrub to closed scrub over *Melaleuca radula* scattered shrubs over scattered sedges and grasses.

This plant community differed by having an *Acacia acuminata* subsp. *acuminata* scattered low trees to low open woodland tree layer. Releves CR18, CR19 and CR59.

Releve CR18
Date: 9/11/03
Location: Cairn Hill.
AMG84: 50J 0407233/UTM 66 20013 (WGS 84; GPS unit).
Site description: Mid slope of long, gentle, west facing slope of low ridge.
Soil: Gravelly brown sand.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris closed scrub (80-100%) over Neurachne alopecuroidea scattered grasses and Cheilanthes adiantoides fernland with Trachymene ornata, Chamaescilla corymbosa var. corymbosa, Millotia tenuifolia var. tenuifolia very open herbland.
Associated species: Melaleuca radula (near openings), Dioscorea hastifolia, Podolepis lessonii, Stylidium septentrionale.
Notes: Downslope more open (~40-50% = open scrub), with more Borya sphaerocephala and Stylidium septentrionale, Stypandra glauca, Melaleuca radula and less Cheilanthes adiantoides. Also some yellow Calytrix depressa and Baeckea crispiflora var. tenuior.

Releve CR19
Date: 9/11/03
Location: Cairn Hill.
AMG84: 50J 0407170/UTM 66 20094 (WGS 84; GPS unit).
Site description: Gently sloping west-facing mid slope of low ridge (long slope).
Soil: Brown gravelly sand.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris open to closed scrub (40-50 to 70-80%) (more open upslope) over Melaleuca radula, Baeckea crispiflora var. tenuior scattered shrubs over Borya sphaerocephala (3-5%), Stylidium septentrionale (3-5%), Cheilanthes adiantoides (1-2%), Podolepis lessonii open herbland with Neurachne alopecuroidea scattered grasses.
Associated specie: Trachymene cyanopetala, Dichopogon capillipes, Chamaescilla corymbosa var. corymbosa, Xanthorrhoea drummondii.

Releve CR59 (small unit)
Date: 23/11/03
Location: Cairn Hill.
AMG84: 50J 0407716/UTM 66 21314 (WGS 84; GPS unit).
Site description: Gentle, east-facing upper slope of low rocky ridge (where breakaway normally is but not very rocky).
Vegetation description: Acacia acuminata subsp. acuminata (10-15%), (Eucalyptus loxophleba subsp. loxophleba (+)) low open woodland over Allocasuarina campestris (50-60%) open scrub over Melaleuca radula scattered shrubs over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges and grasses.

Vegetation Association AcMs: *Acacia acuminata* subsp. *acuminata* scattered low trees over *Allocasuarina campestris* open to closed scrub over *Melaleuca sclerophylla* open shrubland.
Plant Communities:
AcMs.1: See the vegetation description for releve GHR272 below.
Releve GHR272.

Releve GHR272
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408283/UTM 66 17208 (WGS 84; GPS unit).
Site description: Gentle, west-facing slope of low (chert) rocky rise.
Soil:
Rock type: ? Sandstone.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris (60-70%) open to closed scrub over Melaleuca sclerophylla (3-5%) open shrubland over Schoenus clandestinus (1%), Desmocladus flexuosus, Lepidobolus chaetocephalus, Neurachne alopecuroidea, Lepidosperma leptostachyum very open sedgeland/grassland with Borya sphaerocephala (1-2%), Stylidium septentrionale (1-2%) very open herbland.
Associated species: Burchardia umbellata, Amphipogon caricinus, Trachymene cyanopetala, Podolepis lessonii, Blennospora drummondii, Crassula colorata var. colorata, Beackea crispiflora var. tenuior (~80-90 cm).
Condition: Very good to excellent (very few weeds and good number of species present).

Vegetation Association AcRm: *Regelia megacephala* high open shrubland to shrubland over *Allocasuarina campestris* open to closed scrub.
Plant Communities:
AcRm.1: See the vegetation description for releve CNR105 below.
This unit was probably an intermediate vegetation unit. It occurred on an upper slope of a low chert ridge with a *Regelia megacephala* scrub unit upslope and an *Allocasuarina campestris* scrub unit downslope. Releve CNR105.

Releve CNR105
Date: 29/11/03
Location: Cairn Hill North.
AMG84: 50J 0407217/UTM 66 22414 (WGS 84; GPS unit).
Site description: Gently sloping, west-facing upper slope of rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Regelia megacephala (10-12%) high open shrubland to open scrub over Allocasuarina campestris (60-70%) open scrub over Neurachne alopecuroidea scattered grasses with Borya sphaerocephala (1-2%) scattered herbs.
Associated species: Chamaescilla corymbosa var. corymbosa, Lawrencella rosea, Burchardia umbellata.
Notes: Site CNR105 very similar to site CR67.

AcRm.2: See the vegetation description for releve CR39 below.
This plant community, which occurred on a chert breakaway, differed by having a *Santalum acuminatum* low open woodland and included a *Calothamnus* aff. *quadrifidus* Moora Watheroo high open shrubland. Releve CR39.

Releve CR39
Date: 21/11/03
Location: Cairn Hill.
AMG84: 50J 0407659/UTM 66 20494 (WGS 84; GPS unit).
Site description: Steep mid to upper, west-facing slope of low ridge (chert breakaway).
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and sheet rock.
Vegetation description: Santalum acuminatum low open woodland over Regelia megacephala (5-8%), Calothamnus aff. quadrifidus Moora-Watheroo (3-5%), Allocasuarina campestris (30-40%) open scrub over Lepidosperma tenue scattered sedges with Stypandra glauca, Dichopogon capillipes very open low herbland.

Associated species: Lawrencella rosea, Dioscorea hastifolia, Pityrodia dilatata, Dryandra sessilis var. sessilis, Xanthorrhoea drummondii, Xanthosia fruticulosa, Cheilanthes adiantoides.

AcRm.3: See the vegetation description for releve CR2 below.
This plant community differed by having an *Allocasuarina huegeliana* scattered low trees layer, a *Calothamnus* aff. *quadrifidus* Moora Watheroo, *Kunzea praestans* high shrubland component and *Melaleuca calyptroides* scattered shrubs. Releve CR2.

Releve CR2
Date: 7/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407696/UTM 66 20035 (WGS 84; GPS unit).
Site description: Moderate west facing rocky chert slope of a low ridge.
Soil: Skeletal gravelly loam brown sand amongst chert boulders.
Vegetation description: Allocasuarina huegelii scattered low trees over Allocasuarina campestris (50-60%), Regelia megacephala (10-20%) Calothamnus aff. quadrifidus Moora-Watheroo (2-5%), Kunzea praestans (2-5%) open to closed scrub over Melaleuca calyptroides (2-5%) scattered shrubs to open shrubland over Stypandra glauca open herbland.
Associated species: Hibbertia subvaginata, Xanthosia fruticulosa
Condition: Excellent.
Notes: Some areas where Regelia megacephala is 30-40% and little Allocasuarina campestris.

AcRm.4: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris and Regelia megacephala open to closed scrub over Ricinocarpos muricatus scattered shrubs over *Vulpia myuros, *Avena barbata very open grassland
Releve ATR007

Releve ATR007
Date: 12/11/2010
Location: Arthur and Rhonda Tonkin's property.
MGA: 94410277 mE 6625428 mN (WGS 84; GPS unit).
Site description: Gentle west facing upper slope of low ridge.
Soil description: Brown sand (?) (north of sampled)
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Allocasuarina campestris and Regelia megacephala open to closed scrub over Ricinocarpos muricatus scattered shrubs over *Vulpia myuros, *Avena barbata very open grassland.
Associated species: Dioscorea sp., *Ursinia anthemoides
Condition: Good
Fire Age: >10 years
Notes: Photos BM19. This is a transitional vegetation unit

Vegetation Alliance 14: *Allocasuarina microstachya* open scrub.
Vegetation Association Am: Allocasuarina huegeliana scattered low trees over *Allocasuarina microstachya*, (*Kunzea praestans*) open scrub over *Calytrix leschenaultii*, *Calytrix depressa* scattered low shrubs over scattered sedges/grasses and open herbland.
Plant Communities:
Am.1: See the vegetation description for releve GHR300 below.
Only one small area of this plant community was found in the survey area, at Gardiner's Hill.
Releve GHR300.

Releve GHR300

Date: 18/11/04
Location: Gardiner's hill.
AMG84: 50J 0408795/UTM 66 17814(WGS 84; GPS unit).
Vegetation description: Allocasuarina huegeliana scattered low trees over Allocasuarina microstachya (2.1m) (40-60%), (Kunzea praestans) open scrub over Calytrix leschenaultii, Calytrix depressa scattered low shrubs over Neurachne alopecuroidea, Schoenus clandestinus scattered sedges/grasses with Borya sphaerocephala (3-5%), Gilberta tenuifolia (+), Podolepis lessonii (+), Podolepis canescens (3-5%) open herbland.
Associated species: Dianella revolute var. divaricata, Lawrencella rosea.
Notes: Very small unit.

Vegetation Alliance 15: *Regelia megacephala* high shrubland to open and closed scrub

Regelia megacephala high shrubland to open and closed scrub occurred on the exposed chert slopes and sometimes crests of the chert ridges in the study area. In places *Regelia megacephala* scrub stands occurred in low open woodlands and occurred with different associated tree and shrub species which varied depending on the area within the study area.

Vegetation Association Rm: *Regelia megacephala* open scrub.
Plant Communities:
Rm.1: *Regelia megacephala* open scrub over annual grassland and *Stypandra glauca* scattered herbs.
Releve CSR332.

Releve CSR332
Date: 18/2/05
Location: Kim Chester's property.
AMG84: 50J 0407236/UTM 66 19110 (WGS 84; GPS unit).
Site description: Moderate to steep, west-facing mid slope of low ridge.
Soil:
Rock type: Chert.
Vegetation description: Regelia megacephala (30-40 (60%) open scrub over *Ehrharta longiflora, *Avena barbata, Bromus diandrus annual grassland with Stypandra glauca scattered herbs.
Associated species:
Condition: Poor – very poor (very weedy).

Vegetation Association RmAh: *Allocasuarina huegeliana* low open woodland to low open forest over *Regelia megacephala* open scrub over scattered sedges and herbs.
Plant Communities:
RmAh.1: *Allocasuarina huegeliana* low open woodland over *Regelia megacephala*, (*Kunzea praestans*) open scrub over *Hibbertia subvaginata*, (*Xanthosia fruticulosa*) (low) open shrubland over *Stypandra glauca* very open herbland.

This plant community was differentiated by having *Kunzea praestans* high open shrubland and *Hibbertia subvaginata* low open shrubland. Quadrats CAH15 and CHN5. Releve CR74.

Releve CR74
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406933/UTM 66 20762 (WGS 84; GPS unit).
Site description: Steep, west facing mid to upper slope of rocky (chert) low ridge.
Soil: Gravelly, pebbly, cobbly brown sand.

Vegetation description: Allocasuarina huegeliana (5%) low open woodland over Regelia megacephala (30-40%), Kunzea praestans (5-10%) open scrub over Hibbertia subvaginata (3-4%) open shrubland over Lepidosperma leptostachyum scattered sedges with Stypandra glauca (10-15%) open herbland.
Associated species: Dichopogon capillipes, Burchardia umbellata, Dioscorea hastifolia, Lawrencella rosea.
Notes: cf. CAH15 (south facing slope). Mpg unit R74A (CAH, north-west corner)
Similar to R74 but Allocasuarina huegeliana/Regelia megacephala closed scrub at base of steep rocky chert slope (west-facing).

RmAh.2: *Allocasuarina huegeliana* low open woodland over *Regelia megacephala* open scrub over *Hibbertia subvaginata* scattered low shrubs over scattered sedges/grasses with *Stypandra glauca* very open herbland and very open annual grassland/herbland.

This plant community was differentiated by having a *Hibbertia subvaginata* low open shrubland strata (no *Kunzea praestans* strata). Releves CNR109 and GHR291.

Releve CNR109 (~R74/R85)
Date: 2/12/03
Location: Cairn Hill North.
AMG84: 50J 0407025/UTM 66 22616 (WGS 84; GPS unit).
Site description: West-facing, gently to moderately sloping rocky lower slope of rocky low ridge.
Soil: Gravelly, pebbly, cobbly brown sand?.
Vegetation description: Allocasuarina huegeliana (5-10%) low open woodland over Regelia megacephala (15-20%), Allocasuarina campestris (5-8%) open scrub over Hibbertia subvaginata, Xanthosia fruticulosa (2-3%) scattered low shrubs over Neurachne alopecuroidea, Desmocladus flexuosus scattered grasses/sedges with Stypandra glauca (1%), Dichopogon capillipes very open herbland with Cheilanthes adiantoides scattered ferns.
Associated species: Acacia congesta subsp. congesta, Xanthorrhoea drummondii.
Condition: Good. Lot of weeds (Avena barbata, Ursinia anthemoides, Briza maxima).

Releve GHR291
Date: 13/11/04
Location: Gardiner's hill.
AMG84: 50J 0408323/UTM 66 18076 (WGS 84; GPS unit).
Site description: Moderate, north-west facing upper slope of low rocky ridge.
Soil:
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5-10% live) low open woodland over Regelia megacephala (35-50%) open scrub over Hibbertia subvaginata scattered low shrubs over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Stypandra glauca, Podolepis canescens (1-2%) very open herbland and Avena barbata, Hypochaeris glabra, very open annual grassland/herbland.
Associated species: Dioscorea hastifolia, Chamaescilla corymbosa var. corymbosa, Podotheca angustifolia.
Condition: Good to very good (patchy weeds).
Notes: This unit is broken up by ~R281. This unit was recorded as site N27.

RmAh.3: See the vegetation description for releve CSR325 below.
Releve CSR325.

Releve CSR325
Date: 17/2/05
Location: Kim Chester's property, south of Cairn Hill.

AMG84: 50J 0407579/UTM 66 19585 (WGS 84; GPS unit).
Site description: Crest and gentle south-west to west-facing, upper slope of low ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (3-5%) low open woodland over Regelia megacephala ((5) 20%), (Xanthorrhoea drummondii (2-3%)) high open shrubland to high shrubland over *Avena barbata, *Ehrharta longiflora, *Vulpia myuros var. hirsuta annual grassland.
Associated species:
Condition: Very poor (annual grassland of weeds).

RmAh.4: See the vegetation description for releve CR85 below.

In this plant community, *Allocasuarina huegeliana* formed a low open forest over a *Regelia megacephala* open scrub on the lower slopes of a chert ridge in the north-west corner of Cairn Hill. Releve CR85.

Releve CR85
Date: 27/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406894/UTM 66 21403 (WGS 84; GPS unit).
Site description: Moderate, west-facing slope at base of steep rocky slope of low rocky ridge.
Soil: Gravel.
Vegetation description: Allocasuarina huegeliana (30-50%) low open forest over Regelia megacephala (80-90%) closed scrub over Dodonaea pinifolia (1%) scattered shrubs over Stypandra glauca scattered herbs with Cheilanthes adiantoides (2-4%) very open fernland,
Associated species: Thysanotus manglesianus, Dichopogon capillipes, Xanthosia fruticulosa.

Vegetation Association RmB: *Regelia megacephala*, (*Kunzea praestans*) open scrub over *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland.

Plant Communities:
RmB.1: Quadrat CHN8 and releve CR50.

Releve CR50
Date: 23/11/03
Location: Cairn Hill.
AMG84: 50J 0407730/UTM 66 21135 (WGS 84; GPS unit).
Site description: Moderate east-facing upper slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and rocky outcrop (chert).
Vegetation description: Allocasuarina huegeliana (1-2%) Acacia acuminata subsp. acuminata (1-2%) scattered low trees to low open woodland over Regelia megacephala (35-45%), Xanthorrhoea drummondii (1-2%) open scrub over Kunzea praestans (4-5%) high open shrubland (to 2m) over Baeckea sp. Moora (R. Bone 1993/1) (2-3%), Calytrix leschenaultii (1-2%) open shrubland over Hibbertia subvaginata (1-2%) scattered low shrubs over Desmocladus flexuosus (1-2%), Neurachne alopecuroidea (+) scattered sedges/grasses with Burchardia umbellata, Podolepis lessonii scattered herbs with Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Pityrodia dilatata, Acacia aristulata, Dioscorea hastifolia, Trachymene pilosa, Dichopogon capillipes, Blennospora drummondii, Bossiaea sp. Cairn Hill (M Henson CH2-28), Waitzia nitida.
Notes: Unit is downslope of CR49.

Vegetation Association RmDs: *Regelia megacephala*, (*Dryandra sessilis var. sessilis*) open scrub. One plant community was included in this vegetation association.

Plant Communities:
RmDs.1: *Regelia megacephala*, (*Dryandra sessilis* var. *sessilis*) open scrub (over *Hibbertia subvaginata* scattered low shrubs) over very open fernland very open lianes.
Quadrat GH9 and releve G328.

Releve G328
Date: 17/2/05
Location: Phil & Jenny Gardiner's property, south of Cairn Hill.
AMG84: 50J 0408144/UTM 66 19365 (WGS 84; GPS unit).
Site description: Moderate, west-facing slope of very low ridge.
Soil:
Rock type: Chert.
Vegetation description: Regelia megacephala (30-40%), (Xanthorrhoea drummondii (+), Dryandra sessilis var. sessilis (+)) open scrub over *Avena barbata annual grassland.
Associated species:
Condition: Very poor – high weed cover.

Vegetation Association RmEe: *Eucalyptus eudesmioides* scattered low trees to low woodland over *Regelia megacephala* open to closed scrub.
Plant Communities:
RmEe.1: *Eucalyptus eudesmioides* scattered low trees to low woodland over *Regelia megacephala*, *Kunzea praestans* open scrub over *Melaleuca calyptroides*, *Baeckea* sp. Moora (R. Bone 1993/1) open shrubland over *Hibbertia subvaginata* scattered low shrubs to low open shrubland over very open sedgeland/herbland.

This plant community was distinguished by having a *Kunzea praestans* high shrubland and *Melaleuca calyptroides* scattered shrubs to open shrubland.
Quadrat CAH2 and releve CR30.

Releve CR30
Date: 15/11/03
Location: West Cairn Hill.
AMG84: 50J 0407249/UTM 66 20522 (WGS 84; GPS unit).
Site description: Moderate, west-south-west facing mid to upper slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and exposed sheet rock.
Vegetation description: Allocasuarina huegeliana scattered low trees over Eucalyptus eudesmioides scattered mallees over Regelia megacephala (20-35%), Kunzea praestans (20-30%), Allocasuarina campestris (3-5%) open scrub over Melaleuca calyptroides, Baeckea sp. Moora (R. Bone 1993/1) open shrubland over Hibbertia subvaginata scattered low shrubs over Desmocladus flexuosus scattered sedges with Stypandra glauca low open herbland.
Associated species: Lawrencella rosea, Dichopogon capillipes, Dianella revoluta var. divaricate, Trachymene pilosa, Cheilanthes adiantoides, Dioscorea hastifolia, Xanthosia fruticulosa.

RmEe.2: See the vegetation description for releve CSR324 below.
The very poor condition of vegetation at this site may have affected the vegetation structure and species and therefore the vegetation classification.
Releve CSR324.

Releve CSR324
Date: 17/2/05
Location: Kim Chester's property, south of Cairn Hill.
AMG84: 50J 0407545/UTM 66 19474 (WGS 84; GPS unit).
Site description: Moderate, south-west facing slope of low rocky ridge.

Soil: Gravelly, pebbly, cobbly grey sand in matrix of rock outcrop and rocks, boulders.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5-20%) low open woodland to low woodland over Eucalyptus eudesmioides low open woodland (5-10%) over Regelia megacephala (20-30 (40%)) high shrubland to open scrub over Xanthorrhoea drummondii scattered tall shrubs over Hibbertia subvaginata scattered low shrubs over *Avena barbata, *Vulpia myuros var. hirsuta, Ehrharta longiflora annual grassland.
Associated species:
Condition: Poor to very poor – very weedy.

Vegetation Association RmHs: *Regelia megacephala* open scrub over *Hibbertia subvaginata* low open shrubland to low shrubland.
Plant Communities:
RmHs.1: *Regelia megacephala* open scrub over *Hibbertia subvaginata* (low) shrubland over very open grassland with scattered annual herbs and grasses.
Quadrats ERG5, ERG8, WOR1, WOR4 and WOR5.

RmHs.2: *Allocasuarina huegeliana* scattered low trees over *Regelia megacephala* high shrubland to open scrub over *Hibbertia subvaginata* scattered (low) shrubs over *Stypandra glauca* scattered herbs to very open herbland with scattered sedges and very open annual grassland.

This plant community differed by the presence of a low tree layer (scattered *Allocasuarina huegeliana*). Quadrats EOR2 and EOR3 and releve NBRM1.

Releve NBRM1
Date: 12/04
Location: Ron Manning's property.
AMG84: 50J 0408075/UTM 66 22325(WGS 84; GPS unit).
Vegetation description: Allocasuarina huegeliana scattered low trees over Regelia megacephala open to closed scrub over Hibbertia subvaginata scattered low shrubs over Lepidosperma tenue scattered sedges.
Condition: Good to very good condition.

RmHs.3: See the vegetation description for releve ERR166 below.

This plant community was differentiated by having a low tree layer (scattered *Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana*), an *Allocasuarina campestris* high open shrubland and *Hibbertia subvaginata* scattered shrubs. Releve ERR166.

Releve ERR166
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407813/UTM 66 23919 (WGS 84; GPS unit).
Site description: Gentle, east-facing slope on eastern edge of ridge top of low rocky ridge.
Soil: Very gravelly, pebbly, cobbly with boulders and lots of rock outcrop.
Vegetation description: Acacia acuminata subsp. acuminata (3.5-4 m) (1-2%), Allocasuarina huegeliana (<1%) scattered low trees over Regelia megacephala (40-50%), Allocasuarina campestris (3-5%) open scrub over Hibbertia subvaginata (1-2%), Calytrix leschenaultii (<1%) scattered shrubs over Lepidosperma tenue, Neurachne alopecuroidea scattered sedges/grasses with Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Dioscorea hastifolia, Dichopogon capillipes, Podolepis lessonii, Burchardia umbellata.

Condition: Good to very good. Low weed presence (Avena barbata, Briza maxima, Ursinia anthemoides).

Vegetation Association RmKp: *Regelia megacephala* high shrubland to open scrub over *Kunzea praestans* high open shrubland to open scrub over *Hibbertia subvaginata* scattered shrubs to low open shrubland.
Plant Communities:
RmKp.1: *Regelia megacephala* high shrubland over *Kunzea praestans* open scrub over *Hibbertia subvaginata, Xanthosia fruticulosa* over *Stypandra glauca* very open herbland.
Releve CR68.

Releve CR68
Date: 25/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407166/UTM 66 20727 (WGS 84; GPS unit).
Site description: Gentle, south-west facing lower slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst rock outcrop and boulders.
Vegetation description: Regelia megacephala (10-15%) high shrubland over Kunzea praestans (30-40%) open scrub over Xanthosia fruticulosa (4-5%) low open shrubland over Stypandra glauca (+) very open herbland.
Associated species: Hibbertia subvaginata (juvenile), Lawrencella rosea, Dianella revoluta var. divaricate, Allocasuarina huegeliana, Dichopogon capillipes.

RmKp.2: *Regelia megacephala*, (*Kunzea praestans*) high shrubland to open to closed scrub over (*Hibbertia subvaginata*, *Xanthosia fruticulosa*) scattered shrubs to low open shrubland over *Stypandra glauca* very open herbland and scattered sedges.

This plant community differed by having a lower cover of *Kunzea praestans* (high open shrubland to high shrubland) over *Hibbertia subvaginata* scattered shrubs.
Quadrats CHN2, CAH7, CAH11, WOR2 and WDM1. Releves CR60, CR76 and CNR128.

Releve CR60
Date: 24/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407498/UTM 66 21096 (WGS 84; GPS unit).
Site description: Moderate to steep, west-facing mid slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and sheet rock.
Vegetation description: Regelia megacephala (50-60%) open scrub over Kunzea praestans (3-4%), Calothamnus aff. quadrifidus Moora-Watheroo (1-2%), Allocasuarina campestris (1%) high open shrubland over Hibbertia subvaginata (2-3%), Pityrodia dilatata (+), Xanthosia fruticulosa (1-2%) scattered low shrubs to low open shrubland over Lepidosperma leptostachyum (+) scattered sedges with Stypandra glauca (5-8%) open herbland.
Associated species: Bossiaea sp. Cairn Hill (M Henson CH2-28), Dioscorea hastifolia, Dichopogon capillipes, Burchardia umbellata, Pterostylis sp., Nuytsia floribunda, Trachymene pilosa, Acacia aristulata, Cheilanthes adiantoides, Xanthorrhoea drummondii, Allocasuarina huegeliana.
Notes: 1) Similar to CR33 but CR33 has 5-10% Melaleuca calyptroides. No Melaleuca calyptroides at this unit.
2) Allocasuarina huegeliana – 1 tree 7 m away. Overall, no tree layer. Very few Allocasuarina huegeliana in this unit.

Releve CR76
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406920/UTM 66 20699 (WGS 84; GPS unit).

Site description: Moderately to steep, west facing lower to mid slope.
Soil: Gravelly, pebbly, cobbly brown sand with some exposed rock outcrop.
Vegetation description: Regelia megacephala (4-5%) high open shrubland over Kunzea praestans (10-12%) high open shrubland to open scrub over Stypandra glauca (5-7%) very open herbland over Borya sphaerocephala (10-15%) low open herbland.
Associated species: Allocasuarina huegeliana, Xanthorrhoea drummondii, Hibbertia subvaginata, Cheilanthes adiantoides, Burchardia umbellata.

Releve CNR128
Date: 5/12/03
Location: Cairn Hill North.
AMG84: 50J 0407498/UTM 66 21710 (WGS 84; GPS unit).
Site description: Flat, very gently sloping, east-facing slope on crest of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst rock outcrop (covers about 30% of surface).
Vegetation description: Regelia megacephala (60-70%) open to closed scrub (Kunzea praestans (+) where Regelia megacephala scrub more open) over Hibbertia subvaginata, Xanthosia fruticulosa (1%) scattered shrubs over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with scattered herbs.
Associated species: Chamaescilla corymbosa var. corymbosa, Dichopogon capillipes, Trachymene pilosa, Bossiaea sp. Cairn Hill (M Henson CH2-28)

RmKp.3: Regelia megacephala, Kunzea praestans open scrub over Hibbertia subvaginata, Calytrix leschenaultii low scattered shrubs over *Avena barbata, very open grassland with *Ursinia anthemoides very open herbland. Releve ATR006

Releve ATR006
Date: 11/11/2010

Location: Arthur and Rhonda Tonkin's property.

MGA94: 408681 mE 6625521 mN (WGS 84; GPS unit).

Site description: Upper slope to crest of low ridge

Soil description: Brown sand.

Rock type: Chert >50% rock cover

Vegetation description: Regelia megacephala, Kunzea praestans open scrub over Hibbertia subvaginata, Calytrix leschenaultii low scattered shrubs over *Avena barbata, very open grassland with *Ursinia anthemoides very open herbland.

Associated species: Acacia acuminata subsp. acuminata, Allocasuarina campestris, Melaleuca calyptroides, Pityrodia dilatata, Ricinocarpos muricatus
Notes: Photos BM18

Vegetation Association RmKpMc: *Regelia megacephala open to closed scrub and Kunzea praestans* high open shrubland to open scrub over *Melaleuca calyptroides* open shrubland to shrubland over *Hibbertia subvaginata* low open shrubland.
Plant Communities:
RmKpMc.1: *Allocasuarina huegeliana* scattered low trees over *Regelia megacephala, Kunzea praestans* open scrub over *Melaleuca calyptroides, Hibbertia subvaginata* open shrubland over *Stypandra glauca* open herbland.

This plant community included a *Kunzea praestans* high shrubland to open scrub and a *Melaleuca calyptroides*. open shrubland in its structure. Releves CR24, ATR002

Releve CR24
Date: 14/11/03

Location: Cairn Hill.
AMG84: 50J 0407407/UTM 66 20132 (WGS 84; GPS unit).
Site description: Gently sloping, west-facing upper slope of low rocky ridge.
Soil: Gravelly, pebbly brown sand with extensive area of exposed sheet rock (~20-30%).
Vegetation description: Allocasuarina huegeliana scattered low trees over Regelia megacephala (15-20%, 30-40), Kunzea praestans (30%) open scrub over Melaleuca calyptroides (5-10%), Hibbertia subvaginata (2-3%), Xanthosia fruticulosa (5%) open shrubland over Stypandra glauca (5-6%) low open herbland.
Associated species: Allocasuarina campestris (few small juvenile), Blennospora drummondii, Trachymene pilosa.
Notes: 1) Large parts of this area look "broken down" eg: lightning strike? Tricoryne elatior, Stylidium septentrionale, Calothamnus aff. quadrifidus Moora-Watheroo.
2) Less Allocasuarina huegeliana and lots more Kunzea praestans, Melaleuca calyptroides than CAH15.

4) Amount of Regelia megacephala covers varies greatly. As Regelia cover increases so Kunzea and Melaleuca cover decreased.

Releve ATR002
Date: 10/11/2010
Location: Arthur and Rhonda Tonkin's property.
MGA94: 408210 mE 6626037 mN (WGS 84; GPS unit).
Site description: Gentle, north facing upper slope of low chert ridge.
Rock type: Chert
Vegetation description: Regelia megacephala, (Kunzea praestans) open scrub over Melaleuca calyptroides scattered shrubs over Hibbertia subvaginata scattered low shrubland over Desmocladus flexuosus scattered herbs.
Associated species: Millotia tenuifolia, *Petrorhagia dubia, Stylidium repens, Stypandra glauca, *Ursinia anthemoides, Xanthorrhoea drummondii
Condition: Very good.
Fire Age: >7-10 years

RmKpMc.2: (*Allocasuarina huegeliana* scattered low trees over) *Regelia megacephala* tall shrubland to open and closed scrub over *Kunzea praestans*, *Melaleuca calyptroides* open shrubland to shrubland over *Calytrix leschenaultii* scattered low shrubs over *Borya sphaerocephala* low open herbland and scattered annual herbs.

This plant community had a lower *Kunzea praestans* cover (high open shrubland) and a higher cover of *Melaleuca calyptroides* (open shrubland to shrubland).
Quadrats GH2, GH3, CAH1 and JT8.

RmKpMc.3: *Regelia megacephala*, *Kunzea praestans*, *Allocasuarina campestris* open scrub over *Melaleuca calyptroides* scattered shrubs to open shrubland over *Hibbertia subvaginata* scattered low shrubs over scattered sedges/grasses/herbs.

This plant community differed by having an *Allocasuarina campestris* component of the shrub or scrub layer.
Quadrat CHN4. Releves CR11 and CR33.

Releve CR11
Date: 11/11/03
Location: Cairn Hill, south-east corner.
AMG84: 50J 0407841/UTM 66 20347 (WGS 84; GPS unit).

Site description: Crest of low ridge.
Soil: Gravelly, pebbly, cobbly grey sand with exposed sheet rock (chert).
Vegetation description: Regelia megacephala (20-30%), Allocasuarina campestris (5-10%), Kunzea praestans (10-15%) high open scrub over Melaleuca calyptroides (3-5%) open shrubland over Hibbertia subvaginata (2-3%), Baeckea sp. Moora (R. Bone 1993/1) (+), Calytrix leschenaultii (+) low open shrubland over Neurachne alopecuroidea scattered grasses.
Associated species: Trachymene cyanopetala, Trachymene pilosa, Podotheca angustifolia, Blennospora drummondii, Millotia tenuifolia var. tenuifolia, Crassula colorata var. colorata, Stypandra glauca, Acacia acuminata subsp. acuminata, Allocasuarina huegeliana.
Condition: Very good to excellent.
Notes: Varies considerably, with Regelia megacephala lower cover and areas with Melaleuca calyptroides open heath. Areas of Baeckea sp. Moora (R. Bone 1993/1) low open heath.

Releve CR33
Date: 15/11/03
Location: Cairn Hill.
AMG84: 50J 0407523/UTM 66 20619 (WGS 84; GPS unit).
Site description: West-facing, moderate sloping mid slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and exposed sheet rock (chert).
Vegetation description: Regelia megacephala (60-70%), (Allocasuarina campestris) (5-6%) open scrub over Melaleuca calyptroides (5-10%) open shrubland over Hibbertia subvaginata (2-3%) low open shrubland over Lepidosperma leptostachyum scattered sedges with Stypandra glauca, Dichopogon capillipes low open herbland and Cheilanthes adiantoides scattered ferns.
Associated species: Calothamnus aff. quadrifidus Moora-Watheroo, Kunzea praestans, Trachymene pilosa, Dioscorea hastifolia, Xanthosia fruticulosa.

Vegetation Alliance 16: *Kunzea praestans* high shrubland to open and closed scrub

Vegetation Association KpAh: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* low open woodland to low woodland over *Kunzea praestans* high shrubland to open scrub over *Hibbertia subvaginata* scattered shrubs to low open shrubland.
Plant Communities:
KpAh.1: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata*) low open woodland to low woodland over *Kunzea praestans*, (*Xanthorrhoea drummondii)* high shrubland to open scrub over *Hibbertia subvaginata* scattered low shrubs to shrubland over very open herbland/sedgeland/grassland.
Quadrats ERG14, ERG2 and releves CR82, CR83, CR84, CNR107 and RM6.

Releve: CR82
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406875/UTM 66 21600 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and rock outcrop (surface cover about 70%).
Vegetation description: Allocasuarina huegeliana (5-7%) low open woodland over Kunzea praestans (6-8%) high open shrubland over Hibbertia subvaginata (1-2%), Xanthosia fruticulosa (2-3%) scattered low shrubs over Stypandra glauca (6-8%), Borya sphaerocephala (1-2%) very open herbland with (dead) Cheilanthes adiantoides (3-5%) very open fernland.
Associated species: Burchardia umbellata, Dioscorea hastifolia, Dichopogon capillipes, Pityrodia dilatata.

Releve CR83

Date: 27/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407040/UTM 66 21301 (WGS 84; GPS unit).
Site description: Moderate to gentle, east-facing mid-slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana (10-20%) low woodland over Kunzea praestans (40-50%), (Xanthorrhoea drummondii (2%)) open scrub over Hibbertia subvaginata, Xanthosia fruticulosa (3-5%) low open shrubland over Desmocladus flexuosus (3-4%), Neurachne alopecuroidea (+) very open sedgeland/grassland with very open herbland and Cheilanthes adiantoides (2-4%) very open fernland.
Associated species: Dichopogon capillipes, Dryandra sessilis var. sessilis, Lawrencella rosea, Podotheca angustifolia, Burchardia umbellata, Dioscorea hastifolia, Thysanotus manglesianus.
Notes: Similar to CH8.

Releve CR84
Date: 27/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406930/UTM 66 21351 (WGS 84; GPS unit).
Site description: Moderate to steep mid to upper west-facing slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and rock outcrop (80-90% surface has rock cover).
Vegetation description: Allocasuarina huegeliana (8-10%) low open woodland over Kunzea praestans (20-30%) high shrubland over Hibbertia subvaginata (4-5%) open shrubland over Dodonaea pinifolia (1%), Xanthosia fruticulosa (3-4%) low open shrubland over Stypandra glauca (3-4%) open herbland and Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Dichopogon capillipes, Dioscorea hastifolia, Lawrencella rosea, Waitzia nitida.

Releve CNR107
Date: 29/11/03
Location: Cairn Hill North.
AMG84: 50J 0407067/UTM 66 22602 (WGS 84; GPS unit).
Site description: Moderate, west-facing mid slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with boulders and outcrop.
Vegetation description: Allocasuarina huegeliana (5-8%) low open woodland over Kunzea praestans (10-20%), Allocasuarina campestris (5-10%) open scrub over Hibbertia subvaginata (2-3%), Xanthosia fruticulosa (5-6%) low open shrubland over Neurachne alopecuroidea scattered grasses with Stypandra glauca (1-2%) very open herbland and Cheilanthes adiantoides (1-2%) scattered ferns.
Associated species: Xanthorrhoea drummondii, Burchardia umbellata, Dichopogon capillipes, Dioscorea hastifolia.

Releve**:** RM6
Date: 10/12/04
Location: Location: Ron Manning's property.
AMG84: 50J 0408068/UTM 66 22137 (WGS 84; GPS unit).
Site description: Gentle to moderate, west-facing lower to mid slope of low ridge.
Rock type: Chert (lots of outcropping).
Vegetation description: Allocasuarina huegeliana scattered low trees over Kunzea praestans high open shrubland to high shrubland over Hibbertia subvaginata low open shrubland over Lepidosperma tenue very open sedgeland and Ehrharta longiflora, Briza maxima very open annual grassland with Hyalosperma cotula very open herbland and Cheilanthes adiantoides scattered ferns.
Associated species: Vulpia myuros var. hirsuta, Dioscorea hastifolia, Xanthorrhoea drummondii, Dichopogon capillipes, Neurachne alopecuroidea.
Condition: Good to very good.

Notes: Fire more than 7 years ago.

Vegetation Association KpAhB: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* scattered trees to low open woodland over *Kunzea praestans* high shrubland to open scrub over shrubland including *Melaleuca calyptroides* and *Baeckea* sp. Moora (R. Bone 1993/1) scattered shrubs to open shrubland.
Plant Communities:
KpAhB.1: *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* scattered low trees over *Kunzea praestans*, (Allocasuarina campestris) open scrub over *Melaleuca calyptroides*, *Baeckea* sp. Moora (R. Bone 1993/1) (4-5%) scattered shrubs to open shrubland over (*Hibbertia subvaginata*) scattered shrubs to low open shrubland over low open shrubland over very open grass/herbland. Quadrats CAH9, CHN6 and CHN7 and releves CR35 and CR46.

Releve CR35
Date: 15/11/03
Location: Cairn Hill.
AMG84: 50J 0407681/UTM 66 20743 (WGS 84; GPS unit).
Site description: Lower, west-facing gentle to moderate slope.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana, (Acacia acuminata subsp. acuminata) scattered low trees over Kunzea praestans (40-50%) (very variable), Allocasuarina campestris (5-10%), Xanthorrhoea drummondii (2-3%) open scrub over Calothamnus sanguineus (5-6%), Melaleuca calyptroides (2-3%), Baeckea sp. Moora (R.Bone 1993/1) (4-5%) open shrubland over Calytrix leschenaultii, Astroloma serratifolium scattered low shrubs over Lepidobolus chaetocephalus, Desmocladus flexuosus, Schoenus brevisetis (+), Amphipogon caricinus, Neurachne alopecuroidea (+) very open sedgeland/grassland with Lomandra effusa (+), Borya sphaerocephala (2-3%) very open herbland.
Associated species: Hakea lissocarpha (shrub to 90 cm-1m), Chamaescilla corymbosa var. corymbosa, Burchardia umbellata, Schoenus clandestinus, Goodenia hassallii, Stypandra glauca, Austrostipa elegantissima, Verticordia densiflora var. densiflora, Gompholobium glutinosum (15 m – downslope ~20 cm high).

Releve CR46
Date: 22/11/03
Location: Cairn Hill.
AMG84: 50J 0407822/UTM 66 20461 (WGS 84; GPS unit).
Site description: Crest of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with some boulders and exposed sheet rock.
Vegetation description: Allocasuarina huegeliana scattered low trees over Allocasuarina campestris (5-8%), (Regelia megacephala (+)) high open shrubland over Kunzea praestans (20-30%) shrubland over Melaleuca calyptroides (10-15%), Baeckea sp. Moora (R.Bone 1993/1) (5-10%) shrubland over Calytrix leschenaultii scattered low scrub over Stypandra glauca, Borya sphaerocephala (+), Stylidium septentrionale scattered herbs.
Associated species: Calothamnus sanguineus, Xanthorrhoea drummondii (dead), Trachymene cyanopetala, Blennospora drummondii, Trachymene pilosa, Neurachne alopecuroidea, Acacia aristulata, Podotheca angustifolia.

KpAhB.2: (*Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* scattered low trees) over *Dryandra sessilis* var. *sessilis* high open shrubland over *Kunzea praestans*, (*Allocasuarina campestris*) open to closed scrub over *Baeckea* sp. Moora (R. Bone 1993/1), *Calytrix leschenaultii*, (*Hibbertia subvaginata*) (low) open shrubland over scattered sedges/grasses/herbs.

This plant community differed by having a *Dryandra sessilis* var. *sessilis* high open shrubland strata and generally no *Melaleuca calyptroides* open shrubland.
Quadrat CAH5 and releves CNR117, CNR126 and CNR131.

Releve CNR117
Date: 4/12/03
Location: Cairn Hill North.
AMG84: 50J 0407607/UTM 66 21539 (WGS 84; GPS unit).
Site description: Flat top of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with some rock and rock outcrop (<5%).
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (2-3%) low woodland over Dryandra sessilis var. sessilis (5-10%) high open shrubland over Kunzea praestans (30-40(50-60%)) (very variable), (Allocasuarina campestris) (+) open scrub over Baeckea sp. Moora (R. Bone 1993/1) (3-5%) open shrubland over Calytrix leschenaultii (1-2%) scattered low shrubs over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Stypandra glauca scattered herbs.
Associated species: Blennospora drummondii, Trachymene pilosa, Podolepis lessonii, Podotheca angustifolia, Trachymene cyanopetala, Burchardia umbellata, Lawrencella rosea.
Notes: Similar to unit R97 and very similar to CHN6 (but with no Hibbertia subvaginata and R97 didn't have Baeckea sp. Moora (R Bone 1993/1)).

Releve: CNR126
Date: 4/12/03
Location: Cairn Hill North.
AMG84: 50J 0407219/UTM 66 21600 (WGS 84; GPS unit).
Site description: Moderate to gentle west-facing lower slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with rock outcrop (about 3-5% of surface cover).
Vegetation description: Dryandra sessilis var. sessilis (3-5%) high open shrubland over Kunzea praestans (30-40%), Xanthorrhoea drummondii (2-3%), Allocasuarina campestris (2-3%) open scrub over Baeckea sp. Moora (R. Bone 1993/1) (10-15%), Hibbertia subvaginata (1-2%), Calytrix leschenaultii (1-2%) shrubland over Lepidosperma leptostachyum, Lepidobolus chaetocephalus, Neurachne alopecuroidea scattered sedges/grasses with Opercularia vaginata (5-7%), Borya sphaerocephala (+), Stylidium septentrionale (1-2%) very open herbland.
Associated species: Tricoryne elatior, Blennospora drummondii, Lawrencella rosea, Trachymene pilosa, Podolepis lessonii.

Releve CNR131
Date: 5/12/03
Location: Cairn Hill North.
AMG84: 50J 0407514/UTM 66 21887 (WGS 84; GPS unit).
Site description: Moderate, east-facing upper slope of low rocky ridge (elevation 272 m).
Soil: Gravelly, pebbly, cobbly brown sand with rocks and boulders.
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (2-3%) low open woodland to low woodland over Dryandra sessilis var. sessilis (4-5%) high open shrubland over Kunzea praestans (15-20%), Allocasuarina campestris (1-2%) high shrubland over Hibbertia subvaginata (15-20%) shrubland over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Dichopogon capillipes, Dianella revoluta var. divaricate, Baeckea sp. Moora (R.Bone 1993/1), Calytrix leschenaultii, Xanthosia fruticulosa.

KpAhB.3: See vegetation description for releve CR63 below.
This plant community was distinguished by having *Allocasuarina humilis* in the open scrub on a rocky chert slope. Releve CR63.

Releve CR63
Date: 24/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407403/UTM 66 21231 (WGS 84; GPS unit).
Site description: South-west facing, gently sloping, upper slope of low rocky ridge.
Soil: Gravelly, pebbly brown sand.
Vegetation description: (Allocasuarina huegeliana scattered low trees) over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans (50-60%), Allocasuarina humilis (1-2%), Xanthorrhoea drummondii (3-5%) open scrub over Melaleuca calyptroides (4-5%), Isopogon divergens (7-8%), Calothamnus sanguineus (1-2%), Baeckea sp. Moora (R.Bone 1993/1) (4-5%) open shrubland over Neurachne alopecuroidea scattered grasses with Stylidium septentrionale, Borya sphaerocephala scattered herbs.
Associated species: Burchardia umbellata, Schoenus brevisetis, Lawrencella rosea, Trachymene pilosa, Schoenus nanus, Xanthosia fruticulosa.

Vegetation Association KpAhDs: *Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* scattered low trees to low open woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Kunzea praestans*, (*Xanthorrhoea drummondii*) high shrubland to open scrub over *Hibbertia subvaginata* low open shrubland.
Plant Communities:
KpAhDs.1: (*Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata*) scattered low trees over *Dryandra sessilis* var. sessilis scattered tall shrubs to high open shrubland over *Kunzea praestans*, (*Xanthorrhoea drummondii*) high shrubland to open scrub over *Hibbertia subvaginata*, (*Calytrix leschenaultii*) (low) open shrubland over *Desmocladus flexuosus*, *Neurachne alopecuroidea* very open sedgeland/grassland with Cheilanthes adiantoides very open fernland. This plant community had a *Kunzea praestans*, (*Xanthorrhoea drummondii*) high shrubland over *Hibbertia subvaginata* low open shrubland.
Releves CR49, CNR97, RM13, JTR254 and SWR216.

Releve CR49
Date: 23/11/03
Location: Cairn Hill.
AMG84: 50J 0407747/UTM 66 21073 (WGS 84; GPS unit).
Site description: East-facing, moderate rocky (chert) upper slope of short slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand amongst boulders and exposed rock.
Vegetation description: Allocasuarina huegeliana (3-5%) low open woodland over Dryandra sessilis var. sessilis (3-4%) high open shrubland over Kunzea praestans (30-40%) open scrub over Hibbertia subvaginata (3-4%), Calytrix leschenaultii (1-2%) low open shrubland over Desmocladus flexuosus (1%), Neurachne alopecuroidea (+) scattered sedges/grasses with Cheilanthes adiantoides (3-5%) very open fernland with Dichopogon capillipes scattered herbs.
Associated species: Nuytsia floribunda, Burchardia umbellata, Bossiaea sp. Cairn Hill (M Henson CH2-28), Baeckea sp. Moora (R.Bone 1993/1), Dioscorea hastifolia, Thysanotus manglesianus, Podolepis lessonii, Chamaescilla corymbosa var. corymbosa, Podotheca angustifolia, Allocasuarina humilis.

Releve CNR97
Date: 28/11/03
Location: Cairn Hill North.
AMG84: 50J 0407511/UTM 66 21908 (WGS 84; GPS unit).
Site description: Mid to upper, north-east facing gentle slope of low rocky ridge.
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (2-3%) low open woodland over Dryandra sessilis var. sessilis (3-5%) high open shrubland over Kunzea praestans (25-30%), (Xanthorrhoea drummondii (2-4%)), Allocasuarina campestris (5-6%) open scrub over Hibbertia subvaginata (2-3%), Calytrix leschenaultii (+), Xanthosia fruticulosa (4-

5%) low open shrubland over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with very open herbland.
Associated species: Dichopogon capillipes, Chamaescilla corymbosa var. corymbosa, Lawrencella rosea, Thysanotus manglesianus, Cheilanthes adiantoides, Trachymene pilosa.

Releve RM13
Date: 11/12/04
Location: Ron Manning's property.
AMG84: 50J 0408751/UTM 66 21586 (WGS 84; GPS unit).
Site description: Gentle, north-facing upper slope of ridge.
Rock type: Chert (lot of rock outcrop).
Vegetation description: Allocasuarina huegeliana, (Acacia acuminata subsp. acuminata, Nuytsia floribunda) low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii scattered tall shrubs over Kunzea praestans high shrubland over Hibbertia subvaginata, Calytrix leschenaultii low open shrubland over Desmocladus flexuosus very open sedgeland and Vulpia myuros var. hirsuta, Briza maxima, Avena barbata open grassland with Opercularia vaginata, Podolepis lessonii open herbland.
Associated species: Chamaescilla corymbosa var. corymbosa, Rhodanthe polycephala, Pityrodia dilatata, Neurachne alopecuroidea.
Condition: Good to poor.
Notes: More than 10 years since fire. Photo: BM13-8, 9 (Looking Sth).

Site number: JTR254
Date:14/1/04
Location: John Tonkin's property.
AMG84: 50J 0409361/UTM 66 25371 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid to upper slope of low rocky ridge (elevation 270 m).
Soil: Very gravelly, pebbly, cobbly brown sand amongst boulders and rock outcrop (30-40%).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans (15-25%), (Xanthorrhoea drummondii (+)) high shrubland over Hibbertia subvaginata (5-8%) open shrubland over Pityrodia dilatata scattered low shrubs over Desmocladus flexuosus (2-5%), Neurachne alopecuroidea (+) very open sedgeland/grassland with Cheilanthes adiantoides very open fernland and Avena barbata, Bromus diandrus, Hypochaeris glabra, Briza maxima annual grassland/herbland.
Condition: Good (high weed cover).
Notes: Other unit species: Trymalium ledifolium var. rosmarinifolium, Acacia aristulata, Calytrix leschenaultii.

Releve SWR216
Date: 10/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409073/UTM 66 25080 (WGS 84; GPS unit).
Site description: Gentle, east-facing upper slope of low rocky ridge (elevation 239 m).
Rock type:
Vegetation description: Acacia acuminata subsp. acuminata (+) scattered low trees over Dryandra sessilis var. sessilis (10-12%) high open shrubland to high shrubland over Kunzea praestans (10-15%), (Xanthorrhoea drummondii (1%)) high shrubland over Hibbertia subvaginata (3-5%) low open shrubland over Desmocladus flexuosus (1%), Neurachne alopecuroidea scattered sedges/grasses with Cheilanthes adiantoides scattered ferns and Avena barbata, Ehrharta longiflora, Hypochaeris glabra (10-12%) open annual grassland/herbland.
Associated species: Millotia tenuifolia var. tenuifolia, Dichopogon capillipes.
Condition: Good to very good.

KpAhDs.2: *Allocasuarina huegeliana*, *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Kunzea praestans*, (*Xanthorrhoea drummondii*) scattered tall shrubs to high shrubland over *Hibbertia subvaginata* (shrubland to) open heath over very open sedgeland/grassland/fernland and very open annual grassland.

This plant community differed by having a *Kunzea praestans*, (*Xanthorrhoea drummondii*) high open shrubland over *Hibbertia subvaginata* low heath.
Quadrats ERG9, WOR3 and WOR6.

KpAhDs.3: See the vegetation description for releve G317 below.
This plant community differed by not having *Hibbertia subvaginata* in the low shrub layer. Releve G317.

Releve G317
Date: 12/12/04
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0408514/UTM 66 20780 (WGS 84; GPS unit).
Site description: Gentle, north-west facing slope of low ridge.
Soil:
Rock type: Chert (5% outcropping).
Vegetation description: Allocasuarina huegeliana, Nuytsia floribunda scattered tall shrubs over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans (heavily grazed), (Allocasuarina campestris) high shrubland over Calytrix leschenaultii low open shrubland over Vulpia myuros var. hirsuta, Pentaschistis pallida very open annual grassland and Podolepis lessonii very open herbland.
Associated species:
Condition: Poor to good.
Notes: Last fire more than 7 years ago.

Vegetation Association KpAhMc: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata)* scattered trees to low open woodland over *Kunzea praestans* open scrub over *Melaleuca calyptroides* open shrubland to shrubland.
Plant Communities:
KpAhMc.1: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata)* scattered low trees over *Kunzea praestans*, (*Allocasuarina campestris*) open to closed scrub over *Melaleuca calyptroides* open shrubland to shrubland over scattered sedges/herbs.
Releves CR22 and CR45.

Releve CR22
Date: 14/11/03
Location: Cairn Hill.
AMG84: 50J 0407321/UTM 66 20214 (WGS 84; GPS unit).
Site description: Moderate to steep, north-west facing mid slope of low to moderately high rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand around exposed base sheet rock.
Vegetation description: Allocasuarina huegeliana scattered low trees over Kunzea praestans (50-60%), Allocasuarina campestris (5-10%), Regelia megacephala (1%), Calothamnus aff. quadrifidus Moora-Watheroo (+) open scrub to closed scrub over Melaleuca calyptroides (5%) open shrubland over Lepidosperma tenue scattered sedges and Cheilanthes adiantoides scattered ferns with Stypandra glauca (1%) Stylidium septentrionale (1-2%), Borya sphaerocephala (1-2%) very open herbland.
Associated species: Xanthorrhoea drummondii, Neurachne alopecuroidea, Acacia restiacea, Opercularia vaginata, Podolepis canescens, Hakea incrassata, Lepidosperma sp P1 small head (M.D.

Tindale 166A), Trachymene cyanopetala, Schoenus brevisetis, Hakea incrassata, Chamaescilla corymbosa var. corymbosa, Xanthosia fruticulosa (1-2%).

Releve CR45
Date: 22/11/03
Location: Cairn Hill.
AMG84: 50J 0407704/UTM 66 20283 (WGS 84; GPS unit).
Site description: South-facing moderate, mid slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Allocasuarina huegeliana scattered low trees over Kunzea praestans (40-50%), Allocasuarina campestris (3-5%) open scrub over Melaleuca calyptroides (25-30%) shrubland over Calytrix leschenaultii (3-5%) scattered low scrub over Desmocladus flexuosus scattered sedges.
Associated species: Xanthosia fruticulosa, Acacia aristulata, Chamaescilla corymbosa var. corymbosa, Burchardia umbellata, Trachymene pilosa, Hibbertia subvaginata, Xanthorrhoea drummondii, Acacia acuminata subsp. acuminata.

Vegetation Association KpDs: *Dryandra sessilis* var. *sessilis* high open shrubland over *Kunzea praestans* (*Xanthorrhoea drummondii*) open scrub over *Hibbertia subvaginata* scattered low shrubs. This association has no tree layer.

Plant Communities:
KpDs.1: (*Nuytsia floribunda* scattered low trees over) *Dryandra sessilis* var. *sessilis* high open shrubland over *Kunzea praestans*, (*Xanthorrhoea drummondii*) high shrubland to open scrub over *Hibbertia subvaginata*, *Calytrix leschenaultii* scattered (low) shrubs to (low) heath over *Desmocladus flexuosus*, *Neurachne alopecuroidea* very open sedgeland/grassland and *Cheilanthes adiantoides* very open fernland.
Releves CR62, G339, D9, SWR229.

Releve CR62
Date: 24/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407522/UTM 66 21078 (WGS 84; GPS unit).
Site description: Upper slope, west-facing moderate slope of low rocky (chert) ridge.
Soil: Gravelly, pebbly, cobbly brown sand with some boulders and exposed rock.
Vegetation description: Nuytsia floribunda, Dryandra sessilis var. sessilis scattered low trees over Kunzea praestans (15-20%) open shrubland over Hibbertia subvaginata (40-50%) heath over Calytrix leschenaultii (4-5%), Xanthosia fruticulosa (1-2%) low open shrubland over scattered herbs with Cheilanthes adiantoides scattered ferns.
Associated species: Lawrencella rosea, Neurachne alopecuroidea, Burchardia umbellata, Opercularia vaginata, Trachymene pilosa, Blennospora drummondii, Stypandra glauca, Allocasuarina humilis.

Releve D9
Date: 10/12/04
Location: Doblestein's property.
AMG84: 50J 0408985/UTM 66 22510 (WGS 84; GPS unit).
Site description: Moderate, north-facing slope of low ridge.
Soil: Gravelly, pebbly, cobbly brown sand in matrix of rock outcrop/boulders.
Rock type: Chert.
Vegetation description: Nuytsia floribunda scattered low trees over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans high open shrubland to high shrubland over Hibbertia subvaginata, Calytrix leschenaultii low shrubland to shrubland over Desmocladus flexuosus very open sedgeland and Avena barbata, Ehrharta calycina, Lolium perene, Pentaschistis pallida open grassland.

Associated species: Dichopogon capillipes, Dioschorea hastifolia, Austrodanthonia acerosa, Cheilanthes adiantoides (+), Podotheca angustifolia, Bossia sp. Cairn Hill, Linum trigynum, Neurachne alopecuroidea.
Condition: Good to very good.
Notes: Last fire more than 7 years ago. Photo: BM13-3, 4, 5.

Releve SWR229
Date: 11/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409038/UTM 66 25112 (WGS 84; GPS unit).
Site description: Moderate, south-west facing upper slope of low rocky ridge.
Rock type: Chert.
Vegetation description: Dryandra sessilis var. sessilis (5-10%) high open shrubland over Kunzea praestans (50-70%) open scrub over Xanthorrhoea drummondii scattered tall shrubs over Hibbertia subvaginata (1-2%), Calytrix leschenaultii (+) scattered low shrubs over Desmocladus flexuosus (2-3%), Neurachne alopecuroidea very open sedgeland/grassland with Cheilanthes adiantoides very open fernland with Vulpia myuros var. hirsuta, Briza maxima scattered annual grasses.
Associated species: Burchardia umbellata.
Condition: Very good.
Notes: Variant of SWR216.

Releve G339
Date: 18/2/05
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0407154/UTM 66 17948 (WGS 84; GPS unit).
Site description: Gentle, south-facing upper slope of low ridge.
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata scattered low trees over Dryandra sessilis var. sessilis (5-10%) high open shrubland over Kunzea praestans (10-15%), (Allocasuarina campestris (1-2%), Xanthorrhoea drummondii (+)) high shrubland over Hibbertia subvaginata, (Gastrolobium acutum) scattered low shrubs over Austrostipa sp. (+), *Avena barbata, Briza maxima open grassland.
Condition: Good.
Notes: 3 x Nemcia acuta.

Vegetation Association KpDsMc: *Dryandra sessilis* var. *sessilis* scattered tall shrubs to high open shrubland over *Kunzea praestans* high shrubland to open scrub over *Melaleuca calyptroides* scattered shrubs to shrubland over *Hibbertia subvaginata* scattered low shrubs to low open shrubland.
Plant Communities:
KpDsMc.1: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) scattered low trees to low open woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Kunzea praestans*, (*Allocasuarina campestris*, *Xanthorrhoea drummondii*) high open shrubland to open scrub over *Melaleuca calyptroides* scattered shrubs to open shrubland over (*Hibbertia subvaginata*), *Calytrix leschenaultia* low open shrubland over scattered sedges/grasses with *Borya sphaerocephala* very open herbland and annual grassland.

This plant community differed by having a tree strata (*Allocasuarina huegeliana* (*Acacia acuminata* subsp. *acuminata)* scattered low trees to low woodland).
Quadrat JT1. Releves SWR206, JTR211, SWR215, JTR222, SWR234, JTR234, JTR243, GHR286, GHR299 and GHR306.

Releve SWR206

Date: 9/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409333/UTM 66 25138 (WGS 84; GPS unit).
Site description: Gentle, south-facing slope on top of spur of low rocky ridge.
Soil: Gravelly, pebbly brown sand with rocks and rock outcrop (3-5% surface cover).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5%), Acacia acuminata subsp. acuminata (1-2%) low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans (4-5%; 1.8-5m) high open shrubland over Melaleuca calyptroides (1.8-2m; 1-3%), Xanthorrhoea drummondii (+) open shrubland over Hibbertia subvaginata (3-5%), (Calytrix leschenaultia) low open shrubland over Desmocladus flexuosus scattered sedges with Borya sphaerocephala (5-10%), Podolepis lessonii (1-3%), Erodium sp. open herbland with Avena barbata, Erodium botrys open annual grassland/herbland.
Associated species: Acacia congests subsp. congesta, Austrostipa sp.
Condition: Poor to (good). High weed cover, but a lot of species still present.
Notes: SWR206 description recorded as 'N14'.

Releve JTR211
Date: 10/1/04
Location: John Tonkin's property.
AMG84: 50J 0408908/UTM 66 25795 (WGS 84; GPS unit).
Site description: Gentle, west of north-facing upper slope on top of low rocky ridge (elevation 255 m).
Soil: Gravelly, pebbly silty fine sand with scattered cobbles.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana scattered low trees over Dryandra sessilis var. sessilis (2-3%) scattered tall shrubs over Kunzea praestans (2-3.5m) (30-40%), (Calothamnus aff. quadrifidus Moora-Watheroo (2-2.5 m (5 m)) (2-3%) open heath over Melaleuca calyptroides (4-5%) open shrubland over Hibbertia subvaginata (2-3%), Calytrix leschenaultii (1-2%) low open shrubland over Desmocladus flexuosus (1%), Schoenus clandestinus, Neurachne alopecuroidea (+) scattered sedges/grasses over Borya sphaerocephala (2-3%), Stylidium septentrionale (1%) low very open herbland with Cheilanthes adiantoides scattered ferns and 3-5% annual weedland (Avena barbata, Vulpia myuros var. hirsuta, Pentaschistis pallida, Hypochaeris glabra).
Associated species: Podolepis lessonii, Millotia tenuifolia var. tenuifolia, Podotheca angustifolia, Austrostipa variabilis.
Condition: Good to very good – native sp. present, but significant weed cover (although patchy).

Releve SWR215
Date: 10/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409077/UTM 66 25154 (WGS 84; GPS unit).
Site description: Gentle, east-facing mid slope of low rocky ridge (elevation 246 m).
Soil: Gravelly grey silty sand with boulders and outcrop (10-15% of surface).
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata (3-5 (15)%), Allocasuarina huegeliana (+) low woodland over Dryandra sessilis var. sessilis (2-3%) high open shrubland over Kunzea praestans (10-15%), (Allocasuarina campestris (1-3%), Xanthorrhoea drummondii (1-2%)) high shrubland over Melaleuca calyptroides (5-7%) open shrubland over Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus (+), Neurachne alopecuroidea scattered sedges/grasses with Podolepis lessonii, Borya sphaerocephala (+) scattered low herbs and Cheilanthes adiantoides (+) scattered ferns and Ehrharta longiflora, Vulpia myuros var. hirsuta, Avena barbata (5-10%) annual open grassland.
Associated species: Dichopogon capillipes, Austrostipa sp. Trichoryne elatior.
Condition: Good to very good. Quite high weed cover.

Releve JTR222
Date: 11/1/04
Location: John Tonkin's property.
AMG84: 50J 0408815/UTM 66 26106 (WGS 84; GPS unit).
Site description: Gentle, south-west facing mid slope of low rocky ridge (elevation 261 m).
Soil: Very gravelly brown silty fine sand with some outcrop (2-5%).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans (15-25%) high shrubland over Melaleuca calyptroides scattered shrubs over Hibbertia subvaginata (3-5%), Calytrix leschenaultii (+) low open shrubland over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses and Borya sphaerocephala, Opercularia vaginata scattered herbs to very open herbland and Avena barbata, Hypochaeris glabra, Vulpia myuros var. hirsuta open annual grassland/herbland.
Associated species: Pityrodia dilatata, Nemcia acuta, Acacia aristulata, Podolepis lessonii, Stylidium septentrionale.
Condition: (Poor) to good (lot of weed cover but still has a good number of species).
Notes: Similar to site JT1; similar to R211 but no Calothamnus aff. quadrifidus Moora-Watheroo and has Pityrodia dilatata, Nemcia acuta and Acacia aristulata.

Releve JTR234
Location: John Tonkin's property.
Date: 12/1/04
AMG84: 50J 0408900/UTM 66 25598 (WGS 84; GPS unit).
Site description: Very gentle, south-west facing upper slope on top of low rocky ridge (elevation 251 m).
Soil: Very gravelly, pebbly brown sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana scattered low trees over Dryandra sessilis var. sessilis (2-3%) scattered tall shrubs over Kunzea praestans (40-50%) open scrub over Melaleuca calyptroides scattered shrubs over Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Opercularia vaginata (15-25%), Podolepis lessonii (2-3%) open herbland.
Associated species: Podotheca angustifolia, Dryandra fraseri, Allocasuarina campestris, Xanthorrhoea drummondii, Calothamnus aff. quadrifidus Moora-Watheroo.
Condition: Good to very good – not sure of extent of any previous clearing/fire and: - how natural this stand is. It’s an area of old disturbance.

Releve JTR243
Date: 13/1/04
Location: John Tonkin's property.
AMG84: 50J 0409006/UTM 66 26610 (WGS 84; GPS unit).
Site description: Moderate, east-facing mid slope of low rocky ridge (elevation 275 m).
Soil: Very gravelly brown silty fine sand with rocks, boulders and outcrop on surface (about 30-40% surface cover).
Vegetation description: Acacia acuminata subsp. acuminata, (Allocasuarina huegeliana (+)) scattered low trees over Dryandra sessilis var. sessilis (1-2%) scattered tall shrubs over Kunzea praestans (mainly heavily grazed regrowth) (5-6%), Allocasuarina campestris (2-4%), Xanthorrhoea drummondii (2-3%) high open shrubland over Calytrix leschenaultii (grazed), Hibbertia subvaginata, Acacia restiacea scattered low shrubs over Desmocladus flexuosus (1-2%), Austrostipa sp. scattered sedges/grasses with Cheilanthes adiantoides scattered ferns and Borya sphaerocephala scattered herbs and Avena barbata, Pentaschistis pallida, Ursinia anthemoides annual grassland/herbland.
Associated species: Kennedia prostrata, Ptilotus polystachyus, Podolepis lessonii, Melaleuca calyptroides (on west side of ridge).

Condition: Poor to very poor (very high weed cover).
Notes: Similar to R222.

Releve GHR286
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408326/UTM 66 17940 (WGS 84; GPS unit).
Site description: Gentle, nort-west facing slope just below crest of low rocky ridge (elevation 267 m).
Soil: Gravelly, pebbly brown fine sand with some rock outcrop (~10-12%).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana scattered low trees over Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans (10-15%), Allocasuarina campestris (+), Xanthorrhoea drummondii (1-3%) high shrubland over Olearia dampieri subsp. eremicola, Melaleuca calyptroides scattered shrubs over Hibbertia subvaginata, Calytrix leschenaultii scattered low shrubs over Schoenus clandestinus (1-2%), Neurachne alopecuroidea (+) scattered sedges/grasses with Borya sphaerocephala (3-5%), Podolepis canescens (3-5%) very open to open herbland.
Associated species: Goodenia hassallii, Olearia dampieri subsp. eremicola, Isopogon divergens, Daviesia dielsii, Calothamnus sanguineus (80 cm).
Condition: Good to very good (Hypochaeris glabra, Pentaschistis pallida very open annual grassland/sedgeland).
Notes: Heavily grazed (especially Kunzea praestans).
Mpg unit Notes: Kunzea praestans cover varies up to 20-30% high shrubland to open scrub.

Releve GHR299
Date: 18/1/04
Location: Gardiner's hill.
AMG84: 50J 0408915/UTM 66 17785 (WGS 84; GPS unit).
Site description: Gentle, east-facing mid – upper slope of low rocky ridge (elevation 273 m).
Soil: Very gravelly brown silty fine sand.
Rock type: ?Chert.
Vegetation description: Allocasuarina huegeliana scattered low trees over Kunzea praestans (5-10%), Allocasuarina campestris (3-5%) high open shrubland over Melaleuca calyptroides (2-4%) open shrubland over Dryandra fraseri (5-15%), Calytrix leschenaultii (1-2%) low open shrubland to open shrubland over Desmocladus flexuosus, Lepidosperma tenue, Neurachne alopecuroidea, Schoenus clandestinus scattered sedges/grasses with Borya sphaerocephala (5-10%), Stypandra glauca (+), Podolepis lessonii (1-3%) very open herbland to open herbland.
Associated species: Hakea lissocarpha, Xanthorrhoea drummondii, Podotheca angustifolia, Chamaescilla corymbosa var. corymbosa, Calothamnus sanguineus.
Condition: Good – very good.

Releve GHR306
Date: 7/12/04
Location: Gardiner's hill.
Location: North-east end of block.
AMG84: 50J 0408809/UTM 66 18068 (WGS 84; GPS unit).
Site description: Very gently, north-west facing crest of low ridge.
Soil: Gravelly, pebbly, cobbly brown sand with low % cover of exposed chert.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana low open woodland to low woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii scattered tall shrubs over Kunzea praestans (10-20%) open shrubland to shrubland over Melaleuca calyptroides (5-12%) low open shrubland to low shrubland over Calytrix leschenaultii scattered low shrubs over

Borya sphaerocephala (1-2%), Opercularia vaginata (1%), Podolepis canescens (1-2%) very open herbland and Vulpia myuros var. hirsuta very open annual grassland and Desmocladus flexuosus scattered sedges.
Associated species: Isopogon divergens, Podotheca angustifolia, Pentaschistis pallida, Cassytha pomiformis, Hakea recurva subsp. recurva, Dryandra fraseri.
Condition: Very good.
Notes: Similar to site GHR229, but GHR299 had no Dryandra fraseri.

KpDsMc.2: *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Kunzea praestans*, (*Xanthorrhoea drummondii*) high shrubland over *Melaleuca calyptroides* scattered shrubs to open shrubland over *Hibbertia subvaginata*, (*Calytrix leschenaultii*) low shrubland over *Desmocladus flexuosus*, *Stylidium septentrionale* scattered sedges and herbs.

This plant community had no tree layer. Quadrats JT3, JT11 and releve JTR213, ATR008.

Releve JTR213
Date: 10/1/04
Location: John Tonkin's property.
AMG84: 50J 0408882/UTM 66 25750 (WGS 84; GPS unit).
Site description: Very gentle, north-west facing lower slope of low rocky ridge (elevation 258 m).
Soil: Gravelly, pebbly, cobbly brown silty sand with rock outcrop (30-40% surface cover).
Rock type: Chert.
Vegetation description: Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans (5-6%) high open shrubland over Melaleuca calyptroides (2%) scattered shrubs over Hibbertia subvaginata (15-20%), Calytrix leschenaultii (1%) low shrubland over Desmocladus flexuosus (1%) scattered sedges.
Associated species: Xanthorrhoea drummondii, Dioscorea hastifolia, Austrostipa.variablis.
Condition: Good to very good (weed cover 5% - Pentaschistis pallida, Briza maxima, Hypochaeris glabra, Avena barbata).

Releve ATR008
Date: 12/11/2010
Location: Arthur and Rhonda Tonkin's property.
MGA94: 408581 mE 6626911 mN (WGS 84; GPS unit).
Site description: Crest of low ridge.
Soil description: Brown sand.
Rock type: Chert
Vegetation description: (Acacia acuminata subsp. acuminata scattered low trees) over Kunzea praestans, (Dryandra sessilis, Xanthorrhoea drummondii) high shrubland to open scrub over Hibbertia subvaginata, Calytrix leschenaultii low open shrubland over *Avena barbata, Austrostipa trichophylla, *Vulpia myuros scattered sedges/grasses with Desmocladus flexuosus, *Erodium botrys herbland.
Associated species: Allocasuarina campestris, Allocasuarina huegeliana, Amyema preissii, Banksia sphaerocarpa var. sphaerocarpa, Diplopeltis huegelii subsp. lehmannii, Melaleuca calyptroides, Neurachne alopecuroidea, Nuytsia floribunda, Ptilotus polystachyus var. polystachyus
Condition: Poor
Fire Age: >10 years.
Notes: Photos BM22-23. Heavily grazed, high weed cover, modified strata.

KpDsMc.3: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low woodland to

low open forest over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Kunzea praestans*, *Xanthorrhoea drummondii* open shrubland to tall open shrubland over *Hibbertia subvaginata*, *Calytrix leschenaultii* scattered low shrubs to low open shrubland over annual herb/grassland.

This plant community differed by having a tree layer and a *Xanthorrhoea drummondii* high open shrubland strata. Quadrats GH4 and GH8.

Vegetation Association KpEe: *Eucalyptus eudesmioides* low woodland over *Kunzea praestans* open scrub over *Melaleuca calyptroides* and *Baeckea* sp. Moora (R. Bone 1993/1) open shrubland.
Plant Communities:
KpEe.1: See the vegetation association description above.
This unit was recorded at Cairn Hill. Releve CR64

Releve CR64
Date: 24/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407301/UTM 66 21262 (WGS 84; GPS unit).
Site description: Moderate to steep, west-south-west facing mid to upper slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Vegetation description: Eucalyptus eudesmioides (15-20%) low mallee woodland over Kunzea praestans (50-60%), Xanthorrhoea drummondii open scrub over Melaleuca calyptroides (5-7%), Baeckea sp. Moora (R.Bone 1993/1) (3-5%) open shrubland over Hibbertia subvaginata (2%) scattered low shrubs over Neurachne alopecuroidea, Desmocladus flexuosus scattered grasses/sedges with scattered herbs.
Associated species: Acacia aristulata, Bossiaea sp. Cairn Hill (M Henson CH2-28), Nem acut, Burchardia umbellata, Allocasuarina huegeliana, Allocasuarina humilis, Xanthosia fruticulosa.
Vegetation Association KpHs: *Kunzea praestans* high shrubland to open scrub over *Hibbertia subvaginata* (low) open shrubland to (low) open heath over scattered to very open sedgeland/grassland/herbland..
Plant Communities:
KpHs.1: *Kunzea praestans* high shrubland to open scrub over *Hibbertia subvaginata* open shrubland to open heath over very open herb/fernland.
Quadrats ERG3, ERG21 and JT10. Releve CR77.

Releve CR77
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407009/UTM 66 20626 (WGS 84; GPS unit).
Site description: Gently sloping lower slopes, south facing, of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with some boulders and rock outcrop.
Vegetation description: Kunzea praestans (2-2.5 m, 60-70%) open to closed scrub over Acacia congesta subsp. congesta (+) scattered shrubs over Hibbertia subvaginata (2-3%) low open shrubland over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges and grasses with very open herbland.
Associated species: Nuytsia floribunda, Dichopogon capillipes, Burchardia umbellata, Cryptandra glabriflora (erect shrub, 7o cm), Lawrencella rosea, Cheilanthes adiantoides, Xanthosia fruticulosa (1-2%).

KpHs.2: *Kunzea praestans*, (*Allocasuarina campestris*) open scrub to high shrubland over *Hibbertia subvaginata* scattered shrubs over scattered herbs.

This plant community had an *Allocasuarina campestris* component in the open scrub. Quadrat CHN3.

Vegetation Association KpXd: *Xanthorrhoea drummondii* high open shrubland over *Kunzea praestans* high open shrubland.
Plant Communities:
KpXd.1: *Kunzea praestans, Xanthorrhoea drummondii* high open shrubland over *Calytrix leschenaultii* scattered low shrubs over scattered sedges/grasses with very open herbland.
Releves GHR289 and G340.

Releve GHR289
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408419/UTM 66 17870 (WGS 84; GPS unit).
Site description: Flat, broad crest of low rocky ridge.
Rock type: Chert.
Vegetation description: Xanthorrhoea drummondii (3-5%) high open shrubland over Kunzea praestans (regrowth) (2%) scattered tall shrubs over Calytrix leschenaultii, scattered low shrubs over Neurachne alopecuroidea, Desmocladus flexuosus scattered sedges/grasses with Podolepis canescens (1-2%), Borya sphaerocephala (2-3%) very open herbland and Hypochaeris glabra very open annual herbland.
Associated species: Stackhousia monogyna, Podolepis lessonii.
Condition: Very good.

Releve G340
Date: 18/2/05
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0407087/UTM 66 18025 (WGS 84; GPS unit).
Site description: Gentle, south-facing mid slope of low rounded ridge.
Vegetation description: Allocasuarina huegeliana (2-5%) scattered low trees to low open woodland over Xanthorrhoea drummondii (5-10%) high open shrubland over Kunzea praestans (5-10%) high open shrubland over Daviesia dielsii scattered low shrubs to low open shrubland over *Avena barbata open annual grassland and Podolepis lessonii very open herbland and Schoenus clandestinus very open sedgeland.
Condition: Good.

Vegetation Alliance 17: *Melaleuca calyptroides* open to closed heath

Vegetation Association Mc: *Kunzea praestans* high open shrubland over *Melaleuca calyptroides* open to closed heath over *Hibbertia subvaginata, Calytrix leschenaultii* scattered low shrubs to low open shrubland.
Plant Communities:
Mc.1: *Kunzea praestans* high open shrubland over *Melaleuca calyptroides* open to closed heath over *Hibbertia subvaginata, Calytrix leschenaultii* low open shrubland over *Desmocladus flexuosus* scattered sedges/grasses with *Stylidium septentrionale, Borya sphaerocephala* scattered herbs.
Releves JTR214 and JTR235.

Releve JTR214
Date: 10/1/04
Location: John Tonkin's property.
AMG84: 50J 0408966/UTM 66 25593 (WGS 84; GPS unit).
Site description: Flat ridge top of low rocky ridge (very shallow saddle in ridge top) (elevation 263 m).
Soil: Very gravelly, pebbly brown sand (90% of surface covered by chert gravel/pebbles).
Rock type: Chert.

Vegetation description: Kunzea praestans (2-4%), Allocasuarina campestris (+) high open shrubland over Melaleuca calyptroides (40-50% (60%)) open heath over Hibbertia subvaginata, Calytrix leschenaultii scattered low shrubs to low open shrubland over Desmocladus flexuosus (1%), Neurachne alopecuroidea (+) scattered sedges/grasses with Stylidium septentrionale (+), Borya sphaerocephala (+), Podolepis lessonii (+) scattered herbs to very open herbland.
Associated species: Isopogon divergens, Trachymene pilosa, Podotheca angustifolia, Acacia acuminata subsp. acuminata.
Condition: Very good.

Releve JTR235
Date: 12/1/04
Location: John Tonkin's property.
AMG84: 50J 0408865/UTM 66 25628 (WGS 84; GPS unit).
Site description: Flat to very very gently, south-west facing, slope on crest of low rocky ridge (elevation 264 m).
Soil: Very gravelly, pebbly brown silty sand with some boulders and sheet rock (<1%).
Rock type: Chert.
Vegetation description: Kunzea praestans (2-5%) high open shrubland over Melaleuca calyptroides (60-80%) open to closed heath over Hibbertia subvaginata, Calytrix leschenaultii (1-2%) low open shrubland over Desmocladus flexuosus (1-2%) scattered sedges with Stylidium septentrionale (1%), Borya sphaerocephala (+) scattered herbs.
Associated species: Daviesia dielsii, Astroloma serratifolium (35 cm), Podotheca angustifolia, Chamaescilla corymbosa var. corymbosa.
Condition: Very good (very low weed presence).
Mc2: See the vegetation description for releve SWR231 below.
This plant community differed by having an upper strata of scattered *Dryandra sessilis* var. *sessilis*.
Releve SWR231.

Releve SWR231
Date: 11/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409032/UTM 66 25230 (WGS 84; GPS unit).
Site description: Very gentle, south-facing slope on ridge top of low rocky ridge.
Soil: Gravelly brown sand amongst boulders and rock outcrop (~5-10%).
Vegetation description: Dryandra sessilis var. sessilis scattered tall shrubs over Kunzea praestans (5-10%) high open shrubland over Melaleuca calyptroides (40-50%) open heath over Hibbertia subvaginata scattered low shrubs over Desmocladus flexuosus scattered sedges with Cheilanthes adiantoides scattered ferns with Vulpia myuros var. hirsuta, Pentaschistis pallida, Hypochaeris glabra, Trifolium arvense var. arvense very open annual grassland/herbland.
Associated species: Millotia tenuifolia var. tenuifolia, Daviesia dielsii.
Condition: Good to very good (but with significant weed cover).
Notes: High moss cover. Similar to JT7 but with more Kunzea praestans. Very similar to R214.

Mc.3: See the vegetation description for releve CR51 below.
This plant community differed by having an upper strata of scattered *Dryandra sessilis* var. *sessilis* and a *Baeckea* sp. Moora (R. Bone 1993/1) open shrubland. Releve CR51.

Releve CR51
Date: 23/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0407692/UTM 66 21211 (WGS 84; GPS unit).
Site description: Gentle north-facing slope along top of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with some boulders and rock outcrops.

Vegetation description: Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii, Kunzea praestans (1-2%) high open shrubland over Melaleuca calyptroides (50-60%), Baeckea sp. Moora (R.Bone 1993/1) (5-10%), Calytrix leschenaultii (1.6m, 1-2%) open to closed heath over Desmocladus flexuosus, Neurachne alopecuroidea, Amphipogon caricinus scattered sedges/grasses with Stylidium septentrionale, Borya sphaerocephala scattered herbs.
Associated species: Dichopogon capillipes, Daviesia dielsii, Acacia acuminata subsp. acuminata (juv), Blennospora drummondii, Hibbertia subvaginata (juv), Burchardia umbellata.
Notes: May be associated with some surface soil disturbance.

Mc.4: *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* scattered low trees over *Kunzea praestans*, (*Xanthorrhoea drummondii*) high open shrubland to high shrubland over *Melaleuca calyptroides* open heath over open herbland/sedgeland.

This plant community differed by having a low tree layer (*Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) scattered low trees). Quadrats JT4 and JT7.

Vegetation Alliance 18: *Hibbertia subvaginata* low shrublands to low open heath

Vegetation Association Hs: *Hibbertia subvaginata* open heath.
Plant Communities:
Hs.1: *Hibbertia subvaginata*, (*Calytrix leschenaultii*) (low) open heath over scattered sedges with very open herbland and very open annual grassland.
Releves ERR157 and RM14.

Releve ERR157
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407960/UTM 66 24119 (WGS 84; GPS unit).
Site description: Moderate, south-east facing lower slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly brown sand with rock outcrop and boulders (cover about 15-20%).
Vegetation description: Hibbertia subvaginata (50-60%) open heath over Avena barbata, Briza maxima very open annual grassland with Chamaescilla corymbosa var. corymbosa scattered herbs and Cheilanthes adiantoides scattered ferns.
Associated species: Hypochaeris glabra, Dichopogon capillipes, Ursinia anthemoides.
Condition: Poor to good – heavy weed infestation in much of area.

Releve RM14
Date: 11/12/04
Location: Ron Manning's property.
AMG84: 50J 0408787/UTM 66 21649 (WGS 84; GPS unit).
Site description: Gentle, east-facing lower slope of low ridge.
Soil: Very pebbly, gravelly brown sand with about 3-5 % exposed rock outcrop.
Rock type: Chert.
Vegetation description: Hibbertia subvaginata, (Calytrix leschenaultii) low open heath over Desmocladus flexuosus scattered sedges and Pentaschistis pallida very open annual grassland with Borya sphaerocephala, Podolepis lessonii very open herbland.
Associated species: Kunzea praestans, Allocasuarina huegeliana, Avena barbata, Dryandra sessilis var. sessilis.
Condition: Good to poor.
Notes: More than 10 years since fire. Photo: BM13-11

Vegetation Association HsAh: *Allocasuarina huegeliana* scattered trees over *Hibbertia subvaginata* (low open shrubland) to open heath.

Plant Communities:
HsAh.1: *Allocasuarina huegeliana* low open woodland over *Hibbertia subvaginata* open heath over *Pityrodia dilatata* low shrubland over scattered grasses and scattered annual grasses.

This plant community was recorded on rocky, south-facing slopes on the Eastern Ridge and differed by having a *Pityrodia dilatata* low shrubland. Quadrat ERG13.

HsAh.2: *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata*, *Eucalyptus loxophleba* subsp. *loxophleba* scattered low trees over *Allocasuarina campestris* high open shrubland, over *Hibbertia subvaginata* open heath over very open herbland/sedgeland/grassland.

This plant community was also recorded on rocky, south-facing slopes on the Eastern Ridge and was distinguished by its *Allocasuarina campestris* high open shrubland. Quadrat ERG10.

HsAh.3: *Allocasuarina huegeliana* scattered low trees over *Kunzea praestans* scattered shrubs to open shrubland over *Hibbertia subvaginata* low open shrubland over very open sedgeland and open annual grassland.

This plant community had a *Kunzea praestans* scattered shrubs to open shrubland over *Hibbertia subvaginata* low open shrubland. Releve D8.

Releve: D8
Date: 9/12/04
Location: Doblestein's property.
AMG84: 50J 0409186/UTM 66 23654 (WGS 84; GPS unit).
Site description: West-facing moderate slope of low ridge.
Rock type: > 70% surface cover of rock, chert.
Vegetation description: Allocasuarina huegeliana scattered low trees over Kunzea praestans scattered shrubs to open shrubland over Hibbertia subvaginata low open shrubland over Lepidosperma leptostachyum, Desmocladus flexuosus very open sedgeland and Avena barbata, Vulpia myuros var. hirsuta open annual grassland.
Associated species:
Condition: Poor (grazing damage).

Vegetation Association HsDs: *Nuytsia floribunda* scattered low trees over *Dryandra sessilis* var. *sessilis* high open shrubland over *Hibbertia subvaginata* low shrubland.

Plant Communities:
HsDs.1: See the vegetation description for releve G337 below.
Releve G337.

Releve G337
Date: 18/2/05
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0407411/UTM 66 17755 (WGS 84; GPS unit).
Vegetation description: Nuytsia floribunda scattered low trees over Dryandra sessilis var. sessilis (5-8%) high open shrubland over Hibbertia subvaginata (20-25%) low shrubland over *Avena barbata, *Briza maxima open annual grassland.
Associated species: Kunzea praestans, Xanthorrhoea drummondii, Calytrix leschenaultii.
Condition: Good.

Vegetation Alliance 19: *Xanthorrhoea drummondii* high open shrubland
Vegetation Association Xd

Plant Communities:
Xd.1: See the vegetation description for releve NBRM2 below.
Releve NBRM2.

Releve NBRM2
Date: 12/04
Location: Ron Manning's property.
AMG84: 50J 0408650/UTM 66 22100(WGS 84; GPS unit).
Soil: Very cobbly, pebbly, rocky ground.
Vegetation description: Xanthorrhoea drummondii high open shrubland over grassland/herbland/sedgeland.
Notes: Fire less than 3 months ago. Difficult to determine vegetation type, but no sign of trees or shrubs other than Xanthorrhoea drummondii.

Vegetation Alliance 20: Miscellaneous heaths

Vegetation Alliance 20/1: *Dryandra sessilis* high shrubland

Vegetation Association Ds: *Dryandra sessilis* var. *sessilis*, *Xanthorrhoea drummondii* high open shrubland over *Allocasuarina campestris* scattered tall shrubs.
Plant Communities:
Ds.1: See the vegetation description for releve CSR318 below.
Releve CSR318.

Releve CSR318
Date: 16/2/05
Location: Kim Chester's property, south of Cairn Hill.
AMG84: 50J 0407284/UTM 66 19345 (WGS 84; GPS unit).
Site description: Crest of low rocky ridge on western side of chert ridge.
Soil: Gravelly, pebbly, cobbly brown sand in matrix of rocks, boulders, rock outcrop.
Rock type: Chert.
Vegetation description: Dryandra sessilis var. sessilis (3-5%), Xanthorrhoea drummondii (1-2%) high open shrubland over Allocasuarina campestris scattered tall shrubs over *Avena barbata, *Pentaschistis airoides annual grassland.
Associated species:
Condition: Very poor – high weed cover, absence of low shrubs, herbs?

Vegetation Association DsHs: *Allocasuarina huegeliana*, (*Acacia acuminata*) scattered low trees to low open woodland over *Dryandra sessilis* var. *sessilis* high open shrubland to open scrub over *Hibbertia subvaginata* low shrubland.
Plant Communities:
DsHs.1: See the vegetation association description above.
Releves CR81, G312 and G344.

Releve CR81
Date: 26/11/03
Location: Cairn Hill Reserve.
AMG84: 50J 0406914/UTM 66 21205 (WGS 84; GPS unit).
Site description: Gently sloping, west-facing lower slope at base of steep rocky slope of low rocky ridge.
Vegetation description: Allocasuarina huegeliana, Nuytsia floribunda, Eucalyptus eudesmioides scattered low trees over Dryandra sessilis var. sessilis (20-30%) high shrubland over Hibbertia subvaginata (10-15%), Bossiaea sp. Cairn Hill (M Henson CH2-28) (6-8%) low shrubland over Desmocladus flexuosus (1-2%) scattered sedges.

Associated species: Kunzea praestans, Calytrix leschenaultii, Trachymene pilosa, Eucalyptus eudesmioides subsp. eudesmioides.

Releve G312
Date: 11/12/04
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0408791/UTM 66 21337 (WGS 84; GPS unit).
Site description: Gentle, south-facing slope of crest of low ridge.
Rock type: Chert.
Vegetation description: Nuytsia floribunda, (Allocasuarina huegeliana, Acacia acuminata subsp. acuminata) scattered low trees over Dryandra sessilis var. sessilis high open shrubland over Hibbertia subvaginata, (Calytrix leschenaultii) low shrubland to low open heath over Desmocladus flexuosus very open sedgeland and Vulpia myuros var. hirsuta, Briza maxima annual grassland.
Associated species:
Condition: Poor to good.
Notes: Similar to site RM14. Last fire more than 10 years ago. Photo: BM13-11

Releve G344
Date: 18/2/05
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0407190/UTM 66 17236 (WGS 84; GPS unit).
Site description: Crest of low rocky ridge.
Vegetation description: Allocasuarina huegeliana (3-5%), (Acacia acuminata subsp. acuminata (+)) low open woodland over Dryandra sessilis var. sessilis (10-15%) high shrubland over Hibbertia subvaginata (10-15%) low shrubland over Podolepis lessonii very open herbland and *Avena barbata open grassland.
Condition: Good – very good.
Notes: Similar to unit G337.
Vegetation Association DsKp: *Dryandra sessilis* var. *sessilis* high shrubland to open scrub over *Kunzea praestans, Leptospermum erubescens* high shrubland over *Acacia pulchella, Baeckea* aff. *preissiana, Daviesia dielsii, Dryandra nivea ssp. nivea* (narrow leaf, mound) *Banksia sphaerocarpha* low open shrubland.
Plant Communities:
DsKp.1: See the vegetation description for releve G316 below.
This plant community was recorded on the gentle slopes of a broad low rise with some exposed chert. Releve G316.

Releve G316
Date: 12/12/04
Photo: BM13-16
Location: Phil & Jenny Gardiner's property.
AMG84: 50J 0408483/UTM 66 20280 (WGS 84; GPS unit).
Site description: Gentle, south-east facing slope of low rise in undulating area.
Rock type: Chert (some exposed outcrop)
Vegetation description: (Nuytsia floribunda scattered low trees) over Dryandra sessilis var. sessilis high shrubland to open heath over Kunzea praestans (10-15%), Leptospermum erubescens, Grevillea amplexicans ssp. semivestita high shrubland over Acacia pulchella var. glaberrima, Baeckea aff. preissiana, Daviesia dielsii, Dryandra nivea ssp. nivea 'narrow leaf mound' (30 cm), Banksia sphaerocephala var. sphaerocephala low open shrubland over Vulpia myuros var. hirsuta, Neurachne alopecuroidea very open to open grassland and Podolepis lessonii scattered herbs
Associated species: Jacksonia foliosa, Jacksonia floribunda (3.5 m), Petrophile brevifolia, Allocasuarina huegeliana.
Condition: Good.
Notes: Heavily grazed area. More than 7 years since fire.

Vegetation Alliance 20/2: *Melaleuca concreta* open scrub.
Vegetation Association Mco: *Eucalyptus loxophleba* subsp. *loxophleba*, *Acacia acuminata* subsp. *acuminata* scattered low trees over *Melaleuca concreta* open scrub over scattered low shrubs over scattered sedges.
Plant Communities:
Mco.1: *Eucalyptus loxophleba* subsp. *loxophleba*, *Acacia acuminata* subsp. *acuminata* scattered low trees over *Melaleuca concreta* open scrub over *Baeckea* sp. Moora (R.Bone 1993/1) scattered low shrubs over scattered sedges and herbs.

This plant community occurred in a small area of a linear depression (?dyke) that occurred near the Cairn Hill North ridge crest. Releve CNR112.

Releve CNR112
Date: 3/12/03
Location: Cairn Hill North.
AMG84: 50J 0407346/UTM 66 22198 (WGS 84; GPS unit).
Site description: Gently sloping, west-facing slope adjacent to ridge to and at head of a linear 'dyke'?.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Eucalyptus loxophleba subsp. loxophleba, Acacia acuminata subsp. acuminata scattered low trees over Melaleuca concreta (30-40%) open scrub over Baeckea sp. Moora (R.Bone 1993/1) scattered low shrubs over Schoenus clandestinus, Lepidosperma tenue scattered sedges with Borya sphaerocephala (+), Stylidium septentrionale septentrionale scattered herbs.
Associated species: Melaleuca radula, Trymalium daphnifolium (shrub to 2m).
Notes: 1) Unit has Allocasuarina campestris mixing in scrub layer at margins.
2) Unit R112 at 50J 0407421/UTM 66 21885 (WGS 84; GPS unit) had Melaleuca concreta scrub to 4 m high.

Mco.2: *Melaleuca concreta* open to closed scrub over *Melaleuca sclerophylla*, *Olearia dampieri* subsp. *eremicola* open shrubland over scattered grasses and herbs with *Cheilanthes adiantoides* open fernland.

This plant community occurred in a small area in the south-east corner of Gardiner's Hill and differed in not having a tree layer and having a *Melaleuca sclerophylla*, Olearia dampieri subsp. eremicola open shrubland. Releve GHR276.

Releve GHR276
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408294/UTM 66 17292 (WGS 84; GPS unit).
Site description: Very small unit (35 m by 15 m) (elevation 247 m).
Rock type:
Vegetation description: Melaleuca concreta (3.5-6 m) (60-70%) open to closed scrub over Melaleuca sclerophylla (2-3% - maybe ecotonal from adjacent unit R270), Olearia dampieri subsp. eremicola (1.8 m, +) open shrubland over Austrodanthonia acerosa, Ausrostipa elegantissima scattered grasses with Waitzia nitida, Podolepis lessonii, Crassula colorata var. colorata scattered herbs and Cheilanthes adiantoides (5-10%) open fernland.
Associated species: Acacia ericksoniae (shrub 35 cm high, north end of unit).
Condition: Very good.

Vegetation Alliance 20/3: *Melaleuca radula* high shrubland to open scrub
Vegetation Association Mr: *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) scattered low trees to low woodland over *Melaleuca radula*, (*Calothamnus* aff. *quadrifidus* Moora Watheroo, *Xanthorrhoea drummondii*) high shrubland to open scrub.
Plant Communities: See the vegetation association description above.
Mr.1: Releves GHR294, GHR294a and GHR308.

Releve GHR294
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408441/UTM 66 17592 (WGS 84; GPS unit).
Site description: Moderate, west-facing lower – mid slope of low rock ridge (elevation 257 m).
Soil: Gravelly clayey loam to loamy clay.
Rock type: Chert.
Vegetation description: Acacia acuminata subsp. acuminata, (10-15%), Allocasuarina huegeliana (5-10%) low woodland over Melaleuca radula (25-30% (50%)) (patchy) open scrub over Schoenus clandestinus (1-2%), Neurachne alopecuroidea (+) with Borya sphaerocephala (10-15%), Opercularia vaginata (1-2%), Podolepis lessonii (1-2%) open herbland and Cheilanthes adiantoides (2-3%) very open fernland.
Condition: Very good (low weed cover).

Releve GHR294a
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408570/UTM 66 17925(WGS 84; GPS unit).
Site description: Upper slope part of unit.
Rock type:
Vegetation description: Allocasuarina huegeliana (15-20%), Acacia acuminata subsp. acuminata (+) low woodland over Calothamnus aff. quadrifidus Moora-Watheroo (+), Xanthorrhoea drummondii (2-3%) high open shrubland over Melaleuca radula (to 5 m) (5-10%) open shrubland over Calytrix leschenaultii scattered low shrubs over Desmocladus flexuosus, Neurachne alopecuroidea (+), Schoenus clandestinus (+) scattered sedges/grasses with Borya sphaerocephala (15-20%), Opercularia vaginata (2-3%), Podolepis lessonii (3-5%), Stylidium septentrionale (+) open herbland.
Associated species: Melaleuca calyptroides, Blennospora drummondii, Trymalium ledifolium var. rosmarinifolium.

Releve GHR308
Date: 7/12/04
Location: Gardiner's hill, north end of block.
AMG84: 50J 0408621/UTM 66 18060 (WGS 84; GPS unit).
Site description: Moderate, north-east facing slope of low ridge.
Soil: Gravelly, pebbly, cobbly brown sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana scattered low trees to low open woodland over Melaleuca radula (30-40%), (Xanthorrhoea drummondii (+)) high shrubland to open scrub over Schoenus clandestinus, Lepidosperma pubisquameum (+),Lepidobolus chaetocephalus scattered sedges with Opercularia vaginata (3-5%). Podolepis lessonii (3-5%), Borya sphaerocephala (1-2%) very open herbland to open herbland and Avena barbata, Pentaschistis pallida open annual grassland.
Associated species: Calothamnus aff. quadrifidus Moora-Watheroo, Hakea recurva ssp. recurva.
Condition: Good to very good.

Vegetation Alliance 20/4: *Melaleuca sclerophylla* open heath
Vegetation Association Ms: *Melaleuca sclerophylla, Hypocalymma angustifolium* open heath over *Dodonaea pinifolia, Gastrolobium obovatum* low open shrubland.
Plant Communities:
Ms.1: See the vegetation description for releve GHR270 below.
This plant community was recorded from one small area in the south-west corner of Gardiner's Hill. Releve GHR270.

Releve GHR270
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408330/UTM 66 17228 (WGS 84; GPS unit).
Site description: Gentle, north-east facing slope of low rocky rise (elevation 253 m).
Soil: Gravelly brown clayey loam amongst rock outcrop (5% surface cover).
Rock type: Not chert (? sandstone)
Vegetation description: Melaleuca sclerophylla (40%), Hypocalymma angustifolium (3-5%), open heath over Dodonaea pinifolia (5-10%), Gastrolobium obovatum (+) low open shrubland over Schoenus clandestinus, Lepidosperma tenue (around rock outcrop), Lepidosperma sp., Neurachne alopecuroidea, Desmocladus flexuosus scattered sedges/grasses with Borya sphaerocephala (5-8%), Stylidium septentrionale (1-2%), Caesia sp. Moora open herbland.
Associated species: Stenanthemum tridentatum, Eremophyllum tenellum, Calytrix depressa (upslope in unit).
Condition: Very good to excellent.

Vegetation Alliance 20/5: *Baeckea* sp. Moora (R. Bone 1993/1) low open heath
Vegetation Association B: *Allocasuarina huegeliana* scattered low trees to low open woodland over *Allocasuarina campestris*, (*Xanthorrhoea drummondii*) high open shrubland over *Baeckea* sp. Moora (R. Bone 1993/1), (*Calytrix leschenaultii*) low shrubland to low open heath.
Plant Communities:
B.1: See the vegetation association description above.
This plant community was recorded on the top of a low ridge in the Cairn Hill North area. Quadrat CHN10 and releve CNR123.

Releve CNR123 (~very similar to CHN10)
Date: 4/12/03
Location: Cairn Hill North. just outside of CHN10.
AMG84: 50J 0407561/UTM 66 21707 (WGS 84; GPS unit).
Site description: Gentle, east-facing mid slope below rocky crest of low rocky ridge.
Soil: Gravelly, pebbly brown sand.
Vegetation description: Allocasuarina huegeliana (10-15%) low woodland over Allocasuarina campestris (5-8%), Xanthorrhoea drummondii high open shrubland over Baeckea sp. Moora (R.Bone 1993/1) (60-70%), Calytrix leschenaultii (1-2%) open heath over Schoenus clandestinus, Neurachne alopecuroidea scattered sedges/grasses with Borya sphaerocephala (3-4%) very open herbland.
Associated species: Goodenia hassallii, Tricoryne arenicola, Lawrencella rosea, Leptibolous chaetocephalus, Melaleuca radula.
Notes: This unit can result from disturbance (partial clearing) of R119 unit or perhaps hot fire.

Vegetation Alliance 20/6: *Calytrix leschenaultii* open heath
Vegetation Association Cl: *Allocasuarina campestris, Kunzea praestans* scattered tall shrubs over *Calytrix leschenaultii*, (*Hibbertia subvaginata*) open heath.
Plant Communities:
Cl.1: See the vegetation association description above.

The described community was described on a very gently sloping base of a low ridge slope at releve ERR158. Another stand of this plant community was recorded at site ERR190, which occurred on a lower slope of a low chert ridge and varied significantly by having a low open woodland of *Eucalyptus wandoo* subsp. *wandoo* (possibly indicating underlying doleritic soils).
Releves ERR158, ERR190

Releve ERR158
Date: 21/12/03
Location: Eastern Ridge.
AMG84: 50J 0407950/UTM 66 24089 (WGS 84; GPS unit).
Site description: Very gently sloping, south-east facing base of slope of low rocky ridge.
Soil: Gravelly, pebbly, very cobbly brown loamy sand.
Vegetation description: Allocasuarina campestris (1-2%), Kunzea praestans (1-2% (10%)) scattered tall shrubs over Calytrix leschenaultii (.9-1.2 m) (50-60%) Hibbertia subvaginata (1-2%-(5%)) open heath over Bromus diandrus, Briza maxima very open annual grassland and Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Podolepis lessonii, Borya sphaerocephala (1-2%) scattered herbs.
Associated species: Xanthorrhoea drummondii, Chamaescilla corymbosa var. corymbosa.
Condition: Poor to good with considerable weed cover.

Releve ERR190
Date: 3/1/04
Location: Eastern Ridge.
AMG84: 50J 0407970/UTM 66 23710 (WGS 84; GPS unit).
Site description: Gentle to moderate, east-facing lower slope of low rocky ridge (elevation 256 m).
Soil: Gravelly, pebbly brown sand with surface covering of gravel, pebbles and cobbles.
Rock type: Chert.
Vegetation description: Eucalyptus wandoo subsp. wandoo (3-5%), Allocasuarina huegeliana (3-5%) low open woodland over Kunzea praestans (3-5%), Allocasuarina campestris (+), Xanthorrhoea drummondii (2-3%) high open shrubland over Calytrix leschenaultii (15-20 (30-40%)) low shrubland to low open heath over Neurachne alopecuroidea scattered grasses with Borya sphaerocephala (2-3%), Podolepis lessonii (1-2%) very open herbland with Avena barbata, Briza maxima very open to open annual grassland and Hypochaeris glabra annual open herbland.
Associated species: Olearia dampieri subsp. eremicola, Dichopogon capillipes, Solanum oldfieldii.
Condition: Poor to good. High weed cover in parts. (Very poor to Degraded along downslope boundary).

Vegetation Association ClAh: *Allocasuarina huegeliana,* (*Acacia acuminata* subsp. *acuminata*) low open woodland to low woodland over *Kunzea praestans, Xanthorrhoea drummondii* high open shrubland over *Calytrix leschenaultii* open heath.
Plant Communities:
ClAh.1: *Allocasuarina huegeliana* low open woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Kunzea praestans, Xanthorrhoea drummondii* scattered tall shrubs over *Calytrix leschenaultii,* (*Hibbertia subvaginata*) open heath over scattered sedges/grasses with very open herbland.

This plant community, recorded on John Tonkin's, differed by having a *Dryandra sessilis* var. *sessilis* scattered tall shrub layer and a *Hibbertia subvaginata* low open shrubland component. Releve JTR219.

Releve JTR219
Date: 11/1/04
Location: John Tonkin's property.
AMG84: 50J 0408855/UTM 66 26011 (WGS 84; GPS unit).

Site description: Gentle, west of south-facing lower slope on top of and near end of, low rocky ridge (elevation – see R217).
Soil: Very gravelly, pebbly brown silty fine sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5-7%) low open woodland over Dryandra sessilis var. sessilis scattered tall shrubs over Xanthorrhoea drummondii (1-2%) scattered tall shrubs over Kunzea praestans (1-2%) scattered tall shrubs over Calytrix leschenaultii (30-40%) (1.3m), Hibbertia subvaginata (5-10%) (1.3 m) open heath over Desmocladus flexuosus, Neurachne alopecuroidea scattered sedges/grasses with Borya sphaerocephala (2-3%), Podolepis lessonii, Stylidium septentrionale very open herbland and Vulpia myuros var. hirsuta , Pentaschistis pallida, Avena barbata, Hypochaeris glabra (3-8%) very open annual grassland/herbland.
Condition: Good to very good.

ClAh.2: *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* low open woodland over *Kunzea praestans, Xanthorrhoea drummondii* high open shrubland to high shrubland over *Calytrix leschenaultii* low shrubland over scattered sedges/grasses and very open herbland.

This community was recorded from rocky ridge slopes on the Eastern Ridge. Releves ERR187 and ERR197.

Releve ERR187
Date: 2/4/04
Location: Eastern Ridge.
AMG84: 50J 0407734/UTM 66 23563 (WGS 84; GPS unit).
Site description: Gentle, south-facing slope of low rocky ridge (elevation 250 m).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (15-20%), Acacia acuminata subsp. acuminata (+) low woodland over Kunzea praestans ((+) 3-5 (10)%), Xanthorrhoea drummondii (2%), Allocasuarina campestris (+) high open shrubland over Calytrix leschenaultii (15-20%(25)) low shrubland over Desmocladus flexuosus (1%), Neurachne alopecuroidea (1%) scattered sedges/grasses with Borya sphaerocephala (1-2%) scattered low herbs.
Associated species: Podotheca angustifolia, Waitzia nitida, Podolepis lessonii, Blennospora drummondii.
Condition: Very good.

Releve ERR197
Date: 4/1/04
Location: Eastern Ridge.
AMG84: 50J 0407760/UTM 66 23327 (WGS 84; GPS unit).
Site description: West-facing, moderate lower slope of low rocky ridge.
Soil: Gravelly, pebbly, cobbly light brown silty sand amongst boulders and rock outcrop (20-30% surface cover).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (5-10%), Acacia acuminata subsp. acuminata (1-2%) low open woodland over Kunzea praestans (2-5%), Xanthorrhoea drummondii (4-5%) high open shrubland to high shrubland over Calytrix leschenaultii (20-30%), (Acacia lasiocarpa var. sedifolia (+)) low shrubland over Lepidosperma tenue (1%), Desmocladus flexuosus (+), Neurachne alopecuroidea (+) scattered sedges/grasses with Borya sphaerocephala (3-5%), Stylidium septentrionale (3-5%), Gilberta tenuifolia (1-2%) very open to open low herbland.
Associated species: Dryandra sessilis var. sessilis, Hakea lissocarpha, Podolepis lessonii, Pityrodia dilatata.
Condition: Very good to excellent.

Vegetation Alliance 20/7: *Calytrix depressa* low open heath

Vegetation Association Cd: *Allocasuarina campestris* scattered tall shrubs over *Melaleuca radula, Hypocalymma angustifolium* open shrubland over *Calytrix depressa* low shrubland.
Plant Communities:
Cd.1: See the vegetation description for releve GHR274 below.
This plant community was recorded on the slopes of a low ridge in Gardiner's Hill. Releve GHR274.

Releve GHR274
Date: 16/1/04
Location: Gardiner's hill.
AMG84: 50J 0408345/UTM 66 17197 (WGS 84; GPS unit).
Site description: Very gentle, east-facing slope including rocky sandstone ridge adjacent and downslope to narrow chert ridge.
Rock type: Sandstone.
Vegetation description: Allocasuarina campestris scattered tall shrubs over Melaleuca radula (to 1.2m), Hypocalymma angustifolium (+) open shrubland over Calytrix depressa (25-30%) low shrubland over Schoenus clandestinus (3-4%), Lepidosperma tenue (3-5%), Neurachne alopecuroidea (+) open sedges/grassland with Borya sphaerocephala (2-3%), Dampiera lavandulacea (1%), Stylidium septentrionale (+) very open herbland.
Associated species: Gastrolobium obovatum, Astroloma serratifolium, Stenanthemum tridentatum (25 cm), Podolepis lessonii, Dichopogon capillipes.
Condition: Very good to excellent (very few weeds).

Vegetation Association CdAh: *Allocasuarina huegeliana* low woodland over *Allocasuarina campestris*, *Kunzea praestans*, *Xanthorrhoea drummondii* high open shrubland over *Baeckea* sp. Moora (R. Bone 1993/1) scattered shrubs over *Calytrix depressa* low open heath.
Plant Communities:
CdAh.1: See the vegetation association description above.
Very small areas of this plant community were recorded on the top of the low ridge at Cairn Hill North. Releve CNR124.

Releve CNR124
Date: 4/12/03
Location: Cairn Hill North.
AMG84: 50J 0407558/UTM 66 21749 (WGS 84; GPS unit).
Site description: Upper slopes, gently east sloping, just below rocky crest of low ridge.
Soil: Very gravelly, pebbly brown sand.
Vegetation description: Allocasuarina huegeliana (15-20%) low woodland over Allocasuarina campestris (2-3%), Kunzea praestans (1-2%), Xanthorrhoea drummondii (1-2%) high open shrubland over Baeckea sp. Moora (R.Bone 1993/1) (1-2%) scattered shrubs over Calytrix depressa (30-40%) low open heath over Borya sphaerocephala (3-5%) very open herbland.
Associated species: Tricoryne elatior, Goodenia hassallii, Podolepis lessonii.
Notes: 1 of 2 (40 m south) very small areas of this unit.

Vegetation Alliance 20/8: *Calothamnus* aff. *quadrifidus* Moora-Watheroo high shrubland

Vegetation Association CqMc: *Calothamnus* aff. *quadrifidus* Moora Watheroo high shrubland over *Xanthorrhoea drummondii* scattered shrubs over *Melaleuca calyptroides* shrubland.
Plant Communities:
CqMc.1: See the vegetation association description above.
One plant community was included in this vegetation association. Releve SWR232.

Releve SWR232
Date: 11/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0409072/UTM 66 25211 (WGS 84; GPS unit).
Site description: Gentle, east-facing mid slope of low rocky ridge (elevation 249 m).
Soil: Very gravelly, pebbly, cobbly brown sand.
Rock type: Chert.
Vegetation description: Calothamnus aff. quadrifidus Moora-Watheroo (2-3.5 m) (15-25%) high open shrubland over Xanthorrhoea drummondii scattered shrubs over Melaleuca calyptroides (20-25%) shrubland over Desmocladus flexuosus, Schoenus clandestinus scattered sedges with Stylidium septentrionale scattered herbs.
Associated species: Crassula colorata var. colorata, Daviesia dielsii, Acacia acuminata subsp. acuminata.

Vegetation Association CqAh: *Allocasuarina huegeliana* scattered low trees over *Calothamnus* aff. *quadrifidus* Moora Watheroo, (*Kunzea praestans, Allocasuarina campestris*) high open shrubland to high shrubland over *Hibbertia subvaginata* scattered low shrubs to low open shrubland.
Plant Communities:
CqAh.1: See the vegetation association description above.
One plant community was included in this vegetation association. Releves JTR201 and GHR290.

Releve JTR201
Date: 9/1/04
Location: John Tonkin's property.
AMG84: 50J 0409185/UTM 66 25477 (WGS 84; GPS unit).
Site description: Very gently sloping, south-west facing slope on top of end of low rocky ridge (elevation 256 m).
Soil: Brown sand amongst a lot of rock outcrop rocks and boulders (60-70% of surface)
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana, Acacia acuminata subsp. acuminata scattered low trees over Calothamnus aff. quadrifidus Moora-Watheroo (2.2m to 3.5-4.5m) (15-20%), Kunzea praestans (1-2%), Allocasuarina campestris (1-2%) high open shrubland over Hibbertia subvaginata scattered low shrubs to low shrubland (patches) over Lepidosperma tenue scattered sedges with Avena barbarta, Vulpia myuros var. hirsuta, Ehrharta longiflora (20-30%) annual grassland.

Releve GHR290
Date: 17/1/04
Location: Gardiner's hill.
AMG84: 50J 0408325/UTM 66 17972 (WGS 84; GPS unit).
Site description: Gentle, north-west facing slope on edge of ridge top (upper slope).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana scattered low trees over Calothamnus aff. quadrifidus Moora-Watheroo (2-4%) high open shrubland over Kunzea praestans, Allocasuarina campestris scattered tall shrubs over Calytrix leschenaultii (2-3%), Hibbertia subvaginata (1-2%) low open shrubland over Neurachne alopecuroidea scattered grasses with Podolepis canescens (2-3%), Borya sphaerocephala (1-2%) very open herbland.
Associated species: Olearia dampieri subsp. eremicola, Xanthorrhoea drummondii.
Condition: Very good.

Vegetation Alliance 20/9: *Ricinocarpus muricatus* shrubland to open heath

Vegetation Association Rmu: *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* low woodland to low open forest over *Ricinocarpus muricatus* shrubland to open heath.
Plant Communities:

Rmu.1: See the vegetation association description above.
This plant community was described from the slopes of two low ridges in Ridgeway's property, just north of Kiaka Rd. Stands varied in the *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* cover and the cover of *Ricinocarpus muricatus*. Releves SWR239, SWR239a and SWR239b.

Releve SWR239
Date: 12/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408935/UTM 66 25095 (WGS 84; GPS unit).
Site description: Gentle to moderate, south-facing, mid slope of long, rocky, low chert ridge.
Rock type:
Vegetation description: Allocasuarina huegeliana (15-20%), Acacia acuminata subsp. acuminata (15-20%) low open forest over Ricinocarpus muricatus (2.2 m) (1-2%) (patches), Allocasuarina campestris (+) scattered tall shrubs over Desmocladus flexuosus scattered sedges and Podolepis lessonii, Crassula colorata scattered herbs with Cheilanthes adiantoides scattered ferns and Avena barbata, Hypochaeris glabra very open annual grassland/herbland.
Associated species: Dichopogon capillipes, Austrostipa sp., Austrodanthonia setacea, Kunzea praestans.
Condition: Good – probably grazing impacts and weeds.

Releve SWR239a
Date: 12/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408816/UTM 66 25139 (WGS 84; GPS unit).
Site description: Ricinocarpus muricatus forms a shrubland (25-35%) to open heath.

Releve SWR239b
Date: 12/1/04
Location: Stan Ridgeway's property (East).
AMG84: 50J 0408756/UTM 66 25121 (WGS 84; GPS unit).
Site description: Moderate, west-facing slope on low rocky ridge.
Soil: Very gravelly dark brown loamy sand.
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (15-25%), Acacia acuminata subsp. acuminata (10-15%), (Eucalyptus loxophleba subsp. loxophleba (+)) low woodland to low open forest over Ricinocarpus muricatus (30-40%) open heath over Podolepis lessonii (1-2%), Rhodanthe polycephala (1-2%) very open herbland and Avena barbata, Briza maxima, Ehrharta longiflora open annual grassland.
Notes: Similar to SWR239a and SWR239.

Vegetation Alliance 20/10: *Ricinocarpus velutinus* open heath

Vegetation Association RvAh: *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low open woodland to low woodland over *Allocasuarina campestris* scattered tall shrubs over *Xanthorrhoea drummondii* scattered shrubs over *Ricinocarpus velutinus* open heath.
Plant Communities:
RvAh.1: See the vegetation association description above.
One stand of this plant community was recorded in a remnant vegetation block about 500 meters east of the southern end of the Eastern Ridge. Releve RM2.

Releve RM2
Date: 10/12/04
Location: Ron Manning's property.

AMG84: 50J 0408590/UTM 66 22558 (WGS 84; GPS unit).
Site description: Moderate, west-facing upper slope of ridge.
Soil: Brown sand in matrix of rock outcrops over boulders (50-60% cover).
Rock type: Chert.
Vegetation description: Allocasuarina huegeliana (15-20%), Acacia acuminata subsp. acuminata (3-5%) low open woodland to low woodland over Allocasuarina campestris scattered tall shrubs over Xanthorrhoea drummondii scattered shrubs over Ricinocarpus velutinus (40-50%) open heath over Lepidosperma tenue scattered sedges to very open sedgeland and Avena barbata, Briza maxima, Ehrharta calycina (Austrostipa mollis (+)) very open grassland with Hyalosperma cotula, Rhodanthe polycephala scattered herbs and Cheilanthes adiantoides very open fernland.
Associated species: Dioscorea hastifolia, Dichopogon capillipes, Goodenia arthrotricha, Waitzia nitida, Neurachne alopecuroidea, Stypandra glauca, Hibbertia subvaginata, Kunzea praestans (+) (near southern end of unit).
Condition: Very good.
Notes: More than 7 years since last fire. Photo: BM12-24 (looking west of south), 25 (looking west of north)

Vegetation Alliance 21: Other miscellaneous

Vegetation Alliance 21/1: *Lepidosperma pubisquameum* sedgeland

Vegetation Association Lp: *Xanthorrhoea drummondii* open shrubland over *Lepidosperma pubisquameum* sedgeland with an annual herbland and open annual grassland.
Plant Communities:

Lp.1: *Xanthorrhoea drummondii* open shrubland over *Lepidosperma pubisquameum* sedgeland with *Stypandra glauca* annual herbland with open annual grassland.

This plant community occurred in one small area on the top of a low rocky ridge near the south end of Eastern Ridge. Quadrat ERG19.

Vegetation Alliance 22: *Casuarina obesa* (*Eucalyptus loxophleba* subsp. *loxophleba*) low open forest

Vegetation Association CoAl.1: Casuarina obesa (Eucalyptus loxophleba subsp. loxophleba) low open forest over Acacia ligustrina and Hakea preissii high open shrubland over *Cynosurus echinatus and *Vulpia myuros closed annual grassland.
Plant Communities:
CoAl.1: See the vegetation association description above.
Releve ATR001.

Releve ATR001
Date: 9/11/2010
Location: Arthur and Rhonda Tonkin's property.
MGA94: 408739 mE 6627586 mN (WGS 84; GPS unit).
Site description: Low flat plain.
Soil description: Brown clay.
Vegetation description: Casuarina obesa (Eucalyptus loxophleba subsp. loxophleba) low open forest over Acacia ligustrina and Hakea preissii high open shrubland over *Cynosurus echinatus and *Vulpia myuros closed annual grassland.
Associated species: Acacia erinacea, Atriplex suberecta, Maireana brevifolia, Ptilotus spathulatus forma spathulatus, Salsola tragus subsp. tragus
Notes: Photos BM4

APPENDIX 8: Species lists for each vegetation alliance within the Coomberdale Chert Threatened Ecological Community.

Family	Species
List for Vegetation Alliance 1: *Eucalyptus salmonophloia* woodlands to open forests.	
Adiantaceae	Cheilanthes adiantoides
Adiantaceae	Cheilanthes distans
Aspleniaceae	Pleurosorus rutifolius
Cupressaceae	Actinostrobus arenarius
Poaceae	Amphipogon caricinus
Poaceae	Aristida contorta
Poaceae	Austrodanthonia acerosa
Poaceae	Austrodanthonia caespitosa
Poaceae	Austrodanthonia setacea
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa hemipogon
Poaceae	Austrostipa nitida
Poaceae	Austrostipa sp.
Poaceae	Austrostipa trichophylla
Poaceae	Austrostipa variabilis
Poaceae	Neurachne alopecuroidea
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta calycina
Poaceae	*Ehrharta longiflora
Poaceae	*Lolium perenne
Poaceae	*Pentaschistis airoides
Poaceae	*Pentaschistis pallida
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma aff. leptostachyum (Moora: ERG18-7)
Cyperaceae	Lepidosperma leptostachyum
Cyperaceae	Lepidosperma sp.
Cyperaceae	Lepidosperma sp. P1 small head (M.D. Tindale 166A)
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus brevisetis
Cyperaceae	Schoenus clandestinus
Cyperaceae	Schoenus nanus
Restionaceae	Desmocladus flexuosus
Restionaceae	Lepidobolus chaetocephalus
Dasypogonaceae	Lomandra (Moora twisty)
Dasypogonaceae	Lomandra aff. micrantha subsp. micrantha
Dasypogonaceae	Lomandra effusa
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Dianella revoluta var. divaricata
Phormiaceae	Stypandra glauca
Anthericaceae	Caesia (Moora hairy stem)
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Laxmannia ramosa subsp. ramosa
Anthericaceae	Thysanotus manglesianus
Anthericaceae	Thysanotus sp.
Anthericaceae	Tricoryne elatior
Colchicaceae	Burchardia umbellata
Boryaceae	Borya laciniata
Boryaceae	Borya sphaerocephala
Haemodoraceae	Haemodorum paniculatum
Haemodoraceae	Haemodorum simulans
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Dioscoreaceae	Dioscorea hastifolia
Iridaceae	Orthrosanthus laxus var. gramineus
Iridaceae	*Romulea rosea
Orchidaceae	Caladenia denticulata
Orchidaceae	Caladenia flava subsp. flava
Orchidaceae	Cyanicula deformis
Orchidaceae	Cyanicula gemmata
Orchidaceae	Diuris aff. recurva
Orchidaceae	Eriochilus helonomos
Orchidaceae	Pterostylis aff. nana
Orchidaceae	Pterostylis exserta (ms)
Orchidaceae	Pterostylis recurva
Orchidaceae	Pterostylis sanguinea
Orchidaceae	Pterostylis setulosa

Family	Species
Orchidaceae	Pterostylis vittata
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Casuarinaceae	Allocasuarina humilis
Casuarinaceae	Allocasuarina sp.
Proteaceae	Dryandra fraseri
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Hakea incrassata
Proteaceae	Hakea lissocarpha
Proteaceae	Hakea recurva subsp. recurva
Proteaceae	Isopogon divergens
Loranthaceae	Nuytsia floribunda
Polygonaceae	Muehlenbeckia adpressa
Amaranthaceae	Ptilotus polystachyus var. polystachyus
Portulacaceae	Calandrinia calyptrata
Portulacaceae	Calandrinia sp.
Portulacaceae	Calandrinia sp. Blackberry (D.M. Porter 171)
Caryophyllaceae	*Petrorhagia dubia
Caryophyllaceae	*Silene gallica var. gallica
Lauraceae	Cassytha pomiformis
Droseraceae	Drosera aff. macrantha
Droseraceae	Drosera erythrorhiza subsp. erythrorhiza
Droseraceae	Drosera macrantha subsp. macrantha
Droseraceae	Drosera pallida
Crassulaceae	Crassula colorata var. colorata
Crassulaceae	Crassula exserta
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia aestivalis
Mimosaceae	Acacia aristulata
Mimosaceae	Acacia congesta subsp. congesta
Mimosaceae	Acacia hemiteles
Mimosaceae	Acacia lasiocarpa var. sedifolia
Mimosaceae	Acacia microbotrya
Mimosaceae	Acacia pulchella var. goadbyi
Mimosaceae	Acacia restiacea
Mimosaceae	Acacia stenoptera
Papilionaceae	Bossiaea sp. Cairn Hill (M Henson CH2-28)

Family	Species
Papilionaceae	Cristonia biloba
Papilionaceae	Daviesia dielsii
Papilionaceae	Daviesia hakeoides subsp. subnuda
Papilionaceae	Gastrolobium acutum
Papilionaceae	Gompholobium glutinosum
Papilionaceae	Nemcia acuta
Papilionaceae	*Trifolium arvense var. arvense
Papilionaceae	*Trifolium hirtum
Papilionaceae	*Trifolium repens var. repens
Papilionaceae	*Trifolium subterraneum
Geraniaceae	Erodium cygnorum
Geraniaceae	*Erodium botrys
Linaceae	*Linum trigynum
Rutaceae	Boronia ramosa subsp. anethifolia
Polygalaceae	Comesperma integerrimum
Euphorbiaceae	Euphorbia drummondii subsp. drummondii
Stackhousiaceae	Stackhousia monogyna
Stackhousiaceae	Tripterococcus brunonis
Sapindaceae	Diplopeltis huegelii subsp. lehmannii
Sapindaceae	Dodonaea pinifolia
Rhamnaceae	Cryptandra glabriflora
Rhamnaceae	Trymalium ledifolium var. rosmarinifolium
Sterculiaceae	Guichenotia micrantha
Sterculiaceae	Guichenotia sarotes
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo
Myrtaceae	Calothamnus sanguineus
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus eudesmioides subsp. eudesmioides
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca radula
Myrtaceae	Regelia megacephala
Myrtaceae	Verticordia densiflora var.

Family	Species
	densiflora
Apiaceae	Daucus glochidiatus
Apiaceae	Platysace cirrosa
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Apiaceae	Trachymene pilosa
Apiaceae	Xanthosia fruticulosa
Epacridaceae	Astroloma serratifolium
Primulaceae	*Anagallis arvensis
Loganiaceae	Phyllangium sulcatum
Chloanthaceae	Pityrodia dilatata
Scrophulariaceae	*Parentucellia latifolia
Rubiaceae	Opercularia vaginata
Lobeliaceae	Isotoma hypocrateriformis
Goodeniaceae	Goodenia arthrotricha
Goodeniaceae	Goodenia berardiana
Goodeniaceae	Goodenia hassallii
Goodeniaceae	Lechenaultia biloba
Goodeniaceae	Scaevola phlebopetala
Stylidiaceae	Levenhookia stipitata
Stylidiaceae	Stylidium cordifolium
Stylidiaceae	Stylidium miniatum
Stylidiaceae	Stylidium repens
Stylidiaceae	Stylidium septentrionale
Asteraceae	Blennospora drummondii
Asteraceae	Gilberta tenuifolia
Asteraceae	Hyalosperma cotula
Asteraceae	Lawrencella rosea
Asteraceae	Millotia myosotidifolia
Asteraceae	Millotia tenuifolia var. tenuifolia
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis canescens
Asteraceae	Podolepis lessonii
Asteraceae	Podotheca angustifolia
Asteraceae	Podotheca gnaphalioides
Asteraceae	Quinetia urvillei
Asteraceae	Rhodanthe polycephala
Asteraceae	Schoenia cassiniana
Asteraceae	Waitzia nitida

Family	Species
Asteraceae	*Arctotheca calendula
Asteraceae	*Hypochaeris glabra
Asteraceae	*Hypochaeris radicata
Asteraceae	*Sonchus oleraceus
Asteraceae	*Tripteris clandestina
Asteraceae	*Urospermum picroides
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 2: Provisional list *Eucalyptus wandoo* subsp. *wandoo* woodlands and open forests.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrodanthonia acerosa
Poaceae	Austrodanthonia caespitosa
Poaceae	Austrodanthonia setacea
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa exilis
Poaceae	Austrostipa hemipogon
Poaceae	Austrostipa scabra
Poaceae	Austrostipa trichophylla
Poaceae	Austrostipa variabilis
Poaceae	Neurachne alopecuroidea
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta longiflora
Poaceae	*Lolium perenne
Poaceae	*Pentaschistis airoides
Poaceae	*Pentaschistis pallida
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma aff. leptostachyum (Moora: ERG18-7)
Cyperaceae	Lepidosperma costale
Cyperaceae	Lepidosperma leptostachyum
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus clandestinus
Restionaceae	Desmocladus flexuosus
Dasypogonaceae	Lomandra (Moora twisty)
Dasypogonaceae	Lomandra aff. micrantha subsp. micrantha
Dasypogonaceae	Lomandra effusa

Family	Species
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Dianella revoluta var. divaricata
Phormiaceae	Stypandra glauca
Anthericaceae	Caesia (Moora hairy stem)
Anthericaceae	Caesia alfordii
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Sowerbaea laxiflora
Anthericaceae	Thysanotus dichotomus
Anthericaceae	Thysanotus manglesianus
Colchicaceae	Burchardia umbellata
Boryaceae	Borya sphaerocephala
Hypoxidaceae	Hypoxis glabella var. leptantha
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Hypoxidaceae	Hypoxis sp.
Dioscoreaceae	Dioscorea hastifolia
Iridaceae	Orthrosanthus laxus
Iridaceae	Orthrosanthus laxus var. gramineus
Iridaceae	*Romulea rosea
Orchidaceae	Caladenia flava subsp. flava
Orchidaceae	Cyanicula deformis
Orchidaceae	Eriochilus helonomos
Orchidaceae	Pterostylis aff. rufa
Orchidaceae	Pterostylis sanguinea
Orchidaceae	Pterostylis setulosa
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Urticaceae	Parietaria debilis
Proteaceae	Dryandra sessilis var. sessilis
Santalaceae	Santalum acuminatum
Chenopodiaceae	Rhagodia drummondii
Amaranthaceae	Ptilotus drummondii var. drummondii
Amaranthaceae	Ptilotus gaudichaudii var. parviflorus
Amaranthaceae	Ptilotus manglesii
Portulacaceae	Calandrinia calyptrata
Portulacaceae	Calandrinia sp.
Caryophyllaceae	*Petrorhagia dubia

Family	Species
Caryophyllaceae	*Silene gallica var. gallica
Droseraceae	Drosera macrantha subsp. macrantha
Droseraceae	Drosera sp.
Crassulaceae	Crassula colorata var. colorata
Crassulaceae	Crassula exserta
Pittosporaceae	Sollya heterophylla
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia erinacea
Mimosaceae	Acacia microbotrya
Papilionaceae	*Trifolium repens var. repens
Papilionaceae	*Trifolium subterraneum
Geraniaceae	Erodium cygnorum
Polygalaceae	Comesperma integerrimum
Polygalaceae	Comesperma volubile
Sapindaceae	Dodonaea inaequifolia
Rhamnaceae	Stenanthemum tridentatum
Rhamnaceae	Trymalium ledifolium var. rosmarinifolium
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus wandoo subsp. wandoo
Myrtaceae	Melaleuca radula
Haloragaceae	Glischrocaryon flavescens
Apiaceae	Apium annuum
Apiaceae	Daucus glochidiatus
Apiaceae	Platysace cirrosa
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Apiaceae	Trachymene pilosa
Apiaceae	Xanthosia fruticulosa
Primulaceae	*Anagallis arvensis
Loganiaceae	Phyllangium sulcatum
Solanaceae	Solanum oldfieldii
Scrophulariaceae	*Parentucellia latifolia
Scrophulariaceae	*Zaluzianskya divaricata
Rubiaceae	Opercularia vaginata
Campanulaceae	Wahlenbergia gracilenta

Family	Species
Lobeliaceae	Lobelia sp. small flowers (K.F. Kenneally 7705)
Goodeniaceae	Dampiera lavandulacea
Goodeniaceae	Goodenia arthrotricha
Goodeniaceae	Goodenia berardiana
Goodeniaceae	Goodenia sp.
Asteraceae	Blennospora drummondii
Asteraceae	Gilberta tenuifolia
Asteraceae	Hyalosperma cotula
Asteraceae	Lagenophora huegelii
Asteraceae	Lawrencella rosea
Asteraceae	Millotia aff. tenuifolia (Moora: CH20-11)
Asteraceae	Millotia tenuifolia var. tenuifolia
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis canescens
Asteraceae	Podolepis lessonii
Asteraceae	Podotheca angustifolia
Asteraceae	Rhodanthe laevis
Asteraceae	Rhodanthe polycephala
Asteraceae	Schoenia cassiniana
Asteraceae	Waitzia nitida
Asteraceae	*Arctotheca calendula
Asteraceae	*Hedypnois rhagadioloides
Asteraceae	*Hypochaeris glabra
Asteraceae	*Tripteris clandestina
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 3: *Eucalyptus loxophl* subsp. *loxophleba* low woodlands to low open forests.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrodanthonia acerosa
Poaceae	Austrodanthonia caespitosa
Poaceae	Austrodanthonia setacea
Poaceae	Austrodanthonia sp.
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa nitida
Poaceae	Austrostipa scabra
Poaceae	Austrostipa trichophylla
Poaceae	Austrostipa variabilis
Poaceae	Neurachne alopecuroidea

Family	Species
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta longiflora
Poaceae	*Pentaschistis pallida
Poaceae	*Pentaschistis sp.
Poaceae	*Pentaschistis sp. Moora (doubtful ID)
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma costale
Cyperaceae	Lepidosperma leptostachyum
Cyperaceae	Schoenus clandestinus
Restionaceae	Desmocladus flexuosus
Centrolepidaceae	Centrolepis sp.
Dasypogonaceae	Lomandra (Moora twisty)
Dasypogonaceae	Lomandra effusa
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Dianella revoluta var. divaricata
Phormiaceae	Stypandra glauca
Anthericaceae	Caesia (Moora hairy stem)
Anthericaceae	Caesia alfordii
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Sowerbaea laxiflora
Anthericaceae	Thysanotus manglesianus
Anthericaceae	Thysanotus patersonii
Anthericaceae	Tricoryne elatior
Colchicaceae	Burchardia umbellata
Boryaceae	Borya sphaerocephala
Haemodoraceae	Haemodorum simulans
Hypoxidaceae	Hypoxis glabella var. leptantha
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Dioscoreaceae	Dioscorea hastifolia
Iridaceae	*Romulea rosea
Orchidaceae	Caladenia denticulata
Orchidaceae	Cyanicula deformis
Orchidaceae	Prasophyllum gracile
Orchidaceae	Pterostylis sanguinea

Family	Species
Orchidaceae	Pterostylis setulosa
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Hakea lissocarpha
Proteaceae	Hakea recurva subsp. recurva
Santalaceae	Santalum spicatum
Loranthaceae	Amyema miraculosa subsp. miraculosa
Chenopodiaceae	Enchylaena tomentosa
Chenopodiaceae	Rhagodia drummondii
Chenopodiaceae	Rhagodia preissii subsp. preissii
Amaranthaceae	Ptilotus divaricatus var. divaricatus
Amaranthaceae	Ptilotus drummondii var. drummondii
Amaranthaceae	Ptilotus holosericeus
Amaranthaceae	Ptilotus manglesii
Amaranthaceae	Ptilotus polystachyus var. polystachyus
Amaranthaceae	Ptilotus spathulatus forma spathulatus
Portulacaceae	Calandrinia calyptrata
Portulacaceae	Calandrinia remota
Portulacaceae	Calandrinia sp.
Caryophyllaceae	*Petrorhagia dubia
Caryophyllaceae	*Silene gallica var. gallica
Droseraceae	Drosera macrantha subsp. macrantha
Crassulaceae	Crassula colorata
Crassulaceae	Crassula colorata var. colorata
Crassulaceae	Crassula exserta
Surianaceae	Stylobasium australe
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia erinacea
Mimosaceae	Acacia microbotrya
Papilionaceae	Kennedia prostrata
Papilionaceae	*Lupinus angustifolius
Geraniaceae	Erodium cygnorum
Geraniaceae	*Erodium botrys
Oxalidaceae	*Oxalis corniculata
Linaceae	*Linum trigynum

Family	Species
Polygalaceae	Comesperma integerrimum
Euphorbiaceae	Poranthera microphylla
Sapindaceae	Dodonaea pinifolia
Rhamnaceae	Trymalium daphnifolium
Rhamnaceae	Trymalium ledifolium var. rosmarinifolium
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Calytrix depressa
Myrtaceae	Eucalyptus loxophleba subsp. loxophleba
Myrtaceae	Eucalyptus obtusiflora
Myrtaceae	Eucalyptus wandoo subsp. wandoo
Myrtaceae	Melaleuca concreta
Myrtaceae	Melaleuca radula
Apiaceae	Daucus glochidiatus
Apiaceae	Platysace cirrosa
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Apiaceae	Trachymene pilosa
Apiaceae	Xanthosia fruticulosa
Primulaceae	*Anagallis arvensis
Loganiaceae	Phyllangium sulcatum
Asclepiadaceae	Rhyncharrhena linearis
Chloanthaceae	Pityrodia dilatata
Solanaceae	Solanum oldfieldii
Scrophulariaceae	*Parentucellia latifolia
Plantaginaceae	Plantago debilis
Rubiaceae	Opercularia vaginata
Rubiaceae	*Galium murale
Campanulaceae	Wahlenbergia gracilenta
Lobeliaceae	Lobelia sp. small flowers (K.F. Kenneally 7705)
Goodeniaceae	Brunonia australis
Goodeniaceae	Goodenia berardiana
Goodeniaceae	Velleia cycnopotamica
Asteraceae	Amblysperma sp. Moora (GH7-57)
Asteraceae	Blennospora drummondii
Asteraceae	Brachyscome perpusilla
Asteraceae	Calotis hispidula
Asteraceae	Gilberta tenuifolia

Family	Species
Asteraceae	Hyalosperma glutinosum subsp. glutinosum
Asteraceae	Lagenophora huegelii
Asteraceae	Millotia tenuifolia var. tenuifolia
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis canescens
Asteraceae	Podolepis lessonii
Asteraceae	Podotheca angustifolia
Asteraceae	Rhodanthe manglesii
Asteraceae	Rhodanthe polycephala
Asteraceae	Rhodanthe pygmaea
Asteraceae	Schoenia cassiniana
Asteraceae	Waitzia nitida
Asteraceae	*Arctotheca calendula
Asteraceae	*Hedypnois rhagadioloides
Asteraceae	*Hypochaeris glabra
Asteraceae	*Tripteris clandestina
Asteraceae	*Urospermum picroides
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 4: *Eucalyptus eudesmioides* subsp. *eudesmioides* low mallee woodlands to low mallee open forests.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Neurachne alopecuroidea
Poaceae	*Avena barbata
Poaceae	*Bromus diandrus
Cyperaceae	Lepidosperma leptostachyum
Cyperaceae	Lepidosperma tenue
Restionaceae	Desmocladus flexuosus
Restionaceae	Lepidobolus chaetocephalus
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Stypandra glauca
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Dioscoreaceae	Dioscorea hastifolia
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Hakea incrassata
Proteaceae	Isopogon divergens

Family	Species
Pittosporaceae	Sollya heterophylla
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia congesta subsp. congesta
Papilionaceae	Bossiaea sp. Cairn Hill (M Henson CH2-28)
Papilionaceae	Daviesia dielsii
Sapindaceae	Dodonaea pinifolia
Malvaceae	Alyogyne huegelii var. grossulariifolia
Sterculiaceae	Thomasia grandiflora
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus eudesmioides subsp. eudesmioides
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca radula
Myrtaceae	Regelia megacephala
Apiaceae	Trachymene pilosa
Apiaceae	Xanthosia fruticulosa
Epacridaceae	Astroloma serratifolium
Goodeniaceae	Dampiera lavandulacea
Stylidiaceae	Stylidium septentrionale
List for Vegetation Alliance 5: *Eucalyptus camaldulensis* open forest to low mallee open forests.	
Myrtaceae	Eucalyptus camaldulensis
List for Vegetation Alliance 6: *Eucalyptus obtusiflora* low woodlands to low open forests.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrodanthonia setacea
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa variabilis
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta longiflora
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma tenue

Family	Species
Dasypogonaceae	Lomandra sp.
Anthericaceae	Caesia (Moora hairy stem)
Anthericaceae	Dichopogon capillipes
Anthericaceae	Thysanotus manglesianus
Hypoxidaceae	Hypoxis glabella var. leptantha
Dioscoreaceae	Dioscorea hastifolia
Orchidaceae	Eriochilus helonomos
Orchidaceae	Pterostylis sanguinea
Orchidaceae	Pterostylis scabra
Chenopodiaceae	Maireana marginata
Chenopodiaceae	Rhagodia preissii subsp. preissii
Amaranthaceae	Ptilotus divaricatus var. divaricatus
Portulacaceae	Calandrinia sp.
Crassulaceae	Crassula colorata var. colorata
Mimosaceae	Acacia erinacea
Geraniaceae	Erodium cygnorum
Oxalidaceae	*Oxalis corniculata
Sapindaceae	Dodonaea inaequifolia
Rhamnaceae	Trymalium daphnifolium
Myrtaceae	Eucalyptus loxophleba subsp. loxophleba
Myrtaceae	Eucalyptus obtusiflora
Apiaceae	Apium annuum
Apiaceae	Daucus glochidiatus
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Apiaceae	Trachymene sp.
Plantaginaceae	Plantago debilis
Asteraceae	Blennospora drummondii
Asteraceae	Calotis hispidula
Asteraceae	Rhodanthe polycephala
Asteraceae	*Arctotheca calendula
Asteraceae	*Hypochaeris glabra
List for Vegetation Alliance 7: *Eucalyptus horistes* woodlands to low open forests.	
Poaceae	Neurachne alopecuroidea
Poaceae	*Ehrharta longiflora
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma leptostachyum
Cyperaceae	Schoenus brevisetis

Family	Species
Restionaceae	Desmocladus flexuosus
Xanthorrhoeaceae	Xanthorrhoea drummondii
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Santalaceae	Leptomeria preissiana
Papilionaceae	Nemcia acuta
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus eudesmioides subsp. eudesmioides
Myrtaceae	Eucalyptus horistes
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Regelia megacephala
Apiaceae	Xanthosia fruticulosa
Goodeniaceae	Goodenia glareicola
Stylidiaceae	Stylidium cordifolium
Stylidiaceae	Stylidium septentrionale
List for Vegetation Alliance 8: *Eucalyptus pruiniramis* low woodland.	
Myrtaceae	Eucalyptus pruiniramis
List for Vegetation Alliance 9: Provisional list *Allocasuarina huegeliana* low woodlands to low open forests.	
Adiantaceae	Cheilanthes adiantoides
Adiantaceae	Cheilanthes distans
Aspleniaceae	Pleurosorus rutifolius
Poaceae	Austrodanthonia acerosa
Poaceae	Austrodanthonia caespitosa
Poaceae	Austrodanthonia setacea
Poaceae	Austrodanthonia sp.
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa hemipogon
Poaceae	Austrostipa macalpinei
Poaceae	Austrostipa mollis
Poaceae	Austrostipa nitida
Poaceae	Austrostipa scabra
Poaceae	Austrostipa sp.

Family	Species
Poaceae	Austrostipa trichophylla
Poaceae	Austrostipa variabilis
Poaceae	Neurachne alopecuroidea
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta longiflora
Poaceae	*Pentaschistis airoides
Poaceae	*Pentaschistis pallida
Poaceae	*Pentaschistis sp. Moora (doubtful ID)
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma aff. leptostachyum (Moora: ERG18-7)
Cyperaceae	Lepidosperma costale
Cyperaceae	Lepidosperma leptostachyum
Cyperaceae	Lepidosperma pubisquameum
Cyperaceae	Lepidosperma sp.
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus clandestinus
Restionaceae	Desmocladus flexuosus
Restionaceae	Lepidobolus chaetocephalus
Dasypogonaceae	Lomandra aff. micrantha subsp. micrantha
Dasypogonaceae	Lomandra effusa
Dasypogonaceae	Lomandra sp.
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Dianella revoluta var. divaricata
Phormiaceae	Stypandra glauca
Anthericaceae	Caesia (Moora hairy stem)
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Sowerbaea laxiflora
Anthericaceae	Thysanotus dichotomus
Anthericaceae	Thysanotus manglesianus
Anthericaceae	Thysanotus multiflorus
Anthericaceae	Tricoryne elatior
Colchicaceae	Burchardia umbellata
Boryaceae	Borya sphaerocephala

Family	Species
Haemodoraceae	Haemodorum simulans
Hypoxidaceae	Hypoxis glabella var. leptantha
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Dioscoreaceae	Dioscorea hastifolia
Iridaceae	*Romulea rosea
Orchidaceae	Caladenia denticulata
Orchidaceae	Caladenia flava subsp. flava
Orchidaceae	Cyanicula deformis
Orchidaceae	Diuris aff. recurva
Orchidaceae	Elythranthera brunonis
Orchidaceae	Eriochilus helonomos
Orchidaceae	Pterostylis sanguinea
Orchidaceae	Pterostylis setulosa
Orchidaceae	Pterostylis sp.
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Proteaceae	Dryandra fraseri
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Hakea lissocarpha
Proteaceae	Hakea recurva subsp. recurva
Proteaceae	Isopogon divergens
Santalaceae	Santalum acuminatum
Loranthaceae	Amyema preissii
Loranthaceae	Nuytsia floribunda
Amaranthaceae	Ptilotus declinatus
Amaranthaceae	Ptilotus polystachyus var. polystachyus
Portulacaceae	Calandrinia calyptrata
Portulacaceae	Calandrinia eremaea
Portulacaceae	Calandrinia sp.
Caryophyllaceae	*Petrorhagia dubia
Caryophyllaceae	*Silene gallica var. gallica
Droseraceae	Drosera aff. macrantha
Droseraceae	Drosera erythrorhiza subsp. erythrorhiza
Droseraceae	Drosera macrantha subsp. macrantha
Crassulaceae	Crassula colorata
Crassulaceae	Crassula colorata var. colorata
Crassulaceae	Crassula decumbens var. decumbens

Family	Species
Crassulaceae	Crassula exserta
Surianaceae	Stylobasium australe
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia aristulata
Mimosaceae	Acacia congesta subsp. congesta
Mimosaceae	Acacia lasiocarpa var. sedifolia
Mimosaceae	Acacia restiacea
Mimosaceae	Acacia stenoptera
Papilionaceae	Bossiaea sp. Cairn Hill (M Henson CH2-28)
Papilionaceae	Daviesia dielsii
Papilionaceae	Daviesia hakeoides subsp. subnuda
Papilionaceae	Gastrolobium obovatum
Papilionaceae	Kennedia prostrata
Papilionaceae	Nemcia acuta
Papilionaceae	*Trifolium hirtum
Papilionaceae	*Trifolium repens var. repens
Papilionaceae	*Trifolium subterraneum
Linaceae	*Linum trigynum
Rutaceae	Boronia coerulescens subsp. spinescens
Polygalaceae	Comesperma integerrimum
Polygalaceae	Comesperma volubile
Euphorbiaceae	Phyllanthus calycinus
Euphorbiaceae	Poranthera microphylla
Stackhousiaceae	Stackhousia monogyna
Stackhousiaceae	Tripterococcus brunonis
Sapindaceae	Diplopeltis huegelii subsp. lehmannii
Sapindaceae	Dodonaea pinifolia
Rhamnaceae	Stenanthemum tridentatum
Rhamnaceae	Trymalium ledifolium var. rosmarinifolium
Sterculiaceae	Keraudrenia velutina subsp. velutina
Sterculiaceae	Thomasia grandiflora
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Baeckea crispiflora var. tenuior
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo

Family	Species
Myrtaceae	Calothamnus sanguineus
Myrtaceae	Calytrix depressa
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus eudesmioides subsp. eudesmioides
Myrtaceae	Eucalyptus loxophleba subsp. loxophleba
Myrtaceae	Eucalyptus wandoo subsp. wandoo
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca radula
Myrtaceae	Regelia megacephala
Myrtaceae	Verticordia densiflora var. densiflora
Apiaceae	Apium annuum
Apiaceae	Daucus glochidiatus
Apiaceae	Platysace cirrosa
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Apiaceae	Trachymene pilosa
Apiaceae	Trachymene sp.
Apiaceae	Xanthosia fruticulosa
Epacridaceae	Astroloma serratifolium
Primulaceae	*Anagallis arvensis
Loganiaceae	Phyllangium paradoxum
Loganiaceae	Phyllangium sulcatum
Chloanthaceae	Pityrodia dilatata
Chloanthaceae	Pityrodia sp.
Solanaceae	Solanum oldfieldii
Solanaceae	*Solanum nigrum
Scrophulariaceae	*Parentucellia latifolia
Rubiaceae	Opercularia vaginata
Rubiaceae	*Galium murale
Campanulaceae	Wahlenbergia gracilenta
Campanulaceae	Wahlenbergia preissii
Campanulaceae	*Wahlenbergia capensis
Lobeliaceae	Lobelia sp. small flowers (K.F. Kenneally 7705)
Goodeniaceae	Goodenia arthrotricha
Goodeniaceae	Goodenia berardiana

Family	Species
Goodeniaceae	Goodenia hassallii
Goodeniaceae	Goodenia sp.
Goodeniaceae	Scaevola glandulifera
Stylidiaceae	Stylidium cordifolium
Stylidiaceae	Stylidium repens
Stylidiaceae	Stylidium septentrionale
Asteraceae	Blennospora drummondii
Asteraceae	Gilberta tenuifolia
Asteraceae	Hyalosperma cotula
Asteraceae	Hyalosperma glutinosum subsp. glutinosum
Asteraceae	Lawrencella rosea
Asteraceae	Millotia tenuifolia var. tenuifolia
Asteraceae	Olearia dampieri subsp. dampieri
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis canescens
Asteraceae	Podolepis lessonii
Asteraceae	Podotheca angustifolia
Asteraceae	Rhodanthe laevis
Asteraceae	Rhodanthe polycephala
Asteraceae	Schoenia cassiniana
Asteraceae	Waitzia nitida
Asteraceae	*Arctotheca calendula
Asteraceae	*Hypochaeris glabra
Asteraceae	*Sonchus oleraceus
Asteraceae	*Tripteris clandestina
Asteraceae	*Urospermum picroides
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 10: Provisional list *Casuarina obesa* open forest.	
Casuarinaceae	Casuarina obesa
List for Vegetation Alliance 11: *Acacia acuminata* low woodlands to low open forests.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrodanthonia acerosa
Poaceae	Austrodanthonia caespitosa
Poaceae	Austrodanthonia setacea
Poaceae	Austrodanthonia sp.
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa eremophila

Family	Species
Poaceae	Austrostipa exilis
Poaceae	Austrostipa nitida
Poaceae	Austrostipa sp.
Poaceae	Austrostipa trichophylla
Poaceae	Austrostipa variabilis
Poaceae	Neurachne alopecuroidea
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta longiflora
Poaceae	*Pentaschistis pallida
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma aff. leptostachyum (Moora: ERG18-7)
Cyperaceae	Lepidosperma costale
Cyperaceae	Lepidosperma leptostachyum
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus clandestinus
Restionaceae	Desmocladus flexuosus
Dasypogonaceae	Lomandra effusa
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Dianella revoluta var. divaricata
Phormiaceae	Stypandra glauca
Anthericaceae	Caesia (Moora hairy stem)
Anthericaceae	Caesia alfordii
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Sowerbaea laxiflora
Anthericaceae	Thysanotus dichotomus
Anthericaceae	Thysanotus manglesianus
Anthericaceae	Tricoryne arenicola
Anthericaceae	Tricoryne elatior
Colchicaceae	Burchardia umbellata
Colchicaceae	Wurmbea drummondii
Boryaceae	Borya sphaerocephala
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Hypoxidaceae	Hypoxis sp.

Family	Species
Dioscoreaceae	Dioscorea hastifolia
Orchidaceae	Caladenia flava subsp. flava
Orchidaceae	Cyanicula deformis
Orchidaceae	Diuris aff. recurva
Orchidaceae	Prasophyllum gracile
Orchidaceae	Pterostylis setulosa
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Hakea recurva subsp. recurva
Loranthaceae	Amyema preissii
Loranthaceae	Lysiana casuarinae
Loranthaceae	Nuytsia floribunda
Amaranthaceae	Ptilotus declinatus
Amaranthaceae	Ptilotus drummondii var. drummondii
Amaranthaceae	Ptilotus polystachyus var. polystachyus
Portulacaceae	Calandrinia calyptrata
Portulacaceae	Calandrinia sp.
Caryophyllaceae	*Petrorhagia dubia
Caryophyllaceae	*Silene gallica var. gallica
Brassicaceae	*Brassica barrelieri subsp. oxyrrhina
Droseraceae	Drosera aff. macrantha
Droseraceae	Drosera macrantha subsp. macrantha
Droseraceae	Drosera macrophylla subsp. macrophylla
Crassulaceae	Crassula colorata
Crassulaceae	Crassula colorata var. colorata
Crassulaceae	Crassula exserta
Pittosporaceae	Sollya heterophylla
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia aristulata
Mimosaceae	Acacia restiacea
Papilionaceae	Gastrolobium obovatum
Papilionaceae	Kennedia prostrata
Papilionaceae	*Trifolium subterraneum
Geraniaceae	Erodium cygnorum
Polygalaceae	Comesperma integerrimum
Sapindaceae	Dodonaea pinifolia

Family	Species
Rhamnaceae	Stenanthemum tridentatum
Rhamnaceae	Trymalium ledifolium var. rosmarinifolium
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus loxophleba subsp. loxophleba
Myrtaceae	Eucalyptus wandoo subsp. wandoo
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca coronicarpa
Myrtaceae	Melaleuca radula
Haloragaceae	Glischrocaryon flavescens
Haloragaceae	Gonocarpus nodulosus
Apiaceae	Daucus glochidiatus
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Apiaceae	Trachymene pilosa
Loganiaceae	Phyllangium paradoxum
Loganiaceae	Phyllangium sulcatum
Chloanthaceae	Pityrodia dilatata
Scrophulariaceae	*Parentucellia latifolia
Myoporaceae	Eremophila undulata
Rubiaceae	Opercularia vaginata
Rubiaceae	*Galium murale
Campanulaceae	*Wahlenbergia capensis
Goodeniaceae	Brunonia australis
Goodeniaceae	Goodenia arthrotricha
Goodeniaceae	Goodenia berardiana
Stylidiaceae	Stylidium septentrionale
Asteraceae	Blennospora drummondii
Asteraceae	Brachyscome perpusilla
Asteraceae	Gilberta tenuifolia
Asteraceae	Hyalosperma cotula
Asteraceae	Hyalosperma glutinosum subsp. glutinosum
Asteraceae	Lagenophora huegelii
Asteraceae	Lawrencella rosea
Asteraceae	Olearia dampieri subsp. eremicola

Family	Species
Asteraceae	Podolepis canescens
Asteraceae	Podolepis lessonii
Asteraceae	Rhodanthe laevis
Asteraceae	Rhodanthe manglesii
Asteraceae	Schoenia cassiniana
Asteraceae	Waitzia nitida
Asteraceae	*Arctotheca calendula
Asteraceae	*Hypochaeris glabra
Asteraceae	*Tripteris clandestina
Asteraceae	*Urospermum picroides
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 12: *Banksia prionotes* scattered low trees.	
Poaceae	Neurachne alopecuroidea
Poaceae	*Avena barbata
Poaceae	*Pentaschistis pallida
Poaceae	*Vulpia myuros
Xanthorrhoeaceae	Xanthorrhoea drummondii
Casuarinaceae	Allocasuarina campestris
Proteaceae	Banksia prionotes
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Grevillea amplexans subsp. semivestita
Proteaceae	Hakea lissocarpha
Mimosaceae	Acacia acuminata subsp. acuminata
Geraniaceae	*Erodium botrys
Myrtaceae	Baeckea crispiflora var. tenuior
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Calytrix strigosa
Myrtaceae	Eremaea beaufortioides var. lachnosanthe
Myrtaceae	Kunzea praestans
Myrtaceae	Leptospermum erubescens
Asteraceae	Podolepis lessonii
List for Vegetation Alliance 13: Provisiona Allocasuarina campestris high shrublands open and closed scrub.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Amphipogon caricinus

Family	Species
Poaceae	Aristida contorta
Poaceae	Austrodanthonia acerosa
Poaceae	Austrodanthonia caespitosa
Poaceae	Austrodanthonia setacea
Poaceae	Austrodanthonia sp.
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa exilis
Poaceae	Austrostipa hemipogon
Poaceae	Austrostipa nitida
Poaceae	Austrostipa scabra
Poaceae	Austrostipa sp.
Poaceae	Austrostipa sp. Cairn Hill (M.E. Trudgen 21176)
Poaceae	Austrostipa tenuifolia
Poaceae	Austrostipa trichophylla
Poaceae	Austrostipa variabilis
Poaceae	Neurachne alopecuroidea
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta longiflora
Poaceae	*Pentaschistis airoides
Poaceae	*Pentaschistis pallida
Poaceae	*Pentaschistis sp. Moora (doubtful ID)
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma aff. lepto-stachyum (Moora: ERG18-7)
Cyperaceae	Lepidosperma costale
Cyperaceae	Lepidosperma leptostachyum
Cyperaceae	Lepidosperma sp.
Cyperaceae	Lepidosperma sp. P1 small head (M.D. Tindale 166A)
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus brevisetis
Cyperaceae	Schoenus clandestinus
Cyperaceae	Schoenus sp.
Restionaceae	Desmocladus flexuosus
Restionaceae	Lepidobolus chaetocephalus
Centrolepidaceae	Centrolepis drummondiana
Centrolepidaceae	Centrolepis pilosa

Family	Species
Dasypogonaceae	Lomandra (Moora twisty)
Dasypogonaceae	Lomandra aff. micrantha subsp. micrantha
Dasypogonaceae	Lomandra effusa
Dasypogonaceae	Lomandra sp.
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Dianella revoluta var. divaricata
Phormiaceae	Stypandra glauca
Anthericaceae	Caesia (Moora hairy stem)
Anthericaceae	Caesia alfordii
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Laxmannia omnifertilis
Anthericaceae	Sowerbaea laxiflora
Anthericaceae	Thysanotus dichotomus
Anthericaceae	Thysanotus manglesianus
Anthericaceae	Thysanotus multiflorus
Anthericaceae	Thysanotus sp.
Anthericaceae	Tricoryne arenicola
Anthericaceae	Tricoryne elatior
Colchicaceae	Burchardia bairdiae
Colchicaceae	Burchardia umbellata
Colchicaceae	Wurmbea drummondii
Boryaceae	Borya sphaerocephala
Haemodoraceae	Conostylis androstemma
Haemodoraceae	Haemodorum paniculatum
Haemodoraceae	Haemodorum simulans
Hypoxidaceae	Hypoxis aff. glabella
Hypoxidaceae	Hypoxis glabella var. leptantha
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Dioscoreaceae	Dioscorea hastifolia
Iridaceae	Orthrosanthus laxus
Iridaceae	Orthrosanthus laxus var. gramineus
Iridaceae	*Romulea rosea
Orchidaceae	Caladenia denticulata
Orchidaceae	Caladenia flaccida subsp. flaccida
Orchidaceae	Caladenia flava subsp. flava
Orchidaceae	Caladenia vulgata

Family	Species
Orchidaceae	Cyanicula deformis
Orchidaceae	Cyanicula gemmata
Orchidaceae	Diuris aff. recurva
Orchidaceae	Elythranthera brunonis
Orchidaceae	Eriochilus dilatatus
Orchidaceae	Eriochilus helonomos
Orchidaceae	Habenaria elongata
Orchidaceae	Leporella fimbriata
Orchidaceae	Pterostylis aff. nana
Orchidaceae	Pterostylis aff. rufa
Orchidaceae	Pterostylis recurva
Orchidaceae	Pterostylis sanguinea
Orchidaceae	Pterostylis setulosa
Orchidaceae	Pterostylis sp.
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Casuarinaceae	Allocasuarina humilis
Proteaceae	Dryandra fraseri
Proteaceae	Dryandra sessilis
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Hakea incrassata
Proteaceae	Hakea lissocarpha
Proteaceae	Isopogon divergens
Santalaceae	Santalum acuminatum
Polygonaceae	Muehlenbeckia adpressa
Chenopodiaceae	Rhagodia drummondii
Portulacaceae	Calandrinia calyptrata
Portulacaceae	Calandrinia sp.
Caryophyllaceae	*Petrorhagia dubia
Caryophyllaceae	*Silene gallica var. gallica
Lauraceae	Cassytha pomiformis
Brassicaceae	*Brassica barrelieri subsp. oxyrrhina
Droseraceae	Drosera aff. macrantha
Droseraceae	Drosera erythrorhiza subsp. erythrorhiza
Droseraceae	Drosera macrantha subsp. macrantha
Droseraceae	Drosera macrophylla subsp. macrophylla
Droseraceae	Drosera pallida
Droseraceae	Drosera sp.

Family	Species
Crassulaceae	Crassula colorata
Crassulaceae	Crassula colorata var. colorata
Crassulaceae	Crassula decumbens var. decumbens
Crassulaceae	Crassula exserta
Surianaceae	Stylobasium australe
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia aristulata
Mimosaceae	Acacia congesta subsp. congesta
Mimosaceae	Acacia lasiocarpa var. sedifolia
Mimosaceae	Acacia pulchella
Mimosaceae	Acacia pulchella var. goadbyi
Mimosaceae	Acacia restiacea
Mimosaceae	Acacia saligna
Mimosaceae	Acacia scirpifolia
Papilionaceae	Bossiaea sp. Cairn Hill (M Henson CH2-28)
Papilionaceae	Daviesia dielsii
Papilionaceae	Daviesia hakeoides subsp. subnuda
Papilionaceae	Gompholobium glutinosum
Papilionaceae	Kennedia prostrata
Papilionaceae	Nemcia acuta
Papilionaceae	*Lupinus angustifolius
Papilionaceae	*Trifolium arvense var. arvense
Papilionaceae	*Trifolium hirtum
Papilionaceae	*Trifolium repens var. repens
Papilionaceae	*Trifolium subterraneum
Geraniaceae	Erodium cygnorum
Geraniaceae	*Erodium botrys
Linaceae	*Linum trigynum
Rutaceae	Boronia coerulescens subsp. spinescens
Polygalaceae	Comesperma integerrimum
Stackhousiaceae	Stackhousia monogyna
Stackhousiaceae	Tripterococcus brunonis
Sapindaceae	Dodonaea inaequifolia
Sapindaceae	Dodonaea pinifolia
Rhamnaceae	Cryptandra glabriflora
Rhamnaceae	Trymalium ledifolium var. rosmarinifolium
Sterculiaceae	Thomasia grandiflora

Family	Species
Dilleniaceae	Hibbertia subvaginata
Thymelaeaceae	Pimelea imbricata var. piligera
Myrtaceae	Baeckea crispiflora
Myrtaceae	Baeckea crispiflora var. tenuior
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo
Myrtaceae	Calothamnus sanguineus
Myrtaceae	Calytrix depressa
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus eudesmioides
Myrtaceae	Eucalyptus eudesmioides subsp. eudesmioides
Myrtaceae	Eucalyptus loxophleba subsp. loxophleba
Myrtaceae	Eucalyptus salmonophloia
Myrtaceae	Eucalyptus wandoo subsp. wandoo
Myrtaceae	Hypocalymma angustifolium
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca radula
Myrtaceae	Melaleuca sclerophylla
Myrtaceae	Melaleuca sp.
Myrtaceae	Regelia megacephala
Myrtaceae	Verticordia acerosa var. preissii
Myrtaceae	Verticordia huegelii var. stylosa
Apiaceae	Apium annuum
Apiaceae	Daucus glochidiatus
Apiaceae	Platysace cirrosa
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Apiaceae	Trachymene pilosa
Apiaceae	Trachymene sp.
Apiaceae	Xanthosia fruticulosa
Epacridaceae	Astroloma serratifolium
Primulaceae	*Anagallis arvensis
Loganiaceae	Phyllangium sulcatum
Chloanthaceae	Pityrodia dilatata
Lamiaceae	Hemiandra incana

Family	Species
Scrophulariaceae	*Parentucellia latifolia
Rubiaceae	Opercularia vaginata
Campanulaceae	Wahlenbergia gracilenta
Lobeliaceae	Lobelia sp. small flowers (K.F. Kenneally 7705)
Goodeniaceae	Brunonia australis
Goodeniaceae	Dampiera lavandulacea
Goodeniaceae	Goodenia arthrotricha
Goodeniaceae	Goodenia berardiana
Goodeniaceae	Goodenia hassallii
Goodeniaceae	Lechenaultia biloba
Goodeniaceae	Scaevola glandulifera
Goodeniaceae	Scaevola phlebopetala
Stylidiaceae	Stylidium calcaratum
Stylidiaceae	Stylidium glabrifolium
Stylidiaceae	Stylidium miniatum
Stylidiaceae	Stylidium septentrionale
Asteraceae	Blennospora drummondii
Asteraceae	Gilberta tenuifolia
Asteraceae	Hyalosperma cotula
Asteraceae	Lagenophora huegelii
Asteraceae	Lawrencella rosea
Asteraceae	Millotia tenuifolia var. tenuifolia
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis canescens
Asteraceae	Podolepis lessonii
Asteraceae	Podotheca angustifolia
Asteraceae	Pterochaeta paniculata
Asteraceae	Rhodanthe laevis
Asteraceae	Rhodanthe polycephala
Asteraceae	Schoenia cassiniana
Asteraceae	Siloxerus humifusus
Asteraceae	Waitzia nitida
Asteraceae	*Arctotheca calendula
Asteraceae	*Hedypnois rhagadioloides
Asteraceae	*Hypochaeris glabra
Asteraceae	*Hypochaeris radicata
Asteraceae	*Sonchus oleraceus
Asteraceae	*Tripteris clandestina
Asteraceae	*Urospermum picroides

Family	Species
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 14: *Allocasuarina microstachya* open scrub.	
Poaceae	Neurachne alopecuroidea
Cyperaceae	Schoenus clandestinus
Boryaceae	Borya sphaerocephala
Casuarinaceae	Allocasuarina huegeliana
Casuarinaceae	Allocasuarina microstachya
Myrtaceae	Calytrix depressa
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Kunzea praestans
Asteraceae	Gilberta tenuifolia
Asteraceae	Lawrencella rosea
Asteraceae	Podolepis canescens
Asteraceae	Podolepis lessonii
List for Vegetation Alliance 15: Provisional list *Regelia megacephala* high shrubland to open and closed scrub.	
Adiantaceae	Cheilanthes adiantoides
Adiantaceae	Cheilanthes distans
Aspleniaceae	Pleurosorus rutifolius
Poaceae	Amphipogon caricinus
Poaceae	Aristida contorta
Poaceae	Austrodanthonia acerosa
Poaceae	Austrodanthonia caespitosa
Poaceae	Austrodanthonia setacea
Poaceae	Austrostipa compressa
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa hemipogon
Poaceae	Austrostipa macalpinei
Poaceae	Austrostipa nitida
Poaceae	Austrostipa scabra
Poaceae	Austrostipa sp.
Poaceae	Austrostipa tenuifolia
Poaceae	Austrostipa trichophylla
Poaceae	Austrostipa variabilis
Poaceae	Eriachne ovata
Poaceae	Neurachne alopecuroidea
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Briza maxima

Family	Species
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta longiflora
Poaceae	*Pentaschistis airoides
Poaceae	*Pentaschistis pallida
Poaceae	*Pentaschistis sp.
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma aff. leptostachyum (Moora: ERG18-7)
Cyperaceae	Lepidosperma leptostachyum
Cyperaceae	Lepidosperma sp.
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus brevisetis
Cyperaceae	Schoenus clandestinus
Cyperaceae	Schoenus pleiostemoneus
Restionaceae	Desmocladus flexuosus
Centrolepidaceae	Centrolepis drummondiana
Centrolepidaceae	Centrolepis pilosa
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Dianella revoluta var. divaricata
Phormiaceae	Stypandra glauca
Anthericaceae	Agrostocrinum scabrum
Anthericaceae	Caesia (Moora hairy stem)
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Sowerbaea laxiflora
Anthericaceae	Thysanotus dichotomus
Anthericaceae	Thysanotus manglesianus
Anthericaceae	Tricoryne elatior
Colchicaceae	Burchardia umbellata
Boryaceae	Borya laciniata
Boryaceae	Borya sphaerocephala
Hypoxidaceae	Hypoxis glabella var. leptantha
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Dioscoreaceae	Dioscorea hastifolia
Iridaceae	Orthrosanthus laxus var. gramineus
Iridaceae	*Romulea rosea
Orchidaceae	Caladenia denticulata
Orchidaceae	Caladenia flaccida subsp. flaccida
Orchidaceae	Caladenia flava subsp. flava
Orchidaceae	Caladenia sp.
Orchidaceae	Cyanicula deformis
Orchidaceae	Cyanicula gemmata
Orchidaceae	Cyrtostylis huegelii
Orchidaceae	Diuris aff. recurva
Orchidaceae	Elythranthera brunonis
Orchidaceae	Eriochilus dilatatus
Orchidaceae	Eriochilus helonomos
Orchidaceae	Pterostylis recurva
Orchidaceae	Pterostylis sanguinea
Orchidaceae	Pterostylis sargentii
Orchidaceae	Pterostylis scabra
Orchidaceae	Pterostylis setulosa
Orchidaceae	Pterostylis sp.
Orchidaceae	Pterostylis spathulata
Orchidaceae	Pterostylis vittata
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina campestris subsp. campestris
Casuarinaceae	Allocasuarina huegeliana
Casuarinaceae	Allocasuarina humilis
Proteaceae	Dryandra fraseri
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Grevillea biternata
Proteaceae	Hakea incrassata
Proteaceae	Isopogon divergens
Loranthaceae	Nuytsia floribunda
Amaranthaceae	Ptilotus polystachyus var. polystachyus
Portulacaceae	Calandrinia calyptrata
Portulacaceae	Calandrinia eremaea
Portulacaceae	Calandrinia sp.
Caryophyllaceae	*Petrorhagia dubia
Caryophyllaceae	*Silene gallica var. gallica
Caryophyllaceae	*Spergula arvensis
Lauraceae	Cassytha pomiformis
Droseraceae	Drosera aff. macrantha
Droseraceae	Drosera erythrorhiza subsp. erythrorhiza

Family	Species
Droseraceae	Drosera macrantha subsp. macrantha
Droseraceae	Drosera pallida
Droseraceae	Drosera sp.
Crassulaceae	Crassula colorata var. colorata
Crassulaceae	Crassula exserta
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia aristulata
Mimosaceae	Acacia congesta subsp. congesta
Mimosaceae	Acacia lasiocarpa var. sedifolia
Mimosaceae	Acacia stenoptera
Papilionaceae	Bossiaea sp. Cairn Hill (M Henson CH2-28)
Papilionaceae	Daviesia dielsii
Papilionaceae	Kennedia prostrata
Papilionaceae	Nemcia acuta
Papilionaceae	*Trifolium arvense var. arvense
Papilionaceae	*Trifolium hirtum
Papilionaceae	*Trifolium repens var. repens
Papilionaceae	*Trifolium subterraneum
Geraniaceae	Erodium cygnorum
Geraniaceae	Erodium botrys
Linaceae	Linum trigynum
Rutaceae	Boronia ramosa subsp. anethifolia
Polygalaceae	Comesperma integerrimum
Polygalaceae	Comesperma volubile
Stackhousiaceae	Stackhousia monogyna
Stackhousiaceae	Tripterococcus brunonis
Sapindaceae	Dodonaea pinifolia
Rhamnaceae	Cryptandra glabriflora
Rhamnaceae	Trymalium ledifolium var. rosmarinifolium
Sterculiaceae	Thomasia grandiflora
Dilleniaceae	Hibbertia subvaginata
Thymelaeaceae	Pimelea imbricata var. piligera
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo
Myrtaceae	Calothamnus sanguineus
Myrtaceae	Calytrix leschenaultii

Family	Species
Myrtaceae	Eucalyptus eudesmioides subsp. eudesmioides
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Regelia megacephala
Apiaceae	Apium annuum
Apiaceae	Daucus glochidiatus
Apiaceae	Platysace cirrosa
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Apiaceae	Trachymene pilosa
Apiaceae	Xanthosia fruticulosa
Epacridaceae	Astroloma serratifolium
Primulaceae	*Anagallis arvensis
Loganiaceae	Phyllangium sulcatum
Gentianaceae	*Centaurium tenuiflorum
Chloanthaceae	Pityrodia dilatata
Scrophulariaceae	*Parentucellia latifolia
Orobanchaceae	*Orobanche minor
Plantaginaceae	Plantago debilis
Rubiaceae	Opercularia vaginata
Campanulaceae	Wahlenbergia gracilenta
Goodeniaceae	Dampiera lavandulacea
Goodeniaceae	Goodenia arthrotricha
Goodeniaceae	Goodenia berardiana
Goodeniaceae	Goodenia hassallii
Goodeniaceae	Goodenia sp.
Goodeniaceae	Lechenaultia biloba
Goodeniaceae	Scaevola anchusifolia
Goodeniaceae	Scaevola phlebopetala
Stylidiaceae	Levenhookia stipitata
Stylidiaceae	Stylidium caricifolium
Stylidiaceae	Stylidium cordifolium
Stylidiaceae	Stylidium glabrifolium
Stylidiaceae	Stylidium miniatum
Stylidiaceae	Stylidium repens
Stylidiaceae	Stylidium septentrionale
Asteraceae	Blennospora drummondii
Asteraceae	Gilberta tenuifolia

Family	Species
Asteraceae	Hyalosperma cotula
Asteraceae	Lawrencella rosea
Asteraceae	Millotia myosotidifolia
Asteraceae	Millotia tenuifolia var. tenuifolia
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis canescens
Asteraceae	Podolepis gracilis
Asteraceae	Podolepis lessonii
Asteraceae	Podotheca aff. gnaphalioides (Moora WDM1-65)
Asteraceae	Podotheca angustifolia
Asteraceae	Quinetia urvillei
Asteraceae	Waitzia acuminata
Asteraceae	Waitzia nitida
Asteraceae	*Arctotheca calendula
Asteraceae	*Hypochaeris glabra
Asteraceae	*Hypochaeris radicata
Asteraceae	*Sonchus oleraceus
Asteraceae	*Tripteris clandestina
Asteraceae	*Urospermum picroides
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 16: Provisional list *Kunzea Praestans* high shrubland to open & close scrub.	
Adiantaceae	Cheilanthes adiantoides
Adiantaceae	Cheilanthes distans
Aspleniaceae	Pleurosorus rutifolius
Cupressaceae	Actinostrobus arenarius
Poaceae	Amphipogon caricinus
Poaceae	Aristida contorta
Poaceae	Austrodanthonia acerosa
Poaceae	Austrodanthonia caespitosa
Poaceae	Austrodanthonia setacea
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa hemipogon
Poaceae	Austrostipa nitida
Poaceae	Austrostipa sp.
Poaceae	Austrostipa trichophylla
Poaceae	Austrostipa variabilis
Poaceae	Neurachne alopecuroidea

Family	Species
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta calycina
Poaceae	*Ehrharta longiflora
Poaceae	*Lolium perenne
Poaceae	*Pentaschistis airoides
Poaceae	*Pentaschistis pallida
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma aff. lepto-stachyum (Moora: ERG18-7)
Cyperaceae	Lepidosperma leptostachyum
Cyperaceae	Lepidosperma sp.
Cyperaceae	Lepidosperma sp. P1 small head (M.D. Tindale 166A)
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus brevisetis
Cyperaceae	Schoenus clandestinus
Cyperaceae	Schoenus nanus
Restionaceae	Desmocladus flexuosus
Restionaceae	Lepidobolus chaetocephalus
Dasypogonaceae	Lomandra (Moora twisty)
Dasypogonaceae	Lomandra aff. micrantha subsp. micrantha
Dasypogonaceae	Lomandra effusa
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Dianella revoluta var. divaricata
Phormiaceae	Stypandra glauca
Anthericaceae	Caesia (Moora hairy stem)
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Laxmannia ramosa subsp. ramosa
Anthericaceae	Thysanotus manglesianus
Anthericaceae	Thysanotus sp.
Anthericaceae	Tricoryne elatior
Colchicaceae	Burchardia umbellata
Boryaceae	Borya laciniata
Boryaceae	Borya sphaerocephala
Haemodoraceae	Haemodorum paniculatum

Family	Species
Haemodoraceae	Haemodorum simulans
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Dioscoreaceae	Dioscorea hastifolia
Iridaceae	Orthrosanthus laxus var. gramineus
Iridaceae	*Romulea rosea
Orchidaceae	Caladenia denticulata
Orchidaceae	Caladenia flava subsp. flava
Orchidaceae	Cyanicula deformis
Orchidaceae	Cyanicula gemmata
Orchidaceae	Diuris aff. recurva
Orchidaceae	Eriochilus helonomos
Orchidaceae	Pterostylis aff. nana
Orchidaceae	Pterostylis exserta (ms)
Orchidaceae	Pterostylis recurva
Orchidaceae	Pterostylis sanguinea
Orchidaceae	Pterostylis setulosa
Orchidaceae	Pterostylis vittata
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Casuarinaceae	Allocasuarina humilis
Casuarinaceae	Allocasuarina sp.
Proteaceae	Dryandra fraseri
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Hakea incrassata
Proteaceae	Hakea lissocarpha
Proteaceae	Hakea recurva subsp. recurva
Proteaceae	Isopogon divergens
Loranthaceae	Nuytsia floribunda
Polygonaceae	Muehlenbeckia adpressa
Amaranthaceae	Ptilotus polystachyus var. polystachyus
Portulacaceae	Calandrinia calyptrata
Portulacaceae	Calandrinia sp.
Portulacaceae	Calandrinia sp. Blackberry (D.M. Porter 171)
Caryophyllaceae	*Petrorhagia dubia
Caryophyllaceae	*Silene gallica var. gallica
Lauraceae	Cassytha pomiformis
Droseraceae	Drosera aff. macrantha
Droseraceae	Drosera erythrorhiza subsp. erythrorhiza
Droseraceae	Drosera macrantha subsp. macrantha
Droseraceae	Drosera pallida
Crassulaceae	Crassula colorata var. colorata
Crassulaceae	Crassula exserta
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia aestivalis
Mimosaceae	Acacia aristulata
Mimosaceae	Acacia congesta subsp. congesta
Mimosaceae	Acacia hemiteles
Mimosaceae	Acacia lasiocarpa var. sedifolia
Mimosaceae	Acacia microbotrya
Mimosaceae	Acacia pulchella var. goadbyi
Mimosaceae	Acacia restiacea
Mimosaceae	Acacia stenoptera
Papilionaceae	Bossiaea sp. Cairn Hill (M Henson CH2-28)
Papilionaceae	Cristonia biloba
Papilionaceae	Daviesia dielsii
Papilionaceae	Daviesia hakeoides subsp. subnuda
Papilionaceae	Gastrolobium acutum
Papilionaceae	Gompholobium glutinosum
Papilionaceae	Nemcia acuta
Papilionaceae	*Trifolium arvense var. arvense
Papilionaceae	*Trifolium hirtum
Papilionaceae	*Trifolium repens var. repens
Papilionaceae	*Trifolium subterraneum
Geraniaceae	Erodium cygnorum
Geraniaceae	*Erodium botrys
Linaceae	*Linum trigynum
Rutaceae	Boronia ramosa subsp. anethifolia
Polygalaceae	Comesperma integerrimum
Euphorbiaceae	Euphorbia drummondii subsp. drummondii
Stackhousiaceae	Stackhousia monogyna
Stackhousiaceae	Tripterococcus brunonis
Sapindaceae	Diplopeltis huegelii subsp. lehmannii
Sapindaceae	Dodonaea pinifolia

Family	Species
Rhamnaceae	Cryptandra glabriflora
Rhamnaceae	Trymalium ledifolium var. rosmarinifolium
Sterculiaceae	Guichenotia micrantha
Sterculiaceae	Guichenotia sarotes
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo
Myrtaceae	Calothamnus sanguineus
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus eudesmioides subsp. eudesmioides
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca radula
Myrtaceae	Regelia megacephala
Myrtaceae	Verticordia densiflora var. densiflora
Apiaceae	Daucus glochidiatus
Apiaceae	Platysace cirrosa
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Apiaceae	Trachymene pilosa
Apiaceae	Xanthosia fruticulosa
Epacridaceae	Astroloma serratifolium
Primulaceae	*Anagallis arvensis
Loganiaceae	Phyllangium sulcatum
Chloanthaceae	Pityrodia dilatata
Scrophulariaceae	*Parentucellia latifolia
Rubiaceae	Opercularia vaginata
Lobeliaceae	Isotoma hypocrateriformis
Goodeniaceae	Goodenia arthrotricha
Goodeniaceae	Goodenia berardiana
Goodeniaceae	Goodenia hassallii
Goodeniaceae	Lechenaultia biloba
Goodeniaceae	Scaevola phlebopetala
Stylidiaceae	Levenhookia stipitata
Stylidiaceae	Stylidium cordifolium
Stylidiaceae	Stylidium miniatum

Family	Species
Stylidiaceae	Stylidium repens
Stylidiaceae	Stylidium septentrionale
Asteraceae	Blennospora drummondii
Asteraceae	Gilberta tenuifolia
Asteraceae	Hyalosperma cotula
Asteraceae	Lawrencella rosea
Asteraceae	Millotia myosotidifolia
Asteraceae	Millotia tenuifolia var. tenuifolia
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis canescens
Asteraceae	Podolepis lessonii
Asteraceae	Podotheca angustifolia
Asteraceae	Podotheca gnaphalioides
Asteraceae	Quinetia urvillei
Asteraceae	Rhodanthe polycephala
Asteraceae	Schoenia cassiniana
Asteraceae	Waitzia nitida
Asteraceae	*Arctotheca calendula
Asteraceae	*Hypochaeris glabra
Asteraceae	*Hypochaeris radicata
Asteraceae	*Sonchus oleraceus
Asteraceae	*Tripteris clandestina
Asteraceae	*Urospermum picroides
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 17: *Melaleuca calyptr open to closed heath.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Amphipogon caricinus
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa trichophylla
Poaceae	Neurachne alopecuroidea
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Pentaschistis pallida
Poaceae	*Pentaschistis sp. Moora (doubtful ID)
Poaceae	*Vulpia myuros
Restionaceae	Desmocladus flexuosus

Family	Species
Dasypogonaceae	Lomandra (Moora twisty)
Xanthorrhoeaceae	Xanthorrhoea drummondii
Anthericaceae	Caesia (Moora hairy stem)
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Laxmannia ramosa subsp. ramosa
Anthericaceae	Thysanotus manglesianus
Colchicaceae	Burchardia umbellata
Boryaceae	Borya sphaerocephala
Orchidaceae	Caladenia denticulata
Orchidaceae	Caladenia flava subsp. flava
Orchidaceae	Cyanicula deformis
Orchidaceae	Cyanicula gemmata
Orchidaceae	Paracaleana carinata
Orchidaceae	Pterostylis recurva
Orchidaceae	Pterostylis sanguinea
Orchidaceae	Pterostylis setulosa
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Casuarinaceae	Allocasuarina sp.
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Isopogon divergens
Caryophyllaceae	*Silene gallica var. gallica
Droseraceae	Drosera aff. macrantha
Droseraceae	Drosera erythrorhiza subsp. erythrorhiza
Droseraceae	Drosera macrantha subsp. macrantha
Crassulaceae	Crassula colorata var. colorata
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia hemiteles
Papilionaceae	Daviesia dielsii
Papilionaceae	Nemcia acuta
Papilionaceae	*Trifolium arvense var. arvense
Papilionaceae	*Trifolium hirtum
Sapindaceae	Diplopeltis huegelii subsp. lehmannii
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)

Family	Species
Myrtaceae	Calothamnus sanguineus
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca calyptroides
Apiaceae	Apium annuum
Apiaceae	Homalosciadium homalocarpum
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Apiaceae	Trachymene pilosa
Epacridaceae	Astroloma serratifolium
Loganiaceae	Phyllangium sulcatum
Chloanthaceae	Pityrodia dilatata
Scrophulariaceae	*Parentucellia latifolia
Rubiaceae	Opercularia vaginata
Campanulaceae	Wahlenbergia gracilenta
Stylidiaceae	Levenhookia stipitata
Stylidiaceae	Stylidium repens
Stylidiaceae	Stylidium septentrionale
Asteraceae	Blennospora drummondii
Asteraceae	Millotia tenuifolia var. tenuifolia
Asteraceae	Podolepis lessonii
Asteraceae	Podotheca angustifolia
Asteraceae	*Arctotheca calendula
Asteraceae	*Hypochaeris glabra
Asteraceae	*Urospermum picroides
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 18: *Hibbertia subvaginata* low shrublands to low open heath.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrodanthonia acerosa
Poaceae	Austrodanthonia caespitosa
Poaceae	Austrodanthonia setacea
Poaceae	Austrostipa elegantissima
Poaceae	Neurachne alopecuroidea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta longiflora
Poaceae	*Pentaschistis airoides

Family	Species
Poaceae	*Pentaschistis pallida
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma leptostachyum
Restionaceae	Desmocladus flexuosus
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Stypandra glauca
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Thysanotus manglesianus
Colchicaceae	Burchardia umbellata
Boryaceae	Borya sphaerocephala
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Dioscoreaceae	Dioscorea hastifolia
Orchidaceae	Caladenia denticulata
Orchidaceae	Caladenia flava subsp. flava
Orchidaceae	Cyanicula deformis
Orchidaceae	Pterostylis setulosa
Orchidaceae	Pterostylis sp.
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Proteaceae	Dryandra sessilis var. sessilis
Loranthaceae	Nuytsia floribunda
Portulacaceae	Calandrinia calyptrata
Portulacaceae	Calandrinia sp.
Caryophyllaceae	*Petrorhagia dubia
Droseraceae	Drosera macrantha subsp. macrantha
Droseraceae	Drosera sp.
Crassulaceae	Crassula colorata var. colorata
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia aristulata
Mimosaceae	Acacia congesta subsp. congesta
Papilionaceae	Kennedia prostrata
Papilionaceae	*Trifolium repens var. repens
Papilionaceae	*Trifolium subterraneum
Polygalaceae	Comesperma integerrimum
Rhamnaceae	Trymalium ledifolium var. rosmarinifolium
Dilleniaceae	Hibbertia subvaginata

Family	Species
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus loxophleba subsp. loxophleba
Myrtaceae	Kunzea praestans
Apiaceae	Trachymene cyanopetala
Apiaceae	Trachymene ornata
Loganiaceae	Phyllangium sulcatum
Chloanthaceae	Pityrodia dilatata
Scrophulariaceae	*Parentucellia latifolia
Goodeniaceae	Goodenia berardiana
Stylidiaceae	Stylidium glabrifolium
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis lessonii
Asteraceae	Quinetia urvillei
Asteraceae	Waitzia nitida
Asteraceae	*Arctotheca calendula
Asteraceae	*Hypochaeris glabra
Asteraceae	*Urospermum picroides
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 19: *Xanthorrhoea drummondii* high open shrubland.	
Xanthorrhoeaceae	Xanthorrhoea drummondii
List for Vegetation Alliance 20-1: *Dryandra sessilis* high shrubland.	
Poaceae	Neurachne alopecuroidea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Pentaschistis airoides
Poaceae	*Vulpia myuros
Restionaceae	Desmocladus flexuosus
Xanthorrhoeaceae	Xanthorrhoea drummondii
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Proteaceae	Banksia sphaerocarpa var. sphaerocarpa
Proteaceae	Dryandra nivea
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Grevillea amplexans subsp. semivestita
Proteaceae	Petrophile brevifolia
Loranthaceae	Nuytsia floribunda
Mimosaceae	Acacia acuminata subsp.

Family	Species
	acuminata
Mimosaceae	Acacia pulchella var. glaberrima
Papilionaceae	Bossiaea sp. Cairn Hill (M Henson CH2-28)
Papilionaceae	Daviesia dielsii
Papilionaceae	Jacksonia floribunda
Papilionaceae	Jacksonia foliosa
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Baeckea aff. preissiana (Schauer)Domin EAG 7109
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus eudesmioides subsp. eudesmioides
Myrtaceae	Kunzea praestans
Myrtaceae	Leptospermum erubescens
Apiaceae	Trachymene pilosa
Asteraceae	Podolepis lessonii
List for Vegetation Alliance 20-2: *Melaleuca conc* open scrub.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrodanthonia acerosa
Poaceae	Austrostipa elegantissima
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus clandestinus
Boryaceae	Borya sphaerocephala
Crassulaceae	Crassula colorata var. colorata
Mimosaceae	Acacia acuminata subsp. acuminata
Mimosaceae	Acacia ericksoniae
Rhamnaceae	Trymalium daphnifolium
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Eucalyptus loxophleba subsp. loxophleba
Myrtaceae	Melaleuca concreta
Myrtaceae	Melaleuca radula
Myrtaceae	Melaleuca sclerophylla
Stylidiaceae	Stylidium septentrionale
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis lessonii
Asteraceae	Waitzia nitida

Family	Species
List for Vegetation Alliance 20-3: *Melaleuca radu* high shrubland to open scrub.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Neurachne alopecuroidea
Poaceae	*Avena barbata
Poaceae	*Pentaschistis pallida
Cyperaceae	Lepidosperma pubisquameum
Cyperaceae	Schoenus clandestinus
Restionaceae	Desmocladus flexuosus
Restionaceae	Lepidobolus chaetocephalus
Xanthorrhoeaceae	Xanthorrhoea drummondii
Boryaceae	Borya sphaerocephala
Casuarinaceae	Allocasuarina huegeliana
Proteaceae	Hakea recurva subsp. recurva
Mimosaceae	Acacia acuminata subsp. acuminata
Rhamnaceae	Trymalium ledifolium var. rosmarinifolium
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Melaleuca calyptroides
Myrtaceae	Melaleuca radula
Rubiaceae	Opercularia vaginata
Stylidiaceae	Stylidium septentrionale
Asteraceae	Blennospora drummondii
Asteraceae	Podolepis lessonii
List for Vegetation Alliance 20-4: *Melaleuca sclerophylla* open heath.	
Poaceae	Neurachne alopecuroidea
Cyperaceae	Lepidosperma costale
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus clandestinus
Restionaceae	Desmocladus flexuosus
Boryaceae	Borya sphaerocephala
Papilionaceae	Gastrolobium obovatum
Sapindaceae	Dodonaea pinifolia
Rhamnaceae	Stenanthemum tridentatum
Myrtaceae	Hypocalymma angustifolium
Myrtaceae	Melaleuca sclerophylla
Stylidiaceae	Stylidium septentrionale

Family	Species
List for Vegetation Alliance 20-5: *Baeckea* sp. Mo (R. Bone 1993/1) low open heath.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrodanthonia caespitosa
Poaceae	Neurachne alopecuroidea
Poaceae	*Ehrharta longiflora
Cyperaceae	Lepidosperma aff. leptostachyum (Moora: ERG18-7)
Cyperaceae	Schoenus clandestinus
Restionaceae	Lepidobolus chaetocephalus
Xanthorrhoeaceae	Xanthorrhoea drummondii
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Thysanotus manglesianus
Anthericaceae	Tricoryne arenicola
Colchicaceae	Burchardia umbellata
Boryaceae	Borya sphaerocephala
Haemodoraceae	Haemodorum simulans
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Orchidaceae	Caladenia flava subsp. flava
Orchidaceae	Cyanicula deformis
Orchidaceae	Leporella fimbriata
Orchidaceae	Pterostylis sanguinea
Orchidaceae	Pterostylis setulosa
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Droseraceae	Drosera aff. macrantha
Droseraceae	Drosera erythrorhiza subsp. erythrorhiza
Papilionaceae	*Lupinus angustifolius
Thymelaeaceae	Pimelea imbricata var. piligera
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Calytrix depressa
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca radula
Haloragaceae	Gonocarpus nodulosus
Apiaceae	Trachymene cyanopetala
Goodeniaceae	Goodenia berardiana
Goodeniaceae	Goodenia hassallii

Family	Species
Stylidiaceae	Stylidium septentrionale
Asteraceae	Blennospora drummondii
Asteraceae	Lawrencella rosea
Asteraceae	Podolepis lessonii
Asteraceae	Podotheca angustifolia
Asteraceae	Quinetia urvillei
Asteraceae	Waitzia nitida
Asteraceae	*Arctotheca calendula
Asteraceae	*Hypochaeris glabra
Asteraceae	*Ursinia anthemoides
List for Vegetation Alliance 20-6: *Calytrix leschenaultii* open heath.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrodanthonia caespitosa
Poaceae	Neurachne alopecuroidea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Pentaschistis pallida
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus clandestinus
Restionaceae	Desmocladus flexuosus
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Dianella revoluta var. divaricata
Phormiaceae	Stypandra glauca
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Colchicaceae	Burchardia umbellata
Boryaceae	Borya sphaerocephala
Dioscoreaceae	Dioscorea hastifolia
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Proteaceae	Dryandra sessilis var. sessilis
Proteaceae	Hakea lissocarpha
Mimosaceae	Acacia acuminata subsp. acuminata
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Eucalyptus wandoo subsp. wandoo

Family	Species
Myrtaceae	Kunzea praestans
Chloanthaceae	Pityrodia dilatata
Solanaceae	Solanum oldfieldii
Stylidiaceae	Stylidium septentrionale
Asteraceae	Blennospora drummondii
Asteraceae	Gilberta tenuifolia
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis lessonii
Asteraceae	Podotheca angustifolia
Asteraceae	Waitzia nitida
Asteraceae	*Hypochaeris glabra
List for Vegetation Alliance 20-7: *Calytrix depressa* low open heath.	
Poaceae	Neurachne alopecuroidea
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus clandestinus
Xanthorrhoeaceae	Xanthorrhoea drummondii
Anthericaceae	Dichopogon capillipes
Anthericaceae	Tricoryne elatior
Boryaceae	Borya sphaerocephala
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Papilionaceae	Gastrolobium obovatum
Rhamnaceae	Stenanthemum tridentatum
Myrtaceae	Baeckea sp. Moora (R. Bone 1993/1)
Myrtaceae	Calytrix depressa
Myrtaceae	Hypocalymma angustifolium
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca radula
Epacridaceae	Astroloma serratifolium
Goodeniaceae	Dampiera lavandulacea
Goodeniaceae	Goodenia hassallii
Stylidiaceae	Stylidium septentrionale
Asteraceae	Podolepis lessonii
List for Vegetation Alliance 20-8: *Calothan* aff. *quadrifidus* Moora-Watheroo high shrubland.	
Poaceae	Neurachne alopecuroidea
Poaceae	*Avena barbata

Family	Species
Poaceae	*Ehrharta longiflora
Poaceae	*Vulpia myuros
Cyperaceae	Lepidosperma tenue
Cyperaceae	Schoenus clandestinus
Restionaceae	Desmocladus flexuosus
Xanthorrhoeaceae	Xanthorrhoea drummondii
Boryaceae	Borya sphaerocephala
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Crassulaceae	Crassula colorata var. colorata
Mimosaceae	Acacia acuminata subsp. acuminata
Papilionaceae	Daviesia dielsii
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Calothamnus aff. quadrifidus Moora-Watheroo
Myrtaceae	Calytrix leschenaultii
Myrtaceae	Kunzea praestans
Myrtaceae	Melaleuca calyptroides
Stylidiaceae	Stylidium septentrionale
Asteraceae	Olearia dampieri subsp. eremicola
Asteraceae	Podolepis canescens
List for Vegetation Alliance 20-9: *Ricinocarpus muricatus* shrubland to open heath.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrodanthonia setacea
Poaceae	Austrostipa sp.
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Ehrharta longiflora
Restionaceae	Desmocladus flexuosus
Anthericaceae	Dichopogon capillipes
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Crassulaceae	Crassula colorata
Mimosaceae	Acacia acuminata subsp. acuminata
Euphorbiaceae	Ricinocarpos muricatus
Myrtaceae	Eucalyptus loxophleba subsp. loxophleba
Myrtaceae	Kunzea praestans
Asteraceae	Podolepis lessonii

Family	Species
Asteraceae	Rhodanthe polycephala
Asteraceae	*Hypochaeris glabra
List for Vegetation Alliance 20-10: *Ricinocarpus velutinus* open heath.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrostipa mollis
Poaceae	Neurachne alopecuroidea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Ehrharta calycina
Cyperaceae	Lepidosperma tenue
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Stypandra glauca
Anthericaceae	Dichopogon capillipes
Dioscoreaceae	Dioscorea hastifolia
Casuarinaceae	Allocasuarina campestris
Casuarinaceae	Allocasuarina huegeliana
Mimosaceae	Acacia acuminata subsp. acuminata
Euphorbiaceae	Ricinocarpos velutinus
Dilleniaceae	Hibbertia subvaginata
Myrtaceae	Kunzea praestans
Goodeniaceae	Goodenia arthrotricha
Asteraceae	Hyalosperma cotula
Asteraceae	Rhodanthe polycephala
Asteraceae	Waitzia nitida
List for Vegetation Alliance 2-10: Other miscellaneous.	
Adiantaceae	Cheilanthes adiantoides
Poaceae	Austrodanthonia setacea
Poaceae	Austrostipa elegantissima
Poaceae	Austrostipa nitida
Poaceae	Austrostipa variabilis
Poaceae	Neurachne alopecuroidea
Poaceae	*Aira caryophyllea
Poaceae	*Avena barbata
Poaceae	*Briza maxima
Poaceae	*Bromus diandrus
Poaceae	*Ehrharta longiflora
Poaceae	*Pentaschistis sp. Moora (doubtful ID)
Cyperaceae	Lepidosperma pubisquameum

Family	Species
Xanthorrhoeaceae	Xanthorrhoea drummondii
Phormiaceae	Dianella revoluta var. divaricata
Phormiaceae	Stypandra glauca
Anthericaceae	Chamaescilla corymbosa var. corymbosa
Anthericaceae	Dichopogon capillipes
Anthericaceae	Sowerbaea laxiflora
Anthericaceae	Thysanotus manglesianus
Colchicaceae	Burchardia umbellata
Hypoxidaceae	Hypoxis occidentalis var. occidentalis
Dioscoreaceae	Dioscorea hastifolia
Iridaceae	*Romulea rosea
Orchidaceae	Cyanicula deformis
Orchidaceae	Diuris aff. recurva
Casuarinaceae	Allocasuarina huegeliana
Caryophyllaceae	*Petrorhagia dubia
Caryophyllaceae	*Silene gallica var. gallica
Droseraceae	Drosera aff. macrantha
Droseraceae	Drosera macrantha subsp. macrantha
Crassulaceae	Crassula colorata var. colorata
Mimosaceae	Acacia acuminata subsp. acuminata
Geraniaceae	Erodium cygnorum
Geraniaceae	*Erodium botrys
Rutaceae	Boronia coerulescens subsp. spinescens
Polygalaceae	Comesperma integerrimum
Haloragaceae	Gonocarpus nodulosus
Apiaceae	Daucus glochidiatus
Apiaceae	Trachymene ornata
Primulaceae	*Anagallis arvensis
Loganiaceae	Phyllangium sulcatum
Scrophulariaceae	*Parentucellia latifolia
Rubiaceae	*Galium murale
Campanulaceae	*Wahlenbergia capensis
Goodeniaceae	Goodenia berardiana
Asteraceae	Blennospora drummondii
Asteraceae	Calotis hispidula
Asteraceae	Gilberta tenuifolia
Asteraceae	Hyalosperma glutinosum subsp. glutinosum

Family	Species
Asteraceae	Podolepis lessonii
Asteraceae	Waitzia nitida
Asteraceae	*Arctotheca calendula
Asteraceae	*Hypochaeris glabra
Asteraceae	*Sonchus oleraceus
Asteraceae	*Tripteris clandestina
Asteraceae	*Ursinia anthemoides
List for Provisional Vegetation Alliance 22 Casuarina obesa (Eucalyptus loxophleba subsp. loxophleba) over Acacia ligustrina Hakea preissii.	
Poaceae	*Cynosurus echinatus
Poaceae	*Vulpia myuros

Family	Species
Casuarinaceae	Casuarina obesa
Proteaceae	Hakea preissii
Chenopodiaceae	Atriplex suberecta
Chenopodiaceae	Maireana brevifolia
Chenopodiaceae	Salsola tragus subsp. tragus
Amaranthaceae	Ptilotus spathulatus forma spathulatus
Mimosaceae	Acacia erinacea
Mimosaceae	Acacia ligustrina
Myrtaceae	Eucalyptus loxophleba subsp. loxophleba

APPENDIX 9: Photographs of the vegetation of the survey area and of declared rare flora species

The vegetation type represented by each photograph is given. The code in bold (e.g. **Aa.1**) is the code used in the text (see Appendix 7) and on the vegetation map.

Photographs of the declared rare flora species *Acacia aristulata* and *Eucalyptus pruiniramis* are also provided.



Photograph 1. Aa.1 *Acacia acuminata* subsp. *acuminata* low woodland over *Schoenus clandestinus* open sedgeland and *Austrodanthonia* sp, *Neurachne alopecuroidea*, **Avena barbata* scattered grasses with *Borya sphaerocephala* (1-2%), *Waitzia nitida*, *Gilberta tenuifolia*, *Podolepis lessonii* open herbland. (Releve RM4, R. Manning's).



Photograph 2. Aa.2 *Acacia acuminata* subsp. *acuminata* low open woodland over *Xanthorrhoea drummondii* high open shrubland over some remnant low shrubs and herbs (*Pityrodia dilatata*, *Opercularia vaginata*) and annual grassland (Disturbed remnant). (Releve NBPD1, P&L Doblestein's).



Photograph 3. Aa.2 *Acacia acuminata* subsp. *acuminata* low open woodland over *Xanthorrhoea drummondii* high open shrubland to scattered tall shrubs over **Avena barbata, *Ehrharta longiflora, *Briza maxima* annual grassland and *Ptilotus drummondii* var. *drummondii, Waitzia nitida, Lawrencella rosea* open herbland. (Disturbed remnant). (Releve NBPD2, P&L Doblestein's)



Photograph 4. Aa.2 *Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana* low open woodland over *Xanthorrhoea drummondii* high open shrubland over *Lepidosperma leptostachyum* open sedgeland over **Avena barbata* very open to scattered annual grasses with *Podolepis lessonii, Gilberta tenuifolia, Waitzia nitida* very open to open herbland. (Releve D5, P&L Doblestein's).



Photograph 5. AaKp.1 *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low woodland to low open forest over *Kunzea praestans* scattered tall shrubs (at top of breakaway) over *Pityrodia dilatata* scattered low shrubs over *Stypandra glauca* open herbland with *Dioscorea hastifolia* open lianes and **Avena barbata* annual open grassland. (Quadrat ERG15, Eastern Ridge)



Photograph 6. AaTl.1 *Acacia acuminata* subsp. *acuminata* scattered low trees over *Trymalium ledifolium* var. *rosmarinifolium* open shrubland over *Neurachne alopecuroidea* scattered grasses and Cheilanthes adiantoides open fernland with *Schoenia cassiniana*, *Podolepis lessonii* annual herbland. (Quadrat GH5, Gardiner's Hill).



Photograph 7. Ac.3 *Eucalyptus loxophleba* subsp. *loxophleba*, *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low open woodland over *Allocasuarina campestris* shrubland to high shrubland over *Borya sphaerocephala*, *Cheilanthes adiantoides* low open herbland/fernland. (Quadrat ERG18, Eastern Ridge).



Photograph 8. Ac.4 *Acacia acuminata* subsp. *acuminata*, *Allocasuarina huegeliana* scattered low trees to low open woodland over *Allocasuarina campestris* open to closed scrub over *Cheilanthes adiantoides*, *Dichopogon capillipes*, *Stylidium septentrionale* open fern/herbland. (Quadrat JT6, J&J Tonkin's).



Photograph 9. Ac.4 *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland over *Allocasuarina campestris*, *Xanthorrhoea drummondii* high open shrubland over **Avena barbata* very open annual grassland and with *Cheilanthes adiantoides* scattered ferns. (Releve G311, P&J Gardiner's).



Photograph 10. AcAh.2 *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low open woodland to low woodland over *Allocasuarina campestris* high open shrubland over tussock sedgeland over *Cheilanthes adiantoides* low open ferns with *Podolepis lessonii* annual herbland/grassland and *Dioscorea hastifolia* open lianes. (Quadrat ERG20, Eastern Ridge).



Photograph 11. AcCq.1 *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* scattered low trees over *Allocasuarina campestris*, (*Calothamnus* aff. *quadrifidus* Moora-Watheroo) open scrub over *Neurachne alopecuroidea*, *Desmocladus flexuosus*, *Stylidium septentrionale* scattered grasses, sedges and herbs. (Quadrat JT9, J&J Tonkin's).



Photograph 12. AcId.2 *Allocasuarina huegeliana* scattered low trees over *Allocasuarina campestris, Kunzea praestans* high shrubland to open scrub over *Melaleuca calyptroides*, *Isopogon divergens* shrubland over *Calytrix leschenaultii* low open shrubland over *Borya sphaerocephala*, *Stylidium septentrionale* very open herbland. (Quadrat CH17, Cairn Hill Reserve).



Photograph 13. AcId.3 *Allocasuarina campestris* closed scrub over *Isopogon divergens* open shrubland over scattered low shrubs over *Neurachne alopecuroidea* scattered grasses. (Quadrat CH19, Cairn Hill Reserve).



Photograph 14. Ah.3 *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* low woodland to low open forest over *Allocasuarina campestris* scattered tall shrubs to high open shrubland over *Podolepis lessonii, Trachymene ornata* open annual herbland. (Quadrat JT5, J&J Tonkin's).



Photograph 15. Ah.3 *Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana* low woodland to low open forest over *Allocasuarina campestris* scattered tall shrubs to high open shrubland over *Podolepis lessonii, Trachymene* spp. annual herbland. (Quadrat JT2, J.& J. Tonkin's)



Photograph 16. Ah.4 *Allocasuarina huegeliana* low woodland to low open forest over *Kunzea praestans, Xanthorrhoea drummondii* scattered tall shrubs over *Xanthosia fruticulosa* low open shrubland to low shrubland over *Opercularia vaginata, Cheilanthes adiantoides, Neurachne alopecuroidea* very open low herbland/fernland/sedgeland. (Quadrat CH8, Cairn Hill Reserve).



Photograph 17. AhDs.2 *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Xanthorrhoea drummondii* high open shrubland over *Calytrix leschenaultii*, *Hibbertia subvaginata* low open shrubland over *Cheilanthes adiantoides* very open fernland and **Ehrharta longiflora* annual grassland. (Quadrat GH10, Gardiner's Hill).



Photograph 18. AhDsKp.3 *Allocasuarina huegeliana* low open forest over *Dryandra sessilis* open scrub over *Kunzea praestans* open shrubland over *Calytrix leschenaultia*, *Hibbertia subvaginata* low open shrubland over *Desmocladus flexuosus* very open sedgeland. (Quadrat GH1, Gardiner's Hill).



Photograph 19. AhTl.1 *Acacia huegeliana* low open forest over *Trymalium ledifolium* var. *rosmarinifolium*, *Xanthosia fruticulosa* low open shrubland over *Neurachne alopecuroidea*, *Desmocladus flexuosa* very open grass/sedgeland with *Dioscorea hastifolia* very open lianes. (Quadrat CH13, Cairn Hill Reserve).



Photograph 20. AhXd.2 *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*) low open woodland over *Xanthorrhoea drummondii* high open shrubland over *Kunzea praestans* scattered shrubs over *Trymalium ledifolium* var. *rosmarinifolium*, *Pityrodia dilatata*, *Acacia lasiocarpa* var. *sedifolia* low open shrubland to low shrubland over **Avena barbata* annual open grassland and *Stypandra glauca*, *Podolepis lessonii* very open herbland and *Cheilanthes adiantoides* scattered ferns and *Neurachne alopecuroidea* scattered native grasses. (Site D1, P&L Doblestein's).



Photograph 21. AhXd.4 *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low open woodland over *Xanthorrhoea drummondii* scattered tall shrubs over *Pityrodia dilatata* scattered low shrubs over a very open sedgeland and *Austrodanthonia caespitosa*, *Neurachne alopecuroidea* scattered grasses with *Opercularia vaginata* (10-15%) open herbland and *Cheilanthes adiantoides* scattered ferns. (Site RM1, R. Manning's).



Photograph 22. Bp.2 *Banksia prionotes* scattered low trees over *Dryandra sessilis* var. *sessilis* high open shrubland over *Leptospermum erubescens*, *Grevillea amplexcans* ssp. *semivestita*, *Kunzea praestans* high shrubland (*Leptospermum erubescens* heavily grazed) over *Calytrix leschenaultii* scattered low shrubs over **Vulpia myuros* var. *hirsuta*, (*Neurachne alopecuroidea*) open grassland and *Podolepis lessonii* very open herbland. (Releve G315, P&J Gardiner's).



Photograph 23. DsHs.1 *Nuytsia floribunda*, (*Allocasuarina huegeliana*) scattered low trees over *Dryandra sessilis* var. *sessilis* high open shrubland over *Hibbertia subvaginata*, (*Calytrix leschenaultii*) low open heath over *Desmocladus flexuosus* very open sedgeland and annual grassland. (Releve G312, P&J Gardiner's)



Photograph 24. DsKp.1 (*Nuytsia floribunda* scattered low trees) over *Dryandra sessilis* var. sessilis high shrubland to open heath over *Kunzea praestans*, *Leptospermum erubescens*, *Grevillea amplexicans* ssp. *semivestita* high shrubland over *Acacia pulchella* var. *glaberrima*, *Baeckea* aff. *preissiana*, *Daviesia dielsii*, *Dryandra nivea* 'narrow leaf mound', *Banksia sphaerocephala* var. *sphaerocephala* low open shrubland over open annual grassland and scattered herbs. (Releve G316, P&J Gardiner's).



Photograph 25. El.1 *Eucalyptus loxophleba* subsp. *loxophleba*, (*Allocasuarina huegeliana*) low woodland over *Austrostipa trichophylla*, *Neurachne alopecuroidea*, *Caesia alfordii* scattered grasses and herbs with *Gilberta tenuifolia*, *Podolepis* sp. open annual herbland to annual herbland with *Dioscorea hastifolia* scattered lianes. Quadrat ERG17, Eastern Ridge).



Photograph 26. El.2 *Eucalyptus loxophleba* subsp. *loxophleba*, *Acacia acuminata* subsp. *acuminata* low open woodland over *Cheilanthes adiantoides* fernland with *Gilberta tenuifolia*, *Podolepis lessonii*, *Hyalosperma glutinosum* subsp. *glutinosum* annual herbland. (Quadrat GH7, Gardiner's Hill).



Photograph 27. El.2 *Eucalyptus loxophleba* subsp. *loxophleba* low woodland over *Schoenus clandestinus* scattered sedges and *Borya sphaerocephala* (1-2%), *Waitzia nitida, Gilberta tenuifolia, Podolepis lessonii, Hyalospermum glutinosum* ssp. *glutinosum* open herbland with **Avena barbata*, *Austrodanthonia* sp, *Austrostipa scabra* scattered grasses to very open grasslands. Releve RM3, R Manning's).



Photograph 28. El.4 *Eucalyptus loxophleba* subsp. *loxophleba* low scattered trees over *Schoenia cassiniana, Brunonia australis* annual herbland. (Quadrat ERG23, Eastern Ridge).



Photograph 29. El.4 *Eucalyptus loxophleba* subsp. *loxophleba* low woodland over *Allocasuarina campestris* scattered tall shrubs over *Brunonia australis*, *Podolepis lessonii*, *Waitzia* sp. annual herbland. (Quadrat ERG22, Eastern Ridge).



Photograph 30. EoTd.1 *Eucalyptus obtusiflora* mallee scrub to closed mallee scrub over *Trymalium daphnifolium*, *Acacia erinacea* shrubland over *Austrodanthonia setacea*, *Austrostipa elegantissima* scattered low grasses. (Quadrat CH14, Cairn Hill Reserve).



Photograph 31. Ew.2 *Eucalyptus wandoo* subsp. *wandoo* low mallee woodland over *Allocasuarina campestris* high shrubland to open scrub over *Dichopogon capillipes* scattered herbs and **Ehrharta longiflora* open annual grassland. (Quadrat ERG16, Eastern Ridge).



Photograph 32. EwDi.1 *Eucalyptus wandoo* subsp. *wandoo* scattered low trees/trees over *Allocasuarina huegeliana* low woodland over *Dodonaea inaequifolia*, *Santalum acuminatum* scattered tall shrubs to high open shrubland over *Trymalium ledifolium* var. *rosmarinifolium*, *Xanthosia fruticulosa* low open shrubland over *Desmocladus flexuosus* low open sedgeland. (Quadrat CH10, Cairn Hill Reserve).



Photograph 33. EwTl.1 *Eucalyptus wandoo* subsp. *wandoo* open woodland over *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* low open woodland over *Xanthorrhoea drummondii* open shrubland over *Trymalium ledifolium* var. *rosmarinifolium* low open shrubland over open fern/grassland. (Quadrat GH6, Gardiner's Hill).



Photograph 34. KpAhB.1 *Allocasuarina huegeliana* scattered low trees over *Kunzea praestans*, *Allocasuarina campestris* high shrubland over *Melaleuca calyptroides* shrubland over *Baeckea* sp. Moora (R. Bone 1993/1) low open shrubland over scattered grassland/sedgeland with scattered herbs. (Quadrat CH9, Cairn Hill Reserve).



Photograph 35. KpAhDs.1 *Allocasuarina huegeliana*, (*Acacia acuminata* subsp. *acuminata*, *Nuytsia floribunda*) low open woodland over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Kunzea praestans* high shrubland over *Hibbertia subvaginata* low open shrubland over *Desmocladus flexuosus* very open sedgeland with *Opercularia vaginata* open herbland and open annual grassland. (Releve RM13, R. Manning's).



Photograph 36. KpDs.1 *Nuytsia floribunda* scattered low trees over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Kunzea praestans* high shrubland over *Hibbertia subvaginata*, *Calytrix leschenaultii* low shrubland to shrubland over *Desmocladus flexuosus* very open sedgeland and **Avena barbata* open grassland. (Releve D9, P&L Doblestein's).



Photograph 37. KpDsMc.1 *Allocasuarina huegeliana*, *Acacia acuminata* subsp. *acuminata* scattered low trees over *Kunzea praestans*, (*Xanthorrhoea drummondii*) high open shrubland over *Melaleuca calyptroides* scattered shrubs over *Hibbertia subvaginata* low open shrubland over **Avena barbata*, **Pentaschistis pallida*, **Vulpia myuros* var. *hirsuta* annual grassland. (Quadrat JT1, J&J Tonkin's).



Photograph 38. KpDsMc.2 *Kunzea praestans*, (*Dryandra sessilis* var. sessilis, *Xanthorrhoea drummondii*) high shrubland over *Melaleuca calyptroides* open shrubland over *Hibbertia subvaginata* low shrubland over *Desmocladus flexuosus*, *Stylidium septentrionale* scattered sedges and herbs. (Quadrat JT3, J&J Tonkin's).



Photograph 39. KpDsMc.2 *Kunzea praestans* high shrubland over *Hibbertia subvaginata*, (*Calytrix leschenaultii*) low shrubland over *Desmocladus flexuosa*, *Stylidium septentrionale* scattered sedges and herbs. (Quadrat JT11, J&J Tonkin's).



Photograph 40. KpDsMc.3 *Allocasuarina huegeliana* (*Acacia acuminata*) low woodland over *Kunzea praestans*, *Xanthorrhoea drummondii* high open shrubland to high shrubland over *Melaleuca calyptroides* low open shrubland over *Opercularia vaginata* herbland and low annual herbland/grassland. (Quadrat GH4, Gardiner's Hill).



Photograph 41. KpDsMc.3 *Allocasuarina huegeliana* low woodland to low open forest over *Dryandra sessilis* var. *sessilis* scattered tall shrubs over *Xanthorrhoea drummondii, Kunzea praestans* open shrubland to tall open shrubland over *Calytrix leschenaultii* scattered low shrubs to low open shrubland over annual herb/grassland. (Quadrat GH8, Gardiner's Hill).



Photograph 42. KpHs.1 *Kunzea praestans* high shrubland over *Hibbertia subvaginata* shrubland over *Stypandra glauca* very open herbland over *Cheilanthes adiantoides* very open fernland with *Dioscorea hastifolia* open herbland. (Quadrat ERG21, Eastern Ridge).



Photograph 43. KpHs.1 *Acacia acuminata* subsp. *acuminata* scattered low trees over *Kunzea praestans* high shrubland over *Hibbertia subvaginata* shrubland. (Quadrat JT10, J&J Tonkin's).



Photograph 44. Lp.1 *Xanthorrhoea drummondii* open shrubland over *Lepidosperma pubisquameum* sedgeland with *Podolepis* sp., *Thysanotus manglesianus*, *Stypandra glauca* annual herbland with **Avena barbata*, **Aira caryophyllea* open annual grassland. (Quadrat ERG19, Eastern Ridge).



Photograph 45. Mc.4 *Allocasuarina huegeliana* scattered low trees over *Kunzea praestans, Xanthorrhoea drummondii* high open shrubland to high shrubland over *Melaleuca calyptroides* open heath over *Stylidium septentrionale, Desmocladus flexuosus* low open herb/sedgeland. (Quadrat JT4, J&J Tonkin's).



Photograph 46. Mc.4 *Allocasuarina huegeliana, Acacia acuminata* subsp. *acuminata* scattered low trees over *Kunzea praestans*, (*Dryandra sessilis*) scattered tall shrubs over *Melaleuca calyptroides*, (*Allocasuarina campestris*) open heath over *Calytrix leschenaultii* low open shrubland over *Desmocladus flexuosa, Stylidium septentrionale* scattered sedges and herbs. (Quadrat JT7, J&J Tonkin's).



Photograph 47. RmAh.1 *Allocasuarina huegeliana* low open woodland over *Regelia megacephala* open scrub over *Xanthosia fruticulosa*, *Hibbertia subvaginata* low open shrubland over *Stypandra glauca*, *Dichopogon capillipes* very open herbland. (Quadrat CH15, Cairn Hill Reserve).



Photograph 48. RmDs.1 *Regelia megacephala*, (*Dryandra sessilis* var. *sessilis*) open scrub over *Hibbertia subvaginata* scattered low shrubs over *Cheilanthes adiantoides* very open fernland with *Dioscorea hastifolia* very open lianes. (Quadrat GH9, Gardiner's Hill).



Photograph 49. RmKp.2 *Regelia megacephala*, *Kunzea praestans* high shrubland over *Xanthosia fruticulosa* low open shrubland over *Borya sphaerocephala* open herbland. (Quadrat CH7, Cairn Hill Reserve).



Photograph 50. RmKp.2 *Regelia megacephala* (*Kunzea praestans*) open scrub over *Allocasuarina campestris* scattered shrubs over *Hibbertia subvaginata*, *Xanthosia fruticulosa* low open shrubland over *Stypandra glauca* very open herbland with *Dioscorea hastifolia* very open lianes. (Quadrat CH11, Cairn Hill Reserve).



Photograph 51. RmKpMc.2 *Acacia acuminata* subsp. *acuminata, Allocasuarina huegeliana* scattered low trees over *Regelia megacephala, Kunzea praestans* high shrubland over *Melaleuca calyptroides* shrubland over *Desmocladus flexuosus* scattered sedges and **Briza maxima, Podotheca angustifolia* very open annual grass/herbland. (Quadrat JT8, J&J Tonkin's).



Photograph 52. RmKpMc.2 *Allocasuarina huegeliana* scattered low trees over *Regelia megacephala* tall open shrubland to tall shrubland over *Melaleuca calyptroides* open shrubland over *Calytrix leschenaultii* scattered low shrubs over *Borya sphaerocephala* low open herbland and *Podolepis canescens*, **Ursinia anthemoides* scattered annual herbs. (Quadrat GH2, Gardiner's Hill).



Photograph 53. RmKpMc.2 *Regelia megacephala* open scrub over *Kunzea praestans, Melaleuca calyptroides* shrubland over *Hibbertia subvaginata, Calytrix leschenaultii* scattered low shrubs over *Borya sphaerocephala, Neurachne alopecuroidea* very open low herbland/grassland. (Quadrat GH3, Gardiner's Hill).



Photograph 54. RvAh.1 *Allocasuarina huegeliana* (15-20%), *Acacia acuminata* subsp. *acuminata* (3-5%) low open woodland to low woodland over *Allocasuarina campestris, Xanthorrhoea drummondii* scattered tall shrubs over *Ricinocarpus velutinus* open heath over scattered sedges and *Austrostipa mollis* scattered grasses and herbs. (Releve RM2, R. Manning's).



Photograph 55: *Eucalyptus pruiniramis* (DRF) (P&J Gardiner's property).



Photograph 56. Exploration pit, north end of Eastern Ridge, with quadrat **ERG21** behind and to the left of the pit.



Photograph 57. *Acacia aristulata* (DRF) shrub.



Photograph 58. *Acacia aristulata*.